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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	09/09/2014	RE45117	Q129473	1081

23373 7590 08/20/2014

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

Joon Kang, Seoul, KOREA, REPUBLIC OF;
Jin Hyun Cho, Seoul, KOREA, REPUBLIC OF;
Jeong Su Lim, Suwon-si, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** 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)

23373

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, NW
SUITE 800
WASHINGTON, DC 20037

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.
13/403,559	02/23/2012	Joon KANG	Q129473	1081

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
reissue	Undiscounted	$960	$0	$0	$960	07/29/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
DATSKOVSKIY, MICHAIL V	2835	361-692000

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.

1 Sughrue Mion, PLLC
2
3

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: **SAMSUNG ELECTRONICS CO., LTD.**

(B) RESIDENCE: (CITY and STATE OR COUNTRY): **Suwon-si, Republic of Korea**

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.
☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 19-4880 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
☐ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
☐ Applicant changing to regular undiscounted fee status — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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	/Chidambaram.S.Iyer/43355	Date	July 28, 2014
Typed or Printed Name	*for* S. Stuart Lee	Registration No.	61,124

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

23373 7590 04/29/2014

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER
DATSKOVSKIY, MICHAIL V

ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 04/29/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	07/29/2014

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 ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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.

PTOL-85 (Rev. 02/11)

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 3 of 305

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23373 7590 04/29/2014
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

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EXAMINER	ART UNIT	CLASS-SUBCLASS
DATSKOVSKIY, MICHAIL V	2835	361-692000

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- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
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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.
1 _____
2 _____
3 _____

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

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.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
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NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 4 of 305

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 04/29/2014

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	

ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 04/29/2014

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

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.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 5 of 305

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 13/403,559	Applicant(s) KANG ET AL.	
	Examiner MICHAIL V. DATSKOVSKIY	Art Unit 2835	AIA (First Inventor to File) Status No

-- 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 *04/10/2014*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-23*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   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. *11/872,057* .
   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.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ 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)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☒ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MICHAIL V DATSKOVSKIY/ Primary Examiner, Art Unit 2835	04/18/2014

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 7 of 305

1. The present application is being examined under the pre-AIA first to invent provisions.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Christopher J. Bezak, Reg. No. 63,241 on 04/18/2014.

The application has been amended as follows: In claim 11, line 20: after the words "second space located" insert the words "at an internal space of the circuit board mounting part".

3. The following is an examiner's statement of reasons for allowance: The following is an examiner's statement of reasons for allowance: Claims 1-23 are allowed due to the applicant's amendment and arguments filed on 01/10/2014. Examiner agrees that by amending the claim 11 applicant has overcome the rejection of the claims 11-23 under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based, submitted by examiner in the Office Action from 04/30/2013; and submitted on 01/10/2014 an appropriate cumulative reissue oath/declaration pursuant to 37 CFR 1.175(b)(1).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.” 4.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAIL V. DATSKOVSKIY whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

04/18/2014
/MICHAIL V DATSKOVSKIY/
Primary Examiner, Art Unit 2835

Application Number	Application No.	Applicant(s)
	13403559	KANG et al.
	Notice of Reissue Published in OG on 03/20/2012	

Original Patent Number of Patent To Be Reissued is 7667964	The Maintenance fee status is: ☒ up to date. ☐ not required.

This reissue patent is subject to A Terminal Disclaimer that:

☐ was filed during the prosecution of the reissue application.
☐ was of record prior to the filing of the reissue application.

Physical surrender of the letters patent

☐ was made.
☐ was not made, but a statement of loss/inaccessibility was provided.
☒ is not required

Final SPRE Review

/Karl Tamai/ Digitally signed by /Karl Tamai/ DN: cn=/Karl Tamai/, o, ou=TC 2800 TQAS Detailee, email=karl.tamai@uspto.gov, c=US Date: 2014.04.21 12:03:14 -04'00'

(INITIALS)

4/21/2014

(DATE)

U.S. Patent and Trademark Office

RESPONSE UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
GROUP 2835
PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

SUPPLEMENTAL RESPONSE UNDER 37 C.F.R. § 1.116

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

Sir:

In further response to the Office Action dated October 10, 2013, please consider the remarks as submitted herewith on the accompanying pages.

TABLE OF CONTENTS

REMARKS 2

REMARKS

Applicant submits herewith a Supplemental Declaration for Reissue Application.

A Notice of Appeal is being concurrently submitted only should any deficiency of the Supplemental Declaration be determined by the Examiner, to maintain proper pendency of the application.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

SUGHRUE MION, PLLC
Telephone: 202.293.7060
Facsimile: 202.293.7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 10, 2014

Petitioner Manufacturing Resources International, Inc.
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SUPPLEMENTAL DECLARATION FOR REISSUE PATENT APPLICATION TO CORRECT "ERRORS" STATEMENT (37 CFR 1.175)

Docket Number	Q129473
First Named Inventor	Joon KANG
COMPLETE	
Application Number	13/403,559
Filing Date	February 23, 2012
Art Unit	2835
Examiner Name	DATSKOVSKIY, MICHAIL V

We hereby declare that:

Every error in the patent which was corrected in the present reissue application, and which is not covered by the prior oath(s) and/or declaration(s) submitted in this application, arose without any deceptive intention on the part of the applicant.

Specifically, errors were corrected in Amendments filed on November 13, 2012, April 17, 2013, September 24, 2013, and January 10, 2014, to correct various errors in independent claim 11 to recite a "module" and a "circuit board mounting part," further clarify aspects of the "circuit board" and "heat generating side" thereof, configuration of the cooling paths, "rear cover case," and "circuit substrate"; clarify the "display panel"; to recite a "circuit board mounting part" and location "at an internal space of the circuit board mounting part"; and recite the "rear case," respectively.

We hereby declare that all statements made herein of my/our 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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])	Family Name or Surname	
Joon	KANG	
Inventor's Signature	Date	2014.4.4
Name of Second Inventor:	☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])	Family Name or Surname	
Jin Hyun	CHO	
Inventor's Signature	Date	2014.4.4
Name of Second Inventor:	☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])	Family Name or Surname	
Jeong Su	LIM	
Inventor's Signature	Date	2014.4.4

☐ Additional inventors or legal representative(s) are being named on the _____ supplemental sheets attached hereto.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 14 of 305

NOTICE OF APPEAL FROM THE EXAMINER TO THE PATENT TRIAL AND APPEAL BOARD	Docket Number Q129473 Confirmation Number 1081

I hereby certify that this correspondence is being facsimile transmitted to the USPTO, EFS-Web transmitted to the USPTO, or deposited with the United States Postal Service with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____ Signature _____ Typed or printed name	In re Application of Joon KANG, et al.	
	Application Number 13/403,559	Filed February 23, 2012
	For PANEL TYPE DISPLAY DEVICE	
	Art Unit 2835	Examiner DATSKOVSKIY, MICHAIL V

Applicant hereby **appeals** to the Patent Trial and Appeal Board from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 41.20(b)(1)) $800.00

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: _____

☑ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

☐ A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is enclosed.

CORRESPONDENCE ADDRESS

Direct all correspondence to the address for SUGHRUE MION, PLLC filed under the Customer Number listed below:

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

I am the

☐ applicant/inventor.

☐ 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)

☑ attorney or agent of record. Registration number 63,241

☐ attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

/ Christopher J. Bezak /
Signature

Christopher J. Bezak
Typed or printed name

202.293.7060
Telephone number

April 10, 2014
Date

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*.

☑ *Total of 2 forms submitted.

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 01/29/2014

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

NOTIFICATION DATE	DELIVERY MODE
01/29/2014	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PPROCESSING@SUGHRUE.COM
sughrue@sughrue.com
USPTO@sughrue.com

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 13/403,559	**Applicant(s)** KANG ET AL.	
	Examiner MICHAIL V. DATSKOVSKIY	**Art Unit** 2835	**AIA (First Inventor to File) Status** No

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

THE REPLY FILED 10 January 2014 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☒ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: .
    Claim(s) objected to: .
    Claim(s) rejected: 1-23.
    Claim(s) withdrawn from consideration: .

01/23/2014	/MICHAIL V DATSKOVSKIY/ Primary Examiner, Art Unit 2835

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 17 of 305

Claims 1-23 are still rejected as being based upon a defective reissue application under 35 U.S.C. 251. See 37 CFR 1.175. The nature of the defect is set forth below. Receipt of an appropriate supplemental oath/declaration will overcome this rejection. An example of acceptable language to be used in the supplemental oath/declaration is as follows: "Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant." See MPEP § 1414.01.

The claims were amended 1/10/14 (removed cover in claim 11), 9/24/13 (added mounting part and internal space on the circuit board mounting part), 4/17/13 (added rear case), 11/13/12 (added module, circuit board mounting part, etc..). All of these changes are errors that the applicant must state were made without deceptive intent.

See MPEP 1444.II. Supplemental declaration.
"During the prosecution of a reissue application, amendments are often made and additional errors in the patent are corrected. A supplemental oath/declaration need not be submitted with each amendment and additional correction. Rather, it is suggested that the reissue applicant wait until the case is in condition for allowance, and then submit a cumulative supplemental reissue oath/declaration pursuant to 37 CFR 1.175(b)(1)."

Petitioner Manufacturing Resources International, Inc.
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AMENDMENT UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
GROUP 2835
PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

AMENDMENT UNDER 37 C.F.R. § 1.116

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

Sir:

In response to the Office Action dated October 10, 2013, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

LISTING OF THE CLAIMS 2

REMARKS 9

LISTING OF THE CLAIMS

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

Petitioner Manufacturing Resources International, Inc.
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4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (original): A panel display device comprising:

Petitioner Manufacturing Resources International, Inc.
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a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

Petitioner Manufacturing Resources International, Inc.
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Please add the following new claims, as follows (the entire text of new claims 11-23 is presented in underline, in accordance with 37 C.F.R. §§ 1.173(b)-(d)):

11. (fourthly amended): A panel display device comprising:

a display panel;

a front case configured to be disposed in front the display panel and adapted for viewing of a screen portion of the display panel;

a rear case coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;

wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,

wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and in front the rear case, and

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 23 of 305

wherein the rear case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

12. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit.

13. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

14. (previously presented): The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part.

Petitioner Manufacturing Resources International, Inc.
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15. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region.

16. (previously presented): The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

18. (previously presented): The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

19. (previously presented): The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located.

20. (previously presented): The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 25 of 305

one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

23. (previously presented): The panel display device as claimed in claim 11, wherein the first and second cooling fluid paths are entirely separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path entirely prohibited.

Petitioner Manufacturing Resources International, Inc.
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REMARKS

Claims 1-23 are all the claims pending in the application. By this Amendment, Applicant amends claim 11 to cure the minor informality identified in the Office Action, as shown below. In accordance with 37 C.F.R. § 1.173(c), support for the amendment to claim 11 may be at least found at U.S. Patent 7,667,964: col. 2, l. 65 – col. 3, l. 7.

Claim Objections

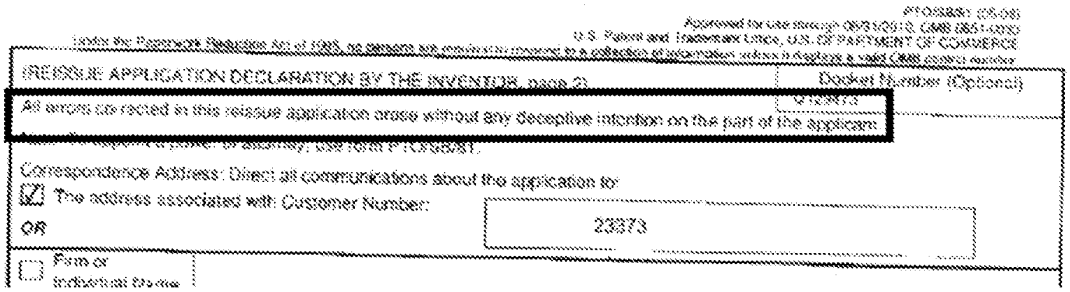
Claim 11 is objected to because there is insufficient antecedent basis for the term "rear cover case" in line 22.

Applicant amends claim 11 to recite "the rear ~~cover~~ case" in line 22, and respectfully requests the Examiner to withdraw the objection in view of the self-explanatory amendment.

Claim Rejections – 35 U.S.C. § 251

Claims 1-23 are rejected as being based upon a defective reissue application under 35 U.S.C. § 251 for failure to submit a Declaration in accordance with 37 C.F.R. § 1.75(b)(1).

Applicant respectfully submits the Declaration (Form PTO/SB/51) submitted on February 23, 2012, fully complies with 37 C.F.R. § 1.75(b)(1), as shown below (emphasis added):


(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)
Docket Number (Optional)
All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant.
Correspondence Address: Direct all communications about the application to:
The address associated with Customer Number:
OR
23373
Firm or

Accordingly, Applicant respectfully requests the Examiner to withdraw the rejection.

Petitioner Manufacturing Resources International, Inc.
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Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: January 10, 2014

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 28 of 305

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 10/10/2013

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	

ART UNIT	PAPER NUMBER
2835	

NOTIFICATION DATE	DELIVERY MODE
10/10/2013	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PPROCESSING@SUGHRUE.COM
sughrue@sughrue.com
USPTO@sughrue.com

Office Action Summary	Application No. 13/403,559	Applicant(s) KANG ET AL.	
	Examiner MICHAIL V. DATSKOVSKIY	Art Unit 2835	AIA (First Inventor to File) Status No

-- 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 _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *1-23* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-23* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ 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).

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).

Certified copies:

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)).

* 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) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Objections

2. Claim 11 is objected to because of the following informalities: Claim 11 recites the term "rear cover case" in line 22. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required. Examiner recommends eliminating the word “cover”.

3. In accordance with pre-AIA 37 CFR 1.175(b)(1), for applications filed before September 16, 2012, a supplemental reissue oath/declaration must be received before this reissue application can be allowed.

Claims 1-23 are rejected as being based upon a defective reissue application under 35 U.S.C. 251. See 37 CFR 1.175. The nature of the defect is set forth above.

Receipt of an appropriate supplemental oath/declaration will overcome this rejection. An example of acceptable language to be used in the supplemental oath/declaration is as follows:

“Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant.”

See MPEP § 1414.01.

Conclusion

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAIL V. DATSKOVSKIY whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

10/04/2013
/MICHAIL V DATSKOVSKIY/
Primary Examiner, Art Unit 2835

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SEP 24 2013

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

SUPPLEMENTAL AMENDMENT UNDER 37 C.F.R. § 1.111

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

Sir:

Supplemental to the Amendment under 37 C.F.R. § 1.111 filed August 30, 2013, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE CLAIMS 2

REMARKS 9

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SUPPLEMENTAL AMENDMENT UNDER 37 C.F.R. § 1.111 Attorney Docket No.: Q129473
Appln. No.: 13/403,559

AMENDMENTS TO THE CLAIMS

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

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for

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covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

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Petitioner Manufacturing Resources International, Inc.
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8. (original): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

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10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

Please add the following new claims, as follows (the entire text of new claims 11-23 is presented in underline, in accordance with 37 C.F.R. §§ 1.173(b)-(d)):

11. (thrice amended): A panel display device comprising:

a display panel;

a front case configured to be disposed in front the display panel and adapted for viewing of a screen portion of the display panel;

a rear case coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;

wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,

wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board mounting part and the second cooling fluid

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path comprises a second space located at an internal space of the circuit board mounting part behind the heat-generating side of the circuit board and in front the rear case, and

wherein the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

12. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit.

13. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

14. (previously presented): The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part.

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15. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region.

16. (previously presented): The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

18. (previously presented): The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

19. (previously presented): The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located.

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20. (previously presented): The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

23. (previously presented): The panel display device as claimed in claim 11, wherein the first and second cooling fluid paths are entirely separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path entirely prohibited.

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SUPPLEMENTAL AMENDMENT UNDER 37 C.F.R. § 1.111 Attorney Docket No.: Q129473
Appln. No.: 13/403,559

REMARKS

Claims 1-23 are all the claims pending in the application. By this Amendment, Applicant amends claim 11 to recite "wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board mounting part and the second cooling fluid path comprises a second space located at an internal space of the circuit board mounting part behind the heat-generating side of the circuit board and in front the rear case," as discussed during the interview of September 12, 2013. In accordance with 37 C.F.R. § 1.173(c), support for the amendment to claim 11 may be at least found at U.S. Patent 7,667,964: col. 3, ll. 22-27.

Claim Rejections – 35 U.S.C. § 251

Claims 11-23 are rejected under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. Applicant respectfully traverses the rejections.

Independent claim 11 recites *inter alia* (emphasis added):

> wherein *the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited*,
>
> a *circuit board mounting part provided on the rear case* and adapted for mounting the circuit substrate thereto;
>
> ...
>
> wherein the first cooling fluid path comprises *a first space located behind a rear surface of the display panel and in front of the circuit board mounting part and the second cooling fluid path comprises a second space located at an internal space of the circuit board mounting part behind the heat-generating side of the circuit board and in front the rear case*.

Whereas patented claims 1-10 are directed to a first embodiment illustrated in FIG. 1, such limitations directed to the alternative embodiment illustrated in FIG. 3 are not evidenced in

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the claims or prosecution history of U.S. Patent 7,667,964, and are therefore directed to overlooked aspects (MPEP § 1412.02(V)).

Such limitations are also narrowing. In the Office Action, the rejection identifies omission of "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part" as the basis of the impermissible recapture rejection under 35 U.S.C. § 251. More particularly, the rejection identifies the omission of the term "partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part."

Applicant respectfully submits that the combination of features recited in claim 11 narrows the subject matter of claim 11. This is because, while patented claim 1 recites only that the circuit board mounting part is "partitioned from a space in which the display panel is mounted," claim 11 requires that the circuit board mounting part *forms the basis upon which the cooling paths are separated such that "air flow from the second cooling fluid path to the first cooling fluid path is prohibited*." That is to say, the circuit board mounting part of claim 11 forms the physical structure by which air flow between cooling paths is prohibited ("wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and *in front of the circuit board mounting part* and the second cooling fluid path comprises a second space located *at an internal space of the circuit board mounting part* behind the heat-generating side of the circuit board and in front the rear case"). On the other hand, the circuit board mounting part of patented claim 1 simply requires that "the second cooling fluid path includes an internal space of the circuit board mounting part," and does not require the structural separation between the cooling paths recited by claim 11.

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As a result, because the limitations of claim 11 are narrowing and directed to overlooked aspects, Applicant submits that reissue claim 11 and its dependent claims satisfy 35 U.S.C. § 251, and respectfully requests reconsideration and withdrawal of the rejections.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: September 24, 2013

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

AMENDMENT UNDER 37 C.F.R. § 1.111

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

Sir:

In response to the Office Action dated April 30, 2013, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

LISTING OF THE CLAIMS 2

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LISTING OF THE CLAIMS

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

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4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (original): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

Petitioner Manufacturing Resources International, Inc.
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at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

11. (previously presented): A panel display device comprising:

a display panel;

a front case configured to be disposed in front the display panel and adapted for viewing of a screen portion of the display panel;

a rear case coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

Petitioner Manufacturing Resources International, Inc.
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a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;

wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,

wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and in front the rear case, and

wherein the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

12. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

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wherein the at least heat-generating components facing away from the display panel comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit.

13. (previously presented): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

14. (previously presented): The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part.

15. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region.

16. (previously presented): The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

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18. (previously presented): The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

19. (previously presented): The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located.

20. (previously presented): The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

23. (previously presented): The panel display device as claimed in claim 11, wherein the first and second cooling fluid paths are entirely separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path entirely prohibited.

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REMARKS

Claims 1-23 are all the claims pending in the application. No amendments to claims 1-23 are presented.

Claim Rejections – 35 U.S.C. § 251

Claims 11-23 are rejected under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. Applicant respectfully traverses the rejections.

MPEP § 1412.02(V) ("REBUTTAL BY THE REISSUE APPLICANT") describes that the recapture may be rebutted by demonstrating that the claim includes one or more limitations that "materially narrow" the claims, as shown below:

> The reissue applicant may rebut a recapture rejection by demonstrating that a claim rejected for recapture includes one or more claim limitations that "materially narrow" the reissue claims. A limitation is said to "materially narrow" the reissue claims if the narrowing limitation is directed to one or more "overlooked aspects" of the invention. Hester, 142 F.3d at 1482-83, 46 USPQ2d at 1649-50. The inclusion of such a limitation in a claim rejected for recapture will overcome the recapture rejection. A limitation that had been prosecuted in the original patent application is not directed to "overlooked aspects" of the disclosed invention and will not overcome the recapture rejection.

Applicant respectfully submits that reissue claim 11 includes limitations that materially limits reissue claim 11.

At page 2 of the Office Action ("Response to Arguments"), the rejection is based on the position that limitations related to the front and rear cases cannot constitute overlooked limitations because patented claim 2 describes front and rear cases. Additionally, the rejection is

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based on the assertions that recitation of the "circuit board mounting part provided on the rear case," a first cooling path behind the display panel and in front of the circuit board, and a second cooling path behind the circuit board and in front of the rear case are not materially narrowing because such limitations are described in U.S. Patent 7,667,964, U.S. Patent 6,198,222, U.S. Patent 4,980,842, and U.S. Patent 7,164,586.

Patented claim 2 recites *inter alia*:

> wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

On the other hand, independent claim 11 recites *inter alia* (emphasis added):

> wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,
>
> …
>
> wherein the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and
>
> wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

During prosecution of U.S. Application No. 11/872,057, the Examiner rejected patented claim 2 on prior art grounds over Chang (U.S. patent 6,198,222) and Lin (U.S. Patent 7,164,586). In the Non-Final Office Action mailed on July 11, 2012, the Examiner rejected the "front case…" and "rear case…" recited in reissue claim 11 again over Chang. Applicant subsequently amended reissue claim 11 to recite the combination of features shown above including "wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case," in the Amendment under

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37 C.F.R. § 1.111 filed on November 13, 2012. In the Final Office Action mailed on January 17, 2013, the rejections over Chang were withdrawn, and the claims are not rejected over Chang in the present Non-Final Office Action mailed on April 30, 2013.

Because patented claim 2 and reissue claim 11 were previously rejected over Chang, and reissue claim 11 is now patentable over Chang, Applicant respectfully submits that the combination of (now patentable) features recited in claim 11 *prima facie* materially narrow reissue claim 11. Specifically, as shown above, claim 11 recites "wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case" and such limitation (alone or in combination with additional features of reissue claim 11) renders reissue claim 11 patentable over the prior art. Such limitations are therefore necessarily materially narrowed with respect to patented claim 1 (and patented claim 2), as evidenced by the patentability of reissue claim 11 over the prior art.

Particularly, with respect to the features recited in reissue claim 11, Applicant respectfully submits that the limitations of patented claim 1 are overly narrowed with respect to the prior art. Claim 11 now recites modified limitations of claim 1 that are broader than that of the patented claim 1, yet still materially narrowing with respect to the original claim, and hence the recapture rule does not bar reissue. *In re Youman*, 679 F.3d 1335 (Fed. Cir. May 8, 2012 ("the Board has already determined that the added limitation…has not been eliminated; rather, it has been broadened…Such modification does not instantly implicate the recapture rule bar…rather, such a broadening modification must be evaluated to determine if it materially narrows relative to the original claim such that the surrendered subject matter is not entirely or substantially recaptured…"). Because the limitations of claim 11 are materially narrowing,

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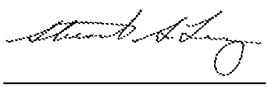
Applicant submits that reissue claim 11 and its dependent claims satisfy 35 U.S.C. § 251, and respectfully requests reconsideration and withdrawal of the rejections.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Reg. No. 61,474

for

Christopher J. Bezak
Registration No. 63,241

SUGHRUE MION, PLLC
Telephone: 202.293.7060
Facsimile: 202.293.7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: August 30, 2013

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 04/30/2013

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

NOTIFICATION DATE	DELIVERY MODE
04/30/2013	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@sughrue.com
sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM

Office Action Summary	Application No. 13/403,559	Applicant(s) KANG ET AL.	
	Examiner MICHAIL V. DATSKOVSKIY	Art Unit 2835	AIA (First Inventor to File) Status No

-- 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 *17 April 2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *1-23* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-23* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ 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).

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).

Certified copies:

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)).

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

Interim copies:

a)☐ All b)☐ Some c)☐ None of the: Interim copies of the priority documents have been received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/17/2013 with respect to the rejection of the claims 11-22 under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based have been fully considered but they are not persuasive. Applicant argues the front and rear cases were overlooked in the original prosecution. This is not persuasive because issued claim 2 clearly shows the front and rear cases were originally considered part of the invention and claimed by the applicant.
Applicant argues that the narrowing limitations from the original patent are included in claim 11, therefore no recapture (applicant's arguments pg. 13). Cited in the parent US Patent 7,667,964 Chang (6,198,222); Griffin et al (4,980,842); and Lin (7,164,586) each discloses the applicant's argued narrowing limitation: circuit board mounting part on the rear case, with first cooling path behind the display panel and in front of the circuit board and second cooling path behind the circuit board and in front of the rear case.
Therefore, the modified limitation of claim 11 is not materially narrowing (see in re Youman, 102 USPQ2d 1862, at 1870.), and the rejection of the claims 11-22 under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue based stays.

Claim Objections

2. Claim 11 is objected to because of the following informalities: Claim 11 recites the term "rear cover case" in line 22. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

3. Claims 11-23 are rejected under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. A claim is broader in scope than the original claims if it contains within its scope any conceivable product or process which would not have infringed the original patent. A claim is broadened if it is broader in any one respect even though it may be narrower in other respects. See *North American Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 75 USPQ2d 1545 (Fed. Cir. 2005); *Pannu v. Storz Instruments Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001); *Hester Industries, Inc.* v. *Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998); *In re Clement,* 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997)*; Ball Corp.* v. *United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 295 (Fed. Cir. 1984). A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application for the patent shows that the broadening aspect (in the reissue) relates to claim subject matter that applicant previously surrendered during the prosecution of the application for the patent. Accordingly, the narrow scope of the claims in the patent was not an error within the meaning of 35 U.S.C. 251, and the broader scope of claim subject matter surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application. New claim 11 is

broader than the original patent claim 1. The original patent claim was rejected under 102(b) as anticipated by Chang (see Non-Final Rejection mailed on 1/29/2009 in 11/872057). The applicants amended claim 1 to overcome the rejection of the claim (see amendment filed on 4/29/2009). The broadening aspects of claim 11 relate to the case, the circuit board mounting part, and the first and second cooling fluid paths, and these broadening aspects appear to be within the amendments made to overcome the rejection in the original prosecution. Accordingly, this broadening reissue constitutes recapture.

The new 11 is still broader than the original patent claim 1 by deleting portions of the limitation: the “circuit board mounting part” being “partitioned from a space in which the display panel is mounted” and “the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case” and “the second cooling fluid path includes an internal space of the circuit board mounting part", wherein the partitioning, first, and second cooling paths seem to be argued in the parent patent (see applicant’s arguments 4/29/09 and reason for allowance 1/29/09) to distinguish over the prior art. (see original patent claim 1 in US Pat. 7667964).

From the prosecution record of the original application (11/872057), the examiner rejected claim 1 under 35 USC 102(b) as anticipated by Chang (US6198222) and objected to claim 8, which depended from claim 1, as containing allowable subject matter. See Non-Final Rejection mailed on 1/29/2009.

In response to the rejection, the applicant amended independent claim 1 (which is also patent claim 1) to include the limitations of claim 8 and recite “***wherein the case***

includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…,the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" arguing about the patentability of these limitations over the prior art of record. See p.2/claim 1 and p.6/ll.21-26 of the amendment filed on 4/29/2009.

In response to the amendment, the examiner allowed claim 1. See Notice of Allowance mailed on 5/7/2009.

Thus, the limitation in the patent claims of "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…, the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" was surrendered in the original application to obtain the original patent. Portions of this limitation, however, are now deleted from new claim 11.

The recapture rule cannot be avoided since the newly added claim 11 was not materially narrower in other aspects of the claimed invention (see MPEP 1412.I.C).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAIL V. DATSKOVSKIY whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

04/24/2013
/MICHAIL V DATSKOVSKIY/
Primary Examiner, Art Unit 2835

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Application Number	13/403,559	Filing Date	February 23, 2012	Confirmation Number	1081	Docket Number	Q129473
First Named Inventor	Joon KANG		Examiner Name	DATSKOVSKIY, MICHAIL V		Art Unit	2835
Title	PANEL TYPE DISPLAY DEVICE						

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments attached with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☑ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☐ Do NOT consider the amendment(s)/reply under 37 CFR 1.116 previously filed on _____

☑ Attached

- ☑ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☑ Payment by credit card.

☑ The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

CORRESPONDENCE ADDRESS

Direct all correspondence to the address for SUGHRUE MION, PLLC filed under the Customer Number listed below:

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

SIGNATURE OF REGISTERED U.S. PATENT PRACTITIONER

Signature / Christopher J. Bezak / Date April 17, 2013

Name Christopher J. Bezak Registration No. 63,241

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

AMENDMENT UNDER 37 C.F.R. § 1.114(c)

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

Sir:

In response to the Office Action dated January 17, 2013, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE SPECIFICATION 2

AMENDMENTS TO THE CLAIMS 3

REMARKS 10

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at column 2, line 57, and ending at column 2, line 64, of the specification (U.S. Patent 7,667,964) with the following amended paragraph:

The display panel 20 may be an LCD or a PDP. The circuit substrates 31, 32 and 33 are electrically connected to the display panel 20 through a flexible wiring part 34 ([not]shown in phantom). A plurality of electronic components are mounted on the circuit substrates 31, 32 and 33. The plurality of electronic components constitute a driving circuit for controlling light emission of the display panel 20, a control circuit, a tuning circuit, a power circuit and the like.

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AMENDMENTS TO THE CLAIMS

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

LISTING OF CLAIMS:

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

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3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is

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mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (original): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

Petitioner Manufacturing Resources International, Inc.
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10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

Please add the following new claims, as follows (the entire text of new claims 11-23 is presented in underline, in accordance with 37 C.F.R. §§ 1.173(b)-(d)):

11. (twice amended): A panel display device comprising:

a display panel;

a front case configured to be disposed in front the display panel and adapted for viewing of a screen portion of the display panel;

a rear case coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;

wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,

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wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and in front the rear case, and

wherein the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

wherein the circuit substrate mounted to the rear case and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

12. (twice amended): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit.

13. (twice amended): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

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14. (twice amended): The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part.

15. (twice amended): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region.

16. (previously presented): The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

18. (previously presented): The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

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19. (twice amended): The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located.

20. (previously presented): The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

23. (previously presented): The panel display device as claimed in claim 11, wherein the first and second cooling fluid paths are entirely separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path entirely prohibited.

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REMARKS

By this Amendment, Applicant amends claims 11-15 and 19 to address the rejection under 35 U.S.C. § 112(a) and recite a "display panel ~~module~~." In accordance with 37 C.F.R. § 1.173(c), support for the amendments to claims 11-15, 19, and 23 may be at least found at U.S. Patent 7,667,964: FIGS. 1-2, col. 2, l. 48 - col. 3, l. 41.

Objection to the Specification

The specification is objected to for an improper amendment notation.

Applicant amends the specification, as the Examiner suggests, to recite "a flexible wiring part 34 ([not]shown in phantom)," and respectfully requests the Examiner to withdraw the objection in view of the self-explanatory amendment.

Claim Rejections – 35 U.S.C. § 112

Claims 11-23 are rejected under 35 U.S.C. § 112(a), as failing to comply with the written description requirement.

As discussed above, Applicant amends claims 11-15 and 19 to address the rejection under 35 U.S.C. § 112(a) and recite a "display panel ~~module~~," and respectfully requests the Examiner to withdraw the rejection in view of the self-explanatory amendments.

Claim Rejections – 35 U.S.C. § 251

Claims 11-23 are rejected under 35 U.S.C. § 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. Applicant respectfully traverses the rejection.

At pages 2 to 5 of the Office Action, the rejection is based on the assertions that omission of parts of the limitation "wherein the case includes a circuit board mounting part provided on a

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rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" constitutes an impermissible recapture and that the recapture cannot be avoided since claim 11 was not materially narrowed in other respects.

MPEP § 1412.02(V) ("REBUTTAL BY THE REISSUE APPLICANT") describes that the recapture may be rebutted by demonstrating that the claim includes one or more limitations that "materially narrow" the claims, as shown below:

> The reissue applicant may rebut a recapture rejection by demonstrating that a claim rejected for recapture includes one or more claim limitations that "materially narrow" the reissue claims. A limitation is said to "materially narrow" the reissue claims if the narrowing limitation is directed to one or more "overlooked aspects" of the invention. Hester, 142 F.3d at 1482-83, 46 USPQ2d at 1649-50. The inclusion of such a limitation in a claim rejected for recapture will overcome the recapture rejection. A limitation that had been prosecuted in the original patent application is not directed to "overlooked aspects" of the disclosed invention and will not overcome the recapture rejection.

Applicant respectfully submits that independent claim 11 includes at least one or more limitations that materially limit claim 11.

For example, claim 1 of U.S. Patent 7,667,964 recites a case. On the other hand, claim 11 recites both a "front case" and a "rear case," as shown below:

U.S. Patent 7,667,94	Current Claims
1. A panel display device comprising:	11. A panel display device comprising:
a case;	a **front case** configured to be disposed in front the display panel and adapted for viewing of a screen portion of the display panel;

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	a **rear case** coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

As shown above, claim 11 recites the additional structural limitations of the "front case" and the "rear case." Neither of such limitations are evidenced in the claims or prosecution history of U.S. Patent 7,667,964. Accordingly, because such limitations were not prosecuted during the original patent application that matured into U.S. Patent 7,667,964, such limitations are directed to overlooked aspects that materially narrow claim 11.

Additionally, claim 11 recites additional aspects related to the "rear case," as shown below:

> wherein the circuit substrate is mounted to the **rear case** via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel,
>
> …
>
> wherein the rear cover case and the circuit board mounting part are fixed to each other and the **rear case** is located behind the circuit substrate, and
>
> wherein the circuit substrate mounted to the **rear case** and the display panel moves apart away from each other automatically upon detaching the rear case from the front case.

Again, while claim 11 recites the additional aspects describing the "rear case," such limitations are not evidenced in the claims or prosecution history of U.S. Patent 7,667,964. Accordingly, because such limitations were not prosecuted during the original patent application that matured into U.S. Patent 7,667,964, such limitations are directed to overlooked aspects that materially narrow claim 11.

Last, it is noted, the limitations omitted from claim 1 are not wholly omitted from claim 11, as shown below:

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U.S. Patent 7,667,94	Current Claims
1. A panel display device comprising:	11. A panel display device comprising:
wherein the case includes **a circuit board mounting part** provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, **the first cooling fluid path includes a space** between a rear surface of the display panel and an inner surface of the case, and **the second cooling fluid path includes an internal space** of the circuit board mounting part.	**a circuit board mounting part** provided on the rear case and adapted for mounting the circuit substrate thereto;
	wherein **the first cooling fluid path comprises a first space** located behind a rear surface of the display panel and in front of the circuit board and **the second cooling fluid path comprises a second space** located behind the heat-generating side of the circuit board and in front the rear case

Accordingly, claim 11 does not present a situation in which a surrender-generating limitation is entirely omitted (*see* MPEP § 1412.02(I)(C)(i)(2), "If a claim is presented in a reissue application that omits, in its entirety, the surrender-generating limitation, that claim impermissibly recaptures what was previously surrendered, and that claim is barred under 35 U.S.C. 251").

As such, Applicant respectfully submits (i) the limited nature of the broadening has been demonstrated and (ii) the addition of the significant overlooked aspects materially narrowing reissue claim 11 has also been demonstrated. When taken in conjunction (*see* MPEP § 1412.02(I)(C)(i)(2), "nature of the broadening and narrowing must be examined to determine whether the reissue claims are barred as being recapture of surrendered subject matter"), Applicant submits that claim 11, including (i) the materially narrowing amendments and (ii) the limited broadening aspects, satisfies 35 U.S.C. § 251, and respectfully requests reconsideration and withdrawal of the rejection of claims 11-23 under 35 U.S.C. § 251.

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Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 17, 2013

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

Petitioner Manufacturing Resources International, Inc.
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UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 01/17/2013

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

NOTIFICATION DATE	DELIVERY MODE
01/17/2013	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@sughrue.com
sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM

Office Action Summary	Application No.	Applicant(s)	
	13/403,559	KANG ET AL.	
	Examiner	Art Unit	
	MICHAIL V. DATSKOVSKIY	2835	

-- 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 *13 November 2012*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *1-23* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-23* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ 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).

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) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks, filed 11/13/2012, with respect to claims 1-22 as being rejected based upon a defective reissue oath/declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175. have been fully considered and are persuasive. The rejection of claims 1-22 based upon a defective reissue oath/declaration under 35 U.S.C. 251 has been withdrawn. However, Applicant is reminded that amendment of the claims 1-22 on 11/13/12, will require a supplemental declaration (See MPEP 1414.01). The Applicant can defer filing of the supplement declaration until receiving a Notice of Allowability, but sooner or later they will need to file the supplemental declaration

Amendment

2. Amendment to the specification filed on 11/13/2012 is objected for improper amendment notation under 37 CFR 1.175(d)(1), because the deletion should be shown with a single set of bracket "[ ]", rather than double brackets "[[ ]]".

3. Claims 11-22 are still rejected under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. See *North American Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 75 USPQ2d 1545 (Fed. Cir. 2005); *Pannu v. Storz Instruments Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001); *Hester Industries, Inc.* v. *Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998); *In re Clement*, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997); *Ball Corp.* v. *United States*,

729 F.2d 1429, 1436, 221 USPQ 289, 295 (Fed. Cir. 1984). A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application for the patent shows that the broadening aspect (in the reissue) relates to claim subject matter that applicant previously surrendered during the prosecution of the application for the patent. Accordingly, the narrow scope of the claims in the patent was not an error within the meaning of 35 U.S.C. 251, and the broader scope of claim subject matter surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application. New claim 11 is broader than the original patent claim 1. The original patent claim was rejected under 102(b) as anticipated by Chang (see Non-Final Rejection mailed on 1/29/2009 in 11/872057). The applicants amended claim 1 to overcome the rejection of the claim (see amendment filed on 4/29/2009). The broadening aspects of claim 11 relate to the case, the circuit board mounting part, and the first and second cooling fluid paths, and these broadening aspects appear to be within the amendments made to overcome the rejection in the original prosecution. Accordingly, this broadening reissue constitutes recapture.

The new 11 is still broader than the original patent claim 1 by deleting portions of the limitation: the “circuit board mounting part” being “partitioned from a space in which the display panel is mounted” and “the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case” and “the second cooling fluid path includes an internal space of the circuit board mounting part", wherein

the partitioning, first, and second cooling paths seem to be argued in the parent patent (see applicant's arguments 4/29/09 and reason for allowance 1/29/09) to distinguish over the prior art. (see original patent claim 1 in US Pat. 7667964).

From the prosecution record of the original application (11/872057), the examiner rejected claim 1 under 35 USC 102(b) as anticipated by Chang (US6198222) and objected to claim 8, which depended from claim 1, as containing allowable subject matter. See Non-Final Rejection mailed on 1/29/2009.

In response to the rejection, the applicant amended independent claim 1 (which is also patent claim 1) to include the limitations of claim 8 and recite "***wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…,the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part***" arguing about the patentability of these limitations over the prior art of record. See p.2/claim 1 and p.6/ll.21-26 of the amendment filed on 4/29/2009.

In response to the amendment, the examiner allowed claim 1. See Notice of Allowance mailed on 5/7/2009.

Thus, the limitation in the patent claims of "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…, the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" was surrendered in the original

application to obtain the original patent. Portions of this limitation, however, are now deleted from new claim 11.

The recapture rule cannot be avoided since the newly added claim 11 was not materially narrower in other aspects of the claimed invention (see MPEP 1412.I.C).

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(a):
(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-23 are also rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant amended claims by claiming a new part - “the display panel module”, which is not defined in the specification.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAIL V. DATSKOVSKIY whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

01/02/2013
/MICHAIL V DATSKOVSKIY/
Primary Examiner, Art Unit 2835

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q129473
Joon KANG, et al.	
Appln. No.: 13/403,559	Group Art Unit: 2835
Confirmation No.: 1081	Examiner: DATSKOVSKIY, MICHAIL V
Filed: February 23, 2012	
For: PANEL TYPE DISPLAY DEVICE	

AMENDMENT UNDER 37 C.F.R. § 1.111

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

Sir:

In response to the Office Action dated July 11, 2012, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE SPECIFICATION....2

AMENDMENTS TO THE CLAIMS....3

AMENDMENTS TO THE DRAWINGS....10

REMARKS....11

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at column 2, line 57, and ending at column 2, line 64, of the specification (U.S. Patent 7,667,964) with the following amended paragraph:

The display panel 20 may be an LCD or a PDP. The circuit substrates 31, 32 and 33 are electrically connected to the display panel 20 through a flexible wiring part 34 ([[not]]shown in phantom). A plurality of electronic components are mounted on the circuit substrates 31, 32 and 33. The plurality of electronic components constitute a driving circuit for controlling light emission of the display panel 20, a control circuit, a tuning circuit, a power circuit and the like.

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AMENDMENTS TO THE CLAIMS

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

LISTING OF CLAIMS:

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

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3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is

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mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (original): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

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10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

Please add the following new claims, as follows (the entire text of new claims 11-23 is presented in underline, in accordance with 37 C.F.R. §§ 1.173(b)-(d)):

11. (amended): A panel display device comprising:

a display panel module;

a front case configured to be disposed in front the display panel module and adapted for viewing of a screen portion of the display panel module;

a rear case coupled to the front case, the rear case defining a rear surface of the panel display device and an edge portion extending from periphery thereof;

a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto;

a first cooling fluid path which cools the display panel module; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;

wherein the circuit substrate is mounted to the rear case via the circuit board mounting part such that the heat generating side of the circuit board having the electronic components face in a direction away from the display panel module,

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wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel module and in front of the circuit board and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and in front the rear case, and

wherein the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

wherein the circuit substrate mounted to the rear case and the display panel module moves apart away from each other automatically upon detaching the rear case from the front case.

12. (amended): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel module,

wherein the at least heat-generating components facing away from the display panel module comprises at least one of a driving circuit for controlling light emission of the display panel module, a control circuit, a tuning circuit, and a power circuit.

13. (amended): The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel module,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

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14. (amended): The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel module through a flexible wiring part.

15. (amended): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel module, an upper angled region located above the central region and a lower angled region located below the central region.

16. (previously presented): The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. (previously presented): The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

18. (previously presented): The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

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19. (amended): The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel module is located.

20. (previously presented): The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. (previously presented): The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

23. (new): The panel display device as claimed in claim 11, wherein the first and second cooling fluid paths are entirely separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path entirely prohibited.

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AMENDMENTS TO THE DRAWINGS

Please replace FIG. 2 with the attached ("AMENDED") (*see* 37 C.F.R. § 1.173(b)(3), "Amended figures must be identified as "Amended") FIG. 2, in which the flexible wiring (34) (*see* U.S. Patent 7,667,964, col. 2, l. 59), is illustrated.

Attachment: One replacement ("AMENDED") sheet.

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REMARKS

By this Amendment, Applicant amends claims 11-15 and 19. Applicant also adds new claim 23. Therefore, claims 1-23 are all the claims pending in the application. Pursuant to 37 C.F.R. § 1.173(c), support for the amendments to claims 11-15, 19, and 23 may be at least found at U.S. Patent 7,667,964: FIGS. 1-2, col. 2, l. 48 - col. 3, l. 41.

Preliminary Matters

Applicant thanks the Examiner for acknowledging the claim of foreign priority under 35 U.S.C. § 119(a)-(d), and for initialing and returning the Form PTO/SB/08 submitted with the Information Disclosure Statement filed on February 23, 2012.

Objection to Oath/Declaration

The reissue oath/declaration is objected to under 37 C.F.R. § 1.75(a)(1) as failing to contain the statement as to Applicant's belief that the original patent is wholly or partly inoperative or invalid. Applicant respectfully traverses the objection.

37 C.F.R. § 1.175(a)(1) requires the reissue oath or declaration to state that: "(1) The applicant believes the original patent to be wholly or partly inoperative or invalid by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than the patentee had the right to claim in the patent, stating at least one error being relied upon as the basis for reissue."

Applicant respectfully directs the Examiner to MPEP § 1414.I, which states (emphasis added):

> **In order to satisfy this requirement, a declaration can state as for example:**

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> 1. "Applicant believes the original patent to be partly inoperative or invalid by reason of a defective specification or drawing."
>
> 2. "Applicant believes the original patent to be partly inoperative or invalid by reason of the patentee claiming more than patentee had a right to claim in the patent."
>
> 3. "Applicant believes the original patent to be partly inoperative or invalid by reason of the patentee claiming less than patentee had a right to claim in the patent."
>
> …
>
> **The above examples will be sufficient to satisfy this requirement without any further statement.**

The reissue declaration (Form PTO/SB/51) includes a statement that Applicant believes the original patent to be partly inoperative or invalid "by reason of the patentee claiming more than patentee had a right to claim in the patent." Nothing further is required. Therefore, the reissue declaration satisfies 37 C.F.R. § 1.175(a)(1), and Applicant respectfully requests the Examiner to withdraw the objection.

At paragraph 1 on page 2 of the Office Action, the objection is also based on the assertion that the reissue declaration fails to state "at least one error being relied upon as the basis for reissue," as required by 37 C.F.R. § 1.175(a)(1), as shown below (emphasis added):

> and see MPEP § 1414. The reissue declaration identified the specific limitations recited in original claim 1 that are being corrected (*i.e.*, a display panel mounted in an interior of the case). However, the oath fails to specify how these limitations render the original patent wholly or partially inoperative. The reissue oath states that these limitations are not necessary to carry out the invention because they are merely exemplary. The fact that patented claimed limitations are exemplary and not essential for practicing the invention does not render the original patent wholly or partly inoperative or invalid.

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Applicant respectfully submits that 37 C.F.R. § 1.175 does not require any explanation that identifies how the limitations render the original patent inoperative. Moreover, to the extent the objection is based on the assertion that, the fact that patent claimed limitations are not essential does not render the original patent invalid, is improper. Rather, Applicant respectfully directs the Examiner to MPEP § 1414.II(B), which states that the Applicant must only specify the error upon which reissue is based and how the error renders the original patent inoperative, as shown below (emphasis added):

> B) Applicant **need only** specify in the reissue oath/declaration one of the errors upon which reissue is based. **Where applicant specifies one such error, this requirement of a reissue oath/declaration is satisfied.** Applicant may specify more than one error. Where more than one error is specified in the oath/declaration and some of the designated "errors" are found to not be "errors" under 35 U.S.C. 251, any remaining error which is an error under 35 U.S.C. 251 will still support the reissue. The "at least one error" which is relied upon to support the reissue application must be set forth in the oath/declaration. It is not necessary, however, to point out how (or when) the error arose or occurred. Further, it is not necessary to point out how (or when) the error was discovered. If an applicant chooses to point out these matters, the statements directed to these matters will not be reviewed by the examiner, and the applicant should be so informed in the next Office action. All that is needed for the oath/declaration statement as to error is the identification of "at least one error" relied upon. **In identifying the error, it is sufficient that the reissue oath/declaration identify a single word, phrase, or expression in the specification or in an original claim, and how it renders the original patent wholly or partly inoperative or invalid.** The corresponding corrective action which has been taken to correct the original patent need **not** be identified in the oath/declaration. If the initial reissue oath/declaration "states at least one error" in the original patent, and, in addition, recites the specific corrective action taken in the reissue application, the oath/declaration would be considered acceptable, even though the corrective action statement is not required.

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As shown above, MPEP § 1414.II(B) clarifies that 37 C.F.R. § 1.175(a)(1) requires Applicant only to specify the error upon which reissue is based, and "**[w]here applicant specifies one such error, this requirement of a reissue oath/declaration is satisfied**."

Further, as shown above, "[i]n identifying the error, it is sufficient that the reissue oath/declaration identify a single word, phrase, or expression in the specification or in an original claim, and how it renders the original patent wholly or partly inoperative or invalid." The reissue declaration identifies limitations in original claim 1 that are not essential, thus original claim 1 is overly narrow by claiming additional unnecessary limitations, thereby rendering original claim 1 inoperative.

Applicant respectfully submits, the assertion that, the fact that patent claimed limitations are not essential does not render the original patent invalid, is improper. The reissue declaration has identified a limitation of original claim 1, as required. Further, the reissue declaration has identified how original claim 1 is inoperative, by claiming limitations are not essential, such that the claims would be patentable without the inessential limitations. Nothing further is required.

Last, at paragraph 1 on page 2 of the Office Action, the objection is also based on the assertion that the reissue declaration fails identify the new claims that lack the language of original claim 1 wherein the error lies, as shown below (emphasis added):

> In addition to the above, the error statement fails to identify the new claim(s) that lack the language in original claim 1 wherein the error lies. Any error in the claims must be identified by reference to the specific claim(s). The applicant has not pointed out the claim(s) that corrects the error in original claim 1.

Applicant respectfully submits 37 C.F.R. § 1.175(a)(1) does not require such errors to be identified. Rather, as shown above, MPEP § 1414.II(B) clarifies "[t]he corresponding corrective

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action which has been taken to correct the original patent **need not** be identified in the oath/declaration." Thus, contrary to the assertion in the Office Action, the reissue declaration is not required to point out the claims that correct the error in original claim 1.

Accordingly, Applicant respectfully submits that the reissue declaration is fully in accord with 37 C.F.R. § 1.175, and respectfully requests the Examiner to withdraw the objection.

The reissue oath/declaration is objected to under 37 C.F.R. § 1.75 as failing to identify the foreign application on which foreign priority is being claimed. Applicant respectfully traverses the objection.

Applicant submits an Application Data Sheet (ADS) identifying the foreign application, and respectfully requests the Examiner to withdraw the objection (*see* MPEP § 1417 and 37 C.F.R. § 1.63, the oath or declaration must identify the foreign application for patent or inventors' certificate on which priority is claimed unless supplied on an application data sheet).

Objection to the Drawings

The Figures are objected to as failing to illustrate the features of claim 14. Applicant respectfully traverses the objection.

Applicant thanks the Examiner for pointing out, with particularity, the features of claim 14 believed to be not illustrated. Applicant submits a replacement ("AMENDED") FIG. 2, which illustrates the "flexible wiring part," and respectfully requests the Examiner to withdraw the objection.

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Claim Rejections – 35 U.S.C. § 251

Claims 11-22 are rejected under 35 U.S.C. § 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. Applicant respectfully traverses the rejection.

At paragraph 5 on page 4 of the Office Action, the rejection identifies the limitation "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" of original claim 1 as surrendered subject matter which is omitted from independent reissue claim 11.

Claim 11 is amended to recite, *inter alia*, "a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto" and "wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel module and front of the circuit board and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and front the rear case." Applicant respectfully submits the subject matter identified as surrendered appears in claim 11. Accordingly, claim 11 does not omit any surrendered subject matter, and hence there is no impermissible recapture. Thus, claim 11 and its dependent claims satisfy 35 U.S.C. § 251.

Claim Rejections – 35 U.S.C. § 102

Claims 11-13, 18, 19, 21, and 22 are rejected under 35 U.S.C. § 102(b) as being anticipated by Chang (U.S. Patent 6,198,222). Applicant respectfully traverses the rejection.

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As amended (*see* MPEP § 1453(V)(D), "applicant must point out what is changed in the "Remarks" portion of the amendment"), independent claim 11 recites (amendments to claim 11 shown):

> A panel display device comprising:
>
> a display panel module;
>
> a front case configured to be ~~coupled to~~disposed in front the display panel module and ~~having an opening formed at~~adapted for viewing of a screen portion of the display panel module;
>
> a rear case coupled to the front case, the rear case ~~including a rear side vertical wall portion~~ defining a rear surface of the panel display device and an edge portion extending from periphery thereof ~~of the rear side vertical wall portion~~;
>
> a circuit substrate including a circuit board with a heat generating side having a plurality of electronic components mounted thereto ~~to a circuit board~~;
>
> a first cooling fluid path which cools the display panel module; and
>
> a second cooling fluid path which cools the circuit substrate,
>
> wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,
>
> a circuit board mounting part provided on the rear case and adapted for mounting the circuit substrate thereto;
>
> wherein the circuit substrate is mounted to the rear case via ~~a~~ the circuit board mounting part such that the heat generating side of the circuit board having the electronic components ~~mounted to the circuit board~~ face in a direction away from the display panel module, ~~and~~
>
> wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel module and in front of the circuit board ~~mounting part~~ and the second cooling fluid path comprises a second space located behind the heat-generating side of the circuit board and in front ~~substrate and in front of the rear side vertical wall portion of~~ the rear case, and
>
> wherein ~~the rear side vertical wall portion of~~ the rear cover case and the circuit board mounting part are fixed to each other and the rear case is located behind the circuit substrate, and

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wherein the circuit substrate mounted to the rear case and the display panel module moves apart away from each other automatically upon detaching the rear case from the front case.

Dependent claims 12-15 and 19 are amended to recite "the display panel module," to maintain proper antecedent basis.

Chang fails to teach or suggest the combination of features recited in claim 11 including "the circuit substrate is mounted to the rear case via the circuit board mounting part," "the rear cover case and the circuit board mounting part are fixed to each other," and "the circuit substrate mounted to the rear case and the display panel module moves apart away from each other automatically upon detaching the rear case from the front case." Instead, Chang merely describes a display panel (12) (*see* Chang, col. 2, ll. 38-41), a rear plate (16) (*see* Chang, FIG. 2, col. 2, ll. 53-54), and a circuit board (36) (*see* Chang, col. 2, l. 60). There is no teaching or suggestion that the circuit board (36) moves away from the display panel (12) upon detaching the rear plate (16) from the assembly in Chang. In fact, Figure 2 of Chang illustrates the scenario in which the rear plate (16) is removed, while the circuit board (36) and display panel (12) remain respectively positioned (*see* Chang, col. 2, ll. 53-54).

Accordingly, Chang fails to teach or suggest the combination of features recited in claim 11. Therefore, claim 11 and its dependent claims are patentable over Chang for at least these reasons.

Claims 11, 15, 18, 19, 21, and 22 are rejected under 35 U.S.C. § 102(e) as being anticipated by Lin (U.S. Patent 7,164,586). Applicant respectfully traverses the rejection.

As discussed above, claim 11 recites "the circuit substrate is mounted to the rear case via the circuit board mounting part," "the rear cover case and the circuit board mounting part are fixed to each other," and "the circuit substrate mounted to the rear case and the display panel

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module moves apart away from each other automatically upon detaching the rear case from the front case."

Lin merely describes a display panel (10) (*see* Lin, col. 1, l. 13), a back cover (40) (*see* Lin, col. 3, l. 4), and a circuit board (350) (*see* Lin, col. 3, l. 2). There is no teaching or suggestion that the circuit board (350) moves away from the display panel (10) upon detaching the back cover (40) from the assembly in Lin. Rather, in Lin, when the back cover (40) is detached from the front case, the circuit substrate (350) remains physically connected to the display panel module, as shown in Figure 3 of Lin.

Accordingly, Lin fails to teach or suggest the combination of features recited in claim 11. Therefore, claim 11 and its dependent claims are patentable over Lin for at least these reasons.

Claim 14 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang or Lin, in view of Official Notice. Applicant respectfully traverses the rejection.

Claim 14 depends on claim 11 and incorporates all the features of claim 11. Official Notice is taken for teaching a flexible wiring. However, even if Chang or Lin could have somehow been modified to incorporate flexible wiring, the modified Chang or Lin would still fail to teach or suggest the combination of features recited in claim 11. Therefore, claim 11, and hence claim 14, is patentable over Chang or Lin, even in view of Official Notice.

Allowable Subject Matter

Claims 1-10 would be allowable if rewritten to or amended to overcome the rejection(s) under 35 U.S.C. §.S.C. § 251.

Applicant respectfully submits that claims 1-10 are patentable, in view of the remarks above.

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Claims 16, 17, and 20 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.

Applicant respectfully holds the rewriting of claims 16, 17, and 20 in abeyance, until the remarks with respect to claim 11 are considered.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

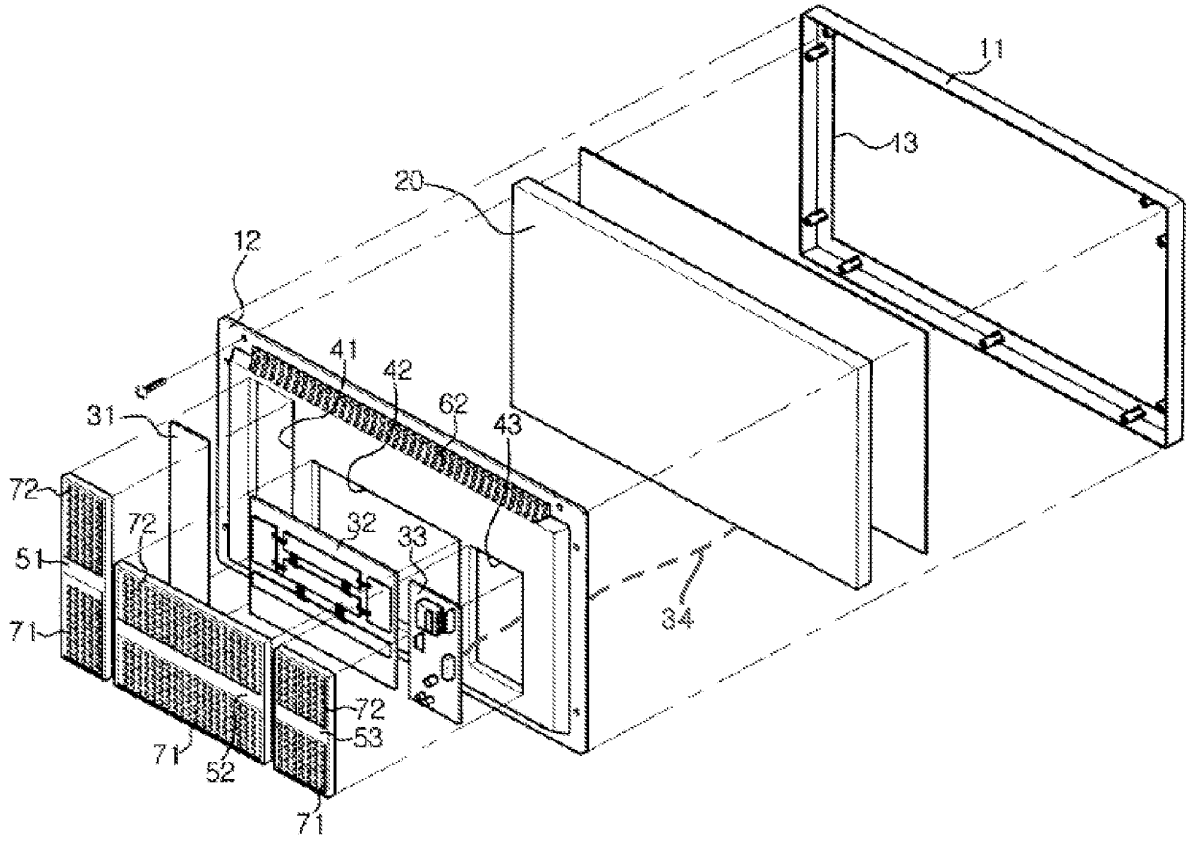
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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: November 13, 2012

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Fig. 2



AMENDED

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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/403,559	02/23/2012	Joon Kang	Q129473	1081

23373 7590 07/11/2012

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EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

NOTIFICATION DATE	DELIVERY MODE
07/11/2012	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@sughrue.com
sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM

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Office Action Summary	Application No.	Applicant(s)	
	13/403,559	KANG ET AL.	
	Examiner	Art Unit	
	MICHAIL V. DATSKOVSKIY	2835	

-- 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 *23 February 2012*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *1-22* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-22* is/are rejected.

8)☒ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *23 February 2012* 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).

12)☐ 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

13)☒ 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 *02/23/2012*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The reissue oath/declaration filed with this application is defective because it fails to contain the statement(s) required under 37 CFR 1.175(a)(1) as to applicant's belief that the original patent is wholly or partly inoperative or invalid. See 37 CFR 1.175(a)(1) and see MPEP § 1414. The reissue declaration identified the specific limitations recited in original claim 1 that are being corrected (*i.e.*, a display panel mounted in an interior of the case). However, the oath fails to specify how these limitations render the original patent wholly or partially inoperative. The reissue oath states that these limitations are not necessary to carry out the invention because they are merely exemplary. The fact that patented claimed limitations are exemplary and not essential for practicing the invention does not render the original patent wholly or partly inoperative or invalid.
In addition to the above, the error statement fails to identify the new claim(s) that lack the language in original claim 1 wherein the error lies. Any error in the claims must be identified by reference to the specific claim(s). The applicant has not pointed out the claim(s) that corrects the error in original claim 1.

2. The reissue oath/declaration filed with this application is also defective (see 37 CFR 1.175 and MPEP § 1414) because of the following: Unless supplied in an application data sheet (ADS), the oath must identify the foreign application on which foreign priority is being claimed by specifying the application number, country, day, month, and year of its filing. If the original patent contains a claim for foreign priority, such claim must be repeated in the reissue application in order to retain priority to the earlier effective filing date.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the flexible wiring part (claim 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. Claims 1-22 are rejected as being based upon a defective reissue oath/declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the oath/declaration is set forth in the discussion above in this Office action.

5. Claims 11-22 are also rejected under 35 U.S.C. 251 as being an impermissible recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. See *North American Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 75 USPQ2d 1545 (Fed. Cir. 2005); *Pannu v. Storz Instruments Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001); *Hester Industries, Inc.* v. *Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998); *In re Clement,* 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997)*; Ball Corp.* v. *United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 295 (Fed. Cir. 1984). A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application for the patent shows that the broadening aspect (in the reissue) relates to claim subject matter that applicant previously surrendered during the prosecution of the application for the patent. Accordingly, the narrow scope of the claims in the patent was not an error within the meaning of 35 U.S.C. 251, and the broader scope of claim subject matter surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application. New claim 11 is broader than the original patent claim 1. The original patent claim was rejected under 102(b) as anticipated by Chang (see Non-Final Rejection mailed on 1/29/2009 in 11/872057). The applicants amended claim 1 to overcome the rejection of the claim (see amendment filed on 4/29/2009). The broadening aspects of claim 11 relate to the case, the circuit board mounting part, and the first and second cooling fluid paths, and these broadening aspects appear to be

within the amendments made to overcome the rejection in the original prosecution. Accordingly, this broadening reissue constitutes recapture.

The new 11 is broader than the original patent claim 1 by deleting portions of the limitation "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…, the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" (see original patent claim 1 in US Pat. 7667964).

From the prosecution record of the original application (11/872057), the examiner rejected claim 1 under 35 USC 102(b) as anticipated by Chang (US6198222) and objected to claim 8, which depended from claim 1, as containing allowable subject matter. See Non-Final Rejection mailed on 1/29/2009.

In response to the rejection, the applicant amended independent claim 1 (which is also patent claim 1) to include the limitations of claim 8 and recite "***wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…,the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part***" arguing about the patentability of these limitations over the prior art of record. See p.2/claim 1 and p.6/ll.21-26 of the amendment filed on 4/29/2009.

In response to the amendment, the examiner allowed claim 1. See Notice of Allowance mailed on 5/7/2009.

Thus, the limitation in the patent claims of "wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted…, the first cooling fluid path includes a space between…an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part" was surrendered in the original application to obtain the original patent. Portions of this limitation, however, are now deleted from new claim 11.

The recapture rule cannot be avoided since the newly added claim 11 was not materially narrower in other aspects of the claimed invention (see MPEP 1412.I.C).

Claim Rejections - 35 USC § 102

6. 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.

7. Claims 11-13, 18—19, 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang (US Patent 6,198,222).

Chang teaches a panel display device 10, Figs. 1-4, comprising: a display panel 18; a front case 14 configured to be coupled to the display panel 18 and having an opening formed at a screen portion of the display panel; a rear case 16 coupled to the front case 14, the rear case 16 including a rear side vertical wall portion defining a rear surface of the panel display device and an edge (top) portion extending from periphery of the rear side vertical wall portion; a circuit substrate 36 including a plurality of electronic

components mounted to a circuit board; a first cooling fluid path which cools the display pane 18l; and a second cooling fluid path which cools the circuit substrate 36, wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited, wherein the circuit substrate36 is mounted to the rear case via a circuit board mounting part 28 such that the electronic components mounted to the circuit board face in a direction away from the display panel 18, and wherein the first cooling fluid path comprises a first space 19 located behind a rear surface of the display panel 18 and in front of the circuit board mounting part and the second cooling fluid path comprises a second space 40 located behind the circuit substrate 36 and in front of the rear side vertical wall portion of the rear case 16, wherein the rear side vertical wall portion of the rear cover is located behind the circuit substrate. Chang teaches furthermore said panel display device as claimed in claim 11, wherein the circuit substrate 36 is mounted to the rear case 16 such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel 18, wherein the at least heat-generating components facing away from the display panel inherently comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit (There are four circuit boards 36 which support all power and controlling electronic components of the display 10) . Chang teaches also said panel display device as claimed in claim 11, wherein the one or more circuit boards 36 mounting part 28 is coupled to the rear case 16, wherein the circuit substrates 36 are supported by the one or more circuit board mounting parts 28; and, wherein the circuit

board mounting part 28 provided on the rear case 16 includes a region which is partitioned by partition 44 from another region 19 in which the display panel is located; and, wherein the rear case 16 includes a plurality of air flow holes 22 formed at a lower portion of the rear case through which air flows into and out thereof; and a plurality of air flow holes22 formed at an upper portion of the rear case through which air flows into and out thereof.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 11, 15, 18-19, 21-22 are also rejected under 35 U.S.C. 102(e) as being anticipated by Lin (US Patent 7,164,586).

Lin teaches panel display device, Fig. 3, comprising: a display panel 10; a front case configured to be coupled to the display panel and having an opening formed at a screen portion of the display panel; a rear case 40 coupled to the front case, the rear case including a rear side vertical wall portion defining a rear surface of the panel display device and an edge portion extending from periphery of the rear side vertical wall portion; a circuit substrate 300 including a plurality of electronic components 340 mounted to a circuit board; a first cooling fluid path which cools the display panel 10 (see vents on the top and bottom surfaces of the front case); and a second cooling fluid path which cools the circuit substrate 300, wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited, wherein the circuit substrate is mounted

to the rear case via a circuit board mounting part 362 such that the electronic components mounted to the circuit board face in a direction away from the display panel 10, and wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board mounting part and the second cooling fluid path comprises a second space located behind the circuit substrate and in front of the rear side vertical wall portion of the rear case, wherein the rear side vertical wall portion of the rear cover is located behind the circuit substrate. Lin teaches furthermore said panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located by the partition 30; and, wherein panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes 81 formed at a lower portion of the rear case through which air flows into and out thereof; and a plurality of air flow holes 80 formed at an upper portion of the rear case through which air flows into and out thereof.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang or Lin.

Chang and/or Lin each teaches all the limitations of the claim except at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part. Official Notes is taken that it is well known in the art to connect at least one of the display circuit substrates to the display panel through a flexible wiring part. Therefore, it would have been obvious to the one having ordinary skill in the art at the time invention was made to electrically connect at least one of the circuit substrates in the devices by Chang or Lin to the display panel through a flexible wiring part.

Allowable Subject Matter

11. Claims 1-10 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

12. Claims 16, 17 and 20 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.

13. The following is a statement of reasons for the indication of allowable subject matter: The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates (claim 16); The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates (claims 17, 20).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAIL V. DATSKOVSKIY whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

07/05/2012
/MICHAIL V DATSKOVSKIY/
Primary Examiner, Art Unit 2835

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Joon KANG

Reissue of U.S. Patent No.: 7,667,964

Confirmation No.: Not Yet Assigned

Filed: February 23, 2012

For: PANEL TYPE DISPLAY DEVICE

Docket No: Q129473

Former Group Art Unit: 2835

Former Examiner: Michail V. Datskovskiy

PRELIMINARY AMENDMENT UNDER 37 C.F.R. § 1.173(b)

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

Sir:

Prior to examination, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE CLAIMS 2
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AMENDMENTS TO THE CLAIMS

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

LISTING OF CLAIMS:

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

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3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

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7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (original): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,

wherein the at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,

wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

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9. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

10. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

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Please add the following new claims, as follows (the entire text of new claims 11-22 is presented in underline, in accordance with 37 C.F.R. §§ 1.173(b) and (d)):

11. A panel display device comprising:

a display panel;

a front case configured to be coupled to the display panel and having an opening formed at a screen portion of the display panel;

a rear case coupled to the front case, the rear case including a rear side vertical wall portion defining a rear surface of the panel display device and an edge portion extending from periphery of the rear side vertical wall portion;

a circuit substrate including a plurality of electronic components mounted to a circuit board;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit substrate,

wherein the first and second cooling fluid paths are separated from each other such that air flow from the second cooling fluid path to the first cooling fluid path is prohibited,

wherein the circuit substrate is mounted to the rear case via a circuit board mounting part such that the electronic components mounted to the circuit board face in a direction away from the display panel, and

wherein the first cooling fluid path comprises a first space located behind a rear surface of the display panel and in front of the circuit board mounting part and the second cooling fluid path comprises a second space located behind the circuit substrate and in front of the rear side vertical wall portion of the rear case,

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wherein the rear side vertical wall portion of the rear cover is located behind the circuit substrate.

12. The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises at least one of a driving circuit for controlling light emission of the display panel, a control circuit, a tuning circuit, and a power circuit.

13. The panel display device as claimed in claim 11, wherein the circuit substrate is mounted to the rear case such that at least heat-generating components mounted to the circuit board face in the direction away from the display panel,

wherein the at least heat-generating components facing away from the display panel comprises a power circuit.

14. The panel display device as claimed in claim 11, further comprising a plurality of circuit substrates, wherein at least one of the circuit substrates is electrically connected to the display panel through a flexible wiring part.

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15. The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a central region that is substantially parallel to the display panel, an upper angled region located above the central region and a lower angled region located below the central region.

16. The panel display device as claimed in claim 15, wherein the central region of the rear side vertical wall portion comprises a rear cover for covering at least one of the circuit substrates.

17. The panel display device as claimed in claim 11, wherein the rear side vertical wall portion of the rear case comprises a rear cover for covering at least one of the circuit substrates.

18. The panel display device as claimed in claim 11, wherein the one or more circuit board mounting part is coupled to the rear case, wherein the circuit substrates are supported by the one or more circuit board mounting part.

19. The panel display device as claimed in claim 11, wherein the circuit board mounting part provided on the rear case includes a region which is partitioned from another region in which the display panel is located.

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20. The panel display device as claimed in claim 17, wherein the circuit board mounting part has an open rear while being recessed such that at least one the circuit substrates is mounted in the circuit board mounting part, and the rear cover is configured for covering the circuit board mounting part.

21. The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at a lower portion of the rear case through which air flows into and out thereof.

22. The panel display device as claimed in claim 11, wherein the rear case includes a plurality of air flow holes formed at an upper portion of the rear case through which air flows into and out thereof.

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REMARKS

Entry and consideration of this Amendment are respectfully requested.

Pursuant to 37 C.F.R. § 1.173(c), claims 1-10 are original and claims 11-22 are newly added, and therefore claims 1-22 are all the claims pending in the application. Support for the newly added claims may be at least found at the following portions of the specification (U.S. Patent 7,667,964): claim 11: FIG. 1, col. 2, l. 48 - col. 3, l. 41; claim 12: FIG. 1, col. 3, ll. 42-54; claims 13, 14: FIG. 1, col. 2, ll. 57-64; claim 15: FIG. 1; claims 16, 17: FIG. 1, col. 19-28; claims 18-20: FIG. 2, col. 2, l. 65 - col. 3, l. 7; and claims 21 and 22: FIG. 1, col. 3, ll. 8-18.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: February 23, 2012

Respectfully submitted,

/ Christopher J. Bezak /

Christopher J. Bezak
Registration No. 63,241

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

Mail Date: 05/20/2010

Applicant	: Joon KANG	: DECISION ON REQUEST FOR
Patent Number	: 7667964	: RECALCULATION of PATENT
Issue Date	: 02/23/2010	: TERM ADJUSTMENT IN VIEW
Application No	: 11/872,057	: OF WYETH AND NOTICE OF INTENT TO
Filed	: 10/15/2007	: ISSUE CERTIFICATE OF CORRECTION
		:

The Request for Recalculation is **GRANTED** to the extent indicated.

The patent term adjustment has been determined to be **106** days. The USPTO will *sua sponte* issue a certificate of correction reflecting the amount of PTA days determined by the recalculation.

Prior to the issuance of the certificate of correction, the USPTO will afford patentee an opportunity to be heard and request reconsideration. Accordingly, patentee has **one month or thirty (30) days**, whichever is longer, to file a request for reconsideration of this patent term adjustment calculation. See 35 U.S.C. 154(b)(3)(B)(ii) and 37 CFR 1.322(a)(4). No extensions of time will be granted under 37 CFR 1.136.

Patentee should use document code PET.OP if electronically filing a request for reconsideration of this patent term adjustment calculation. The patentee must also include the information required by 37 CFR 1.705(b)(2) and the fee required by 37 CFR 1.18(e). If patentee does not file a timely request for reconsideration of this patent term adjustment calculation including the information required by 37 CFR 1.705(b)(2) and the fee required by 37 CFR 1.18(e), the USPTO will issue a certificate of correction reflecting the PTA determination noted above.

Patentee should be aware that in order to preserve the right to review in the United States District Court for the District of Columbia of the USPTO patent term adjustment determination, patentee must ensure that he or she also take the steps required under 35 U.S.C. 154(b)(4)(A) in a timely manner. Nothing in the request for recalculation should be construed as providing an alternative time frame for commencing a civil action under 35 U.S.C. 154(b)(4)(A).

Any questions concerning this decision should be directed to the Office of Patent Legal Administration at 571-272-7702.

Petitioner Manufacturing Resources International, Inc.
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FTW

11872057

Doc Code: PET.PTA.RCAL
Document Description: Request for Recalculation in view of Wyeth

PTO/SB/131 (01-10)
Approved for use through 02/28/2011. OMB 0651-0020
U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE
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OPAP
MAY 13 2010
MAP20
PATENT & TRADEMARK OFFICE

REQUEST FOR RECALCULATION OF PATENT TERM ADJUSTMENT IN VIEW OF *WYETH**

Attorney Docket Number:	Patent Number: 7,667,964
Filing Date (or 371(b) or (f) Date): 2007-10-15	Issue Date: 2010-02-23
First Named Inventor: Joon Kang	
Title: Panel type display device	

PATENTEE HEREBY REQUESTS RECALCULATION OF THE PATENT TERM ADJUSTMENT (PTA) UNDER 35 USC 154(b) INDICATED ON THE ABOVE-IDENTIFIED PATENT. THE PATENTEE'S SOLE BASIS FOR REQUESTING THE RECALCULATION IS THE USPTO'S PRE-*WYETH* INTERPRETATION OF 35 U.S.C. 154(b)(2)(A).

Note: This form is only for requesting a recalculation of PTA for patents issued before March 2, 2010, if the sole basis for requesting the recalculation is the USPTO's pre-*Wyeth* interpretation of 35 U.S.C. 154(b)(2)(A). See Instruction Sheet on page 2 for more information.

Patentees are reminded that to preserve the right to review in the United States District Court for the District of Columbia of the USPTO's patent term adjustment determination, a patentee must ensure that he or she also takes the steps required under 35 U.S.C. 154(b)(3) and (b)(4) and 37 CFR 1.705 in a timely manner.

**Wyeth v. Kappos*, No. 2009-1120 (Fed. Cir., Jan. 7, 2010).

Signature	Date May.10,2010
Name (Print/Typed) Mark Davis	Registration Number 60552

Note: *Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below**.

☐ *Total of _____ forms are submitted.

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 12 hours 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.

20100507155845

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	02/23/2010	7667964	Q102146	8128

23373 7590 02/03/2010

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

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 106 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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

Joon KANG, Seoul, KOREA, REPUBLIC OF;
Jin Hyun Cho, Seoul, KOREA, REPUBLIC OF;
Jeong Su Lim, Suwon-si, KOREA, REPUBLIC OF;

Petitioner Manufacturing Resources International, Inc.
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

23373 7590 01/15/2010

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
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EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

NOTIFICATION DATE	DELIVERY MODE
01/15/2010	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

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Supplemental Notice of Allowability	**Application No.** 11/872,057	**Applicant(s)** KANG ET AL.	
	Examiner Michael V. Datskovskiy	**Art Unit** 2835	

-- 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 *04/29/2009*.

2. ☒ The allowed claim(s) is/are *1-7 and 9-11*.

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)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 10/15/2007
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Michael V Datskovskiy/ Primary Examiner, Art Unit 2835	01/12/2010

IDS filed 10/15/2007

PTO/SB/08a (05-07)
Approved for use through 09/30/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	11/872,057
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	~~Unknown~~ Michael Datskovsky
	Attorney Docket Number	Q102146

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/M.D./	1	2001-264754	JP	A	2001-09-26	NEC CORP		☐
/M.D./	2	2006-162641	JP	A	2006-06-22	MATSUSHITA ELECTRIC IND CO LTD		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	11/872,057
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	~~Unknown~~ Michael Datskovsky
	Attorney Docket Number	Q102146

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Michail Datskovskiy/	Date Considered	01/12/2010

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

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

PART B - FEE(S) TRANSMITTAL

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

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, NW
SUITE 800
WASHINGTON, DC 20037

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.

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510.00	$300.00	$0.00	$1,810.00	08/07/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
Michail V. Datskovskiy	2835	361-692000

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

(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. 3

1 Sughrue Mion, PLLC

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)

SAMSUNG ELECTRONICS CO., LTD. Suwon-si, Republic of Korea

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 1310-2038 is attached.

☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 19-4880 .

☑ The USPTO is directed and authorized to charge all required fees to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

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	/ S. Stuart Lee /	Date	July 28, 2009
Typed or Printed Name	S. Stuart Lee	Registration No.	61,124

Modified PTOL-85 (Rev. 08/08 Approved for use through 08/31/2010.

Electronic Patent Application Fee Transmittal

Application Number:	11872057
Filing Date:	15-Oct-2007
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Filer:	Kelly G. Hyndman/Mussie Beyene
Attorney Docket Number:	Q102146

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
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($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1810**

Electronic Acknowledgement Receipt

EFS ID:	5780396
Application Number:	11872057
International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Kelly G. Hyndman/Mussie Beyene
Filer Authorized By:	Kelly G. Hyndman
Attorney Docket Number:	Q102146
Receipt Date:	28-JUL-2009
Filing Date:	15-OCT-2007
Time Stamp:	11:03:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1810
RAM confirmation Number	7543
Deposit Account	194880
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Issue Fee Payment (PTO-85B)	Q102146_ISSUE_FEE_PTOL85B.pdf	67924 4d8c04cd237cf7f317c8cca2696b719aca246275	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	32036 d72e47dbceebb3c6752cdf38d1d0f7996449b25c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	99960		

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.

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.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q102146
Joon KANG, et al.	
Appln. No.: 11/872,057	Group Art Unit: 2835
Confirmation No.: 8128	Examiner: Michail V. Datskovskiy
Filed: October 15, 2007	

For: PANEL TYPE DISPLAY DEVICE

STATEMENT OF SUBSTANCE OF INTERVIEW

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

Sir:

The Examiner contacted the Applicant's Representative on June 2, 2009 (Applicant's representative notes that the Interview Summary mailed June 15, 2009 indicates the interview was on June 5, 2009) to propose Amendments to the claims. Applicant's representative indicated that the amendment was acceptable.

Respectfully submitted,

__/Michael C. Jones/___
Michael C. Jones
Registration No. 63,266

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: June 23, 2009

Electronic Acknowledgement Receipt

EFS ID:	5571394
Application Number:	11872057
International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Michael Christopher Jones/Tanya Lee
Filer Authorized By:	Michael Christopher Jones
Attorney Docket Number:	Q102146
Receipt Date:	23-JUN-2009
Filing Date:	15-OCT-2007
Time Stamp:	16:18:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	Q102146_Statement_of_Substance_of_Interview.pdf	50389 dcd61a06d0192abad2c669a563c9f9424282cc76	no	1

Warnings:

Information:

Total Files Size (in bytes):	50389

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.

New Applications Under 35 U.S.C. 111
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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
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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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

23373 7590 06/15/2009

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

MAIL DATE	DELIVERY MODE
06/15/2009	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.

Interview Summary	Application No.	Applicant(s)	
	11/872,057	KANG ET AL.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Michael V. Datskovskiy*. (3)_____.

(2) *Michael C. Jones, Reg. No. 63,266*. (4)_____.

Date of Interview: *05 June 2009*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☐ No.
If Yes, brief description: _____.

Claim(s) discussed: *9*.

Identification of prior art discussed: *prior art of record*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *It was agreed to amend claim 9 with additional limitation regarding to the way it is mounted to a rear surface of the case*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/Michael V Datskovskiy/ Primary Examiner, Art Unit 2835	06/05/2009

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 145 of 305

Supplemental Notice of Allowability	Application No.	Applicant(s)	
	11/872,057	KANG ET AL.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

-- 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 *05/21/2009*.

2. ☒ The allowed claim(s) is/are *1-7 and 9-11*.

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).

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Attachment(s)

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3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 05/21/2009
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20090605* .
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Michael V Datskovskiy/ Primary Examiner, Art Unit 2835	06/05/2009

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael C. Jones, Reg. No. 63,266 on 06/05/2009.

The application has been amended as follows: In claim 9, line 8:

After the last words: "fluid path" insert the words: "wherein at least one circuit board is mounted to a circuit board mounting part provided on a rear surface of the case,".

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

06/05/2009
/Michael V Datskovskiy/
Primary Examiner, Art Unit 2835

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11/872,057
	Filing Date	October 15, 2007
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	Michail V. Datskovskiy
	Attorney Docket Number	Q102146

U.S. PATENTS

Examiner Initials*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S. PATENT APPLICATION PUBLICATIONS

Examiner Initials*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[5]
/M.D./		2003-75858	JP	A	2003-03-12	Matsushita Electric Works Ltd		Abstract

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T[5]

EXAMINER SIGNATURE

Examiner Signature	/Michail Datskovskiy/	Date Considered	06/05/2009

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

1 See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. 2 Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). 3 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 4 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 5 Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11/872,057
	Filing Date	October 15, 2007
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	Michail V. Datskovskiy
	Attorney Docket Number	Q102146

U.S. PATENTS

Examiner Initials*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S. PATENT APPLICATION PUBLICATIONS

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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[5]
		2003-75858	JP	A	2003-03-12	Matsushita Electric Works Ltd		Abstract

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T[5]

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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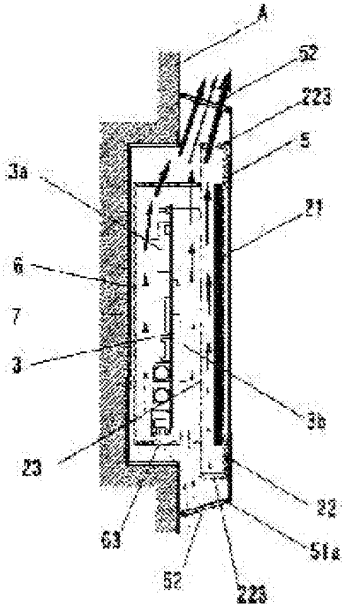
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(54) HEAT RADIATION STRUCTURE OF WALL-BURIED TYPE LIQUID CRYSTAL PANEL UNIT

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a heat radiation structure of a wall buried type liquid crystal panel unit.
SOLUTION: On the back of a liquid crystal panel 2 which displays an image of video, etc., a driving printed board 3 which drives the liquid crystal panel 2 and a power supply printed board 4 which supplies electric power to the driving printed board 3 or the liquid crystal panel 2 are arranged. A panel unit body which contains them with a front cover 5 for fixation so that the liquid crystal panel 2 is exposed in the front is mounted on a fitting surface such as a well surface to obtain the heat radiation structure of the wall buried type liquid crystal panel unit. The front of the front cover 5 is fitted projecting from the fitting surface A and a plurality of air vents 52 for radiating heat to the peripheral wall 51 of the projection part are formed to radiate the heat generated by mounted components on a printed board in the panel unit body by ventilation through the air vents 52.



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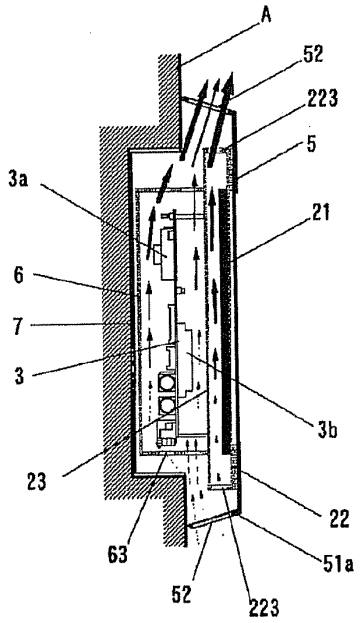
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最終頁に続く

(54)【発明の名称】　壁埋め込み型液晶パネルユニットの放熱構造

(57)【要約】
【課題】　壁埋め込み型液晶パネルユニットの放熱構造を提供する。
【解決手段】　映像等の画像を表示する液晶パネル２の背面に、液晶パネル２を駆動する駆動用プリント基板３と、同駆動用プリント基板３あるいはその液晶パネル２等に電源を供給する電源用プリント基板４とを配する。これらを前記液晶パネル２が前面から露見するよう固定する前面カバー５にて収容させたパネルユニット本体を、壁面等の取付面に装着した壁埋め込み型液晶パネルユニットの放熱構造である。前面カバー５の前面を取付面Ａよりも前側に突出した状態で取り付け、且つ、その突出部の周壁５１に熱を放出するための複数の通気開口５２を設けて、通気開口５２を介してパネルユニット本体の内部のプリント基板の実装部品から発生される熱を通気し放熱させる。



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【特許請求の範囲】

【請求項１】　映像等の画像を表示する液晶パネルの背面に、同液晶パネルを駆動する駆動用プリント基板と、同駆動用プリント基板あるいはその液晶パネル等に電源を供給する電源用プリント基板とを配し、これらを前記液晶パネルが前面から露見するよう固定する前面カバーにて収容させたパネルユニット本体を、壁面等の取付面に装着した壁埋め込み型液晶パネルユニットの放熱構造であって、

前記前面カバーの前面を取付面よりも前側に突出した状態で取り付け、且つ、その突出部の周壁に熱を放出するための複数の通気開口を設けて、同通気開口を介してパネルユニット本体の内部のプリント基板の実装部品から発生される熱を通気し放熱させることを特徴とする壁埋め込み型液晶パネルユニットの放熱構造。

【請求項２】　前記突出部の周壁を傾斜させた請求項１記載の壁埋め込み型液晶パネルユニットの放熱構造。

【請求項３】　前記通気開口を、前記周壁のうち上下それぞれに設け、且つ、左右それぞれには設けないことを特徴とする請求項１又は２記載の壁埋め込み型液晶パネルユニットの放熱構造。

【請求項４】　前記駆動用プリント基板を、前記液晶パネルと平行に配設し、且つ、この駆動用プリント基板の実装部品のうちレギュレータ等の発熱しやすい発熱性部品を上方に、ＣＰＵ等の熱に弱い弱熱性部品を下方に配置した請求項１乃至３のいずれか一つの請求項に記載の壁埋め込み型液晶パネルユニットの放熱構造。

【請求項５】　前記駆動用プリント基板を、両面回路基板を用い、その一面側に前記発熱性部品を、他面側には前記弱熱性部品を配置し形成した請求項１乃至４のいずれか一つの請求項に記載の壁埋め込み型液晶パネルユニットの放熱構造。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、液晶パネルを駆動用回路等とともに収容させた壁埋め込み型液晶パネルユニットの放熱構造に関する。

【０００２】

【従来の技術】従来、ビルなどの建物内での監視制御情報は、ＣＲＴディスプレイなどの表示手段を用いて表示されることが多かったが、最近は、薄型軽量化や低価格化などもあって、液晶パネルを内蔵した液晶パネルユニットによる表示手段にて表示されることも増加してきている。

【０００３】これらの液晶パネルユニットのうち、壁面等の取付面に形成された凹所内に設けられる壁埋め込み型液晶パネルユニットを用いた場合、美観を損ねず設置することができるため、ビルなどの非住宅の建物だけでなく、特に美観が重要視される住居などの建物内においても多く利用されつつある。その一例としては、台所やリビングなどの生活空間において用いられる、玄関等で撮像された来客映像情報や防犯センサ等から取得された機器監視情報などといった情報をリアルタイムに表示するような壁埋め込み型液晶パネルユニットが挙げられる。

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【０００４】上述のような壁埋め込み型液晶パネルユニットは、放熱が期待しづらい壁面などの取付面内にパネルユニット本体が埋設されるわけであるが、これを構成する部材の中には熱に弱い部材もあることから、これの部材が熱にて損傷されることを回避する必要がある。したがって、放熱構造として、パネルユニット本体を形成する外郭ケースの背面側に放熱用の開口を設け、壁背面の空間部分を介して内部の熱を逃がす方法が採用されている。

【０００５】

【発明が解決しようとする課題】ところで上記パネルユニット本体は、埋込ボックスを用いて埋設し設置されることがある。また、最近の液晶パネルユニットにおいては、従来より更に高機能・高性能化が進んだものが提案され、例えば、液晶パネルをより高輝度化を実現するための大電流タイプのインバータ回路を搭載したもの、あるいはオープンネットワークに対応したブラウジング機能を実現するためのより高性能ＣＰＵを搭載したものにあっては、益々、内部での消費電力が増大して、従来より以上に内部のプリント基板への実装部品から熱が発生するようになってきている。

【０００６】すなわち、上記のような高機能タイプの壁埋め込み型の液晶パネルユニットにおいては、液晶パネル駆動のためのインバータ回路の如く発熱部材とＣＰＵの如く高度な集積回路とが、取付面背面側の外郭ケースに密封され埋設されるということとなる。そして、埋込ボックスを用いて設置され取付面背面側での通気の無い状態においては、内部により熱が蓄積されることとなって液晶表示やＣＰＵ等の集積回路の動作が不安定となることも想定された。

【０００７】本発明は、かかる事由に鑑み、取付面背面側での通気の無い状態においても内部の実装部品から発生される熱の放出可能な壁埋め込み型液晶パネルユニットの放熱構造を提供しようとするものである。

【０００８】

【課題を解決するための手段】上記目的を解決するために、本発明の壁埋め込み型液晶パネルユニットの放熱構造においては、映像等の画像を表示する液晶パネルの背面に、同液晶パネルを駆動する駆動用プリント基板と、同駆動用プリント基板あるいはその液晶パネル等に電源を供給する電源用プリント基板とを配し、これらを前記液晶パネルが前面から露見するよう固定する前面カバーにて収容させたパネルユニット本体を、壁面等の取付面に装着した壁埋め込み型液晶パネルユニットの放熱構造であって、前記前面カバーの前面を取付面よりも前側に

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突出した状態で取り付け、且つ、その突出部の周壁に熱を放出するための複数の通気開口を設けて、同通気開口を介してパネルユニット本体の内部のプリント基板の実装部品から発生される熱を通気し放熱させることを特徴とする。

【０００９】この構成により、内部の熱を外側に逃がすために、前記前面カバーの前面は壁面よりも前側に突出した状態で取り付られ、且つ、その突出部の周壁は熱を放出するための複数の通気開口が設けられ、同通気開口を介し液晶パネルユニット内部にて発生する熱が通気され放熱される。

【００１０】また、前記突出部の周壁を傾斜させることが好ましい。この場合、通気開口が前面カバーの前側の傾斜された突出部の周壁に形成される。

【００１１】また、前記通気開口を、前記周壁の上下それぞれに設け、且つ、左右それぞれには設けないことが好ましい。この場合、ユニット内部にて発生した熱が、前面カバーの前側の上下方向のみに通気し放熱される。

【００１２】また、前記駆動用プリント基板を、前記液晶パネルと平行に配設し、且つ、この駆動用プリント基板の実装部品のうちレギュレータ等の発熱しやすい発熱性部品を上方に、ＣＰＵ等の熱に弱い弱熱性部品を下方に配置することが好ましい。この場合、発熱しやすい発熱性部品が、地面に直立する方向に配設される液晶パネルと平行に配設された駆動用プリント基板の、熱に弱い弱熱性部品より上方に設けられる。

【００１３】また、前記駆動用プリント基板は、両面回路基板を用いて形成し、その一面側に前記発熱性部品を、他面側には前記弱熱性部品を配置することが好ましい。この場合、発熱しやすい発熱性部品が、地面に直立する方向に配設される液晶パネルと平行に配設された、両面回路基板による駆動用プリント基板の一面側に、他面側の熱に弱い弱熱性部品と離隔されて設けられる。

【００１４】

【発明の実施の形態】図１は、本発明の壁埋め込み型液晶パネルユニットの放熱構造を具現化した壁埋め込み型液晶パネルユニットの一実施の形態を示し、（ａ）は正面図、（ｂ）は側面図である。図２は、同壁埋め込み型液晶パネルユニットの斜視図、図３は、同壁埋め込み型液晶パネルユニットを背面側から見た分解斜視図、図４は、同壁埋め込み型液晶パネルユニットによる本発明の壁埋め込み型液晶パネルユニットの放熱構造を示す説明図である。

【００１５】この実施の形態の壁埋め込み型液晶パネルユニットの放熱構造による壁埋め込み型液晶パネルユニット１は、図３に示すように、映像等の画像を表示する液晶パネル２の背面に、同液晶パネル２を駆動する駆動用プリント基板３と、同駆動用プリント基板３あるいはその液晶パネル２等に電源を供給する電源用プリント基板４とを配し、これらを前記液晶パネル２が前面から露

見するよう固定する前面カバー５にて収容させたパネルユニット本体を、壁面等の取付面Ａに装着した壁埋め込み型液晶パネルユニット１であって、前記前面カバー５の前面を取付面Ａよりも前側に突出した状態で取り付け、且つ、その突出部の周壁５１に熱を放出するための複数の通気開口５２を設けて、同通気開口５２を介してパネルユニット本体の内部のプリント基板の実装部品から発生される熱を通気し放熱させるようになっている。なお、この場合、パネルユニット本体には背面カバー６が設けられて構成されている。

【００１６】液晶パネル２は、映像等の情報を表示するための従来周知の液晶パネルであり、壁埋め込み型液晶パネルユニット１の前側となる後述する前面カバー５前面に露出されて内部で処理された映像等の情報を表示する。この液晶パネル２は、液晶パネル本体２１と、後述する前面液晶パネルカバー２２及び後面液晶パネルカバー２３とから構成される。液晶パネル本体２１は、前面液晶パネルカバー２２と後面液晶パネルカバー２３とに挟持されて、壁面に平行に位置するよう前面カバー５に配置される。なお、液晶パネル本体２１は、後述する駆動用プリント基板３と電気的に接続されて、電源と映像等の情報を表示させる映像信号とが供給される。

【００１７】前面液晶パネルカバー２２は、上記液晶パネル本体２１を壁埋め込み型液晶パネルユニット１本体に固定するためのもので、前側の液晶パネル本体２１を露出させる枠部２２１と、枠部２２１の左右両側の鍔部２２２，２２２とを有して板金材料にて形成されている。液晶パネル本体２１は、鍔部２２２，２２２に後面液晶パネルカバー２３がねじ固定されて狭持されるようになっており、さらに枠部２２１両側の貫通孔を介して後述する前面カバー５にねじ固定され配置される。なお、この前面液晶パネルカバー２２においては、枠部２２１上下に折曲形成された補強片に放熱用の通気開口２２３が設けられており、パネルユニット本体内部における上下方向の通気経路を妨げないようになっている。

【００１８】後面液晶パネルカバー２３は、上記前面液晶パネルカバー２２とともに液晶パネル本体２１を狭持し保持するためのもので、この場合、略長方形の形状をした金属板で形成されている。この後面液晶パネルカバー２３は、後述する駆動用プリント基板３の装着スペース形成を兼ねており、この後面液晶パネルカバー２３に複数のスペーサ２３１が装着される。すなわち、図４に示すように、スペーサ２３１を介してこの後面液晶パネルカバー２３背面側に駆動用プリント基板３が装着されることで、パネルユニット本体内において液晶パネル本体２１の配設される前側、及び駆動用プリント基板３の配設される２つの空間に分離する隔壁が形成されることとなって、その各空間どうしにおいて熱の流通が防止される。

【００１９】駆動用プリント基板３は、液晶パネル２を

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駆動制御するためのもので、この場合、ガラスエポキシ樹脂基板等の両面回路基板材料にて形成されている。この駆動用プリント基板３は、前記後面液晶パネルカバー２３の片面に装設され、壁面と平行に、すなわち地面に対して直立するよう配置される。また、この駆動用プリント基板３には、液晶パネル２の駆動用コントローラ、インバータ回路、ＣＰＵ、メモリ、キーボードやマウスのための入出力インターフェース、ネットワークインターフェース、各種デバイスドライバコントローラ、バックアップ電源等の多数の回路モジュールが基板上に搭載されるが、発熱を伴う部品と熱に弱い部品とが基板上に密集し実装される。

【００２０】この場合、レギュレータや給電用コンデンサ、ヒートシンク等の熱を発生する発熱性部品３ａを上記両面プリント基板の背面側上方に、ＣＰＵやメモリ、ゲートＩＣ等の熱に弱い弱熱性部品３ｂをその基板前面側下方に配置する。さらに、上記と同じ目的で、該発熱性部品３ａと弱熱性部品３ｂとを、それぞれ別の面上に配置してあり、発熱を伴う部品と熱に弱い部品とを分けて配置されている。したがって、発熱しやすい発熱性部品３ａが、地面に直立する方向に配設される液晶パネル２１と平行に配設された駆動用プリント基板３の、熱に弱い弱熱性部品３ｂより上方に設けられ、さらに、発熱しやすい発熱性部品３ａが、両面回路基板による駆動用プリント基板３の一面側に、他面側の熱に弱い弱熱性部品３ｂと離隔されて設けられることとなって、熱が自然通気において上方に移動するという性質と駆動用プリント基板３により対峙する空間が別々になることにより、弱熱性部品３ｂをより熱の影響を受けにくくさせることができる。

【００２１】電源用プリント基板４は、パネルユニット本体内の各部に電源を供給するもので、交流電源を低電圧化し安定化する電源回路等で構成され、この場合、パネルユニット本体背面側からの交流電源接続用の接続端子４１を有して形成されている。なお、この電源用プリント基板４も、発熱の大きな要因をなすため、上記発熱性部品３ａが実装される面と略同一面位置となるよう後面液晶パネルカバー２３に上記のスペーサ２３１を介して装着されるようになっており、弱熱性部品３ｂへの熱の影響が軽減される。

【００２２】前面カバー５は、美観を目的として設けられる化粧カバーで、その前面に液晶パネル２１を露見させる小開口５４を有する背面側の開口した、例えば板金製の箱体にて形成される。この前面カバー５は、パネルユニット本体の突出部に相当するもので、上記小開口５４の形成される前板５３周囲に前面を始点として後側に向かい傾斜する傾斜面５１ａを形成するよう周壁５１が設けられ、この場合、その周壁５１のうち上下それぞれのもののみに複数の通気開口５２が設けられている。これにより、ユニット内部にて発生した熱が、前面カバー

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の前側の上下方向のみに通気し放熱されることとなる。また、通気開口が前面カバーの前側の傾斜された突出部の周壁に形成されて、通気開口５２がその面積をより大きくして形成される。

【００２３】背面カバー６は、上記前面カバー５とともに液晶パネル２等の装置全体を収容する外郭ケースを構成するもので、例えば板金製の箱体にて形成される。この場合、パネルユニット本体の背面側となる底板部分に上記接続端子４１へ外部からアクセスするための小カバー６１、及び駆動用プリント基板３の入出力部分へのアクセスを可能とするとネットワーク用パネル６２とが付設され、また、上下それぞれの側壁に複数の通気開口６３を有しており、図４に示すように、前面カバー５の通気開口５２からその通気開口６３を経由する通気経路を形成して、パネルユニット本体内の熱が放熱されるようになっている。なお、この背面カバー６は、箱体の開口周縁に設けられている結合片６４を介して前面カバー５とねじ結合される。

【００２４】上記構成による壁埋め込み型液晶パネルユニット１は、例えば、図４に示すように、前面開口の鋼板箱体にて形成される従来周知の埋込ボックス７を用いて、住宅などの建物の、取付面となる壁に埋設され使用される。なお、この壁埋め込み型液晶パネルユニット１は、埋込ボックス７による埋設設置以外、勿論、中空壁構造のパネル壁の壁面、あるいは、露出ボックスを用いて壁面に露出取付させて使用することもできる。

【００２５】また、図４は、本発明のよる壁埋め込み型液晶パネルユニットの放熱構造における内部の熱流動を示す説明図であり、上述した壁埋め込み型液晶パネルユニット１は、前面カバー５の前面が壁面Ａよりも前側に突出した状態で取り付られ、且つ、その突出部となる前面カバー５の上下の周壁５１に設けられた複数の通気開口５２からパネルユニット本体内部にて発生する熱が放出される、同通気開口を介し通気され放熱される。また、このとき、そのパネルユニット本体内部において、駆動用プリント基板３などの各基板の発熱しやすい発熱性部品３ａが、地面に直立する方向に配設される液晶パネル２１と平行に配設された、両面回路基板による駆動用プリント基板３の一面側に、他面側の熱に弱い弱熱性部品３ｂと離隔されて、且つ壁面と平行に列設されることによって各基板間に空間が形成されるため、前面カバー５や背面カバー６等の上下それぞれに設けた通気開口５２、６３と相俟って、下から上方向に向けて通気され放熱されることとなっている。すなわち、駆動用プリント基板３等の実装部品のうち発熱性部品３ａから発生した発生した熱は、その性質によりパネルユニット内部で上昇し背面カバー６の上面に設けた通気開口６３、前面カバー５に設けた通気開口５２により外部に放熱され弱熱性部品３ｂを加熱することなく放熱されるのである。また、この場合、背面カバー６の下面に設けた通気開口

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６３も前面カバー５に設けられた通気開口５２から熱を放熱する通気経路を形成するようになっており、下から上方向に向けて熱放熱せしめる役割を果たすこととなるのである。

【００２６】またこの場合、壁埋め込み型液晶パネルユニット１は、後面液晶パネルカバー２３により前後２つの空間に分割されるとともに、駆動用プリント基板３により後方の空間の一部が中央と後方のほぼ２つに分割されることで、前方、中央、後方の大きく３つの空間が形成される。この中央の空間に収容されるように駆動用プリント基板３の弱熱性部品３ｂの実装面を向けることで、中央の空間における熱の対流が軽減される。

【００２７】したがって、以上説明した壁埋め込み型液晶パネルユニット１の放熱構造によれば、前記前面カバー５の前面は壁面よりも前側に突出した状態で取り付られ、且つ、その突出部の周壁５１が傾斜されるよう傾斜面が形成されるとともにその上下の傾斜面５１ａに熱を放出するための複数の通気開口５２がより大きな面積をもって設けられ、同通気開口５２を介し液晶パネルユニット内部にて発生する熱が通気されてより効率よく放熱されるるため、パネルユニット内部にて発生した熱が、熱の対流の性質により該通気開口５２から放出され、以て、取付面Ａ背面側での通気の無い状態においても内部の実装部品から発生される熱を放出できる。

【００２８】また、駆動用プリント基板３上の発熱性部品３ａは弱熱性部品３ｂとは逆の基板上方に配置されるため、発熱性部品３ａから発生する熱はそのまま上方に移動することで、基板裏面の下方に配置された弱熱性部品３ｂは、熱の影響を受けにくくなる。

【００２９】なお、本発明の壁埋め込み型液晶パネルユニット１は、上述したもののみ限定されるものではなく、本発明の要旨を逸脱しない範囲内において種々変更を加え得ることは勿論である。

【００３０】

【発明の効果】以上、説明したように本発明の請求項１から請求項５記載の壁埋め込み型液晶パネルユニットの放熱構造によれば、前記前面カバーの前面は壁面よりも前側に突出した状態で取り付られ、且つ、その突出部の

周壁は傾斜されるよう傾斜面が形成されるとともにその傾斜面に熱を放出するための複数の通気開口が設けられ、同通気開口を介し液晶パネルユニット内部にて発生する熱が通気され放熱されるるため、パネルユニット内部にて発生した熱が、熱の対流の性質により該通気開口から放出されることにより、取付面背面側での通気の無い状態においても内部の実装部品から発生される熱を放出できる。

【００３１】また、駆動用プリント基板上の発熱性部品は弱熱性部品とは離隔された側の基板上方に配置されるため、発熱性部品から発生する熱がそのまま上方に移動することで、基板裏面の下方に配置された弱熱性部品は、熱の影響を受けにくくなるため、液晶の表示あるいは熱に弱いＣＰＵ等の動作をより安定化できる。

【図面の簡単な説明】

【図１】本発明の壁埋め込み型液晶パネルユニットの放熱構造を具現化した壁埋め込み型液晶パネルユニットの一実施の形態を示し、（ａ）は正面図、（ｂ）は側面図である。

【図２】同壁埋め込み型液晶パネルユニットの斜視図である。

【図３】同壁埋め込み型液晶パネルユニットを背面側から見た分解斜視図である。

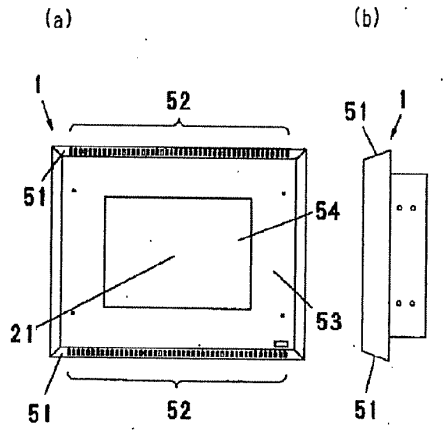
【図４】同壁埋め込み型液晶パネルユニットによる本発明の壁埋め込み型液晶パネルユニットの放熱構造を示す説明図である。である。

【符号の説明】

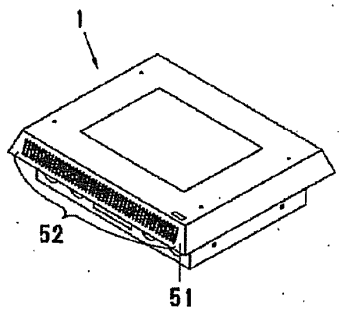
１	壁埋め込み型液晶パネルユニット
２	液晶パネル
３	駆動用プリント基板
３ａ	発熱性部品
３ｂ	弱熱性部品
４	電源用プリント基板
５	前面カバー
５１	周壁５１
５２	通気開口
Ａ	取付面

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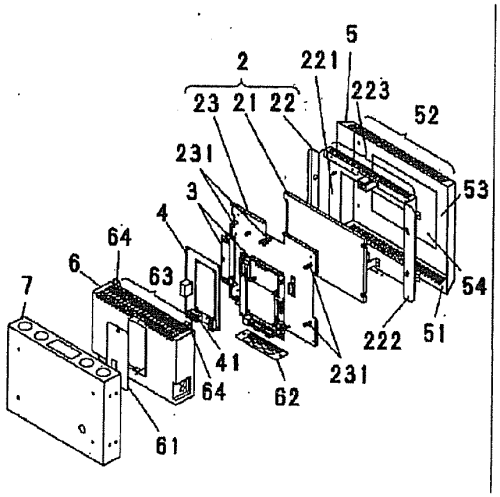
【図1】



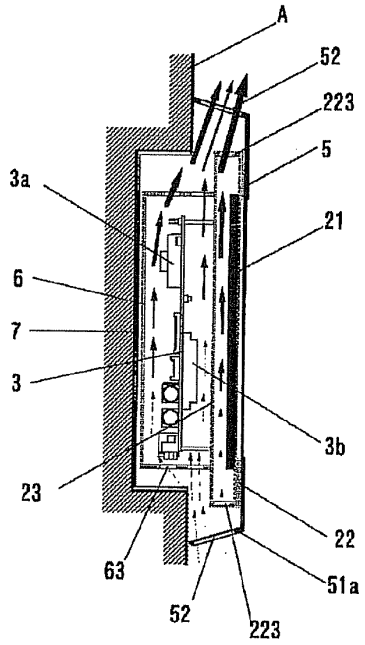
【図2】



【図3】



【図4】



フロントページの続き

Fターム(参考)　2H089 HA40 JA10 QA06 TA03
2H092 GA50 NA17 NA25 PA05 PA06
5C094 AA33 AA34 AA35 BA43
5B322 AA04 BA01 BA05
5G435 AA12 BB12 GG43 GG44 LL04
LL08

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Electronic Patent Application Fee Transmittal

Application Number:	11872057
Filing Date:	15-Oct-2007
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Filer:	Seok-Won Stuart Lee/Michael Abrams
Attorney Docket Number:	Q102146

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	5376662
Application Number:	11872057
International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Seok-Won Stuart Lee/Michael Abrams
Filer Authorized By:	Seok-Won Stuart Lee
Attorney Docket Number:	Q102146
Receipt Date:	21-MAY-2009
Filing Date:	15-OCT-2007
Time Stamp:	14:29:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	612
Deposit Account	194880
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		IDS.pdf	110194 74db6c4a63df11dd2c51f17ead77231914a30e3c	yes	4

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal Letter	1	3
Information Disclosure Statement (IDS) Filed (SB/08)	4	4

Warnings:					
Information:					
2	Foreign Reference	Reference_JP200375858A.pdf	752098 df4961a1cbc05a8ae266e23067c6e6e7b8c25e5d	no	7
Warnings:					
Information:					
3	NPL Documents	Chinese_OA_with_translation.pdf	697160 b9874931bc7d7643ae60606d824d0a02ec226322	no	12
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	30273 508b9ab75b3b09d3f4998dac78cae5971aab8596	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1589725		

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q102146
Joon KANG, et al.	Allowed: May 7, 2009
Appln. No.: 11/872,057	Group Art Unit: 2835
Confirmation No.: 8128	Examiner: Michail V. Datskovskiy
Filed: October 15, 2007	

For: PANEL TYPE DISPLAY DEVICE

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

In accordance with the duty of disclosure under 37 C.F.R. § 1.56, Applicant hereby notifies the U.S. Patent and Trademark Office of the documents which are listed on the attached PTO/SB/08 (modified) form and/or listed herein and which the Examiner may deem material to patentability of the claims of the above-identified application.

One copy of each of the listed documents is submitted herewith.

The present Information Disclosure Statement is being filed after either a Final Office Action, Notice of Allowance, or an action that otherwise closes prosecution in the application (whichever is earlier), but before payment of the Issue Fee, and therefore the fee of $180.00 under 37 C.F.R. § 1.17(p) is being remitted, and a Statement Under 37 C.F.R. § 1.97(e).

In compliance with the concise explanation requirement under 37 C.F.R. § 1.98(a)(3) for foreign language documents, Applicant encloses herewith a copy of a Communication from the Chinese patent office in a counterpart application citing such documents, together with an English-language version (if not already included) of at least that portion of the Communication

indicating the degree of relevance found by the Chinese patent office. Applicant also submits herewith an English language abstract for Japanese Patent Application Publication No. 2003-75858 A.

Applicant notes that U.S. Patent Application Publication No. 2005/0124221 A1, cited on the enclosed Communication from the Chinese patent office, was previously cited by the Examiner in an Office Action dated January 29, 2009 as U.S. Patent No. 7,164,586.

The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicant does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/ S. Stuart Lee /

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: May 21, 2009

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 163 of 305

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q102146
Joon KANG, et al.	
Appln. No.: 11/872,057	Group Art Unit: 2835
Confirmation No.: 8128	Examiner: Michail V. Datskovskiy
Filed: October 15, 2007	
For: PANEL TYPE DISPLAY DEVICE	

STATEMENT UNDER 37 C.F.R. § 1.97(e)

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

The undersigned hereby states, upon information and belief:

That unless otherwise noted in the accompanying Information Disclosure Statement, each item of information contained in the Information Disclosure Statement filed concurrently herewith was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of said Information Disclosure Statement.

Respectfully submitted,

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: May 21, 2009

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

23373 7590 05/07/2009

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EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 05/07/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

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	08/07/2009

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.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 165 of 305

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **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)

23373 7590 05/07/2009

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

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.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

TITLE OF INVENTION: PANEL TYPE DISPLAY DEVICE

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	08/07/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
DATSKOVSKIY, MICHAIL V	2835	361-692000

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.

1 _____

2 _____

3 _____

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

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.

❑ 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).

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.

Petitioner Manufacturing Resources International, Inc.
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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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

23373 7590 05/07/2009

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 05/07/2009

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 45 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 45 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.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Petitioner Manufacturing Resources International, Inc.
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Notice of Allowability	Application No.	Applicant(s)	
	11/872,057	KANG ET AL.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

-- 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 *04/29/2009*.

2. ☒ The allowed claim(s) is/are *1-7 and 9-11*.

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)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Michael V Datskovskiy/ Primary Examiner, Art Unit 2835	05/05/2009

Petitioner Manufacturing Resources International, Inc.
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REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: The claims 1-7 and 9-11 are allowable over the prior art of record for the following reasons: Claims 1-7: Allowable subject matter was indicated in the previous office action and successfully included in the amended claims. Claims 9-11 are allowable for at least the reason that the prior art fails to teach or suggest a panel display device comprising: a case; a partition plate for dividing an interior of the case into first and second cooling fluid paths; a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path, wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

2. Discovered prior art references teach a panel display device comprising: a case; a partition plate for dividing an interior of the case into first and second cooling fluid paths; a display panel mounted between the partition plate and a front surface of the

case to be cooled by air flowing in the first cooling fluid path; and at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path, wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted. However, each of them teaches the first cooling path in the space between a rear surface of the display panel and an inner surface of the partition, and the second cooling path in the space in which the circuit board is mounted located between said partition and an inner surface of the case.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

05/05/2009
/Michael V Datskovskiy/
Primary Examiner, Art Unit 2835

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11872057	KANG ET AL.
	Examiner	**Art Unit**
	Michael V Datskovskiy	2835

ORIGINAL		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
361	692	H	0	5	K	7 / 20 (2006.01.01)					

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
361	695	697			
313	582				
349	58				

☐ 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														
2	2														
3	3														
4	4														
5	5														
6	6														
7	7														
	8														
8	9														
9	10														
10	11														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	10	
/Michael V Datskovskiy/ Primary Examiner.Art Unit 2835	05/05/2009	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Petitioner Manufacturing Resources International, Inc.
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11872057	KANG ET AL.
	Examiner	**Art Unit**
	Michael V Datskovskiy	2835

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
361	687, 690-697, 714-724	01/23/2009	M.D.
165	185, 121, 122, 104.33	01/23/2009	M.D.
454	184	01/23/2009	M.D.
349	58, 59, 60, 61	01/23/2009	M.D.
313	17, 46, 582, 584	01/23/2009	M.D.
345	82-87, 156, 905	01/23/2009	M.D.
	Updated	05/05/2009	M.D.

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
EAST Search, History included	01/23/2009	M.D.
EAST Search, including Interference, History included	05/05/2009	MD..

INTERFERENCE SEARCH			
Class	**Subclass**	**Date**	**Examiner**
361	692, 695, 697	05/05/2009	M.D.
313	582	05/05/2009	M.D.
349	58	05/05/2009	M.D.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 8128

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/872,057	10/15/2007 RULE	362	2835	Q102146

APPLICANTS

Joon KANG, Seoul, KOREA, REPUBLIC OF;
Jin Hyun Cho, Seoul, KOREA, REPUBLIC OF;
Jeong Su Lim, Suwon-si, KOREA, REPUBLIC OF;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

REPUBLIC OF KOREA 10-2007-0002081 01/08/2007

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

11/02/2007

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	KOREA, REPUBLIC OF	3	11	2

35 USC 119(a-d) conditions met ☑ Yes ☐ No ☐ Met after Allowance

Verified and Acknowledged /MICHAIL V DATSKOVSKIY/ Examiner's Signature

Initials

ADDRESS

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037
UNITED STATES

TITLE

PANEL TYPE DISPLAY DEVICE

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1030	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4	(("6198222") or ("6104451") or ("4980848") or ("7184586")).PN.	USPAT	OR	OFF	2009/05/05 13:04
L2	4	(("6198222") or ("6104451") or ("4980848") or ("7164586")).PN.	USPAT	OR	OFF	2009/05/05 13:07
L3	0	(display or monitor or screen) same (partition same (display adj panel)) same (circuit adj board) same (airpath or airflow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:11
L4	0	(display or monitor or screen) same partition same (display adj panel) same (circuit adj board) same (airpath or airflow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:12
L5	69	(display or monitor or screen) same partition same (airpath or airflow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:12
L6	36	(display or monitor or screen) same partition same (display adj panel) same (circuit adj board)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:15
L7	36	6 not 5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:15
L8	17	("20020109969" | "20030050002" | "4557095" | "4716493" | "4980848" | "5928076" | "6043979" | "6081425" | "6100468" | "6104451" | "6186890" | "6229584" | "6324056" | "6459577" | "6597569").PN. OR ("7269009").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 13:27

Petitioner Manufacturing Resources International, Inc.
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L9	457	(display or monitor or screen) and (separat$3 with (circuit adj board)) same (air cooling or airpath or airflow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:35
L10	279	(display) and (separat$3 with (circuit adj board)) same (air cooling or airpath or airflow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:35
L11	8	("20030071551" | "20030094296" | "20030102789" | "20030169573" | "5705860" | "5971566" | "6477039" | "6633126"). PN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 13:48
L12	18	("20040036819" | "20050047067" | "5541618" | "5661500" | "5663741" | "5674553" | "5724054" | "5786794" | "5952782" | "5971566" | "6373702" | "6411353" | "6630916" | "6707436" | "6894739" | "6946798" | "7164586" | "RE37444"). PN. OR ("7457120").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 13:49
L13	14	("20030020152" | "20030068487" | "20050078446" | "4442450" | "4689720" | "5268815" | "5287001" | "5971566" | "6043981" | "6049469" | "6381124" | "6388189" | "6504713" | "6870738").PN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 13:50
L14	5	("6160349" | "6359390" | "6646391").PN. OR ("6946798").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 13:51
L15	2621	(display) and (circuit or (circuit adj board)) same (air or cooling or airpath or airflow) with (channel or duct or plenum)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:58
L16	2274	(display) and (circuit or (circuit adj board)) same (air or airpath or airflow) with (channel or duct or plenum)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:58

Petitioner Manufacturing Resources International, Inc.
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L17	1129	(display) and (circuit or (circuit adj board)) with (air or airpath or airflow) with (channel or duct or plenum)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/05 13:59
L18	17	(display) and (circuit or (circuit adj board)) with (air or airpath or airflow) with (channel or duct or plenum)	EPO; JPO; IBM_TDB	OR	ON	2009/05/05 13:59
L19	67	17 and "361"/$.ccls.	US-PGPUB; USPAT	OR	ON	2009/05/05 14:01
L20	10	17 and "454"/184.ccls.	US-PGPUB; USPAT	OR	ON	2009/05/05 14:03
L21	2	(("6833674") or ("6744186")).PN.	USPAT	OR	OFF	2009/05/05 15:04
L22	10	("5831374" | "5971566"). PN. OR ("6744186").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 15:07
L23	10	("5086509" | "6366264" | "6525786").PN. OR ("6833674").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 15:08
L24	16	("20040223299" | "20060082271" | "20060164804" | "20060199514" | "20070103863" | "20070103864" | "20070103865" | "20070103866" | "20080083527" | "4652101" | "4958500" | "5623392" | "5869919" | "6697250" | "6833674" | "7164586").PN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/05/05 15:09
L25	1082	(313/582).CCLS.	US-PGPUB	OR	OFF	2009/05/05 15:23
L26	867	(349/58).CCLS.	US-PGPUB	OR	OFF	2009/05/05 15:23
L27	1190	(361/692,695,697).CCLS.	US-PGPUB	OR	OFF	2009/05/05 15:23
L28	0	25 and (display or monitor or screen) same partition same (airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:24
L29	0	26 and (display or monitor or screen) same partition same (airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:24
L30	1	27 and (display or monitor or screen) same partition same (airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:24

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L31	2	25 and (display) and (separat$3 with (circuit adj board)) same (air cooling or airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:24
L32	1	26 and (display) and (separat$3 with (circuit adj board)) same (air cooling or airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:25
L33	7	27 and (display) and (separat$3 with (circuit adj board)) same (air cooling or airpath or airflow)	US-PGPUB	OR	ON	2009/05/05 15:25

5/5/09 3:26:26 PM

Petitioner Manufacturing Resources International, Inc.
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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q102146
Joon KANG, et al.	
Appln. No.: 11/872,057	Group Art Unit: 2835
Confirmation No.: 8128	Examiner: Michail V. Datskovskiy
Filed: October 15, 2007	

For: PANEL TYPE DISPLAY DEVICE

AMENDMENT UNDER 37 C.F.R. § 1.111

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

Sir:

In response to the Office Action dated January 29, 2009, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE CLAIMS 2

REMARKS 6

AMENDMENTS TO THE CLAIMS

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

LISTING OF CLAIMS:

1. (original): A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other, and

wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

2. (original): The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting

Petitioner Manufacturing Resources International, Inc.
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part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

3. (original): The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. (original): The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. (original): The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. (original): The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and

Petitioner Manufacturing Resources International, Inc.
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air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

7. (original): The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. (canceled).

9. (currently amended): A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path.

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wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and

wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

10. (original): The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

11. (original): The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

Petitioner Manufacturing Resources International, Inc.
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REMARKS

Claims 1-7, and 9-11 are all the claims pending in the application. Claims 1 and 9 have been amended herein. Claim 8 has been cancelled without prejudice or disclaimer. This Response, submitted in reply to the Office Action dated January 29, 2009, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Preliminary Matters

Applicant wishes to thank the Examiner for indicating that the subject matter of claims 3-8 was allowable if rewritten in independent form including the limitations of the base claims and any intervening claims.

Claim Rejections- 35 U.S.C. § 102

The following is a summary of rejections set forth in the office action:

1. Claims 1, 2, 9, 10 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Chang (U.S. Patent 6,198,222).
2. Claims 1, 9-11 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Matsuoka et al. (U.S. Patent 6,104,451).
3. Claims 1, 9-11 stand rejected under 35 U.S.C. § 102(b) as allegedly being clearly anticipated by Griffin et al. (U.S. Patent 4,980,848).
4. Claims 1, 2, and 9-11 stand rejected under 35 U.S.C. § 102(b) as allegedly being clearly anticipated by Lin (U.S. Patent 7,164,586).

Claim 1

As discussed above, the Examiner has indicated that the subject matter of claim 8 was allowable if rewritten in independent form including the limitations of the base claims and any intervening claims. Claim 1 has been amended herein to include the subject matter of claim 8. Therefore, Applicant respectfully submits that claim 1 and all claims dependant thereon are now allowable and respectfully requests that the rejections of these claims be withdrawn.

Petitioner Manufacturing Resources International, Inc.
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Claim 9

Claim 9 recites:

> A panel display device comprising:
>
> a case;
>
> a partition plate for dividing an interior of the case into first and second cooling fluid paths;
>
> a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and
>
> at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path,
>
> wherein the partition plate divides the case into a first space in which the display panel is mounted and a separate second space in which the circuit board is mounted, and
>
> wherein the first cooling path comprises the space between a rear surface of the display panel and an inner surface of the case and the second cooling path comprises the space in which the circuit board is mounted.

Applicant respectfully submits that none of the applied references show a case which has a partition plate, which divides the case into separate spaces in which the display panel and the circuit board are mounted. Further, Applicant submits also submits that the applied references do not teach a first cooling path which "comprises the space between a rear surface of the display panel and an inner surface of the case" and a second cooling path which "comprises the space in which the circuit board is mounted" as claimed. Therefore, Applicant respectfully submits that claim 9 and all claims dependant thereon are patentable over the applied reference for at least these reasons and respectfully requests that these rejections be withdrawn.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Petitioner Manufacturing Resources International, Inc.
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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880 via EFS payment screen. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Michael C. Jones/
Michael C. Jones
Registration No. 63,266

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 29, 2009

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 186 of 305

Electronic Acknowledgement Receipt

EFS ID:	5239729
Application Number:	11872057
International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Michael Christopher Jones/Tanya Lee
Filer Authorized By:	Michael Christopher Jones
Attorney Docket Number:	Q102146
Receipt Date:	29-APR-2009
Filing Date:	15-OCT-2007
Time Stamp:	11:32:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Q102146_Amendment_111.pdf	78251 0c323dc57b6e7ecfe8d4bdebf101b966013abba1	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	8
Warnings:			
Information:			
	Total Files Size (in bytes):	78251	

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.

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/872,057	10/15/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ 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 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	04/29/2009	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 10	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		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 $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						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:
/VENESSA JONES/

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.
11/872,057	10/15/2007	Joon KANG	Q102146	8128

23373 7590 01/29/2009

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

MAIL DATE	DELIVERY MODE
01/29/2009	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.

Office Action Summary	Application No.	Applicant(s)	
	11/872,057	KANG ET AL.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

-- 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 *15 October 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) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 9-11* is/are rejected.

7)☒ Claim(s) *3-8* 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 *15 October 2007* 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 *10/15/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

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.

2. Claims 1, 2, 9, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang (US Patent 6,198,222).

Chang teaches a panel display device 10, Figs. 1-4, comprising: a case 14, 16; a display panel 12 mounted in an interior of the case; at least one circuit board 36 which controls the display panel 12; a first cooling fluid path which cools the display panel 12; and a second cooling fluid path which cools the circuit board 36, wherein the first and second cooling fluid paths are separated from each other, and wherein the case includes front 14 and rear 16 cases coupled to each other, and the rear case 16 includes a circuit board mounting part 26 provided on an outer surface of the rear case such that the circuit board 36 is mounted in the circuit board mounting part 26. Chang also teaches a partition plate 44 for dividing an interior of the case into first and second cooling fluid paths, wherein air inlets and outlets 24 are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

3. Claims 1, 9-11 are also rejected under 35 U.S.C. 102(b) as being anticipated by Matsuoka et al (US Patent 6,104,451).

Matsuoka et al teach a panel display device 10, Figs. 1-4, comprising: a case 14, 16; a display panel 12 mounted in an interior of the case; at least one circuit board 36 which controls the display panel 12; a first cooling fluid path which cools the display panel 12; and a second cooling fluid path which cools the circuit board 36, wherein the first and second cooling fluid paths are separated from each other, and wherein the case includes front 14 and rear 16 cases coupled to each other, and the rear case 16 includes a circuit board mounting part 26 provided on an outer surface of the rear case such that the circuit board 36 is mounted in the circuit board mounting part 26. Chang also teaches a partition plate 44 for dividing an interior of the case into first and second cooling fluid paths, wherein air inlets and outlets 24 are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path, and wherein a plurality of air flow holes 1040, 1041, 1042 through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

4. Claims 1, 9-11 are also rejected under 35 U.S.C. 102(b) as being clearly anticipated by Griffin et al (US Patent 4,980,848).

5. Claims 1, 2 and 9-11 are also rejected under 35 U.S.C. 102(b) as being clearly anticipated by Lin (US Patent 7,164,586).

Although Lin does not discuss an air path cooling a display panel, there are vents at a top and bottom sides of a front case , which inherently would provide the air path cooling the display panel 10.

Allowable Subject Matter

6. Claims 3-8 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.

7. The following is a statement of reasons for the indication of allowable subject matter: The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on the circuit board mounting part (claims 3, 4, 6); The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part (claim 5); The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit

board mounting part and the cover (claim 7); The panel display device as claimed in claim 1, wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part (claim 8).

8. The prior art made of record provided in the PTO Form 892 and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571)272-2040. The examiner can normally be reached on 8:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Ganghi can be reached on (571) 272-3740. 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.

01/23/2009

/Michael V Datskovskiy/
Primary Examiner, Art Unit 2835

Notice of References Cited	Application/Control No. 11/872,057	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Michael V. Datskovskiy	Art Unit 2835	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,198,222	03-2001	Chang, Shan-Han	313/582
*	B	US-4,980,848	12-1990	Griffin et al.	361/687
*	C	US-6,104,451	08-2000	Matsuoka et al.	349/58
*	D	US-7,164,586	01-2007	Lin, Yu-Kai	361/714
*	E	US-6,833,674	12-2004	Kaneko et al.	313/587
*	F	US-2007/0081109 A1	04-2007	Igarashi, Yoshihiro	349/058
*	G	US-7,269,009	09-2007	Ryu et al.	361/692
*	H	US-7,369,400	05-2008	Bang et al.	361/681
*	I	US-5,869,919	02-1999	Sato et al.	313/17
*	J	US-5,971,566	10-1999	Tani et al.	362/294
*	K	US-7,224,121	05-2007	Ahn, Joong-Ha	313/582
	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11872057	KANG ET AL.
	Examiner	**Art Unit**
	Michael V Datskovskiy	2835

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	01/23/2009								
	1	✓								
	2	✓								
	3	O								
	4	O								
	5	O								
	6	O								
	7	O								
	8	O								
	9	✓								
	10	✓								
	11	✓								

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 198 of 305

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11872057	KANG ET AL.
	Examiner	Art Unit
	Michael V Datskovskiy	2835

SEARCHED			
Class	Subclass	Date	Examiner
361	687, 690-697, 714-724	01/23/2009	M.D.
165	185, 121, 122, 104.33	01/23/2009	M.D.
454	184	01/23/2009	M.D.
349	58, 59, 60, 61	01/23/2009	M.D.
313	17, 46, 582, 584	01/23/2009	M.D.
345	82-87, 156, 905	01/23/2009	M.D.

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search, History included	01/23/2009	M.D.

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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BIB DATA SHEET

CONFIRMATION NO. 8128

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/872,057	10/15/2007 RULE	362	2835	Q102146

APPLICANTS

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Jin Hyun Cho, Seoul, KOREA, REPUBLIC OF;
Jeong Su Lim, Suwon-si, KOREA, REPUBLIC OF;

**** CONTINUING DATA **************************

**** FOREIGN APPLICATIONS **************************

REPUBLIC OF KOREA 10-2007-0002081 01/08/2007

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

11/02/2007

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	KOREA, REPUBLIC OF	3	11	2

35 USC 119(a-d) conditions met ☑ Yes ☐ No ☐ Met after Allowance

Verified and Acknowledged /MICHAIL V DATSKOVSKIY/ Examiner's Signature

Initials

ADDRESS

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037
UNITED STATES

TITLE

PANEL TYPE DISPLAY DEVICE

FILING FEE RECEIVED		
1030	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1383	display and (first and second) with (cooling with (path or flow))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 12:34
L2	536	display same panel and (first and second) with (cooling with (path or flow))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 12:34
L3	6	("20050047067" | "6549403" | "6807051" | "7014558" | "7164586" | "7269009").PN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:43
L4	17	("20020109969" | "20030050002" | "4557095" | "4716493" | "4980848" | "5928076" | "6043979" | "6081425" | "6100468" | "6104451" | "6186890" | "6229584" | "6324056" | "6459577" | "6597569").PN. OR ("7269009").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:45
L5	50	("4496943" | "4571456" | "4617640" | "4742478" | "4839837").PN. OR ("4980848").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:50
L6	16	("4084213" | "4751872" | "4952925" | "5163870" | "5252955" | "5381043" | "5398991" | "5432526" | "5583529" | "5606341" | "5623392" | "5684674" | "5869919").PN. OR ("6043979").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:53

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L7	67	("3844650" | "3895866" | "4563067" | "4652101" | "4671634" | "4763993" | "4772098").PN. OR ("4952925").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:56
L8	25	("4563617" | "4899080" | "4952925" | "5185554" | "5313362" | "5345362" | "5499868").PN. OR ("5869919").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 12:57
L9	14	("4771365" | "5869919" | "5971566").PN. OR ("6198222").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:00
L10	27	("20030147036" | "4904079" | "5183323" | "5207505" | "5402312" | "5508782" | "5634711" | "5831816" | "5907222" | "6007205" | "6104451" | "6181070" | "6181553" | "6198222" | "6255786" | "6265820" | "6353295" | "6417832" | "6469449" | "6476560" | "6476883" | "6575599" | "6671177" | "6693381" | "6775134" | "H001876" | "RE36060").PN. OR ("7286347").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:01
L11	4	("4652932" | "6198222" | "6494429").PN. OR ("7206039").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:03
L12	50	("4496943" | "4571456" | "4617640" | "4742478" | "4839837").PN. OR ("4980848").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:08
L13	28	("5363227" | "5831816" | "5867148" | "6008870").PN. OR ("6104451").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:10

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L14	23	("20030020152" | "20030068487" | "20050078446" | "4442450" | "4689720" | "5268815" | "5287001" | "5971566" | "6043981" | "6049469" | "6381124" | "6388189" | "6504713" | "6870738").PN. OR ("7164586").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:14
L15	25	("4646349" | "5400408" | "5568357" | "5689574" | "5761322" | "5796854" | "5818942" | "5970161" | "6130658" | "6411720").PN. OR ("6807051").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:16
L16	847	1 not 2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:21
L17	252	16 and (plazma or LCD or flat)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:21
L18	342198	(display or monitor) with (plazma or LCD or flat)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:24
L19	58395	18 and (cooling or heat)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:24
L20	4482	19 and (air with (inlet or outlet or vent or exhaust))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:25
L21	551	20 and (first and second) with path	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:25

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L22	512	21 not 2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:26
L23	501	22 not 17	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:26
L24	15	23 and "361"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:27
L25	22	("20020167794" | "20030063462" | "20030136545" | "20030189829" | "20040001310" | "20040070934" | "20050073639" | "4039890" | "4574330" | "5255109" | "5383340" | "5606341" | "5748269" | "5990615" | "6052280" | "6275220" | "6324055" | "6439731" | "6515857" | "6522543" | "6552899" | "6737790").PN. OR ("7352582").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:27
L26	0	22 not 17	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:29
L27	0	20 and (first and second) with path	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:30
L28	104	19 and (air with (inlet or outlet or vent or exhaust))	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:30
L29	380	20 and "361"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:40
L30	365	29 not 24	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:40

Petitioner Manufacturing Resources International, Inc.
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L31	337	30 not 2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:40
L32	12	("5757615").PN. OR ("6519146").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 13:52
L33	168	19 and ((display adj panel) with (inlet or outlet or vent or exhaust))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 13:55
L34	23	"361"/$.ccls. and ((display adj panel) with (inlet or outlet or vent))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:44
L35	1010	"361"/$.ccls. and ((display) and air with (inlet or outlet or vent))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:46
L36	339	"361"/$.ccls. and ((display with (LCD or pla$1ma or flat)) and air with (inlet or outlet or vent))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:47
L37	42	36 not 29	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:47
L38	10	("4189281" | "4692091" | "4895489" | "5000079" | "6027307" | "6198222" | "6254343" | "6833674" | "6853553" | "6948912").PN. OR ("7190578").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 14:48
L39	8	("5086509" | "6366264" | "6525786").PN. OR ("6833674").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 14:49
L40	385	("313"/$.ccls. or "345"/$.ccls. or "349"/$.ccls.) and (((display with (LCD or pla$1ma or flat)) and air with (inlet or outlet or vent)))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:52

Petitioner Manufacturing Resources International, Inc.
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L41	357	40 not (29 or 36)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 14:53
L42	2	("5971566").PN. OR ("7224121").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 15:04
L43	38	("4546407" | "5146354" | "5831374").PN. OR ("5971566").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 15:16
L44	60	("3844650" | "4154007" | "4194833" | "4222641" | "4294524" | "4349817" | "4365869" | "4368963" | "4372639" | "4386836" | "4403216" | "4409583" | "4514042").PN. OR ("4763993").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/23 15:21
L45	74	1 and (natural adj conve$1tion)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/23 15:23

1/ 23/ 09 3:25:38 PM

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11/872,057
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	~~Unknown~~ Michael Datskovsky
	Attorney Docket Number	Q102146

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	2001-264754	JP	A	2001-09-26	NEC CORP		☐
	2	2006-162641	JP	A	2006-06-22	MATSUSHITA ELECTRIC IND CO LTD		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	11/872,057
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	2835
	Examiner Name	~~Unknown~~ Michael Datskovsky
	Attorney Docket Number	Q102146

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature	/Michail Datskovskiy/	Date Considered	01/23/2009

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

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/872,057	10/15/2007	Joon KANG	Q102146

CONFIRMATION NO. 8128

23373
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
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WASHINGTON, DC 20037

PUBLICATION NOTICE

OC000000030893498

Date Mailed: 07/10/2008

Title:PANEL TYPE DISPLAY DEVICE

Publication No.US-2008-0165496-A1
Publication Date:07/10/2008

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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.

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Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 209 of 305

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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
11/872,057	10/15/2007	2875	1030	Q102146	11	2

CONFIRMATION NO. 8128

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WASHINGTON, DC 20037

FILING RECEIPT

OC00000026586047

Date Mailed: 11/09/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. 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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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**

Applicant(s)

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Jeong Su Lim, Suwon-si, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

Samsung Electronics Co., Ltd., Suwon-si, KOREA, REPUBLIC OF

Power of Attorney: The patent practitioners associated with Customer Number 23373

Domestic Priority data as claimed by applicant

Foreign Applications

REPUBLIC OF KOREA 10-2007-0002081 01/08/2007

If Required, Foreign Filing License Granted: 11/02/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 11/872,057**

Projected Publication Date: 07/10/2008

Non-Publication Request: No

Early Publication Request: No

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 210 of 305

Title

PANEL TYPE DISPLAY DEVICE

Preliminary Class

362

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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Exhibit 1002 - Page 212 of 305

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/872,057	10/15/2007	Joon KANG	Q102146

CONFIRMATION NO. 8128

23373
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC20037

Date Mailed. 11/08/2007

NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 07/10/2008. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently http://pair.uspto.gov. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice should be directed to the Office of Patent Publication at 1-888-786-0101.

PART 1 - ATTORNEY/APPLICANT COPY

MODIFIED FORM PTO/SB/05 (07-07)

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	Q102146
First Inventor	Joon KANG
Title	PANEL TYPE DISPLAY DEVICE
Express Mail Label No.	

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria VA 22313-1450

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

1. ☐ Fee Transmittal Form (e.g., PTO/SB/17)
   (Submit an original and duplicate for fee processing)
2. ☐ Applicant claims small entity status.
   See 37 CFR 1.27.
3. ☑ Specification [Total Pages 14]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☑ Drawing(s) (35 U.S.C. 113) [Total Sheets 3]
5. Oath or Declaration [Total Sheets 4]
   a. ☑ New executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTORS
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☑ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
   ☐ Landscape Table on CD
8. ☐ Nucleotide and/or Amino Acid Sequence Submission
   (if applications, items a. – c. are required)
   c. ☐ Computer Readable Form (CRF)
   d. Specification Sequence Listing on:
   ii. ☐ CD-ROM or CD-R (2 copies); or
   iii. ☐ Paper
   e. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
   Name of Assignee SAMSUNG ELECTRONICS CO., LTD.
10. ☐ 37 CFR 3.73(b) Statement ☑ Power of Attorney
    (when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☑ Information Disclosure Statement (PTO/SB/08 or PTO-1449)
    ☑ Copies of foreign patent documents, publications, & other information
13. ☐ Preliminary Amendment
14. ☐ Return Receipt PostCard (MPEP 503)
    (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
    (if foreign priority is claimed)
16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i)
    Applicant must attach form PTO/SB/35 or equivalent.
17. ☑ Priority is claimed from:
    SEE ATTACHED
18. ☐ Other:

19. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No:

Prior application information: Examiner Art Unit:

20. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number:

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

OR ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
County		Telephone		Email Address	

Signature	/darrylmexic/	Date	October 15, 2007
Name (Print/Type)	Darryl Mexic	Registration No. (Attorney/Agent)	23,063

UTILITY PATENT APPLICATION TRANSMITTAL
ADDITIONAL PAGE

Priority is claimed from:

Country	Application No	Filing Date
KR	10-2007-0002081	January 8, 2007

PANEL TYPE DISPLAY DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from Korean Patent Application No. 10-2007-0002081, filed on January 8, 2007, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the invention

[0002] Apparatuses consistent with the present invention relate generally to a panel type display device and, more particularly, to a panel type display device capable of minimizing temperature increase in the interior of a case and a display panel.

2. Description of the Related Art

[0003] A panel type display device, such as a Liquid Crystal Display (LCD) or a Plasma Display Panel (PDP), has a flat type panel on which images are displayed. The panel type display device has a thinner thickness and a lighter weight as compared with those of a conventional cathode ray tube (CRT) display device.

[0004] As disclosed in Japanese Patent Unexamined Publication No. 2006-162641, such a display device includes a case having front and rear cases, a display panel mounted in an interior of the case, and circuit boards mounted in the

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interior of the case to be electrically connected to the display panel. Air inlets through which air flows are formed at a lower portion of the rear case, and air outlets through which air is exhausted are formed at an upper portion of the rear case. Air flowing through the lower air inlets cools down the display panel and the circuit boards in the interior of the case, and is then exhausted through the upper air outlets.

[0005] However, in such a display device, a display panel and circuit boards, from which heat is produced, are mounted in the same space, such as the interior of a case. For this reason, there is a problem in that the internal temperature of the case is increased due to inter-heating between the display panel and the circuit boards. Such a temperature increase causes the surface temperature of a display panel to be increased. In the case of an LCD panel, the temperature increase causes deterioration of the liquid crystal.

SUMMARY OF THE INVENTION

[0006] Accordingly, the present invention has been made to address the above-mentioned problems occurring in the related art, and an aspect of the present invention is to provide a panel type display device capable of minimizing temperature increase in the interior of a case and a display panel.

[0007] Therefore, according to an aspect of the present invention, there is provided a panel display device, which includes: a case; a display panel mounted in an interior of the case; at least one circuit board which controls the display

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panel; a first cooling fluid path which cools the display panel; and a second cooling fluid path which cools the circuit board, wherein the first and second cooling fluid paths are separated from each other.

[0008] Further, the case may include front and rear cases coupled to each other, and the rear case may include a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

[0009] Furthermore, the circuit board mounting part may have an open rear while being recessed from the outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, may be mounted on the circuit board mounting part.

[0010] In addition, the first cooling fluid path may include a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path may include an internal space of the circuit board mounting part.

[0011] Further, air inlets through which air flows in the first cooling fluid path may be formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path may be formed at an upper portion of the rear case.

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[0012] According to another aspect of the present invention, there is provided a panel type display device, which includes: a case; a partition plate for partitioning an interior of the case into first and second cooling fluid paths; a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other aspects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0014] FIG. 1 is sectional view of a panel type display device according to a first exemplary embodiment of the present invention;

[0015] FIG. 2 is an exploded perspective view of the panel type display device according to the first exemplary embodiment of the present invention; and

[0016] FIG. 3 is a sectional view of a panel type display device according to a second exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0017] Hereinafter, exemplary embodiments of the present invention will be described with reference to the accompanying drawings.

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[0018] FIGS. 1 and 2 illustrate a panel type display device according to a first embodiment of the present invention. The display device includes a case 10, a display panel 20 mounted at an inner front of the case 10, and a plurality of circuit boards 31, 32 and 33 mounted at a rear of the case 10.

[0019] The case 10 includes a front case 11 coupled to the display panel 20 at a front thereof and having an opening 13 formed at a screen portion, and a rear case 12 of which an edge portion is coupled to the front case 11 at a rear of the display panel 20.

[0020] The display panel 20 may be an LCD or a PDP. The circuit substrates 31, 32 and 33 are electrically connected to the display panel 20 through a flexible wiring part (not shown). A plurality of electronic components are mounted on the circuit substrates 31, 32 and 33. The plurality of electronic components constitute a driving circuit for controlling light emission of the display panel 20, a control circuit, a tuning circuit, a power circuit and the like.

[0021] As illustrated in FIG. 2, circuit board mounting parts 41, 42 and 43 for respectively mounting the circuit boards 31, 32 and 33 are provided on a rear surface of the rear case 12. Each of the circuit board mounting parts 41, 42 and 43 has an open rear while being recessed in a predetermined depth from rear to front of the rear case 12 such that the circuit boards 31, 32 and 33 can be received in the circuit board mounting parts 41, 42 and 43, respectively. Further, covers

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51, 52 and 53 for covering the circuit board mounting parts 41, 42 and 43 are mounted thereon, respectively.

[0022] As illustrated in FIG. 1, a plurality of air inlets 61 through which air for cooling the display panel 20 can flow in an interior of the case 10 are formed at a lower portion of the rear case 12, and a plurality of air outlets 62 through which air in the interior of the case 10 can be exhausted are formed at an upper portion of the rear case 12. Further, as illustrated in FIG. 2, a plurality of air flow holes 71 and 72 through which air can flow in internal spaces of the circuit board mounting parts 41, 42 and 43 are formed on the covers 51, 52 and 53 for respectively covering the circuit board mounting parts 41, 42 and 43.

[0023] As illustrated in FIG. 1, such components independently constitute a first cooling fluid path 60 for cooling the display panel 20 and second cooling fluid paths 70 for respectively cooling the circuit boards 31, 32 and 33. That is, the first cooling fluid path 60 is formed by a space between a rear surface of the display panel 20 and an inner surface of the rear case 12, and the second cooling fluid paths 70 are respectively formed by internal spaces of the circuit board mounting parts 41, 42 and 43 of the rear case 12. Thus, the first and second cooling fluid paths 60 and 70 are separated from one another.

[0024] Therefore, the display panel 20 is cooled by air flowing along the first cooling fluid path 60. Air flowing in through the air inlets 61 cools the display panel 20 while rising along the first cooling fluid path 60, and is then exhausted

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through the upper air outlets 62. Further, each of the circuit boards 31, 32 and 33 is cooled by air flowing in an interior of the second cooling fluid path 70 through the air flow holes 71 and 72 formed on each of the covers 51, 52 and 53. Air flowing in the first and second cooling fluid paths 60 and 70 respectively cools the display panel 20 and the circuit boards 31, 32 and 33 while flowing from bottom to top of the first and second cooling fluid paths 60 and 70 due to a natural convection phenomenon.

[0025] In such a cooling structure, heat produced from the circuit boards 31, 32 and 33 can be discharged through the second cooling fluid paths 70 without influencing the display panel 20, and heat produced from the display panel can also be discharged through the first cooling fluid path 60 without influencing the circuit boards 31, 32 and 33. Accordingly, the display panel 20 and the circuit boards 31, 32 and 33 can be smoothly cooled, and thus temperature increase in the interior of the case 10 can be minimized. As an experimental result, such a cooling structure enabled a temperature of a front portion of the display panel to be dropped by about 5 to 7℃ as compared with a cooling structure of the conventional display device.

[0026] In FIG. 2, the circuit board mounting parts 41, 42 and 43 are recessed from rear to front of the rear case 12. However, the present invention is not limited thereto but may be implemented in such a manner that circuit boards are

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mounted to protrude from an outer surface of a rear case, and respectively covered with covers.

[0027] FIG. 3 is a sectional view of a panel type display device according to a second exemplary embodiment of the present invention. In the second embodiment, a partition plate 500 for partitioning a cooling fluid path is mounted on an inner surface of a rear case 120. Thus, in the state in which circuit boards 32 are mounted on an inner surface of the partition plate 500, the partition plate 500 can be mounted on the inner surface of the rear case 120. That is, a circuit board mounting part is replaced by the partition plate 500. Further, a plurality of air flow holes 710 and 720 for air flow of a second cooling fluid path 700 are formed on the rear case 120. A first cooling fluid path 60 and air inlets and outlets 61 and 62 respectively formed at lower and upper portions of the rear case 120 are identical with those of the first embodiment. That is, the first and second cooling fluid paths 60 and 700 are separated from each other by the partition plate 500 mounted on the inner surface of the rear case 120 in the second embodiment.

[0028] As described above, in a panel type display device consistent with the present invention, first and second cooling fluid paths for respectively cooling a display panel and circuit boards are separated from each other, thereby preventing a phenomenon in which the circuit boards are heated by the heat of the display panel or the display panel is heated by the heat of the circuit boards. Accordingly, there is an advantage in that the cooling efficiency for the display panel and the

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circuit boards is enhanced, so that temperature increase in the interior of a case and the display panel can be minimized.

[0029] Although exemplary embodiments of the present invention have been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

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WHAT IS CLAIMED IS:

1. A panel display device comprising:

a case;

a display panel mounted in an interior of the case;

at least one circuit board which controls the display panel;

a first cooling fluid path which cools the display panel; and

a second cooling fluid path which cools the circuit board,

wherein the first and second cooling fluid paths are separated from each other.

2. The panel display device as claimed in claim 1, wherein the case includes front and rear cases coupled to each other, and the rear case includes a circuit board mounting part provided on an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part.

3. The panel display device as claimed in claim 2, wherein the circuit board mounting part has an open rear while being recessed from an outer surface of the rear case such that the circuit board is mounted in the circuit board mounting part, and a cover for covering the circuit board mounting part, on which

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a plurality of air flow holes are formed, is mounted on the circuit board mounting part.

4. The panel display device as claimed in claim 3, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

5. The panel display device as claimed in claim 2, wherein the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

6. The panel display device as claimed in claim 4, wherein air inlets through which air flows in the first cooling fluid path are formed at a lower portion of the rear case, and air outlets through which air is exhausted from the first cooling fluid path are formed at an upper portion of the rear case.

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7. The panel display device as claimed in claim 2, wherein a cover for covering the circuit board mounting part, on which a plurality of air flow holes are formed, is mounted on an outer rear surface of the rear case, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the rear case, and the second cooling fluid path includes a space confined by the circuit board mounting part and the cover.

8. The panel display device as claimed in claim 1, wherein the case includes a circuit board mounting part provided on a rear surface of the case and partitioned from a space in which the display panel is mounted such that the circuit board is received in the circuit board mounting part, the first cooling fluid path includes a space between a rear surface of the display panel and an inner surface of the case, and the second cooling fluid path includes an internal space of the circuit board mounting part.

9. A panel display device comprising:

a case;

a partition plate for dividing an interior of the case into first and second cooling fluid paths;

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a display panel mounted between the partition plate and a front surface of the case to be cooled by air flowing in the first cooling fluid path; and

at least one circuit board mounted between the partition plate and a rear surface of the case to be cooled by air flowing in the second cooling fluid path.

10. The panel display device as claimed in claim 9, wherein air inlets and outlets are formed at lower and upper portions of the case, respectively, for allowing air to flow into the first cooling fluid path.

11. The panel display device as claimed in claim 9, wherein a plurality of air flow holes through which air flows are formed on the rear surface of the case for allowing air to flow into the second cooling fluid path.

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ABSTRACT OF THE DISCLOSURE

A panel type display device for minimizing temperature increase in the interior of a case and a display panel. The display device includes a case, a display panel mounted in an interior of the case, at least one circuit board for controlling the display panel, a first cooling fluid path for cooling the display panel, and a second cooling fluid path for cooling the circuit board. In the display device, the first and second cooling fluid paths are separated from each other.

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Fig. 1

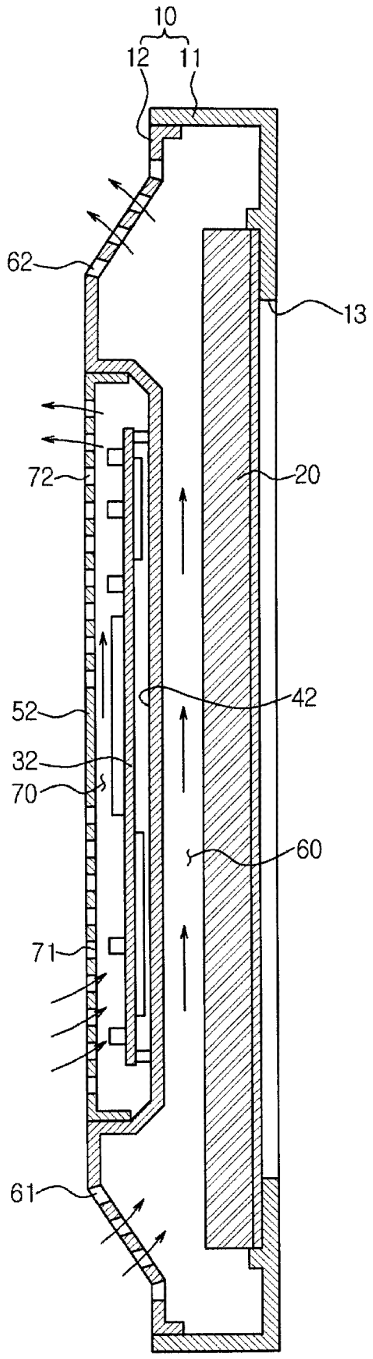


Fig. 2

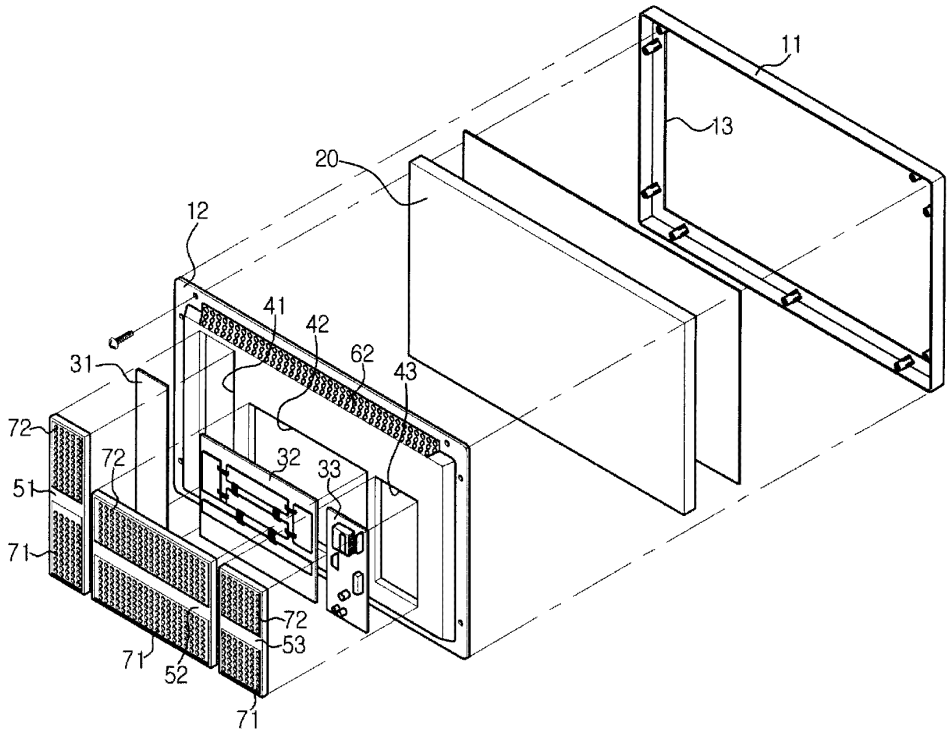
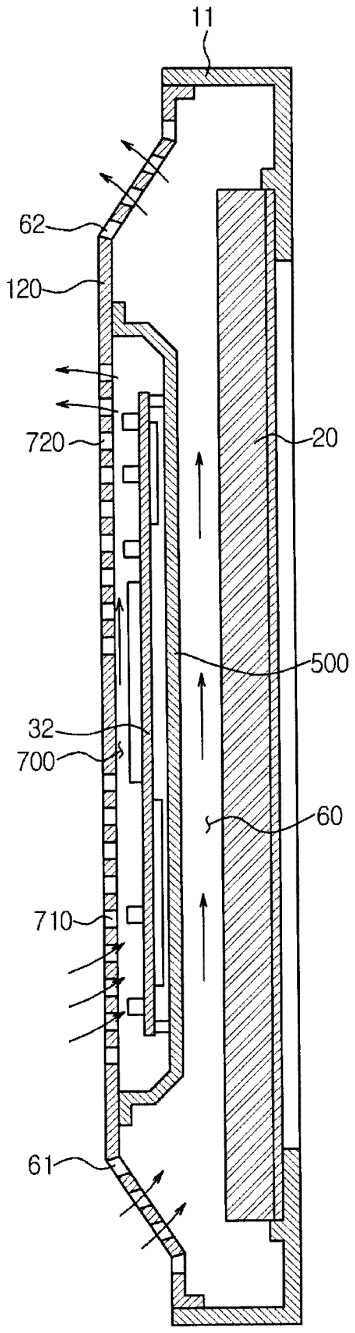


Fig. 3



Docket No.: Q102146

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (37 C.F.R. 1.63)

특허 출원 관련 선언 및 위임장

Korean Language Declaration

한국어 선언서

본인은 다음과 같이 선언합니다.

I hereby declare that:

각 발명자의 거주지, 우편 주소 및 국적은 하기 각 발명자의 성명의 아래칸에 기재된 것과 동일합니다.

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

본인은, 하기의 발명자(들)이, 다음의 제목을 갖는 발명과 관련하여 특허를 받고자 하며 또 특허청구 범위에 기재되어 있는 대상에 대하여 원래의 최초 발명자(들)이라고 믿습니다.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

_____

_____

_____

_____

_____

PANEL TYPE DISPLAY DEVICE

본원 명세서는,

☐ 첨부된 바와 같습니다.

또는

☐ 미합중국 출원번호 또는 PCT 국제 출원 번호는 _____ (확인번호 _____)로 _____ 일에 출원되었고 _____ 일에 보정되었음 (해당 경우).

the specification of which:

☒ is attached hereto

OR

☐ was filed on as United States Application Number or PCT International Application Number (Confirmation No.__), and was amended on _____ (if applicable).

본인은 위에 구체적으로 언급된 보정서에 의해 보정된 상기 명세서 (특허청구 범위 포함)의 내용을 검토 및 이해했음을 확인합니다.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

본인은 연방 규정 코드 제 37 장 제 1.56 항에 규정된 바에 따라, 특허성의 판단에 중요한 자료 정보를 공개할 의무가 있음을 인정하며, 이와 같은 의무에는, 부분 연속 출원(들)의 경우에, 선 출원의 출원일과 부분 연속 출원의 국내 출원일 혹은 PCT 국제 출원일 사이에 입수되었던 중요한 자료 정보를 공개하는 것이 포함됨을 인정합니다.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for continuation-in-part application(s), material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Korean Language Declaration

본인은 아래 기재된 바와 같은 외국 특허출원(들), 외국 발명자증 출원(들) 또는 외국 식물 육종가 권리증 출원(들)에 기초하여 미합중국 코드 제 35 장 제 119(a)-(d)항 또는 (f)항, 또는 365(b)항에 규정된 외국 우선권 혹은 미합중국을 제외한 최소한 한 국가를 지정하는 PCT 국제출원(들)에 기초하여 미합중국 코드 제 35 장 제 365(a)항에 규정된 외국 우선권을 주장하며, 나아가 우선권이 주장되는 출원의 출원일 이전에 출원된 외국 특허출원(들), 외국 발명자증 출원(들) 혹은 외국 식물육종가 권리증(들) 또는 PCT 국제출원(들)도 아래 해당란을 체크함으로써 표시하였습니다.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application(s) which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application(s) having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)
이전의 외국 출원번호(들)

(Application Number) (출원 번호)	(Country) (국가)	(Filing Date) (출원 일자)	Priority Claimed? 우선권 주장함 Yes 예	No 아니오
10-2007-0002081	KR	January 8, 2007	☒	☐
			☐	☐

본인은 미합중국 코드인 제 35 장 제 119(e)항에 명시된 바와 같이 하기 미합중국 가출원의 국내 우선권을 주장합니다.

I hereby claim domestic priority under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

(Application Number) (출원 번호)	(Filing Date) (출원 일자)

본인은 미합중국 코드 제 35 장 제 120 항에 의거 미합중국 출원(들)의 이익 또는 제 365(c)항에 의거 미합중국을 지정하는 PCT 국제출원(들)의 이익을 하기와 같이 주장합니다. 또한, 본 특허출원의 각 특허청구범위에 기재된 대상이 미합중국 코드 제 35 장 제 112 항의 첫번째 패러그패프에 규정된 바에 따라 선 미합중국 출원 또는 선 PCT 국제출원에 기재되어 있지 않은 경우에는, 본 출원의 특허성을 판단하는데 중요한 자료 정보로서 선 출원의 출원일과 본 출원의 국내 출원일 또는 PCT 국제 출원일 사이에 발생한 모든 자료 정보들을 공개할 의무가 있음을 인정합니다.

I hereby claim benefit under 35 U.S.C. 120 of any United States application(s) or 365(c) of any PCT international application(s) designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge my duty to disclose any information material to the patentability of this application as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. or International Application Number(s)
이전의 국내 또는 국제 출원 번호(들)

(Application Number) (출원 번호)	(Filing Date) (출원 일자)	(Status: patented, pending, abandoned) (현황: 특허 획득, 출원중, 포기)

본인이 아는 한도 내에서 여기에 제공된 모든 내용이 사실이고, 제공된 정보나 소신이 모두 사실임을 확인하며, 더 나아가 미합중국 코드 제 18 장의 1001 항에 명시된 바와 같이 그 외의 허위 진술 및 이와 유사한 행위는 벌금이나 투옥으로 처벌 받거나 벌금과 감옥형을 모두 받을 수 있고 어떠한 고의의 허위 진술은 특허 출원이나 후에 발급된 특허의 유효성을 위태롭게 함을 인지하면서 여기에 진술함을 선언합니다.

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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Korean Language Declaration

위임장: 본인은 본건 출원을 수행하고 그와 관련하여 미국 특허상표청 업무의 모든 사무를 처리하기 위하여 하기 표기한 USPTO 고객 번호에 등재된 SUGHRUE MION, PLLC 의 모든 변호사들을 본인의 대리인으로 지명하는 바이며, 해당 고객 번호에 등재된 어떤 특정 변호사들이 Sughrue Mion, PLLC 의 재량에 따라 수시로 변동될 수 있음을 인정하며, 출원에 대한 모든 서신을 동일한 USPTO 고객 번호에 기재된 주소로 송부해 줄 것을 요청합니다.

POWER OF ATTORNEY: I hereby appoint all attorneys of **SUGHRUE MION, PLLC** who are listed under the USPTO Customer Number shown below as my attorneys to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, recognizing that the specific attorneys listed under that Customer Number may be changed from time to time at the sole discretion of Sughrue Mion, PLLC, and request that all correspondence about the application be addressed to the address filed under the same USPTO Customer Number.

STATEMENT OF ACCURATE TRANSLATION IN ACCORDANCE WITH 37 C.F.R. §1.69(b):

The declaration and power of attorney is an accurate translation of the corresponding English language declaration and power of attorney.

Signature

Date 10. 24. 2006

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

직통 전화 번호:

SUGHRUE MION, PLLC
(202) 293-7060

Direct Telephone Calls to:

SUGHRUE MION, PLLC
(202) 293-7060

NAME OF SOLE OR FIRST INVENTOR: 단독 혹은 최초 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외) Joon		Family Name or Surname 성(姓) KANG	
Inventor's signature 발명자의 서명		Date 일자 09/03/2007	
Residence: 거주지: Seoul, Republic of Korea			Citizenship 국적 Republic of Korea
Mailing Address: 우편 주소: #301, Minwoo-officetel, 602-27, Namhyeon-dong, Gwanak-gu, Seoul, Republic of Korea			
NAME OF SECOND INVENTOR: 두번째 발명자의 성명			
Given Name (first and middle [if any]) 이름(성씨는 제외) Jin Hyun		Family Name or Surname 성(姓) CHO	
Inventor's signature 발명자의 서명		Date 일자 09/01/2007	
Residence: 거주지: Seoul, Republic of Korea			Citizenship 국적 Republic of Korea
Mailing Address: 우편 주소: #202-104, Apgujeong-dong, Gangnam-gu, Seoul, Republic of Korea			

NAME OF THIRD INVENTOR: 세번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외) Jeong Su	Family Name or Surname 성(姓) LIM	
Inventor's signature 발명자의 서명	Date 일자 09/03/2007	
Residence: 거주지: Suwon-si, Republic of Korea	Citizenship 국적 Republic of Korea	
Mailing Address: 우편 주소: #107-105, Jugong Apt., Weoncheon-dong, Yeongtong-dong, Suwon-si, Gyeonggi-do, Republic of Korea		

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	Q102146
	Application Number	
Title of Invention	PANEL TYPE DISPLAY DEVICE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Joon		KANG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Seoul	Country Of Residence[i]	KR
Citizenship under 37 CFR 1.41(b)[i]	KR		

Mailing Address of Applicant:

Address 1	#301, Minwoo-officetel, 602-27,
Address 2	Namhyeon-dong, Gwanak-gu,

City	Seoul	State/Province	
Postal Code		Country[i]	KR

Applicant 2

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jin Hyun		CHO	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Seoul	Country Of Residence[i]	KR
Citizenship under 37 CFR 1.41(b)[i]	KR		

Mailing Address of Applicant:

Address 1	#202-104, Apgujeong-dong,
Address 2	Gangnam-gu,

City	Seoul	State/Province	
Postal Code		Country[i]	KR

Applicant 3

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jeong Su		LIM	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Suwon-si	Country Of Residence[i]	KR

PTO/SB/14 (07-07)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	Q102146
	Application Number	
Title of Invention	PANEL TYPE DISPLAY DEVICE	

Citizenship under 37 CFR 1.41(b) [i]	KR		
Mailing Address of Applicant:			
Address 1	#107-105, Jugong Apt., Weoncheon-dong,		
Address 2	Yeongtong-dong, Gyeonggi-do,		
City	Suwon-si	**State/Province**	
Postal Code		**Country** [i]	KR

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	23373		
Email Address	sughrue@sughrue.com	Add Email	Remove Email

Application Information:

Title of the Invention	PANEL TYPE DISPLAY DEVICE		
Attorney Docket Number	Q102146	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	3	**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	Q102146
	Application Number	
Title of Invention	PANEL TYPE DISPLAY DEVICE	

Customer Number	23373

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
10-2007-0002081	KR	2007-01-08	(•) Yes ( ) No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1			
If the Assignee is an Organization check here. ☑			
Organization Name	Samsung Electronics Co., Ltd.		
Mailing Address Information:			
Address 1	416, Maetan-dong, Yeongtong-gu,		
Address 2	Gyeonggi-do,		
City	Suwon-si	**State/Province**	
Country [i]	KR	Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 239 of 305

PTO/SB/14 (07-07)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	Q102146
	Application Number	
Title of Invention	PANEL TYPE DISPLAY DEVICE	

Signature	/darrylmexic/			Date (YYYY-MM-DD)	2007-10-15
First Name	Darryl	Last Name	Mexic	Registration Number	23063

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 241 of 305

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Docket No: Q102146
Joon KANG, et al.	
Appln. No.: Not Yet Determined	
Confirmation No.: Not Yet Determined	Group Art Unit: Not Yet Determined
Filed: October 15, 2007	Examiner: Not Yet Determined
For: PANEL TYPE DISPLAY DEVICE	

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

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

Sir:

In accordance with the duty of disclosure under 37 C.F.R. § 1.56, Applicant hereby notifies the U.S. Patent and Trademark Office of the documents which are listed on the attached PTO/SB/08 A & B (modified) form and/or listed herein and which the Examiner may deem material to patentability of the claims of the above-identified application.

One copy of each of the listed documents is submitted herewith.

In compliance with the concise explanation requirement under 37 C.F.R. § 1.98(a)(3) for foreign language documents, Applicant submits the following explanations: English language abstracts, submitted herewith, constitute concise statements of relevance for Japanese Patent Application Publication Nos. 2001-264754 and 2006-162641.

The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicant does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

Respectfully submitted,

/darrylmexic/

_____

Darryl Mexic
Registration No. 23,063

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: October 15, 2007

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 243 of 305

PTO/SB/08a (05-07)
Approved for use through 09/30/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	
	Examiner Name	Unknown
	Attorney Docket Number	Q102146

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2001-264754	JP	A	2001-09-26	NEC CORP		☐
	2	2006-162641	JP	A	2006-06-22	MATSUSHITA ELECTRIC IND CO LTD		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	
	Examiner Name	Unknown
	Attorney Docket Number	Q102146

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Petitioner Manufacturing Resources International, Inc.
Exhibit 1002 - Page 245 of 305

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	2007-10-15
	First Named Inventor	Joon KANG
	Art Unit	
	Examiner Name	Unknown
	Attorney Docket Number	Q102146

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☑ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/darrylmexic/	Date (YYYY-MM-DD)	2007-10-15
Name/Print	Darryl Mexic	Registration Number	23063

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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PATENT ABSTRACTS OF JAPAN

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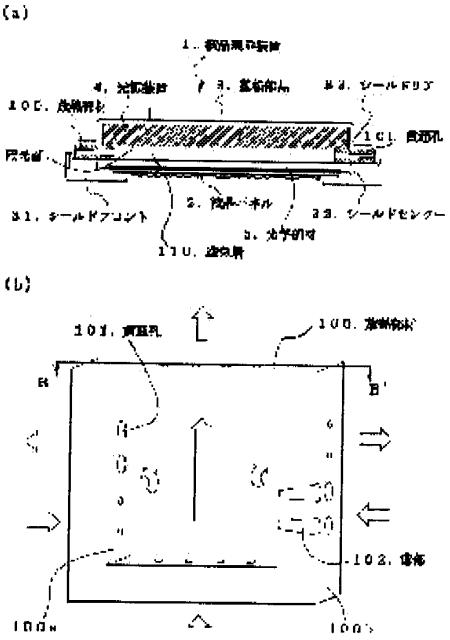
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(54) LIQUID CRYSTAL DISPLAY DEVICE AND LIGHT SOURCE DEVICE USED FOR THE SAME

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a liquid crystal display device capable of preventing heat accumulation of a liquid crystal panel without reducing brightness and to provide its manufacturing method and a light source device used for the liquid crystal display device.
SOLUTION: The liquid crystal display device is characterized in that an illumination surface nearly flush with a light source device 4 is opposed to the back surface of the liquid crystal panel 2 or the back surface of an optical member 5 through an air layer.



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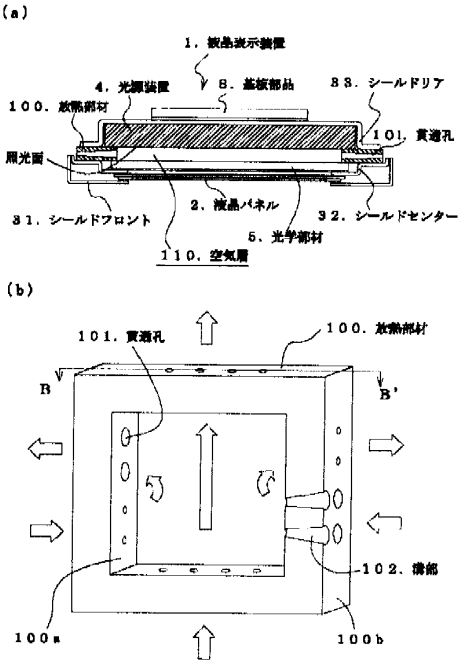
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最終頁に続く

(54)【発明の名称】　液晶表示装置及びそれに用いられる光源装置

(57)【要約】
【目的】輝度を低下させることなく液晶パネルの熱蓄積を防ぐ液晶表示装置及びその製造方法並びに液晶表示装置に用いられる光源装置を提供する。
【構成】光源装置４の略面一の照光面が液晶パネル２の裏面又は光学部材５の裏面に空気層を介して対向してなることを特徴とする。



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【特許請求の範囲】
【請求項１】光源装置の略面一の照光面が液晶パネルの裏面又は光学部材の裏面に空気層を介して対向してなることを特徴とする液晶表示装置。
【請求項２】拡散板を介して照射対象と略平行に対向して光源装置が設けられた液晶表示装置において，前記光源装置と拡散板との間に空気層が設けられると共に光源装置の照射対象側には略面一の照光面が設置されたことを特徴とする液晶表示装置。
【請求項３】前記空気層は放熱部材が拡散板と光源装置の照射面とに挟持されてなることを特徴とする請求項１又は請求項２に記載の液晶表示装置。
【請求項４】前記光源装置は直下型の光源装置の照射側に所定の透過率を有する照射面を備えた光源装置であることを特徴とする請求項１乃至請求項３の何れか一に記載の液晶表示装置。
【請求項５】前記光源装置はサイドライト型の光源装置であることを特徴とする請求項１乃至請求項３の何れか一に記載の液晶表示装置。
【請求項６】前記放熱部材には、内周面と外周面とを貫通する一以上の貫通孔が設けられたことを特徴とする請求項１乃至請求項５の何れか一に記載の液晶表示装置。
【請求項７】前記貫通孔の形状がテーパ形状をなすことを特徴とする請求項６に記載の液晶表示装置。
【請求項８】前記貫通孔の形状が空気の流入経路に基づいて設定されたことを特徴とする請求項７に記載の液晶表示装置。
【請求項９】前記放熱部材には、内周面と外周面とを貫通する一以上の溝部が設けられたことを特徴とする請求項１乃至請求項５の何れか一に記載の液晶表示装置。
【請求項１０】前記溝部の形状がテーパ形状をなすことを特徴とする請求項９に記載の液晶表示装置。
【請求項１１】前記溝部の形状が空気の流入経路に基づいて設定されたことを特徴とする請求項１１に記載の液晶表示装置。
【請求項１２】前記放熱部材と光源装置とが一体に成型されたことを特徴とする請求項１乃至請求項１１に記載の液晶表示装置。
【請求項１３】照光面の周縁部に突出部を有し、係る突出部には内周面と外周面とを貫通する一以上の貫通孔が設けられたことを特徴とする光源装置。
【請求項１４】前記貫通孔の形状がテーパ形状をなすことを特徴とする請求項１３に記載の光源装置。
【請求項１５】前記貫通孔の形状が空気の流入経路に基づいて設定されることを特徴とする請求項１４に記載の光源装置。
【請求項１６】照光面の周縁部に突出部を有し、係る突出部には、内周面と外周面とを連通する一以上の溝部が設けられたことを特徴とする光源装置。
【請求項１７】前記溝部の形状がテーパ形状をなすことを特徴とする請求項１６に記載の光源装置。
【請求項１８】前記溝部の形状が空気の流入経路に基づいて設定されることを特徴とする請求項１６又は請求項１７に記載の光源装置。
【発明の詳細な説明】
【０００１】
【発明の属する分野】本発明は、液晶パネル及び光学部材の温度上昇を防ぐ構造を有する液晶表示装置及びそれに用いられる光源装置に関するものである。
【０００２】
【従来の技術】近年、液晶表示装置の大型化が進むにつれて液晶表示装置の高輝度化、広視野角化に対する要望が強くなってきている。液晶表示装置の高輝度化を実現するために、液晶パネルの透過率（開口率）の増加や光利用効率の改善などがなされているが、これらには限界があり、バックライト、すなわち光源装置の輝度を増加させる手段が一般に行われている。また、広視野角化に関しても、前記液晶パネルの透過率（開口率）が犠牲となる場合があり、係るデメリットを補うために光源装置の輝度を増加させる技術を採択する手段が有効である。従って、光源装置のさらなる高輝度化を実現することが液晶表示装置の高輝度化及び広視野角化に十分な効果をもたらすこととなる。
【０００３】しかしながら、上述したように光源装置の輝度の増加は、光源への入力電力を増加させることが必要であり、光源の発光メカニズムに注目すれば、そのエネルギーの数十%が熱として損失されることが一般に知られている。すなわち、光源への入力電力の増加に伴い、熱損失も増加すると共に光源の発熱量も増大する。光源の発熱量が上昇すると、光源装置の近傍に設置された液晶パネルの温度も上昇し、係る液晶パネルには温度特性があるために液晶表示装置としての表示品質が損なわれるおそれがあった。従って、液晶パネルの表示品質を低下させないように高輝度化が実現できる液晶表示装置が求められていた。
【０００４】このような問題を解決する手段として、液晶表示装置の筐体の裏面にファンやヒートシンクが設置された構造がなされていた。以下に、従来の液晶表示装置及びそれに用いられる光源装置について図面を用いて説明する。図７（ａ）は、液晶表示装置の従来の構成を示す斜視図である。図７（ａ）に示すように、液晶表示装置１は、液晶パネル２及び光源装置等（図示せず）を内蔵した筐体３と、係る筐体３の裏面に設置された放熱部材７及び基板部品８とからなる。前記筐体３の表面側を構成するシールドフロント３１には開口部３１ａが設けられ、係る開口部３１ａに液晶パネル２の表面の一部が露出されて、その露出部分が液晶表示装置１の表示面をなしている。また、前記放熱部材７は筐体３の裏面側を構成するシールドリア（図示せず）に直接設置されており、係るシールドリアの材質としては熱伝導性が高

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く、軽量であるアルミニウム等が多く用いられていた。このようにして、放熱性の高いシールドリアを介して光源装置から放出される熱を外部に放出していた。ここで、前記液晶パネル２の表面とは液晶パネル２の表示面を指し、以後、液晶パネル２以外の表面の記載についても、液晶パネル２の表面と同様の方向に位置する面を表面と記載すると共に、係る表面の裏側の面を裏面と記載する。

【０００５】次に、図７（ａ）のＡ－Ａ‘断面図である図７（ｂ）を参照して液晶表示装置の内部の構造について以下に説明する。図７（ｂ）に示すように、液晶表示装置１は略板形状の液晶パネル２と拡散板等の光学部材５と光源装置４とが略平行に、かつ相互に対向して設置されている。前記液晶パネル２はシールドフロント３１とシールドセンター３２とに狭持され、光学部材５及び光源装置４はシールドセンター３２及びシールドリア３３に狭持されている。また、放熱部材７及び基板部品８はシールドリア３３の裏面に設置されている。このようにして、シールドフロント３１とシールドセンター３２とシールドリア３３とが互いにネジ等によって固定されて液晶表示装置１が構成されていた。

【０００６】ここで、前記光源装置の構造について、図８を参照して以下に説明する。前記光源装置４の構造には主に直下型構造とサイドライト型構造がある。図８（ａ）は、直下型構造の光源装置を備えた液晶表示装置の断面図であり、図８（ｂ）はサイドライト型構造の光源装置を備えた液晶表示装置の断面図である。図８（ａ）に示すように、直下型構造の光源装置４は、シールドリア３３の略皿形状部分（以下、ランプハウスとする）の内側に反射板４３が設置され、係る反射板４３の近傍には拡散板４３に沿って並列に円柱形状をなす複数の光源４１が設置されていた。また、この直下型構造の光源装置４の照光側には輝度ムラの発生を防ぐために前記光源４１と所定の距離が確保して拡散板等の光学部材５がランプハウスを覆うように設置されていた。次に、図８（ｂ）に示すように、サイドライト型構造の光源装置４は、略板形状の導光板４２と、係る導光板４２の一方の側面部に設置された円柱形状の光源４１と、前記導光板４２の一方の側面部と共に前記光源４１を囲むように設置されたリフレクタとからなる。前記導光板４２は光透過性の高いアクリル等からなり、光源４１からの光が導光板４２を透過して、導光板４２の表面のうち、シールドセンター３２の開口部３２ａの領域から液晶パネル２の裏面を照射していた。また、導光板４２における照射面と反対側の面、すなわち反射板４３を介してシールドリア３３と対向する導光板４２の裏面には、輝度ムラを調整するためにドット等がプリントされたグラデーション加工が施されていた。

【０００７】また、液晶表示装置の従来の放熱構造として、特開昭６１－１７２１８１号公報には直下型構造の光源装置を備えた液晶表示装置において、ランプハウスに通気口を設け、係る通気口に空気を流入させることによって光源装置の放熱を行う技術が開示されている。具体的には、図９に示すように、液晶パネル２を備えたプリント基板３４の裏側に設置される光源装置４にはランプハウス４ａが形成され、係るランプハウス４ａには円柱形状の光源４１が設置されると共に、ランプハウス４ａの対向する側面部の各々には通気口４４が形成されている。また、図９の光源装置４を液晶表示装置に用いた場合の断面図である図１０に示すように、ランプハウス４ａを覆うように光学部材（拡散板）４２が設置され、係る光学部材４２を介して光源４１と対向するように液晶パネル２が設置されていた。

【０００８】

【発明が解決しようとする課題】前述したように、液晶表示装置の表示面の輝度を向上させようとすると、光源装置から液晶パネルに対して輝度の向上に依存した熱放射が生じることは自明である。従って、液晶パネルに対する光源装置の熱放射量は、従来の液晶パネルの輝度を損なわない程度以上であると共に、表示機能を著しく損なわない程度以下であるといった所定の範囲が設定される。しかしながら、筐体の裏面に放熱部材を設置する液晶表示装置の放熱構造においては、筐体及び放熱部材を構成する材料を熱伝導性の高い材料に採択するか、放熱部材の表面積を増加させる程度しか改善の余地がなかった。また、直下型構造の光源装置、特に前述した特開昭６１－１７２１８１号公報に開示された光源装置においては、ランプハウスに貫通孔が設けられることによって、その貫通孔を通して流れる空気により、光源が直接冷却される。すなわち、光源の熱を積極的に外部に逃がしている。しかし、冷陰極管等の光源の輝度は温度によって変動し、室温（２５℃程度）では輝度が低く、四十数℃程度まで発熱した状態で高輝度が得られる。ここで、同公報に開示されているように、放熱効率を上げるために通気孔の大きさを大とすると、光源の温度が低くなりすぎ、輝度の低下を招くおそれがあった。あるいは、室温（点灯時）から適温（輝度最大）までの昇温時間が長くなるおそれがあった。従って、光源の温度が必要以上に低くならないように、放熱効率を下げなければならず、結果として液晶パネルの温度は上昇してしまい、液晶パネルの輝度が下がってしまう結果を招いていた。

【０００９】本発明は、以上の従来技術における問題に鑑みてなされたものであり、輝度を低下させることなく液晶パネルの熱蓄積を防ぐ液晶表示装置及びその製造方法並びに液晶表示装置に用いられる光源装置を提供することを目的とする。

【００１０】

【課題を解決するための手段】前記課題を解決するために提供する本願第一の発明に係る液晶表示装置は、光源

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装置の略面一の照光面が液晶パネルの裏面又は光学部材の裏面に空気層を介して対向してなることを特徴とする。

【００１１】係る構成とすることにより、光源装置から発生する熱を拡散板等の光学部材や液晶パネルの裏面に直接照射することがないため、光学部材や液晶パネルの機能低下を未然に防ぐことができる。特に、直下型構造の光源装置を備えた液晶表示装置においては、光学部材の裏面に対向する光透過板が設置されることによって、それが面光源の照光面をなすと共に、ランプハウスが密閉される。また、本発明の目的は光源の輝度及び液晶パネルの輝度を高くすることにある。従って、光源の輝度が高くなるように光源を必要以上に冷却しないと共に、液晶パネルに対しては光源からの熱によって温度上昇しないように制御する必要がある。すなわち、光源は照光面によって空気層から遮断され、直接冷却されない構成をなすと共に、液晶パネルは空気層によって直接冷却される構成をなしている。このようにすることによって、液晶表示装置の高輝度化と表示品質の保持とを向上させられるように、光源の温度と液晶パネルの温度とをコントロールすることができる。

【００１２】前記課題を解決するために提供する本願第二の発明に係る液晶表示装置は、拡散板を介して照射対象に対向して光源装置が設けられた液晶表示装置において、前記光源装置と拡散板との間に空気層が設けられると共に光源装置の照射対象側には略面一の照光面が設置されたことを特徴とする。

【００１３】係る構成とすることにより、光源装置が照光面を有すると共に、係る照光面と光学部材との間に空気層が形成される。従って、光源装置から光学部材又は液晶パネルに対して光源装置の放射熱が直接照射されることなく、前記空気層によって和らげられ、液晶パネル及び光学部材の機能低下を未然に防ぐことができる。ここで、前記略面一の照光面とは、照射対象である光学部材の裏面若しくは液晶パネルの裏面に対して、少なくとも一部が略平行に対向した光放射面である。

【００１４】前記課題を解決するために提供する本願第三の発明に係る液晶表示装置は、空気層は放熱部材が拡散板と光源装置の照射面とに狭持されてなることを特徴とする。

【００１５】係る構成とすることにより、放熱部材の開口部と光源装置の照光面と光学部材の裏面とが空気層を形成し、係る空気層が液晶パネル若しくは光学部材に対する光源装置の熱放射を緩和する。また、光源装置の大型化に伴って発熱量が大となっても、それに伴って空気層の容量も大とすることができる。

【００１６】前記課題を解決するために提供する本願第四の発明に係る液晶表示装置は、光源装置は直下型の光源装置の照射側に所定の透過率を有する照射面を備えた光源装置であることを特徴とする。

【００１７】係る構成とすることにより、前記照光面が空気層を形成する一部となり、光源と光学部材（拡散板）との距離を確保して、輝度ムラを抑制することができる。ここで、前記所定の透過率とは、照光面自体が拡散板等の光学部材のような機能を備えるものではなく、光源の光量を著しく損なわない程度に透過すればよい。

【００１８】前記課題を解決するために提供する本願第五の発明に係る液晶表示装置は、光源装置はサイドライト型の光源装置であることを特徴とする。

【００１９】前記課題を解決するために提供する本願第六の発明に係る液晶表示装置は、放熱部材には、内周面と外周面とを貫通する一以上の貫通孔が設けられたことを特徴とする。

【００２０】係る構成とすることにより、空気層内に空気が流入し、効率的に空気層内を冷却することができる。従って、光源装置の放射熱によって空気層内に貯まった熱を効率的に放熱し、液晶表示装置の適正な動作を可能にする。

【００２１】前記課題を解決するために提供する本願第七の発明に係る液晶表示装置は、貫通孔の形状がテーパ形状をなすことを特徴とする。

【００２２】係る構成とすることにより空気層内に対流を生じさせやすくし、より効率的な空気層内の放熱を行うことができる。

【００２３】前記課題を解決するために提供する本願第八の発明に係る液晶表示装置は、貫通孔の形状が空気の流入経路に基づいて設定されたことを特徴とする。

【００２４】係る構成とすることにより、液晶表示装置の設置される方向に基づいて、空気層内に流入出（対流）しやすい貫通孔の形状が特定される。たとえば、放熱部材の上下面及び左右面に形成される貫通孔の形状をそれぞれ対流させやすいように特定することによって、より効率的な空気層内の放熱が可能となる。

【００２５】前記課題を解決するために提供する本願第九の発明に係る液晶表示装置は、放熱部材には、内周面と外周面とを貫通する一以上の溝部が設けられたことを特徴とする。

【００２６】係る構成とすることにより、溝部と光源装置の照光面、若しくは溝部と光学部材の裏面とが貫通孔を形成することによって、空気層内に空気を流入出させる放熱構造がなされる。

【００２７】前記課題を解決するために提供する本願第十の発明に係る液晶表示装置は、溝部の形状がテーパ形状をなすことを特徴とする。

【００２８】係る構成とすることにより、空気層内に対流を生じさせやすくし、より効率的な空気層内の放熱を行うことができる。

【００２９】前記課題を解決するために提供する本願第十一の発明に係る液晶表示装置は、溝部の形状が空気の流入経路に基づいて設定されたことを特徴とする。

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【００３０】係る構成とすることにより、液晶表示装置の設置される方向に基づいて、空気層内に流入出（対流）しやすい貫通孔の形状が特定される。たとえば、放熱部材の上下面及び左右面に形成される貫通孔の形状をそれぞれ対流させやすいように特定することによって、より効率的な空気層内の放熱が可能となる。

【００３１】前記課題を解決するために提供する本願第十二の発明に係る液晶表示装置は、放熱部材と光源装置とが一体に成型されたことを特徴とする。

【００３２】係る構成とすることにより、部品点数を削減すると共に、組立工数も軽減し、結果として液晶表示装置の生産コストを抑えることができる。

【００３３】前記課題を解決するために提供する本願第十三の発明に係る液晶表示装置に用いられる光源装置は、照光面の周縁部に突出部を有し、係る突出部には内周面と外周面とを貫通する一以上の貫通孔が設けられたことを特徴とする。

【００３４】係る構成とすることにより、前記突出部の内面と光源装置の照光面と光学部材とが空気層を形成し、係る空気層に空気を流入出させる貫通孔が光源装置によって蓄熱された空気層内を冷却することができる。

【００３５】前記課題を解決するために提供する本願第十四の発明に係る液晶表示装置に用いられる光源装置は、貫通孔の形状がテーパ形状をなすことを特徴とする。

【００３６】係る構成とすることにより、空気層内に対流を生じさせやすくし、より効率的な空気層内の放熱を行うことができる。

【００３７】前記課題を解決するために提供する本願第十五の発明に係る液晶表示装置に用いられる光源装置は、貫通孔の形状が空気の流入経路に基づいて設定されることを特徴とする。

【００３８】係る構成とすることにより、液晶表示装置の設置される方向に基づいて、空気層内に流入出（対流）しやすい貫通孔の形状が特定される。たとえば、放熱部材の上下面及び左右面に形成される貫通孔の形状をそれぞれ対流させやすいように特定することによって、より効率的な空気層内の放熱が可能となる。

【００３９】前記課題を解決するために提供する本願第十六の発明に係る液晶表示装置に用いられる光源装置は、照光面の周縁部に突出部を有し、係る突出部には、内周面と外周面とを連通する一以上の溝部が設けられたことを特徴とする。

【００４０】係る構成とすることにより、溝部と光源装置の照光面、若しくは溝部と光学部材の裏面とが貫通孔を形成することによって、空気層内に空気を流入出させる放熱構造がなされる。従って、そのように形成された貫通孔に空気が流入出し、光源装置によって蓄熱された空気層内を放熱することにより、光学部材及び液晶パネルの蓄熱化を防ぐことができる。

【００４１】前記課題を解決するために提供する本願第十七の発明に係る液晶表示装置に用いられる光源装置は、溝部の形状がテーパ形状をなすことを特徴とする。

【００４２】係る構成とすることにより、空気層内に対流を生じさせやすくし、より効率的な空気層内の放熱を行うことができる。

【００４３】前記課題を解決するために提供する本願第十八の発明に係る液晶表示装置に用いられる光源装置は、溝部の形状が空気の流入経路に基づいて設定されることを特徴とする。

【００４４】係る構成とすることにより、液晶表示装置の設置される方向に基づいて、空気層内に流入出（対流）しやすい貫通孔の形状が特定される。たとえば、放熱部材の上下面及び左右面に形成される貫通孔の形状をそれぞれ対流させやすいように特定することによって、より効率的な空気層内の放熱が可能となる。

【００４５】

【発明の実施の形態】以下に、本発明に係る液晶表示装置及びそれに用いられる光源装置の一実施の形態における構成について図面を参照して説明する。図１は、本発明に係る液晶表示装置の一実施の形態における構成を示す断面図である。図１（ａ）に示すように、本発明に係る液晶表示装置１は、液晶表示装置１の筐体を構成するシールドフロント３１及びシールドセンター３２及びシールドリア３３とそれらに内蔵される液晶パネル２及び光源装置４等とからなる。前記シールドフロント３１及びシールドセンター３２は、それぞれ開口部を有した枠形状をなしている。具体的には、シールドフロント３１及びシールドセンター３２に略板形状の液晶パネル２が狭持されると共に、シールドセンター３２及びシールドリア３３に拡散板等の光学部材５と、放熱部材１００と、光源装置４とが狭持されている。また、シールドリア３３の内面（表面）には反射板（図示せず）を介して光源装置４が設置されると共に、シールドリア３３の外面（裏面）には基板部品８が設置されている。さらに、光学部材５と光源装置４とに狭持された放熱部材１００は開口部を有する枠形状をなし、内周面１００ａと外周面１００ｂとを貫通する貫通孔１０１が一以上形成されている。従って、放熱部材の内面１００ａと光学部材５と光源装置の表面（照射面）とによって形成される空気層１１０と筐体外部とが前記貫通孔１０１によって連通されている。ここで、前記放熱部材の内周面１００ａとは、放熱部材の開口部を厚さ方向に形成する面を指し、前記放熱部材の外周面１００ｂとは、前記内周面１００ａに対して放熱部材１００の外周を構成する面を指す。すなわち、前記放熱部材１００を液晶表示装置に設置したときに、光学部材５及びシールドセンター３２に接する側を表面とし、光源装置４の表面（照射面）及びシールドリア３３に接する側の面を裏面とする。また、放熱部材の外周面１００ｂはシールドセンター３２及びシー

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ルドフロント３１に覆われることなく、液晶表示装置１の端面として外部に露出している。

【００４６】次に、放熱部材の構造について図１（ｂ）を参照して以下に説明する。図１（ｂ）は本発明に係る液晶表示装置の一実施の形態に用いられる放熱部材の斜視図である。図１（ｂ）に示すように、放熱部材１００は開口部を有した略枠形状をなし、内周面１００ａと外周面１００ｂとを貫通する貫通孔１０１が形成されている。また、放熱部材１００には、その内周面１００ａと外周面１００ｂとを連通させる溝部１０２を形成してもよい。この溝部１０２を形成することによって、放熱部材１００を液晶表示装置１に設置した場合に、溝部１０２とシールドリア３３等とが貫通孔を形成することとなる。さらに、前記貫通孔１０１及び溝部１０２はテーパ形状をなしており、そのテーパ形状の形成される方向がそれぞれ設定される。詳しくは、液晶表示装置１及び各貫通孔１０１及び溝部１０２の位置に基づいて、太字の矢印に示すような空気の対流を生じさせるために、前記貫通孔１０１及び溝部１０２の形成される方向が設定される。

【００４７】ここで、図１（ｂ）のＢ－Ｂ‘断面図を図２に示し、貫通孔１０１及び溝部１０２の形状について以下に説明する。図２（ａ）に示すように、放熱部材１００には、内周面１００ａと外周面１００ｂとを貫通するようにテーパ形状をなす貫通孔１０１が複数形成されており、それぞれの貫通孔１０１はその形成される位置に基づいてテーパ形状の形成方向が設定されている。たとえば、液晶表示装置の設置方向が特定された場合、放熱部材１００の下部の外周面１００ａと内周面１００ｂとを貫通する貫通孔１０１は、内周面１００ａに形成される孔径よりも外周面１００ｂに形成された孔径が大に設定される。同様に、放熱部材１００の上部の外周面１００ｂと内周面１００ａとを貫通する貫通孔１０１は、内周面１００ａに形成される孔径よりも外周面１００ｂに形成された孔径が小に設定される。また、放熱部材１００の側部における上半部分に形成された貫通孔１０１及び溝部１０２と、下半部分に形成された貫通孔１０１及び溝部１０２とはそれぞれの方向が異なるように形成される。すなわち、放熱部材１００に形成された貫通孔１０１及び溝部１０２は、図１（ｂ）の太線矢印に示すような空気の対流が行われるように形成される。また、貫通孔１０１及び溝部１０２のテーパ角θは３０°であることが望ましい。さらに、貫通孔１０１及び溝部１０２において孔径が大である一方の孔の面積が他方の孔の面積に対して１１０％以上の面積比を有していることが望ましい。

【００４８】本発明に係る液晶表示装置の一実施の形態に用いられる放熱部材は、図２（ｂ）に示すように、屈曲した貫通孔１０１ａや湾曲した貫通孔１０１ｂが形成された放熱部材であってもよい。このような形状をなす貫通孔を放熱部材に形成することによって、放熱効率を損なうことなく、光源装置の外部に対する光損失を軽減することができる。

【００４９】次に、本発明に係る液晶表示装置に用いられる光源装置の一実施の形態における構成について図面を参照して以下に説明する。図３（ａ）は、本発明に係る液晶表示装置に用いられる光源装置の一実施の形態において直下型構造の光源装置を用いた液晶表示装置の構造を示す断面図である。図３（ａ）に示すように、空気層１１０を介して拡散板等の光学部材５の裏面に対向する光源装置として直下型構造の光源装置４が採用されている。光源装置４には、前記光学部材５の裏面に対向する照射面として光透過板１０３がランプハウス４ａを覆う態様で設置されている。この光透過板１０３は光源４１の拡散機能を備えたものではなく、ランプハウス４ａを密閉空間とするために設けられたものであり、十分に光源４１からの光を透過するものであればよい。すなわち、光透過板１０３がランプハウス４ａを密閉すると共にシールドセンター３２及びシールドリア３３に貫通孔１０１を備えた放熱部材１００が狭持されることによって、空気層１１０が形成される。従って、前記貫通孔１０１及び空気層１１０が形成されたことによる空気の流入が前記貫通孔１０１及び空気層１１０で生じ、光源４１から発生する熱による光学部材５及び液晶パネル２の温度上昇を防ぐことができる。また、ランプハウス４ａの内部に設置された光源４１と光学部材５との距離も十分に確保されるため、直下型構造の光源装置を用いる上で生じやすい輝度ムラの発生を軽減することができる。

【００５０】図３（ｂ）は本発明に係る液晶表示装置に用いられる光源装置の一実施の形態においてサイドライト型構造の光源装置を用いた液晶表示装置の断面図である。図３（ｂ）に示すように、空気層１１０を介して拡散板等の光学部材５の裏面に対向する光源装置としてサイドライト型構造の光源装置４が採用されている。この光源装置４は、導光板４２と、係る導光板４２の一方の端面に設置された光源４１と、その光源４１を覆うように設けられたリフレクタ４３とからなる。光源装置４は、貫通孔１０１が形成された放熱部材１００とシールドリア３３とに狭持されている。また、前記放熱部材１００と係る放熱部材１００の表面側に設置された光学部材５とがシールドリア３３及びシールドセンター３２に狭持されている。ここで、前記放熱部材１００は、開口部を有した略枠形状をなしており、その開口部と前記導光板４２と光学部材５とによって空気層１１０が形成されると共に、前記貫通孔１０１が空気層１１０と外部とを連通している。さらに、光学部材５の表面側には液晶パネル２がシールドセンター３２とシールドフロント３１とに狭持され、シールドフロント３１とシールドセンター３２とシールドリア３３とがネジ等で固定されて液晶表示装置１をなす。以上のような構成をなすことによ

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って、前記貫通孔１０１及び空気層１１０が形成されたことによる空気の流入が前記貫通孔１０１及び空気層１１０で生じ、光源４１から発生する熱による光学部材５及び液晶パネル２の温度上昇を防ぐことができる。また、導光板４２の照射面、すなわち液晶パネル２の裏面と対向する面には、輝度ムラを調整するためにドット等がプリントされたグラデーション加工が施されていた。

【００５１】また、本発明に係る液晶表示装置に用いられる光源装置は略面一の照光面を備えていることから、封止材（シール材）等を介して二枚の透明基板を重ね合わせ、それらによって形成された密閉空間の内部に希ガス類又は水銀蒸気等を封入してなる平面型の光源（以下、面光源とする）を備えた光源装置を用いることも可能である。図３（ｃ）は、このような面光源装置の構造を示す断面図である。図３（ｃ）に示すように、本発明に係る光源装置４はシール材等の封止壁４４を介してスキャン側基板４５とデータ側基板４６とからなる二の透明基板が相互に対向し、二の透明基板と封止壁４４とにより一の密閉空間が形成されてなる。スキャン側基板４５はガラス等からなり、複数の電極４５ａ，４５ｂとそれらを覆うように形成された誘電体層４５ｃと係る誘電体層４５ｃの表面に形成された保護膜４５ｄとが表面に形成される。また、データ側基板４６は、その裏面に誘電体層４６ａと蛍光体４６ｂとが積層されてなる。これらスキャン側基板４５とデータ側基板４６とを封止壁４４を介して焼成することにより、密閉された放電層４７が形成されている。この放電層４７は、その内部に希ガス又は水銀蒸気等が封入されて前記電極に通電されることによってデータ側基板４６の表面を照光面とする光源４１としての機能をなすものである。ここで、前記放電層４７の内部に封入される気体において、希ガス、たとえばスキャナ、ファクシミリ、コピー機等の光源に封入されるキセノンガスは沸点１０８．１３℃、融点－１１１．８℃の気体であるため通常液晶表示装置を用いる環境下（温度範囲）においては温度依存性がない。しかし、冷陰極管に封入される水銀蒸気は、常温で蒸気圧を有すると共に、係る蒸気圧が温度変化に伴って変化する。すなわち、温度依存性がある。従って、図３（ｄ）に示すように、内部に水銀蒸気を封入した放電層４７を有する光源装置４を用いた液晶表示装置１は前記直下型構造の光源装置４と同様に、光源４１と空気層との間に断熱材として光透過板１０３を介在させることが望ましい。係る構造とすることによって、光源４１が冷却されすぎることなく、その一方で照射対象の温度上昇を抑制することができる。

【００５２】また、本発明に係る液晶表示装置の他の実施の形態として、光源装置と放熱部材とを一体に成型することも可能である。図４（ａ）は本発明に係る液晶表示装置の他の実施の形態において直下型の光源装置を備えた構造を示す断面図である。図４（ａ）に示すように、シールドリア３３のランプハウス４ａ以外の領域には、ランプハウス４ａの形成方向と反対の方向に突出した突出部３３ａが形成されている。また、突出部３３ａには、貫通孔１０１が形成されており、係る貫通孔１０１は外方に向かって断面積が小となるようにテーパ形状をなしている。ランプハウス４ａの内部には、反射板６を介して光源４１が複数設置されると共に、ランプハウス４ａを覆うように、光透過板１０３が設置されている。以上のような構成をなすことによって、光透過板１０３と突出部３３ａの内面と液晶表示装置の光学部材（図示せず）とが空気層を形成すると共に、係る空気層に貫通孔１０１が空気を流入させる構成をなす。

【００５３】図４（ｂ）は本発明に係る液晶表示装置の他の実施の形態におけるサイドライト型の光源装置を備えた構造を示す断面図である。図４（ｂ）に示すように、反射板６を介して導光板４２を内面に設置したシールドリア３３の縁部には、導光板４２が設置された方向に突出した突出部３３ａが形成されている。また、突出部３３ａには、貫通孔１０１が形成されており、係る貫通孔１０１は外方に向かって断面積が小となるようにテーパ形状をなしている。さらに、導光板４２における照射面と反対側の面、すなわち反射板４３を介してシールドリア３３と対向する導光板４２の裏面には、グラデーション加工が施されている。この導光板４２の裏面に施されるグラデーション処理は、ドット等がプリントされることによって、輝度ムラを調整する拡散板と同様の機能をなす。加えて、導光板４２の一方の端面には光源４１が設置され、係る光源４１を覆うようにリフレクタ４３が設置されている。以上のような構成をなすことによって、導光板４２と突出部３３ａの内面と液晶表示装置の光学部材（図示せず）とが空気層を形成すると共に、係る空気層に貫通孔１０１が空気を流入させる構成をなす。ここで、本発明に係る液晶表示装置及びそれに用いられる光源装置の他の実施の形態として、光源装置は液晶表示装置の筐体の一部であるシールドリアを含めた構成として説明したが、光源装置が単一の構成をなすものであればこの構成に限定されるものではない。

【００５４】図４（ｃ）は本発明に係る液晶表示装置の他の実施の形態における面光源装置を備えた構造を示す断面図である。図４（ｃ）に示すように、面光源４１及び光透過板１０３を内面に設置したシールドリア３３の縁部には、面光源４１が設置された方向に突出した突出部３３ａが形成されている。すなわち、シールドリア３３と突出部３３ａとが面光源４１及び光透過板１０３を狭持する態様で形成されている。ここで、面光源４１はシール材等の封止壁４４を介してスキャン側基板４５とデータ側基板４６とからなる二の透明基板が相互に対向し、二の透明基板と封止壁４４とにより一の密閉空間（放電層４７）が形成されてなる。この放電層４７は、その内部に希ガス又は水銀蒸気等が封入されて前記スキ

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ャン電極４５に形成された電極（図示せず）に通電されることによってデータ側基板４６の表面を照光面として光源４１としての機能が生じる。前述したように、本発明に係る液晶表示装置も、放電層４７に封入される気体が温度依存性の気体か若しくは温度に依存しない気体かによってその構造を異にする。すなわち、温度依存性の性質を有する気体を放電層に封入する場合には、断熱材として前記光透過板１０３を面光源４１と共にシールドリア３３及び突出部３３ａに狭持させる必要がある。しかし、温度依存性のない気体を放電層の内部に封入する場合には、面光源４１と拡散板等の光学部材５との距離を適正に確保する目的以外には設けられなくてもよい。また、突出部３３ａには、貫通孔１０１が形成されており、係る貫通孔１０１は外方に向かって断面積が小となるようにテーパ形状をなしている。以上のような構成をなすことによって、光透過板１０３又は面光源４１の照光面と突出部３３ａの内面と液晶表示装置の光学部材（図示せず）とが空気層を形成すると共に、係る空気層に貫通孔１０１が空気を流入させる構成をなす。ここで、本発明に係る液晶表示装置及びそれに用いられる光源装置の他の実施の形態として、光源装置は液晶表示装置の筐体の一部であるシールドリアを含めた構成として説明したが、光源装置が単一の構成をなすものであればこの構成に限定されるものではない。

【００５５】（実施例）ここで、本発明に係る液晶表示装置の一実施例として、液晶表示装置の内部に形成される空気層の構成について図面を参照して以下に説明する。本発明に係る液晶表示装置の内部に形成される空気層は、光源装置から発生する熱を効率よく放熱し、拡散板等の光学部材及び液晶パネルの温度上昇を防ぐために設けられたものである。すなわち、空気層は光源装置の照射面と光学部材の裏面との間に設けられる空間であり、前記光源装置の照射面と光学部材の裏面との間の距離を適正化することによって、液晶表示装置の放熱を効率的に行うことができる。従って、前記距離の設定と液晶表示装置の筐体内の温度上昇との関係について本願発明者は、図５及び図６に示すような実験を行った。図５（ａ）に示すように、光源装置をアクリルケース等内に設置し、光源装置を点灯した後、ケース内の温度が飽和した状態の雰囲気温度をＴａ、そのときの光源装置の発光面の中心温度をＴｐ、ケース内の雰囲気温度に対する光源装置の上昇温度をΔＴｐとする。また、図５（ｂ）に示すように、光源装置を液晶表示装置の筐体内に設置し、光源装置を点灯させた後、筐体内の温度が飽和した状態の雰囲気温度をＴｂとする。ここで、ΔＴｐ０が１７℃の光源装置を用い、係る光源装置の照射面と光学部材間の距離ｄ（ｍｍ）をｄ０＝１とした場合、光源装置の許容上昇温度値は、

ΔＴｐｍａｘ＝（液晶パネルの許容温度）－（筐体内の雰囲気温度）－（マージン、個体差）

と、設定することができる。一般に液晶表示装置は実使用状態において、筐体内の雰囲気温度が３５℃程度に達することが知られている。一方、液晶パネルは、その表面温度が所定の温度以上になると表示機能が低下するため、５０℃以下で動作させることが望ましい。また、光学部材に関しても所定の温度以上で変更機能等が低下することが知られている。従って、筐体のマージン、個体差を５℃に設定して上式に適用すると、

$$\Delta T_{pmax} = 50℃ - 35℃ - 5℃ = 10℃$$

となり、ΔＴｐｍａｘは１０℃以下に設定する必要がある。そこで、光源装置の照射面と光学部材間の距離ｄを変化させたときのΔＴｐの実測結果のグラフを図５に示す。図６に示すように、$\Delta T_p \propto -1.614d$という式が明らかにされた。すなわち、ΔＴｐが１５℃以上の光源装置を用いる場合には、

$$\Delta T_p - \Delta T_{pmax} = 1.614(d - d0)$$

とすることができ、この条件を満たすためには、ｄ＝４．３３．．．となる。従って、光源装置の照射面と光学部材間の距離を４．３ｍｍ以上に確保することによって、光学部材及び液晶パネルにおける光源装置からの熱による影響を十分に軽減することができる。

【００５６】また、本発明に係る液晶表示装置及び液晶表示装置に用いられる光源装置は、光源装置の照光面が略面一に形成されるか若しくは、照射対象に対向する照光面を有し、かつ照光面が拡散板等ではない直下型構造の光源装置であれば転用することができる。

【発明の効果】以上説明したように、本発明に係る液晶表示装置及びそれに用いられる光源装置によって、光源装置からの熱を液晶パネル及び光学部材の機能を損なわない程度に効率よく放熱することができる。また、直下型の光源装置を用いた場合には、光源と、拡散板等の光学部材との距離が十分に確保されることとなり、輝度ムラの発生を軽減することができる。従って、本発明に係る液晶表示装置及びそれに用いられる光源装置によって生産コストや組立工数の低減化をはかることができる。

【００５７】

【図面の簡単な説明】

【図１】本発明に係る液晶表示装置の一実施の形態における構成を示す断面図である。

【図２】本発明に係る液晶表示装置の一実施の形態における放熱部材の構造を示す斜視図である。

【図３】本発明に係る液晶表示装置の一実施の形態における光源装置を備えた液晶表示装置の構造を示す断面図である。

【図４】本発明に係る液晶表示装置に用いられる光源装置の構造を示す断面図である。

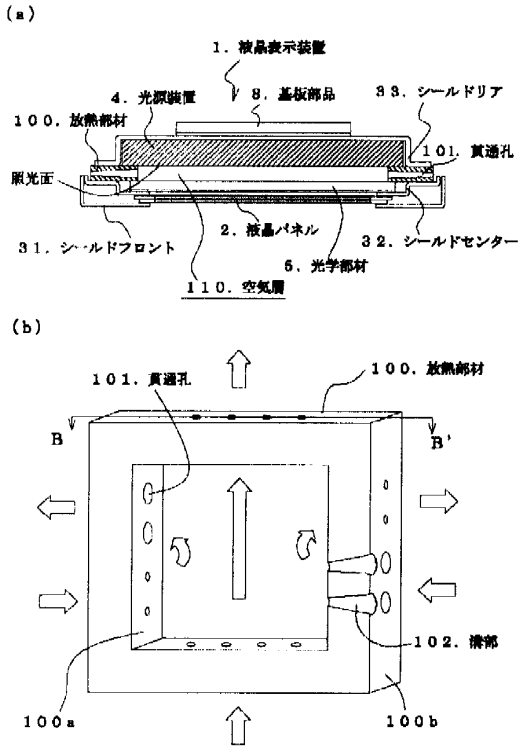
【図５】本発明に係る液晶表示装置の一実施例を説明する図である。

【図６】本発明に係る液晶表示装置の一実施例における

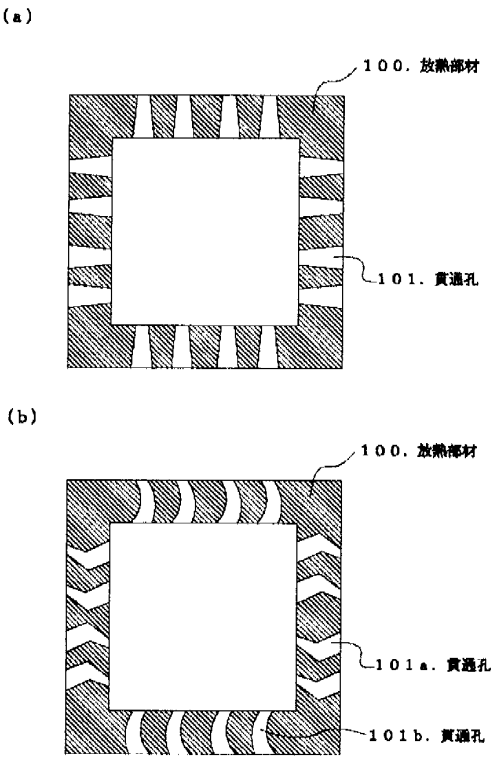
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光源装置の照射面と液晶パネルとの距離と雰囲気温度に対する上昇温度との関係を示すグラフである。
【図７】液晶表示装置の従来の構成を示す斜視図及び断面図である。
【図８】種々の光源装置を備えた液晶表示装置の従来の構成を示す断面図である。
【図９】液晶表示装置の従来の構成を示す斜視図である。
【図１０】液晶表示装置の従来の構成を示す断面図である。
【符号の説明】
１．液晶表示装置
２．液晶パネル
３．筐体
４．光源装置
５．光学部材（拡散板）
６．反射板
７．放熱部材
８．基板部品
３１．シールドフロント
３２．シールドセンター
３３．シールドリア
３４．プリント基板
４１．光源
４２．導光板
４３．リフレクタ
４４．通気孔
１００．放熱部材
１０１．貫通孔
１０２．溝部
１０３．光透過板
１１０．空気層

【図１】

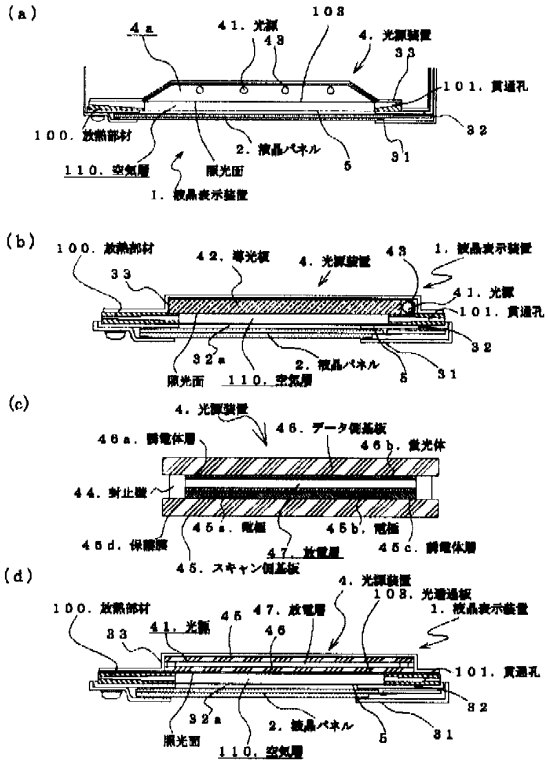


【図２】

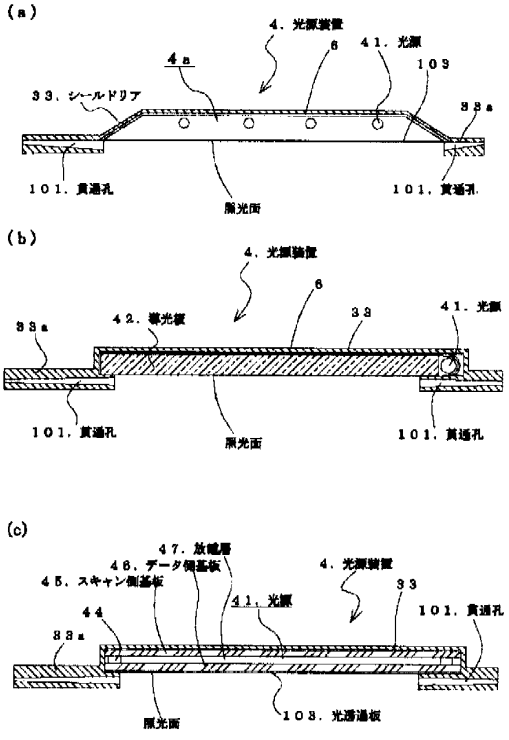


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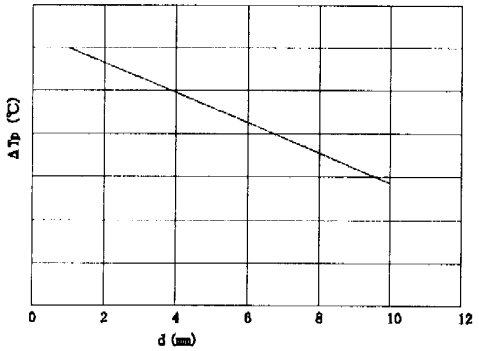
【図3】


(a)
4a
41. 光源
103
43
4. 光源装置
33
101. 貫通孔
100. 放熱部材
32
2. 液晶パネル
5
31
110. 空気層
照光面
1. 液晶表示装置
(b)
100. 放熱部材
42. 導光板
4. 光源装置
43
1. 液晶表示装置
33
41. 光源
101. 貫通孔
32
32a
2. 液晶パネル
照光面
110. 空気層
5
31
(c)
4. 光源装置
46. データ側基板
46a. 誘電体層
46b. 蛍光体
44. 封止壁
45a. 電極
45b. 電極
45d. 保護膜
47. 放電層
45c. 誘電体層
45. スキャン側基板
(d)
100. 放熱部材
4. 光源装置
108. 光透過板
1. 液晶表示装置
41. 光源
45
47. 放電層
46
33
101. 貫通孔
32
32a
2. 液晶パネル
照光面
5
31
110. 空気層

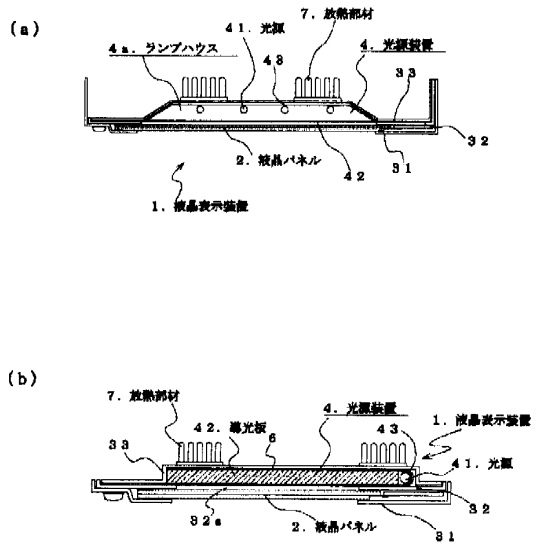
【図4】


(a)
4. 光源装置
6
41. 光源
4a
103
33. シールドリア
33a
101. 貫通孔
照光面
101. 貫通孔
(b)
4. 光源装置
6
33a
42. 導光板
33
41. 光源
101. 貫通孔
照光面
101. 貫通孔
(c)
47. 放電層
46. データ側基板
4. 光源装置
45. スキャン側基板
33
44
41. 光源
101. 貫通孔
33a
照光面
103. 光透過板

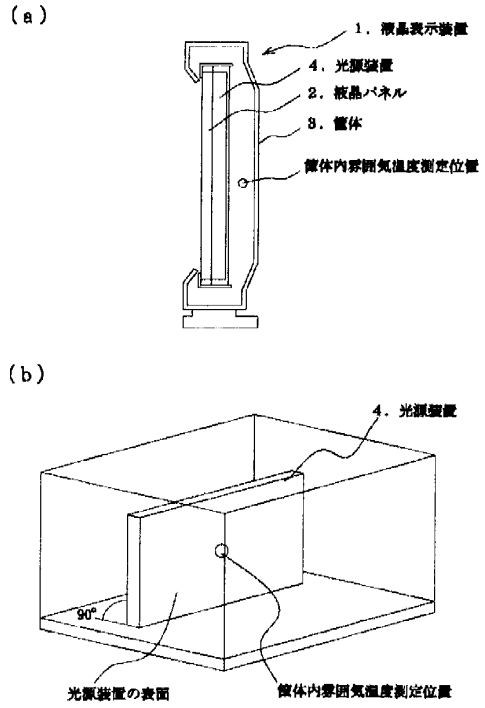
【図6】


ΔTp (℃)
0
2
4
6
8
10
12
d (mm)

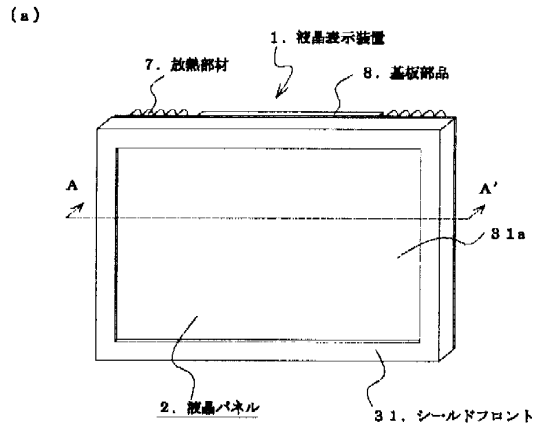
【図8】


(a)
7. 放熱部材
41. 光源
4a. ランプハウス
43
4. 光源装置
33
32
2. 液晶パネル
42
31
1. 液晶表示装置
(b)
7. 放熱部材
4. 光源装置
42. 導光板
43
1. 液晶表示装置
33
6
41. 光源
32
32a
2. 液晶パネル
31

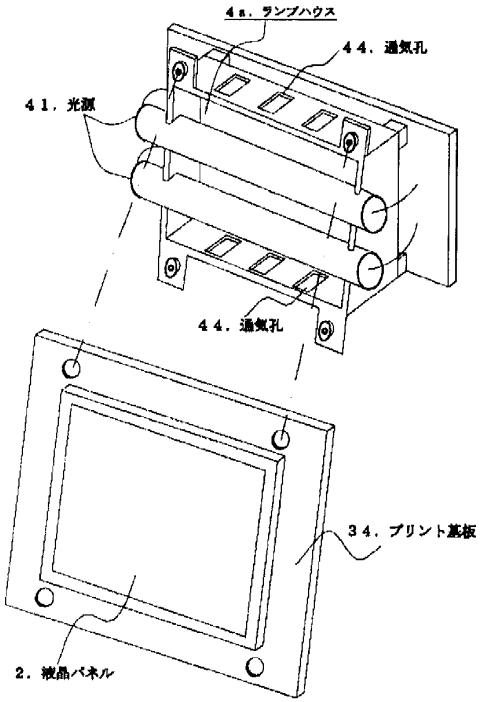
【図5】


(a)
1．液晶表示装置
4．光源装置
2．液晶パネル
3．筐体
筐体内雰囲気温度測定位置
(b)
4．光源装置
90°
光源装置の表面
筐体内雰囲気温度測定位置

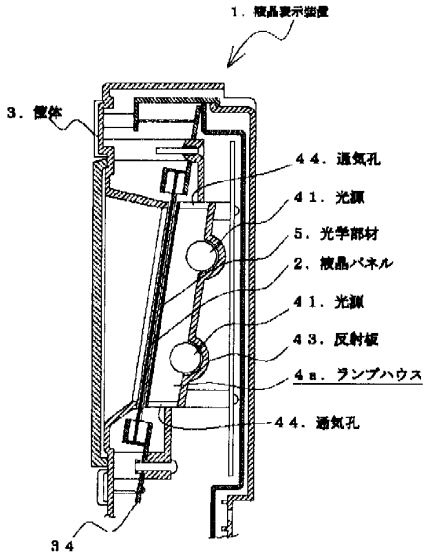
【図7】


(a)
1．液晶表示装置
7．放熱部材
8．基板部品
A
A'
31a
2．液晶パネル
31．シールドフロント
(b)
1．液晶表示装置
7．放熱部材
4．光源装置
8．基板部品
33．シールドリア
2．液晶パネル
31．シールドフロント
32．シールドセンター
5．光学部材

【図9】


4a．ランプハウス
44．通気孔
41．光源
44．通気孔
34．プリント基板
2．液晶パネル

【図10】


1．液晶表示装置
3．筐体
44．通気孔
41．光源
5．光学部材
2．液晶パネル
41．光源
43．反射板
4a．ランプハウス
44．通気孔
34

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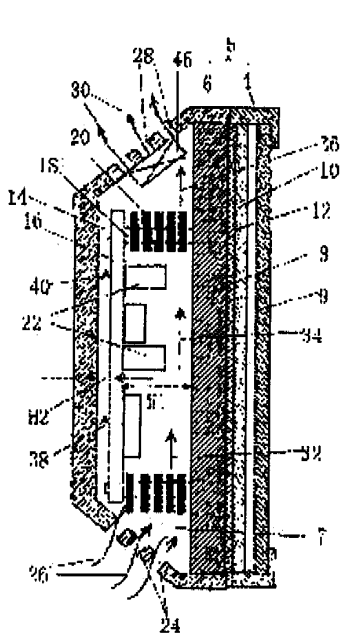
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(21)Application number : 2004-349341
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(54) PLASMA DISPLAY APPARATUS

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a plasma display apparatus capable of efficiently dissipating heat generated in the plasma display apparatus to a rear space formed by a rear case and radiating the heat to outside.
SOLUTION: A frame chassis 8 which is heated by conduction heat from a plasma display panel (PDP) 10 and a circuit substrate 16 for driving and controlling the PDP 10 are connected by a support post 18 having a high heat conductive and heat dissipating structure 20. The heat generated from it is concentrated to the support post 18 and efficiently dissipated to the rear space 7 formed by the rear case 6 through the heat dissipating structure 20. Thereby, the plasma display apparatus 2 in which the heat generated from the PDP 10 and the heat of the circuit substrate 16 are efficiently radiated through air intake holes 24 and air exhaust holes 28 prepared in the rear case, is provided.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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H04N	5/66	(2006.01)	H04N	5/66	101A	5G435

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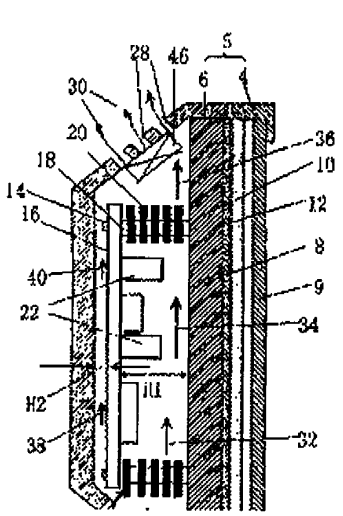
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最終頁に続く

(54)【発明の名称】プラズマ表示装置

(57)【要約】
【課題】プラズマ表示装置内で発生する熱を、効率よくリアケースが構成する背面空間へ放散させ、さらに外部へ放熱することができるプラズマ表示装置を提供する。
【解決手段】ＰＤＰ１０からの伝導熱によって加熱されたフレームシャーシ８と、ＰＤＰ１０を駆動・制御する回路基板１６とを、高熱伝導性でかつ放熱構造体２０を有する支柱１８により結合する。それらから発生する熱を上記支柱１８に集中させ、上記放熱構造体２０を通じてリアケース６が構成する背面空間７に効率的に放散させる。これにより、リアケースに設けた吸気孔２４および排気孔２８を通じて、ＰＤＰ１０から発生する熱および回路基板１６の熱を有効に放出可能なプラズマ表示装置２を提供できる。
【選択図】図１



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【特許請求の範囲】
【請求項１】
フロントケースとリアケースを含む筐体と、
前記筐体の前面に信号を表示するプラズマ表示パネルと、
前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、
前記プラズマ表示パネルと電気的に接続された回路基板と
前記リアケースの上方に配設し前記背面空間内の空気を外部に放出するファンとを具備し、
前記フレームシャーシと前記回路基板とを、熱伝導性材料からなりかつ少なくとも一部に放熱構造体を有する支柱により結合し、
前記リアケースが構成する背面空間内に流入する空気に、前記フレームシャーシと前記回路基板から発生する熱を前記放熱構造体から放散し、
前記背面空間から外部へ放熱せしめるプラズマ表示装置。
【請求項２】
前記回路基板は電子部品が実装された面を前記フレームシャーシ面に対向させ，前記回路基板と前記フレームシャーシとの間に前記支柱の放熱構造体を挟み込んだ状態で，
前記回路基板と前記フレームシャーシの間隔が、前記リアケースと前記回路基板との間隔より大きくなるように配設され、
前記回路基板と前記フレームシャーシの間隔を通過する空気に，前記回路基板と前記フレームシャーシの熱を放熱せしめる請求項１に記載のプラズマ表示装置。
【請求項３】
前記回路基板は，電子部品が実装された面を前記フレームシャーシ面と反対側に向けて対向させた状態で、前記リアケースと前記回路基板との間隔が、前記回路基板と前記フレームシャーシの間隔より大きくなるように配設され、
前記回路基板とリアケース間に前記支柱の放熱構造体を配設して、前記リアケースと前記回路基板との間隔を通過する空気に前記回路基板と前記フレームシャーシの熱を放熱せしめる請求項１に記載のプラズマ表示装置。
【請求項４】
フロントケースとリアケースを含む筐体と、
前記筐体の前面に信号を表示するプラズマ表示パネルと、
前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、
前記プラズマ表示パネルと電気的に接続された回路基板と
前記リアケースの上方に配設し前記リアケースが構成する背面空間内の空気を外部に放出する排気孔とを具備し、
前記フレームシャーシと前記リアケースとを、熱伝導性材料からなりかつ少なくとも一部に放熱構造体を有する支柱により結合し、
前記フレームシャーシから発生する熱を、前記放熱構造体から前記リアケースが構成する背面空間内に流入する空気に放散せしめ、前記排気孔より外部に放出するとともに、
前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱するプラズマ表示装置。
【請求項５】
フロントケースとリアケースからなる筐体と、
前記筐体の前面に信号を表示するプラズマ表示パネルと、
前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、
前記プラズマ表示パネルと電気的に接続された回路基板と

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ケースが構成する背面空間内に流入する空気に放散せしめ、
前記排気孔より外部に放出するとともに、前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱するプラズマ表示装置。
【請求項６】
前記回路基板の電子部品が実装された面を前記フレームシャーシ面に対向させて、前記支柱の放熱構造体を挟み込むように、前記回路基板と前記フレームシャーシの間隔が、前記リアケースと前記回路基板との間隔より大きくなるように構成し、
前記回路基板と前記フレームシャーシの熱を前記回路基板と前記フレームシャーシの間隔を通過する空気に放熱させて前記排気孔より外部に放出し、
かつ前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱する請求項５に記載のプラズマ表示装置。
【請求項７】
前記回路基板は，電子部品が実装された面を前記フレームシャーシ面と反対側に向けて対向させた状態で、前記リアケースと前記回路基板との間隔が、前記回路基板と前記フレームシャーシの間隔より大きくなるように配設され、
前記回路基板とリアケース間に前記支柱の放熱構造体を配設し、前記回路基板と前記フレームシャーシの熱を前記リアケースと前記回路基板との間隔を通過する空気に放熱させて前記排気孔より外部に放出し、かつ前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱する請求項５に記載のプラズマ表示装置。
【請求項８】
前記支柱と前記リアケースを熱伝導性の弾性体を介して結合する請求項４または請求項５に記載のプラズマ表示装置。
【請求項９】
フロントケースとリアケースからなる筐体と、
前記筐体の前面に信号を表示するプラズマ表示パネルと、
前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、
前記プラズマ表示パネルと電気的に接続された複数の回路基板と
前記フレームシャーシの垂直方向に延びる熱伝導性の複数のリブとを具備し、
前記複数のリブ間に前記複数の回路基板をそれぞれ配置して、前記リブの一方の端部をリアケースの面と密接して配設したプラズマ表示装置。
【請求項１０】
前記リブの端部と前記リアケースを熱伝導性の弾性体を介して結合した請求項９に記載のプラズマ表示装置。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、プラズマ表示装置内に生じた熱を効率的に外部へ放熱するプラズマ表示装置に関する。
【背景技術】
【０００２】
近年、プラズマ表示パネルを用いた表示装置が、大画面、薄型、軽量の表示装置として、ディジタルテレビや情報表示装置などに実用化されつつある。このプラズマ表示パネル（ＰＤＰ）とは、２枚のガラス基板間に放電ガスを封入し、蛍光体を設けたマトリックス状の複数の微小放電空間を配設し、その微小放電空間のガス放電によって発生する紫外線により蛍光体を励起し、それにより発生する可視光を情報の表示に利用するものである。

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る。これを防止するための種々の検討がなされている。

【０００４】

例えば、筐体内にＰＤＰを支持する基台部とＰＤＰを駆動する回路部の部品取り付け面とを対向させた状態で、所定の間隔を設けて回路部を基台部で支持し、この間隔を通過する空気によって、基台部および電子部品から発生する熱を効率的に冷却することが提案されている（例えば、特許文献１参照）。

【０００５】

図７に示すプラズマ表示装置の構成断面図を用いて上記特許文献１に関して具体的に説明する。

【０００６】

プラズマ表示装置８００は、筐体８１８、ＰＤＰ８０２、回路部８１０、基台部８１２、透明なガラスあるいは合成樹脂からなる前面パネル８１４とから構成されている。情報を表示するＰＤＰ８０２は、透明なガラスからなる表面板８０６と背面板８０８との間に放電セル構造部８０４を有している。放電セル構造部８０４には、隔壁で区切られた多数の微細セルやセルに充填された封入ガス、セル内面に塗工された蛍光体層、プラズマ放電用の電極などを備えている。また、表面板８０６と背面板８０８との対向面上には、互いに交差する方向に並べた多数の透明電極体からなる線状電極も配置されている。ＰＤＰ８０２は、熱伝導シート（図示せず）を介して基台部８１２上に支持されている。

【０００７】

これにより、ＰＤＰ８０２で発生した熱を、熱伝導シートを介して基台部８１２に伝え、基台部８１２の熱を外部に放散させることができる。回路部８１０は、回路基板８１５と回路基板８１５の表面上に実装された多数の電子部品８１６を有し、ＰＤＰを駆動制御するための制御回路が組み込まれている。回路部８１０は、電子部品８１６が取り付けられた面を基台部８１２に向けた状態で、所定の間隔で回路基板８１５の表面から円筒支柱を通じて基台部８１２に止めねじをねじ込んで取り付けられる。筐体８１８の内部では、ＰＤＰ８０２から発生する熱は熱伝導シートを介して基台部８１２に伝達され、更にＰＤＰ８０２を駆動する回路部８１０からも熱が発生する。空気が、複雑に配置された電子部品８１６の間隔を長い時間および距離にわたって基台部８１２および電子部品８１６、回路基板８１５と接触しながら通過するため、この間隔を通過する空気へ熱を効果的に伝達することができる。筐体８１８には、通気孔や通気スリットなどの通気部８２０が設けられており、筐体８１８の内外で矢印８２２に示すように空気を流通させ、基台部８１２、回路部８１０の熱を外部に放出し易くするように構成されている。

【特許文献１】特開２００１－２２２８１号公報

【発明の開示】

【発明が解決しようとする課題】

【０００８】

しかしながら、上記従来例では、基台部（以下、フレームシャーシと呼ぶ）と、電子部品の実装面をフレームシャーシと対向させた回路基板との間に、互いの熱伝導を遮断した状態で支柱を用いて間隔を設けている。そして、ＰＤＰで発生した熱が熱伝導シートを介して熱伝導したフレームシャーシからの熱、およびフレームシャーシの背面に配設した駆動・制御回路などの回路基板から発生する熱を、その間隔を通過し、フレームシャーシ、電子部品および回路基板と接触する空気に放熱するものである。したがって、高さの異なる電子部品が多数実装されているため、空気がこの間隔内に配置された多数の電子部品間および電子部品の近傍を通過する過程において、乱流が生じて空気が電子部品間を効率よく通過しない、またフレームシャーシから空気への熱伝導度率が金属などに比べて低いた

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示装置を提供することを目的とする。
【課題を解決するための手段】
【００１０】
上述したような課題を解決するために、本発明のプラズマ表示装置は、フロントケースとリアケースを含む筐体と、前記筐体の前面に信号を表示するプラズマ表示パネルと、前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、前記プラズマ表示パネルと電気的に接続された回路基板と前記リアケースの上方に配設し前記背面空間内の空気を外部に放出するファンとを具備し、前記フレームシャーシと前記回路基板とを、熱伝導性材料からなりかつ少なくとも一部に放熱構造体を有する支柱により結合し、前記リアケースが構成する背面空間内に流入する空気に、前記フレームシャーシと前記回路基板から発生する熱を前記放熱構造体から放散し、前記背面空間から外部へ放熱せしめる構成である。
【００１１】
このような構成によれば、フレームシャーシおよび回路基板からの熱を、放熱構造体を有する支柱に集中させ、その放熱構造体からリアケースが構成する背面空間に効率よく放散し、ファンを通じてリアケースの排気孔から外部に効果的に放出する、優れた放熱効果を有するプラズマ表示装置を供給できる。
【００１２】
また、前記回路基板の電子部品が実装された面を前記フレームシャーシ面に対向させて、前記支柱の放熱構造体を挟み込むように、前記回路基板と前記フレームシャーシの間隔が、前記リアケースと前記回路基板との間隔より大きくなるように構成し、前記回路基板と前記フレームシャーシの間隔を通過する空気に前記回路基板と前記フレームシャーシの熱を放熱せしめる構成であってもよい。
【００１３】
このような構成によれば、外部から流入する空気を前記回路基板と前記フレームシャーシの間隔にほぼ絞り込むことができる。この空気がフレームシャーシと回路基板および回路基板に実装した電子部品の表面に接触して熱を吸収するとともに、前記回路基板と前記フレームシャーシの熱を、前記放熱構造体を有する支柱に集中させて、その放熱構造体から上記空気に効率よく放散させ、ファンを通じてリアケースの排気孔から外部に効果的に放出するプラズマ表示装置を実現できる。
【００１４】
さらに、前記回路基板の電子部品が実装された面を前記フレームシャーシ面と反対側に向けて対向させ、前記リアケースと前記回路基板との間隔が、前記回路基板と前記フレームシャーシの間隔より大きくなるように構成し、前記回路基板とリアケース間に前記支柱の放熱構造体を配設して、前記リアケースと前記回路基板との間隔を通過する空気に前記回路基板と前記フレームシャーシの熱を放熱せしめる構成であってもよい。
【００１５】
このような構成によれば、外部から流入する空気を前記回路基板と前記リアケースとの間隔にほぼ絞り込むことができる。前記回路基板と前記フレームシャーシの熱を、前記放熱構造体を有する支柱に集中させて、その放熱構造体から上記空気に効率よく放散させ、ファンを通じてリアケースの排気孔から外部に効果的に放出するとともに、その過程において、その空気が高熱伝導性のリアケースの側面に接触してリアケースへ熱を伝え、外部へ放熱するプラズマ表示装置を実現できる。
【００１６】
また、本発明のプラズマ表示装置は、フロントケースとリアケースを含む筐体と、前記

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フレームシャーシから発生する熱を、前記放熱構造体から前記リアケースが構成する背面空間内に流入する空気に放散せしめ、前記排気孔より外部に放出するとともに、前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱する構成である。

【００１７】

このような構成によれば、フレームシャーシからの熱を、放熱構造体を有する支柱に集中させ、その放熱構造体からリアケースが構成する背面空間に効率よく放散し、リアケースの排気孔から外部に効果的に放出するとともに、フレームシャーシからの熱を、支柱よりリアケースに伝導してリアケースを通じて有効に外部へ放熱する、さらにすぐれた放熱効果を有するプラズマ表示装置を供給できる。

【００１８】

また、本発明のプラズマ表示装置は、フロントケースとリアケースからなる筐体と、前記筐体の前面に信号を表示するプラズマ表示パネルと、前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、前記プラズマ表示パネルと電気的に接続された回路基板と，前記リアケースの上方に配設し前記リアケースが構成する背面空間内の空気を外部に放出する排気孔とを具備し、前記フレームシャーシおよび前記回路基板と前記リアケースとを、熱伝導性材料からなりかつ少なくとも一部に放熱構造体を有する支柱により結合し、前記フレームシャーシおよび回路基板から発生する熱を、前記放熱構造体から前記リアケースが構成する背面空間内に流入する空気に放散せしめ、前記排気孔より外部に放出するとともに、前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱する構成である。

【００１９】

このような構成によれば、フレームシャーシおよび回路基板からの熱を、放熱構造体を有する支柱に集中させ、その放熱構造体からリアケースが構成する背面空間に効率よく放散し、リアケースの排気孔から外部に効果的に放出するとともに、フレームシャーシと回路基板からの熱を、支柱よりリアケースに伝導してリアケースを通じて有効に外部へ放熱する、さらに放熱効果の優れたプラズマ表示装置を実現できる。

【００２０】

また、前記回路基板の電子部品が実装された面を前記フレームシャーシ面に対向させて、前記支柱の放熱構造体を挟み込むように、前記回路基板と前記フレームシャーシの間隔が、前記リアケースと前記回路基板との間隔より大きくなるように構成し、前記回路基板と前記フレームシャーシの熱を前記回路基板と前記フレームシャーシの間隔を通過する空気に放熱させ前記排気孔より外部へ放出し、かつ前記支柱を通じて前記リアケースに伝導させリアケースを介して外部に放熱する構成であってもよい。

【００２１】

このような構成によれば、外部から流入する空気を前記回路基板と前記フレームシャーシの間隔にほぼ絞り込むことができる。この空気がフレームシャーシと回路基板および回路基板に実装した電子部品の表面に接触して熱を吸収するとともに、前記回路基板と前記フレームシャーシの熱を、前記放熱構造体を有する支柱に集中させて、その放熱構造体から上記の空気に効率よく放散させ、リアケースの排気孔から外部に効果的に放出できる。それと同時に、フレームシャーシと回路基板からの熱を、上述の支柱を通じてリアケースに伝導してリアケースを介して有効に外部へ放熱する放熱効果の優れたプラズマ表示装置を実現できる。

【００２２】

また、前記回路基板の電子部品が実装された面を前記フレームシャーシ面と反対側に向けて対向させ、前記リアケースと前記回路基板との間隔が、前記回路基板と前記フレーム

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【００２３】
このような構成によれば、外部から流入する空気を前記回路基板と前記リアケースとの間隔にほぼ絞り込むことができる。前記回路基板と前記フレームシャーシの熱を、前記放熱構造体を有する支柱に集中させて、その放熱構造体から上記の空気に効率よく放散させ、リアケースの排気孔から外部に効果的に放出することができる。それとともに、その過程において、その空気が高熱伝導性のリアケースの側面に接触してリアケースへ熱を伝え、外部へ放出できる。さらに、それと同時にフレームシャーシと回路基板からの熱を、支柱よりリアケースに伝導してリアケースを通じて有効に外部へ放熱する、放熱効果の優れたプラズマ表示装置を実現できる。
【００２４】
さらに、前記支柱と前記リアケースを熱伝導性の弾性体を介して結合する構成であってもよい。
【００２５】
このような構成によれば、機械的な振動や衝撃に強いプラズマ表示装置を実現できる。また、支柱の端面の面積より広い面積の熱伝導性の弾性体を用いることにより、支柱からリアケースへ広い領域に熱を拡散して伝達するため、熱がリアケースの局部に集中することを防止できる。
【００２６】
また、本発明のプラズマ表示装置は、フロントケースとリアケースからなる筐体と、前記筐体の前面に信号を表示するプラズマ表示パネルと、前記プラズマ表示パネルの背面に熱伝導材料を介して装着するフレームシャーシと、前記プラズマ表示パネルと電気的に接続された複数の回路基板と、前記フレームシャーシの垂直方向に延びる熱伝導性の複数のリブとを具備し、前記複数のリブ間に前記複数の回路基板をそれぞれ配置して、前記リブの一方の端部をリアケースの面と密接して配設した構成であってもよい。
【００２７】
このような構成によれば、フレームシャーシからの熱が、リブによってリアケースに伝達されて筐体内の温度を大幅に低下させることができる。また、前記リブは、各リブ間のブロックの仕切り板の役目を果たすため、発熱の大きなブロックから発熱の低いブロックへの熱の輻射を防止し、輻射熱を各リブで吸収してリアケースに伝導し、外部へ放熱する。また、空気が煙突効果によって効果的に下方から上方へ流れるため、さらに放熱効果を向上させたプラズマ表示装置を実現できる。
【００２８】
さらに、前記リブの端部と前記リアケースを熱伝導性の弾性体を介して結合した構成であってもよい。
【００２９】
このような構成によれば、機械的な振動や衝撃に強く、優れた放熱効果を有するプラズマ表示装置を提供できる。
【発明の効果】
【００３０】
本発明のプラズマ表示装置によれば、ＰＤＰから伝導される熱によって加熱されたフレームシャーシと、ＰＤＰを駆動・制御する回路基板とを、高熱伝導性でかつ放熱構造体を有する支柱により結合し、それらから発生する熱を上記支柱に集中させて、その支柱の放熱構造体を通じて、リアケースが構成する背面空間内に効率的に放散できる。したがって、リアケースに設けた吸気孔および排気孔を通じて、フレームシャーシの熱および回路基板の熱を有効に放出し、さらに、上記支柱の一端をリアケースと結合することによって、

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【００３２】
（実施の形態１）
図１は、本発明のプラズマ表示装置の側面断面図を示し、図２は、ＰＤＰで発生する熱を放熱するアルミシャーシと回路基板との結合状態と熱の放散の状態を説明する要部断面図である。図１および図２を用いて本実施の形態１におけるプラズマ表示装置に関して詳細に説明する。
【００３３】
本発明の実施の形態１におけるプラズマ表示装置２では、有機樹脂からなるフロントケース４とアルミ（Ａｌ）など高熱伝導性金属のリアケース６とが、アルミダイカストのフレームシャーシ８の周辺端面部に固定され、筐体５を構成している。ＰＤＰ１０の前面側には、前面パネル９が配置される。この前面パネル９として、電磁波や赤外線などを防止し、コントラストを向上させる、ガラスや樹脂で構成された多機能のフィルタが用いられる。また、ＰＤＰ１０の背面側は、金属粉末を分散させたシリコンなどの熱伝導性シート１２を介してフレームシャーシ８に装着され、ＰＤＰ１０のガス放電によって発生する熱をフレームシャーシ８に熱伝導する。
【００３４】
一方、ＰＤＰ１０とフレキシブルな配線部（図示せず）によって電気的に結合されて発光を制御する駆動・制御回路、チューナ回路、電源回路などの種々の回路基板１６が、放熱板などの放熱構造体２０を有する支柱１８を介してフレームシャーシ８上のそれぞれの所定の場所に分散されて固定されている。これらの回路基板１６上には、大電流を流すトランジスタなどの多数の電子部品２２などを実装しており、これらの電子部品２２により熱が発生している。
【００３５】
本実施の形態１では、電子部品２２を実装した回路基板１６の面をフレームシャーシ８側に向けた状態で、上記放熱構造体２０を回路基板１６とフレームシャーシ８とで挟み込むように、回路基板１６が支柱１８によってフレームシャーシ８に固定される。
【００３６】
この支柱１８の材料としては、Ａｌ、銅（Ｃｕ）などの高熱伝導性の金属が有効である。また、支柱１８の構造としては、支柱１８をねじ構造としてフレームシャーシ８にねじ１４で押し込む方法、あるいはアルミダイカストのフレームシャーシ８に予め形成したボスに円筒状の支柱１８を押し込み、ねじ１４で固定する方法が有効である。
【００３７】
放熱構造体２０である放熱板のフィンの方向は、回路基板１６とフレームシャーシ８の面に概ね平行に形成され、通過する空気の妨げにならないように構成される。また、この放熱構造体２０は支柱１８と一体的に構成されるのが望ましいが、支柱１８の一部に密接して取り付けられたものも有効である。
【００３８】
このように構成すると、図２に示すようにＰＤＰ１０から発生した熱が矢印４２で示すようにフレームシャーシ８を通じて、上述の支柱１８に伝達される。一方、実装された多数の電子部品２２から発生した熱は、回路基板１６を通じて、矢印４４で示すように高熱伝導性の支柱１８に伝達される。このようにフレームシャーシ８と回路基板１６からの熱が高熱伝導性の支柱１８に集中する。この集中した熱を、フレームシャーシ８と回路基板１６との間隔Ｈ１を通じて流れる矢印３４で示す空気に、上記放熱構造体２０である放熱板から放散させる。また、この間隔Ｈ１を通過する空気は、同時にフレームシャーシ８と回路基板１６上に実装された電子部品２２の表面と接触し、それらの熱をも吸収する。

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ス上部に配設された排気孔２８を通じて外部へ放出される。

【００４０】

本実施の形態１では、フレームシャーシ８と回路基板１６との間隔Ｈ１を、リアケース６と回路基板１６との間隔Ｈ２より十分大きく構成する。このように構成すると、リアケース６内に流入した空気の一部は、矢印３８、４０で示すように、回路基板１６とリアケース６との間隔Ｈ２を下方から上方へ流れるが、ほとんどの空気は、上述したように間隔Ｈ１を通じて流れ、空気の流路を絞り込むことができる。これにより、プラズマ表示装置２の内部で発生した熱を、吸気孔２４から流入した空気に有効に放散させ、排気孔２８を通じて効率よく外部へ放出することができる。

【００４１】

また、プラズマ表示装置の薄型化が求められており、さらに回路基板１６とフレームシャーシ８との間隔を小さくすることが要求される。一方、放熱板を有する支柱１８の長さを長くするほど熱を放散させる効果を向上することができる。本実施の形態１のように、電子部品２２を実装した回路基板１６の面をフレームシャーシ８側に対面させる配置は、電子部品２２を実装した回路基板１６の面をフレームシャーシ８側と反対方向に向ける配置に比べて、電子部品２２の中で最大の高さＨ３の分だけ、支柱の長さを長くできるため、放熱効果を向上させることができる。したがって、プラズマ表示装置の薄型化には、前者の配置が優れている。

【００４２】

なお、フロントケース４の材料として有機樹脂を用いたが、熱伝導性の金属を用いると放熱効果を向上させるのにさらに有効である。また、電子部品が実装された回路基板の面とは、主として電子部品が多く実装され、高さが高い電子部品が実装された面を示すものである。

【００４３】

（実施の形態２）

図３は、本発明の実施の形態２におけるプラズマ表示装置の側面断面図である。以下、図３を用いて説明する。実施の形態１と同じ共通要素には同一符番を付している。

【００４４】

実施の形態１では、ＰＤＰによって加熱されたフレームシャーシと回路基板からの熱を、放熱構造体を有する支柱に集中させ、主として放熱構造体により、リアケースが形成する背面空間へ放熱し、排気孔より筐体の外部に放出するものである。実施の形態１とは、リアケースとフレームシャーシとを結合してフレームシャーシからの熱をリアケースへ伝導させるとともに背面空間へも効率よく放散させることによって、放熱効果を向上させたプラズマ表示装置を実現する点が異なる。以下の説明では、実施の形態１と異なる点についてのみ説明する。

【００４５】

本実施の形態２においては、図３に示すように、多数の電子部品２２を実装した回路基板１６の面を、フレームシャーシ８と反対側に向けてフレームシャーシ８上に取り付ける。フレームシャーシ８とリアケース６とを、放熱構造体２０を有する高熱伝導性の支柱１８によって結合し、フレームシャーシ８からの熱を、直接リアケース６に伝導させるとともに、その放熱構造体２０のフィンを通じて背面空間７に放散させる。リアケース６の下方に配設した吸気孔２４を通じて外部より空気が流入し、矢印５２、５４に示すように下方から上方へ流れる。この空気が回路基板１６および回路基板１６に実装された電子部品２２を冷却し、さらに上記放熱構造体２０をも冷却する。このようにして背面空間７に放散した熱を吸収した空気は、リアケース６の上方に配設した排気孔２８を通じて放出され

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シャーシ８と支柱１８を結合する。その方法として、先端にねじの構造を持つ支柱１８をフレームシャーシ８にねじ込み固定する方法や、予めアルミダイカストのフレームシャーシ８に形成したボスに差し込む方法が有効である。その後、リアケース６が、リアケース６の背面からねじ５０を用いて支柱１８にねじ込み固定される。

【００４７】

上記構成により、リアケース６へ熱を伝導したフレームシャーシ８は、温度が著しく低下するため、回路基板１６への輻射熱が大幅に低下し、回路基板１６への熱による電子部品の寿命の低下や半田による接合状態の劣化などの悪影響を大幅に改善することができる。

【００４８】

（実施の形態３）

本発明の実施の形態３では、放熱構造体を有する支柱を用いて、フレームシャーシからの熱および回路基板からの熱の両者をリアケースに伝導するとともに、リアケース内の背面空間に放散した、フレームシャーシおよび回路基板からの熱を、筐体の外部へ放熱させるものである。

【００４９】

図４は、電子部品を実装した回路基板の面をフレームシャーシ側に向けた場合の本発明のプラズマ表示装置の側面断面図である。図５は、電子部品を実装した回路基板の面をフレームシャーシ側と反対側を向けた場合の本発明のプラズマ表示装置の側面断面図である。図４および図５を用いて本実施の形態３におけるプラズマ表示装置について説明する。また、実施の形態１および２と差異のある点についてのみ説明する。なお、実施の形態１および２と同じ共通要素には同一符番を付している。

【００５０】

図４は、図１に示すＡｌなどの高熱伝導性からなるリアケース６と支柱１８とを熱伝導性の弾性体４８を介してねじ５０を用いて接続したものである。このように構成することにより、背面空間７にフレームシャーシ８の熱と回路基板１６の熱をリアケース６に同時に伝導し、実施の形態１および２で説明した放熱構造体による放熱と並行して、リアケース６から外部へ放熱することができる。そのため、フレームシャーシ８と回路基板１６の温度が大幅に低下し、相互に熱的影響を及ぼすことが少なくなる。例えば、回路基板１６の熱がＰＤＰ１０の映像画面に影響したり、フレームシャーシ８からの輻射熱が部品の寿命を劣化させたり、半田の接合不良を生じさせたりすることが大幅に改善され、安定なプラズマ表示装置２を実現できる。

【００５１】

熱伝導性の弾性体４８としては、シリコンゴムやシリコン樹脂、また、熱導電性粒子を分散させた樹脂などが有効である。なお、熱伝導性の弾性体４８の面積は、支柱１８のリアケース６側端面の面積より広くすることによって、熱をリアケースの広範囲に拡散することができ、局部的にリアケースの一部に熱が集中することを防止できる。したがって、手を触れても熱く感じることがほとんどなくなり、安全上でも優れた放熱方法になる。

【００５２】

また、熱伝導性の弾性体４８の取り付け方法としては、予め支柱１８と接触する領域より広い面積でリアケース６側に接着しておき、支柱１８をこの熱伝導性の弾性体４８に押し当てる方法でも良い。この方法では、必ずしも全ての支柱１８をリアケース６にねじ止めする必要はなくなり、製造が容易となる。また、補修を行う際にも簡単にリアケース６を取り外すことが可能となるなどの利点がある。リアケース６に直接支柱１８を結合させても良いが、上述した熱伝導性の弾性体４８を用いることにより、機械的振動や衝撃に強

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ース６に伝導されて両者の熱が著しく低下するため、互いに熱による悪影響を及ぼすことが大幅に改善される。また、吸気孔２４から流入した空気が、回路基板１６および電子部品２２、フレームシャーシ８の表面と接触し、それぞれを冷却することも並行して行われる。さらに、加熱された空気が排気孔２８を通じて筐体の外部へ放出されることは図４および図５において共通である。

【００５４】

（実施の形態４）

図６（Ａ）は、本発明の実施の形態４のプラズマ表示装置の背面側から見た、リアケースを取り外した状態での平面図である。図６（Ｂ）は、フレームシャーシおよびフレームシャーシ上に形成されて仕切り板の役目を果たすリブとリアケースの配置を模式的に示す斜視図である。なお、図６（Ｂ）では、分かりやすくするため回路基板１６の描画は省略している。本実施の形態４のプラズマ装置に関して図６（Ａ）および図６（Ｂ）を用いて説明する。なお、実施の形態１～３と同じ共通要素には同一符番を付している。

【００５５】

フレームシャーシ８上に配設した複数のリブ５８の間に電子部品が実装された回路基板１６を配置する。前記リブ５８は、フレームシャーシ８に対して概ね垂直方向に配設され、横方向に平行に複数個配列されている。さらに、これらの複数のリブ５８と図６（Ｂ）の点線で示すリアケース６とを密接して設け、複数のブロック６０を構成する。この場合、リブ５８とリアケース６とは、図示していないが、ねじなどでリアケース６の外面側から固定しても良い。各ブロック６０の上端部６２と下端部６４が開放された構造となっているため、外部の空気は、煙突のような効果により下方から上方へと流れ、温度が高いブロックほど速く流れ、冷却効果が向上する特徴がある。したがって、フレームシャーシ８および回路基板１６から発生する熱は、この空気流によって下方から上方へと放出される。

【００５６】

また、リブ５８とリアケース６とを密接させることによって、フレームシャーシ８からの熱が、リブ５８よりリアケース６に伝達されて筐体内部の温度を大幅に低下させることができる。また、前記リブ５８は、仕切り板の役目を果たすため、発熱の大きなブロックから発熱の低いブロックへの熱の輻射を防止し、輻射熱を各リブ５８で吸収してリアケース６に伝導する。したがって、騒音や電力の少ない、ファンレスのプラズマ表示装置を実現できるものである。

【００５７】

なお、上記リブ５８としては、フレームシャーシ８と一体的に形成されたものが好ましいが、フレームシャーシ８にねじ止めなどにより固定しても、もちろん有効である。

【００５８】

また、熱伝導性の弾性体４８を、リブ５８がリアケース６と密接する領域より広い幅で予めリアケース６側に接着し、この接着した熱伝導性の弾性体４８に上記リブ５８を押し当てる方法であってもよい。これにより、熱がリブとリアケースとが直接接触するより広い範囲に拡散し、リアケースの局部に熱が集中することを防止できる。

【００５９】

また、各ブロック６０の上端部６２および下端部６４は、開放された構造が好ましいが、網目構造のカバーで覆っても有効である。上端部６２が、リアケース６によって覆われる構造の場合には（図示せず）、温度が最も高いブロック６０の上端部近傍にファンを設けることにより、外部へ空気を放出しても良い。

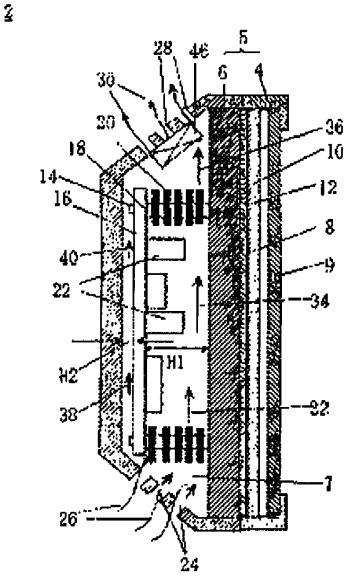
【産業上の利用可能性】

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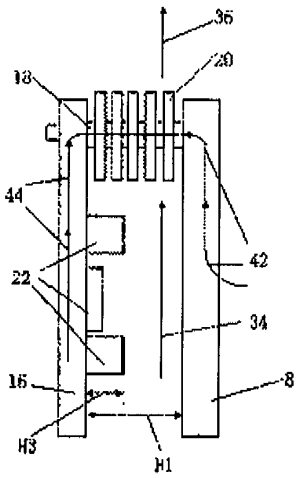
【図１】本発明の実施の形態１におけるプラズマ表示装置の構成を示す側面妥部断面図
【図２】本発明の実施の形態１における熱伝導の経路を模式的に示す拡大側面断面図
【図３】本発明の実施の形態２におけるプラズマ表示装置の構成を示す側面妥部断面図
【図４】本発明の実施の形態３におけるプラズマ表示装置の構成を示す側面妥部断面図
【図５】本発明の実施の形態３におけるもう一つのプラズマ表示装置の構成を示す側面妥部断面図
【図６】（Ａ）本発明の実施の形態４におけるプラズマ表示装置の構成のリアケース側から見た平面図（Ｂ）（Ａ）の斜視図
【図７】従来のプラズマ表示装置の構成を示す側面妥部断面図
【符号の説明】
【００６２】
２，８００　プラズマ表示装置
４　フロントケース
５，８１８　筐体
６　リアケース
７　背面空間
８　フレームシャーシ
９，８１４　前面パネル
１０，８０２　ＰＤＰ
１２　熱伝導性シート
１４，５０　ねじ
１６，８１５　回路基板
１８　支柱
２０　放熱構造体
２２，８１６　電子部品
２４　吸気孔
２６，３０，３２，３４，３６，３８，４０，４２，４４，５２，５４，８２２　矢印
２８　排気孔
４６　ファン
４８　熱伝導性の弾性体
５８　リブ
６０　ブロック
６２　上端部
６４　下端部
８０４　放電セル構造部
８０６　表面板
８０８　背面板
８１０　回路部
８１２　基台部
８２０　通気部

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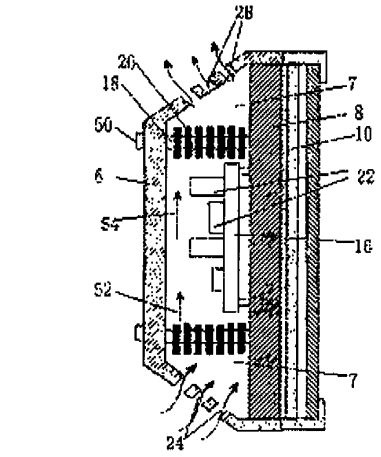
【図１】



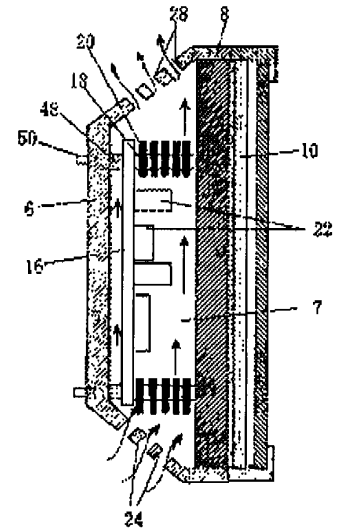
【図２】



【図３】

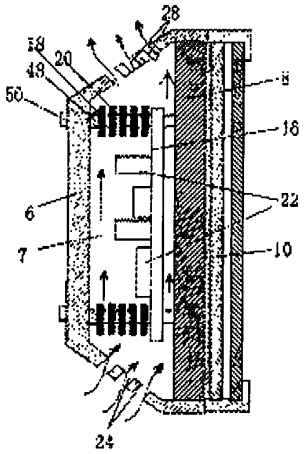


【図４】

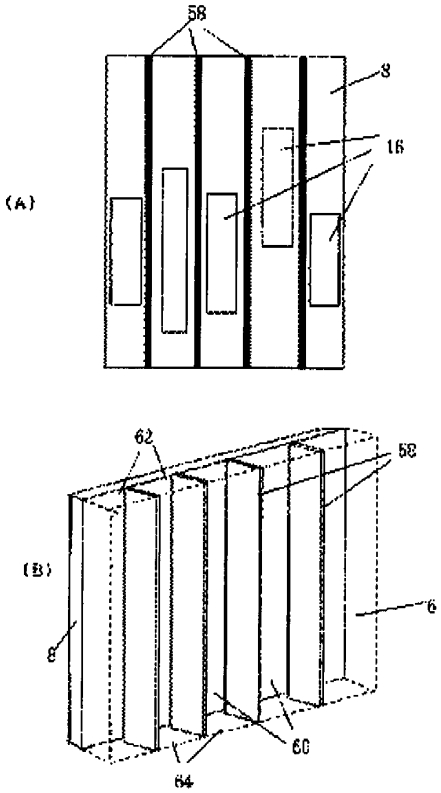


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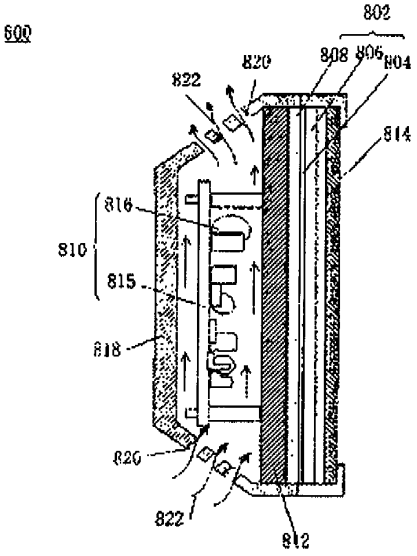
【図５】



【図６】



【図７】



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フロントページの続き

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Ｆターム(参考) 5C058 AB06 BA30
5G435 AA12 BB06 CC09 EE02 GG44 LL04

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Exhibit 1002 - Page 277 of 305

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Filer:	Darryl Mexic/Penny Harris
Attorney Docket Number:	Q102146

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1030**

Electronic Acknowledgement Receipt

EFS ID:	2317904
Application Number:	11872057
International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Darryl Mexic/Penny Harris
Filer Authorized By:	Darryl Mexic
Attorney Docket Number:	Q102146
Receipt Date:	15-OCT-2007
Filing Date:	
Time Stamp:	08:51:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1030
RAM confirmation Number	5013
Deposit Account	194880
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	trans.pdf	42136 da0b14ec16f071ed2eb5efad484b0f9892acd573	no	2
Warnings:					
Information:					
2		spec.pdf	85771 c7eb30e35cf25c857aef71761f5d60127d8fa9e8	yes	14
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	9	
	Claims		10	13	
	Abstract		14	14	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	dwg.pdf	91195 1c2d465b7ea29ff18d2a0c23a805233fd1c73bb3	no	3
Warnings:					
Information:					
4	Oath or Declaration filed	dec.pdf	194697 8dfa387d3337f7fd28b93436e15d3ff2489d2229	no	4
Warnings:					
Information:					
5	Application Data Sheet	ads.pdf	78295 c0bd5d504c0dc865936bc4de631bd3f023c56f0e	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
6	Information Disclosure Statement (IDS) Filed	ids.pdf	19614 f8c7e6c650f1ec751d060d29b8b368a363330765	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					

7	Information Disclosure Statement (IDS) Filed	ptosb08.pdf	62088 68f6cebdcb539550e917bc6e25715e42489228af	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
8	Foreign Reference	jp2001264754.pdf	983797 7381b75fc4aac8b3541d7d226cd4ced62e2d74f0	no	13
Warnings:					
Information:					
9	Foreign Reference	jp2006162641.pdf	971603 fe2fcc785838cccd5593d3effc8a2f1447a8e6a5	no	17
Warnings:					
Information:					
10	Fee Worksheet (PTO-06)	fee-info.pdf	8342 a852f57790f6f9f2c5d55041507fc17f6264881a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2537538		

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

Electronic Acknowledgement Receipt	
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International Application Number:	
Confirmation Number:	8128
Title of Invention:	PANEL TYPE DISPLAY DEVICE
First Named Inventor/Applicant Name:	Joon KANG
Customer Number:	23373
Filer:	Darryl Mexic/Penny Harris
Filer Authorized By:	Darryl Mexic
Attorney Docket Number:	Q102146
Receipt Date:	15-OCT-2007
Filing Date:	
Time Stamp:	08:51:39
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2		spec.pdf	85771 c7eb30e35cf25c857aef71761f5d60127d8fa9e8	yes	14
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	9	
	Claims		10	13	
	Abstract		14	14	
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Information:					
3	Drawings-only black and white line drawings	dwg.pdf	91195 1c2d465b7ea29ff18d2a0c23a805233fd1c73bb3	no	3
Warnings:					
Information:					
4	Oath or Declaration filed	dec.pdf	194697 8dfa387d3337f7fd28b93436e15d3ff2489d2229	no	4
Warnings:					
Information:					
5	Application Data Sheet	ads.pdf	78295 c0bd5d504c0dc865936bc4de631bd3f023c56f0e	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
6	Information Disclosure Statement (IDS) Filed	ids.pdf	19614 f8c7e6c650f1ec751d060d29b8b368a363330765	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					

7	Information Disclosure Statement (IDS) Filed	ptosb08.pdf	62088 68f6cebdcb539550e917bc6e25715e42489228af	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
8	Foreign Reference	jp2001264754.pdf	983797 7381b75fc4aac8b3541d7d226cd4ced62e2d74f0	no	13
Warnings:					
Information:					
9	Foreign Reference	jp2006162641.pdf	971603 fe2fcc785838cccd5593d3effc8a2f1447a8e6a5	no	17
Warnings:					
Information:					
10	Fee Worksheet (PTO-06)	fee-info.pdf	8342 a852f57790f6f9f2c5d55041507fc17f6264881a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2537538		

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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<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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OIPE IAP97
OCT 15 2007
PATENT & TRADEMARK OFFICE

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Joon KANG, et al.

Appln. No.: **11/872,057**

Confirmation No.: **8128**

Filed: October 15, 2007

For: PANEL TYPE DISPLAY DEVICE

Docket No: Q102146

Group Art Unit: Unknown

Examiner: Not Yet Assigned

SUBMISSION OF PRIORITY DOCUMENT

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

Sir:

Submitted herewith is a certified copy of the priority document on which a claim to priority was made under 35 U.S.C. § 119. The Examiner is respectfully requested to acknowledge receipt of said priority document.

Respectfully submitted,

/darrylmexic/

Darryl Mexic
Registration No. 23,063

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Enclosures: Korea, Republic of 10-2007-0002081

Date: October 15, 2007

Joon KANG, et al.
PANEL TYPE DISPLAY DEVICE
October 15, 2007
Darryl Mexic 202-293-7060
Q102146
1 of 1

Issue Number : 5-5-2007-026185810

대한민국특허청
KOREAN INTELLECTUAL PROPERTY OFFICE

별첨 사본은 아래 출원의 원본과 동일함을 증명함.

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

출원번호 : Application Number		10-2007-0002081
출원년월일 : Filing Date		2007년 01월 08일 JAN 08, 2007
출원인 : Applicant(s)		삼성전자주식회사 SAMSUNG ELECTRONICS CO., LTD.

2007년 05월 11일

특허청 COMMISSIONER

◆ This certificate was issued by Korean Intellectual Property Office. Please confirm any forgery or alteration of the contents by an issue number or a barcode of the document below through the KIPOnet- Online Issue of the Certificates' menu of Korean Intellectual Property Office homepage (www.kipo.go.kr). But please notice that the confirmation by the issue number is available only for 90 days.

Issue Date : 2007.05.11

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【서지사항】

【서류명】	특허출원서
【권리구분】	특허
【수신처】	특허청장
【참조번호】	0003
【제출일자】	2007.01.08
【발명의 국문명칭】	패널형 디스플레이장치
【발명의 영문명칭】	PANEL TYPE DISPLAY DEVICE
【출원인】	
【명칭】	삼성전자 주식회사
【출원인코드】	1-1998-104271-3
【대리인】	
【성명】	서봉석
【대리인코드】	9-1998-000289-6
【포괄위임등록번호】	2003-068131-1
【대리인】	
【성명】	서원호
【대리인코드】	9-2004-000074-3
【포괄위임등록번호】	2005-053352-1
【발명자】	
【성명】	강준
【성명의 영문표기】	KANG Joon
【주민등록번호】	761030-1XXXXXXX
【우편번호】	151-080
【주소】	서울 관악구 남현동 602-27 민우오피스텔 301호
【국적】	KR
【발명자】	
【성명】	조진현

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【성명의 영문표기】 CHO Jin Hyun

【주민등록번호】 700120-1XXXXXXX

【우편번호】 135-110

【주소】 서울 강남구 압구정동 202동 104호

【국적】 KR

【발명자】

【성명】 임정수

【성명의 영문표기】 LIM Jeong Su

【주민등록번호】 710108-1XXXXXXX

【우편번호】 443-757

【주소】 경기 수원시 영통구 원천동 주공아파트 107동 105호

【국적】 KR

【취지】 특허법 제42조의 규정에 의하여 위와 같이 출원합니다.

대리인 서봉석 (인)

대리인 서원호 (인)

【수수료】

【기본출원료】	0 면	38,000 원
【가산출원료】	14 면	0 원
【우선권주장료】	0 건	0 원
【심사청구료】	0 항	0 원
【합계】	38,000 원	

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【요약서】

【요약】

케이스 내부 및 디스플레이패널의 온도상승을 최소화할 수 있도록 한 패널형 디스플레이장치를 개시한다. 이 디스플레이장치는 케이스와, 케이스 내에 설치된 디스플레이패널과, 디스플레이패널의 제어를 위한 적어도 하나의 회로기판과, 디스플레이패널의 냉각을 위한 제1냉각유로와, 회로기판의 냉각을 위한 제2냉각유로를 포함하며, 제1냉각유로와 제2냉각유로가 상호 격리된다.

【대표도】

도 1

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【명세서】

【발명의 명칭】

패널형 디스플레이장치{PANEL TYPE DISPLAY DEVICE}

【도면의 간단한 설명】

<1> 도 1은 본 발명의 제1실시 예에 따른 패널형 디스플레이장치의 단면도이다.

<2> 도 2는 본 발명의 제1실시 예에 따른 패널형 디스플레이장치의 분해 사시도이다.

<3> 도 3은 본 발명의 제2실시 예에 따른 패널형 디스플레이장치의 단면도이다.

<4> * 도면의 주요 부분에 대한 부호의 설명 *

<5> 10: 케이스, 11: 전면케이스,

<6> 12,120: 후면케이스, 20: 디스플레이패널,

<7> 31,32,33: 회로기판, 41,42,43: 회로기판결합부,

<8> 51,52,53: 커버, 60: 제1냉각유로,

<9> 61: 공기유입구, 62: 공기배출구,

<10> 70,700: 제2냉각유로, 71,72, 710,720: 공기유통공,

<11> 500: 격판.

【발명의 상세한 설명】

【발명의 목적】

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【발명이 속하는 기술분야 및 그 분야의 종래기술】

<12> 본 발명은 패널형 디스플레이장치에 관한 것으로, 더욱 상세하게는 케이스 내부 및 디스플레이패널의 온도상승을 최소화 할 수 있는 패널형 디스플레이장치에 관한 것이다.

<13> 패널형 디스플레이장치는 LCD(liquid crystal display)나 PDP(plasma display panel)처럼 영상을 구현하는 패널이 평판형태이다. 이는 기존의 CRT 디스플레이장치에 비하여 두께가 얇고 가볍다.

<14> 이러한 디스플레이장치는 일본 공개특허공보 2006-162641호에 개시된 바와 같이, 전면케이스와 후면케이스로 된 케이스, 케이스 내부에 설치된 디스플레이 패널, 디스플레이 패널과 전기적으로 접속되도록 케이스 내부에 설치된 회로기판들을 구비한다. 후면케이스의 하부에는 공기가 유입되는 흡입구가 형성되고 후면케이스의 상부에는 공기가 배출되는 배출구가 형성되어 있다. 하부의 흡입구를 통하여 흡입된 공기가 케이스 내부의 디스플레이 패널과 회로기판들을 냉각시킨 후 상부의 배출구를 통하여 배출될 수 있도록 한 것이다.

<15> 그러나 이러한 디스플레이장치는 발열이 생기는 디스플레이패널과 회로기판들이 모두 케이스 내부의 같은 공간에 설치되기 때문에 디스플레이패널과 회로기판들이 상호 가열시키는 현상으로 인하여 케이스 내부의 온도가 상승하는 문제가 있었다. 이러한 온도상승은 디스플레이패널의 표면온도 상승을 초래하였고, LCD 패널의 경우 액정열화현상을 야기하였다.

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【발명이 이루고자 하는 기술적 과제】

<16> 본 발명은 이와 같은 문제점을 해결하기 위한 것으로, 본 발명의 목적은 케이스 내부 및 디스플레이패널의 온도상승을 최소화할 수 있도록 하는 패널형 디스플레이장치를 제공하는 것이다.

【발명의 구성】

<17> 이러한 목적을 달성하기 위한 본 발명에 따른 패널형 디스플레이장치는 케이스와, 상기 케이스 내에 설치된 디스플레이패널과, 상기 디스플레이패널의 제어를 위한 적어도 하나의 회로기판과, 상기 디스플레이패널의 냉각을 위한 제1냉각유로와, 상기 회로기판의 냉각을 위한 제2냉각유로를 포함하며, 상기 제1냉각유로와 상기 제2냉각유로가 상호 격리된 것을 특징으로 한다.

<18> 또한 상기 케이스는 상호 결합되는 전면케이스와 후면케이스를 포함하고, 상기 후면케이스는 상기 회로기판의 설치를 위해 그 외면에 마련된 회로기판결합부를 포함하는 것을 특징으로 한다.

<19> 또한 상기 회로기판결합부는 상기 회로기판의 수용을 위해 상기 후면케이스의 외면으로부터 함몰되고 후방이 개방되며, 상기 회로기판결합부에는 상기 회로기판결합부를 덮으며 복수의 공기유통공을 갖춘 커버가 설치된 것을 특징으로 한다.

<20> 또한 상기 제1냉각유로는 상기 디스플레이패널 후면과 상기 후면케이스 내면 사이의 공간을 포함하고, 상기 제2냉각유로는 상기 회로기판결합부의 내부공간을 포함하는 것을 특징으로 한다.

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<21> 또한 본 발명은 상기 제1냉각유로로 공기 유입을 위해 상기 후면케이스 하부에 형성된 공기유입구와, 상기 제1냉각유로의 공기 배출을 위해 상기 후면케이스 상부에 형성된 공기배출구를 포함하는 것을 특징으로 한다.

<22> 또한 본 발명에 따른 패널형 디스플레이장치는 케이스와, 상기 케이스의 내부를 전방의 제1냉각유로와 후방의 제2냉각유로로 구획하는 격판과, 상기 제1냉각유로의 공기에 의해 냉각될 수 있도록 상기 격판과 상기 케이스 전면 사이에 설치된 디스플레이패널과, 상기 제2냉각유로의 공기에 의해 냉각될 수 있도록 상기 격판과 상기 케이스 후면 사이에 설치된 적어도 하나의 회로기판을 포함하는 것을 특징으로 한다.

<23> 이하에서는 본 발명에 따른 바람직한 실시 예를 첨부 도면을 참조하여 상세히 설명한다.

<24> 도 1과 도 2는 본 발명의 제1실시 예에 따른 패널형 디스플레이장치는 나타낸 것이다. 이 디스플레이장치는 케이스(10), 케이스(10)의 내측 전방에 설치된 디스플레이패널(20), 그리고 케이스(10)의 후방에 설치된 복수의 회로기판들(31,32,33)을 구비한다.

<25> 케이스(10)는 디스플레이패널(20)의 전방에 결합되며 화면 부분에 개구(13)가 형성된 전면케이스(11)와, 디스플레이패널(20)의 후방에 결합되며 테두리부분이 전면케이스(11)에 결합되는 후면케이스(12)를 포함한다.

<26> 디스플레이패널(20)은 LCD(liquid crystal display)나 PDP(plasma display

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panel)일 수 있다. 회로기판들(31,32,33)은 도면에 도시하지는 않았지만 유연한 배선부에 의하여 디스플레이패널(20)과 전기적으로 연결된다. 이러한 회로기판들(31,32,33)은 다수의 전자부품들이 실장된 것으로 디스플레이패널(20)의 발광을 제어하기 위한 구동회로, 제어회로, 튜너회로, 전원회로 등을 구성한다.

<27> 후면케이스(12)의 후면에는 도 2에 도시한 바와 같이, 회로기판들(31,32,33)을 설치하기 위한 회로기판결합부들(41,42,43)이 마련된다. 회로기판결합부들(41,42,43)은 각 회로기판들(31,32,33)을 수용할 수 있도록 후면케이스(12)의 후방으로부터 전방으로 소정깊이 함몰되며 후방이 개방된 형태이다. 그리고 이러한 회로기판결합부들(41,42,43)에는 각 회로기판결합부를 덮는 커버들(51,52,53)이 설치된다.

<28> 후면케이스(12)의 하부에는 도 1에 도시한 바와 같이, 디스플레이패널(20)의 냉각을 위한 공기가 케이스(10) 내부로 유입될 수 있도록 다수의 공기유입구(61)가 형성되고, 후면케이스(12)의 상부에는 케이스(10) 내부의 공기가 배출될 수 있도록 다수의 공기배출구(62)가 형성된다. 또 회로기판결합부들(41,42,43)을 덮는 커버들에는 도 2에 도시한 바와 같이, 회로기판결합부(41,42,43)의 내부공간으로 공기가 유통할 수 있도록 다수의 공기유통공들(71,72)이 형성된다.

<29> 이러한 구성들은 도 1에 도시한 바와 같이, 디스플레이패널(20)의 냉각을 위한 제1냉각유로(60)와, 회로기판들(31,32,33)의 냉각을 위한 제2냉각유로(70)를 독립적으로 구성한 것이다. 즉 디스플레이패널(20) 후면과 후면케이스(12) 내면 사이의 공간에 의해 제1냉각유로(60)가 형성되도록 하고, 후면케이스(12)의 회로기판결

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합부들(41,42,43) 내부공간에 의해 제2냉각유로(70)가 형성되도록 하여 제1냉각유로(60)와 제2냉각유로(70)가 상호 격리되도록 한 것이다.

<30> 따라서 디스플레이패널(20)은 제1냉각유로(60)를 따라 흐르는 공기에 의하여 냉각된다. 공기유입구(61)로 유입된 공기가 제1냉각유로(60)를 따라 상승하면서 디스플레이패널(20)을 냉각시킨 후 상부의 공기배출구(62)로 배출된다. 그리고 회로기판들(31,32,33)은 커버들(51,52,53)에 형성된 공기유통공들(71,72)을 통하여 제2냉각유로(70) 내부를 유동하는 공기에 의하여 냉각된다. 제1냉각유로(60)와 제2냉각유로(70)를 흐르는 공기는 각각 자연 대류현상에 의하여 하부에서 상부로 유동하면서 디스플레이패널(20) 및 회로기판들(31,32,33)을 냉각시킨다.

<31> 이러한 냉각구조는 회로기판들(31,32,33)에서 생기는 열이 디스플레이패널(20)에 영향을 미치지 않고 제2냉각유로(70)를 통하여 배출되고, 디스플레이패널(20)에서 생기는 열도 회로기판들(31,32,33)에 영향을 미치지 않고 제1냉각유로(60)를 통하여 배출될 수 있도록 한다. 따라서 디스플레이패널(20)과 회로기판들(31,32,33)이 원활히 냉각되도록 할 수 있고, 케이스(10)의 내부의 온도상승도 최소화할 수 있다. 실험결과 이러한 냉각구조는 종래 디스플레이장치의 냉각구조에 비하여 디스플레이패널(20) 전면부의 온도를 대략 5~7도정도 하강시킬 수 있었다.

<32> 도 2의 예는 회로기판결합부들(41,42,43)이 후면케이스(12)의 외면으로부터 함몰된 형태를 나타낸 것이나, 본 발명은 이에 한정되지 않고 회로기판들을 후면케이스의 외면에 돌출하도록 장착하고, 커버들이 회로기판들을 덮도록 하는 방식으로도 구현할 수 있을 것이다.

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<33> 도 3은 본 발명의 제2실시 예에 따른 디스플레이장치를 나타낸 것이다. 제2실시 예는 후면케이스(120)의 내면에 냉각유로의 구획을 위한 격판(500)이 설치된 것이다. 이는 회로기판들(32)을 격판(500)의 내면에 장착시킨 상태에서 격판(500)을 후면케이스(120)의 내면에 장착시킬 수 있도록 한 것이다. 회로기판결합부를 격판(500)으로 대체한 형태이다. 그리고 후면커버(120)에는 제2냉각유로(700)의 공기유통을 위한 다수의 공기유통공(710,720)이 형성된 것이다. 제1냉각유로(60)와 후면케이스(120)의 하부 및 상부에 형성된 공기유입구(61)와 공기배출구(62)는 제1실시 예의 형태와 동일하다. 즉 제2실시 예는 케이스 내부에 설치되는 격판(500)에 의하여 제1냉각유로(60)와 제2냉각유로(700)가 격리되는 것이다.

【발명의 효과】

<34> 이상에서 상세히 설명한 바와 같이, 본 발명에 따른 패널형 디스플레이장치는 디스플레이패널의 냉각을 위한 제1냉각유로와 회로기판들의 냉각을 위한 제2냉각유로가 격리되기 때문에 디스플레이패널의 열이 회로기판들을 가열하거나 회로기판들의 열이 디스플레이패널을 가열하는 현상을 방지할 수 있다. 따라서 디스플레이패널 및 회로기판들을 냉각효과를 높일 수 있어 케이스 내부 및 디스플레이패널의 온도상승을 최소화할 수 있는 효과가 있다.

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【특허청구범위】

【청구항 1】

케이스와, 상기 케이스 내에 설치된 디스플레이패널과, 상기 디스플레이패널의 제어를 위한 적어도 하나의 회로기판과, 상기 디스플레이패널의 냉각을 위한 제1냉각유로와, 상기 회로기판의 냉각을 위한 제2냉각유로를 포함하며,

상기 제1냉각유로와 상기 제2냉각유로가 상호 격리된 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 2】

제1항에 있어서,

상기 케이스는 상호 결합되는 전면케이스와 후면케이스를 포함하고,

상기 후면케이스는 상기 회로기판의 설치를 위해 그 외면에 마련된 회로기판결합부를 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 3】

제2항에 있어서,

상기 회로기판결합부는 상기 회로기판의 수용을 위해 상기 후면케이스의 외면으로부터 함몰되고 후방이 개방되며,

상기 회로기판결합부에는 상기 회로기판결합부를 덮으며 복수의 공기유통공을 갖춘 커버가 설치된 것을 특징으로 하는 패널형 디스플레이장치.

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【청구항 4】

제3항에 있어서,

상기 제1냉각유로는 상기 디스플레이패널 후면과 상기 후면케이스 내면 사이의 공간을 포함하고,

상기 제2냉각유로는 상기 회로기판결합부의 내부공간을 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 5】

제4항에 있어서,

상기 제1냉각유로로 공기 유입을 위해 상기 후면케이스 하부에 형성된 공기유입구와, 상기 제1냉각유로의 공기 배출을 위해 상기 후면케이스 상부에 형성된 공기배출구를 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 6】

제2항에 있어서,

상기 회로기판결합부를 덮기 위해 상기 후면케이스의 후면 외측에 결합되며 복수의 공기유통공을 갖춘 커버를 포함하고,

상기 제1냉각유로는 상기 디스플레이패널 후면과 상기 후면케이스 내면 사이의 공간을 포함하고,

상기 제2냉각유로는 상기 회로기판결합부와 상기 커버에 의해 한정되는 공간을 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

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【청구항 7】

제1항에 있어서,

상기 케이스는 상기 회로기판의 수용을 위해 그 후면 쪽에 마련되며 상기 디스플레이패널이 설치된 공간과 구획된 회로기판결합부를 포함하고,

상기 제1냉각유로는 상기 디스플레이패널 후면과 상기 케이스 내면 사이의 공간을 포함하고,

상기 제2냉각유로는 상기 회로기판결합부의 내부공간을 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 8】

케이스와, 상기 케이스의 내부를 전방의 제1냉각유로와 후방의 제2냉각유로로 구획하는 격판과, 상기 제1냉각유로의 공기에 의해 냉각될 수 있도록 상기 격판과 상기 케이스 전면 사이에 설치된 디스플레이패널과, 상기 제2냉각유로의 공기에 의해 냉각될 수 있도록 상기 격판과 상기 케이스 후면 사이에 설치된 적어도 하나의 회로기판을 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

【청구항 9】

제8항에 있어서,

상기 제1냉각유로의 공기유통을 위해 상기 케이스의 하부에 형성된 공기유입구와, 상기 케이스의 상부에 형성된 공기배출구를 더 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

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【청구항 10】

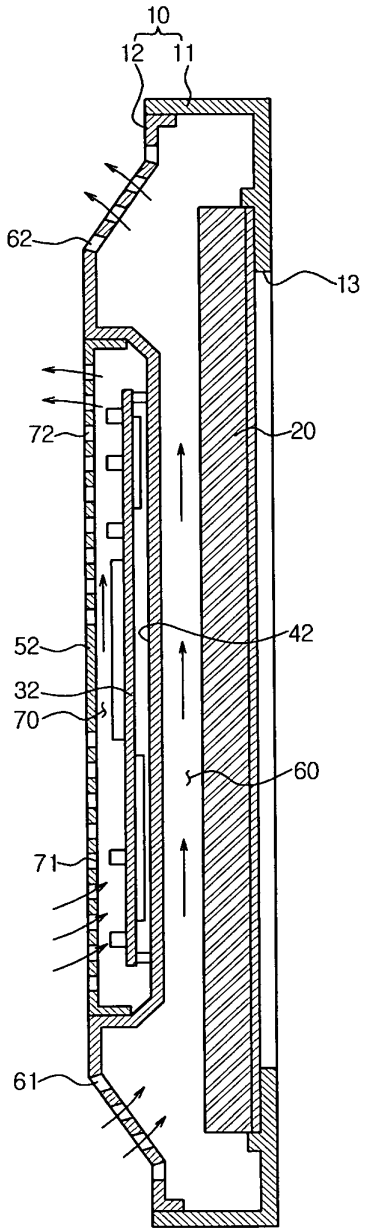
제1항에 있어서,

상기 제2냉각유로의 공기유통을 위해 상기 케이스 후면에 형성된 복수의 공기유통공을 포함하는 것을 특징으로 하는 패널형 디스플레이장치.

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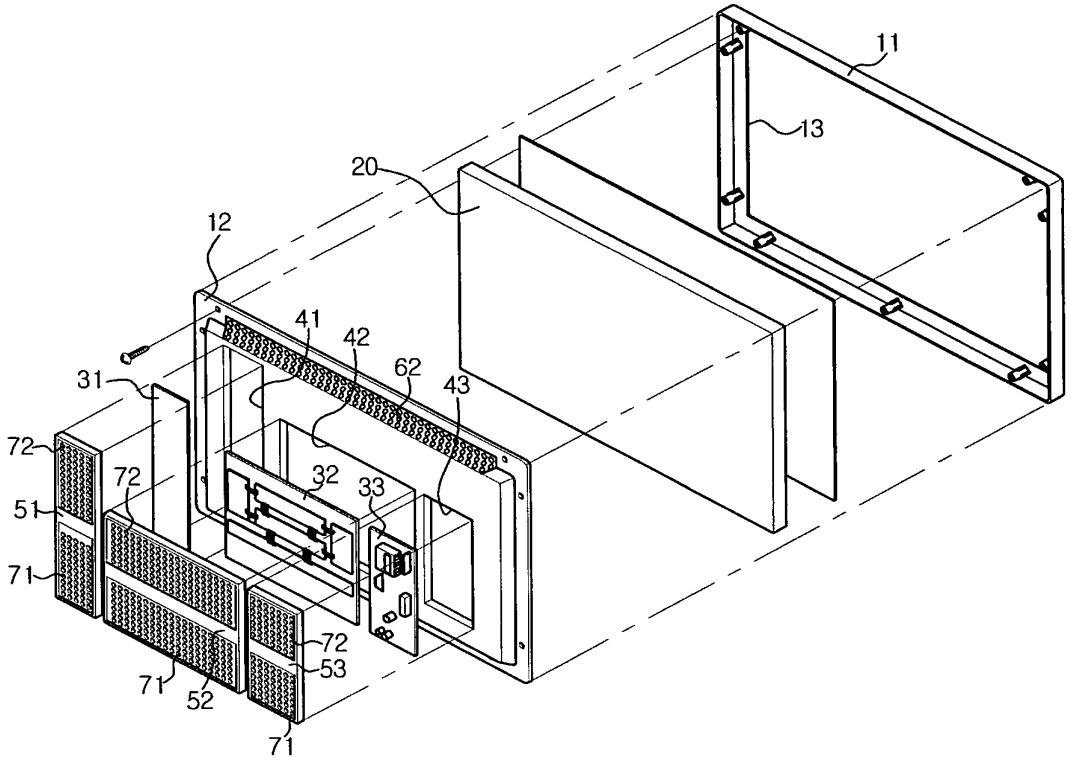
【도면】

【도 1】



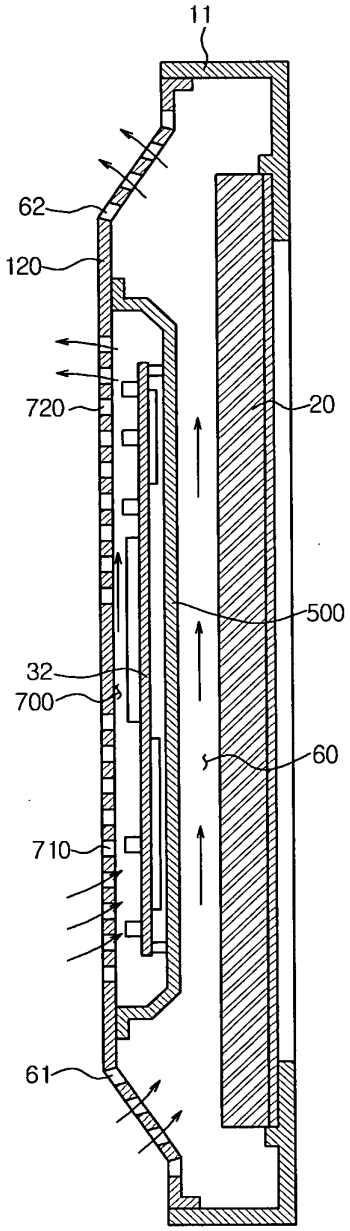
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【도 2】



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【도 3】



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PTO/SB/06 (12-04)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

11/872,057

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	310
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	510
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	210
TOTAL CLAIMS (37 CFR 1.16(i))	11 minus 20 =	0	X$ 25		OR	X$50	0
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	* 0	X$105			X$210	0
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 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			185			370	
			TOTAL	0		TOTAL	1030

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

1.9.