



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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/739,995	02/02/2016	9253925	SL-391	5387

76279 7590 01/13/2016
Brian Tucker/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

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 287 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):

Robert H. Smith, Salt Lake City, UT;
L-3 Communications Corp., New York, NY

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.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

76279 7590 12/17/2015
Brian Tucker/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT

PAPER NUMBER

2835

DATE MAILED: 12/17/2015

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

13/739,995

01/11/2013

Robert H. Smith

SL-391

5387

TITLE OF INVENTION: Panel For Enhancing Thermal Conduction In An Electronic Assembly

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	03/17/2016

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.

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)

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.

76279 7590 12/17/2015
Brian Tucker/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

TITLE OF INVENTION: Panel For Enhancing Thermal Conduction In An Electronic Assembly

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	03/17/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
SMITH, COURTNEY L	2835	361-707000

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, 1 _____
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 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)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

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.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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. _____



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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

76279 7590 12/17/2015
Brian Tucker/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT	PAPER NUMBER
----------	--------------

2835

DATE MAILED: 12/17/2015

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

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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.

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. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	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 11/9/15.
☐ 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 1-11, 13-20, 22-23. 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. _____.
 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) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 6. ☐ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☐ Other _____. |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/COURTNEY SMITH/
Primary Examiner
Art Unit: 2835

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	2628677	(H05K\$ or F25D\$ or A47B\$ or H01L\$).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 16:53
L4	691	3 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 16:55
L7	4	support attached inner facing walls electronic assembly structure enclosing space circuit substrate mounting device panel coupled sections plane contiguous planar parallel perpendicular degrees first second thermal conductivity between greater.clm.	US-PGPUB	AND	ON	2015/12/13 16:59
L8	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (plan\$3)) (inner adj2 (angle))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:01

L9	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (surface))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:01
L10	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (plan\$3 adj2 (conductivity)) (conduct\$4 adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:03
L11	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (angle adj2 (conductivity))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:03
L12	1	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:05

		adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (distance adj2 (perpendicular\$2))				
L13	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (adhesive adj2 (edge))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:06
L14	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (plan\$3)) (cover or panel or wall adj2 (angle)) (cover or panel or wall adj2 (board or pcb or substrate))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:07
L15	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:09

		casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (plan\$3)) (cover or housing or enclosure or casing or case or panel or wall adj2 (angle)) (cover or housing or enclosure or casing or case or panel or wall adj2 (sections))				
L16	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (plan\$3)) (cover or housing or enclosure or casing or case or panel or wall adj2 (angle)) (cover or housing or enclosure or casing or case or panel or wall adj2 (sections))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:09
L17	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (adhesive adj2 (edge))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:09
L18	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:10

		(cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (angle adj2 (conductivity))				
L19	0	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (surface))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:10
L20	72	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower or greater)) carbon fiber	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:12
L21	22	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower or greater)) carbon fiber elongated	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:12
L22	0	H02B\$.cpc. electr\$4 (cover or housing	US-PGPUB;	AND	ON	2015/12/13

		or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower))	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			17:24
L23	973	H02B\$.cpc. electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (perpendicular\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:26
L24	0	23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower or greater)) carbon fiber	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:27
L25	0	23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:28

		(conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (surface))				
L26	0	23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower)) (plan\$3 adj2 (angle)) (conduct\$4 adj2 (angle)) (inner adj2 (plan\$3)) (cover or panel or wall adj2 (angle)) (cover or panel or wall adj2 (board or pcb or substrate))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:28
L27	0	23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or perpendicular\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater)) (plan\$3 adj2 (conductivity)) (conduct\$4 adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:28
L28	8	H02B\$.cpc. electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (perpendicular\$2)) angle adhesive fiber	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/12/13 17:29
S1	3897	((Robert) near2 (Smith)).INV.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 10:54
S2	4	("20100321892" "7784585").PN.	US-PGPUB;	AND	ON	2015/01/06

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:54
S3	25	(US-20120320544-\$ or US-20110228498-\$ or US-20030227750-\$ or US-20030184969-\$ or US-20100263851-\$ or US-20030198022-\$ or US-20050078456-\$ or US-20120193803-\$).did. or (US-8373990-\$ or US-7440282-\$ or US-7031165-\$ or US-6365964-\$ or US-6282092-\$ or US-8199509-\$ or US-7903422-\$ or US-5812375-\$ or US-6958910-\$ or US-7050305-\$ or US-6025991-\$ or US-5777844-\$ or US-5808868-\$ or US-5402313-\$ or US-6696643-\$ or US-7304854-\$ or US-7082034-\$).did.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 11:33
S4	4	"13783476"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 11:55
S5	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:36
S6	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/01/06 12:38
S7	280	S5 S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:38
S8	1909528	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:39

		casing or case or panel adj2 (parallel or horizontal\$2))				
S9	348995	S6 S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:40
S10	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:45
S11	47403	S6 S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:46
S12	12855	S11 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:47
S13	0	"13739995"	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 12:49
S14	10541	S12 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (circuit or board or pcb adj2 (connector or socket))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:49
S15	2825	S14 (circuit or board or pcb adj2 (connector or socket or frame or support)) (groove or fasten\$3 or fix\$3 adj2 (connector or socket or frame or support))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	AND	ON	2015/01/06 12:59

			IBM_TDB			
S16	22	S15 (conductivity adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 13:00
S17	1	(12/557277).APP.	US-PGPUB; USOCR	AND	ON	2015/01/06 13:47
S18	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 15:51
S19	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 09:22
S20	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S21	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/01/07 11:15
S22	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S23	47403	S21 S22	US-PGPUB;	AND	ON	2015/01/07

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			11:15
S24	12855	S23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S25	0	S20 S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S26	3	(smith adj2 (courtney)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:18
S27	14	("20020197923" "20060070720" "20060232932" "20070000642" "20070053168" "20070285890" "20080101026" "20090282852" "20100033935" "20110101394" "20110228482" "6521990" "8081468" "8130500").PN. OR ("8537553").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 11:21
S28	1	(13/071015).APP.	US-PGPUB; USOCR	AND	ON	2015/01/07 11:37
S29	1	(13/404546).APP.	US-PGPUB; USOCR	AND	ON	2015/01/07 15:12
S30	1	"13739995"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 10:17
S31	0	"13739995"	US-PGPUB	AND	ON	2015/07/01 10:18
S34	622853	(H05K\$ or F25D\$).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:16

S35	1941	S34 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:16
S36	1941	S35 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:19
S37	8	S35 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (greater)) perpendicular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:21
S38	12	S35 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:21
S39	66	S35 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:21

		adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (less))				
S40	72	S35 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:22
S41	64	(S40 not (S38 or S39))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:22

12/ 13/ 2015 5:30:48 PM
C:\ Users\ csmith7\ Documents\ EAST\ Workspaces\ 13739995.wsp

Issue Classification 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 2835

CPC						
Symbol					Type	Version
H05K		7	/	20409	F	2013-01-01
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
				
				

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	21	
/COURTNEY SMITH/ Primary Examiner.Art Unit 2835	12/13/15	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1B

Issue Classification 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 2835

☐ 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	16	17												
2	2	17	18												
3	3	18	19												
4	4	19	20												
5	5		21												
6	6	20	22												
7	7	21	23												
8	8														
9	9														
10	10														
11	11														
	12														
12	13														
13	14														
14	15														
15	16														

NONE	Total Claims Allowed:	
(Assistant Examiner)	21	
(Date)		
/COURTNEY SMITH/ Primary Examiner.Art Unit 2835	12/13/15	O.G. Print Claim(s)
(Primary Examiner)	(Date)	O.G. Print Figure
		1
		1B

Search Notes 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 2835

CPC- SEARCHED		
Symbol	Date	Examiner
H05K w/limited text search	12/13/15	C.S.
F25D w/limited text search	12/13/15	C.S.
H02B w/limited text search	12/13/15	C.S.
H01L w/limited text search	12/13/15	C.S.

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
361	.CLAS. w/limited text search	1/7/14	C.S.
257	.CLAS. w/limited text search	1/7/14	C.S.
174	.CLAS. w/limited text search	1/7/14	C.S.
165	.CLAS. w/limited text search	1/7/14	C.S.
439	.CLAS. w/limited text search	1/7/14	C.S.

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	1/7/14	C.S.
Inventor search	1/7/14	C.S.
East Search Updated	7/1/15	C.S.
CPC Search	7/1/15	C.S.
East Search Updated including CPC Search	12/13/15	C.S.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	PG PUB TEXT SEARCH	12/13/15	C.S.

--	--

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)

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.

76279 7590 12/17/2015
Brian Tucker/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

TITLE OF INVENTION: Panel For Enhancing Thermal Conduction In An Electronic Assembly

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	03/17/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
SMITH, COURTNEY L	2835	361-707000

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 Kirton | McConkie

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)

L-3 Communications Corp.

New York, New York

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)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

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.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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 /Brian Tucker/

Date December 17, 2015

Typed or printed name Brian Tucker

Registration No. 61550

Electronic Patent Application Fee Transmittal

Application Number:	13739995			
Filing Date:	11-Jan-2013			
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly			
First Named Inventor/Applicant Name:	Robert H. Smith			
Filer:	Brian Douglas Tucker			
Attorney Docket Number:	SL-391			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
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	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt

EFS ID:	24401520
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	Brian Douglas Tucker
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	17-DEC-2015
Filing Date:	11-JAN-2013
Time Stamp:	17:51:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$960
RAM confirmation Number	4993
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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)	SL_522_Issue_Fee_Transmittal.pdf	88017	no	1
			dd3ebc6015c933ca42774152cf10aabc247ba049		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30265	no	2
			11b19da97b10fe27afb75bd8f459434f4a313279		
Warnings:					
Information:					
Total Files Size (in bytes):			118282		
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.					

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	13739995	Filing Date	2013-01-11	Docket Number (if applicable)	SL-391	Art Unit	2835
First Named Inventor	Smith			Examiner Name	Courtney L. Smith		

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

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not comply with the requirements of 35 U.S.C. 371, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV.

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed 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 _____

☒ Enclosed

☒ 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.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 500843

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/N. Kenneth Burraston/	Date (YYYY-MM-DD)	2015-11-09
Name	N. Kenneth Burraston	Registration Number	39923

This collection of information is required by 37 CFR 1.114. 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 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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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.

Electronic Patent Application Fee Transmittal

Application Number:	13739995			
Filing Date:	11-Jan-2013			
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly			
First Named Inventor/Applicant Name:	Robert H. Smith			
Filer:	N. Kenneth Burraston			
Attorney Docket Number:	SL-391			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
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(\$)
Extension - 1 month with \$0 paid	1251	1	200	200
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
Total in USD (\$)				1400

Electronic Acknowledgement Receipt

EFS ID:	24026877
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	09-NOV-2015
Filing Date:	11-JAN-2013
Time Stamp:	16:01:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1400
RAM confirmation Number	2745
Deposit Account	500843
Authorized User	ANDERSON, DAX D.

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 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SL391amdNov15.pdf	71426	yes	13
			f8a08aa1da05d28c1ae6c21beecd5118d770b537		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
	Claims		2	8	
	Applicant Arguments/Remarks Made in an Amendment		9	13	
Warnings:					
Information:					
2	Affidavit-traversing rejectns or objectns rule 132	SL391declNov15.pdf	871086	no	4
			57509d81ebd4c8309d9ac2849b99349716a91e00		
Warnings:					
Information:					
3	Extension of Time	SL391extNov15.pdf	163246	no	2
			d4f3ac2f2912992ec39398b701f9fce13862948e		
Warnings:					
Information:					
4	Request for Continued Examination (RCE)	SL391rceNov15.pdf	1349850	no	3
			2666341d6e867af8d06a1f500425f0b960b3f85b		
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	32150	no	2
			f9a564a7a0163918ab9ba652fe204a7d3e0a7fd12		
Warnings:					
Information:					
Total Files Size (in bytes):			2487758		

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.

Amendments to the Claims:

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

Listing of Claims:

Claim 1 (Currently amended): An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising ~~[[an]]~~ a substantially planar inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein an angle ~~at a boundary~~ between said inner surface of a first one of said sections and a plane parallel to said inner surface of a second one of said sections is ~~greater than or equal to~~ between five degrees and forty-five degrees inclusive, and

wherein said second one of said sections is contiguous with said first one of said sections.

Claim 2 (Original): The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity.

Claim 3 (Currently amended): ~~The electronic assembly of claim 1~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity.

Claim 4 (Previously presented): The electronic assembly of claim 2, wherein:

said panel further comprises substantially parallel edges bounding said sections, and

for each said section, said inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section.

Claim 5 (Currently amended): The electronic assembly of claim 4, wherein~~[[:]]~~ said mounting surface is substantially planar;~~and each of the inner surfaces of said sections of said panel are substantially planar.~~

Claim 6 (Previously presented): The electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of said first one of said sections of said panel.

Claim 7 (Previously presented): The electronic assembly of claim 6, wherein said inner surface of said first one of said sections is substantially parallel to said mounting surface.

Claim 8 (Currently amended): ~~The electronic assembly of claim 7,~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

and

wherein:

the inner surface of a first one of said sections is substantially parallel to said mounting surface of said circuit substrate,

the inner surface of a second one of said sections is not substantially parallel to said mounting surface of said circuit substrate,

the inner surface of a third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and

a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said third one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface.

Claim 9 (Currently amended): An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface; and

thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity,

wherein said panel further comprises substantially parallel edges bounding said sections, and for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section,

wherein said mounting surface is substantially planar, and each of the inner surfaces of said sections of said panel are substantially planar,

wherein said inner surface of said one of said sections is substantially parallel to said mounting surface,

wherein the inner surface of a second one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance between said inner surface of said one of said sections and said mounting surface, and

wherein:

an angle between the inner surface of a third one of said sections and a plane parallel to said inner surface of said second one of said sections is greater than zero but less than twenty-five degrees, and

said third one of said sections is contiguous with said one of said sections and said second one of said sections.

Claim 10 (Original): The electronic assembly of claim 9 further comprising:

a second electronic device coupled to said mounting surface of said circuit substrate; and
thermally conductive material disposed between and physically contacting said second electronic device and said inner surface of said second one of said sections of said panel.

Claim 11 (Original): The electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within twenty five degrees of parallel to every other one of said inner surfaces of said sections.

Claim 12 (Canceled)

Claim 13 (Original): The electronic assembly of claim 2, wherein each said section of said panel comprises elongated fibers.

Claim 14 (Original): The electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section.

Claim 15 (Original): The electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel.

Claim 16 (Currently amended): ~~The electronic assembly of claim 15 further comprising~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel, and

wherein said electronic assembly further comprises a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure.

Claim 17 (Original): The electronic assembly of claim 16 further comprising a thermally conductive material disposed between and in physical contact with said electronic device and the inner surface of one of said contiguous ones of said sections of said panel.

Claim 18 (Original): The electronic assembly of claim 13, wherein said elongated fibers are carbon fibers.

Claim 19 (Original): The electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers.

Claim 20 (Original): The electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material.

Claim 21 (Canceled)

Claim 22 (Previously presented): The electronic assembly of claim 1, wherein said first one of said sections comprises:

- a plurality of stacked layers each substantially parallel to said inner surface of said first one of said sections,

- a first of said layers comprises elongated fibers oriented in a first direction,

- a second of said layers comprises elongated fibers oriented in a second direction, and
 - said first direction is different than said second direction.

Claim 23 (Previously presented): The electronic assembly of claim 22, wherein:

- said first direction is substantially perpendicular to said second direction, and

- said first direction and said second direction are substantially parallel to said inner surface of said first one of said sections.

REMARKS/ARGUMENTS

I. Introduction

Claims 1, 3, 5, 8, 9, and 16 are amended. Claims 1-11, 13-20, 22, and 23 are pending in the application. (Claims 12 and 21 are now or were previously canceled.) Applicant respectfully requests reconsideration of the application.

II. The claim amendments in this Paper—not the claim amendments in the AF Amendment filed September 22—should be entered and examined

In the Advisory Action dated October 23, 2015, the Office indicated that the claim amendments in the "Amendment Filed Under 37 CFR 1.116" filed September 22, 2015 were not entered because "[t]hey raise new issues that would require further consideration and/or search." The foregoing amendments to the claims thus have not and should not be entered. Instead, the amendments to the claims in this Paper entitled "Amendment Filed With An RCE" filed November 9, 2015 should be entered and examined.

III. The recitation of "a plane parallel to said inner surface of a second one of said sections" to define the "angle" in line 15 of claim 1 is more than sufficiently clear to meet the requirements of 35 USC § 112

In the Advisory Action dated October 23, 2015, the Office questions the clarity of the "angle" recited at line 15 of claim 1, which is described as "an angle between said inner surface of a first one of said sections and a plane parallel to said inner surface of a second one of said sections." Applicant respectfully asserts that the foregoing is more than sufficiently clear to meet the requirements of 35 USC § 112.

First, the "plane parallel to said inner surface of a second one of said sections" is not recited as a physical element of the claimed "electronic assembly." Rather, it is part of a description of the recited "angle." Moreover, it coincides perfectly with a non-limiting example described in paragraph [0028] of the specification and shown in Figure 2 of the drawings in which elements recited in lines 15-17 of claim 1 correspond to non-limiting examples illustrated in Figure 2 as shown in the following table:

Claim 1 Lines 15-17	Figure 2
"an angle"	angle 204
"inner surface of a first one of said sections"	inner surface 130 of section 118
"a plane parallel to"	axis or plane 202
"said inner surface of a second one of said sections"	inner surface 132 of section 112

Second, no fair or reasonable interpretation of claim 1 can confuse the recited "plane" with the inner surface of a section. The term "substantially planar" is utilized in line 8 of claim 1 to describe the inner surface. No fair or reasonable reading of that description could give rise to a plausible interpretation of line 8 as introducing a "plane" as a new element of claim 1. Moreover, the "plane" recited in line 16 of claim 1 is expressly introduced using the word "a," which is well understood in patent parlance as introducing a new element not previously recited in the claim. There are thus no reasonable grounds for confusing the recitation of "a plane" in line 16 with the "inner surface" of a section recited in line 8.

IV. Claims 3, 8-10, 16, and 17 are patentable in accordance with the Office's identification of patentable subject matter

Applicant acknowledges with appreciation the Office's indication that claims 3, 8-10, 16, and 17 contain allowable subject matter. The rejection of claim 9 as indefinite is addressed and presumably overcome below. Independent claim 9 and claim 10 (which depends from claim 9) should therefore be in condition for allowance.

Claims 3, 8, and 16 have been rewritten in independent form. Although those claims do not include all features of their base claim and/or intervening claims, claims 3, 8, and 16 recite the features the Office identified as distinguishing over the prior art.

That is, claim 3 recites that "for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity." As the Office noted on page 8 of the Office Action, Mohammed lacks such a feature. Independent claim 3 is therefore patentable over Mohammed.

Claim 8 recites that "the inner surface of a first one of said sections is substantially parallel to said mounting surface of said circuit substrate, the inner surface of a second one of said sections is not substantially parallel to said mounting surface of said circuit substrate, the

inner surface of a third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said third one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface." Again, consistent with the Office's finding on page 8 of the Office Action, Mohammed lacks the foregoing. Independent claim 8 is therefore patentable over Mohammed.

Claim 16 recites the features of claim 15 ("a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel") and further requires "a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure." Still again as noted by the Office on page 8 of the Office Action, Mohammed lacks this feature. Independent claim 16 and its dependent claim (claim 17) are therefore also patentable over Mohammed.

V. The claims are more than sufficiently definite to meet the requirements of 35 USC § 112(b)

Claims 1, 9, 11, and 21 were rejected under 35 USC § 112(b) as indefinite. Claim 21 is canceled, mooted the rejection of that claim. Applicant otherwise respectfully traverses this rejection.

Claim 1, including the recitation that "each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section," requires that the thermal conductivity of each section be greater in a direction that is substantially (e.g., within 10 degrees of being perfectly) parallel to the inner surface of that section than the thermal conductivity in a direction that is substantially (e.g., within 10 degrees of being perfectly) perpendicular to the inner surface of that section. But claim 1 does not require that the direction of the first or second thermal conductivity of a section have any particular orientation with respect to the mounting surface of the circuit substrate, nor does claim 1 require that the direction of the first or second thermal conductivity of one section have any particular orientation with respect to the inner

surface of another of the sections. Thus, the descriptions of the first and second thermal conductivities in claim 1 do not—and indeed cannot—contradict the requirement in claim 1 that the inner surface of each section be "oriented within twenty-five degrees of parallel to said mounting surface" of the circuit substrate or that "an angle between said inner surface of a first one of said sections and a plane parallel to said inner surface of a second one of said sections is between five degrees and forty-five degrees inclusive." There is thus nothing indefinite about claim 1. Claim 11 (which depends from claim 1) is similarly more than sufficiently definite to meet the requirements of 35 USC § 112(b).

Claim 9 does not recite the five-degree-angle feature objected to by the Office. The rejection of claim 9 thus appears to be a mistake and should be withdrawn. Claim 9 has nevertheless been amended to clarify the description of the angle that is greater than or equal to five degrees, which is supported at least by the examples of a plane or axis 202 and an angle 204 in Figure 2 of the drawings. (See also the Specification ¶ [0028].)

VI. Claims 1, 2, 4-7, 11, and 13-24 are patentable over Mohammed at least because no portion of the heat sink 40 in Figure 5 is "substantially planar"

Claims 1, 2, 4-7, 11, 13-15, and 18-20 were rejected under 35 USC § 102(b) as anticipated by US Patent Application Publication No. 2012/0206882 to Mohammed et al. ("Mohammed"). Applicant respectfully traverses this rejection.

Independent claim 1 now recites that the "inner surface" of each section of the panel is "substantially planar." In rejecting claim 1, the Office equated the panel recited in claim 1 with the curved heat sink 40 illustrated in Figure 5 of Mohammed and the sections of the panel recited in claim 1 with contiguous portions of the heat sink 40. But a curved surface like the surface of Mohammed's heat sink 40 cannot reasonably or fairly be deemed to be "planar." Indeed, a curved surface is the antithesis of "planar," which means flat or level. (See the Declaration Under 37 CFR § 1.132 Of N. Kenneth Burraston filed herewith.)

Nor can the curved surface of Mohammed's heat sink 40 be deemed "*substantially* planar." The specification defines "*substantially* planar" as "allow[ing] for insignificant, *unintended* deviations from perfect planarity." Mohammed's heat sink 40 is intentionally curved (see Mohammed ¶¶ [0054] and [0055]) and thus cannot be deemed to be "substantially planar." Mohammed thus fails to anticipate claim 1.

Moreover, it would not have been obvious to modify the heat sink 40 in Figure 5 of Mohammed to make it planar. For example, the very purpose of the curved shape of the heat sink 40 is to "enhance the contact area between the various contact surfaces." (Mohammed ¶ [0055].) Mohammed thus teaches against modifying the shape of the heat sink 40 of Figure 5 to make it planar. For at least this reason, Mohammed does not render claim 1 obvious.

Claims 2, 4-7, 11, 13-15, 18-20, 22, and 23 depend from claim 1 and, at least because of that dependency, are also patentable over Mohammed.

VII. Conclusion

In view of the foregoing, Applicant submits that all of the claims are allowable and the application is in condition for allowance. If at any time the Examiner believes that a discussion with Applicant's attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 426-2106.

Applicant requests any extension of time required for acceptance of this Paper and authorizes the Director to charge any fee required for acceptance of this Paper (including but not limited to a fee for an extension of time) to Deposit Account 50-0843 (order no. 15937-0094).

Respectfully submitted,

Date: November 9, 2015

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton | McConkie
P.O. Box 45120
Salt Lake City, Utah 84145-0120
Telephone: (801) 426-2106
Fax: (801) 321-4893

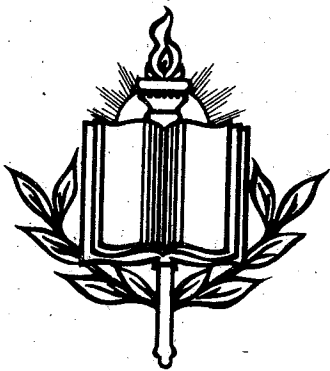
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. Attached to this Declaration are true and correct copies of the following pages from Webster's Encyclopedic Unabridged Dictionary of the English Language, Gramercy Books (1996): the title page, the publication page, and page 1480.
2. All statements herein made of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willful false statements and the like are punishable by fine or imprisonment, or both (18 USC § 1001) and may jeopardize the validity of the above-identified application or any patent issuing thereon.

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

SAMSUNG EX. 1002 - 50/204

WEBSTER'S ENCYCLOPEDIA UNABRIDGED DICTIONARY OF THE ENGLISH LANGUAGE



The dictionary entries are based on the Second Edition of
The Random House Dictionary of the English Language

GRAMERCY BOOKS
New York

Acknowledgments and Permissions

The "A Dictionary of the English Language" section of this book (*Webster's Encyclopedic Unabridged Dictionary*) is based on the second edition of *The Random House Dictionary of the English Language, the Unabridged Edition*, copyright © 1993, 1987.

Copyright © 1996 by Random House Value Publishing, Inc.
All rights reserved under International and Pan-American
Copyright Conventions.

No part of this book may be reproduced or transmitted in any form or by
any means electronic or mechanical including photocopying, recording, or
by any information storage and retrieval system, without permission in
writing from the publisher.

This 1996 edition is published by Gramercy Books,
a division of Random House Value Publishing, Inc.,
201 East 50th Street, New York, N. Y. 10022.

Gramercy Books and colophon are trademarks of
Random House Value Publishing, Inc.

Random House
New York • Toronto • London • Sydney • Auckland
<http://www.randomhouse.com/>
Printed and bound in the United States

Library of Congress Cataloging-in-Publication Data
Webster's encyclopedic unabridged dictionary of the English language—
New rev. ed.
p. cm.
"The dictionary entries are based on the second edition of
The Random House dictionary of the English language."
1. English language—Dictionaries.
PE1625.W46 1994
423dc20

93-48137
CIP

OLD ISBN: 0-517-11888-2
New Deluxe Edition: 0-517-15026-3

10 9 8 7 6 5

pains-man (plānz'mən), *n.*, *pl.* **-men**. an inhabitant of the plains. [1795-1805; PLAIN¹ + -s + -MAN]

Plains of A/bram, a high plain adjoining the city of Quebec, Canada: battlefield where the English under Wolfe defeated the French under Montcalm in 1759.

plain-song (plān'sōng', -sōng'), *n.* 1. the unisonous vocal music used in the Christian church from the earliest times. 2. modal liturgical music; Gregorian chant. 3. a cantus firmus or theme chosen for contrapuntal development. 4. any simple and unadorned melody or air. Also, **plain' song'**. Also called **plainchant** (for defs. 1, 2). [1505-15; trans. of ML *cantus planus*]

plain-spo-ken (plān'spō'kən), *adj.* 1. candid; frank; blunt. 2. using simple, direct language: a plain-spoken politician. [1670-80]

—**Syn.** direct, open, forthright.

plain-stones (plān'stōnz'), *n.pl.* 1. flagstones. 2. (used with a singular *v.*) a flagstone walk or passageway. Also, **plain-stanes** (plān'stānz'). [1765-75; PLAIN¹ + STONE + -s]

plain/ suit', *Cards*. a suit other than the trump suit. Also called **side suit**.

plaint (plānt), *n.* 1. a complaint. 2. *Law*. a statement of grievance made to a court for the purpose of asking redress. 3. a lament; lamentation. [1175-1225; ME < MF < L *planctus* a striking or beating (the breast) in grief, equiv. to *plangere* to beat, strike, mourn for + -tus, suffix of *v.* action]

plain/ ta'ble, *Survey*. See **plane table**.

plain-text (plān'tekst'), *n.* the intelligible original message of a cryptogram, as opposed to the coded or enciphered version. Also called **clear text**. Cf. **cryptography**. [1915-20; PLAIN¹ + TEXT]

plain-tiff (plān'tif), *n.* *Law*. a person who brings suit in a court (opposed to *defendant*). [1350-1400; ME *plaintif* complaining person, *n.* use of the *adj.*: PLAIN-TIVE] —**plain-tiff-ship'**, *n.*

plain-tive (plān'tiv), *adj.* expressing sorrow or melancholy; mournful: a plaintive melody. [1350-1400; PLAIN-TIVE + -IVE; *r.* ME *plaintif* < MF] —**plain-tive-ly**, *adv.* —**plain-tive-ness**, *n.*

—**Syn.** wistful, sorrowful, sad. —**Ant.** happy, joyful.

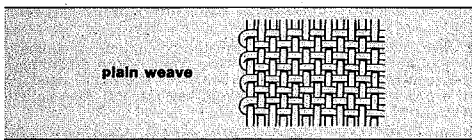
plain/ tripe', the fatty, inner lining of the first stomach (the rumen) of a steer, calf, hog, or sheep, having a bland taste and used as a food, esp. in the preparation of such dishes as haggis, head cheese, etc. Cf. **honeycomb tripe**.

plain-vanilla (plān'və nil'ə), *adj.* *Informal*. having no embellishments, extra equipment, elaborate packaging, etc.; plain; simple; down-to-earth: I want a plain-vanilla car without a lot of chrome trim. (in allusion to vanilla ice cream, taken to be the most basic flavor)

Plain-view (plān'vyoo'), *n.* 1. a town on W Long Island, in SE New York: 28,037. 2. a city in N Texas. 22,187.

Plain-ville (plān'vil'), *n.* a town in N Connecticut. 16,401.

plain/ weave', the most common and tightest of basic weave structures in which the filling threads pass over and under successive warp threads and repeat the same pattern with alternate threads in the following row, producing a checkered surface. Cf. **satin weave**, **twill weave**. [1935-40]



plain weave

plain-wrap (plān'rap'), *adj.* packaged in a plain wrapper, esp. one displaying no brand name; no-frills: the growing popularity of plain-wrap products.

plais-ter (plā'ster), *n.*, *v.t.* *Archaic*. plaster.

plait (plāt, plat), *n.* 1. a braid, esp. of hair or straw. 2. a pleat or fold, as of cloth. —*v.t.* 3. to braid, as hair or straw. 4. to make, as a mat, by braiding. 5. to pleat. [1350-1400; ME *pleit* < MF *pleit* < L *plicium*, neut. of *plicatus*, ptp. of *plicare* to fold; see *PLX*]

plait-ing (plā'ting, plat'ing), *n.* 1. anything that is braided or pleated. 2. plaits collectively. [1375-1425; late ME *pleyting*. See *PLAIT*, -ING¹]

plan (plan), *n.*, *v.* **planned**, **plan-ing**. —*n.* 1. a scheme or method of acting, doing, proceeding, making, etc., developed in advance: battle plans. 2. a design or scheme of arrangement: an elaborate plan for seating guests. 3. a specific project or definite purpose: plans for the future. 4. Also called **plan view**, a drawing made to scale to represent the top view or a horizontal section of a structure or a machine, as a floor layout of a building. 5. a representation of a thing drawn on a plane, as a map or diagram: a plan of the dock area. 6. (in perspective drawing) one of several planes in front of a represented object, and perpendicular to the line between the object and the eye. 7. a formal program for specified benefits, needs, etc.: a pension plan. —*v.t.* 8. to arrange a method or scheme beforehand for (any work, enterprise, or proceeding): to plan a new recreation center. 9. to make plans for: to plan one's vacation. 10. to draw or make a diagram or layout of, as a building. —*v.i.* 11. to make plans: to plan ahead; to plan for one's retirement. [1670-80; < F: ground, plan, ground-

work, scheme, *n.* use of the *adj.*: flat, PLANE¹, learned borrowing of L *planus* level (cf. PLAIN¹)] —**plan/less**, *adj.* —**plan/less-ly**, *adv.* —**plan/less-ness**, *n.*

—**Syn.** 1. plot, formula, system. PLAN, PROJECT, DESIGN, SCHEME imply a formulated method of doing something. PLAN refers to any method of thinking out acts and purposes beforehand: What are your plans for today? A PROJECT is a proposed or tentative plan, often elaborate or extensive: an irrigation project. DESIGN suggests art, dexterity, or craft (sometimes evil and selfish) in the elaboration or execution of a plan, and often tends to emphasize the purpose in view: a misunderstanding brought about by design. A SCHEME is apt to be either a speculative, possibly impracticable, plan, or a selfish or dishonest one: a scheme to swindle someone. 4. sketch, draft, diagram, chart. 5. design, devise, plot.

plan-, var. of **plano-** before a vowel: **planate**.

plan-ar (plā'nār), *adj.* 1. of or pertaining to a geometric plane. 2. flat or level. [1840-50; < LL *planarius* flat, of a level surface, equiv. to L *plan*(um) PLANE¹ + -ārī -AR¹] —**plan-ar-i-ty** (plā'nār-i tē), *n.*

plan-ar-i-an (plā'nār-i'ən), *n.* *Zool.* any of various free-swimming, mostly freshwater flatworms of the class Turbellaria, having an undulating or sluglike motion: popular in laboratory studies for the ability to regenerate lost parts. [1885-90; < NL *Planaria*(a) a flatworm genus (*n.* use of fem. of LL *planarius* level, on level ground; taken to mean "flat"; see PLANE¹, -ARY + -AN)]



plan-ate (plā'nāt), *adj.* having a plane or flat surface. [*<* LL *planatus*, ptp. of *planāre* to make smooth. See PLANE², -ATE]

plan-a-tion (plā'nā'shən, -plā-), *n.* *Geol.* the process whereby an irregular land surface is made flat or level by erosion. [1875-80; PLANE¹ + -ATION]

plan-cher (plan'ser), *n.* the soffit of a cornice, esp. one of wood. Also, **plan-cher** (plan'sēr), **plan-cher** (plan'sēr), **plan-cier** (plan'sēr), **plansheer**. [1655-65; < obs. F, equiv. to MF *plancher*. See PLANCH, -ER]

planch (planch, plānch), *n.* 1. a flat piece of metal, stone, or baked clay, used as a tray in an enameling oven. 2. *Brit. Dial.* a. a floor. b. a plank. Also, **planche**. [1300-50; ME *planchche* < MF *planche* < L *planca* plank]

planch-et (plan'chit), *n.* a flat piece of metal for stamping as a coin; a coin blank. [1605-15; PLANCH + -ET]

plan-chette (plan shet', -chet'), *n.* a small, heart-shaped board supported by two casters and a pencil or stylus that, when moved across a surface by the light, unguided pressure of the fingertips, is supposed to trace meaningful patterns or written messages revealing subconscious thoughts, psychic phenomena, clairvoyant messages, etc. Cf. *Oulija*. [1855-60; < F; see PLANCH, -ETTE]

Planck (plāngk), *n.* **Max Karl Ernst** (māks kār'l ernst), 1858-1947, German physicist: Nobel prize 1918.

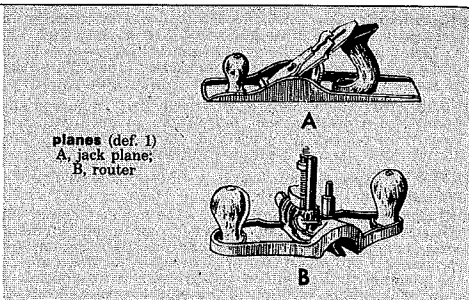
Planck's constant, *Physics*. the fundamental constant of quantum mechanics, expressing the ratio of the energy of one quantum of radiation to the frequency of the radiation and approximately equal to 6.624×10^{-27} erg-seconds. Symbol: *h*. Also, **Planck's constant**. [1905-10; named after M. K. E. PLANCK]

Planck's radiation law, *Physics*. 1. the law that energy associated with electromagnetic radiation, as light, is composed of discrete quanta of energy, each quantum equal to Planck's constant times the corresponding frequency of the radiation: the fundamental law of quantum mechanics. 2. the law giving the spectral distribution of radiation from a blackbody. Also called **Planck's radiation formula**, **Planck's law**. [1905-10; named after M. K. E. PLANCK]

plane¹ (plān), *n.*, *adj.*, *v.* **planned**, **plan-ing**. —*n.* 1. a flat or level surface. 2. *Geom.* a surface generated by a straight line moving at a constant velocity with respect to a fixed point. 3. *Fine Arts*. an area of a two-dimensional surface having determinate extension and spatial direction or position: oblique plane; horizontal plane. 4. a level of dignity, character, existence, development, or the like: a high moral plane. 5. *Aeron.* a. an airplane or a hydroplane: to take a plane to Dallas. b. a thin, flat or curved, extended section of an airplane or a hydroplane, affording a supporting surface. 6. *Archit.* a longitudinal section through the axis of a column. —*adj.* 7. flat or level, as a surface. 8. of or pertaining to planes or plane figures. —*v.i.* 9. to glide or soar. 10. (of a boat) to rise partly out of the water when moving at high speed. 11. *Informal*. to fly or travel in an airplane: We'll drive to Detroit and plane to Los Angeles. [1400-50 for sense "to soar"; 1640-50 for *n.* and *adj.* senses; (*n.*) < L *planum* flat surface (*n.* use of *planus* flat); (*adj.*) < L *planus*; first used to distinguish the geometrical senses formerly belonging to PLAIN¹; in def. 5, shortened form of AIRPLANE, AEROPLANE, or HYDROPLANE; (*v.*) late ME *planen* (of a bird) to soar (cf. MF *planer*); akin to PLAIN¹] —**plane/ness**, *n.*

—**Syn.** 4. stratum, stage. 7. smooth, even, flush.

plane² (plān), *n.*, *v.* **planned**, **plan-ing**. —*n.* 1. *Carpentry*. any of various woodworking instruments for paring, tracing, or smoothing, or for forming moldings, chamfers, rabbets, grooves, etc., by means of an inclined, adjustable blade moved along and against the piece being worked. 2. a trowel-like tool for smoothing the surface of clay in a brick mold. —*v.t.* 3. to smooth or dress with or as if with a plane or a planer. 4. to remove by or as if by means of a plane (usually fol. by *away* or *off*). —*v.i.* 5. to work with a plane. 6. to function as a plane. [1275-1325; (*n.*) ME (< MF) < LL *plāna*, deriv. of *planāre* to smooth itself deriv. of L *planus* PLAIN¹; (*v.*) ME *planan*



planes (def. 1)
A, jack plane;
B, router

plane³ (plān), *n.* See **plane tree**. [1350-1400; ME < MF < L *planatus* < Gk *platanos*, deriv. of *platys* broad, FLAT¹ (with reference to the leaves)]

plane/ an'gle, *Math.* an angle between two intersecting lines. [1820-30]

plane/ geom'etry, *Math.* the geometry of figures whose parts all lie in one plane. [1740-50]

plane/ i'ron, *Carpentry*. the blade of a plane. [1575-85]

plane/ of in'cidence, *Optics*. a plane determined by a given ray, incident on a surface, and the normal at the point where the incident ray strikes the surface. [1825-35]

plane/ polariza'tion, *Optics*. polarization of light in which the vibrations are confined to a single plane, that of the wave front. Also called **linear polarization**. —**plane-po-lar-ized** (plān'pō'lə rīzd'), *adj.*

plan-er (plā'nər), *n.* 1. *Carpentry*. a power machine for removing the rough or excess surface from a board. 2. *Metalworking*. a machine for cutting flat surfaces, having a cutting tool supported by an overhead frame beneath which the work slides back and forth. Cf. **shaper** (def. 2). 3. *Typesetting*. a block of smooth, hard wood for leveling the type in a chase by tapping with a mallet. [1375-1425; late ME; see PLANE², -ER]

plan'er saw', *Carpentry*. a hollow-ground circular saw for ripping and cutting across grain, having raker teeth for clearing away the chips cut by the cutting teeth.

plan'er tree' (plā'nər), a small tree, *Planera aquatica*, of the elm family, growing in moist ground in the southern U.S., bearing a small, ovoid, nutlike fruit and yielding a compact light-brown wood. Also called **water elm**. [1800-10, Amer.; named after I. J. Planer, 18th-century German botanist]

plane/ sail'ing, *Navig.* sailing on a course plotted without reference to the curvature of the earth. Cf. **plain sailing**, **spherical sailing**. [1690-1700]

plan-et (plan'it), *n.* 1. *Astron.* a. Also called **major planet**, any of the nine large heavenly bodies revolving about the sun and shining by reflected light: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, or Pluto in the order of their proximity to the sun. See table on next page. b. a similar body revolving about a star other than the sun. c. (formerly) a celestial body moving in the sky, as distinguished from a fixed star, applied also to the sun and moon. 2. *Astrol.* the sun, moon, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, or Pluto, considered sources of energy or consciousness in the interpretation of horoscopes. [1250-1300; ME *planete* (< OF *planète*) < LL *planēta*, *planētēs* (found only in pl. *planētae*) < Gk (*astēres*) *planētai* lit., wandering (stars)]

plane/ ta'ble, *Survey*. a drawing board mounted on a tripod, used in the field, with an alidade, for surveying tracts of land. Also, **plain table**. [1600-10]

plane-ta'ble (plan'tā'bel), *v.t.*, *v.i.*, **-bled**, **-bling**. to survey with a plane table. [1870-75]

plane-tar-i-um (plan'i tār'ē əm), *n.*, *pl.* **-tar-i-ums**, **-tar-i-a** (-tār'ē ə), 1. an apparatus or model representing the planetary system. 2. a device that produces a representation of the heavens by the use of a number of moving projectors. 3. the building or room in which such a device is housed. [1765-75; < NL, *n.* use of neut. of L *planētarius* PLANETARY; cf. -ARIUM]

plane-tar-y (plan'i tər'ē), *adj.* 1. of pertaining to, or resembling a planet or the planets. 2. wandering; erratic. 3. terrestrial; global. 4. *Mach.* noting or pertaining to an epicyclic gear train in which a sun gear is linked to one or more planet gears also engaging with an encircling ring gear. —*n.* 5. *Mach.* a planetary gear train. [1585-95; < L *planētarius*. See *PLANET*, -ARY]

plan/etary neb'u-la, *Astron.* an expanding shell of thin ionized gas that is ejected from and surrounds a hot, dying star of about the same mass as the sun; the gas absorbs ultraviolet radiation from the central star and reemits it as visible light by the process of fluorescence. [1850-55; so named for its resemblance to the planets Uranus and Neptune]

plan/etary preces'sion, *Astron.* the small component of the precession of the equinoxes contributed by the motion of the ecliptic, the change in orientation of the plane of the earth's orbit being produced by the gravitational attraction of the planets. [1860-65]

plane-tes-i-mal (plan'i tes'ē mōl), *Astron.* —*n.* 1. one of the small celestial bodies that, according to one theory (planetesimal hypothesis), were fused together to form the planets of the solar system. —*adj.* 2. of or pertaining to a planetesimal or planetesimals. [1900-05; from Gk *planetēs* (see PLANET), *malos* (see MAL)]

plan/et gear', *Mach.* any of the gears in an epicyclic train surrounding and engaging with the sun gear. Also

CONCISE ETYMOLOGY KEY: <, descended or borrowed from; >, whence; b, blend of; blended; c, cognate with; cf, compare; deriv., derivative; equiv., equivalent; imit., imitative; obl., oblique; r, replacing; s, stem; sp., spelling; spelled; resp., respelling; respelled; trans., translation; ? origin unknown; †, unattested; ‡, probably

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.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) SL-391
Application Number 13/739,995	Filed January 11, 2013	
For Panel for enhancing thermal conduction in an electronic assembly		
Art Unit 2835	Examiner Courtney L. Smith	

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>	
☒ One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ <u>200</u>
☐ Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$ _____
☐ Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$ _____
☐ Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$ _____
☐ Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ _____

☐ Applicant asserts small entity status. See 37 CFR 1.27.☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.☐ A check in the amount of the fee is enclosed.☐ Payment by credit card. Form PTO-2038 is attached.☐ The Director has already been authorized to charge fees in this application to a Deposit Account.☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to
Deposit Account Number 50-0843.☒ Payment made via EFS-Web.**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

I am the

☐ applicant.☒ attorney or agent of record. Registration number 39,923.☒ attorney or agent acting under 37 CFR 1.34. Registration number 39,923./N. Kenneth Burraston/
SignatureNovember 9, 2015
DateN. Kenneth Burraston
Typed or printed name801-426-2106
Telephone Number**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.☐ * Total of _____ forms are submitted.

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/739,995	Filing Date 01/11/2013	☐ To be Mailed
---	---	----------------------------------	---------------------------------------

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	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 \$310 (\$155 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	

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	11/09/2015	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 21	Minus	** 22	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 5	Minus	*** 5	= 0	X \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						0	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	☐ Application Size Fee (37 CFR 1.16(s))					
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
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.

LIE
/DORIS ISAAC/

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.



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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

76279 7590 10/23/2015

Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT	PAPER NUMBER
----------	--------------

2835

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

10/23/2015

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):

kburraston@kmclaw.com
chandra.l.mills@L-3com.com
kcantu@kmclaw.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	Art Unit 2835	

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

(1) COURTNEY SMITH. (3) ____.

(2) Ken Burraston, Reg.#39,923. (4) ____.

Date of Interview: 14 October 2015.

Type: ☒ Telephonic ☐ Video Conference
 ☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
 If Yes, brief description: ____.

Issues Discussed ☐101 ☒112 ☐102 ☐103 ☐Others
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: N/A.

Substance of Interview
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The applicant presented reasons and support of how and why substantially is properly used in various ways within the claim. The office hereby notes that the possible 112 issues, claim construction(s) and claim interpretations thereof will have to be further considered. The applicant has provided sufficient support for the various uses of the term substantially. However, the claim has been further amended to have 'a plane parallel to' the inner surface of the second one of said sections, but a plane parallel is not explicitly denoted as the plane of the second section and may otherwise be deemed as one of some other plane/structure that may be parallel to the second section. Further, if a plane parallel is deemed as the plane of the second section then the applicant is essentially asserting this plane as perfectly planar without consideration that the inner surface of the second section is previously asserted as substantially planar. Is this simply an antecedence issue? or is a separate feature(i.e. outer surface of the second section) being referred to by 'a plane parallel to'? It is to be noted that these issues have to be resolved before allowability can be determined.

Applicant recordation instructions: 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

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/COURTNEY SMITH/ Primary Examiner, Art Unit 2835	
---	--

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Advisory Action Before the Filing of an Appeal Brief	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	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 22 September 2015 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 Continuation Sheet. (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: PTO-413-paper no. 20151016; PTO-2323-paper no. 20151016.

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: _____

Claim(s) withdrawn from consideration: _____

/COURTNEY SMITH/
Primary Examiner

Continuation of 3. NOTE: Regarding Claim 1; the amended language constitutes a new search and/or further consideration. See interview summary .

<i>Applicant-Initiated Interview Summary</i>	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	Art Unit 2835	

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

(1) COURTNEY SMITH. (3) ____.

(2) Ken Burraston, Reg.#39,923. (4) ____.

Date of Interview: 14 October 2015.

Type: ☒ Telephonic ☐ Video Conference
 ☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
 If Yes, brief description: ____.

Issues Discussed ☐101 ☒112 ☐102 ☐103 ☐Others
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: N/A.

Substance of Interview
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The applicant presented reasons and support of how and why substantially is properly used in various ways within the claim. The office hereby notes that the possible 112 issues, claim construction(s) and claim interpretations thereof will have to be further considered. The applicant has provided sufficient support for the various uses of the term substantially. However, the claim has been further amended to have 'a plane parallel to' the inner surface of the second one of said sections, but a plane parallel is not explicitly denoted as the plane of the second section and may otherwise be deemed as one of some other plane/structure that may be parallel to the second section. Further, if a plane parallel is deemed as the plane of the second section then the applicant is essentially asserting this plane as perfectly planar without consideration that the inner surface of the second section is previously asserted as substantially planar. Is this simply an antecedence issue? or is a separate feature(i.e. outer surface of the second section) being referred to by 'a plane parallel to'? It is to be noted that these issues have to be resolved before allowability can be determined.

Applicant recordation instructions: 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

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/COURTNEY SMITH/ Primary Examiner, Art Unit 2835	
---	--

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

AFCP 2.0 Decision

Application No.

13/739,995

Applicant(s)

SMITH ET AL.

Examiner

COURTNEY SMITH

Art Unit

2835

This is in response to the After Final Consideration Pilot request filed 22 September 2015.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

- ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.
- ☐ A non-broadening amendment to at least one independent claim was not submitted.
- ☐ A proper AFCP 2.0 request was submitted in response to the most recent final rejection.
- ☐ Other:

2. **Proper Request**

- A. After final amendment submitted with the request will not be treated under AFCP 2.0.

The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

- ☐ The after final amendment will be treated under pre-pilot procedure.

- B. Updated search and/or completed additional consideration.

The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

- ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.
- ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action. See attached interview summary for further details.
- ☒ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.
- ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.
- ☐ 5. Other:

Examiner Note: Please attach an interview summary when necessary as described above.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 13/739,995 Conf. No.: 5387
Applicant : L-3 Communications Corp.
Filed : January 11, 2013
TC/A.U. : 2835
Examiner : Courtney L. Smith

Docket No. : SL-391

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

AMENDMENT FILED UNDER 37 CFR 1.116

To Whom It May Concern:

In response to the final Office Action of July 9, 2015, the shortened statutory period for response to which expires October 9, 2015, and in conjunction with the concurrent filing of a Certification and Request for Consideration Under the After Final Consideration Pilot Program 2.0, Applicant submits this response under 37 CFR § 1.116 and requests that the application be amended as follows:

Amendments to the Claims are reflected in the list of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 9 of this paper.

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

SAMSUNG EX. 1002 - 66/204

Electronic Acknowledgement Receipt

EFS ID:	23749032
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	09-OCT-2015
Filing Date:	11-JAN-2013
Time Stamp:	20:18:57
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	SL391ApplInvSum.pdf	16095 6449784616627e3948ce8e5f549620f469a0d263	no	1

Warnings:

Information:

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.



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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

76279 7590 10/01/2015

Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT	PAPER NUMBER
----------	--------------

2835

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

10/01/2015

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):

kburraston@kmclaw.com
chandra.l.mills@L-3com.com
kcantu@kmclaw.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	Art Unit 2835	

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

(1) COURTNEY SMITH. (3) ____.

(2) Kenneth Burraston, Reg. 39,923. (4) ____.

Date of Interview: 14 September 2015.

Type: ☒ Telephonic ☐ Video Conference
 ☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
 If Yes, brief description: ____.

Issues Discussed ☐ 101 ☒ 112 ☐ 102 ☐ 103 ☒ Others
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 9.

Identification of prior art discussed: N/A.

Substance of Interview
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant inquired as to the status of claim 9. The office discussed reasons why claim 9 is appropriately rejected under 112.

Applicant recordation instructions: 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

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/COURTNEY SMITH/ Primary Examiner, Art Unit 2835	
---	--

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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

SAMSUNG EX. 1002 - 72/204

Amendments to the Claims:

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

Listing of Claims:

Claim 1 (Currently amended): An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising ~~[[an]]~~ a substantially planar inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein an angle ~~at a boundary~~ between said inner surface of a first one of said sections and a plane parallel to said inner surface of a second one of said sections is greater than or equal to five degrees, and

wherein said second one of said sections is contiguous with said first one of said sections.

Claim 2 (Original): The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity.

Claim 3 (Currently amended): ~~The electronic assembly of claim 1~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity.

Claim 4 (Previously presented): The electronic assembly of claim 2, wherein:

said panel further comprises substantially parallel edges bounding said sections, and

for each said section, said inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section.

Claim 5 (Currently amended): The electronic assembly of claim 4, wherein~~[[:]]~~ said mounting surface is substantially planar,~~and each of the inner surfaces of said sections of said panel are substantially planar.~~

Claim 6 (Previously presented): The electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of said first one of said sections of said panel.

Claim 7 (Previously presented): The electronic assembly of claim 6, wherein said inner surface of said first one of said sections is substantially parallel to said mounting surface.

Claim 8 (Currently amended): ~~The electronic assembly of claim 7,~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

and

wherein:

the inner surface of a first one of said sections is substantially parallel to said mounting surface of said circuit substrate,

the inner surface of a second one of said sections is not substantially parallel to said mounting surface of said circuit substrate,

the inner surface of a third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and

a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said third one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface.

Claim 9 (Currently amended): An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface; and

thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity,

wherein said panel further comprises substantially parallel edges bounding said sections, and for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section,

wherein said mounting surface is substantially planar, and each of the inner surfaces of said sections of said panel are substantially planar,

wherein said inner surface of said one of said sections is substantially parallel to said mounting surface,

wherein the inner surface of a second one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance between said inner surface of said one of said sections and said mounting surface, and

wherein:

an angle between the inner surface of a third one of said sections and a plane parallel to said inner surface of said second one of said sections is greater than zero but less than twenty-five degrees, and

said third one of said sections is contiguous with said one of said sections and said second one of said sections.

Claim 10 (Original): The electronic assembly of claim 9 further comprising:

a second electronic device coupled to said mounting surface of said circuit substrate; and
thermally conductive material disposed between and physically contacting said second electronic device and said inner surface of said second one of said sections of said panel.

Claim 11 (Original): The electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within twenty five degrees of parallel to every other one of said inner surfaces of said sections.

Claim 12 (Canceled)

Claim 13 (Original): The electronic assembly of claim 2, wherein each said section of said panel comprises elongated fibers.

Claim 14 (Original): The electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section.

Claim 15 (Original): The electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel.

Claim 16 (Currently amended): ~~The electronic assembly of claim 15 further comprising~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel, and

wherein said electronic assembly further comprises a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure.

Claim 17 (Original): The electronic assembly of claim 16 further comprising a thermally conductive material disposed between and in physical contact with said electronic device and the inner surface of one of said contiguous ones of said sections of said panel.

Claim 18 (Original): The electronic assembly of claim 13, wherein said elongated fibers are carbon fibers.

Claim 19 (Original): The electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers.

Claim 20 (Original): The electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material.

Claim 21 (Canceled)

Claim 22 (Previously presented): The electronic assembly of claim 1, wherein said first one of said sections comprises:

- a plurality of stacked layers each substantially parallel to said inner surface of said first one of said sections,

- a first of said layers comprises elongated fibers oriented in a first direction,

- a second of said layers comprises elongated fibers oriented in a second direction, and said first direction is different than said second direction.

Claim 23 (Previously presented): The electronic assembly of claim 22, wherein:

- said first direction is substantially perpendicular to said second direction, and

- said first direction and said second direction are substantially parallel to said inner surface of said first one of said sections.

Claim 24 (New): The electronic assembly of claim 1, wherein said angle between said inner surface of said first one of said sections and said plane parallel to said inner surface of said second one of said sections is less than or equal to forty-five degrees.

REMARKS/ARGUMENTS

I. Introduction

Claims 1, 3, 5, 8, 9, and 16 are amended, and claim 24 is new. Claims 1-11, 13-20, and 22-24 are now pending in the application. (Claims 12 and 21 are now or were previously canceled.) Applicant respectfully requests reconsideration of the application.

II. Claims 3, 8-10, 16, and 17 are patentable in accordance with the Examiner's identification of patentable subject matter

Applicant acknowledges with appreciation the Examiner's indication that claims 3, 8-10, 16, and 17 contain allowable subject matter. The rejection of claim 9 as indefinite is addressed and presumably overcome below. Independent claim 9 and claim 10 (which depends from claim 9) should therefore be in condition for allowance.

Claims 3, 8, and 16 have been rewritten in independent form. Although those claims do not include all features of their base claim and/or intervening claims, claims 3, 8, and 16 recite the features the Examiner identified as distinguishing over the prior art.

That is, claim 3 recites that "for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity." As the Examiner noted on page 8 of the Office Action, Mohammed lacks such a feature. Independent claim 3 is therefore patentable over Mohammed.

Claim 8 recites that "the inner surface of a first one of said sections is substantially parallel to said mounting surface of said circuit substrate, the inner surface of a second one of said sections is not substantially parallel to said mounting surface of said circuit substrate, the inner surface of a third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said third one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface." Again, consistent with the Examiner's finding on page 8 of the Office Action, Mohammed lacks the foregoing. Independent claim 8 is therefore patentable over Mohammed.

Claim 16 recites the features of claim 15 ("a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel") and further requires "a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure." Still again as noted by the Examiner on page 8 of the Office Action, Mohammed lacks this feature. Independent claim 16 and its dependent claim (claim 17) are therefore also patentable over Mohammed.

III. The claims are more than sufficiently definite to meet the requirements of 35 USC § 112(b)

Claims 1, 9, 11, and 21 were rejected under 35 USC § 112(b) as indefinite. Claim 21 is canceled, mooted the rejection of that claim. Applicant otherwise respectfully traverses this rejection.

Claim 1, including the recitation that "each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section," requires that the thermal conductivity of each section be greater in a direction that is substantially (e.g., within 10 degrees of being perfectly) parallel to the inner surface of that section than the thermal conductivity in a direction that is substantially (e.g., within 10 degrees of being perfectly) perpendicular to the inner surface of that section. But claim 1 does not require that the direction of the first or second thermal conductivity of a section have any particular orientation with respect to the mounting surface of the circuit substrate, nor does claim 1 require that the direction of the first or second thermal conductivity of one section have any particular orientation with respect to the inner surface of another of the sections. Thus, the descriptions of the first and second thermal conductivities in claim 1 do not—and indeed cannot—contradict the requirement in claim 1 that the inner surface of each section be "oriented within twenty-five degrees of parallel to said mounting surface" of the circuit substrate or that "an angle between said inner surface of a first one of said sections and a plane parallel to said inner surface of a second one of said sections is greater than or equal to five degrees." There is thus nothing indefinite about claim 1. Claim 11

(which depends from claim 1) is similarly more than sufficiently definite to meet the requirements of 35 USC § 112(b).

Claim 9 does not recite the five-degree-angle feature objected to by the Examiner. The rejection of claim 9 thus appears to be a mistake and should be withdrawn. Claim 9 has nevertheless been amended to clarify the description of the angle that is greater than or equal to five degrees, which is supported at least by the examples of a plane or axis 202 and an angle 204 in Figure 2 of the drawings. (See also the Specification ¶ [0028].)

IV. Claims 1, 2, 4-7, 11, and 13-24 are patentable over Mohammed at least because no portion of the heat sink 40 in Figure 5 is "substantially planar"

Claims 1, 2, 4-7, 11, 13-15, and 18-20 were rejected under 35 USC § 102(b) as anticipated by US Patent Application Publication No. 2012/0206882 to Mohammed et al. ("Mohammed"). Applicant respectfully traverses this rejection.

Independent claim 1 now recites that the "inner surface" of each section of the panel is "substantially planar." In rejecting claim 1, the Examiner equated the panel recited in claim 1 with the curved heat sink 40 illustrated in Figure 5 of Mohammed and the sections of the panel recited in claim 1 with contiguous portions of the heat sink 40. But a curved surface like the surface of Mohammed's heat sink 40 cannot reasonably or fairly be deemed to be "planar." Indeed, a curved surface is the antithesis of "planar," which means flat or level. (See the Declaration Under 37 CFR § 1.132 Of N. Kenneth Burraston filed herewith.)

Nor can the curved surface of Mohammed's heat sink 40 be deemed "*substantially* planar." The specification defines "*substantially* planar" as "allow[ing] for insignificant, *unintended* deviations from perfect planarity." Mohammed's heat sink 40 is intentionally curved (see Mohammed ¶¶ [0054] and [0055]) and thus cannot be deemed to be "substantially planar." Mohammed thus fails to anticipate claim 1.

Moreover, it would not have been obvious to modify the heat sink 40 in Figure 5 of Mohammed to make it planar. For example, the very purpose of the curved shape of the heat sink 40 is to "enhance the contact area between the various contact surfaces." (Mohammed ¶ [0055].) Mohammed thus teaches against modifying the shape of the heat sink 40 of Figure 5 to make it planar. For at least this reason, Mohammed does not render claim 1 obvious.

Claims 2, 4-7, 11, 13-15, 18-20, and 22-24 depend from claim 1 and, at least because of that dependency, are also patentable over Mohammed.

V. Conclusion

In view of the foregoing, Applicant submits that all of the claims are allowable and the application is in condition for allowance. If at any time the Examiner believes that a discussion with Applicant's attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 426-2106.

Applicant requests any extension of time required for acceptance of this Paper and authorizes the Director to charge any fee required for acceptance of this Paper (including but not limited to a fee for an extension of time) to Deposit Account 50-0843 (order no. 15937-0094).

Respectfully submitted,

Date: September 22, 2015

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton | McConkie
P.O. Box 45120
Salt Lake City, Utah 84145-0120
Telephone: (801) 426-2106
Fax: (801) 321-4893

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0		
Practitioner Docket No.: SL-391	Application No.: 13/739,995	Filing Date: January 11, 2013
First Named Inventor: Smith	Title: Panel for Enhancing Thermal Conduction in an Electronic Assembly	
APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116. 1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (<i>e.g.</i>, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c). 2. The above-identified application contains an outstanding final rejection. 3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect. 4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection. 5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response. 6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web). 7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, <i>e.g.</i>, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.] 8. By filing this certification and request, applicant acknowledges the following: • Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0. • The examiner will verify that the AFCP 2.0 submission is compliant, <i>i.e.</i>, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions: ○ The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, <i>e.g.</i>, by mailing an advisory action. ○ If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview. ▪ The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate. ▪ If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.		
Signature /N. Kenneth Burraston/	Date September 22, 2015	
Name (Print/Typed) N. Kenneth Burraston	Practitioner Registration No. 39,923	
Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.		
☐ * Total of _____ forms are submitted.		

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.

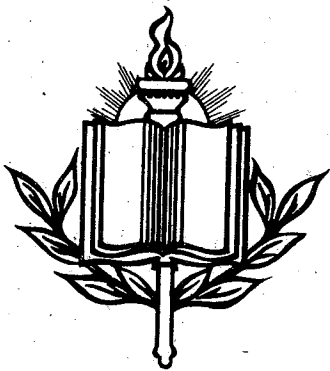
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. Attached to this Declaration are true and correct copies of the following pages from Webster's Encyclopedic Unabridged Dictionary of the English Language, Gramercy Books (1996): the title page, the publication page, and page 1480.
2. All statements herein made of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willful false statements and the like are punishable by fine or imprisonment, or both (18 USC § 1001) and may jeopardize the validity of the above-identified application or any patent issuing thereon.

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

SAMSUNG EX. 1002 - 86/204

WEBSTER'S ENCYCLOPEDIA UNABRIDGED DICTIONARY OF THE ENGLISH LANGUAGE



The dictionary entries are based on the Second Edition of
The Random House Dictionary of the English Language

GRAMERCY BOOKS
New York

Acknowledgments and Permissions

The "A Dictionary of the English Language" section of this book (*Webster's Encyclopedic Unabridged Dictionary*) is based on the second edition of *The Random House Dictionary of the English Language, the Unabridged Edition*, copyright © 1993, 1987.

Copyright © 1996 by Random House Value Publishing, Inc.
All rights reserved under International and Pan-American
Copyright Conventions.

No part of this book may be reproduced or transmitted in any form or by
any means electronic or mechanical including photocopying, recording, or
by any information storage and retrieval system, without permission in
writing from the publisher.

This 1996 edition is published by Gramercy Books,
a division of Random House Value Publishing, Inc.,
201 East 50th Street, New York, N. Y. 10022.

Gramercy Books and colophon are trademarks of
Random House Value Publishing, Inc.

Random House
New York • Toronto • London • Sydney • Auckland
<http://www.randomhouse.com/>
Printed and bound in the United States

Library of Congress Cataloging-in-Publication Data
Webster's encyclopedic unabridged dictionary of the English language—
New rev. ed.
p. cm.
"The dictionary entries are based on the second edition of
The Random House dictionary of the English language."
1. English language—Dictionaries.
PE1625.W46 1994
423dc20

93-48137
CIP

OLD ISBN: 0-517-11888-2
New Deluxe Edition: 0-517-15026-3

10 9 8 7 6 5

plan·e·tes·i·mal (plan/i tes/ə mäl), *Astron.* —*n.* 1. one of the small celestial bodies that, according to one theory (**planetesimal hypothesis**), were fused together to form the planets of the solar system. —*adj.* 2. of or pertaining to a planetesimal or planetesimals. [1900] **PLANETESIMAL** (plan/tes/ə-mäl)

gether to form the planets of the solar system. —adj. 2. of or pertaining to a planetesimal or planetesimals. [1900–05, PLANET + INFINITESIMAL]

Electronic Patent Application Fee Transmittal

Application Number:	13739995			
Filing Date:	11-Jan-2013			
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly			
First Named Inventor/Applicant Name:	Robert H. Smith			
Filer:	N. Kenneth Burraston			
Attorney Docket Number:	SL-391			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Independent claims in excess of 3	1201	2	420	840
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				840

Electronic Acknowledgement Receipt

EFS ID:	23571678
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	22-SEP-2015
Filing Date:	11-JAN-2013
Time Stamp:	17:28:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$840
RAM confirmation Number	4377
Deposit Account	500843
Authorized User	BURRSTON, N KENNETH

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 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SL391amd.pdf	65629	yes	12
			53e201cb04bdda6a391c88a336da9b523bf5995f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Response After Final Action		1	1	
	Claims		2	8	
	Applicant Arguments/Remarks Made in an Amendment		9	12	
Warnings:					
Information:					
2	After Final Consideration Program Request	SL391AFpilot.pdf	226105	no	2
			c81e069dff876b178a8b252120a093ef10bdcf92		
Warnings:					
Information:					
3	Affidavit-not covered under specific rule	SL391declaration.pdf	871082	no	4
			4796d6f05869920c9e89a32b789ab4c0d22238b6		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30426	no	2
			afb261f0a61cf04effaece431054c6e094f9ebc		
Warnings:					
Information:					
Total Files Size (in bytes):			1193242		

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 FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/739,995	Filing Date 01/11/2013	☐ To be Mailed
---	---	----------------------------------	---------------------------------------

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☒ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	390
☒ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	620
☒ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	250
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	* 0	x \$62 =	0
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	* 0	x \$250 =	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 \$310 (\$155 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))				
			TOTAL	1260

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	DATE	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	04/07/2015						
	Total (37 CFR 1.16(i))	* 22	Minus	** 20	= 2	x \$80 =	160
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	160

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	DATE	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	09/22/2015						
	Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	x \$80 =	0
	Independent (37 CFR 1.16(h))	* 5	Minus	*** 3	= 2	x \$420 =	840
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	840

* 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.

LIE
/AJAY R. DAVID/

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.



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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

76279 7590 07/09/2015

Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT	PAPER NUMBER
----------	--------------

2835

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

07/09/2015

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):

kburraston@kmclaw.com
chandra.l.mills@L-3com.com
bdelawder@kmclaw.com

Office Action Summary	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	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 MONTHS 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 4/7/15.
☐ 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) 1-11 and 13-23 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☒ Claim(s) 9 and 10 is/are allowed.
- 7) ☒ Claim(s) 1,2,4-7,11,13-15 and 18-23 is/are rejected.
- 8) ☒ Claim(s) 3,8,16 and 17 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 1/11/13 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) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____ | 4) ☐ Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim(s) 1, 9, 11, and 21, are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention. The office hereby notes that the claim(s) assert the sections are within 25° parallel of the mounting surface, then further asserts the first thermal conductivity is substantially parallel (which is argued by the applicant as to denote within 10°), wherein an angle between section(s) is greater than or equal to 5° and thus the claim(s) will not hold true when the sections are less than 5° and/or between 10-25° of parallel. As such, the claims only appear to hold true when the section(s) are greater than or equal to 5-10° of parallel. Going further, there appears to be a structural omission that allows the claim(s) to accomplish

Claim Rejections - 35 USC § 102

Art Unit: 2835

3. The following is a quotation of the appropriate paragraphs of pre-AIA 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.

4. **Claims 1-2, 4-7, 11, and 13-15,18-20,** are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by **(Mohammed 2012/0206882).**

Regarding Claim 1; Mohammed discloses an electronic assembly **(Fig. 5)** comprising: a support structure **(50 and/or including 60)** comprising walls enclosing a space **(para. 0040-- whereas 40 is coupled to 30 through 50 and 60 from all four sides enclosing a space having device 10)**; a circuit substrate **(20)** coupled to a first portion of said support structure **(as depicted by fig. 5—whereas 20 is coupled to a first portion at a bottom of 50)**, said circuit substrate comprising a mounting surface **(where top surface of 20 abuts 50)**; an electronic device attached to said mounting surface and disposed within said space **(whereas 10 is attached to the top surface of 20)**; and a panel coupled to a second portion of said support structure **(as depicted by fig. 5—where panel 40 is coupled to a second portion at a top of 50)**, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface **(as depicted by fig. 5--whereas 40 includes at least two contiguous sections within 25° of parallel to the mounting surface; whereas a 1st section of 40 constitutes a portion extending from the left side of**

Art Unit: 2835

the device to a left side of 50 which is located at the right of the device, and a 2nd section of 40 extends therefrom the left side of 50 to the right end of 40) wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section, wherein said first thermal conductivity is greater than said second thermal conductivity (**whereas 40 is anisotropic and has very high thermal conductivity in x and/or y lateral direction(s) relative to the z direction--** para.'s 0068, 0038; **and the 1st and 2nd sections perpendicularly receive heat respectively from 50 and 10 in the z direction and transfer heat parallel in the x direction**); wherein an angle at a boundary between said inner surface of a first one of said sections and said inner surface of a second one of said section is greater than or equal to five degrees, and wherein said second one of said sections is contiguous with said first one of said sections (**as already set forth the sections are contiguous; and the angle between the sections at 50 is atleast 5°**). **Note: the applicant argues that substantially hereby denotes within 10°.**

Regarding Claim 2; Mohammed discloses the electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity (as set forth by para. 0038—whereas the 2nd thermal conductivity in the z direction may be less than 20 or 100 W/mK; and the 1st thermal conductivity in the x direction may be 500, 1000 or 1200 W/mK).

Art Unit: 2835

Regarding Claim 4; Mohammed discloses the electronic assembly of claim 2, wherein: said panel further comprises substantially parallel edges bounding said sections, and for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section (as depicted by fig. 5—whereas each section is defined by a vertical cross section of 40 with respect to the vertical left side of 50).

Regarding Claim 5; Mohammed discloses the electronic assembly of claim 4, wherein: said mounting surface is substantially planar, and each of the inner surfaces of said sections of said panel are substantially planar (as already set forth).

Regarding Claim 6; Mohammed discloses the electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel (TIM—para.'s 0029-0030).

Regarding Claim 7; Mohammed discloses the electronic assembly of claim 6, wherein said inner surface of said one of said sections is substantially parallel to said mounting surface (as already set forth).

Regarding Claim 11; Mohammed discloses the electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within

Art Unit: 2835

twenty five degrees of parallel to every other one of said inner surfaces of said sections (as already set forth).

Regarding Claim 13; Mohammed discloses the electronic assembly of claim 2, wherein each said section of said panel comprises elongated fibers (para. 0036-0037).

Regarding Claim 14; Mohammed discloses the electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section (as set forth by para. 0036-0037).

Regarding Claim 15; Mohammed discloses the electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel (as set forth by Fig. 5--where the 2nd section corresponding to the device 10 is below a plane of 50 and is thereby in part enclosed by 50; and the heat transfer through a thermal path in the x direction is transferred to an outer edge of the 2nd section).

Regarding Claim 18; Mohammed discloses the electronic assembly of claim 13, wherein said elongated fibers are carbon fibers (para. 0037).

Regarding Claim 19; Mohammed discloses the electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers (as constituted by fibers of graphene nano-tubes--para. 0037).

Regarding Claim 20; Mohammed discloses the electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material (para. 0037—where fibers of graphene nano-tubes are dispersed in a matrix--para. 0037).

Regarding Claim 21; Mohammed discloses the electronic assembly of claim 1, wherein an angle at a boundary between said inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than or equal to five degrees.

Regarding Claim 22; Mohammed discloses the electronic assembly of claim 1, wherein said first one of said sections comprises: a plurality of stacked layers each substantially parallel to said inner surface of said first one of said sections, a first of said layers comprises elongated fibers oriented in a first direction, a second of said layers comprises elongated fibers oriented in a second direction, and said first direction is different than said second direction (para.'s 0036-0037 discloses sheets including nanotubes in a matrix *and* stacks of layers separated by and dispersed in the matrix, whereas the layers extend along the second x-y plane and the nanotubes constitutes extending in the first z plane).

Regarding Claim 23; Mohammed discloses the electronic assembly of claim 22, wherein: said first direction is substantially perpendicular to said second direction, and said first direction and said second direction are substantially parallel to said inner surface of said first one of said sections (as already set forth).

Allowable Subject Matter

5. **Claims 3, 8, 16-17**, are objected to as being dependent upon a rejected base claim, but would be allowable if all objections are overcome and if rewritten in independent form including all of the limitations of the base claim and any intervening claims. **Regarding Claim 3**; the electronic assembly of claim 1, for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity. **Regarding Claim 8**; the electronic assembly of claim 7, wherein: the inner surface of a third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface. **Regarding Claim 16**; the electronic assembly of claim 15 further comprising a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure.

Claims 9-10 are hereby deemed as allowed, assuming all objections/112 issues are overcome.

Response to Arguments

6. Applicant's arguments with respect to claims 1-2, 4-7, 11, 13-15, and 18-20 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection. Accordingly, new claims 21-23 are rejected. It is noted by the applicant arguments that 'substantially' hereby denotes within ten degrees. The office notes that 'substantially' as explicitly defined along with the particular assertions of sections being within 25° of parallel and angle(s) between boundaries thereof as being greater than or equal 5° hereby renders the claim(s) as unclear as stated in the 112 rejection above. It is to be further noted that assuming all objections/112 issues are overcome that claims 3, 8, 16-17 deemed as allowable and claims 9-10 are deemed as allowed.

Conclusion

7. 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).

Art Unit: 2835

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.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COURTNEY SMITH whose telephone number is (571)272-9094. The examiner can normally be reached on M-F 9a-5p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gandhi Jayprakash 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.

Art Unit: 2835

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.

/COURTNEY SMITH/
Primary Examiner, Art Unit 2835

<i>Index of Claims</i> 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 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	01/07/2015	07/01/2015						
	1	✓	✓						
	2	✓	✓						
	3	✓	○						
	4	✓	✓						
	5	✓	✓						
	6	✓	✓						
	7	✓	✓						
	8	✓	○						
	9	○	=						
	10	✓	=						
	11	✓	✓						
	12	✓	-						
	13	✓	✓						
	14	✓	✓						
	15	✓	✓						
	16	✓	○						
	17	✓	○						
	18	✓	✓						
	19	✓	✓						
	20	✓	✓						

Search Notes 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 2835

CPC- SEARCHED		
Symbol	Date	Examiner
H05K	7/1/15	C.S.
F25D	7/1/15	C.S.

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
361	.CLAS. w/limited text search	1/7/14	C.S.
257	.CLAS. w/limited text search	1/7/14	C.S.
174	.CLAS. w/limited text search	1/7/14	C.S.
165	.CLAS. w/limited text search	1/7/14	C.S.
439	.CLAS. w/limited text search	1/7/14	C.S.

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	1/7/14	C.S.
Inventor search	1/7/14	C.S.
East Search Updated	7/1/15	C.S.
CPC Search	7/1/15	C.S.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
			C.S.

--	--

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	622853	(H05K\$ or F25D\$).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:16
L4	1941	3 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:16
L5	1941	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:19
L6	8	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (greater)) perpendicular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:21
L7	12	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3	US-PGPUB; USPAT; USOCR; FPRS;	AND	ON	2015/07/01 13:21

		or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (greater))	EPO; JPO; DERWENT; IBM_TDB			
L8	66	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (less))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:21
L9	72	4 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:22
L10	64	(9 not (7 or 8))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:22
L11	131	(8 or 9)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:24
L12	1351298	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/07/01 13:28

L13	104	L12 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (less))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:28
L14	560	12 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or lower))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:29
L16	244	14 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (cover or housing or enclosure or casing or case or panel adj2 (angle)) (conductivity adj2 (higher or greater or less\$3 or lower)) perpendicular	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:32
L17	221	(16 not (11))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:32
L18	221	(17 not (9 or 7 or 8))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:33
L19	740668	("257").CLAS.	US-PGPUB; USPAT;	OR	OFF	2015/07/01 13:38

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L20	21	(18 not (19))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/07/01 13:38
S1	3897	((Robert) near2 (Smith)).INV.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 10:54
S2	4	("20100321892" "7784585").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 10:54
S3	25	(US-20120320544-\$ or US-20110228498-\$ or US-20030227750-\$ or US-20030184969-\$ or US-20100263851-\$ or US-20030198022-\$ or US-20050078456-\$ or US-20120193803-\$).did. or (US-8373990-\$ or US-7440282-\$ or US-7031165-\$ or US-6365964-\$ or US-6282092-\$ or US-8199509-\$ or US-7903422-\$ or US-5812375-\$ or US-6958910-\$ or US-7050305-\$ or US-6025991-\$ or US-5777844-\$ or US-5808868-\$ or US-5402313-\$ or US-6696643-\$ or US-7304854-\$ or US-7082034-\$).did.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 11:33
S4	4	"13783476"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 11:55
S5	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:36
S6	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/01/06 12:38

S7	280	S5 S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:38
S8	1909528	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:39
S9	348995	S6 S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:40
S10	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:45
S11	47403	S6 S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:46
S12	12855	S11 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:47
S13	0	"13739995"	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 12:49
S14	10541	S12 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate))	US-PGPUB; USPAT; USOCR;	AND	ON	2015/01/06 12:49

		(thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (circuit or board or pcb adj2 (connector or socket))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S15	2825	S14 (circuit or board or pcb adj2 (connector or socket or frame or support)) (groove or fasten\$3 or fix\$3 adj2 (connector or socket or frame or support))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:59
S16	22	S15 (conductivity adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 13:00
S17	1	(12/557277).APP.	US-PGPUB; USOCR	AND	ON	2015/01/06 13:47
S18	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 15:51
S19	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 09:22
S20	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S21	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR;	OR	OFF	2015/01/07 11:15

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S22	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S23	47403	S21 S22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S24	12855	S23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S25	0	S20 S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S26	3	(smith adj2 (courtney)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:18
S27	14	("20020197923" "20060070720" "20060232932" "20070000642" "20070053168" "20070285890" "20080101026" "20090282852" "20100033935" "20110101394" "20110228482" "6521990" "8081468" "8130500").PN. OR ("8537553").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 11:21
S28	1	(13/071015).APP.	US-PGPUB; USOCR	AND	ON	2015/01/07 11:37
S29	1	(13/404546).APP.	US-PGPUB; USOCR	AND	ON	2015/01/07 15:12
S30	1	"13739995"	US-PGPUB;	AND	ON	2015/07/01

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:17
S31	0	"13739995"	US-PGPUB	AND	ON	2015/07/01 10:18

7/ 1/ 2015 1:39:20 PM
C:\ Users\ csmith7\ Documents\ EAST\ Workspaces\ 13739995.wsp

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

Remarks/Arguments begin on page 7 of this paper.

Amendments to the Claims:

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

Listing of Claims:

Claim 1 (Currently amended): An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

and

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section, [[and]]

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein an angle at a boundary between said inner surface of a first one of said sections and said inner surface of a second one of said sections is greater than or equal to five degrees,
and

wherein said second one of said sections is contiguous with said first one of said sections.

Claim 2 (Original): The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity.

Claim 3 (Original): The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity.

Claim 4 (Currently amended): The electronic assembly of claim 2, wherein:

said panel further comprises substantially parallel edges bounding said sections, and

for each said section, said ~~[[the]]~~ inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section.

Claim 5 (Original): The electronic assembly of claim 4, wherein:

said mounting surface is substantially planar, and

each of the inner surfaces of said sections of said panel are substantially planar.

Claim 6 (Currently amended): The electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of said first one of said sections of said panel.

Claim 7 (Currently amended): The electronic assembly of claim 6, wherein said inner surface of said first one of said sections is substantially parallel to said mounting surface.

Claim 8 (Currently amended): The electronic assembly of claim 7, wherein:

the inner surface of a ~~second~~ third one of said sections is substantially parallel to said mounting surface of said circuit substrate, and

a distance perpendicular to said inner surface of said third one of said sections between said inner surface of said ~~second~~ third one of said sections and said mounting surface of said circuit substrate is greater than a distance perpendicular to said inner surface of said first one of said sections between said inner surface of said first one of said sections and said mounting surface.

Claim 9 (Currently amended): ~~The electronic assembly of claim 8,~~ An electronic assembly comprising:

a support structure comprising walls enclosing a space;

a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;

an electronic device attached to said mounting surface and disposed within said space;

a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface

of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface; and

thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel,

wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section,

wherein said first thermal conductivity is greater than said second thermal conductivity,

wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity,

wherein said panel further comprises substantially parallel edges bounding said sections, and for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section,

wherein said mounting surface is substantially planar, and each of the inner surfaces of said sections of said panel are substantially planar,

wherein said inner surface of said one of said sections is substantially parallel to said mounting surface,

wherein the inner surface of a second one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance between said inner surface of said one of said sections and said mounting surface, and

wherein:

an angle between the inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than zero but less than twenty-five degrees, and

said third one of said sections is contiguous with said one of said sections and said second one of said sections.

Claim 10 (Original): The electronic assembly of claim 9 further comprising:

a second electronic device coupled to said mounting surface of said circuit substrate; and
thermally conductive material disposed between and physically contacting said second electronic device and said inner surface of said second one of said sections of said panel.

Claim 11 (Original): The electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within twenty five degrees of parallel to every other one of said inner surfaces of said sections.

Claim 12 (Canceled)

Claim 13 (Original): The electronic assembly of claim 2, wherein each said section of said panel comprises elongated fibers.

Claim 14 (Original): The electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section.

Claim 15 (Original): The electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel.

Claim 16 (Original): The electronic assembly of claim 15 further comprising a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure.

Claim 17 (Original): The electronic assembly of claim 16 further comprising a thermally conductive material disposed between and in physical contact with said electronic device and the inner surface of one of said contiguous ones of said sections of said panel.

Claim 18 (Original): The electronic assembly of claim 13, wherein said elongated fibers are carbon fibers.

Claim 19 (Original): The electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers.

Claim 20 (Original): The electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material.

Claim 21 (New): The electronic assembly of claim 1, wherein an angle at a boundary between said inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than or equal to five degrees.

Claim 22 (New): The electronic assembly of claim 1, wherein said first one of said sections comprises:

- a plurality of stacked layers each substantially parallel to said inner surface of said first one of said sections,

- a first of said layers comprises elongated fibers oriented in a first direction,

- a second of said layers comprises elongated fibers oriented in a second direction, and
 - said first direction is different than said second direction.

Claim 23 (New): The electronic assembly of claim 22, wherein:

- said first direction is substantially perpendicular to said second direction, and

- said first direction and said second direction are substantially parallel to said inner surface of said first one of said sections.

REMARKS/ARGUMENTS

I. Introduction

Claims 1, 4, 6-9, and 12 are amended, and claim 12 is canceled. In addition, claims 21-23 are new. Claims 1-11 and 13-23 are now pending in the application. Applicants respectfully request reconsideration of the application.

Applicant notes that the amendment to at least claim 4 was not for reasons related to patentability but to correct a typographical error.

II. Per the Examiner's identification of allowable subject matter, at least claims 9 and 10 are clearly in condition for allowance

Applicant acknowledges with appreciation the Examiner's indication that claims 9 and 10 contain allowable subject matter. Applicant has rewritten claim 9 in independent form to include its base claim and all intervening claims. In addition, the objection to the claims is addressed below. Claim 9 and claim 10 (which depends from claim 9) should therefore clearly be in condition for allowance.

III. The term "substantially" is expressly defined in the specification and therefore does not render the claims indefinite

Claims 1, 5-8, 12, and 14 were objected to as unclear due to use of the term "substantially." The Examiner appears to apply a *per se* rule that any and all uses of the word "substantially" in a claim renders the claim indefinite. But the MPEP makes clear that there is no *per se* rule against using "substantially" in a patent claim. Indeed, the MPEP expressly notes that "[t]he term 'substantially' is *often* used in conjunction with another term to describe a particular characteristic of the claimed invention." (MPEP § 2173.05(b), section II.D (emphasis added).) As long as either (1) the specification provides some standard for measuring or (2) a person of ordinary skill would be able to determine the scope of the term "substantially" as used in a claim, the claim is not indefinite. (MPEP § 2173.05(b), section I.) Moreover, the specification need not provide "a precise numerical measurement." (*Id.*)

Here, the term "substantially" is used in the claims to modify the following characteristics: "parallel," "perpendicular," and "planar." The specification defines with numerical precision the meanings of "substantially parallel" and "substantially perpendicular": "within ten degrees of parallel" and "within ten degrees of perpendicular." (Specification ¶¶

[0015].) The scope of "substantially parallel" and "substantially perpendicular" could thus not be clearer.

The term "substantially planar" is not susceptible to the same degree of precise definition but is nevertheless expressly defined in the specification as "allow[ing] for insignificant, unintended deviations from perfect planarity" that nevertheless allow the claimed apparatus "to work for [its] intended purpose." (Specification ¶ [0015].) The foregoing is more than sufficient to provide "general guidelines . . . in the specification" (MPEP § 2173.05(b), section II.D.) from which a person of ordinary skill can ascertain the scope of "substantially planar." (MPEP § 2173.05(b), section I.)

For all of the foregoing reasons, Applicant respectfully asserts that no use of the term "substantially" in the pending claims renders those claims indefinite. Applicant thus requests that the objection to claims 1, 5-8, 12, and 14 be withdrawn.

IV. Claims 1-7 and 10-23 are patentable over Mohammed at least because Mohammed lacks an angle between sections of their heat sink 40

Claims 1, 2, 4-8, 10, 11, and 13-20 were rejected under 35 USC § 102(b) as anticipated by US Patent Application Publication No. 2012/0206882 to Mohammed et al. ("Mohammed"). In addition, claims 3 and 12 were rejected under 35 USC § 103(a) as obvious in view of Mohammed. Applicant respectfully traverses these rejections.

Independent claim 1 recites that an angle between the inner surfaces of two contiguous sections of the recited panel is greater than or equal to five degrees. (See last two phrases of claim 1, which are newly added in this Paper.) Thus, there must be an angle between the inner surfaces of contiguous sections at the boundary between the surfaces. An example is illustrated in Figure 2, which shows an angle between the inner surface 132 of section 112 and the inner surface 130 of section 118. Applicant believes this requirement is in the nature of features recited in claim 9 that led the Examiner to identify the subject matter of that claim as allowable.

Moreover, when claim 1 is read as a whole (as it must be read), the claim requires more than merely an angle at the boundary between contiguous sections of the panel: claim 1 requires that the greater thermal conductivity direction of one section be angled with respect to the greater thermal conductivity direction of a contiguous section. This is because claim 1 requires that the thermal conductivity of each section be greatest "parallel to [its] inner surface" as opposed to

"perpendicular to [its] inner surface." Because claim 1 requires the above-discussed angle between the inner surfaces of contiguous sections, claim 1 implicitly requires the same angle between the thermal paths of greatest conductivity in the contiguous sections. This gives rise to several possible advantages, including the ability to construct panels of various shapes that can accommodate electronic devices of difference sizes and heights from the mounting surface of the circuit substrate as illustrated in the example shown in Figure 8. The requirement of an angle between the inner surfaces of contiguous sections now recited in claim 1 thus does more than merely recite the finding of an optimal angle for dissipating heat from the electronic devices as the Examiner asserted in finding former claim 12 to be obvious. (Office Action pg. 8.)

Mohammed thus fails to teach or render obvious the requirement now recited in claim 1 of an angle between the inner surfaces of contiguous sections of the panel of claim 1. Claim 1 is thus patentable over Mohammed. Claims 2-8, 11, and 13-23 depend from claim 1 and, at least because of that dependency, are also patentable over Mohammed. Moreover, at least some of claims 2-8, 11, and 13-23 recite additional features not taught or rendered obvious by Mohammed.

For example, amended claim 8 now recites that the different distances between the inner surfaces of a third one of the sections and the first one of the sections are perpendicular to the mounting surfaces of the first and third sections. As can be seen in Figure 1A of Mohammed, all such perpendicular distances between the top surface of Mohammed's substrate 20 and any possible section of the heat sink 40 are necessarily equal. Nor is such a feature trivial or a matter of mere design choice. For example, in accordance with the above-discussion of the example shown in Figure 8, this features gives rise to the ability to construct panels of various shapes that can accommodate electronic devices of difference sizes and heights from the mounting surface of the circuit substrate.

As another example, new claim 21 now recites "an angle at a boundary between said inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than or equal to five degrees." For reasons similar to those that led the Examiner to deem the subject matter of claim 9 allowable, claim 21 should also be found to be allowable.

New claims 22 and 23 are yet further examples. Claim 22 requires that at least one of the sections of the panel comprises a plurality of stacked layers each of which is substantially

parallel to the inner surface of the section. Claim 22 further requires that a first of the layers comprises elongated fibers oriented in a first direction, and a second of the layers comprises elongated fibers oriented in a second direction that is different than the first direction. Claim 23 further requires that the first and second directions be substantially perpendicular to each other but substantially parallel to the inner surface of the section. Mohammed fails entirely to teach, suggest, or provide any reason for such features. Claims 22 and 23 thus further distinguish over Mohammed.

V. Conclusion

In view of the foregoing, Applicant submits that all of the claims are allowable and the application is in condition for allowance. If at any time the Examiner believes that a discussion with Applicant's attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 426-2106.

Applicant requests any extension of time required for acceptance of this Paper and authorizes the Director to charge any fee required for acceptance of this Paper (including but not limited to a fee for an extension of time) to Deposit Account 50-0843 (order no. 15937-0094).

Respectfully submitted,

Date: April 7, 2015

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton | McConkie
P.O. Box 45120
Salt Lake City, Utah 84145-0120
Telephone: (801) 426-2106
Fax: (801) 321-4893

Electronic Patent Application Fee Transmittal

Application Number:	13739995			
Filing Date:	11-Jan-2013			
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly			
First Named Inventor/Applicant Name:	Robert H. Smith			
Filer:	N. Kenneth Burraston/Catherine Winslow			
Attorney Docket Number:	SL-391			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in Excess of 20	1202	2	80	160
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				160

Electronic Acknowledgement Receipt

EFS ID:	21995657
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston/Catherine Winslow
Filer Authorized By:	N. Kenneth Burraston
Attorney Docket Number:	SL-391
Receipt Date:	07-APR-2015
Filing Date:	11-JAN-2013
Time Stamp:	17:22:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	3971
Deposit Account	500843
Authorized User	

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 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	SL_391_amendment_April_2015.pdf	59446	no	10
			83a893e19c4def96f9ecb10b48a01e88e2123534		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30525	no	2
			34c5a4503eb1844724bfbfdab1337d38514d65e4		

Warnings:

Information:

Total Files Size (in bytes):	89971
------------------------------	-------

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 FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/739,995	Filing Date 01/11/2013	☐ To be Mailed
---	---	----------------------------------	---------------------------------------

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	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 \$310 (\$155 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	

APPLICATION AS AMENDED – PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	04/07/2015	CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 22	Minus	** 20	= 2	x \$80 =	160
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						160	

(Column 1)

(Column 2)

(Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	Minus	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	☐ Application Size Fee (37 CFR 1.16(s))					
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
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.

LIE
/MYRTLE LEIGH/

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.



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.
13/739,995	01/11/2013	Robert H. Smith	SL-391	5387

76279 7590 01/23/2015

Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

EXAMINER

SMITH, COURTNEY L

ART UNIT	PAPER NUMBER
----------	--------------

2835

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

01/23/2015

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):

kburraston@kmclaw.com
chandra.l.mills@L-3com.com
cwinslow@kmclaw.com

Office Action Summary	Application No. 13/739,995	Applicant(s) SMITH ET AL.	
	Examiner COURTNEY SMITH	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 MONTHS 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 1/11/13.
☐ 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) 1-20 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) 1-8 and 10-20 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 1/11/13 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) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date <u>1/11/13</u> | 4) ☐ Other: ____. |

DETAILED ACTION

Claim Objections

1. **Claims 1, 5-8, 12, and 14**, are objected to because of the following informalities:
'substantially' is hereby deemed as unclear; whereas the office hereby notes that substantially is defined as Merriam Webster's dictionary as: 'being largely but not wholly that which is specified', and thus the claim(s) may be amenable to various claim constructions. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of pre-AIA 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.

3. **Claims 1-2, 4-8, 10-11, and 13-20**, are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by **(Mohammed 2012/0206882)**.

Regarding Claim 1; Mohammed discloses an electronic assembly (**Fig.'s 1A and 1C**) comprising: a support structure (**50 and/or including 60**) comprising walls enclosing a space (**para. 0040--as depicted by Fig. 1C --whereas 40 is coupled to 20 through 50 and 60 on all four sides enclosing a space having device 10**); a circuit substrate (**20**) coupled to a first portion of said support structure (**as depicted by fig. 1A—**

Art Unit: 2835

whereas 20 is coupled to a bottom of 50), said circuit substrate comprising a mounting surface (**footprint of 20 having device 10**); an electronic device attached to said mounting surface and disposed within said space (**as already set forth**); and a panel coupled to a second portion of said support structure (**panel 40 coupled to a top of 50**), said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface (**as depicted by fig. 1A--**

whereas 40 includes at least three contiguous sections parallel to the mounting surface; where a 1st section corresponds to the substrate to the left of the device, a 2nd section constitutes a portion that abuts the device, and a 3rd section corresponds to the substrate to the right of the device; Fig.'s 8a-8B otherwise denotes the sections in which the 1st and 2nd sections respectively has portions 210). Note: sections are not differentiated by any particular structural attributes), wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section, and wherein said first thermal conductivity is greater than said second thermal conductivity (**whereas 40 is anisotropic and has very high thermal conductivity in x and/or y lateral direction(s) relative to the z direction--para.'s 0068, 0038**). Note: as claimed, each section being within 25° of parallel also includes all parallel sections.

Regarding Claim 2; Mohammed discloses the electronic assembly of claim 1, wherein

Art Unit: 2835

for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity (as set forth by para. 0038).

Regarding Claim 4; Mohammed discloses the electronic assembly of claim 2, wherein: said panel further comprises substantially parallel edges bounding said sections, and for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section (as depicted by fig. 1A—whereas each section is planar and parallel with respect to each other).

Regarding Claim 5; Mohammed discloses the electronic assembly of claim 4, wherein: said mounting surface is substantially planar, and each of the inner surfaces of said sections of said panel are substantially planar (as depicted by fig. 1A—whereas each section is planar and parallel with respect to each other).

Regarding Claim 6; Mohammed discloses the electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel (TIM—para.'s 0029-0030).

Regarding Claim 7; Mohammed discloses the electronic assembly of claim 6, wherein said inner surface of said one of said sections is substantially parallel to said mounting surface (as already depicted).

Regarding Claim 8; Mohammed discloses the electronic assembly of claim 7, wherein: the inner surface of a second one of said sections is substantially parallel to said mounting surface of said circuit substrate, and a distance between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance between said inner surface of said one of said sections and said mounting surface (as depicted by fig. 1A--whereas the second section is a greater distance from the mounting surface footprint having 10).

Regarding Claim 10; Mohammed discloses the electronic assembly of claim 9 further comprising: a second electronic device coupled to said mounting surface of said circuit substrate; and thermally conductive material disposed between and physically contacting said second electronic device and said inner surface of said second one of said sections of said panel (multiple chips--para. 0024; and TIM thereof—para.'s 0029-0030).

Regarding Claim 11; Mohammed discloses the electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within twenty five degrees of parallel to every other one of said inner surfaces of said sections (as already set forth).

Regarding Claim 13; Mohammed discloses the electronic assembly of claim 2,

Art Unit: 2835

wherein each said section of said panel comprises elongated fibers (para. 0036-0037).

Regarding Claim 14; Mohammed discloses the electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section (as set forth by para. 0036-0037).

Regarding Claim 15; Mohammed discloses the electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel (as set forth by Fig. 5--where the 2nd section corresponding to the device 10 is below a plane of 50 and is thereby in part enclosed by 50; and the heat transfer in the x direction is transferred to an outer edge of the 1st or 3rd sections).

Regarding Claim 16; Mohammed discloses the electronic assembly of claim 15 further comprising a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure (para. 0032--whereas the support 50 may be attached using a TIM layer).

Regarding Claim 17; Mohammed discloses the electronic assembly of claim 16 further

Art Unit: 2835

comprising a thermally conductive material disposed between and in physical contact with said electronic device and the inner surface of one of said contiguous ones of said sections of said panel (TIM—para.'s 0029-0030).

Regarding Claim 18; Mohammed discloses the electronic assembly of claim 13, wherein said elongated fibers are carbon fibers (para. 0037).

Regarding Claim 19; Mohammed discloses the electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers (as constituted by fibers of graphene nano-tubes--para. 0037).

Regarding Claim 20; Mohammed discloses the electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material (para. 0037—where fibers of graphene nano-tubes are dispersed in a matrix--para. 0037).

Claim Rejections - 35 USC § 103

4. The following is a quotation of pre-AIA 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 negated by the manner in which the invention was made.

5. **Claims 3, 12**, are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **(Mohammed 2012/0206882)**.

Regarding Claim 3; Mohammed discloses the electronic assembly of claim 1, **except**, explicitly wherein for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the material(s) of the panel so as to achieve the desired thermal conductivity, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding Claim 12; Mohammed discloses the electronic assembly of claim 2, wherein: said panel further comprises substantially parallel edges bounding said sections, and an angle between said inner surfaces of each contiguous pair of said sections is greater than zero but approximately less than twenty-five degrees (as already set forth by Fig. 5—where 40 is curved and the corresponding sections and pairs thereof appear to have angles therebetween at approximately less than 25°). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the angle(s) as asserted so as to achieve an optimum rate of heat transfer in lateral directions away from the electronic device, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Allowable Subject Matter

6. **Claims 9-10**, are objected to as being dependent upon a rejected base claim, but would be allowable if all objections are overcome and if rewritten in independent form including all of the limitations of the base claim and any intervening claims. **Regarding Claim 9**; the electronic assembly of claim 8, wherein: an angle between the inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than zero but less than twenty-five degrees, and said third one of said sections is contiguous with said one of said sections and said second one of said sections. **Note:** the claims are deemed allowable, assuming the objections are overcome.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COURTNEY SMITH whose telephone number is (571)272-9094. The examiner can normally be reached on M-F 9a-5p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gandhi Jayprakash 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.

Art Unit: 2835

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.

/COURTNEY SMITH/
Primary Examiner, Art Unit 2835

Notice of References Cited	Application/Control No. 13/739,995	Applicant(s)/Patent Under Reexamination SMITH ET AL.	
	Examiner COURTNEY SMITH	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-2008/0019102 A1	01-2008	Yurko, Joseph M.	361/719
*	B	US-2011/0058336 A1	03-2011	Sundstrom et al.	361/710
*	C	US-2012/0206882 A1	08-2012	Mohammed et al.	361/710
*	D	US-2013/0050953 A1	02-2013	SANO et al.	361/720
*	E	US-8,570,749 B2	10-2013	Tissot, Serge	361/720
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	3897	((Robert) near2 (Smith)).INV.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 10:54
S2	4	("20100321892" "7784585").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 10:54
S3	25	(US-20120320544-\$ or US-20110228498-\$ or US-20030227750-\$ or US-20030184969-\$ or US-20100263851-\$ or US-20030198022-\$ or US-20050078456-\$ or US-20120193803-\$).did. or (US-8373990-\$ or US-7440282-\$ or US-7031165-\$ or US-6365964-\$ or US-6282092-\$ or US-8199509-\$ or US-7903422-\$ or US-5812375-\$ or US-6958910-\$ or US-7050305-\$ or US-6025991-\$ or US-5777844-\$ or US-5808868-\$ or US-5402313-\$ or US-6696643-\$ or US-7304854-\$ or US-7082034-\$).did.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 11:33
S4	4	"13783476"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 11:55
S5	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:36
S6	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/01/06 12:38
S7	280	S5 S6	US-PGPUB;	AND	ON	2015/01/06

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			12:38
S8	1909528	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:39
S9	348995	S6 S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:40
S10	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:45
S11	47403	S6 S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:46
S12	12855	S11 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:47
S13	0	"13739995"	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 12:49
S14	10541	S12 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2015/01/06 12:49

		horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner (circuit or board or pcb adj2 (connector or socket))	DERWENT; IBM_TDB			
S15	2825	S14 (circuit or board or pcb adj2 (connector or socket or frame or support)) (groove or fasten\$3 or fix\$3 adj2 (connector or socket or frame or support))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 12:59
S16	22	S15 (conductivity adj2 (greater))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/06 13:00
S17	1	(12/557277).APP.	US-PGPUB; USOCR	AND	ON	2015/01/06 13:47
S18	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/06 15:51
S19	26	("20030223197" "20080019102" "20090135565" "20100039770" "4721155" "5109318" "5184281" "5224016" "5407297" "5472353" "5677514" "5892660" "6687130" "6765797" "6765798" "6771504" "6873528" "7031167" "7079396" "7322843" "7345882" "7349221").PN. OR ("8223497").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 09:22
S20	280	(smith adj2 (courtney)) electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S21	1294562	((("361") or ("257") or ("174") or ("165") or ("439")).CLAS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/01/07 11:15

S22	99090	electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S23	47403	S21 S22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S24	12855	S23 electr\$4 (cover or housing or enclosure or casing or case or panel adj2 (board or pcb or substrate)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (parallel or horizontal\$2)) (thermal\$2 or conductivity or radiat\$3 or transfer adj2 (cover or housing or enclosure or casing or case or panel)) (cover or housing or enclosure or casing or case or panel adj2 (parallel or horizontal\$2)) anisotropic surface inner	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S25	0	S20 S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:15
S26	3	(smith adj2 (courtney)) anisotropic	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2015/01/07 11:18
S27	14	("20020197923" "20060070720" "20060232932" "20070000642" "20070053168" "20070285890" "20080101026" "20090282852" "20100033935" "20110101394" "20110228482" "6521990" "8081468" "8130500").PN. OR ("8537553").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2015/01/07 11:21
S28	1	(13/071015).APP.	US-PGPUB; USOCR	AND	ON	2015/01/07 11:37

Appl. no. 13/739,995

IDS dated January 11, 2013

Modified Form PTO/SB/08A

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	<i>Complete If Known</i>	
	Application Number	13/739,995
	First Named Inventor	Smith
	Filing Date	January 11, 2013
	Group Art Unit	Not yet assigned
	Examiner Name	Not yet assigned
No. of Refs.: 3	Attorney Docket No.	SL-391

U.S. PUBLISHED PATENT DOCUMENTS						
Examiner Initials [*]	Cite No. ¹	U.S. Patent Document Number Kind Code ²		Name of Patentee or Applicant	Publ./Issue Date	Copy Enclosed
	1.	7784585		Greenwood	8/31/2010	No ^{***}
	2.	2010/0321892		Vander Ploeg et al.	12/23/2010	No ^{***}

OTHER PRIOR ART – NONPATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. ¹	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 ²	Copy Enclosed
	3.	ITT Wire Rope Isolators (printed 9/4/2012), 2 pages		Yes

Examiner Signature	/Courtney Smith/	Date Considered	01/07/2015
--------------------	------------------	-----------------	------------

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

¹Unique citation designation number. ²See attached Kinds of U.S. Patent Documents. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

** Reference cited in parent application US Serial No. _____, CFR § 1.98(d)

*** Pre-OG Notice By Deputy Commissioner Stephen G. Kunin dated July 11, 2003 waiving the requirement to file copies of US patent publications in applications filed after June 30, 2003.

& Notice dated October 19, 2004 by Deputy Commissioner for Patent Examination Policy waiving requirement to file copies of pending US patent applications if the applications are stored in the USPTO's IFW system.

Commonly owned US patent or application whose subject matter may be related to the subject matter of the instance patent application.

4835-3526-8099, v. 2

<i>Index of Claims</i> 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 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	01/07/2015							
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
	6	✓							
	7	✓							
	8	✓							
	9	O							
	10	✓							
	11	✓							
	12	✓							
	13	✓							
	14	✓							
	15	✓							
	16	✓							
	17	✓							
	18	✓							
	19	✓							
	20	✓							

Search Notes 	Application/Control No. 13739995	Applicant(s)/Patent Under Reexamination SMITH ET AL.
	Examiner COURTNEY SMITH	Art Unit 2835

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
361	.CLAS. w/limited text search	1/7/14	C.S.
257	.CLAS. w/limited text search	1/7/14	C.S.
174	.CLAS. w/limited text search	1/7/14	C.S.
165	.CLAS. w/limited text search	1/7/14	C.S.
439	.CLAS. w/limited text search	1/7/14	C.S.

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	1/7/14	C.S.
Inventor search	1/7/14	C.S.

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
			C.S.

--	--



UNITED STATES PATENT AND TRADEMARK OFFICE

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

BIB DATA SHEET

CONFIRMATION NO. 5387

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
13/739,995	01/11/2013	361	2835	SL-391		
RULE						
APPLICANTS L-3 Communications Corp., New York, NY INVENTORS Robert H. Smith, Salt Lake City, UT; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 02/04/2013						
Foreign Priority claimed 35 USC 119(a-d) conditions met Verified and Acknowledged	☐ Yes ☒ No ☐ Yes ☒ No /COURTNEY L SMITH/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY UT	SHEETS DRAWINGS 6	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 1
ADDRESS Ken Burraston/L-3 Communications KIRTON & MCCONKIE 60 EAST SOUTH TEMPLE SUITE 1800 SALT LAKE CITY, UT 84111 UNITED STATES						
TITLE Panel For Enhancing Thermal Conduction In An Electronic Assembly						
FILING FEE RECEIVED 1260	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		

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/739,995				
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	390			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	620			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	250			
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *			OR	x 62 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 250 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).							0.00			
							0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
			TOTAL			TOTAL	1260			
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	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 found in the appropriate box in column 1.										



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
13/739,995	01/11/2013	2856	1260	SL-391	20	1

CONFIRMATION NO. 5387

76279

Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111

FILING RECEIPT



OC000000059091422

Date Mailed: 02/11/2013

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 submit a written request for a Filing Receipt Correction. 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**

Inventor(s)

Robert H. Smith, Salt Lake City, UT;

Applicant(s)

L-3 Communications Corp., New York, NY

Assignment For Published Patent Application

L-3 COMMUNICATIONS CORP., New York, NY

Power of Attorney: The patent practitioners associated with Customer Number 76279

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 02/04/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/739,995**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Panel For Enhancing Thermal Conduction In An Electronic Assembly

Preliminary Class

073

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

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 U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/739,995	01/11/2013	Robert H. Smith	SL-391

CONFIRMATION NO. 5387

POA ACCEPTANCE LETTER

76279
Ken Burraston/L-3 Communications
KIRTON & MCCONKIE
60 EAST SOUTH TEMPLE
SUITE 1800
SALT LAKE CITY, UT 84111



Date Mailed: 02/11/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/30/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/agizaw/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with the Customer Number:

76279

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name Registration	Number	Name Registration	Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number:

76279

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

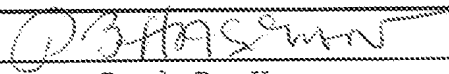
Assignee Name and Address:

L-3 Communications Corp.
600 Third Ave.
New York City, New York 10016

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	25 Sept 2012
Name	Paul B. Haseman	Telephone	(801) 594-2878
Title	VP and General Counsel of L-3 Communications Systems West		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

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.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: L-3 Communications CorpApplication No./Patent No.: 13/739,995Filed/Issue Date: January 11, 2013Titled: PANEL FOR ENHANCING THERMAL CONDUCTION IN AN ELECTRONIC ASSEMBLY

_____, a _____

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 029617, Frame 0254, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 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.

SAMSUNG EX. 1002 - 159/204

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/N. Kenneth Burraston/

Signature

N. Kenneth Burraston

Printed or Typed Name

January 30, 2013

Date

39,923

Title or Registration 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.

Electronic Acknowledgement Receipt

EFS ID:	14834365
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston/Diana Abalos
Filer Authorized By:	N. Kenneth Burraston
Attorney Docket Number:	SL-391
Receipt Date:	30-JAN-2013
Filing Date:	
Time Stamp:	16:55:46
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	Power of Attorney	L3_General_Power_of_Attorney.pdf	981559 33e4a77080c80a5558bf33bbb83cda52bfa397da	no	1

Warnings:

Information:

2	Assignee showing of ownership per 37 CFR 3.73.	aia0096.pdf	77123 37ac0e300a2d1233a193f4633b5e5a6e1295609b	no	3
Warnings:					
Information:					
Total Files Size (in bytes):				1058682	
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.					

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING
AN APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention Panel For Enhancing Thermal Conduction In An Electronic Assembly

As a below named inventor, I declare that:

This declaration is directed to:

- ☒ The attached application (attorney docket no. SL-391), or
☐ U.S. Application No.: _____, filed on _____.

I have reviewed and understand the contents of the above-identified application, including the claims.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information (e.g., prior art) known or that becomes known to me that is material (as defined in 37 CFR § 1.56) to patentability of any claim in the above-identified application or is inconsistent with any position taken during prosecution of the application.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the above-identified application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC § 1001 by fine or imprisonment of not more than five (5) years, or both

LEGAL NAME OF INVENTOR(S)

Inventor one: Robert H. Smith

Signature: _____

Dated: _____

☐ Additional inventors are being named on _ additional form(s) attached hereto.

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly			
First Named Inventor/Applicant Name:	Robert H. Smith			
Filer:	N. Kenneth Burraston			
Attorney Docket Number:	SL-391			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	390	390
Utility Search Fee	1111	1	620	620
Utility Examination Fee	1311	1	250	250
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 (\$)				1260

Electronic Acknowledgement Receipt

EFS ID:	14683483
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	11-JAN-2013
Filing Date:	
Time Stamp:	19:03:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1260
RAM confirmation Number	6548
Deposit Account	500843
Authorized User	ANDERSON, DAX D.

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 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SL391Spec.pdf	92004	yes	18
			0f85a227b02884065db402965fd5038457b18bb2		
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Specification	1	14		
	Claims	15	17		
	Abstract	18	18		
Warnings:					
Information:					
2	Drawings-only black and white line drawings	SL391Drwgs.pdf	76940	no	6
			839bca9c37695ae862ad5c72c2c8d7eb775408af		
Warnings:					
Information:					
3	Application Data Sheet	SL391ADS.pdf	1064536	no	5
			30095fdd10d9af2e527ad23448ba99a664c6bd0c		
Warnings:					
Information:					
4	Oath or Declaration filed	SL391Decl.pdf	448139	no	1
			787b9f77390939d6a941739cfdbe31be989123bd		
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	32728	no	2
			c8072bafb230ace2caa580bae53f88fe49d54cb1		
Warnings:					
Information:					
Total Files Size (in bytes):			1714347		

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.

APPLICATION FOR UNITED STATES LETTERS PATENT

for

PANEL FOR ENHANCING THERMAL
CONDUCTION IN AN ELECTRONIC ASSEMBLY

Inventor(s):

Robert H. Smith

PANEL FOR ENHANCING THERMAL CONDUCTION IN AN ELECTRONIC ASSEMBLY

BACKGROUND

[0001] Circuit board assemblies are known in which multiple electronic circuit elements are attached to a circuit board. A support structure, to which the circuit board is attached, is often included. The support structure can, for example, aid in sinking heat generated by the electronic circuit elements and enhance the physical stiffness of the circuit board. Embodiments of the present invention include a composite heat frame, which can comprise a panel attached to such a support structure. Such a heat frame can be configured to enhance conduction of heat and impart stiffness to the circuit board. This can lead to improvements in heat sinking and physical stiffness with respect to weight, which can allow for the use of larger circuit boards. Some embodiments of the present invention provide the foregoing and/or other improvements and advantages.

SUMMARY

[0002] In some embodiments of the invention, an electronic assembly can include a support structure, a circuit substrate to which an electronic device is attached, and a panel. The support structure can have walls that enclose a space, and the circuit substrate can be coupled to a first portion of the support structure. The electronic device can be attached to a mounting surface of the circuit substrate and disposed within the space. The panel can be coupled to a second portion of the support structure and can comprise contiguous sections. Each of the sections can have an inner surface that faces the mounting surface of the circuit substrate and is oriented within twenty-five degrees of parallel to the mounting surface. Each section can have a first thermal conductivity substantially parallel to the inner surface of the section and a second thermal conductivity substantially perpendicular to the inner surface of said section, and the first thermal conductivity can be greater than the second thermal conductivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Figure 1A illustrates a perspective view of an electronic assembly with a heat frame comprising a panel and a support structure and having superior heat conductive characteristics according to some embodiments of the invention.

[0004] Figure 1B is a cross sectional side view of the electronic assembly of Figure 1A.

[0005] Figure 2 illustrates examples of angles between some of the sections of the panel and a plane that is substantially parallel to the mounting surface of a circuit substrate of the electronic

assembly of Figure 1A or another of the sections according to some embodiments of the invention.

[0006] Figure 3 illustrates with path flow arrows examples of heat conduction paths out of the electronic assembly of Figure 1A.

[0007] Figure 4 illustrates an example in which the sections of the panel each comprise elongated fibers disposed in an encasing material according to some embodiments of the invention.

[0008] Figure 5 shows an example in which one of the sections of the panel comprises layers laminated together according to some embodiments of the invention.

[0009] Figure 6 illustrates another example of an electronic assembly with a composite material panel according to some embodiments of the invention.

[0010] Figure 7 illustrates examples of angles between some of the sections of the panel and a plane that is substantially parallel to the mounting surface of a circuit substrate of the electronic assembly of Figure 6 or another of the sections according to some embodiments of the invention.

[0011] Figure 8 illustrates another example of an electronic assembly with a composite material panel according to some embodiments of the invention.

[0012] Figure 9 illustrates examples of angles between some of the sections of the panel and a plane that is substantially parallel to the mounting surface of a circuit substrate of the electronic assembly of Figure 8 or another of the sections according to some embodiments of the invention.

[0013] Figure 10 shows an example of a mold plate with a patterned surface on which composite material panels can be formed according to some embodiments of the invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0014] This specification describes exemplary embodiments and applications of the invention. The invention, however, is not limited to these exemplary embodiments and applications or to the manner in which the exemplary embodiments and applications operate or are described herein. Moreover, the Figures may show simplified or partial views, and the dimensions of elements in the Figures may be exaggerated or otherwise not in proportion for clarity. In addition, as the terms "on," "attached to," or "coupled to" are used herein, one object (e.g., a material, a layer, a substrate, etc.) can be "on," "attached to," or "coupled to" another object regardless of whether the one object is directly on, attached, or coupled to the other object or there are one or more intervening objects between the one object and the other object. Also, directions (e.g., above, below, top, bottom, side, up, down, under, over, upper, lower,

horizontal, vertical, "x," "y," "z," etc.), if provided, are relative and provided solely by way of example and for ease of illustration and discussion and not by way of limitation. In addition, where reference is made to a list of elements (e.g., elements a, b, c), such reference is intended to include any one of the listed elements by itself, any combination of less than all of the listed elements, and/or a combination of all of the listed elements.

[0015] As used herein, "substantially" means sufficient to work for the intended purpose. The term "substantially" allows for insignificant, unintended deviations from perfection. The words "substantially planar" thus allow for insignificant, unintended deviations from perfect planarity. As used herein, "substantially parallel" means within ten degrees of parallel and "substantially perpendicular" means within ten degrees of perpendicular. The term "ones" means more than one.

[0016] Figures 1A and 1B illustrate an example of an electronic apparatus 100 according to some embodiments of the invention. The electronic apparatus 100 can be, for example, a circuit card assembly. As shown, the electronic apparatus 100 can comprise a circuit substrate 102 and a composite heat frame 101, which can comprise a panel 110 and a support structure 140. As also shown, the circuit substrate 102 and the panel 110 can be coupled to the support structure 140. The heat frame 101 can provide physical stiffness and sink heat generated by electronic devices 150 attached to the circuit substrate 102. For example, the heat frame 101 can provide highly conductive thermal paths away from the electronic devices 150 and thus enhance heat sinking from the electronic devices 150. The heat frame 101 can also enhance physical stiffness.

[0017] As shown, the circuit substrate 102 can be a structure to which one or more electronic devices 150 are attached. For example, the circuit substrate 102 can comprise a mounting surface 104 to which the electronic devices 150 are attached. For example, the electronic devices 150 can be soldered, adhered, or otherwise attached to the mounting surface 104. Illustrated in Figures 1A and 1B is an adhesive material 152 adhering the electronic devices 150 to the mounting surface 104. In some embodiments, the mounting surface 104 can be substantially planar. Although not shown, the circuit substrate 102 can comprise internal and/or external electrical wiring (not shown), such as electrically conductive traces, vias, and/or the like, to which the electronic devices 150 are electrically connected. Non-limiting examples of the circuit substrate 102 include a printed circuit board, which can also be referred to as a circuit board or circuit card.

[0018] As shown in Figure 1B, the circuit substrate 102 can be coupled to the support structure 140, which can comprise walls 142 that enclose and define an interior space 160 between the walls 142. As shown, the circuit substrate 102 can be coupled to the support structure 140 such that the electronic devices 150 attached to the circuit substrate 102 are in the

interior space 160. For example, the circuit substrate 102 can be coupled to a first (e.g., lower) portion of the support structure 140 as shown in Figure 1B. The circuit substrate 102 can be coupled to the support structure 140 in any suitable manner. For example, the circuit substrate 102 can be coupled to the support structure 140 by an adhesive material, screws, bolts, clamps, and/or the like (not shown).

[0019] The electronic devices 150 can be any type of electronic apparatus, component, circuit element, and/or the like. For example, one or more of the electronic devices 150 can be any of the following: a semiconductor die comprising one or more integrated electronic circuits, an electronic component (e.g., a resistors, capacitor, inductor, transistor or the like), a diode, or the like.

[0020] The support structure 140 can provide physical stiffness and can conduct heat away from the electronic devices 150. The support structure 140 can thus comprise a physically stiff material that has a relatively high thermal conductivity. In some embodiments, the support structure 140 can be made of a metal, for example, such as aluminum, copper, or the like. Moreover, the support structure 140 can include one or more coatings. For example, the support structure 140 can be coated with an anti-corrosion material such as nickel.

[0021] The support structure 140 can include features aid in the dissipation of heat. For example, the support structure 140 can comprise one or more heat radiating elements 146, which can comprise, for example, heat fins. Alternatively, an extension similar to element 146 can be a coupling structure that couples with corresponding coupling structure on another component or device (not shown) to facilitate coupling the electronic apparatus 100 to another device or apparatus.

[0022] Although illustrated as comprising four walls 142 surrounding the interior space 160, the support structure 140 can include additional features. For example, the support structure 140 can include isolation walls (not shown) that extend from one or more of the walls 142 into the interior space 160. Such isolation walls (not shown) can, for example, be disposed between ones of the electronic devices 150.

[0023] The material of the support structure 140 can have a relatively high thermal conductivity. The support structure 140 can thus provide thermal paths that sink heat, such as heat generated by the electronic devices 150, from the interior space 160. With reference to Figure 3, heat generated by the electronic devices 150 can thus be conducted by walls 142 of the support structure 140 from the interior space 160 and radiated by the support structure 140 outside of the electronic assembly 100. For example, the support structure 140 can radiate the heat into ambient air or, alternatively, into other components (not shown) outside of the support structure 140. Examples of such components (not shown) include a chassis (not shown), a liquid

cooling apparatus (not shown), a conduction apparatus (not shown), a forced convection cooling apparatus (not shown), or the like. Such a thermal flow is depicted in Figure 3 by thermal flow arrows 306. Heat from the electronic devices 150 can also heat the circuit substrate 102, and such heat can also be conducted by the walls 142 into the ambient air or other components (not shown) (e.g., a chassis (not shown), a liquid cooling conduction apparatus (not shown), a forced convection cooling apparatus (not shown), or the like) that are outside the support structure 140 generally as discussed above. Examples of such thermal flows are depicted by the thermal flow arrows 304 in Figure 3.

[0024] As illustrated in Figures 1A and 1B, the panel 110 can be coupled to a second (e.g., upper) portion of the support structure 140 generally opposite the circuit substrate 102. For example, the support structure 140, the circuit substrate 102, and the panel 110 can bound (e.g., partially or fully enclose) the space 160. The panel 110 can be generally comparable to the circuit substrate 102 in size and overall form factor and can thus, with the support structure 140 and circuit substrate 102, form an enclosure comprising the interior space 160 for the electronic devices 150. The panel 110 can have high thermal conductivity and physical stiffness and can thus significantly enhance the thermal conductivity and stiffness characteristics of the support structure 140.

[0025] As shown in Figures 1A and 1B, the panel 110 can comprise substantially parallel, contiguous sections 112, 118, 122 one or more of which can be angled with respect to each other and/or the mounting surface 104 of the circuit substrate 102. For ease of illustration and discussion, the panel 110 is illustrated in Figures 1A and 1B and discussed below with respect to three such sections 112, 118, 122 angled as shown in Figures 1A and 1B. The panel 110 can, however, have more or fewer than the three substantially parallel, contiguous sections 112, 118, 122 shown, and those sections can be oriented (e.g., angled) differently than shown. As will be further discussed below, Figures 6 and 8 illustrate additional examples of panels 602 and 802 that have different numbers of substantially parallel, contiguous sections which are oriented differently than the panel 110 illustrated in Figures 1A and 1B. Even so, all of the panels 110, 602, 802 are examples only, and the invention is not limited to use of a panel with any particular number of sections or orientation of sections. Generally as illustrated by section 170, the panel 110 can also include other sections, which may not be substantially parallel with one or more of the other sections.

[0026] With reference now to Figures 1A and 1B, as shown, the panel 110 can comprise sections 112, 118, 122, which can be contiguous. In some embodiments, sections 112, 118, 122 can be bounded by boundaries 114, 116, 120, 124. Because sections 112, 118, 122 can be contiguous, pairs of contiguous sections 112, 118, 122 can share a common boundary 114, 116,

120, 124. For example, as illustrated in Figures 1A and 1B, boundary 114 is common to contiguous sections 112 and 118, and boundary 116 is common to contiguous sections 112 and 122. As also shown in Figures 1A and 1B, in some embodiments, the boundaries 114, 116, 120, 124 can correspond generally to straight lines that can be substantially parallel. In other embodiments, however, the boundaries 114, 116, 120, 124 do not correspond to straight lines and need not be substantially parallel. Moreover, as noted above, the panel 110 can have other sections 170 that may not be substantially parallel with other sections, and those sections (e.g., section 170) can include boundaries 172, 174 that are not substantially parallel with the boundaries 114, 116, 120, 124. Such sections 170 can, however, be otherwise configured and have any of the same characteristics of the sections 112, 118, 122 discussed herein.

[0027] As also illustrated in Figures 1A and 1B, each section 112, 118, 122 can have an inner surface 130, 132, 134 that faces the mounting surface 104 of the circuit substrate 102. As used herein, "faces" the mounting surface 104 means that an inner surface 130, 132, 134 is directed generally towards rather than away from the mounting surface 104. In some embodiments, the inner surface 130, 132, 134 of each section 112, 118, 122 can extend between the boundaries 114, 116, 120, 124 of the section 112, 118, 122. For example, the inner surface 130 of section 118 can extend from an outer boundary 120 to the common boundary 114, the inner surface 132 of section 112 can extend from the common boundary 114 to the common boundary 116, and the inner surface 134 of section 122 can extend from the common boundary 116 to the outer boundary 124. As shown, in some embodiments, the inner surfaces 130, 132, 134 can be substantially planar.

[0028] Generally as illustrated in Figure 1B, one or more of sections 112, 118, 122 can be angled with respect to each other and/or the mounting surface 104 of the circuit substrate 102. For example, as shown in Figure 2, sections 118 and 122 can be angled with respect to section 112. For example, there can be an angle 204 between an axis or plane 202 that is parallel to the mounting surface 104 of the circuit substrate 102 and/or the inner surface 132 of section 112. As also illustrated in Figure 2, there can be an angle 206 between the axis or plane 202 and/or the inner surface 132. In some embodiments, the angles 204 and 206 can be less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. Put another way, in various embodiments, the angles 204 and 206 can be greater than zero but less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. In fact, all of the inner surfaces 130, 132, 134 of the all of sections 112, 118, 122 of the panel 110 can be with forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degree, or five degrees of parallel to each other and/or the mounting surface 104 of the circuit substrate 102.

[0029] The panel 110 can comprise a composite material. As used herein, "composite material" means a combination of two or more distinct and different materials. Moreover, the composite material of the panel 110 can be configured such that thermal conductivity can differ in different directions in the panel 110. For example, each section 112, 118, 122 can be configured so that the thermal conductivity is significantly greater in a first direction that is substantially parallel to the inner surface 130, 132, 134 of the section 112, 118, 122 than in a second direction that is substantially perpendicular to the inner surface 130, 132, 134. For example, section 118 can have a first thermal conductivity in a direction that is substantially parallel to the inner surface 130 and a second thermal conductivity in a direction that is substantially perpendicular to the inner surface 130, and the first thermal conductivity can be significantly greater (e.g., two times or more, five times or more, fifty times or more, one-hundred times or more, or five hundred times or more) than the second thermal conductivity of section 118. Put another way, the thermal conductivity of section 118 can be significantly greater (e.g., as much as five hundred times or more in some embodiments) in the plane of the inner surface 130 than perpendicular to the inner surface 130. The panel 110 can also include one or more coatings such as an anti-corrosion coating, an electrically conductive coating that can function as an electromagnetic shield, or the like.

[0030] Similarly, section 112 can have a first thermal conductivity in a direction that is substantially parallel to the inner surface 132 and a second thermal conductivity in a direction that is substantially perpendicular to the inner surface 132, and the first thermal conductivity can be significantly greater (e.g., two times or more, five times or more, fifty times or more, one-hundred times or more, or five hundred times or more) than the second thermal conductivity of section 112. Likewise, section 122 can have a first thermal conductivity in a direction that is substantially parallel to the inner surface 134 and a second thermal conductivity in a direction that is substantially perpendicular to the inner surface 134, and the first thermal conductivity can be significantly greater (e.g., as much as five hundred times or more) than the second thermal conductivity of section 122. The thermal conductivity of section 112 can thus be significantly greater (e.g., in some embodiments, five hundred times or more) in the plane of the inner surface 132 than perpendicular to the inner surface 132, and the thermal conductivity of section 122 can likewise be significantly greater in the plane of the inner surface 134 than perpendicular to the inner surface 134.

[0031] The panel 110 can thus be configured to provide highly conductive thermal paths that are substantially parallel with the inner surfaces 130, 132, 134 of the sections 112, 118, 122. For example, as illustrated in Figure 3, the panel 110 can provide highly conductive thermal paths as illustrated by flow arrows 302 from the electronic devices 150 into section 112 and then through

the outer sections 118 and 122 to the support structure 140. As shown in Figure 1B, a fill material 154 can be disposed between and physically contact the electronic devices 150 and the inner surface 132 of section 112. The fill material 154 can be a thermally conductive material that can thus readily conduct heat from the electronic devices 150 into section 112 of the panel 110. Similarly, the panel 110 can be coupled to the support structure 140 by a thermally conductive adhesive 144 to enhance conduction of the heat from the ends of the panel 110 corresponding to boundaries 120, 124 to the support structure 140.

[0032] Heat from the electronic devices 150 can thus readily flow from the electronic devices 150 through the fill material 154 into section 112 of the panel 110. Due to the high conductivity in each section 112, 118, 122 substantially parallel to the inner surfaces 130, 132, 134, the heat can readily flow as illustrated by flow arrows 302 through section 112 generally parallel to the inner surface 132 of section 112 into either of the outer sections 118, 122 and out the ends of sections 118, 122 that correspond to the outer boundaries 120, 124 into the support structure 140. As discussed above, the support structure 140 can radiate the heat into the surrounding ambient air or into other components (not shown) (e.g., a chassis (not shown), a liquid cooling apparatus (not shown), a conduction apparatus (not shown), a forced convection cooling apparatus (not shown), or the like) that are outside the support structure 140 generally as discussed above.

[0033] The panel 110 can thus provide thermal paths depicted by arrows 302 from the electronic devices 150 that are in addition to the thermal paths depicted by arrows 304 and 306 in Figure 3, which were discussed above. In fact, a thermal path corresponding to the flow arrows 302 in Figure 3 from inside the electronic assembly 100 (e.g., from an electronic device 150) to outside the electronic assembly can have a greater thermal conductivity than any other thermal path from the space 160 inside the electronic assembly 100 to outside of the electronic assembly 100 including the thermal paths depicted by arrows 304, 306 in Figure 3.

[0034] As noted, the panel 110 can comprise a composite material. Figure 4 illustrates an example in which each section 112, 118, 122 is made of a composite material that comprises elongated fibers 402 embedded in an encasing material 404. Moreover, the elongated fibers 402 in each section 112, 118, 122 can be oriented substantially parallel to the inner surface 130, 132, 134 of the section. For example, the elongated fibers 402 embedded in the encasing material 404 of section 118 can be oriented substantially parallel to the inner surface 130. Similarly, the elongated fibers 402 embedded in the encasing material 404 of section 112 can be oriented substantially parallel to the inner surface 132, and the elongated fibers 402 embedded in the encasing material 404 of section 122 can be oriented substantially parallel to the inner surface 134. The fibers 402 can be significantly thermally conductive along their elongated lengths,

which can thus make each section 112, 118, 122 significantly more conductive in a direction that is substantially parallel to the inner surfaces 130, 132, 134 of sections 112, 118, 122 than a direction that is substantially perpendicular to the inner surfaces 130, 132, 134 as discussed above.

[0035] In some embodiments, the elongated fibers 402 in a section 112, 118, 122 can be further oriented to extend generally from one boundary 114, 118, 120, 124 to the other boundary of section. For example, the elongated fibers 402 embedded in the encasing material 404 of section 118 can extend generally from the boundary 120 to the boundary 114 of section 118. Similarly, the elongated fibers 402 embedded in the encasing material 404 of section 112 can extend generally from the boundary 114 to the boundary 116 of section 112, and the elongated fibers 402 embedded in the encasing material 404 of section 122 can extend generally from the boundary 116 to the boundary 124 of section 122.

[0036] The foregoing, however, is merely an example. In some embodiments, one or more (e.g., all) of sections 112, 118, 122 can comprise a quasi-isotropic layup of layers of the fibers 402 in which the elongated lengths of the fibers 402 in all of the layers are substantially parallel to the inner surface 130, 132, 134 but the fibers 402 in one layer are oriented in different directions than the fibers 402 in another of the layers.

[0037] An example is illustrated in Figure 5, which shows an exploded view of section 112 comprising a layer 502 in which the elongated lengths of the fibers 402 are oriented in a first direction that is substantially parallel to the inner surface 132 and a second layer 504 in which the elongated lengths of the fibers 402 are oriented in a different direction that is also substantially parallel to the inner surface 132. Section 112 can comprise two or more of such layers 502, 504 stacked one on top of the other and laminated together. The other sections 118, 122 can similarly comprise a plurality of stacked, laminated layers such as layers 502, 504 as shown in Figure 5.

[0038] The fibers 402 can be any type of fiber that conducts heat along its elongated length. For example, the fibers 402 can be metal fibers. As another example, the fibers 402 can be carbon fibers. Examples of such carbon fibers include vapor grown carbon fibers, carbon nanotubes, or the like. As yet another example, the fibers 402 can be graphic fibers.

[0039] The encasing material 404 can be any material for holding the fibers 402 in place. For example, the encasing material 404 can be a matrix material. Examples of such matrix materials include polymeric, metallic, and ceramic matrixes. Epoxies, polyamides, resins, aluminum, titanium, and alumina are also suitable examples of encasing material 404.

[0040] As shown in Figure 1B, there can be holes 126 in the panel 110 above the electronic devices 150. The fill material 154 can be provided through the holes 126 onto the electronic devices 150. Plugs 128 can thereafter plug the holes 126.

[0041] Alternatively, the plugs 128 can be attached (e.g., with an adhesive such as an epoxy) to the panel 110, and the holes 126 can be drilled through the plugs 128 and the panel 110. The fill material 154 can then be provided through the holes 126 onto the electronic devices 150. Such plugs 128 can seal holes 126 and improve thermal conductivity from the electronic devices 150 to the panel 110.

[0042] Regardless, the fill material 154 can physically contact both the electronic devices 150 and the inner surface 132 of section 112. A noted, the fill material 154 can be thermally conductive and can thus provide high conductivity thermal paths from the electronic devices 150 to the inner surface 132 of section 112 and thus the panel 110.

[0043] As mentioned, the panel 110 can comprise more or fewer than the three substantially parallel sections 112, 118, 122, and Figures 6 and 8 illustrates examples of panels 602 and 802 each of which has a different number and orientation of such sections. Other than a different number and configuration of sections and electronic devices 150, however, the electronic assemblies 600 and 800 of Figures 6 and 8 can be the same as the electronic assembly 100 illustrated in Figures 1A and 1B as discussed above. In Figures 1A, 1B, 6, and 8, like number elements are the same, and like numbered elements in Figures 6 and 8 thus have the same properties and characteristics as discussed above with regard to electronic assembly 100.

[0044] Figure 6 illustrates an electronic apparatus 600 that can be the same as the electronic apparatus 100 but has a heat frame 601 rather than the heat frame 101. As shown, the heat frame 601 can comprise the support structure 140 and an attached panel 602 rather than the panel 110. As illustrated in Figure 6, the panel 602 can comprise sections 606, 610, 614, 618, 622, 626, 630, which can be generally the same as any of sections 112, 118, 122 of the panel 110. For example, each section 606, 610, 614, 618, 622, 626, 630 can comprise an inner surface 640, 642, 644, 646, 648, 650, 652, and each section 606, 610, 614, 618, 622, 626, 630 can be bounded by boundaries 604, 608, 612, 616, 620, 624, 628, 632. Each section 606, 610, 614, 618, 622, 626, 630 can be configured like, comprise the same material as, and have the same characteristics and properties as any of sections 112, 118, 122 discussed above.

[0045] As shown in Figures 6 and 7, section 618 can be oriented such that its inner surface 646 is substantially parallel with the mounting surface 104 of the circuit substrate 102, and the inner sections 642 and 650 of sections 610 and 626 can also be substantially parallel with the mounting surface 104. As illustrated in Figure 7, sections 604, 614, 622, 630 can be angled with respect to sections 608, 618, 626. For example, there can be an angle 704 between an axis or

plane 702 that is parallel with the mounting surface 104 of the circuit substrate 102 and/or the inner surface 646 of section 618 and the inner surface 640 of section 604. As also shown, there can be an angle 706 between the axis or plane 702 and the inner surface 644 of section 614. There can similarly be an angle 708 between the axis or plane 702 and the inner surface 648 of section 622, and there can likewise be an angle 710 between the axis or plane 702 and the inner surface 652 of section 630.

[0046] In some embodiments, the angles 704, 706, 708, 710 can be less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. Put another way, in various embodiments, the angles 704, 706, 708, 710 can be greater than zero degrees by but less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. In fact, all of the inner surfaces 640, 642, 644, 646, 648, 650, 652 of all of the sections 604, 608, 614, 618, 622, 626, 630 can be within forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degree, or five degrees of parallel with each other and/or the mounting surface 104 of the circuit substrate 102.

[0047] As illustrated in Figure 6, the distance between the mounting surface 104 of the circuit substrate 102 and the inner surface 642 of section 610 and/or the inner surface 650 of section 626 can be greater than the distance between the mounting surface 104 and the inner surface 646 of section 618. Moreover, the resulting downward orientation of sections 614 and 622 with respect to section 618 can, in some embodiments, create a downward force on the electronic device 150 that can keep the electronic device 150 in place, reduce contact resistance between leads of the electronic devices 150 and the circuit substrate 102, or the like.

[0048] Figure 8 illustrates an electronic apparatus 800 that can be the same as the electronic apparatus 100 but can comprise a heat frame 801 rather than the heat frame 101. As shown, the heat frame 801 can comprise the support structure 140 and an attached panel 802 rather than the panel 110. The panel 802 can comprise sections 806, 810, 814, 818, 822, 826, 830, 834, 838, which can be generally the same as any of sections 112, 118, 122 of the panel 110. For example, each section 806, 810, 814, 818, 822, 826, 830, 834, 838 can comprise an inner surface 850, 852, 854, 856, 858, 860, 862, 864, 866, and each section 806, 810, 814, 818, 822, 826, 830, 834, 838 can be bounded by boundaries 804, 808, 812, 816, 820, 824, 828, 832, 836, 840. Each section 806, 810, 814, 818, 822, 826, 830, 834, 838 can be configured like, comprise the same material as, and have the same characteristics and properties as any of sections 112, 118, 122 discussed above.

[0049] As shown in Figures 8 and 9, sections 810, 818, 826, 834 can be oriented such that their inner surfaces 852, 856, 860, 864 are substantially parallel with the mounting surface 104 of the circuit substrate 102. As illustrated in Figure 9, sections 806, 814, 822, 830, 838 can be

angled with respect to sections 810, 818, 826, 834. For example, there can be an angle 904 between an axis or plane 902 that is parallel with the mounting surface 104 of the circuit substrate 102 and/or the inner surfaces 852, 856, 860, 864 of sections 810, 818, 826, 834. As also shown, there can be an angle 906 between the axis or plane 902 and the inner surface 854 of section 814. There can similarly be an angle 908 between the axis or plane 902 and the inner surface 858 of section 822, and there can likewise be an angle 912 between the axis or plane 902 and the inner surface 866 of section 838. There can also be an angle 910 between an axis or plane 950 and the inner surface 862 of section 830. The axis or plane 950 can be parallel to the axis or plane 902.

[0050] In some embodiments, the angles 904, 906, 908, 910, 912 can be less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. Put another way, in various embodiments, the angles 904, 906, 908, 910, 912 can be greater than zero degrees by but less than or equal to forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degrees, or five degrees. In fact, all of the inner surfaces 850, 852, 854, 856, 858, 860, 862, 864, 866 of all the sections 806, 810, 814, 818, 822, 826, 830, 834, 838 of the panel 802 can be within forty-five degrees, thirty degrees, twenty-five degrees, fifteen degrees, ten degree, or five degrees of parallel with each other and/or the mounting surface 104 of the circuit substrate 102.

[0051] As illustrated in Figure 8, the distances between the mounting surface 104 of the circuit substrate 102 and two or more of the inner surfaces 852, 856, 860, 864 can be different. The panel 802 can thus be customized to different sized electronic devices 150 as shown in Figure 8.

[0052] Panels 110, 602, 802 can be readily manufactured. For example, as shown in Figure 10, the panel 802 can be manufactured on a patterned surface 1002 of a mold plate 1000. The patterned surface 1002 can be in the desired shape of the panel 802. A panel 802 can be formed on the patterned surface 1002. The panels 110, 602 can also be made on a pattern surface like surface 1002 but that is patterned in the desired shape of panel 110 or panel 602.

[0053] Although specific embodiments and applications of the invention have been described in this specification, these embodiments and applications are exemplary only, and many variations are possible. For example, there can be one or more additional support structures included in any of the electronic apparatuses 100, 600, 800. For example, there can be a second support structure (not shown) disposed above the support structure 140 with the panel 110, 602, 802 between the second support structure (not shown) and the support structure 140 in any of the electronic devices 100, 600, 800.

CLAIMS

We claim:

1. An electronic assembly comprising:
 - a support structure comprising walls enclosing a space;
 - a circuit substrate coupled to a first portion of said support structure, said circuit substrate comprising a mounting surface;
 - an electronic device attached to said mounting surface and disposed within said space;and
 - a panel coupled to a second portion of said support structure, said panel comprising contiguous sections, each said section comprising an inner surface facing said mounting surface of said circuit substrate and oriented within twenty-five degrees of parallel to said mounting surface,
 - wherein each said section has a first thermal conductivity substantially parallel to the inner surface of said section and a second thermal conductivity substantially perpendicular to the inner surface of said section, and
 - wherein said first thermal conductivity is greater than said second thermal conductivity.
2. The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least five times greater than said second thermal conductivity.
3. The electronic assembly of claim 1, wherein for each said section, said first thermal conductivity is at least one-hundred times greater than said second thermal conductivity.
4. The electronic assembly of claim 2, wherein:
 - said panel further comprises substantially parallel edges bounding said sections, and
 - for each said section, said the inner surface of said section is from one of said edges bounding said section to another of said edges bounding said section.
5. The electronic assembly of claim 4, wherein:
 - said mounting surface is substantially planar, and
 - each of the inner surfaces of said sections of said panel are substantially planar.
6. The electronic assembly of claim 5 further comprising thermally conductive material disposed between and physically contacting said electronic device and the inner surface of one of said sections of said panel.

7. The electronic assembly of claim 6, wherein said inner surface of said one of said sections is substantially parallel to said mounting surface.
8. The electronic assembly of claim 7, wherein:
 - the inner surface of a second one of said sections is substantially parallel to said mounting surface of said circuit substrate, and
 - a distance between said inner surface of said second one of said sections and said mounting surface of said circuit substrate is greater than a distance between said inner surface of said one of said sections and said mounting surface.
9. The electronic assembly of claim 8, wherein:
 - an angle between the inner surface of a third one of said sections and said inner surface of said second one of said sections is greater than zero but less than twenty-five degrees, and
 - said third one of said sections is contiguous with said one of said sections and said second one of said sections.
10. The electronic assembly of claim 9 further comprising:
 - a second electronic device coupled to said mounting surface of said circuit substrate; and
 - thermally conductive material disposed between and physically contacting said second electronic device and said inner surface of said second one of said sections of said panel.
11. The electronic assembly of claim 2, wherein each of said inner surfaces of said sections of said panel are oriented within twenty five degrees of parallel to every other one of said inner surfaces of said sections.
12. The electronic assembly of claim 2, wherein:
 - said panel further comprises substantially parallel edges bounding said sections, and
 - an angle between said inner surfaces of each contiguous pair of said sections is greater than zero but less than twenty-five degrees.
13. The electronic assembly of claim 2, wherein each said section of said panel comprises elongated fibers.

14. The electronic assembly of claim 13, wherein for each said section of said panel, said elongated fibers of said section are substantially parallel to the inner surface of said section.
15. The electronic assembly of claim 14, wherein a thermally conductive path from said space enclosed by said walls of said support structure out of said electronic assembly that has a greatest thermal conductivity comprises a thermal path through contiguous ones of said sections of said panel to an outer edge of an outer one of said sections of said panel.
16. The electronic assembly of claim 15 further comprising a thermally conductive adhesive coupling said outer edge of said outer one of said sections to said support structure.
17. The electronic assembly of claim 16 further comprising a thermally conductive material disposed between and in physical contact with said electronic device and the inner surface of one of said contiguous ones of said sections of said panel.
18. The electronic assembly of claim 13, wherein said elongated fibers are carbon fibers.
19. The electronic assembly of claim 18, wherein said elongated fibers are vapor grown carbon fibers.
20. The electronic assembly of claim 13, wherein said panel comprises a matrix material and said elongated fibers disposed in said matrix material.

ABSTRACT

An electronic assembly can include a support structure, a circuit substrate coupled to a first portion of the support structure, and a composite material panel coupled to a second portion of the support structure. An electronic device can be coupled to a mounting surface of the circuit substrate and disposed within a space enclosed by walls of the support structure. The panel can include contiguous sections inner surfaces of which can be oriented within twenty-five degrees of parallel to said mounting surface. Each section can be significantly more thermally conductive generally parallel to the inner surface of the section than generally perpendicular to the inner surface.

Figure 1A

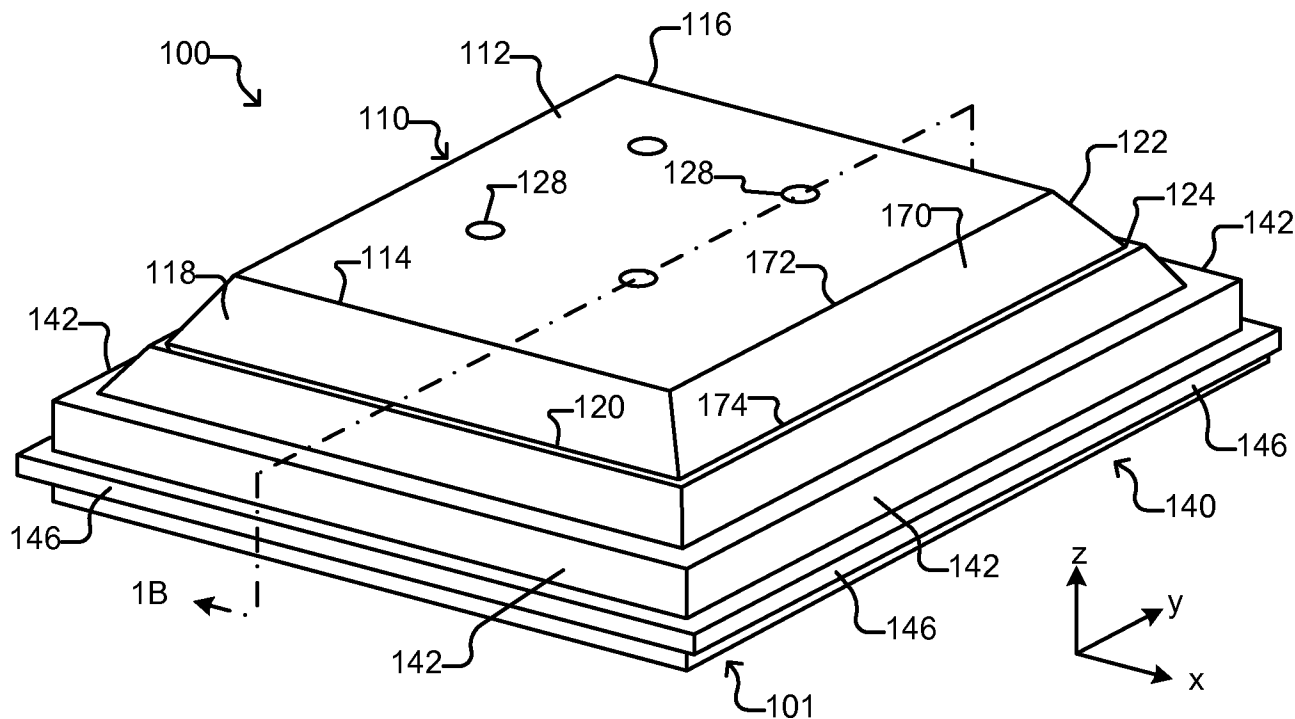


Figure 1B

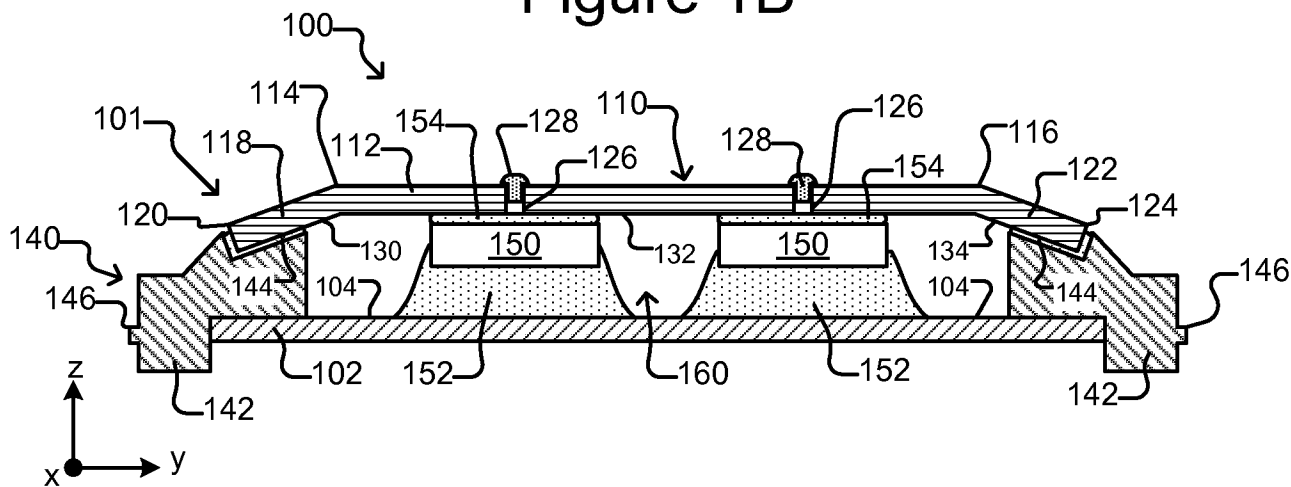


Figure 8

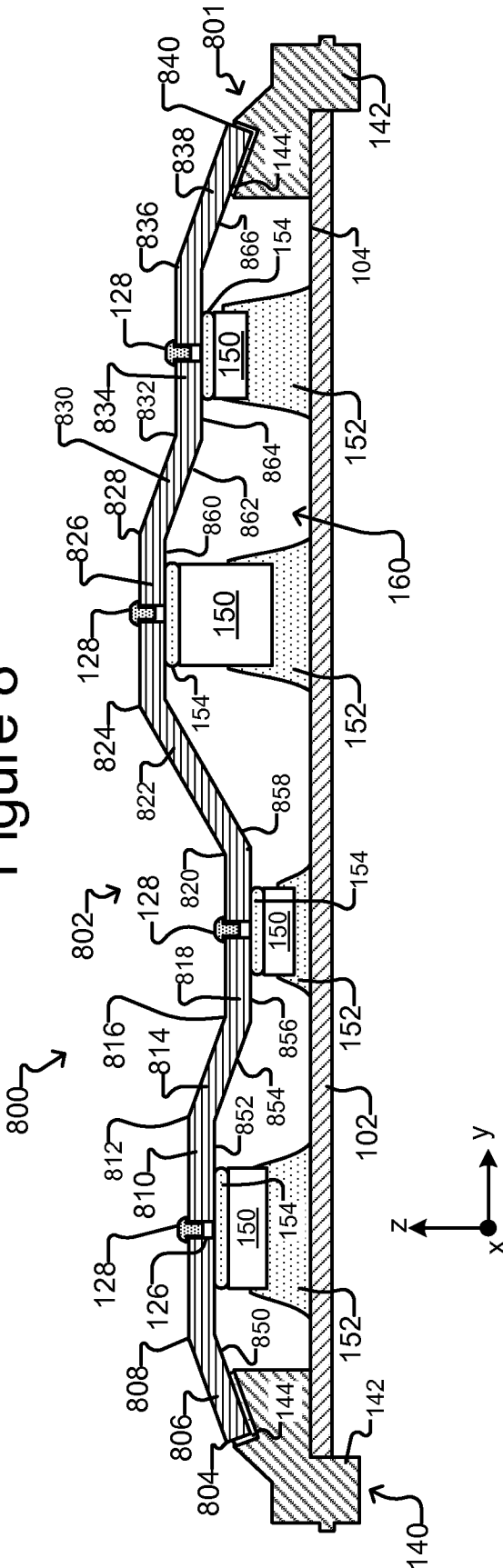


Figure 9

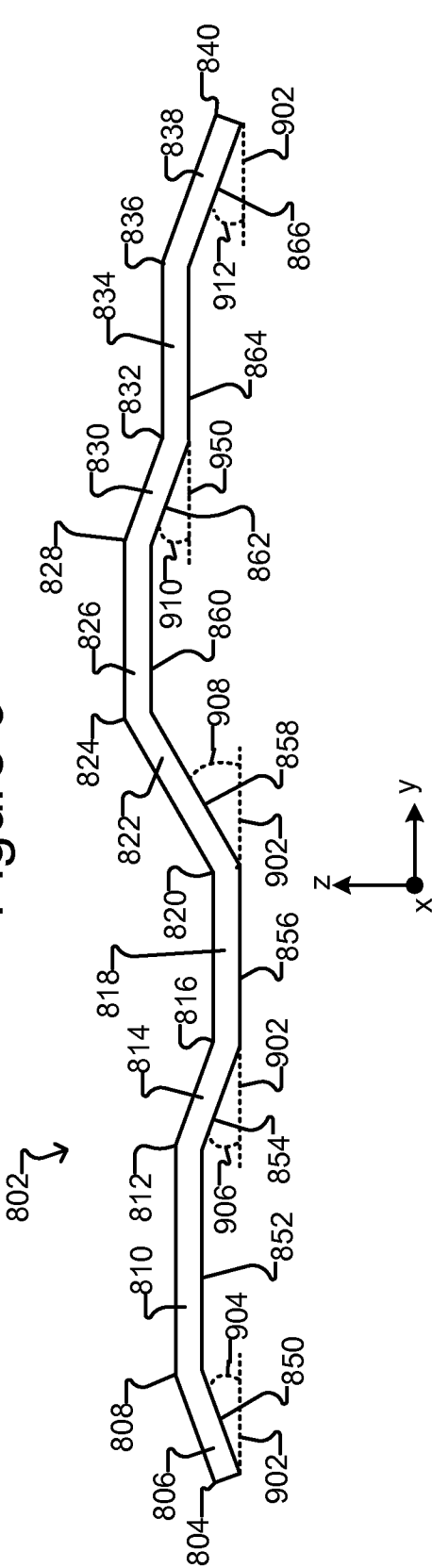
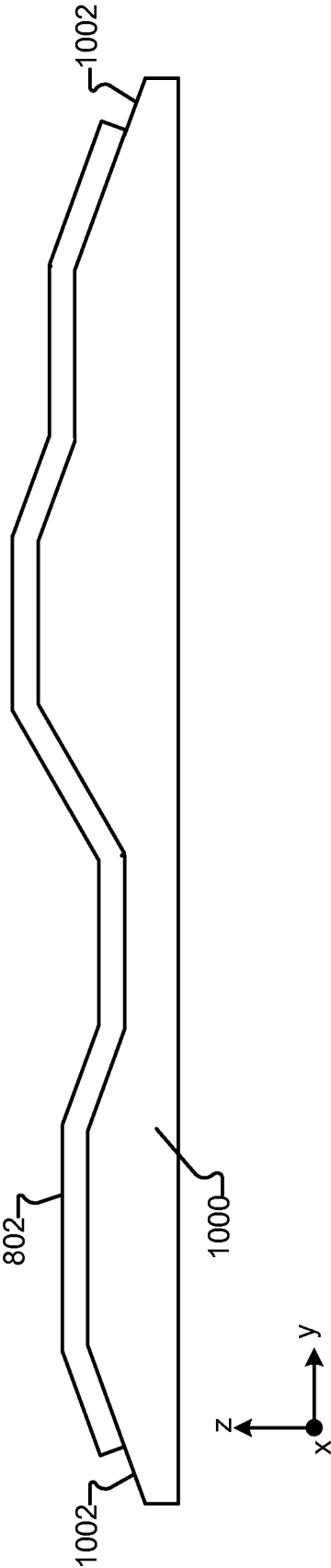


Figure 10



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	SL-391
		Application Number	
Title of Invention	Panel For Enhancing Thermal Conduction In An Electronic Assembly		
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.)
--

Inventor Information:

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Robert	H.	Smith			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Salt Lake City	State/Province	UT	Country of Residence ⁱ	US	
Mailing Address of Inventor:						
Address 1		PO Box 16850				
Address 2						
City	Salt Lake City	State/Province	UT			
Postal Code	84116-0850	Country ⁱ	US			
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	76279		
Email Address	kburraston@kmclaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	Panel For Enhancing Thermal Conduction In An Electronic Assembly		
Attorney Docket Number	SL-391	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)	6	Suggested Figure for Publication (if any)	1B

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SL-391
		Application Number	
Title of Invention	Panel For Enhancing Thermal Conduction In An Electronic Assembly		

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). Either enter 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.											
<table border="1"> <tr> <td>Please Select One:</td> <td>☒ Customer Number</td> <td>☐ US Patent Practitioner</td> <td>☐ Limited Recognition (37 CFR 11.9)</td> </tr> <tr> <td>Customer Number</td> <td colspan="3">76279</td> </tr> </table>				Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)	Customer Number	76279		
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)								
Customer Number	76279										

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.			
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.			Add

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	Filing Date (YYYY-MM-DD)	Priority Claimed
			☐ Yes ☒ No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SL-391
		Application Number	
Title of Invention	Panel For Enhancing Thermal Conduction In An Electronic Assembly		

Authorization to Permit Access:

☐	Authorization to Permit Access to the Instant Application by the Participating Offices
If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.	
Applicant 1	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.	
Remove	
☒ Assignee	☐ Legal Representative under 35 U.S.C. 117
☐ Person to whom the inventor is obligated to assign.	☐ Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:	
Name of the Deceased or Legally Incapacitated Inventor :	
If the Assignee is an Organization check here. ☒	
Organization Name	L-3 Communications Corp.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SL-391
		Application Number	
Title of Invention	Panel For Enhancing Thermal Conduction In An Electronic Assembly		

Mailing Address Information:			
Address 1		600 Third Avenue	
Address 2			
City		New York	State/Province NY
Country i	US	Postal Code	10016
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			Add

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications					
Signature	/N. Kenneth Burraston/			Date (YYYY-MM-DD)	2013-01-11
First Name	N. Kenneth	Last Name	Burraston	Registration Number	39923
Additional Signature may be generated within this form by selecting the Add button.					Add

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.

Modified Form PTO/SB/08A

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)	<i>Complete If Known</i>	
	Application Number	13/739,995
	First Named Inventor	Smith
	Filing Date	January 11, 2013
	Group Art Unit	Not yet assigned
	Examiner Name	Not yet assigned
No. of Refs.: 3	Attorney Docket No.	SL-391

U.S. PUBLISHED PATENT DOCUMENTS						
Examiner Initials [*]	Cite No. ¹	U.S. Patent Document Number Kind Code ²		Name of Patentee or Applicant	Publ./Issue Date	Copy Enclosed
	1.	7784585		Greenwood	8/31/2010	No ***
	2.	2010/0321892		Vander Ploeg et al.	12/23/2010	No ***

OTHER PRIOR ART – NONPATENT LITERATURE DOCUMENTS				
Examiner Initials *	Cite No. ¹	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 ²	Copy Enclosed
	3.	ITT Wire Rope Isolators (printed 9/4/2012), 2 pages		Yes

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

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

¹Unique citation designation number. ²See attached Kinds of U.S. Patent Documents. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

** Reference cited in parent application US Serial No. _____, CFR § 1.98(d)

*** Pre-OG Notice By Deputy Commissioner Stephen G. Kunin dated July 11, 2003 waiving the requirement to file copies of US patent publications in applications filed after June 30, 2003.

& Notice dated October 19, 2004 by Deputy Commissioner for Patent Examination Policy waiving requirement to file copies of pending US patent applications if the applications are stored in the USPTO's IFW system.

Commonly owned US patent or application whose subject matter may be related to the subject matter of the instance patent application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	13/739,995	Conf. No.:	5387
Applicant	:	Smith		
Filed	:	January 11, 2013		
TC/A.U.	:	Not yet assigned		
Examiner	:	Not yet assigned		

Docket No. : SL-391

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

**GENERAL AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT AND
GENERAL PETITION FOR EXTENSION OF TIME**

To Whom It May Concern:

Throughout prosecution of the above-identified patent application, and pursuant to 37 C.F.R. § 1.25(b), where no check is received by the Commissioner, Applicants authorize and request the Commissioner to charge all fees due at any time during the pendency of the above-identified application (or to credit any overpayment) to Deposit Account No. 50-0843, account name Kirton & McConkie (Order No. 15937-0094).

In addition, throughout prosecution of the above-referenced patent application, and pursuant to 37 C.F.R. § 1.136(a)(3), Applicants authorize and request the Commissioner to treat any correspondence requiring a petition for extension of time as containing a request for the required extension of time, and the Commissioner is authorized to charge payment of the requisite petition fees (or credit any overpayment) to Deposit Account No. 500843, account name Kirton & McConkie (Order No. 15937-0094).

Respectfully submitted,

Date: January 11, 2013

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton & McConkie
P.O. Box 45120
Salt Lake City, Utah 84111-1004
Telephone: (801) 323-5934
Fax: (801) 321-4893

Electronic Acknowledgement Receipt

EFS ID:	14683882
Application Number:	13739995
International Application Number:	
Confirmation Number:	5387
Title of Invention:	Panel For Enhancing Thermal Conduction In An Electronic Assembly
First Named Inventor/Applicant Name:	Robert H. Smith
Customer Number:	76279
Filer:	N. Kenneth Burraston
Filer Authorized By:	
Attorney Docket Number:	SL-391
Receipt Date:	11-JAN-2013
Filing Date:	
Time Stamp:	19:51:59
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		SL391IDS.pdf	33747 a6a10f561157c9ded1714f7c7eec08f09a1993a1	yes	3

	Multipart Description/PDF files in .zip description								
	Document Description		Start	End					
	Transmittal Letter		1	2					
	Information Disclosure Statement (IDS) Form (SB08)		3	3					
Warnings:									
Information:									
2	Authorization for Extension of Time all replies	P391GenAuth.pdf	15797	no	1				
			69c9cc8bc881a493ea2f79dcdd2b76435326418						
Warnings:									
Information:									
3	Authorization for Extension of Time all replies	SL391PA.pdf	113880	no	2				
			45ad90b1f3a4187fc6980b3d18688e1f296da75						
Warnings:									
Information:									
Total Files Size (in bytes):			163424						
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.									

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 13/739,995 Conf. No.: 5387
Applicant : Smith
Filed : January 11, 2013
TC/A.U. : Not yet assigned
Examiner : Not yet assigned

Docket No. : SL-391

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

INFORMATION DISCLOSURE STATEMENT

To Whom It May Concern:

Listed on an attached Form PTO/SB/08A is information known to applicant(s). Applicants ask that the attached Form PTO/SB/08A be initialed and returned in accordance with MPEP §609. This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, material to patentability as defined in §1.56.

- ☒ This statement qualifies under 37 C.F.R. §1.97, subsection (b) because (check all that apply):
- ☒ It is being filed within 3 months of the application filing date (other than the filing date of a continued prosecution application under §1.53(d)); or
 - ☐ It is being filed within 3 months of entry of a national stage; or
 - ☐ It is being filed before the mail date of the first Office Action on the merits; or
 - ☐ It is being filed before the mail date of the first Office Action after the filing of a request for continued examination under §1.114.
- ☐ 37 C.F.R. §1.97(c). If this statement is being filed three months after the filing date of a national application or entry of the national stage in an international application and the mailing date of a first Office action on the merits but before the mailing date of the earlier of a final office action, a notice of allowance, or an action that otherwise closes prosecution in the application, then:
- ☐ a statement as specified in §1.97(e) is provided below; **or**
 - ☐ a fee of \$180.00 as set forth in §1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.
- ☐ 37 C.F.R. §1.97(d). If this statement is being filed after the mailing date of the earlier of a final office action under §1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application, but before payment of the issue fee, then:
- a statement as specified in §1.97(e) is provided below; **and**
 - a fee of \$180.00 as set forth in §1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement.

Fee:

- ☒ No fee is due.
- ☐ Payment is provided by credit card.

Regardless of the payment indicated above, Applicants authorize the Director to charge any fee required for acceptance of this Paper to Deposit Account 50-0843 (order no. 15937-0094).

Respectfully submitted,

Date: January 11, 2013

By /N. Kenneth Burraston/
N. Kenneth Burraston
Reg. No. 39,923

Kirton & McConkie
P.O. Box 45120
Salt Lake City, Utah 84145-0120
Telephone: (801) 426-2106
Fax: (801) 321-4893