

AO 120 (Rev. 08/10)

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

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

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

DOCKET NO. 22cv1852(GRB)(ARL)	DATE FILED 4/1/2022	U.S. DISTRICT COURT Eastern District of New York
PLAINTIFF Slingshot Printing LLC		DEFENDANT Canon U.S.A., Inc. and Canon Solutions America, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,484,823	2/3/2009	Holder: Slingshot Printing LLC
2 7,594,708	9/29/2009	Holder: Slingshot Printing LLC
3 7,290,864	11/6/2007	Holder: Slingshot Printing LLC
4		(See Attached Complaint and Exhibits)
5		

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1			
2			
3			
4			
5			

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

DECISION/JUDGEMENT

CLERK Brenna B. Mahoney	(BY) DEPUTY CLERK Laura Jakubowski	DATE 4/4/2022
----------------------------	---------------------------------------	------------------

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

AO 120 (Rev. 08/10)

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

DOCKET NO. 6:20-cv-00048	DATE FILED 1/23/2020	U.S. DISTRICT COURT Western District of Texas - Waco Division
PLAINTIFF Slingshot Printing LLC		DEFENDANT HP Inc
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,484,823	Feb. 3, 2009	Slingshot Printing LLC
2 7,594,708	Sept. 29, 2009	Slingshot Printing LLC
3		
4		
5		

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

DATE INCLUDED	INCLUDED BY			
	Amendment	Answer	Cross Bill	Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK		
1				
2				
3				
4				
5				

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

See attached

CLERK <i>Jeannette J. Clack</i>	(BY) DEPUTY CLERK <i>CDiaz</i>	DATE <i>2/19/20</i>
------------------------------------	-----------------------------------	------------------------

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

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

SLINGSHOT PRINTING LLC,

Plaintiff.

v.

HP INC.,

Defendant.

Civil Action No. 6:20-cv-00048-ADA

ORDER TRANSFERRING CASE TO AUSTIN DIVISION

The Court, having reviewed and considered the Joint Stipulation to Transfer Venue to the Austin Division, does hereby ORDER that the above-captioned action be TRANSFERRED to the Austin Division but remain on the docket of United States District Judge Alan D Albright.

SIGNED this 19th day of February, 2020.



HONORABLE ALAN D ALBRIGHT
UNITED STATES DISTRICT COURT JUDGE

AO 120 (Rev. 08/10)

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

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

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

DOCKET NO. 1:20-CV-189-ADA	DATE FILED 2/19/2020	U.S. DISTRICT COURT Western District of Texas, Austin Division
PLAINTIFF Slingshot Printing LLC		DEFENDANT HP Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,484,823		Slingshot Printing LLC
2 7,594,708		Slingshot Printing LLC
3		
4		
5		

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☒ Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK
1	
2	
3	
4	
5	

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

DECISION/JUDGEMENT ORDER OF DISMISSAL WITH PREJUDICE signed on 3/24/2021

CLERK Jeannette J. Clack	(BY) DEPUTY CLERK <i>Christina Cordero</i>	DATE 4/7/2021
------------------------------------	---	------------------

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

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SLINGSHOT PRINTING LLC,

Plaintiff,

v.

HP INC.,

Defendant.

§
§
§
§
§
§
§
§
§
§

CIVIL ACTION NO. 1:20-CV-189-ADA

ORDER OF DISMISSAL WITH PREJUDICE

The Court is of the opinion that the Stipulated Dismissal with Prejudice agreed to by Slingshot Printing LLC ("Slingshot") and HP Inc. ("HP") should be GRANTED.

IT IS THEREFORE ORDERED that the above-entitled cause and all claims made by Slingshot against HP therein are hereby DISMISSED WITH PREJUDICE to the re-filing of same. All costs and expenses relating to this litigation (including attorney and expert fees and expenses) shall be borne solely by the party incurring the same.

IT IS FURTHER ORDERED that this Court shall retain jurisdiction over this action and the parties for purposes of enforcing the terms of the Settlement, Release and License Agreement entered into by and between the parties.

This is a final judgment.

SIGNED this 24th day of March, 2021


HONORABLE ALAN D ALBRIGHT
UNITED STATES DISTRICT JUDGE

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

DOCKET NO. 6:20-cv-00048	DATE FILED 1/23/2020	U.S. DISTRICT COURT Western District of Texas - Waco Division
PLAINTIFF Slingshot Printing LLC		DEFENDANT HP Inc
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,484,823	Feb. 3, 2009	Slingshot Printing LLC
2 7,594,708	Sept. 29, 2009	Slingshot Printing LLC
3		
4		
5		

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

DATE INCLUDED	INCLUDED BY			
	Amendment	Answer	Cross Bill	Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK		
1				
2				
3				
4				
5				

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

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

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



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/323,809	12/30/2005	Lucas David Barkley	35968/981

1912
AMSTER, ROTHSTEIN & EBENSTEIN LLP
90 PARK AVENUE
NEW YORK, NY 10016

CONFIRMATION NO. 1421
POWER OF ATTORNEY NOTICE



OC000000118777330

Date Mailed: 07/29/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/25/2020.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/nrhayden/



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
11/323,809	12/30/2005	Lucas David Barkley	

133676
Goldberg Segalla LLP
711 3rd Avenue, Suite 1900
New York, NY 10017

CONFIRMATION NO. 1421
POA ACCEPTANCE LETTER



Date Mailed: 07/29/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/25/2020.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/nrhayden/

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

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Patent Number	see attached Exhibit A
	Issue Date	see attached Exhibit A
	First Named Inventor	see attached Exhibit A
	Title	see attached Exhibit A
	Attorney Docket No.	

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

133676

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☒ Firm or Individual Name

Goldberg Segalla LLP

Address

711 3rd Avenue, Suite 1900

City

New York

State

New York

Zip

10017

Country

USA

Telephone

314-446-3359

Email

ipdocket@goldbergsegalla.com

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on see attached Exhibit A

SIGNATURE of Applicant or Patent Owner

Signature

Keith Machen

Date

July 14, 2020

Name

Keith Machen

Telephone

239-776-1596

Title and Company

President Slingshot Printing LLC

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☒ A total of 2 forms are submitted.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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.

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 No.	Application No	First Named Inventor	Title	3.73 date	Issue Date
US-7784917	11866585	Byron Vencent Bell	Process For Making A Micro-Fluid Ejection Head Structure	July 25, 2020	August 31, 2010
US-7673973	11752551	John G. Edelen	Micro-Fluid Ejecting Device Having Embedded Memory Devices	July 25, 2020	March 9, 2010
US-7594708	11323809	Lucas David Barkley	Methods And Apparatuses For Sensing Temperature Of Multi-Via Heater Chips	July 25, 2020	September 29, 2009
US-7364268	11239799	Brian C. Hart	Nozzle Members, Compositions And Methods For Micro-Fluid Ejection Heads	July 25, 2020	April 29, 2008
US-8844137	13925424	Xiaorong Cai	Ejection Devices For Inkjet Printers And Method For Fabricating Ejection Devices	July 25, 2020	Sep 30, 2014
US-8313168	12775530	Sam Norasak	Wind Baffles For Micro-Fluid Ejection Devices	July 25, 2020	Nov 20, 2012
US-8328330	12131953	Richard Louis Goin	Nozzle Plate For Improved Post-Bonding Symmetry	July 25, 2020	Dec 11, 2012
US-7954929	11858611	John Glenn Edelen	Micro-Fluid Ejecting Device Having Embedded Memory In Communication With An External Controller	July 25, 2020	Jun 07, 2011
US-7766455	11556246	David Christopher Graham	Flexible Adhesive Materials For Micro-Fluid Ejection Heads And Methods Relating Thereto	July 25, 2020	Aug 03, 2010
US-7413289	11317575	Robert W. Cornell	Low Energy, Long Life Micro-Fluid Ejection Device	July 25, 2020	Aug 19, 2008
US-7559629	11238559	David G. King	Methods And Apparatuses For Implementing Multi-Via Heater Chips	July 25, 2020	Jul 14, 2009
US-8678557	13187755	Jiandong Fang	Substrate Structure For Ejection Chip And Method For Fabricating Substrate Structure	July 25, 2020	Mar 25, 2014
US-8172369	12346189	Steven Wayne Bergstedt	Inkjet Printhead Substrate With Distributed Heater Elements	July 25, 2020	May 08, 2012
US-7841712	12006190	Robert Muyskens	Automatic Printhead And Tank Install Positioning	July 25, 2020	Nov 30, 2010
US-7815289	11848246	David Laurier Bernard	Micro-Fluid Ejection Heads And Methods For Bonding Substrates To Supports	July 25, 2020	Oct 19, 2010
US-7690760	11466674	Colin G. Maher	High Resolution Ink Jet Printhead	July 25, 2020	Apr 06, 2010
US-7445323	11314296	James Daniel Anderson	Ink Cartridge Venting	July 25, 2020	Nov 04, 2008
US-7484823	11208815	Lucas David Barkley	Methods And Apparatuses For Regulating The Temperature Of Multi-Via Heater Chips	July 25, 2020	Feb 03, 2009
US-8657411	13160568	Frank E. Anderson	Fluid Ejection Device And Method For Fabricating Fluid Ejection Device	July 25, 2020	Feb 25, 2014
US-8235518	12337488	Robert Lee Cornell	Uv-Curable Coatings And Methods For Applying Uv-Curable Coatings Using Thermal Micro-Fluid Ejection Heads	July 25, 2020	Aug 07, 2012
US-7819498	11959593	Jason Todd McCreynolds	Methods And Systems Using Printhead Tank Memory To Determine Printhead Tank Configuration	July 25, 2020	Oct 26, 2010
US-7850284	11779085	David L. Bernard	Method For Dry Etching Fluid Feed Slots In A Silicon Substrate	July 25, 2020	Dec 14, 2010
US-7452058	11427453	Robert Wilson Cornell	Substantially Planar Ejection Actuators And Methods Relating Thereto	July 25, 2020	Nov 18, 2008
US-7559630	11277161	Byron Vencent Bell	Substantially Planar Fluid Ejection Actuators And Methods Related Thereto	July 25, 2020	Jul 14, 2009
US-7635174	11208682	Steven W. Bergstedt	Heater Chip Test Circuit And Methods For Using The Same	July 25, 2020	Dec 22, 2009
US-8491107	12948122	Neal D. McFarland	Fluid Container Having Mixing Chambers For Micro-Fluid Applications	July 25, 2020	Jul 23, 2013
US-7918015	12336767	Byron V. Bell	Micro-Fluid Ejection Device Having High Resistance Heater Film	July 25, 2020	Apr 05, 2011
US-7597419	11948346	Marc Alan Herwald	Directionally Dependent Carrier Isolator For An Imaging Apparatus	July 25, 2020	Oct 06, 2009
US-7850286	11767568	John Glenn Edelen	Micro-Fluid Ejector Pattern For Improved Performance	July 25, 2020	Dec 14, 2010
US-7571979	11361731	Girish S. Patil	Thick Film Layers And Methods Relating Thereto	July 25, 2020	Aug 11, 2009
US-7244015	11269311	George Keith Parish	Inkjet Printhead Heater Chip With Asymmetric Ink Vias	July 25, 2020	Jul 17, 2007
US-7438397	11001433	James Daniel Anderson	Methods And Devices For Purging Gases From An Ink Reservoir	July 25, 2020	Oct 21, 2008
US-8113618	12909912	Jason Todd McCreynolds	Methods And Systems Using Printhead Tank Memory To Determine Printhead Tank Configuration	July 25, 2020	Feb 14, 2012
US-8882221	12195451	David Laurier Bernard	Modular Micro-Fluid Ejection Head Assembly	July 25, 2020	Nov 11, 2014
US-7938523	11762101	Charles Stanley Aldrich	Fluid Supply Tank Ventilation For A Micro-Fluid Ejection Head	July 25, 2020	May 10, 2011
US-7484823	11324167	Lucas David Barkley	Methods And Apparatuses For Regulating The Temperature Of Multi-Via Heater Chips	July 25, 2020	Feb 03, 2009
US-7290864	11241079	David G. King	Heater Chips With A Reduced Number Of Bondpads	July 25, 2020	Nov 06, 2007
US-7178904	10986338	Frank E. Anderson	Ultra-Low Energy Micro-Fluid Ejection Device	July 25, 2020	Feb 20, 2007
US-8826502	12786457	David Laurier Bernard	Micro-Fluid Ejection Heads And Methods For Bonding Substrates To Supports	July 25, 2020	Sep 09, 2014
US-7784918	12145606	Robert W. Cornell	Low Energy, Long Life Micro-Fluid Ejection Device	July 25, 2020	Aug 31, 2010

Electronic Acknowledgement Receipt	
EFS ID:	40104669
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	1912
Filer:	Lynn Ann Lehnert
Filer Authorized By:	
Attorney Docket Number:	35968/981
Receipt Date:	25-JUL-2020
Filing Date:	30-DEC-2005
Time Stamp:	13:21:16
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	Assignee showing of ownership per 37 CFR 3.73	7594708_3_73_Statement.pdf	178786 1bfd3ae9bbd4e8f3972bae997915c6560254cb0eb	no	3
Warnings:					

Information:					
2	Power of Attorney	Slingshot_POA.pdf	2555101	no	3
			df5cd9bfe8579edf0848b57b61bd4dca349ed9d9		
Warnings:					
Information:					
Total Files Size (in bytes):			2733887		
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.					

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Slingshot Printing, LLCApplication No./Patent No.: 7594708Filed/Issue Date: September 29, 2009Titled: Methods And Apparatuses For Sensing Temperature Of Multi-Via Heater ChipsSlingshot Printing, LLC, a corporation

(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 051430, Frame 0989, 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.

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.

/Lynn Lehnert/

July 25, 2020

Signature

Date

Lynn Lehnert

54678

Printed or Typed Name

Title or Registration Number

[Page 2 of 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 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.



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
11/323,809	12/30/2005	Lucas David Barkley	35968/981

1912
AMSTER, ROTHSTEIN & EBENSTEIN LLP
90 PARK AVENUE
NEW YORK, NY 10016

CONFIRMATION NO. 1421
IMPROPER CPOA LETTER



Date Mailed: 07/22/2020

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the power of attorney filed 07/19/2020. The power of attorney in this application is not accepted for the reason(s) listed below:

- The power of attorney is from an assignee and the statement required by 37 CFR 3.73(c) has not been received.

/byemane/

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

Goldberg Segalla LLP
711 3rd Avenue
Suite 1900
New York, NY 10017

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Patent Number	see attached Exhibit A
	Issue Date	see attached Exhibit A
	First Named Inventor	see attached Exhibit A
	Title	see attached Exhibit A
	Attorney Docket No.	

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

133676

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☒ Firm or Individual Name

Goldberg Segalla LLP

Address

711 3rd Avenue, Suite 1900

City

New York

State

New York

Zip

10017

Country

USA

Telephone

314-446-3359

Email

ipdocket@goldbergsegalla.com

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on see attached Exhibit A

SIGNATURE of Applicant or Patent Owner

Signature

Keith Machen

Date

July 14, 2020

Name

Keith Machen

Telephone

239-776-1596

Title and Company

President Slingshot Printing LLC

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☒ A total of 2 forms are submitted.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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.

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 Number	Issue Date	First Named Inventor	Title
US-5926195	Jul 20, 1999	Joseph E. Domhoff	Ink Jet Printhead Cartridge
US-6010208	Jan 04, 2000	James Harold Powers	Nozzle Array For Printhead
US-6027199	Feb 22, 2000	William Henry Reed	Ink Jet Cartridge System And Method Of Printing Using Plurality Of Same Color Inks With Different Intensities
US-6039439	Mar 21, 2000	Steven Robert Komplin	Ink Jet Heater Chip Module
US-6109719	Aug 29, 2000	Robert Wilson Cornell	Printhead Thermal Compensation Method And Apparatus
US-6137502	Oct 24, 2000	Frank Edward Anderson	Dual Droplet Size Printhead
US-6164762	Dec 26, 2000	Carl E. Sullivan	Heater Chip Module And Process For Making Same
US-6172692	Jan 09, 2001	Xuan-Chao Huang	Multilevel Ink Mixing Device And Method Using Diluted And Saturated Color Inks For Inkjet Printers
US-6213587	Apr 10, 2001	Charles S. Whitman	Ink Jet Printhead Having Improved Reliability
US-6217150	Apr 17, 2001	Scott Michael Heydinger	Method Of Printing With An Ink Jet Printer Using Multiple Carriage Speeds
US-6243115	Jun 05, 2001	Ronald Willard Baker	Pressurized Ink Supply And Delivery System For An Ink Jet Printer
US-6286924	Sep 11, 2001	Adam Jude Ahne	Apparatus And Method For Heating Ink Jet Printhead
US-6296350	Oct 02, 2001	Robert Wilson Cornell	Ink Jet Printer Having Driver Circuit For Generating Warming And Firing Pulses For Heating Elements
US-6299292	Oct 09, 2001	Mark Joseph Edwards	Driver Circuit With Low Side Data For Matrix Inkjet Printhead, And Method Therefor
US-6357863	Mar 19, 2002	Frank Edward Anderson	Linear Substrate Heater For Ink Jet Print Head Chip
US-6357870	Mar 19, 2002	Bradley Leonard Beach	Intermediate Transfer Medium Coating Solution And Method Of Ink Jet Printing Using Coating Solution
US-6361162	Mar 26, 2002	Michael Adam Penrod	Method And Apparatus For Fixing Ink To A Print Receiving Medium
US-6394593	May 28, 2002	Steven Robert Komplin	Vent System For Ink Jet Pen Having Internal Pressure Regulator
US-6398346	Jun 04, 2002	Frank Edward Anderson	Dual-Configurable Print Head Addressing
US-6412894	Jul 02, 2002	Benjamin Alan Askren	Ink Cartridge And Method For Determining Ink Volume In Said Ink Cartridge
US-6426801	Jul 30, 2002	William Henry Reed	Printer Apparatuses And Methods For Using The Same
US-6425655	Jul 30, 2002	Girish Shivaji Patil	Dual Curable Encapsulating Material
US-6431677	Aug 13, 2002	Frank Edward Anderson	Print Head Drive Scheme
US-6485124	Nov 26, 2002	Dave Golman King	Optical Alignment Method And Detector
US-6540334	Apr 01, 2003	Jim Michael Mrvos	Method For Making Ink Jet Printheads
US-6575563	Jun 10, 2003	Robert Wilson Cornell	Power/Volume Regime For Ink Jet Printers
US-6601934	Aug 05, 2003	Eric Todd Debusschere	Storage Of Total Ink Drop Fired Count In An Imaging Device
US-6629747	Oct 07, 2003	David G. King	Method For Determining Ink Drop Velocity Of Carrier-Mounted Printhead
US-6637866	Oct 28, 2003	Robert Wilson Cornell	Energy Efficient Heater Stack Using Dlc Island

Patent Number	Issue Date	First Named Inventor	Title
US-6665092	Dec 16, 2003	William Henry Reed	Printer Apparatuses And Methods For Using The Same
US-6666449	Dec 23, 2003	Stephen Francis Defosse	Star Wheel Surface Enhancement And Process Of Manufacture
US-6676246	Jan 13, 2004	Frank Edward Anderson	Heater Construction For Minimum Pulse Time
US-6704996	Mar 16, 2004	Jim Michael Mrvos	Method For Making Ink Jet Printheads
US-6709096	Mar 23, 2004	Bradley Leonard Beach	Method Of Printing And Layered Intermediate Used In Inkjet Printing
US-6712442	Mar 30, 2004	Peter Brown Pickett	Method Of Image Rasterization And Imaging An Address Space An Ink Jet Printers
US-6719405	Apr 13, 2004	James H. Powers	Inkjet Printhead Having Convex Wall Bubble Chamber
US-6739698	May 25, 2004	Michael James Benson	Off-Carrier Tubing Layout
US-6764163	Jul 20, 2004	Frank Edward Anderson	Heater Configuration For Tri-Color Heater Chip
US-6773088	Aug 10, 2004	Charles Stanley Aldrich	Double Lipped Printhead Maintenance Cap
US-6786575	Sep 07, 2004	Frank Edward Anderson	Ink Jet Heater Chip And Method Therefor
US-6796636	Sep 28, 2004	Kin-Ming Kwan	Two Shot Molded Inkjet Printhead Lid For Laser Welding
US-6805431	Oct 19, 2004	Frank Edward Anderson	Heater Chip With Doped Diamond-Like Carbon Layer And Overlying Cavitation Layer
US-6817707	Nov 16, 2004	John R. Fowler	Pressure Controlled Ink Jet Printhead Assembly
US-6834941	Dec 28, 2004	Byron Vencent Bell	Heater Chip Configuration For An Inkjet Printhead And Printer
US-6863381	Mar 08, 2005	George Keith Parish	Inkjet Printhead Heater Chip With Asymmetric Ink Vias
US-6890062	May 10, 2005	Byron Vencent Bell	Heater Chip Configuration For An Inkjet Printhead And Printer
US-6890065	May 10, 2005	Paul Timothy Spivey	Heater Chip For An Inkjet Printhead
US-6935795	Aug 30, 2005	Mark Walter Fagan	Method For Reducing The Effects Of Printhead Carrier Disturbance During Printing With An Imaging Apparatus
US-6951384	Oct 04, 2005	Frank Edward Anderson	Ink Jet Heater Chip And Method Therefor
US-6959979	Nov 01, 2005	Richard L. Goin	Multiple Drop-Volume Printhead Apparatus And Method
US-7014299	Mar 21, 2006	George Keith Parish	Inkjet Printhead Heater Chip With Asymmetric Ink Vias
US-7018012	Mar 28, 2006	J. Glenn Edelen	Microfluid Ejection Device Having Efficient Logic And Driver Circuitry
US-7041226	May 09, 2006	Karthik Vaideeswaran	Methods For Improving Flow Through Fluidic Channels
US-7077509	Jul 18, 2006	George Keith Parish	Inkjet Printhead Heater Chip With Asymmetric Ink Vias
US-7080896	Jul 25, 2006	Byron V. Bell	Micro-Fluid Ejection Device Having High Resistance Heater Film
US-7086713	Aug 08, 2006	Edward Lynn Triplett	Media Detack From An Intermediate Printing Member
US-7152951	Dec 26, 2006	Colin G. Maher	High Resolution Ink Jet Printhead
US-7159974	Jan 09, 2007	Trevor D. Gray	Semipermeable Membrane For An Ink Reservoir And Method Of Attaching The Same
US-7163272	Jan 16, 2007	George K. Parish	Inkjet Print Head
US-7178904	Feb 20, 2007	Frank E. Anderson	Ultra-Low Energy Micro-Fluid Ejection Device

Patent Number	Issue Date	First Named Inventor	Title
US-7195348	Mar 27, 2007	Jeffery J. Buchanan	Laser Welded Inkjet Printheads Having Non-Uniformly Thick Printhead Lids
US-7195341	Mar 27, 2007	David G. King	Power And Ground Buss Layout For Reduced Substrate Size
US-7207652	Apr 24, 2007	Bruce D. Gibson	Balanced Satellite Distributions
US-7222936	May 29, 2007	Frederick Charles Griesemer	Printhead Carrier Positioning Apparatus And Method
US-7244015	Jul 17, 2007	George Keith Parish	Inkjet Printhead Heater Chip With Asymmetric Ink Vias
US-7258434	Aug 21, 2007	Brian D. Smith	Inkjet Printheads Having Multiple Label Placement Positions For Air Diffusion Vents
US-7289243	Oct 30, 2007	Mark W. Fagan	Apparatus And Method For Data Compression Optimized By Print Head Architecture
US-7290864	Nov 06, 2007	David G. King	Heater Chips With A Reduced Number Of Bondpads
US-7311385	Dec 25, 2007	John G. Edelen	Micro-Fluid Ejecting Device Having Embedded Memory Device
US-7350888	Apr 01, 2008	Lucas D. Barkley	Composite Printhead Fire Signals
US-7364268	Apr 29, 2008	Brian C. Hart	Nozzle Members, Compositions And Methods For Micro-Fluid Ejection Heads
US-7364261	Apr 29, 2008	Marc Alan Herwald	Directionally Dependent Carrier Isolator For An Imaging Apparatus
US-7401875	Jul 22, 2008	Stuart M. Jacobsen	Inkjet Printhead Incorporating A Memory Array
US-7410246	Aug 12, 2008	Byron Vencent Bell	Heater Chip Configuration For An Inkjet Printhead And Printer
US-7413289	Aug 19, 2008	Robert W. Cornell	Low Energy, Long Life Micro-Fluid Ejection Device
US-7438397	Oct 21, 2008	James Daniel Anderson	Methods And Devices For Purging Gases From An Ink Reservoir
US-7445323	Nov 04, 2008	James Daniel Anderson	Ink Cartridge Venting
US-7452058	Nov 18, 2008	Robert Wilson Cornell	Substantially Planar Ejection Actuators And Methods Relating Thereto
US-7479203	Jan 20, 2009	David L. Bernard	Lamination Of Dry Film To Micro-Fluid Ejection Head Substrates
US-7484823	Feb 03, 2009	Lucas David Barkley	Methods And Apparatuses For Regulating The Temperature Of Multi-Via Heater Chips
US-7559629	Jul 14, 2009	David G. King	Methods And Apparatuses For Implementing Multi-Via Heater Chips
US-7559630	Jul 14, 2009	Byron Vencent Bell	Substantially Planar Fluid Ejection Actuators And Methods Related Thereto
US-7571979	Aug 11, 2009	Girish S. Patil	Thick Film Layers And Methods Relating Thereto
US-7594708	Sep 29, 2009	Lucas David Barkley	Methods And Apparatuses For Sensing Temperature Of Multi-Via Heater Chips
US-7597419	Oct 06, 2009	Marc Alan Herwald	Directionally Dependent Carrier Isolator For An Imaging Apparatus
US-7635174	Dec 22, 2009	Steven W. Bergstedt	Heater Chip Test Circuit And Methods For Using The Same
US-7673973	Mar 09, 2010	John G. Edelen	Micro-Fluid Ejecting Device Having Embedded Memory Devices
US-7690760	Apr 06, 2010	Colin G. Maher	High Resolution Ink Jet Printhead

Patent Number	Issue Date	First Named Inventor	Title
US-7766455	Aug 03, 2010	David Christopher Graham	Flexible Adhesive Materials For Micro-Fluid Ejection Heads And Methods Relating Thereto
US-7784918	Aug 31, 2010	Robert W. Cornell	Low Energy, Long Life Micro-Fluid Ejection Device
US-7784917	Aug 31, 2010	Byron Vincent Bell	Process For Making A Micro-Fluid Ejection Head Structure
US-7815289	Oct 19, 2010	David Laurier Bernard	Micro-Fluid Ejection Heads And Methods For Bonding Substrates To Supports
US-7819498	Oct 26, 2010	Jason Todd Mcreynolds	Methods And Systems Using Printhead Tank Memory To Determine Printhead Tank Configuration
US-7841712	Nov 30, 2010	Robert Muyskens	Automatic Printhead And Tank Instant Positioning
US-7850286	Dec 14, 2010	John Glenn Edelen	Micro-Fluid Ejector Pattern For Improved Performance
US-7850284	Dec 14, 2010	David L. Bernard	Method For Dry Etching Fluid Feed Slots In A Silicon Substrate
US-7918015	Apr 05, 2011	Byron V. Bell	Micro-Fluid Ejection Device Having High Resistance Heater Film
US-7938523	May 10, 2011	Charles Stanley Aldrich	Fluid Supply Tank Ventilation For A Micro-Fluid Ejection Head
US-7954929	Jun 07, 2011	John Glenn Edelen	Micro-Fluid Ejecting Device Having Embedded Memory In Communication With An External Controller
US-8113618	Feb 14, 2012	Jason Todd Mcreynolds	Methods And Systems Using Printhead Tank Memory To Determine Printhead Tank Configuration
US-8172369	May 08, 2012	Steven Wayne Bergstedt	Inkjet Printhead Substrate With Distributed Heater Elements
US-8235518	Aug 07, 2012	Robert Lee Cornell	Uv-Curable Coatings And Methods For Applying Uv-Curable Coatings Using Thermal Micro-Fluid Ejection Heads
US-8313168	Nov 20, 2012	Sam Norasak	Wind Baffles For Micro-Fluid Ejection Devices
US-8328330	Dec 11, 2012	Richard Louis Goin	Nozzle Plate For Improved Post-Bonding Symmetry
US-8491107	Jul 23, 2013	Neal D. Mcfarland	Fluid Container Having Mixing Chambers For Micro-Fluid Applications
US-8657411	Feb 25, 2014	Frank E. Anderson	Fluid Ejection Device And Method For Fabricating Fluid Ejection Device
US-8678557	Mar 25, 2014	Jiandong Fang	Substrate Structure For Ejection Chip And Method For Fabricating Substrate Structure
US-8826502	Sep 09, 2014	David Laurier Bernard	Micro-Fluid Ejection Heads And Methods For Bonding Substrates To Supports
US-8844137	Sep 30, 2014	Xiaorong Cai	Ejection Devices For Inkjet Printers And Method For Fabricating Ejection Devices
US-8882221	Nov 11, 2014	David Laurier Bernard	Modular Micro-Fluid Ejection Head Assembly

Electronic Acknowledgement Receipt	
EFS ID:	40041201
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	1912
Filer:	Lynn Ann Lehnert
Filer Authorized By:	
Attorney Docket Number:	35968/981
Receipt Date:	19-JUL-2020
Filing Date:	30-DEC-2005
Time Stamp:	11:34:49
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	POA_Slingshot.pdf	5022502	no	6
			32e252eb2c63fe9d621d8eb8405b5102590 bc2ee		
Warnings:					

Information:	
Total Files Size (in bytes):	5022502
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.	

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

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

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

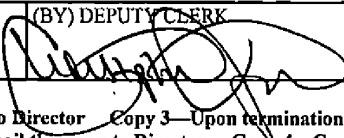
DOCKET NO. 1:20-CV-189-ADA	DATE FILED 2/19/2020	U.S. DISTRICT COURT Western District of Texas, Austin Division
PLAINTIFF Slingshot Printing LLC		DEFENDANT HP Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,484,823		Slingshot Printing LLC
2 7,594,708		Slingshot Printing LLC
3		
4		
5		

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

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

DECISION/JUDGEMENT

CLERK Jeannette J. Clack	(BY) DEPUTY CLERK 	DATE February 19, 2020
------------------------------------	---	----------------------------------

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

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

SLINGSHOT PRINTING LLC,

Plaintiff.

v.

HP INC.,

Defendant.

Civil Action No. 6:20-cv-00048-ADA

ORDER TRANSFERRING CASE TO AUSTIN DIVISION

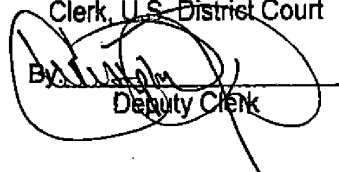
The Court, having reviewed and considered the Joint Stipulation to Transfer Venue to the Austin Division, does hereby ORDER that the above-captioned action be TRANSFERRED to the Austin Division but remain on the docket of United States District Judge Alan D Albright.

SIGNED this 19th day of February, 2020.



HONORABLE ALAN D ALBRIGHT
UNITED STATES DISTRICT COURT JUDGE

A true copy of the original, I certify.
Clerk, U.S. District Court



By _____
Deputy Clerk



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
11/323,809	12/30/2005	Lucas David Barkley	35968/981

1912
AMSTER, ROTHSTEIN & EBENSTEIN LLP
90 PARK AVENUE
NEW YORK, NY 10016

CONFIRMATION NO. 1421
POA ACCEPTANCE LETTER



Date Mailed: 07/17/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/11/2014.

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.

/zmoguss/

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.

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Patent Number	7594708
	Issue Date	09/29/2009
	First Named Inventor	Lucas David Barkley
	Title	METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS
	Attorney Docket Number	35968/981

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 01912

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

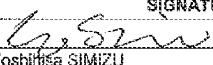
I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Inventor or Patent Owner

Signature		Date	June 9, 2013
Name	Yoshitaka SHIMIZU	Telephone	81-72-870-4353
Title and Company Senior General Manager of Intellectual Property Div., Funai Electric Co., Ltd.			

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ *Total of 1 forms are submitted.

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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: FUNAI ELECTRIC CO., LTD.

Application No./Patent No.: 7594708

Filed/Issue Date: 09/29/2009

Titled: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

FUNAI ELECTRIC CO., LTD.

, a Corporation

(Name of Assignee)

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

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- 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 _____, Frame _____, or for which a copy therefore is attached.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Barkley et al. To: LEXMARK INTERNATIONAL, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 017386, Frame 0534, or for which a copy thereof is attached.

2. From: LEXMARK INTERNATIONAL, INC. To: FUNAI ELECTRIC CO., LTD

The document was recorded in the United States Patent and Trademark Office at
Reel 030416, Frame 0001, or for which a copy thereof is attached.

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.

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

- ☒ As required by 37 CFR 3.73(b)(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.

/Benjamin M. Halpern/

3/19/2014 (981)

Signature

Date

Benjamin M. Halpern

46494

Printed or Typed Name

Title

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.

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:	19561743
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Benjamin M. Halpern/Rosita Butchey
Filer Authorized By:	Benjamin M. Halpern
Attorney Docket Number:	2005-0463.02
Receipt Date:	11-JUL-2014
Filing Date:	30-DEC-2005
Time Stamp:	18:08:47
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	1poa.pdf	95797	no	1
			9c951d081b8a99caa806dcf3ac5b8d2b8aa3992f		
Warnings:					
Information:					

2	Assignee showing of ownership per 37 CFR 3.73.	2statement.pdf	427366 5272cc3ba7498ab0a63713fbff24bd0f47e2be4	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				523163	
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.					



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.
11/323,809	09/29/2009	7594708	2005-0463.02	1421

21972 7590 09/09/2009
LEXMARK INTERNATIONAL, INC.
INTELLECTUAL PROPERTY LAW DEPARTMENT
740 WEST NEW CIRCLE ROAD
BLDG. 082-1
LEXINGTON, KY 40550-0999

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 154 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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

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

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

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

Lucas David Barkley, Lexington, KY;
Bruce David Gibson, Lexington, KY;
Eric Spencer Hall, Lexington, KY;
David G. King, Shelbyville, KY;
George K. Parish, Winchester, KY;

PART B - FEE(S) TRANSMITTAL

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

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

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

21972 7590 05/21/2009

LEXMARK INTERNATIONAL, INC.
 INTELLECTUAL PROPERTY LAW DEPARTMENT
 740 WEST NEW CIRCLE ROAD
 BLDG. 082-1
 LEXINGTON, KY 40550-0999

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421

TITLE OF INVENTION: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/21/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, LAM S	2853	347-017000

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 **Sutherland, Asbill & Brennan**

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

Lexmark International, Inc.

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Lexington, Kentucky

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

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number **12-1213** (enclose an extra copy of this form).

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

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

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

Authorized Signature

Neill R. Kahle, Jr.

Date

August 13, 2009

Typed or printed name

Neill R. Kahle, Jr.

Registration No. **50,383**

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

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

Electronic Acknowledgement Receipt	
EFS ID:	5926353
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Neill R. Kahle./Lori Woods
Filer Authorized By:	Neill R. Kahle.
Attorney Docket Number:	2005-0463.02
Receipt Date:	20-AUG-2009
Filing Date:	30-DEC-2005
Time Stamp:	16:27:34
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	Issue Fee Payment (PTO-85B)	2005-0463-02IssueFee.pdf	273358 0be8ab6851794b87dac074a276075563e b05bd8	no	1
Warnings:					
Information:					

Total Files Size (in bytes):	273358
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.	

PART B - FEE(S) TRANSMITTAL

Complete and file 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

AUG 20 2009

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. (a) 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; (b) directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee.

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

21972 7590 05/21/2009

LEXMARK INTERNATIONAL, INC.
 INTELLECTUAL PROPERTY LAW DEPARTMENT
 740 WEST NEW CIRCLE ROAD
 BLDG. 082-1
 LEXINGTON, KY 40550-0999

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

Certificate of Mailing or Transmission

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

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

08/21/2009 SSANDARI 00000003 121213 11323809

01 FEE: 1501 1510.00 DA	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
02 FEE: 1504 300.00 DA	11/323.809	12/30/2005	Lucas David Barkley	2005-0463.02
				1421

TITLE OF INVENTION: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/21/2009
EXAMINER	ART UNIT	CLASS-SUBCLASS				
NGUYEN, LAM S	2853	347-017000				

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 Sutherland, Asbill & Brennan

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

Lexmark International, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Lexington, Kentucky

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

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 12-1213 (enclose an extra copy of this form).

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

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

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

Authorized Signature

Neill R. Kahle, Jr.

Date

August 13, 2009

Typed or printed name

Neill R. Kahle, Jr.

Registration No.

50,383

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

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

RECEIVED 07/14/2008

PTO/SB/08a (05-07)

Approved for use through 11/30/2007. OMB 0851-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas David Barkley, et al.	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

U.S. PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
/L.N./	1	6357863		2002-03-19	Anderson, et al.		
/L.N./	2	6601941		2003-08-05	Jones, et al.		
/L.N./	3	6382773		2002-05-05	Chang, et al.		
TS 6/17/09 /L.N./	4	6641242		11/2003 ~~2003-08-05~~	Canti, et al.		
/L.N./	5	6644774		2003-11-11	Burger, et al.		
/L.N./	6	6764163		2004-07-20	Anderson, et al.		
/L.N./	7	6808243		2004-10-26	Markham, et al.		
/L.N./	8	6871929		2005-03-29	Crivelli, et al.		

EFS Web 2.0.2

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas Barkley
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

/L.N./	9	6474782		2002-11-05	Furukawa	
/L.N./	10	6488363		12/2002 ~~2005-05-10~~	Torgerson, et al.	
/L.N./	11	6499834		2002-12-31	Takizawa	
/L.N./	12	6601941		2003-08-05	Jones, et al.	
/L.N./	13	6641242		2003-11-04	Canti, et al.	
TS 6/17/09	/L.N./	14	6644774	2003-11-11	Burger, et al.	
/L.N./	15	6663227		2003-12-16	Yamamoto, et al.	
/L.N./	16	6,808,243 ~~6808043~~		2004-10-26	Markham, et al.	
/L.N./	17	6871929		2005-03-29	Crivelli, et al.	
/L.N./	18	6883904		2008-02-01	Jeanmarie, et al.	
/L.N./	19	6890064		2005-05-10	Torgerson, et al.	

EFS Web 2.0.2



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

21972 7590 05/21/2009

LEXMARK INTERNATIONAL, INC.
INTELLECTUAL PROPERTY LAW DEPARTMENT
740 WEST NEW CIRCLE ROAD
BLDG. 082-1
LEXINGTON, KY 40550-0999

EXAMINER

NGUYEN, LAM S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 05/21/2009

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

11/323,809

12/30/2005

Lucas David Barkley

2005-0463.02

1421

TITLE OF INVENTION: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/21/2009

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

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

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

21972 7590 05/21/2009

LEXMARK INTERNATIONAL, INC.
 INTELLECTUAL PROPERTY LAW DEPARTMENT
 740 WEST NEW CIRCLE ROAD
 BLDG. 082-1
 LEXINGTON, KY 40550-0999

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

Certificate of Mailing or Transmission

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

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

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

11/323,809 12/30/2005 Lucas David Barkley 2005-0463.02 1421

TITLE OF INVENTION: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/21/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, LAM S	2853	347-017000

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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

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

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

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

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

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



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421
21972	7590	05/21/2009	EXAMINER	
LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			NGUYEN, LAM S	
			ART UNIT	PAPER NUMBER
			2853	
			DATE MAILED: 05/21/2009	

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

The Patent Term Adjustment to date is 154 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 154 day(s).

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

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

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

Notice of Allowability	Application No.		Applicant(s)	
	11/323,809		BARKLEY ET AL.	
	Examiner		Art Unit	
	LAM S. NGUYEN		2853	

-- 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 Amendment dated 03/03/2009.

2. ☒ The allowed claim(s) is/are 20-34.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

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

/LAM S NGUYEN/ Examiner, Art Unit 2853	
---	--

EXAMINER'S AMENDMENT

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

The amendment in the claims is made to correct a typo error.

In the claims:

Claim 28: On lines 8-9, replaced "array" in "two heater array" by --arrays--.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

Application/Control Number: 11/323,809

Page 3

Art Unit: 2853

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.

/LAM S NGUYEN/

Examiner, Art Unit 2853

Search Notes 		Application/Control No. 11/323,809 Examiner LAM S. NGUYEN		Applicant(s)/Patent under Reexamination BARKLEY ET AL. Art Unit 2853	
--	--	--	--	---	--

SEARCHED			
Class	Subclass	Date	Examiner
345	5,9,12,14,17, 19	5/17/2009	LN
347	40, 42	5/17/2009	LN

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
347	17, 12, 5	5/18/2009	LN
PGPUB CLASS & TEXT SEARCH IN THE SEARCH NOTE PRINTOUT			

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST (PBPUG, USPAT, EPO, JPO, DERWENT, IBM) SEARCH NOTE PRINTOUT	5/18/2009	LN



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. 1421

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
11/323,809	12/30/2005	219	2853	2005-0463.02		
RULE						
APPLICANTS Lucas David Barkley, Lexington, KY; Bruce David Gibson, Lexington, KY; Eric Spencer Hall, Lexington, KY; David G. King, Shelbyville, KY; George K. Parish, Winchester, KY;						
** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 02/10/2006						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged <u>/LAM S NGUYEN/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY KY	SHEETS DRAWINGS 5	TOTAL CLAIMS 15 ¹⁹ LN	INDEPENDENT CLAIMS 2
ADDRESS LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999 UNITED STATES						
TITLE Methods and apparatuses for sensing temperature of multi-via heater chips						
FILING FEE RECEIVED 1130	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	23079	(print\$4 or record \$4) and (ink\$1 or fluid\$1 or liquid\$1) and ((heat\$4 or thermal or element \$1 or actuator\$1 or transducer\$1) same (array\$1 or row\$1 or column \$1)) and (temperature with (sens\$4 or monitor \$4 or check\$4 or measur\$4 or detect \$4)) and (via\$1 or slot\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:33
L2	10195	1 and ((via\$1 or slot\$1) same (ink \$1 or fluid\$1 or liquid\$1)) and ((heat\$4 or thermal or element \$1 or actuator\$1 or transducer\$1) same (array\$1 or row\$1 or column \$1)) and (temperature with (sens\$4 or monitor \$4 or check\$4 or measur\$4 or detect \$4))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:34
L3	10171	2 and ((via\$1 or slot\$1) same (ink \$1 or fluid\$1 or liquid\$1)) and ((heat\$4 or thermal or element \$1 or actuator\$1 or transducer\$1) same (array\$1 or row\$1 or column \$1)) and (temperature with (sens\$4 or monitor \$4 or check\$4 or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:36

		measur\$4 or detect \$4)) and (within or between)				
L4	502	3 and ((via\$1 or slot\$1) same (ink \$1 or fluid\$1 or liquid\$1)) and (((heat\$4 or thermal or element \$1 or actuator\$1 or transducer\$1) with (array\$1 or row\$1 or column \$1)) same (temperature with (sens\$4 or monitor \$4 or check\$4 or measur\$4 or detect \$4)) same (within or between))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:37
L5	277	4 and ((via\$1 or slot\$1) with (ink\$1 or fluid\$1 or liquid \$1)) and (((heat\$4 or thermal or element\$1 or actuator\$1 or transducer\$1) with (array\$1 or row\$1 or column\$1)) same (temperature with (sens\$4 or monitor \$4 or check\$4 or measur\$4 or detect \$4)) same (within or between))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:38
L6	46	5 and "347"/\$.cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 21:39

L7	27	("4418355" "4811237" "4857711" "4931627" "5075690" "5083143" "5087930" "5175565" "5315316" "5406361" "5424767" "5428206" "5881451" "5989757" "6007183" "6019814" "6248151" "6350405" "6416164" "6495809" "6536889" "6548308" "6561640" "6612686" "6720119" "6742884" "6967431").PN. OR ("7445315"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 21:47
L8	31	("4125845" "4250512" "4359372" "4449033" "4532530" "4636812" "4686544" "4704620" "4719472" "4738871" "4772866" "4791435" "4881057" "4899180" "4910528").PN. OR ("5075690"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 21:50

L9	21	("4313124" "4345262" "4459600" "4463359" "4558333" "4719472" "4723129" "4740796" "4791435" "4899180" "4910528" "4980702" "5075690" "5175565").PN. OR ("5467113"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 21:57
L10	44	("4429321" "4601777" "4719472").PN. OR ("4899180"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 21:58
L11	13	("3289046" "4296421" "4663640" "4741796" "4899180" "5278584" "5305015" "5367324" "5442384" "5719605" "6190492" "H000629").PN. OR ("6497470"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:03
L12	82	("4459600" "4550327" "4558333" "4601777" "4660056" "4692777" "4712172" "4719472" "4723129" "4740796").PN. OR ("5175565"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:05
L13	229	5 not 6	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:13

L14	11	(4 not 5) and "347"/\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 22:20
L15	16	("4313124" "4345262" "4459600" "4463359" "4558333" "4723129" "4740796" "5453713" "5745130" "5877784" "6022094").PN. OR ("6474782"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:22
L16	6	("6290334" "6474782" "6491377" "6527367" "6629742" "6729708").PN. OR ("7287832"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:26

4/ 1/ 09 10:29:48 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1172	347/19.CCLS. AND temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/02 20:32
L2	404	347/12.CCLS. AND temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/02 20:32
L3	4	("20020036781" "20030142153" "20040021731" "6520613").PN. OR ("7354125").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:36
L4	6	("6290334" "6474782" "6491377" "6527367" "6629742" "6729708").PN. OR ("7287832").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:38
L5	5	("20010005210" "5412410" "6079809").PN. OR ("6984009").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:41
L6	27	("20020018088" "20020024558" "4077040" "4313124" "4345262" "4459600" "4463359" "4558333" "4608577" "4635078" "4723129" "4740796" "5488398" "5614931" "5751310" "5982998" "5984454" "6092939" "6154233" "6206516" "6257143" "6283569" "6302511" "6305775" "6315389" "6612675").PN. OR ("6966621").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:45

L7	13	("4066918" "4313124" "4345262" "4459600" "4463359" "4558333" "4723129" "4740796" "5083137" "5371395" "5389953" "6302504").PN. OR ("6945622").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:48
L8	9	("4630076" "5638101" "5880756" "6106102" "6270201").PN. OR ("6585352").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/02 20:52

4/ 2/ 09 8:56:03 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	309	lexmark.as. and (barkley.in. or gibson.in. or hall.in. or king.in. or parish.in.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:31
L2	64	1 and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:32
L3	57	2 and heat\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:33
L4	57	3 and print\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:34
L5	54	4 and ink	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:35
L6	9	5 and (heat\$4 near3 array\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 21:36

L7	28	("20020075343" "20030142159" "20050041049" "20050052500" "20070153045" "4791435" "5594488" "5646660" "5731828" "5812162" "6260952" "6357863" "6382773" "6386674" "6398347" "6474782" "6488363" "6499834" "6601941" "6641242" "6644774" "6663227" "6764163" "6808243" "6871929" "6883904" "6890064" "6951378").PN. OR ("7484823").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:41
L8	16	("4313124" "4345262" "4459600" "4463359" "4558333" "4723129" "4740796" "5453713" "5745130" "5877784" "6022094").PN. OR ("6474782").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:42
L9	36	4 not 6	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:43

L10	23	("3414781" "3967305" "4142197" "4462041" "4583111" "4590327" "4725747" "4994891" "5142346" "5258638" "5412239" "5753942" "5955763" "6002156" "6102528" "6184559" "H000842").PN. OR ("6274896").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:52
L11	2	2 not 3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:54
L12	8	("3368390" "4343548" "5208637").PN. OR ("5598251").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 21:55

5/ 17/ 09 9:55:57 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	766	347/17.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 23:07
L2	12	("4896172" "5657061" "5943078" "5963236" "6276790" "6450601" "6481830" "6655791" "6663233" "6742882" "6817705" "6880926").PN. OR ("7125110").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:31
L3	2	("20050259124" "5467112").PN. OR ("7090323").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:32
L4	26	("3747120" "4380018" "4480259" "4490731" "4684956" "4714936" "4881318" "4934564" "5064711" "5206659").PN. OR ("5467112").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:35

L5	17	("4532530" "4638337" "4719472" "4774530" "4791435" "4994826" "5036337" "5107276" "5477246" "5665249" "5710579" "6234599").PN. OR ("6644774").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:37
L6	24	("4429321" "4494126" "4550327" "4601777" "4625128" "4660056" "4719472" "4736089" "4740800" "4873536" "4899180" "4903106" "5175565").PN. OR ("6234599").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:37
L7	6	("20020140755" "20030156182" "5576745" "6231153" "6302507" "6644774").PN. OR ("7325896").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:38
L8	18	("4357614" "4558333" "4605939" "4639748" "4866461" "5257043" "5278584" "5291226" "5297331" "5408738" "5469199" "5574488" "5625396" "5659343").PN. OR ("6170931").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:39

L9	7	("4910528" "5036337" "5073690" "5175565").PN. OR ("5422665").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:41
----	---	--	---------------------------	----	-----	---------------------

5/ 17/ 09 11:43:23 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	982	347/12.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/18 10:13
L2	2	("5568169" "6540326").PN. OR ("7370926"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:21
L3	45	("4748453" "4967203" "5371531" "5428377" "5455610").PN. OR ("5568169"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:21
L4	7	("5208605" "5412410" "6137502" "6309051" "6375294" "6409318" "6652079").PN. OR ("7300137"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:23
L5	13	("4066918" "4313124" "4345262" "4459600" "4463359" "4558333" "4723129" "4740796" "5083137" "5371395" "5389953" "6302504").PN. OR ("6945622"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:26

L6	9	("4630076" "5638101" "5880756" "6106102" "6270201").PN. OR ("6585352"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:28
L7	13	("4862197" "5030971" "5134425" "5363134" "5541629" "5604519" "5644342").PN. OR ("6431686"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:31
L8	82	("4429321" "4458256" "4549191" "4568953" "4601777" "4630076" "4651164" "4746935" "4750009" "4789425" "4791440" "4812859" "4833491" "4887098" "4899181" "4914736" "4947192").PN. OR ("5030971"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:32
L9	8	("5030971" "5880756" "6042225" "6174046" "6267468" "6315389").PN. OR ("6764163"). URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/18 10:33

5/ 18/ 09 10:41:42 AM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1614	347/14.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 23:44
L2	988	347/5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 23:44
L3	4	("20010033307" "6102517" "6325479" "6530644").PN. OR ("7431448").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:50
L4	27	("5543826" "5606353" "5627572" "5745134" "5831646" "5900889" "5914733").PN. OR ("6102517").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:50
L5	91	("4162501" "4279519" "4447820" "4500895" "4511906" "4629164" "4633274" "4712172" "4780095" "4806103" "4907018" "4926196" "4929963" "4961088" "4990938" "4999652" "5049898" "5137379" "5138344" "5187498" "5208610" "5245361" "5278584" "5289211" "5359357" "5363134" "5365312" "5411343" "5414452" "5442386" "5467116" "5469201" "5491540" "5497178" "5506611" "5528269"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:51

		"5594481" "5610635" "5619237" "5640186" "5646660" "5691753" "5696541" "5699091" "5706040" "5710585" "5748210" "5751320" "5788388" "5812156" "5835817" "5861897" "5949459" "5975677" "6000788" "6011937" "6017118" "6019449" "6019461" "6039430" "6065824" "6074042" "6102517" "6109723" "6126265" "6130695" "6155678" "6168262" "6170939" "6170940" "6196670" "6209980" "6212505" "6227638" "6227643" "6312088" "6361138" "6371586" "6375298" "6416152" "6428154" "6447090" "6502916" "6588871" "6631967" "6634738" "6969136" "6995861" "7014304" "D365596" "D369383").PN. OR ("7510273").URPN.				
L6	18	("20020060707" "20020105557" "20040095422" "4882686" "5172134" "5543828" "5587730" "5907666" "6168251" "6297888" "6354689" "6390579" "6445232" "6467870" "6559969" "6705695" "6874863").PN. OR ("7278697").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:56

L7	14	("6084607" "6254218" "6386673").PN. OR ("6467870").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:56
L8	4	("20020024574" "20020196300" "20040032465" "6149327").PN. OR ("7204572").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:57
L9	20	("4469026" "5428379" "5631685" "5655174" "5714990" "5771054").PN. OR ("6149327").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:58

5/ 17/ 09 11:59:20 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1392	(print\$4 or record\$4) and ((ink\$1 or liquid\$1 or fluid\$1) with (via or slot\$4 or manifold\$4 or tunnel\$1 or channel\$1)) and ((heat\$4 or convert\$4 or thermal or resistance or resistor\$1) near4 array\$1) and (temperature with (sens\$4 or monitor\$4 or measur\$4 or detect\$4))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 22:24
L2	256	1 and (print\$4 or record\$4) and (((ink\$1 or liquid\$1 or fluid\$1) with (via or slot\$4 or manifold\$4 or tunnel\$1 or channel\$1)) same ((heat\$4 or convert\$4 or thermal or resistance or resistor\$1) near4 array\$1)) and (temperature with (sens\$4 or monitor\$4 or measur\$4 or detect\$4))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 22:25
L3	32	2 and (print\$4 or record\$4) and (((ink\$1 or liquid\$1 or fluid\$1) with (via or slot\$4 or manifold\$4 or tunnel\$1 or channel\$1)) same ((heat\$4 or convert\$4 or thermal or resistance or resistor\$1) near4 array\$1) same (temperature with (sens\$4 or monitor\$4 or measur\$4 or detect\$4)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/17 22:26

L4	19	("4751528" "4797837" "5081473" "5374179" "5374944" "5461405" "5489925").PN. OR ("5622897").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:34
L5	52	("20040080583" "20050001886" "4412224" "4438191" "4455560" "4567493" "4596994" "4611219" "4646110" "4680595" "4695854" "4730197" "4777494" "4823149" "4894664" "4897668" "4905017" "4929964" "4965594" "5068674" "5132707" "5163177" "5165061" "5469199" "5565900" "5592203" "5604519" "5610641" "5622897" "5748214" "5752303" "5802687" "5825382" "5880756" "5883651" "5956059" "5969736" "6024440" "6044646" "6079819" "6135586" "6155674" "6206501" "6209991" "6281912" "6286939"	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:37

		"6328428" "6367911" "6378991" "6409323" "6457796" "6471339").PN. OR ("7380914").URPN.				
L6	38	("3747120" "3946398" "4014029" "4528575" "4680595" "4695854" "4730197" "4766671" "4769654" "4855752" "4937597" "5126615" "5128694" "5289209" "5359354" "5367324" "5376856" "5402926" "5462412" "5475279").PN. OR ("5880756").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:39
L7	9	("5079571" "5142296" "5357268" "5438350" "5648805" "5880756" "5923349" "6106102").PN. OR ("6513905").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:40
L8	51	("3747120" "4045801" "4251824" "4296421" "4395287").PN. OR ("4646110").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:45
L9	224	2 not 3	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:47
L10	101	9 and "347"/\$.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:49
L11	15	10 and "347"/17.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:49

L12	3	("5175565" "5622897" "6193349").PN. OR ("6648443").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:50
L13	83	("4459600" "4550327" "4558333" "4601777" "4660056" "4692777" "4712172" "4719472" "4723129" "4740796").PN. OR ("5175565").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:51
L14	15	("4723129" "4740796" "5175565" "5367324" "5734392" "6109719" "6286924" "6309052").PN. OR ("6527367").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:53
L15	6	("20060181578" "6527367" "6591500" "6733117" "6799841" "6830317").PN. OR ("7434917").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:53
L16	15	("4723129" "4740796" "5175565" "5367324" "5734392" "6109719" "6286924" "6309052").PN. OR ("6527367").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:54

L17	44	("4125845" "4250512" "4496824" "4532530" "4571598" "4636812" "4686544" "4704620" "4719472" "4723129" "4791435" "4831390" "4899180").PN. OR ("4980702").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 22:57
L18	44	("4429321" "4601777" "4719472").PN. OR ("4899180").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:00
L19	13	("3289046" "4296421" "4663640" "4741796" "4899180" "5278584" "5305015" "5367324" "5442384" "5719605" "6190492" "H000629").PN. OR ("6497470").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:01
L20	86	10 not 11	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:02
L21	24	("4882245" "5026624" "5243363" "5278010" "5304457" "5335004" "5578417" "5736619" "5745131" "5762812" "5774151" "5859655" "5877229" "5907333" "5945253" "6022095" "6124372" "6139920").PN. OR ("6409316").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/05/17 23:04

5/ 17/ 09 11:06:13 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1937	347/19.ccls.	USPAT	OR	OFF	2009/04/03 11:23
L2	6	("20030128253" "20030151775" "5568172" "6371588" "6412907" "7076195").PN. OR ("7448715").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:26
L3	15	("20020181986" "20030020972" "20030081037" "20030210412" "5835108" "6196652" "6198549" "6361139" "6561613" "6690471" "6714748" "6832824" "6871931" "6876467" "7044573").PN. OR ("7431417").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:28
L4	40	("5448269" "5534895" "5600350").PN. OR ("5835108").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:28
L5	3	("20020063871" "6966712" "7021732").PN. OR ("7380898").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:32
L6	7	("20030174184" "20030218648" "5889534" "6213580" "6390588" "6409301" "6450607").PN. OR ("7309118").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:33

L7	4	("20010036370" "20030085940" "5189521" "6082911").PN. OR ("7086715").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:37
L8	8	("20010003458" "5124720" "6010205" "6203140" "6354689" "6481816" "6533380" "6565180").PN. OR ("7036900").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:39
L9	9	("5600350" "5798773" "5992969" "6019454" "6206512" "6232594" "6241334" "6247802").PN. OR ("6652061").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:44
L10	14	("4540996" "5294942" "5635291" "5679451" "5707716" "5800916" "5894314" "5955185" "5965252").PN. OR ("6582047").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:46
L11	5	("6293640" "6382755" "6390589").PN. OR ("6547359").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:48
L12	2	("4540996").PN. OR ("6293640").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:49
L13	6	("5049898" "5677716" "5975674" "6003980" "6234602").PN. OR ("6435644").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:51
L14	4	("5387976" "6241334").PN. OR ("6422678").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:52

L15	13	("4339208" "4493993" "4540990" "4639747" "4907013" "4977459").PN. OR ("6227644").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/03 11:55
L16	1365	347/19.ccls.	US-PGPUB; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/03 12:01

4/ 3/ 09 12:13:00 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	756	347/17.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 22:34
L2	7	"4791435" "5581281" "5736995" "5880751" "6109719" "6322189" "6457794").PN. OR ("7377612").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:56
L3	22	"20010050410" "20020060333" "20020149657" "4772866" "5136305" "5300968" "5942900" "5984455" "6102515" "6154229" "6171880" "6299273" "6336713" "6357863" "6371589" "6382758" "6398346" "6441680" "6443558" "6450622" "6540334" "6565177").PN. OR ("7131714").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 22:59

L4	55	"4097873" "4611219" "4750009" "5124720" "5208605" "5327166" "5344079" "5349375" "5359355" "5398053" "5412406" "5412410" "5428380" "5469198" "5473351" "5480240" "5486848" "5559930" "5563637" "5581284" "5587730" "5598192" "5612722" "5627572" "5631746" "5650808" "5714078").PN. OR ("5984455").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:01
L5	9	"4567353" "4612554" "4719472").PN. OR ("5208611").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:20
L6	7	"4719472" "4899180" "4910528" "5095321").PN. OR ("5191360").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:23
L7	975	347/5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 23:26
L8	338	7 and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 23:26

L9	13	("4066918" "4313124" "4345262" "4459600" "4463359" "4558333" "4723129" "4740796" "5083137" "5371395" "5389953" "6302504").PN. OR ("6945622").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:32
L10	16	("4313124" "4345262" "4459600" "4463359" "4558333" "4608577" "4723129" "4740796" "5532901" "5847576" "6043679" "6290334" "6302504").PN. OR ("6712437").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:35
L11	532	347/9.ccls. and temperature	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 23:39
L12	2	("6070959" "6715852").PN. OR ("6905184").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:47
L13	5	("4879568" "4887100" "5028936").PN. OR ("6412896").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 23:48

4/ 1/ 09 11:49:20 PM

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	307	lexmark.as. and (barkley.in. or gibson. in. or hall.in. or king. in. or parish.in.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 20:27
L2	64	1 and (temperature)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 20:28
L3	33	2 and (array\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 20:28
L4	21	3 and via\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/04/01 20:28
L5	10	("20010004263" "20020027574" "20020052932" "20030081034" "20030142159" "6382773" "6612673" "6634731").PN. OR ("7163272").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:31
L6	44	2not 4	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:46
L7	10	("20010004263" "20020027574" "20020052932" "20030081034" "20030142159" "6382773" "6612673" "6634731").PN. OR ("7163272").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:50

L8	10	("4719472" "4947194" "5182580" "5517224" "5541629" "5975669" "6231153" "6305776" "6389241").PN. OR ("6634731").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:53
L9	36	("4250512" "4352114" "4376945" "4544931" "4550327" "4587534" "4660056" "4719472").PN. OR ("4947194").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:54
L10	90	1 not 2	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:55
L11	2	("5030971" "5211806").PN. OR ("7077509").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:58
L12	47	("4394670" "4438191" "4536250" "4558333" "4701766" "5140345").PN. OR ("5211806").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 20:59
L13	19	("4862197" "4965611" "5159353" "5491505" "5580468" "5635966" "5635968" "5636966" "5666140" "5697144" "5821960" "6062679" "6155675" "6155676" "6180018" "6378978").PN. OR ("6540334").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/04/01 21:03

4/ 1/ 09 9:05:28 PM

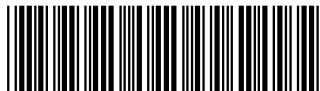
Index of Claims 		Application/Control No. 11/323,809 Examiner LAM S. NGUYEN		Applicant(s)/Patent under Reexamination BARKLEY ET AL. Art Unit 2853	
---	--	--	--	---	--

✓	Rejected	—	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date						
Final	Original	5/18/09						
	1	-						
	2	-						
	3	-						
	4	-						
	5	-						
	6	-						
	7	-						
	8	-						
	9	-						
	10	-						
	11	-						
	12	-						
	13	-						
	14	-						
	15	-						
	16	-						
	17	-						
	18	-						
	19	-						
	20	=						
	21	=						
	22	=						
	23	=						
	24	=						
	25	=						
	26	=						
	27	=						
	28	=						
	29	=						
	30	=						
	31	=						
	32	=						
	33	=						
	34	=						
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							

Claim		Date						
Final	Original							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							
	60							
	61							
	62							
	63							
	64							
	65							
	66							
	67							
	68							
	69							
	70							
	71							
	72							
	73							
	74							
	75							
	76							
	77							
	78							
	79							
	80							
	81							
	82							
	83							
	84							
	85							
	86							
	87							
	88							
	89							
	90							
	91							
	92							
	93							
	94							
	95							
	96							
	97							
	98							
	99							
	100							

Claim		Date						
Final	Original							
	101							
	102							
	103							
	104							
	105							
	106							
	107							
	108							
	109							
	110							
	111							
	112							
	113							
	114							
	115							
	116							
	117							
	118							
	119							
	120							
	121							
	122							
	123							
	124							
	125							
	126							
	127							
	128							
	129							
	130							
	131							
	132							
	133							
	134							
	135							
	136							
	137							
	138							
	139							
	140							
	141							
	142							
	143							
	144							
	145							
	146							
	147							
	148							
	149							
	150							

Issue Classification 	Application/Control No.		Applicant(s)/Patent under Reexamination	
	11/323,809		BARKLEY ET AL.	
	Examiner		Art Unit	
	LAM S. NGUYEN		2853	

ISSUE CLASSIFICATION											
ORIGINAL					CROSS REFERENCE(S)						
CLASS		SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
347		17			347	12	5				
INTERNATIONAL CLASSIFICATION											
B	4	1	J	29/38							
				/							
				/							
				/							
				/							
_____ (Assistant Examiner) (Date)					/LAM S NGUYEN/ 05/18/09 (Primary Examiner) (Date)					Total Claims Allowed: 15 O.G. Print Claim(s) 1 O.G. Print Fig. 5	
_____ (Legal Instruments Examiner) (Date)											

☐ 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
-0	1	12	31		61		91		121		181
-0	2	13	32		62		92		122		182
-0	3	14	33		63		93		123		183
-0	4	15	34		64		94		124		184
-0	5		35		65		95		125		185
-0	6		36		66		96		126		186
-0	7		37		67		97		127		187
-0	8		38		68		98		128		188
-0	9		39		69		99		129		189
-0	10		40		70		100		130		190
-0	11		41		71		101		131		191
-0	12		42		72		102		132		192
-0	13		43		73		103		133		193
-0	14		44		74		104		134		194
-0	15		45		75		105		135		195
-0	16		46		76		106		136		196
-0	17		47		77		107		137		197
-0	18		48		78		108		138		198
-0	19		49		79		109		139		199
1	20		50		80		110		140		200
2	21		51		81		111		141		201
3	22		52		82		112		142		202
4	23		53		83		113		143		203
5	24		54		84		114		144		204
6	25		55		85		115		145		205
7	26		56		86		116		146		206
8	27		57		87		117		147		207
9	28		58		88		118		148		208
10	29		59		89		119		149		209
11	30		60		90		120		150		210

Electronic Acknowledgement Receipt	
EFS ID:	4890932
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	Methods and apparatuses for sensing temperature of multi-via heater chips
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Neill R. Kahle./Lori Woods
Filer Authorized By:	Neill R. Kahle.
Attorney Docket Number:	2005-0463.02
Receipt Date:	03-MAR-2009
Filing Date:	30-DEC-2005
Time Stamp:	09:11:39
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	Amendment Copy Claims/Response to Suggested Claims	2005-0463-02Response.pdf	796243 9cf801746ea98d84cf487229e6d1a25bbe4d4e28	no	7
Warnings:					
Information:					

Total Files Size (in bytes):	796243
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

Applicants:	Lucas David Barkley et al.	)	
		)	Group Art Unit: 2853
Serial No.:	11/323,809	)	
		)	Examiner: Nguyen, Lam S
Filing Date:	December 30, 2005	)	
		)	
Title:	Methods and Apparatuses for	)	
	Sensing Temperature of	)	
	Multi-Via Heater Chip	)	

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Arlington VA 22313-1450

RESPONSE TO OFFICE ACTION

In response to the Office Action mailed on December 3, 2008, Applicants respond
as follows:

IN THE CLAIMS:

Claims 1-19 (Canceled).

20. (Presently Amended) A chip for use with a printing device, comprising:
a plurality of ink vias arranged parallel to one another, each of the ink via having two longitudinal sides;
a heater array disposed adjacent each longitudinal side of the ink vias such that each ink via is associated with two heater arrays disposed adjacent the two longitudinal sides of the ink via;
a region disposed adjacent each heater array, wherein only one region is disposed between two adjacent ink vias and wherein the region disposed between two adjacent ink vias includes two heater arrays each heater array being associated with their respective ink via; and
a single temperature sensing element disposed within each region, the temperature sensing element operable to sense a temperature representative of the heater arrays adjacent to the region and disposed at a predetermined distance away from adjacent heater arrays.
21. (Previously Presented) The chip of claim 20, wherein the temperature sensing element comprises a temperature sensing resistor.
22. (Previously Presented) The chip of claim 21, wherein the temperature sensing element comprises a thermal sense resistor.
23. (Previously Presented) The chip of claim 22, wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.
24. (Previously Presented) The chip of claim 20, wherein the predetermined distance is at least 300 microns.

25. (Previously Presented) The chip of claim 20, wherein the temperature sensing element is positioned substantially planar to each of the adjacent heater arrays.

26. (Previously Presented) The chip of claim 20, further comprising at least one control element operable to receive a temperature measured by the temperature sensing element.

27. (Previously Presented) The chip of claim 20, wherein the chip has at least one edge and at least one region is disposed between one of the plurality of ink vias and the at least one edge.

28. (Presently Amended) A method of fabricating chips for use with a printing device, comprising:

arranging a plurality of ink vias parallel to one another, wherein each of the ink via has two longitudinal sides;

placing a heater array adjacent each longitudinal side of the ink via such that each ink via is associated with two heater arrays placed adjacent its longitudinal sides;

defining a region adjacent each heater array such that there is only one region between two ink vias and the region between two adjacent ink vias includes two heater array each heater array being associated with its respective ink via; and

positioning a single temperature sensing element disposed within each region, wherein the temperature sensing element is operable to sense a temperature representative of the heater arrays adjacent to the region and is disposed at a predetermined distance away from adjacent heater arrays.

29. (Previously Presented) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing element in substantially a center portion of the region.

30. (Previously Presented) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing resistor in the region.

31. (Previously Presented) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a thermal sense resistor in the region.

32. (Previously Presented) The method of claim 30, wherein positioning a temperature sensing element in the region comprises positioning an n-type implant donor thermal sensing resistor in the region.

33. (Previously Presented) The method of claim 28, wherein positioning a temperature sensing element in the region between the adjacent heater arrays comprises positioning the temperature sensing element at least 300 microns from each of the adjacent heater arrays.

34. (Previously Presented) The method of claim 28, wherein positioning a temperature sensing element in the region between the adjacent heater arrays comprises positioning the temperature sensing element substantially planar to each of the heater arrays.

REMARKS

In the above-referenced Office Action, the Examiner rejected claims 20-22, 24-31, and 33-34 under 35 U.S.C. § 103(a) as being unpatentable over the Applicant's admission as prior art (Figs. 1-2) hereinafter "APA" in view of Askeland et al. (U.S. Patent Publication Number 2003/0142159 A1); and rejected claims 23 and 32 under 35 U.S.C. § 103(a) as being unpatentable over the APA in view of Askeland et al. and further in view of Edelen et al. (U.S. Patent Publication Number 2005/0052500 A1).

Applicants have amended independent claims 20 and 28 to further define the claimed invention. No new matter has been added.

Amended independent claim 20 is directed to a chip for use with a printing device that requires, inter alia, that the region disposed between two adjacent ink vias includes two heater arrays each heater array being associated with their respective ink vias. APA (Figs. 1-2) does disclose a region between two adjacent ink vias (e.g., a magenta ink via 204 and a yellow ink via 206), however the region does not include two heater arrays each being associated with their respective ink vias as required by the claimed invention. Rather, the region between the magenta ink via (204) and the yellow ink via (206) includes only a single yellow heater array (212) associated with the yellow ink via (206).

Further, claim 20 requires, inter alia, a single temperature sensing element disposed within each region, the temperature sensing element operable to sense a temperature representative of the heater arrays adjacent to the region. Applicants assert that the APA (Figs. 1-2) that the Examiner relied on fails to disclose or suggest this element of the claimed invention. Fig. 2 of the admitted prior art shows a cyan heater array (208) and a magenta heater array (210) such that the cyan and the magenta heater array are adjacent to the region in which a temperature sense resistor (222) is disposed. However, as shown in Fig. 2, a cyan ink via (202) is present in between the cyan heater array and the magenta heater array, and as it has been described with respect to Fig. 2 in paragraphs 0007 and 0009 of the specification that the ink via (202) functions as a "thermal barrier" (thermal insulator) i.e., thermal barrier in between the cyan heater array (208) and the temperature sense resistor (222), therefore Applicants assert that the temperature sense resistor (222) cannot represent the temperature of the cyan heater array

(208) that is rather being represented by another thermal sense resistor (220). Thus, the temperature sensed by the temperature sense resistor (222) is not representative of the temperature of both the heater arrays (208 and 210) adjacent to the region as required by the claimed invention.

Applicants respectfully submit that Askeland et al. fails to cure the defects of APA as noted above. Thus, claim 20 is allowable over the cited references.

Further, independent claim 28 has similar limitations as that of allowable claim 20 and is therefore also allowable for at least the same reasons.

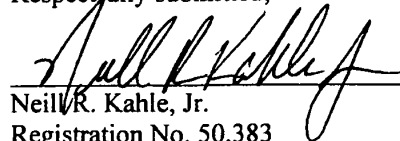
Dependent claims 21-27 and 29-34, depending from allowable independent claims 20 and 28, respectively, are also allowable for at least the same reasons.

The Examiner then rejected claims 23 and 32 under 35 U.S.C. § 103(a) as being unpatentable over Applicant's admission as prior art (Figs. 1-2) in view of Askeland et al. and further in view of Edelen et al. However, Applicants assert that claims 23 and 32 which depend from allowable independent claims 20 and 28, respectively, are also allowable for at least the same reasons. Additionally, Askeland et al. and Edelen et al. fails to cure the defects of APA as discussed above.

Applicants assert that in light of the foregoing remarks this application is in condition for allowance and early passage of this case to issue is requested. The Examiner is invited to telephone the undersigned in the event the Examiner would like to discuss the merits of the application or this Response.

If there are any other fees not accounted for above, the assignee of present application, Lexmark International, Inc., hereby authorizes the Commissioner to charge any such fees, including any extension of time fees, to the account of Lexmark International, Inc., Deposit Account No. 12-1213.

Respectfully submitted,



Neill R. Kahle, Jr.
Registration No. 50,383
Lexmark International, Inc.
Intellectual Property Law Department

Response
Barkley et al.
11/323,809

740 West New Circle Road
Bldg. 082-1
Lexington, KY 40550
Date: 3-2-2009

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/323,809		Filing Date 12/30/2005		☐ To be Mailed			
APPLICATION AS FILED – PART I												
(Column 1)			(Column 2)		SMALL ENTITY ☐		OR		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			RATE (\$)	FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A				N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A				N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A				N/A					
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR		X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =				X \$ =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).											
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))												
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL			TOTAL				
APPLICATION AS AMENDED – PART II												
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
AMENDMENT	03/03/2009	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	X \$ =		OR	X \$52=	0		
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$ =		OR	X \$220=	0		
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.												

Legal Instrument Examiner:
/DESHONNE T. MARTINO/

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.

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/323,809		Filing Date 12/30/2005		☐ To be Mailed					
APPLICATION AS FILED – PART I														
(Column 1)			(Column 2)		SMALL ENTITY ☐		OR		OTHER THAN SMALL ENTITY					
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR		RATE (\$)	FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A				N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A		N/A				N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A				N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*		X \$ =				X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*		X \$ =				X \$ =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).												
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))														
* If the difference in column 1 is less than zero, enter "0" in column 2.														
APPLICATION AS AMENDED – PART II														
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY			
AMENDMENT	03/03/2009		CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))		* 15	Minus	** 20	= 0		X \$ =		OR	X \$52=	0		
	Independent (37 CFR 1.16(h))		* 2	Minus	*** 3	= 0		X \$ =		OR	X \$220=	0		
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
	TOTAL ADD'L FEE													
OR														
TOTAL ADD'L FEE 0														
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY			
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))		*	Minus	**	=		X \$ =		OR	X \$ =			
	Independent (37 CFR 1.16(h))		*	Minus	***	=		X \$ =		OR	X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
	TOTAL ADD'L FEE													
OR														
TOTAL ADD'L FEE														
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.														
Legal Instrument Examiner: /DONNA L. PRICE/														

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.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421
21972 7590 12/03/2008 LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			EXAMINER NGUYEN, LAM S	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 12/03/2008	DELIVERY MODE PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	11/323,809	BARKLEY ET AL.	
	Examiner	Art Unit	
	LAM S. NGUYEN	2853	

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

Period for Reply

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

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

Status

1) ☒ Responsive to communication(s) filed on 19 November 2008.

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

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 20-34 is/are pending in the application.

 4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 20-34 is/are rejected.

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

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

Application Papers

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

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

 a) ☐ All b) ☐ Some * c) ☐ None of:

 1. ☐ Certified copies of the priority documents have been received.

 2. ☐ Certified copies of the priority documents have been received in Application No. _____.

 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

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

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 7/14/08.

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

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/19/2008 has been entered.

Claim Rejections - 35 USC § 103

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

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

1. Claims 20-22, 24-31, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admission as prior art (*FIGs. 1-2*) in view of Askeland et al. (US 2003/0142159).

The applicant's admission as prior art (*FIGs. 1-2*) teaches a chip for use with a printing device, comprising:

a plurality of ink vias (202, 204, 206) arranged parallel to one another, each of the ink via having two longitudinal sides;

a heater array disposed adjacent each longitudinal side of the ink vias (208, 210, 212);

a region disposed adjacent each heater array, wherein only one region is disposed between two adjacent ink vias (*the region, for example between the Y heater array and the M ink via, includes the temperature sense resistor 224 and the adjacent blank space*); and

a single temperature sensing element (220, 222, 224) disposed within each region, the temperature sensing element operable to sense a temperature representative of the heater arrays adjacent to the region.

The applicant's admission as prior art however does not teach wherein the temperature sensing element is disposed at a predetermined distance away from adjacent heater arrays.

Askeland et al. discloses an ink jet printhead having at least two heater arrays (*FIG. 4: Two arrays of elements 318*) and a temperature sensing element (*FIG. 4, elements 440 and 430*) for sensing the temperature in a region between the arrays, wherein the temperature sensing element is disposed at a predetermined distance away from adjacent heater arrays.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the prior art printhead as admitted by the applicant to position the sensing element distance from the heater arrays as disclosed by Askeland et al. The motivation for doing so would have been to gain the accuracy of the sensed temperature in the region due to heat generated from both arrays as taught by Askeland et al. (*FIG. 4*).

• **The applicant's admission as prior art (*FIGs. 1-2*) also discloses the following claimed invention:**

Regarding to claims 21-22, 25, 29-31, 34: wherein the temperature sensing element comprises a temperature sensing resistor or a thermal sense resistor, wherein the temperature sensing element is positioned substantially planar to each of the heater arrays (*FIG. 2: Temperature/thermal sense resistors*).

Regarding to claims 24 and 33: The applicant's admission as prior art, in view of Askeland et al., discloses the claimed invention except wherein the temperature sensing element is positioned at least 300 microns from each of the first heater array and the second heater array. It would have been obvious to one having ordinary skill in the art at the time the invention was made to dispose the temperature sensing element at a desire location from either the array corresponding to the distance between the arrays, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claim 26: further comprising providing at least one control element operable to receive a temperature measured by the temperature sensing element and to heat the first heater array and the second heater array (*Specification, paragraph [0008]*).

Regarding to claim 27: wherein the chip has a least one edge and at least one region is disposed between one of the plurality of ink vias and the at least one edge (*FIGs. 1-2*).

2. Claims 23 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admission as prior art (*FIGs. 1-2*) in view of Askeland et al. (US 2003/0142159), and further in view of Edelen et al. (US 2005/0052500).

The applicant's admission as prior art, as modified, discloses the claimed invention as discussed above except wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.

Edelen et al. discloses an ink jet printhead chip including temperature sensing resistors implanted in the chip, wherein the temperature sensing resistors are made of N-type material (*Abstract*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to make the temperature sensing resistors in the prior printhead by implanting N-type donor as disclosed by Edelen et al. to obtain higher temperature coefficient in order to easily detect temperature changes with more precise measurements (*paragraphs [0044]-[0045]*).

Response to Arguments

Applicant's arguments filed 11/19/2008 have been fully considered but they are not persuasive.

First of all, the Applicant argued that the prior art ink vias functioned as a thermal barrier to prevent the temperature sensor to sense the temperature of the adjacent heater arrays. The Examiner disagrees with such assertion because the main function of the ink vias, each associated with a heater array, is to supply ink to the ink chambers associated with the heater arrays. As a result, the temperature of a region is contributed by both heater arrays adjacent to the region. One heater array may contribute heat to the region more than that from the other. One of ordinary skill in the art thus would locate the TSR within the region so that the TSR can detect heat from both adjacent heater arrays. In addition, an assertion of what seems to follow from

common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness (MPEP 2145 I). In this case, the Applicant's assertion that the ink vias act as thermal barrier is not a kind of factual evidence.

Moreover, the Applicant asserted that the prior art taught two TSRs disposed within each region. It is the Examiner's point of view that based on the claim language that "a region" being "disposed adjacent each heater array" and "between two adjacent ink vias", such region thus as shown in FIG. 2 includes only one temperature sensing element.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

Application/Control Number: 11/323,809

Page 7

Art Unit: 2853

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.

/LAM S NGUYEN/

Primary Examiner, Art Unit 2853

RECEIVED 07/14/2008

PTO/SB/08a (05-07)

Approved for use through 11/30/2007. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas David Barkley, et al.	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
/L.N./	1	6357863		2002-03-19	Anderson, et al.	
/L.N./	2	6601941		2003-08-05	Jones, et al.	
/L.N./	3	6382773		2002-05-05	Chang, et al.	
/L.N./	4	6641242		2003-08-05	Canti, et al.	
/L.N./	5	6644774		2003-11-11	Burger, et al.	
/L.N./	6	6764163		2004-07-20	Anderson, et al.	
/L.N./	7	6808243		2004-10-26	Markham, et al.	
/L.N./	8	6871929		2005-03-29	Crivelli, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809	
	Filing Date		2005-12-30	
	First Named Inventor	Lucas David Barkley, et al.		
	Art Unit	2853		
	Examiner Name	Lam S. Nguyen		
	Attorney Docket Number	2005-0463.02		

/L.N./	9	6883904		2005-04-26	Jeanmarie, et al.	
/L.N./	10	6951378		2005-10-04	Yamada, et al.	

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

Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/L.N./	1	20070153045		2007-07-05	Barkley, et al.	
/L.N./	2	20050052500		2005-03-10	Edelen, et al.	

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

Add

FOREIGN PATENT DOCUMENTS

Remove

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
/L.N./	1	11-254409	JP		1999-09-14	Uenishi		☐

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

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas David Barkley, et al.
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature	/Lam Nguyen/	Date Considered	11/28/2008
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

Index of Claims 		Application/Control No. 11/323,809 Examiner LAM S. NGUYEN		Applicant(s)/Patent under Reexamination BARKLEY ET AL. Art Unit 2853	
---	--	--	--	---	--

✓ Rejected = Allowed	— (Through numeral) Cancelled ÷ Restricted	N Non-Elected I Interference	A Appeal O Objected
---------------------------------------	---	---	--------------------------------------

Claim		Date						
Final	Original	11/29/08						
	1	-						
	2	-						
	3	-						
	4	-						
	5	-						
	6	-						
	7	-						
	8	-						
	9	-						
	10	-						
	11	-						
	12	-						
	13	-						
	14	-						
	15	-						
	16	-						
	17	-						
	18	-						
	19	-						
	20	v						
	21	v						
	22	v						
	23	v						
	24	v						
	25	v						
	26	v						
	27	v						
	28	v						
	29	v						
	30	v						
	31	v						
	32	v						
	33	v						
	34	v						
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							

Claim		Date						
Final	Original							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							
	60							
	61							
	62							
	63							
	64							
	65							
	66							
	67							
	68							
	69							
	70							
	71							
	72							
	73							
	74							
	75							
	76							
	77							
	78							
	79							
	80							
	81							
	82							
	83							
	84							
	85							
	86							
	87							
	88							
	89							
	90							
	91							
	92							
	93							
	94							
	95							
	96							
	97							
	98							
	99							
	100							

Claim		Date						
Final	Original							
	101							
	102							
	103							
	104							
	105							
	106							
	107							
	108							
	109							
	110							
	111							
	112							
	113							
	114							
	115							
	116							
	117							
	118							
	119							
	120							
	121							
	122							
	123							
	124							
	125							
	126							
	127							
	128							
	129							
	130							
	131							
	132							
	133							
	134							
	135							
	136							
	137							
	138							
	139							
	140							
	141							
	142							
	143							
	144							
	145							
	146							
	147							
	148							
	149							
	150							

Electronic Patent Application Fee Transmittal				
Application Number:		11323809		
Filing Date:		30-Dec-2005		
Title of Invention:		Methods and apparatuses for sensing temperature of multi-via heater chips		
First Named Inventor/Applicant Name:		Lucas David Barkley		
Filer:		Neill R. Kahle./Lori Woods		
Attorney Docket Number:		2005-0463.02		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for continued examination	1801	1	810	810
Total in USD (\$)				1920

Electronic Acknowledgement Receipt	
EFS ID:	4316693
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	Methods and apparatuses for sensing temperature of multi-via heater chips
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Neill R. Kahle./Lori Woods
Filer Authorized By:	Neill R. Kahle.
Attorney Docket Number:	2005-0463.02
Receipt Date:	19-NOV-2008
Filing Date:	30-DEC-2005
Time Stamp:	14:38:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1920
RAM confirmation Number	8431
Deposit Account	121213
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	Extension of Time	2005-0463-02PetExtTime.pdf	358791	no	1
			24149a3129df5a39811750a5e3615b07fd5712f		
Warnings:					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	2005-0463-02ResponseRCE.pdf	2878251	no	7
			4488b06e494e0b7e1d9ee2a12bc0655b0148b7a8		
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	2005-0463-02RCE.pdf	939509	no	2
			71a1bf0b29c636583d7fda47d864d7ef5655abeb		
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	32036	no	2
			452a12c2d7363c5c99499438e9a6ff98676fbc19		
Warnings:					
Information:					
Total Files Size (in bytes):			4208587		
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.					

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/323,809		Filing Date 12/30/2005		☐ To be Mailed			
APPLICATION AS FILED – PART I												
(Column 1)			(Column 2)		SMALL ENTITY ☐		OR		OTHER THAN SMALL ENTITY			
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR		RATE (\$)	FEE (\$)		
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A				N/A			
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A		N/A				N/A			
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A				N/A			
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*		X \$ =				X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*		X \$ =				X \$ =			
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))												
					TOTAL				TOTAL			
* 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	11/19/2008		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		* 15	Minus	** 20		= 0	X \$ =		OR X \$52=	0	
	Independent (37 CFR 1.16(h))		* 3	Minus	*** 3		= 0	X \$ =		OR X \$220=	0	
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
									TOTAL ADD'L FEE		OR TOTAL ADD'L FEE	0
AMENDMENT	Total (37 CFR 1.16(i))		*	Minus	**		=	X \$ =		OR X \$ =		
	Independent (37 CFR 1.16(h))		*	Minus	***		=	X \$ =		OR X \$ =		
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
									TOTAL ADD'L FEE		OR TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.												
Legal Instrument Examiner: /LAJUAN HICKSON/												

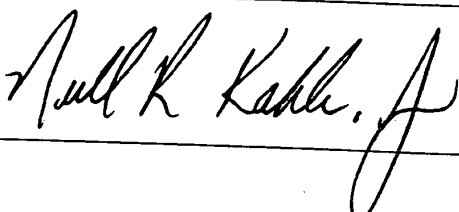
This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes 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.

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

Approved for use through 11/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)							
Application Number	11/323,809	Filing Date		Docket Number (if applicable)	2005_0463.02	Art Unit	2853
First Named Inventor	Lucas David Barkley			Examiner Name	Nguyen, Lam S		
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, 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 <u>12-1213</u>							
SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED							
☒ Patent Practitioner Signature							
☐ Applicant Signature							
							

EFS - Web 2.1.6

Doc code: RCEX

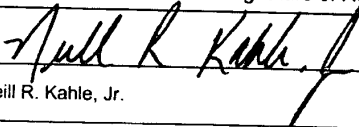
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (10-08)

Approved for use through 11/30/2008. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

Signature of Registered U.S. Patent Practitioner			
Signature		Date (YYYY-MM-DD)	2008-11-19
Name	Neill R. Kahle, Jr.	Registration Number	50383

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Lucas David Barkley et al.	)	
Serial No.:	11/323,809	)	Group Art Unit: 2853
Filing Date:	December 30, 2005	)	Examiner: Nguyen, Lam S
Title:	Methods and Apparatuses for	)	
	Sensing Temperature of	)	
	Multi-Via Heater Chip	)	

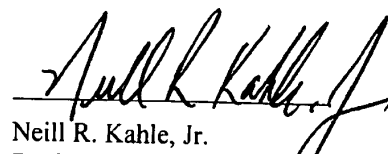
Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Arlington VA 22313-1450

PETITION FOR AN EXTENSION OF TIME

Dear Sir:

Applicants hereby petition for three month extension of time to and including November 19, 2008 to respond to an Office Action mailed on May 19, 2008. Lexmark International, Inc., assignee of the present application, authorizes the Commissioner to charge the fee appropriate fee for the three month extension of time to the account of Lexmark International, Inc., Deposit Account No. 12-1213.

Respectfully submitted,


Neill R. Kahle, Jr.
Registration No. 50,383
Lexmark International, Inc.
740 West New Circle Road
Lexington, KY 40550
Date: 11-19-2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Lucas David Barkley et al.	)	
		)	Group Art Unit: 2853
Serial No.:	11/323,809	)	
		)	Examiner: Nguyen, Lam S
Filing Date:	December 30, 2005	)	
		)	
Title:	Methods and Apparatuses for	)	
	Sensing Temperature of	)	
	Multi-Via Heater Chip	)	

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Arlington VA 22313-1450

RESPONSE WITH REQUEST FOR CONTINUED EXAMINATION

Prior to the continued examination of the present application, and in response to the Final Office Action mailed May 19, 2008, and the Advisory Action mailed July 18, 2008, Applicants hereby submit the following amendments and remarks and an accompanying request for an extension of time. In light of these amendments and remarks, Applicants respectfully asserts that all of the claims of the patent application are patentable, and that the application be allowed.

IN THE CLAIMS:

Claims 1-19 (Canceled).

20. (New) A chip for use with a printing device, comprising:
- a plurality of ink vias arranged parallel to one another, each of the ink via having two longitudinal sides;
 - a heater array disposed adjacent each longitudinal side of the ink vias;
 - a region disposed adjacent each heater array, wherein only one region is disposed between two adjacent ink vias; and
 - a single temperature sensing element disposed within each region, the temperature sensing element operable to sense a temperature representative of the heater arrays adjacent to the region and disposed at a predetermined distance away from adjacent heater arrays.
21. (New) The chip of claim 20, wherein the temperature sensing element comprises a temperature sensing resistor.
22. (New) The chip of claim 20, wherein the temperature sensing element comprises a thermal sense resistor.
23. (New) The chip of claim 20, wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.
24. (New) The chip of claim 20, wherein the predetermined distance is at least 300 microns.
25. (New) The chip of claim 20, wherein the temperature sensing element is positioned substantially planar to each of the adjacent heater arrays.

26. (New) The chip of claim 20, further comprising at least one control element operable to receive a temperature measured by the temperature sensing element.
27. (New). The chip of claim 20, wherein the chip has at least one edge and at least one region is disposed between one of the plurality of ink vias and the at least one edge.
28. (New) A method of fabricating chips for use with a printing device, comprising:
arranging a plurality of ink vias parallel to one another, wherein each of the ink via has two longitudinal sides;
placing a heater array adjacent each longitudinal side of the ink via;
defining a region adjacent each heater array such that there is only one region between two ink vias; and
positioning a single temperature sensing element within each region, wherein the temperature sensing element is operable to sense a temperature representative of the heater arrays adjacent to the region and is disposed at a predetermined distance away from adjacent heater arrays.
29. (New) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing element in substantially a center portion of the region.
30. (New) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing resistor in the region.
31. (New) The method of claim 28, wherein positioning a temperature sensing element in the region comprises positioning a thermal sense resistor in the region.

32. (New) The method of claim 30, wherein positioning a temperature sensing element in the region comprises positioning an n-type implant donor thermal sensing resistor in the region.
33. (New) The method of claim 28, wherein positioning a temperature sensing element in the region between the adjacent heater arrays comprises positioning the temperature sensing element at least 300 microns from each of the adjacent heater arrays.
34. (New) The method of claim 28, wherein positioning a temperature sensing element in the region between the adjacent heater arrays comprises positioning the temperature sensing element substantially planar to each of the heater arrays.

REMARKS

In the above referenced Office Action and Advisory Action, the Examiner alleged that the amendments filed after the final rejection raises new issues that would require further consideration and/or search. In Response, Applicants submit new claims 20-34 and Response concurrently with a Request for Continued Examination.

Independent claim 20 is directed to a chip for use with a printing device that requires, inter alia, a single temperature sensing element disposed within each region, the temperature sensing element operable to sense a temperature representative of the heater arrays adjacent to the region. Applicants assert that the prior art (Figs. 1-2) that the Examiner relied on in the Final Office Action fails to disclose or suggest this element of the claimed invention. Fig. 2 of the prior art shows a cyan heater array 208 and a magenta heater array 210. The Examiner alleged “the region defined by the cyan heater array and the magenta heater array” as the region of the claimed invention. As shown in Fig. 2 the temperature sense resistor 222 is disposed within this “region.” However, as shown in Fig. 2, a Cyan ink via 202 present within the region (i.e., within the region defined by the cyan heater array and the magenta heater array) functions as a “thermal barrier” (thermal insulator) and prevents the temperature sense resistor 222 to sense the temperature of the adjacent heater arrays (i.e., Cyan heater array 208). See paragraph 009. Therefore, the temperature sensed by the temperature sensing element 222 is not representative of the temperature of the heater arrays adjacent to the region as in the claimed invention

Additionally, paragraph 0025 of the claimed invention teaches that “if there is a single TSR associated with each heater array in the illustrative embodiment of FIG. 2, then two TSRs will be placed next to each other between adjacent ink vias. For instance, if one TSR is associated with the left yellow heater array and another TSR is associated with the right magenta heater array, the region between the magenta and yellow vias would include two TSRs.” Thus, Applicants assert that the prior art (Fig. 2) teaches using two TSRs within each region and not a single temperature sensing element as in the claimed invention.

Finally, independent claim 20 requires, inter alia, the temperature sensing element is disposed at a predetermined distance away from adjacent heater arrays. As shown in Fig. 2 of the prior art each of the temperature sense resistor (220, 222, 224) are “placed in close proximity” to each of the heater arrays and are not disposed at a predetermined distance away from the heater array. Further, Applicants assert that it would be completely nonsensical to place a temperature sense resistor at a predetermined distance from adjacent heater arrays in the prior art. Assuming, arguendo, the temperature sense resistor 222 is disposed at a predetermined distance from the adjacent heater arrays (208, 210), then the temperature sense resistor 222 would not be able to measure the temperature of the cyan heater array because of the cyan ink via in between that acts as a thermal insulator. Therefore, Applicants assert that a person ordinary skilled in the art would not be motivated to place a temperature sense resistor that is at a predetermined distance away from adjacent heater arrays as in the claimed invention.

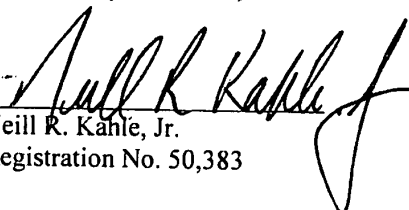
Thus, Applicants assert that independent claim 20 is allowable for at least these reasons. Independent claim 27 has similar limitation as that of allowable claim 20 and is therefore also allowable for at least the same reasons.

Dependent claims 21-26 and 28-33, depending from allowable claims 20 and 27, respectively, are also allowable for at least the same reasons.

Applicant asserts that in light of the foregoing remarks this application is in condition for allowance and early passage of this case to issue is requested. The Examiner is invited to telephone the undersigned in the event the Examiner would like to discuss the merits of the application or this Response.

If there are any other fees not accounted for above, the assignee of present application, Lexmark International, Inc., hereby authorizes the Commissioner to charge any such fees, including any extension of time fees, to the account of Lexmark International, Inc., Deposit Account No. 12-1213.

Respectfully submitted,


Neill R. Kahle, Jr.
Registration No. 50,383

Response
Barkley et al.
11/323,809

Lexmark International, Inc.
Intellectual Property Law Department
740 West New Circle Road
Bldg. 082-1
Lexington, KY 40550
Date: 11/19/2008



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421
21972 7590 07/18/2008 LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			EXAMINER NGUYEN, LAM S	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 07/18/2008	DELIVERY MODE PAPER

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

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

Advisory Action Before the Filing of an Appeal Brief	Application No. 11/323,809	Applicant(s) BARKLEY ET AL.	
	Examiner LAM S. NGUYEN	Art Unit 2853	

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

THE REPLY FILED 14 July 2008 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. 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. The reply must be filed within one of the following time periods:

a) ☐ The period for reply expires _____ 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.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. 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) 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 amendment(s) 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.

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: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a 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).

9. ☐ The affidavit or other evidence filed after the date of filing a 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 a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10. ☐ 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

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.

12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____

13. ☐ Other: _____.

/LAM S NGUYEN/
Primary Examiner, Art Unit 2853

Continuation of 3. NOTE: Claims 1 and 10 are amended to raise new issues that require further consideration and/or search.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	Customer No.: 29052
Lucas David Barkley, et al.	)	
	)	Confirmation No.: 1421
Serial No.: 11/323,809	)	
	)	Art Unit: 2853
Filing Date: December 30, 2005	)	
	)	Examiner: Lam S. Nguyen
For: SENSING TEMPERATURE BY SILICON REGION	)	
	)	
	)	

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

VIA EFS
BOX AF

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

Sir:

Responsive to the final Office Action dated May 19, 2008, Attorney for the Assignee submits the following amendments and remarks. In light of these amendments and remarks, Attorney for the Assignee respectfully asserts that all of the claims of the patent application are patentable, and that the application be allowed.

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

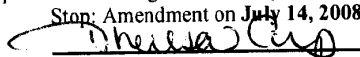
Remarks begin on page 6 of this paper.

Conclusion begins on page 8 of this paper.

DO NOT ENTER: /L.N./

Certificate of Electronic Delivery

I hereby certify that this correspondence is being electronically filed with the Commissioner for Patents, Mail Stop: Amendment on **July 14, 2008**.


Theresa Camp

7957773.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	Confirmation No.: 1421
Lucas Barkley, et al.	)	
	)	Art Unit: 2853
Serial No.: 11/323,809	)	
	)	Examiner: Lam S. Nguyen
Filed: December 30, 2005	)	
	)	
For: METHODS AND APPARATUSES FOR SENSING	)	
TEMPERATURE OF MULTI-VIA HEATER CHIPS	)	
	)	
Attorney Docket No. 2005-0463.02	)	
	)	

SUBMISSION OF SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

The citation of information on the attached Form PTO/SB/08A, "Information Disclosure Statement by Applicant" is made pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98.

Pursuant to the Office's waiver of the requirement for submitting a copy of each cited U.S. patent and each U.S. patent application publication for all U.S. national patent applications, no copy of any cited U.S. patent or U.S. patent application publication is provided herewith.

The citation of this information does not constitute an admission of priority or that any cited item is available as a reference, or a waiver of any right applicant may have under applicable statutes, Rules of Practice in patent cases, or otherwise.

Applicant: Lucas Barkley, et al.
Application No.: 11/323,809
Filed: December 30, 2005
Page 2 of 2

This Statement is submitted under 37 C.F.R. § 1.97(c). Accordingly, the Commissioner is hereby authorized to charge the fee of \$180.00 required for consideration of this Statement to Deposit Account No. 19-5029. No-additional fees are believed due; however, any additional fee required is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully submitted,



Christopher J. Chan
Attorney for Assignee
Registration No. 44,070

Date: July 14, 2008

SUTHERLAND ASBILL & BRENNAN LLP
999 Peachtree Street, NE
Atlanta, GA 30309
Telephone: 404-853-8000
Facsimile: 404-853-8806
SAB Internal No.: 19403-0063

Attorney Docket No. 2005-0463.02

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas David Barkley, et al.	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6357863		2002-03-19	Anderson, et al.	
	2	6601941		2003-08-05	Jones, et al.	
	3	6382773		2002-05-05	Chang, et al.	
	4	6641242		2003-08-05	Canti, et al.	
	5	6644774		2003-11-11	Burger, et al.	
	6	6764163		2004-07-20	Anderson, et al.	
	7	6808243		2004-10-26	Markham, et al.	
	8	6871929		2005-03-29	Crivelli, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas David Barkley, et al.	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

	9	6883904		2005-04-26	Jeanmarie, et al.	
	10	6951378		2005-10-04	Yamada, et al.	

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

Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070153045		2007-07-05	Barkley, et al.	
	2	20050052500		2005-03-10	Edelen, et al.	

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

Add

FOREIGN PATENT DOCUMENTS

Remove

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	11-254409	JP		1999-09-14	Uenishi		☐

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

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas David Barkley, et al.
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	11323809
Filing Date	2005-12-30
First Named Inventor	Lucas David Barkley, et al.
Art Unit	2853
Examiner Name	Lam S. Nguyen
Attorney Docket Number	2005-0463.02

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Christopher J. Chan/	Date (YYYY-MM-DD)	2008-07-14
Name/Print	Christopher J. Chan	Registration Number	44,070

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : **11/323,809**
 Filed : **December 30, 2005**
 Applicant : **Lucas Barkley, et al.**
 Title : **METHODS AND APPARATUSES FOR SENSING TEMPERATURE
 OF MULTI-VIA HEATER CHIPS**

Confirmation No. : **1421**
 Art Unit : **2853**
 Examiner : **Lam S. Nguyen**

Attorney Docket No. : **2005-0463.02**
 Customer No. : **29052**

DISCLOSURE UNDER 37 C.F.R. § 1.56

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

Sir:

The citation of information below and in the enclosed documents is made pursuant to 37 C.F.R. § 1.56.

The prosecution of the following U.S. patent application numbers may be relevant to pending U.S. Patent Application No. 11/323,809:

- (1) U.S. Patent Application No. 11/238,559 (filed September 29, 2005)
 - Non-final Office Action mailed March 22, 2007
 - Response to Non-final Office Action mailed June 19, 2007
 - Final Office Action mailed August 31, 2007
 - Response to Final Office Action mailed October 30, 2007
 - Advisory Action mailed November 13, 2007
 - Request for Continued Examination filed November 30, 2007
 - Non-final Office Action mailed February 11, 2008
 - Response to Non-final Office Action mailed on May 12, 2008
- (2) U.S. Patent Application No. 11/324,167 (filed December 30, 2005)

7964342.1

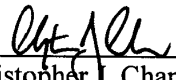
Application No.: 11/323,809
Filed: December 30, 2005
Information Disclosure Statement

- Non-final Office Action mailed December 26, 2007
- Response to non-final Office Action mailed March 25, 2008
- Final Office Action mailed May 12, 2008
- Response to Final Office Action mailed July 14, 2008

These Office Actions, Responses to Office Action, Advisory Opinions, and Notice of Allowances (if any) as well as additional information relating to the prosecution history of these granted and pending patent applications may be accessible through the Patent Application Information Retrieval System (PAIRS) located¹ on the United States Patent and Trademark Office's website.

The citation of this information does not constitute an admission or a waiver of any right the Applicants may have under applicable statutes, Rules of Practice in patent cases, or otherwise. The citation of this information is made to ensure the Examiner is aware of and considers the prosecution history associated with these related patent applications and patents.

Respectfully submitted,



Christopher J. Chan
Attorney for the Assignee
Reg. No. 44,070

DATE: July 14, 2008

SUTHERLAND ASBILL & BRENNAN, LLP
999 Peachtree Street, NE
Atlanta, GA 30309-3996
(404) 853-8000
(404) 853-8806 (fax)
SAB Internal No.: 19403-0063

Attorney Docket No.: 2005-0463.02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	Customer No.: 29052
Lucas David Barkley, et al.	)	
	)	Confirmation No.: 1421
Serial No.: 11/323,809	)	
	)	Art Unit: 2853
Filing Date: December 30, 2005	)	
	)	Examiner: Lam S. Nguyen
For: SENSING TEMPERATURE BY SILICON REGION	)	
	)	
	)	

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

VIA EFS
BOX AF

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

Sir:

Responsive to the final Office Action dated May 19, 2008, Attorney for the Assignee submits the following amendments and remarks. In light of these amendments and remarks, Attorney for the Assignee respectfully asserts that all of the claims of the patent application are patentable, and that the application be allowed.

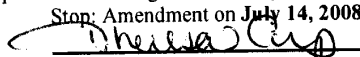
Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 6 of this paper.

Conclusion begins on page 8 of this paper.

Certificate of Electronic Delivery

I hereby certify that this correspondence is being electronically filed with the Commissioner for Patents, Mail Stop: Amendment on **July 14, 2008**.


Theresa Camp

7957773.1

Amendments to the Claims

Please enter the following amendments to the claims:

Listing of Claims:

1. (Currently Amended) A chip for use with a printing device, comprising:
 - a first heater array, positioned substantially adjacent a first via;
 - a second heater array, positioned substantially adjacent a second via;
 - a region, positioned between the first heater array and the second heater array; and
 - a temperature sensing element operable to sense a temperature of the region, the temperature being representative of the first heater array and the second heater array, wherein the temperature sensing element is substantially centrally disposed with respect to the region, and is substantially between the first heater array and the second heater array;
 - a third heater array, positioned substantially adjacent the second via;
 - a fourth heater array, positioned substantially adjacent a third via;
 - a second region, positioned between the third heater array and the fourth heater array; and
 - a second temperature sensing element operable to sense the temperature of the second region, wherein the temperature sensing element is substantially centrally disposed with respect to the second region and is substantially between the third heater array and the fourth heater array.
2. (Original) The chip of claim 1, wherein the temperature sensing element comprises a temperature sensing resistor.
3. (Original) The chip of claim 2, wherein the temperature sensing element comprises a thermal sense resistor.
4. (Original) The chip of claim 3, wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.
5. (Original) The chip of claim 1, wherein the temperature sensing element is positioned at least 300 microns from each of the first heater array and the second heater array.

6. (Original) The chip of claim 5, wherein the temperature sensing element is positioned substantially planar to each of the first heater array and the second heater array.
7. (Original) The chip of claim 1, further comprising at least one control element operable to receive a temperature measured by the temperature sensing element.
8. (Cancelled) The chip of claim 1, further comprising:
 - a third heater array, positioned substantially adjacent the second via;
 - a fourth heater array, positioned substantially adjacent a third via;
 - a second region, positioned between the third heater array and the fourth heater array; and
 - a second temperature sensing element operable to sense the temperature of the second region, wherein the temperature sensing element is substantially centrally disposed with respect to the second region.
9. (Original) The method of claim 8, wherein the temperature sensing element positioned between the first heater array and the second heater array is different than the second temperature sensing element positioned between the third heater array and the fourth heater array.
10. (Currently Amended) A method of fabricating chips for use with a printing device, comprising:
 - providing a first heater array, positioned substantially adjacent a first via;
 - providing a second heater array, positioned substantially adjacent a second via; and
 - positioning a temperature sensing element in a region adjacent to and immediately between the first heater array and the second heater array and substantially adjacent to both the first heater array and second heater array, wherein the temperature sensing element is operable to sense a temperature of the region, the temperature being representative of the first heater array and the second heater array;
 - providing at least one control element operable to receive a temperature measured by the temperature sensing element;
 - providing a third heater array substantially adjacent the second via;
 - providing a fourth heater array substantially adjacent a third via; and
 - positioning a second temperature sensing element in a second region located between the third heater array and the fourth heater array, wherein the temperature sensing element is

operable to sense the temperature of the second region, and wherein the temperature sensing element is substantially centrally disposed with respect to the second region, and is substantially between the third heater array and the fourth heater array.

11. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing element in substantially the center of the region.
12. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing resistor in the region.
13. (Original) The method of claim 12, wherein positioning a temperature sensing element in the region comprises positioning a thermal sense resistor in the region.
14. (Original) The method of claim 13, wherein positioning a temperature sensing element in the region comprises positioning an n-type implant donor thermal sensing resistor in the region.
15. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region between the first heater array and the second heater array comprises positioning the temperature sensing element at least 300 microns from each of the first heater array and the second heater array.
16. (Original) The method of claim 15, wherein positioning a temperature sensing element in the region between the first heater array and the second heater array comprises positioning the temperature sensing element substantially planar to each of the first heater array and the second heater array.
17. (Cancelled) The method of claim 10, further comprising providing at least one control element operable to receive a temperature measured by the temperature sensing element.
18. (Cancelled) The method of claim 17, further comprising:
 - providing a third heater array substantially adjacent the second via;
 - providing a fourth heater array substantially adjacent a third via; and
 - positioning a second temperature sensing element in a second region located between the third heater array and the fourth heater array, wherein the temperature sensing element is operable to sense the temperature of the second region, and wherein the temperature sensing element is substantially centrally disposed with respect to the second region.

19. (Original) The method of claim 18, wherein the temperature sensing element positioned between the first heater array and the second heater array is different than the second temperature sensing element positioned between the third heater array and the fourth heater array.

REMARKS

Claims 1-19 are currently under examination and have been rejected by the prior Office Action. After entry of the present amendment, claims 1-7, 9-16, and 19 remain pending in the application. The present amendment amends independent claims 1 and 10 to clarify the scope of the claimed invention, and incorporates the subject-matter of dependent claims 8, 17, and 18 into the respective independent claims. Claims 8, 17, and 18 are cancelled by the present amendment. The Office Action acknowledged acceptance of a prior filed terminal disclaimer with respect to copending Application No. 11/323,167, against which claims 1-19 of the present application had been provisionally rejected for nonstatutory obviousness-type double patenting. No new matter is introduced by way of the present amendment. Reconsideration of the application in view of the present amendment and following remarks is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-3, 5-13, and 15-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over the applicant's alleged admission as prior art (FIGs. 1-2) in view of Askeland, et al., U.S. Patent Publication No. 2003/0142159 ("*Askeland*"). Claims 4 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over the applicant's alleged admission as prior art (FIGs. 1-2) in view of *Askeland*, and further in view of Edelen, et al., U.S. Publication No. 2005/0052500 ("*Edelen*").

Independent claims 1 and 10 have been amended by the present response to respectively incorporate the subject-matter of dependent claims 8, 17, and 18. For example, claim 1 has been amended to include the elements "a third heater array, positioned substantially adjacent the second via; a fourth heater array, positioned substantially adjacent a third via; a second region, positioned between the third heater array and the fourth heater array; and a second temperature sensing element operable to sense the temperature of the second region, wherein the temperature sensing element is substantially centrally disposed with respect to the second region and is substantially between the third heater array and the fourth heater array" and claim 10 has been similarly amended. The present Office Action acknowledged acceptance of a prior filed terminal disclaimer with respect to copending Application No. 11/323,167, for which claims 8, 17, and 18

had been provisionally rejected for nonstatutory obviousness-type double patenting. Neither Applicant's FIGs. 1 and 2, *Askeland*, or *Edelen*, either alone or in combination with each other, teaches or suggests at least the above elements of Applicant's amended claims 1 and 10.

Furthermore, Applicant's alleged admission of FIGs. 1 and 2 does not teach or suggest each and every element of the Applicant's amended independent claims 1 and 10. For instance, Applicant's amended claim 1 includes the amended element, "a temperature sensing element operable to sense a temperature of the region, the temperature being representative of the first heater array and the second heater array, wherein the temperature sensing element is substantially centrally disposed with respect to the region, and is substantially between the first heater array and the second heater array" (Underlining supplied). Claim 10 has been similarly amended to include the element "positioning a temperature sensing element in a region adjacent to and immediately between the first heater array and the second heater array and substantially adjacent to both the first heater array and second heater array, wherein the temperature sensing element is operable to sense a temperature of the region, the temperature being representative of the first heater array and the second heater array" (Underlining supplied). The temperature sense resistor 222 shown in FIG. 2 is not substantially adjacent to the cyan heater array 208. Because the cyan ink via 202 is disposed between the temperature sense resistor 222 and the cyan heater array 208, the temperature sense resistor 222 is not substantially adjacent to both the cyan heater array 208 and the magenta heater array 210. Neither Applicant's FIGs. 1 and 2, *Askeland*, or *Edelen*, either alone or in combination with each other, teaches or suggests at least the above elements of Applicant's amended claims 1 and 10.

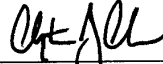
For at least the reasons provided above, the amended independent claims 1 and 10 are believed to be allowable over the cited references, and in condition for allowance.

Dependent claims 2-7, 9, 11-16, and 19 are ultimately dependent on at least one of independent claims 1 or 10, for which arguments of patentability have been provided above. If the underlying independent claims are in condition for allowance, then the respective dependent claims should also be in condition for allowance.

CONCLUSION

It is not believed that extensions of time or fees for addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully submitted,



Christopher J. Chan
Attorney for the Assignee
Reg. No. 44,070

DATE: 14 JULY 2008

SUTHERLAND ASBILL & BRENNAN LLP
999 Peachtree Street NE
Atlanta, Georgia 30309-3996
Telephone: (404) 853-8049
Facsimile: (404) 853-8806

Atty. Docket No.: 19403-0063
Lexmark No.: 2005-0463.02

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平11-245409

(43) 公開日 平成11年(1999) 9月14日

(51) Int. Cl.⁴

識別記号

F 1

B 4 1 J 2/05

B 4 1 J 3/04

1 0 3 B

審査請求 未請求 請求項の数 6 O L (全 12 頁)

(21) 出願番号

特願平10-46463

(22) 出願日

平成10年(1998) 2月27日

(71) 出願人 000001443

カシオ計算機株式会社

東京都渋谷区本町1丁目6番2号

(72) 発明者 上西 勝三

東京都青梅市今井3丁目10番6号 カシオ
計算機株式会社青梅事業所内

(72) 発明者 太田 守雄

東京都青梅市今井3丁目10番6号 カシオ
計算機株式会社青梅事業所内

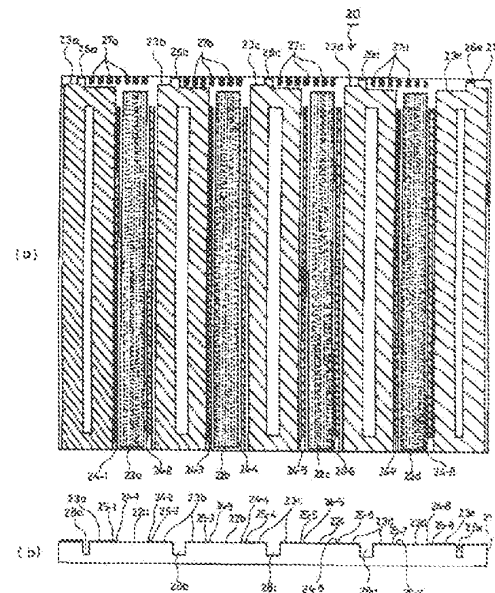
(74) 代理人 弁理士 大曾 義之

(54) 【発明の名称】 サーマルインクジェットヘッド

(57) 【要約】

【課題】 高解像度、小容積で且つ部材の安定した積層が可能なサーマルインクジェットヘッドを提供する。

【解決手段】 シリコン基板21上のサーマルインクジェットヘッド20には4つの駆動回路22a、22b、22c及び22dが形成される。共通電極23aには共通電極23aとの間に個別配線電極24-1を介して第1のオリフィス列の抵抗25-1及び共通電極23bとの間に個別配線電極24-2を介して第2のオリフィス列の抵抗25-2が接続され、第1及び第2のオリフィス列のインク吐出が時分割で制御される。駆動回路22b、22c及び22dも同様に左右の2列のオリフィス列の抵抗を時分割で駆動する。第1及び第8のオリフィス列にはインク通路28a、28cから黒インク、第2と第3、第4と第5、第6と第7のオリフィス列には夫々Mインク、Cインクが供給される。同色の2列のオリフィスの配置は1/2間隔ずれて配置される。



1/17/2008, EAST Version: 2.2.1.0

【特許請求の範囲】

【請求項1】 複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、前記発熱素子上に供給されるインクを前記発熱素子にて加熱し、前記インクと前記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、

隣接する発熱ヘッド間に設けられ、該両側の発熱ヘッドの発熱素子に対し共通に前記インクを供給する単一のインク供給路、

を有することを特徴とするサーマルインクジェットヘッド、

【請求項2】 複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、

前記発熱素子上に供給されるインクを前記発熱素子にて加熱し、前記インクと前記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、

第1の発熱ヘッドと第2の発熱ヘッド間に設けられ、前記第1の発熱ヘッド内の第n番目の発熱素子と前記第2の発熱ヘッド内の第m番目の発熱素子とに共通に駆動信号を供給する駆動手段と、

該駆動手段による前記駆動信号の供給と、前記第1の発熱ヘッドの共通電極と前記第2の発熱ヘッドの共通電極とを、時分割に選択することにより前記第1の発熱ヘッドの発熱素子と前記第2の発熱ヘッドの発熱素子とを時分割駆動するよう前記駆動手段を制御する制御手段と、を有することを特徴とするサーマルインクジェットヘッド、

【請求項3】 複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、前記発熱素子上に供給されるインクを前記発熱素子にて加熱し、前記インクと前記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、

nを整数とし、第n+1列目の発熱ヘッドと第n+2列目の発熱ヘッドの共通電極を単一の共通電極で構成し、第n+3列目の発熱ヘッドと第n+4列目の発熱ヘッドの共通電極を他の単一の共通電極で構成し、

前記第n+2列目の発熱ヘッド内の発熱素子と前記第n+3列目の発熱ヘッド内の発熱素子を時分割駆動する駆動手段を有することを特徴とするサーマルインクジェットヘッド、

【請求項4】 mを整数とし、第m+1列目の発熱ヘッド内の発熱素子と第m+2列目の発熱ヘッド内の発熱素子とは、同一ピッチで且つ1/2ピッチだけ位置をずらして配置されることを特徴とする請求項1、2又は3記載のサーマルインクジェットヘッド、

【請求項5】 mを整数とし、第m+1列目の発熱ヘッ

ドと第m+2列目の発熱ヘッドは、同色のインクを吐出することを特徴とする請求項4記載のサーマルインクジェットヘッド、

【請求項6】 第1列目の発熱ヘッドと最終列の発熱ヘッドからは黒インクを吐出させ、他の発熱ヘッドからはカラーインクを吐出させ、該カラーインクの吐出されるドット密度は前記黒インクの吐出されるドット密度の2倍に構成されることを特徴とする請求項3記載のサーマルインクジェットヘッド、

10 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、サーマルインクジェットヘッドに関する。

【0002】

【従来の技術】近年、サーマルインクジェット方式を用いたプリンタが主流を占めてきている。このサーマルインクジェット方式は、印字のために射出するインクの液滴形成過程において、①ヒータを熱してヒータ面上に核気泡を発生させる。②この核気泡が合体して膜気泡が生まれる。③この膜気泡が断熱膨張して成長する。④その成長した膜気泡が周囲のインクに熱を取られて収縮する。⑤ついには膜気泡が消滅し、次のヒータ加熱を待つ、という一連の工程を瞬時に行うことによって成り立っている。そして、上記の①～⑤の工程には膜沸騰現象が利用されている。

【0003】膜沸騰現象は、例えば鉄の焼き入れのように高温に加熱された物体を液体中に漬けた場合と、液体と接する物体の表面温度を急激に上げた場合とに発現するが、サーマルインクジェットプリンタに用いられる膜沸騰現象は後者の「液体と接する物体の表面温度を急激に上げる」方法によっている。

【0004】また、このように膜沸騰現象を利用し、三原色のインクを吐出して、フルカラー印刷を行うインクジェットプリンタの印字ヘッド（サーマルインクジェットヘッド）は、一般に、シリコンLSIと薄膜技術を利用して製造される。

【0005】そして、その製造方法では、例えば解像度が360dpi（ドット／インチ）の印字ヘッドであれば128個のインク吐出ノズルを、それぞれ個々に駆動回路を対応させて一括して製造する方法が知られている。また、解像度が720dpiの場合であれば256個のインク吐出ノズルが個々の駆動回路と共に形成される。

【0006】これを簡単に説明すると、まず、工程1として、4インチ以上のシリコン基板にLSI形成処理により駆動回路とその端子を形成する。次に、工程2として、薄膜技術によりNiなどによる電極、Ta-Si-SiOなどの微細抵抗を形成する。続いて、工程3として、ウェットエッチングまたはサンドブラスト法などにより上記シリコン基板にインク供給路とインク供給孔を

形成する。更に、工程4として、感光性ポリイミドなどの有機材料を用いて個々のインク吐出口に対応するインク溝を形成すべく隔壁を積層する。そして、工程5として、エポキシ樹脂接着剤などのついた銅薄板またはポリイミド等によりなる薄板部材をシリコン基板に張り付けて上記隔壁によって形成されたインク溝に蓋をして個別の微細通路（インク案内路）を形成する。また更に、工程6として、上記薄板部材の上記微細抵抗に対応する部分にエキシマレーザなどにより $40\mu\text{m} \sim 20\mu\text{m}$ の孔を空けて、多数のノズル孔（オリフィスともいう）を一括形成する。ここまでは、ウェハの状態での処理される。そして、最後に、工程7として、グイッシングソーなどを用いてカツテングして、単位毎に個別に分割する。尚、オリフィスは、一般には導波管等の終端または壁面に形成されたエネルギー伝達用の孔又は窓の意である。

【0007】図6(a)、(b)、(c)及び図7(a)、(b)、(c)は、上記のサーマルインクジェットヘッドの発熱ヘッドの製造方法を工程順に示す図である。図6(a)、(b)、(c)はそれぞれ概略の平面図と断面図を示しており、図7(a)、(b)、(c)はそれぞれ上段に図6(a)、(b)、(c)の詳細拡大部分図、中段に上段のA-A'断面矢視図、下段に上段のB-B'断面矢視図を示している。

【0008】尚、これらの図では、説明の便宜上、いずれも1個の発熱ヘッドのみを示しているが、実際にはこのような発熱ヘッドが複数個連なっており、1枚のシリコン基板上に形成される。また、図6(a)、(b)、(c)のそれぞれ下段に示している断面図は、図7(a)、(b)、(c)のそれぞれ中段に示すA-A'断面矢視図と同一のものである。

【0009】上記の図6(a)及び図7(a)は、上述した工程1～工程3が終了した直後の状態を示している。すなわち、シリコン基板1上には、共通電極2、共通電極給電端子3（図6(a)参照）、個別配線電極4、抵抗5、駆動回路6、駆動回路端子7（図6(a)参照）、インク供給路8、及びインク供給孔10（図7(a)参照）が形成されている。

【0010】次に図6(b)及び図7(b)は、上述の工程4が終了した直後の状態を示している。すなわち、共通電極2のインク供給路8の左側に位置する部分と、個別配線電極4が配設されている部分、及び各抵抗5と抵抗5の間に、隔壁部材9が積層されている。隔壁部材9の上記各抵抗5間に積層される部分は、個別配線電極4上の部分9-1を楕円の洞とすれば、各抵抗5間に伸び出す部分9-2は櫛の歯に相当する形状をなしている。これにより、この櫛の歯を隔壁として、その歯と歯の間の付け根部分に抵抗5が位置する微細なインク案内溝が、抵抗5の数だけ形成される。この隔壁部材9は、 $10\mu\text{m}$ 以上の厚さを有している。

【0011】そして、図6(c)及び図7(c)は、上述した工程5と工程6が終了した直後の状態を示している。すなわち、薄板部材11が駆動回路6と給電端子3及び

7の部分を除く全領域を覆っており、上記のインク案内溝も上を覆われて隔壁部材9の厚さ $10\mu\text{m}$ に対応する高さのインク案内路12を形成している。そして、抵抗5に対応する部分にノズル孔13が形成されており、これにより、1列のノズル孔13を備えた発熱ヘッド14が完成する。

【0012】通常フルカラー印字においては、減法混色の三原色であるイエロー（Y）、マゼンタ（M）、シアン（C）の3色に、文字や画像の黒部分に専用されるブラック（Bk）を加えて合計4色のインクを必要とする。したがって、最低でも4列のノズル列が必要である。そして、上述した製造方法によれば4列の素子をモノリシックに構成することは可能であり、各列の位置関係も今日の半導体の製造技術により正確に配置することが可能である。

【0013】図8は、上述の図6及び図7に示したシリコン基板1、共通電極2、共通電極給電端子3、個別配線電極4、抵抗5、駆動回路6、駆動回路端子7、インク供給路8、隔壁部材9、インク供給孔10、薄板部材11、ノズル孔13の各部を1組としてなる素子（発熱ヘッド）14を4列並べてフルカラーのサーマルインクジェットヘッドを構成した状態を示す図である。尚、同図は、発熱ヘッド14が4列並んだ構成を分かり易く示すため、図6(a)に示した工程1～工程3まで終了した状態のものを示している。

【0014】同図に示すように、サーマルインクジェットヘッド15は、4個の発熱ヘッド14（14a、14b、14c、14d）が並んで配置され、例えばインク供給路8aからYインクが発熱ヘッド14aのインク案内路12（図6(c)及び図7(c)参照）に供給され、インク供給路8bからMインクが発熱ヘッド14bのインク案内路12に供給され、インク供給路8cからCインクが発熱ヘッド14cのインク案内路12に供給され、そして、インク供給路8dからはBkインクが発熱ヘッド14dのインク案内路12に供給される。

【0015】印字に際しては、抵抗5が印字情報に応じて選択的に通電され、瞬時に発熱して膜沸騰現象を発生させ、その抵抗5に対応するノズル孔13からインク滴が吐出される。このようなインクジェット方式ではインク滴はノズル孔13の径に対応する大きさの球状で吐出され、紙面上には略その倍の径の大きさとなって印字される。

【0016】このようにして得られるフルカラーのサーマルインクジェットヘッドは、解像度が 360dpi の場合であれば $128\text{ノズル}/4\text{列}=640\text{ノズル}$ を備えることになり、概略 $8.5\text{mm} \times 19.0\text{mm}$ の大きさに形成される。また解像度が 720dpi の場合であれば、 $256\text{ノズル} \times 4\text{列}=1024\text{ノズル}$ が、 $8.5\text{mm} \times 19.0\text{mm}$ の大きさの中に形成される。

【0017】

【発明が解決しようとする課題】ところで、ノズル孔の径やその配置間隔は、印字の分解能（画像の解像度）によって設計される。上述したように、ノズル孔の径に対応する大きさの球形状で吐出されたインク滴は紙面上では略倍の大きさの径に広がるから、ノズル孔の径は印字するドットピッチの1/2の大きさに設計される。例えば解像度が360 dpiの場合であれば、ドットピッチは約70 μmであり、したがって、ノズル孔の径は30~40 μmに形成される。また、例えば720 dpiの場合では、ドットピッチは約35 μmであり、したがって、ノズル孔の径は15~20 μmとなる。

【0018】このように、ピッチが微細になると、シリコン基板1へオリフィス板（薄板部材11）を張り付ける際の積層される相手側（隔壁部材9の端の歯相当部分9-2）との接着面が減少し、安定した接着を実現することが困難になるという問題が発生する。

【0019】ところが、他方では、印字分解能を上げるために、一色を2列以上の発熱ヘッドで印字するような多列化が望まれ、ますます多ノズル化と高精細化の要求が高まってきている。

【0020】上述したように、フルカラー用のサーマルインクジェットヘッドは最低4列の発熱ヘッドを必要とするが、これらの発熱ヘッドは、図8に示したように、個別に独立の駆動回路6を持ち、これらには駆動回路端子7が配設されている。また、各発熱素子（抵抗5）に共通の電極への給電線も各発熱ヘッド毎に持っている。したがって、このサーマルインクジェットヘッドと外部回路との接続においては多数の接続部が発生し、この接続にはより高度な技術が要求される。

【0021】また、そればかりでなく、このように各発熱ヘッド毎に独立に積層される回路、電極、接続端子数等が多いため、これらを積層されるシリコンチップに大きな面積を必要とし、したがって、モノリシック（monolithic）に形成される発熱ヘッドの量産化が阻害される。

【0022】例えば、図6(a),(b),(c)に示した例では、1列のノズル孔13を有する発熱ヘッドを構成するために略2mmの幅を必要とする。そして、フルカラーのサーマルインクジェットヘッドでは、上記の発熱ヘッドを4列連設するから、前述したように、およそ8、5mm×19、0mmの大きさになる。したがって、例えば4インチのシリコンウエハ上には上記8、5mm×19、0mmのチップは30個程度、5インチのシリコンウエハでは55個程度しか形成できない。このように、1枚のウエハから取れるフルカラー用のサーマルインクジェットヘッドの数は非常に少ないため、製造コストの上昇を招くという問題も有していた。

【0023】本発明の課題は、上記従来の実情に鑑み、高解像度、小容積で且つ素子部材の安定した積層が可能なるサーマルインクジェットヘッドを提供することであ

る。

【0024】

【課題を解決するための手段】以下に、本発明のサーマルインクジェットヘッドの構成を述べる。先ず、請求項1記載の発明のサーマルインクジェットヘッドは、複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、上記発熱素子上に供給されるインクを上記発熱素子にて加熱し、上記インクと上記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、隣接する発熱ヘッド間に設けられ、該両側の発熱ヘッドの発熱素子に対し共通に上記インクを供給する単一のインク供給路を有して構成される。

【0025】次に、請求項2記載の発明のサーマルインクジェットヘッドは、複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、上記発熱素子上に供給されるインクを上記発熱素子にて加熱し、上記インクと上記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、第1の発熱ヘッドと第2の発熱ヘッド間に設けられ、上記第1の発熱ヘッド内の第n番目の発熱素子と上記第2の発熱ヘッド内の第m番目の発熱素子とに共通に駆動信号を供給する駆動手段と、該駆動手段による上記駆動信号の供給と、上記第1の発熱ヘッドの共通電極と上記第2の発熱ヘッドの共通電極とを、時分割に選択することにより上記第1の発熱ヘッドの発熱素子と上記第2の発熱ヘッドの発熱素子とを時分割駆動するよう上記駆動手段を制御する制御手段とを有して構成される。

【0026】更に、請求項3記載の発明のサーマルインクジェットヘッドは、複数の発熱素子をアレー状に配設した発熱ヘッドを複数設け、上記発熱素子上に供給されるインクを上記発熱素子にて加熱し、上記インクと上記発熱素子の界面に気泡を発生させることにより該発熱素子に対応するオリフィスからインク滴を吐出するサーマルインクジェットヘッドであって、nを整数とし、第n+1列目の発熱ヘッドと第n+2列目の発熱ヘッドの共通電極を単一の共通電極で構成し、第n+3列目の発熱ヘッドと第n+4列目の発熱ヘッドの共通電極を他の単一の共通電極で構成し、上記第n+2列目の発熱ヘッド内の発熱素子と上記第n+3列目の発熱ヘッド内の発熱素子を時分割駆動する駆動手段を有して構成される。

【0027】そして、mを整数として、例えば請求項4記載のように、上記第m+1列目の発熱ヘッド内の発熱素子と第m+2列目の発熱ヘッドの内の発熱素子とは、同一ピッチで且つ1/2ピッチだけ位置をずらして配置される。また、例えば請求項5記載のように、第m+1列目の発熱ヘッドと第m+2列目の発熱ヘッドは、同色のインクを吐出するように構成される。また、例えば請求項6記載のように、第1列目の発熱ヘッドと最終列の

発熱ヘッドからは黒インクを吐出させ、他の発熱ヘッドからはカラーインクを吐出させ、該カラーインクの吐出されるドット密度は上記黒インクの吐出されるドット密度の2倍に構成される。

【0028】

【発明の実施の形態】以下、本発明の実施の形態を図面を参照しながら説明する。図1(a)は、一実施の形態におけるサーマルインクジェットヘッドの構成を示す平面図であり、同図(b)は、その断面図である。尚、同図(a),(b)に示すサーマルインクジェットヘッド20は、構成を分かり易く示すため、図6及び図7に示した従来の発熱ヘッドと同様の製作工程において、シリコン基板に駆動回路とその端子を形成し、薄膜技術により電極と抵抗を形成し、ウェットエッチングまたはサンドブラスト法等によりインク供給路を形成したところまでの状態を示しており、シリコンウエハにモノリシックに形成されたものの中から1個のみを切り出して示している。

【0029】このサーマルインクジェットヘッド20は、図1(a),(b)に示すように、シリコン基板21に、4つの駆動回路22a、22b、22c及び22dが形成されている。第1の駆動回路22aには、一方では第1の共通電極23aとの間に個別配線電極24-1を介して抵抗25-1が接続されて形成され、他方では第2の共通電極23bとの間に個別配線電極24-2を介して抵抗25-2が接続されて形成される。

【0030】第2の駆動回路22bには、一方では上記第2の共通電極23bとの間に個別配線電極24-3を介して抵抗25-3が接続されて形成され、他方では第3の共通電極23cとの間に個別配線電極24-4を介して抵抗25-4が接続されて形成される。

【0031】同様に、第3の駆動回路22cには、一方では上記第3の共通電極23cとの間に個別配線電極24-5を介して抵抗25-5が接続されて形成され、他方では第4の共通電極23dとの間に個別配線電極24-6を介して抵抗25-6が接続されて形成される。

【0032】そして、第4の駆動回路22dには、一方では上記第4の共通電極23dとの間に個別配線電極24-7を介して抵抗25-7が接続されて形成され、他方では第5の共通電極23eとの間に個別配線電極24-8を介して抵抗25-8が接続されて形成されている。

【0033】上記5個の共通電極23a~23eには、それぞれ給電端子26a~26eが接続して形成され、4個の駆動回路22a~22dには、それぞれ駆動回路端子27a~27dが接続して形成されている。

【0034】そして、共通電極23a~23eは、それぞれ長手方向に沿って中央部が切り欠かれ、その下方にインク供給路28a~28dが形成されている。このインク供給路28a~28dには、特には図示しないが、シリコン基板21を貫通するインク供給孔が連通してそ

れぞれ形成される。

【0035】そのインク供給孔からは、この例では、第1のインク供給路28a及び第5のインク供給路28eにBkインクが供給される。そして、第2のインク供給路28bにYインクが供給され、第3のインク供給路28cにMインクが供給され、第4のインク供給路28dにはCインクが供給される。

【0036】図2(a)は、上記の状態から更に、図6及び図7に示した従来の発熱ヘッドと同様の製作工程において、各抵抗25(25-1、25-2、...、25-7、25-8)に対応するインク溝を形成する隔壁を積層し、オリフィス板を貼りつけてインク案内路を形成し、エキシマレーザによりノズル孔を一括形成して、単体として切り出したフルカラー用サーマルインクジェットヘッドの完成品を示す平面図であり、同図(b)は、その断面図である。上述した図1(a),(b)に示した状態における共通電極23(23a~23e)の一部と個別配線電極24(24-1~24-8)の部分に重ねて、図2(b)に示すように、隔壁部材31が積層され、その上に、駆動回路22(22a~22d)の配設部を除いた部分に、5枚のオリフィス板32(32a、32b、32c、32d、32e)が、同図(a),(b)に示すように貼り合わせられる。

【0037】オリフィス板32aには、抵抗25-1に対応する位置に、所定の径(このサーマルインクジェットヘッド20の解像度が360dpiであれば、本例においては15~20μmφ、これについては後述する)のノズル孔33(33-1、33-2、...、33-7、33-8)が所定の間隔(約70μm)で一括してそれぞれ形成されている。

【0038】上述した第1のインク供給路28aのBkインクは、オリフィス板32aのノズル孔33-1のノズル列に供給され、第5のインク供給路28eのBkインクは、オリフィス板32eのノズル孔33-8のノズル列に供給される。

【0039】そして、第2のインク供給路28bのYインクは、オリフィス板32bのノズル孔33-2のノズル列及びノズル孔33-3のノズル列に供給され、第3のインク供給路28cのMインクは、オリフィス板32cのノズル孔33-4のノズル列及びノズル孔33-5のノズル列に供給され、第4のインク供給路28dのCインクは、オリフィス板32dのノズル孔33-6のノズル列及びノズル孔33-7のノズル列に供給される。

【0040】このように、各色毎に2列のノズル列、つまり4色分合計で8列のノズル列を備え、それらのノズル孔33にインクを供給するインク供給路28は、ノズル列の数よりも3本少ない5本で構成されて、共通電極32も5個である。また、それらのノズル列に対応する抵抗25を発熱駆動する駆動回路22は4個であり、駆動回路端子27(27a~27d)も4組である。

【0041】このように、4個の駆動回路22で、その倍の列数のノズル孔33の抵抗25の発熱駆動を時分割で制御するように構成される。このように時分割駆動が可能であるのは、サーマルインクジェットヘッドでは、インクの吐出のための抵抗（発熱素子）への通電パルス幅は1μ秒であり、同じノズル孔から次ぎの信号でインクを吐出させるための周期、つまり吐出繰り返し周波数は1kHz～10kHz（1m秒～100μ秒間隔）である。したがって、数拾mHz又はそれ以上の周期で動作可能な駆動回路としては時間的な余裕が充分にあり、この時間的余裕を利用して、時分割で2列のノズル列の抵抗を駆動するようにしたものである。

【0042】また、上記のように同一の抵抗に対する最初の発熱駆動と次の発熱駆動との間には充分な時間的余裕があるから、例えばベタ印字の場合に考慮される発熱ヘッドの最大許容電流の関係も加味して（やや時間的間隔を空けて）上記の時分割駆動を行っても、この時分割駆動が印字速度を低下させる要因とはならない。

【0043】そして、このサーマルインクジェットヘッド20は、各色毎に2列のノズル列、合計8列のノズル列を備えておりながら、全体の大きさは、図8に示した従来の4列のノズル列のものと大差のない寸法で構成されている。

【0044】図3(a)は、上記のサーマルインクジェットヘッド20の、1列のノズル列によるベタ印字を模式的に示したものである。本来であれば360dpiのドット配列では70、6μmのピッチで、ノズル孔の大きさは30～40μmであり、インク滴が倍に広がって、上記のベタ印字では各印字ドットは密着していなければならない。しかし、本実施の形態においては、ノズル孔配置の2倍の解像度で印字を行うために、ノズル孔の径は、720dpiのドット配列の場合に相当する15～20μmに形成されている。そして、同一色の2列のノズル列のノズル孔の配置を1/2ピッチずらして形成している。

【0045】図3(b)は、そのような同一色の2列のノズル孔の配置関係を示している。同図(b)は、1/2ピッチのずれを示すために、2列のノズル列で印字タイミングをずらして印字した場合を示しているが、実際の印字では2列のノズル列で紙面の同一印字領域に印字するようにタイミングをとって、図3(c)に示すように、1列のノズル孔配列の1/2ピッチのドット密度で印字が行われる。このように、小さなオリフィス（ノズル孔）を形成し、1/2ピッチずらした2列のオリフィス列を用いることで、オリフィス列が1列の構成の場合の2倍の解像度を実現することができる。

【0046】このように、本実施の形態においては、駆動回路、給電回路、インク供給路を2列のオリフィス列に共通化することによって、チップの小型化が図れ、サーマルインクジェットヘッドのサイズを大きくすること

なく殆ど従来同様のサイズのままで、従来の2倍のノズル列を構成することができる。また、従来の微細加工の技術水準で2倍の解像度を有する高精細のサーマルインクジェットヘッドを実用的に構成することができる。

【0047】尚、カラー画像は常にきめの細かな高解像度が要求されるが、文字等の黒印字ではそれほど高解像度は要求されない。また、一般に、プリンタは、事務用に限らず個人用に使用されるものであっても、文字（文章）の印字に用いられる場合が多い。したがって、主として文字印字に専用されるBkインクのノズル列のノズル孔配列を、他の色のノズル孔配列の2倍のピッチで且つ2倍の孔径で形成するようにしてもよい。

【0048】図4(a)は、そのような構成のサーマルインクジェットヘッドのYインク、Mインク及びCインクの印字ドット（図3(a)に示した印字ドットと同一）を示し、図4(b)は、Bkインクの印字ドットを同図(a)と同一の拡大率で示している。このように構成すれば、黒のみによる文字による印字の際には、第1列と第8列との印字を分組（例えば印字データの奇数列を第1列目のヘッド、偶数列を第8列目のヘッドで印字）することにより印字速度を2倍に向上させることができる。

【0049】また、前述の図1～図3において、8列全てのオリフィス列から同一色の（例えば黒の）インク滴を吐出するようにし、8列のオリフィス列のノズル孔配置を、それぞれ解像度を決めるピッチの整数倍の位置関係でずらして配置するようにしてもよい。そうすれば、単一色ではあるが極めて高精細の印字画像を得ることができる。

【0050】尚、上記の実施の形態では、いずれも色毎に2列のノズル列を構成する例を示したが、これに限ることなく、色毎のノズル列を1列で構成して、そのノズル列の抵抗を時分割で駆動するようにしてもよい。

【0051】図5(a)は、他の実施の形態におけるサーマルインクジェットヘッドの構成を示す平面図であり、同図(b)は、その断面図である。同図(a)、(b)に示すように、このサーマルインクジェットヘッド20'は、4列の抵抗25'のオリフィス列と、これに対応する4本のインク供給路28'を備えているが共通電極23'は3個のみ、駆動回路22'は2個のみの構成である。この駆動原理は図1～図3に示したサーマルインクジェットヘッド20の場合と同様である。

【0052】この構成によれば、例えば360dpiの解像度で、1列に256ノズルの構成とすれば、サーマルインクジェットヘッド20'は、およそ20mm×6mmの寸法で設計可能である。図6～図8に示した従来の設計では、20mm×8mmの寸法であり、これは、4インチのシリコンウエハ上では30個のチップとなるが、本例のように20mm×6mmであると、40個のチップを形成できる。また、5インチのシリコンウエハでは、従来の55個に対して、本例の構成では75個の

チップを形成できる。

【0053】このように、1個のシリコンウエハから取れるチップの個数が3割又は4割の差となって、生産性の向上に大きく寄与することができる。また、図5(a)から明らかなように、外部との接続端子数も半減できるので、プリンタ装置本体への実装も容易であり、このためカラープリンタでは比較的交流頻度の高い部品となるサーマルインクジェットヘッドの保守作業が容易となって、より実用性の高いサーマルインクジェットヘッドが実現する。

【0054】尚、上記の構成は、中央の共通電極23'といずれか片側の駆動回路22'を一組として、任意の数だけ連接すれば、オリフィス列が4列から6列あるいは8列というように如何様にも拡張することができ、より高精細な印字を実現することができるものである。

【0055】

【発明の効果】以上詳細に説明したように、本発明によれば、2列のオリフィス列を1/2間隔ずらして配置してオリフィス径のみを微細化するので、通常の積層処理の加工精度でその倍の解像度の印字ができ、したがって、高精細な印字を行うサーマルインクジェットヘッドを実現することが容易に可能となる。

【0056】また、隣接するオリフィス列の発熱素子をこれと並列に接続した1つの駆動回路で時分割で駆動するので、駆動回路数がオリフィス列数の1/2でよいことになり、したがって、サーマルインクジェットヘッドの小型化が可能となる。

【0057】また、同様にサーマルインクジェットヘッドが小型になるので、1つのシリコン基板に形成するサーマルインクジェットヘッドの個数を少なくとも従来の40%以上増やすことができ、したがって、サーマルインクジェットヘッドの生産性が向上する。

【0058】また、駆動回路と共に駆動回路端子が半減するので、外部との接続端子数が半減してプリンタ本体への実装が容易となり、したがって、印字ヘッドの交換頻度が比較的高くなるカラープリンタの保守作業が容易となり、これにより、使い勝手が良くなって顧客の信頼を得ることができる。

【図面の簡単な説明】

【図1】(a)は一実施の形態におけるフルカラー用サーマルインクジェットヘッドの構成を示す製作工程途中の平面図、(b)はその断面図である。

【図2】(a)は製作工程を完了し単体として切り出したフルカラー用サーマルインクジェットヘッドの完成品を示す平面図、(b)はその断面図である。

【図3】(a)はサーマルインクジェットヘッドの1列のノズル列によるベタ印字を模式的に示す図、(b)は同一色の2列のノズル孔の配置関係を示す図、(c)は2列のノズル列で同一印字領域に印字して2倍のドット密度を実現できることを示す図である。

【図4】(a)はノズル孔形成の変形例としてカラーインクの印字ドットの径を示す図、(b)は黒インクの印字ドットの径を同一拡大率で示す図である。

【図5】(a)は他の実施の形態におけるサーマルインクジェットヘッドの構成を示す平面図、(b)はその断面図である。

【図6】(a)、(b)、(c)は従来のサーマルインクジェットヘッドの印字部の製造方法を工程順に示す概略の平面図と断面図である。

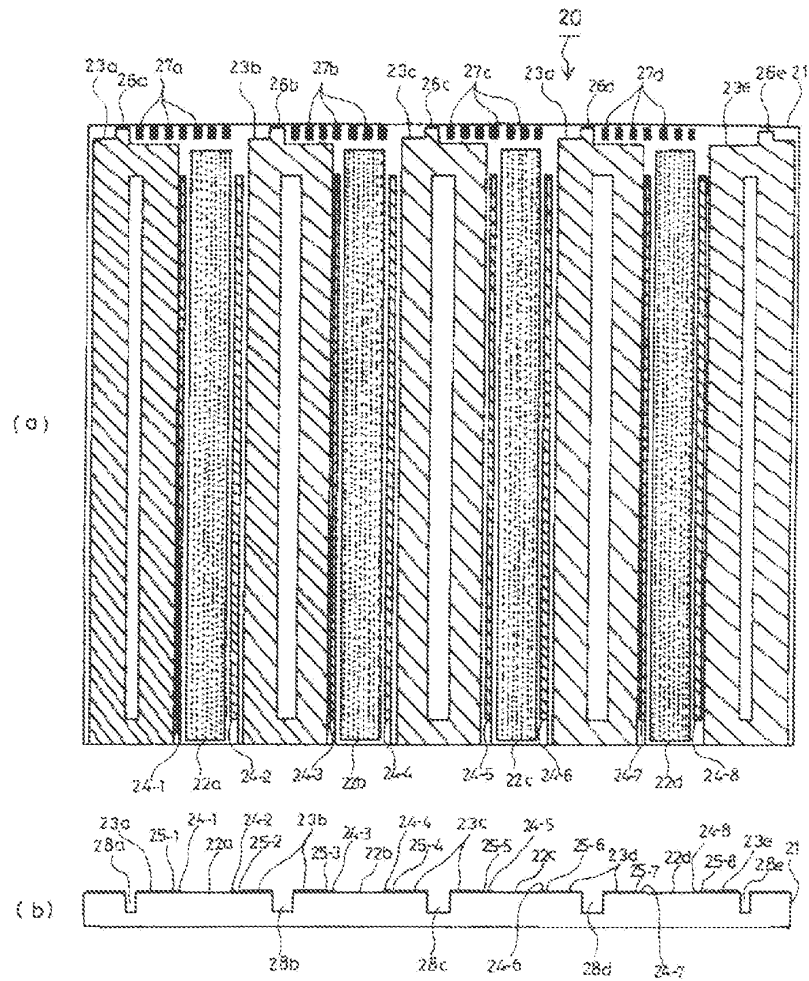
10 【図7】(a)、(b)、(c)は従来の印字部の詳細な拡大部分平面図を上段に、そのA-A'断面矢視図を中段に、B-B'断面矢視図を下段に示す図である。

【図8】従来の印字部を4列並べてフルカラーのサーマルインクジェットヘッドを構成した状態を示す図である。

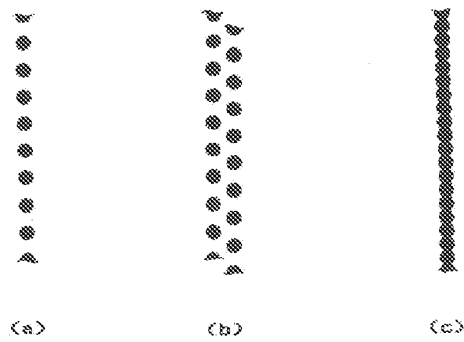
【符号の説明】

- 1 シリコン基板
- 2 共通電極
- 3 共通電極給電端子
- 20 4 個別配線電極
- 5 抵抗
- 6 駆動回路
- 7 駆動回路端子
- 8 (8a、8b、8c、8d) インク供給路
- 9 隔壁部材
- 9-1 極の銅相当部分
- 9-2 極の金相当部分
- 10 インク供給孔
- 11 薄板部材
- 12 インク案内路
- 13 ノズル孔
- 14 (14a、14b、14c、14d) 発熱ヘッド
- 20 サーマルインクジェットヘッド
- 21 シリコン基板
- 22 (22a、22b、22c、22d) 駆動回路
- 23 (23a、23b、23c、23d、23e) 共通電極
- 24 (24-1、24-2、…、24-7、24-8) 個別配線電極
- 25 (25-1、25-2、…、25-7、25-8) 抵抗(発熱素子)
- 26a、26b、26c、26d、26e 給電端子
- 27 (27a、27b、27c、27d) 駆動回路端子
- 28a、28b、28c、28d インク供給路
- 31 隔壁部材
- 32 (32a、32b、32c、32d、32e) オリフィス板
- 33 (33-1、33-2、…、33-7、33-8) ノズル孔

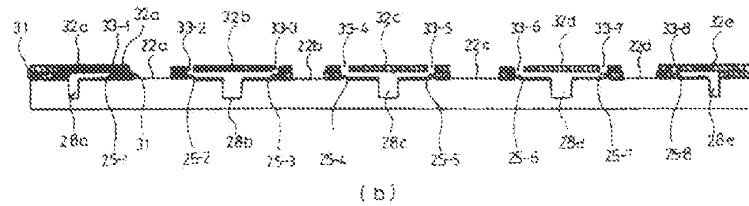
【図1】



【図3】



207



(10)

特開平11-245409

【図4】

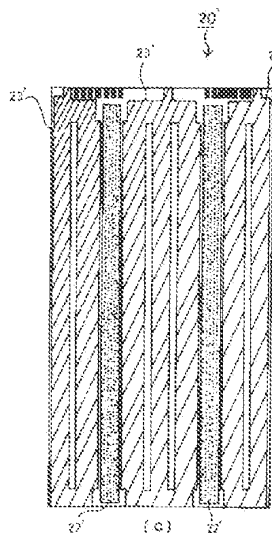


(a)

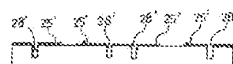


(b)

【図5】

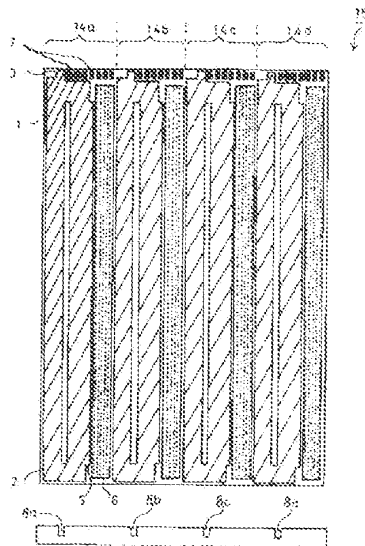


(c)

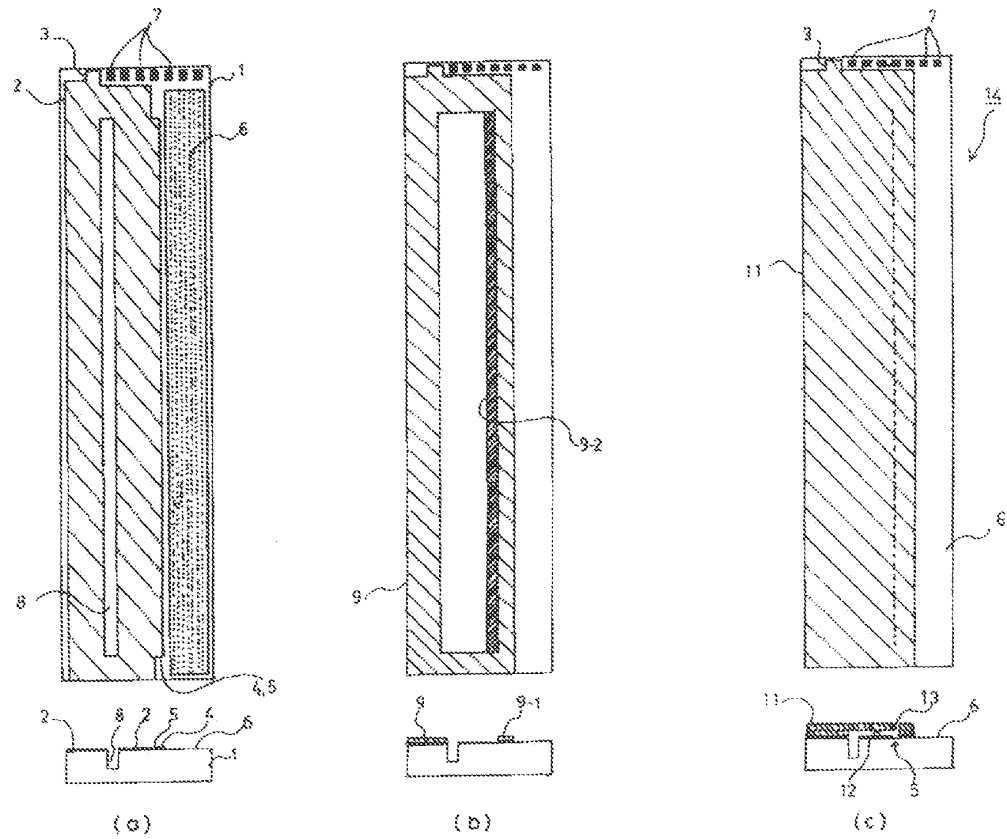


(b)

【図8】



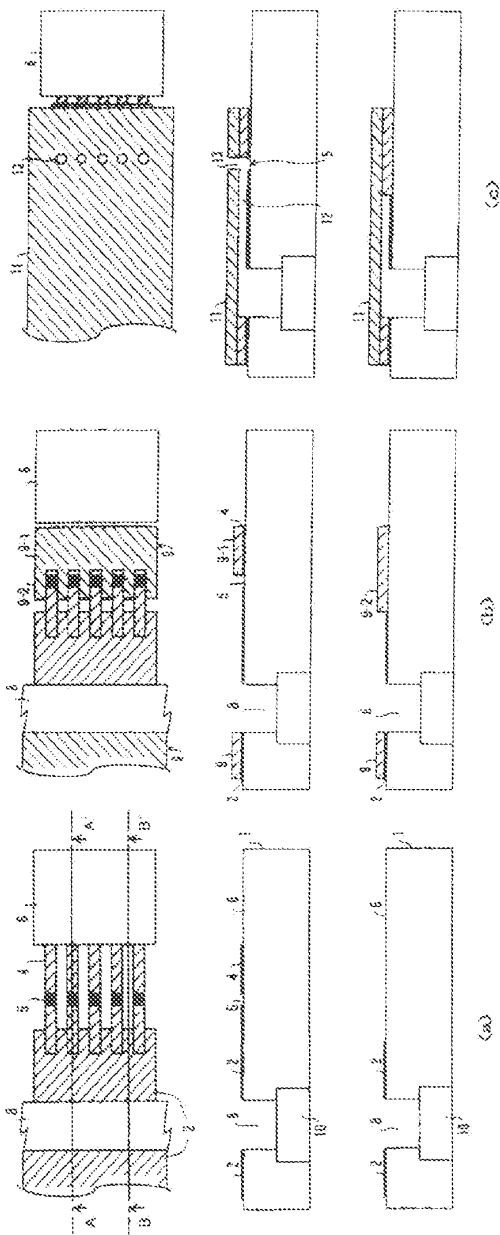
【図6】



(12)

特開平11-245409

【図7】



1/17/2008, EAST Version: 2.2.1.0

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-245409

(43)Date of publication of application : 14.09.1999

(51)Int.Cl.

B41J 2/05

(21)Application number : 10-046463

(71)Applicant : CASIO COMPUT CO LTD

(22)Date of filing : 27.02.1998

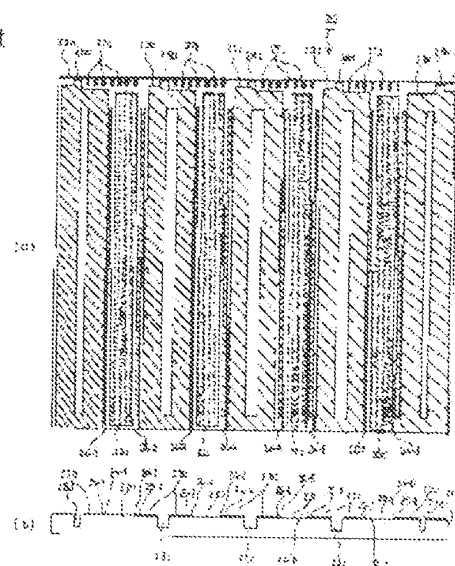
(72)Inventor : UENISHI KATSUZO
OTA MORIO

(54) THERMAL INK-JET HEAD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a thermal ink-jet head which can realize high resolution, small volume and stable layers of members.

SOLUTION: A thermal ink-jet head 20 on a silicon substrate 21 has four drive circuits 22a, 22b, 22c and 22d. A common electrode 23a has a first orifice array resistor 25-1 connected thereto via an individual wiring electrode 24-1 and a second orifice array resistor 25-2 connected thereto via an individual wiring electrode 24-2 held between a common electrode 23b and the common electrode. Ink discharge from the first and second orifice arrays is controlled in a time-sharing manner. The drive circuits 22b, 22c and 22d similarly drive resistors of right and left two orifice arrays in the time-sharing manner. A black ink is supplied from ink passages 28a, 28e to the first and an eighth orifice arrays, and a Y ink, an M ink, a C ink are supplied to the second and a third, a fourth and a fifth and, a sixth and a seventh orifice arrays respectively. The two orifice arrays of the same color are shifted by half a distance.



LEGAL STATUS

[Date of request for examination]

<http://www19.ipdl.inpit.go.jp/PAI/result/detail/main/wAAAM3aOGdDA411245409P1.htm> 1/17/2008

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

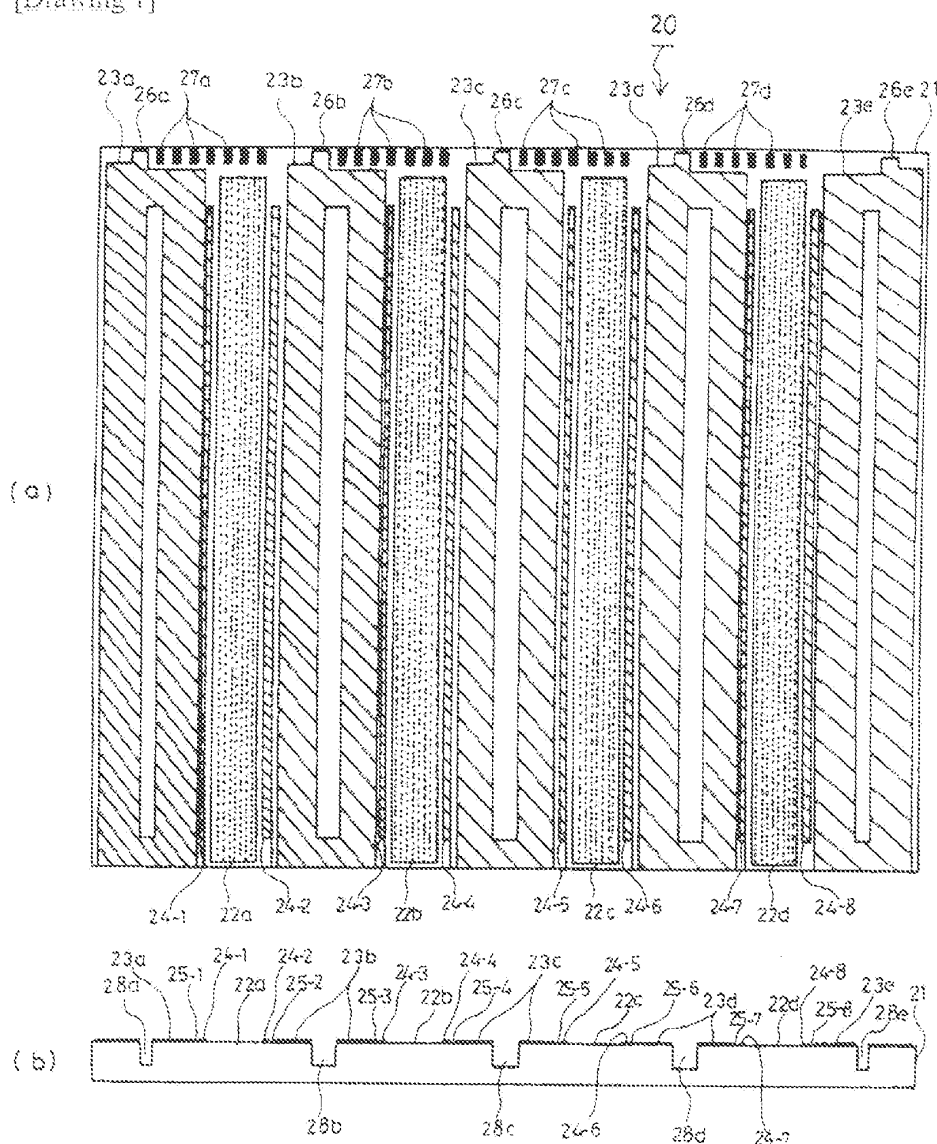
* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

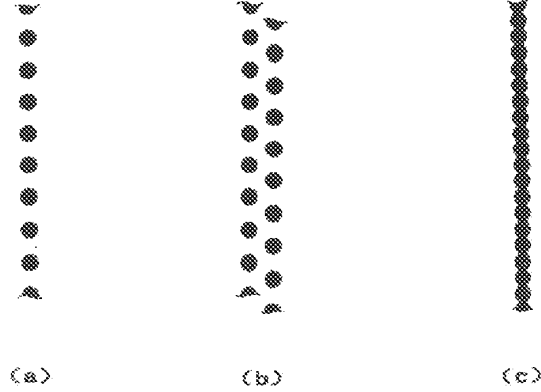
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

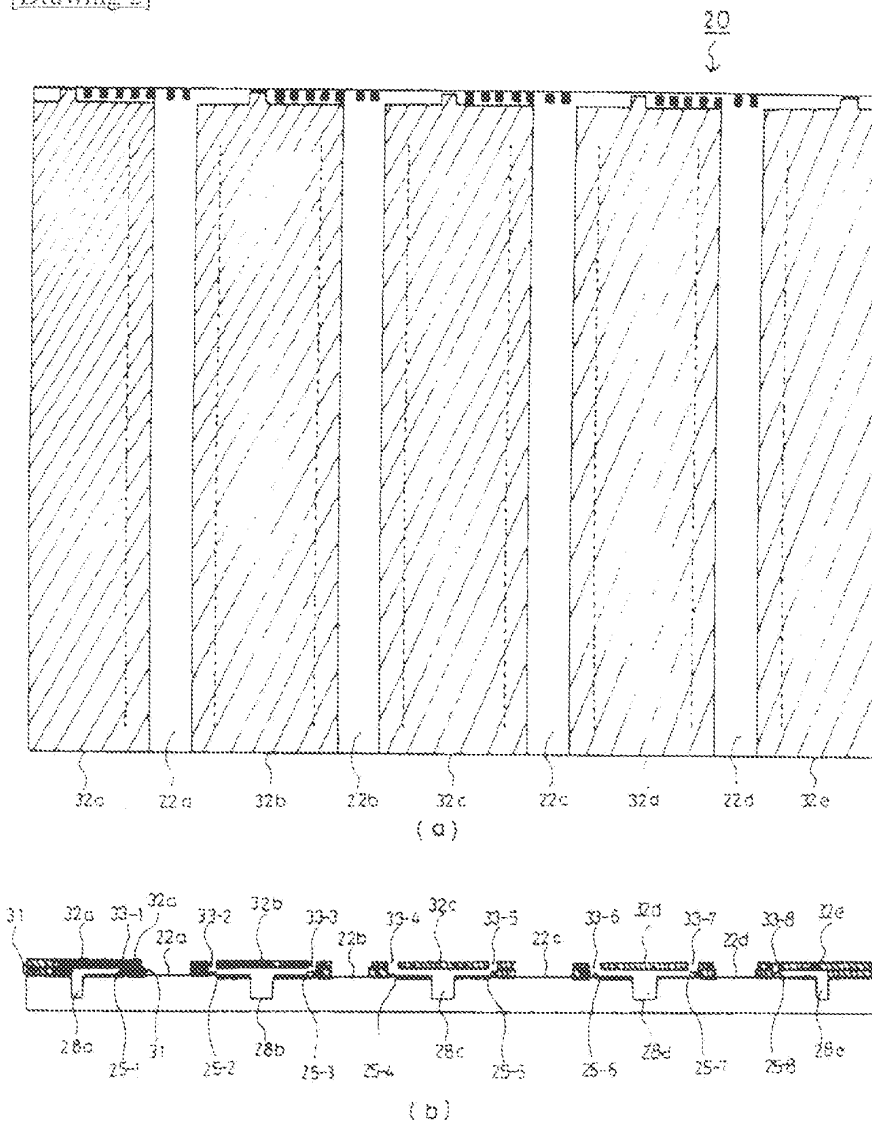
[Drawing 1]



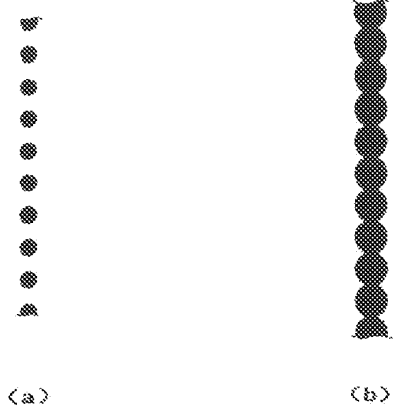
[Drawing 3]



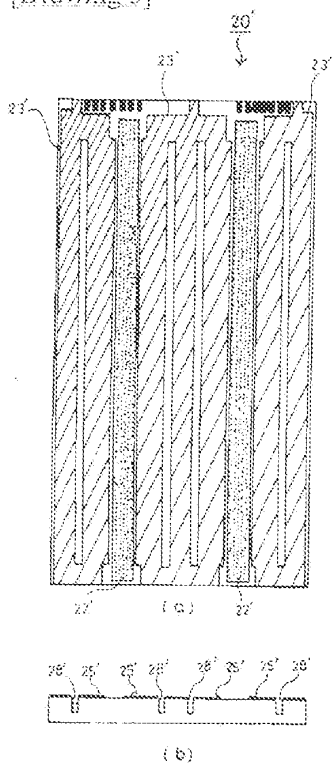
[Drawing 2]



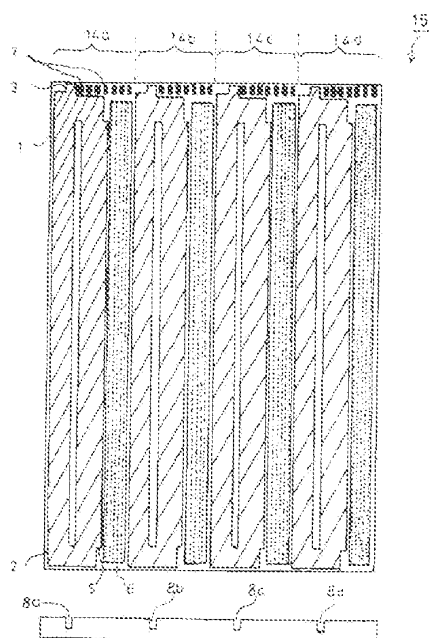
[Drawing 4]



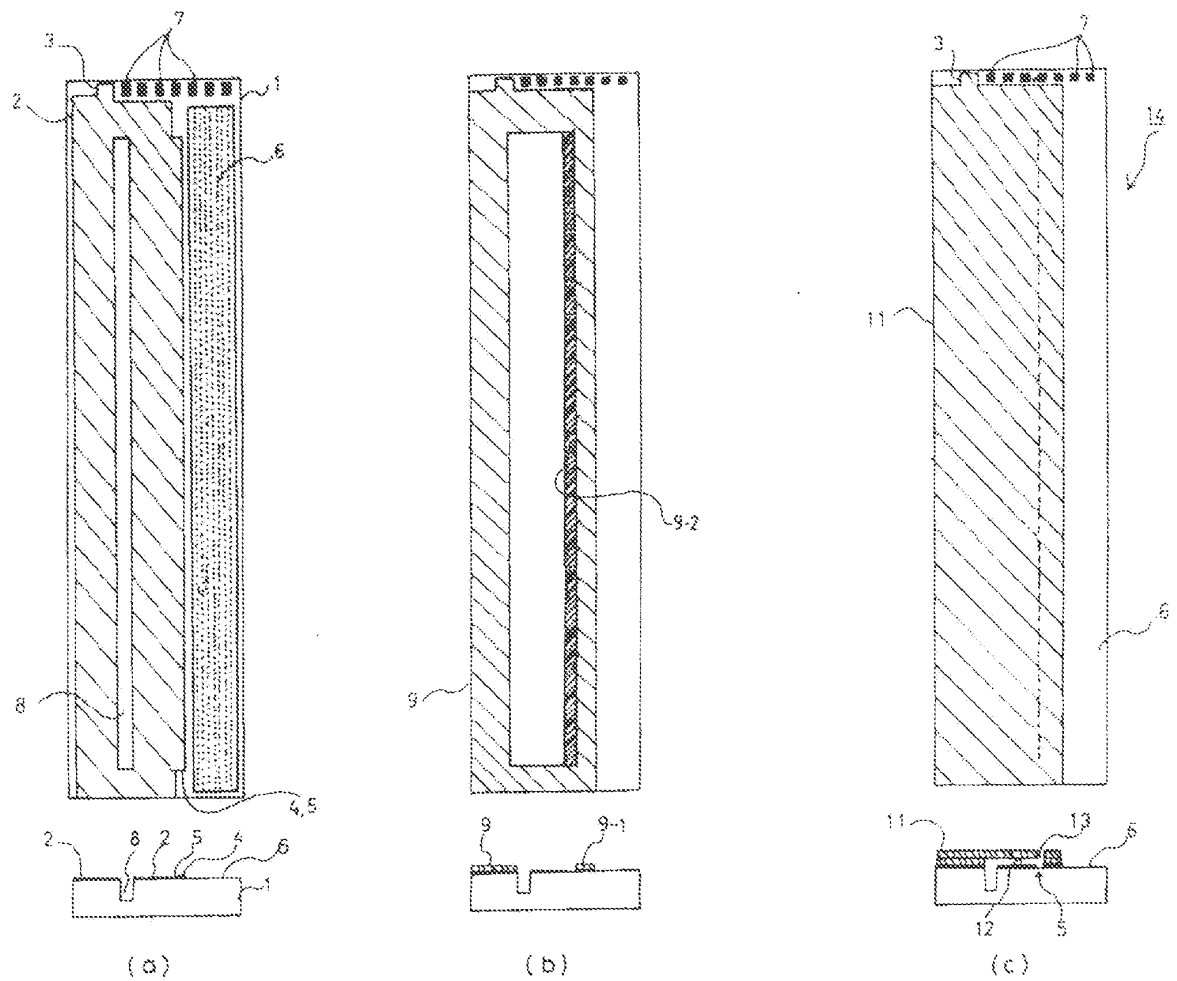
[Drawing 5]



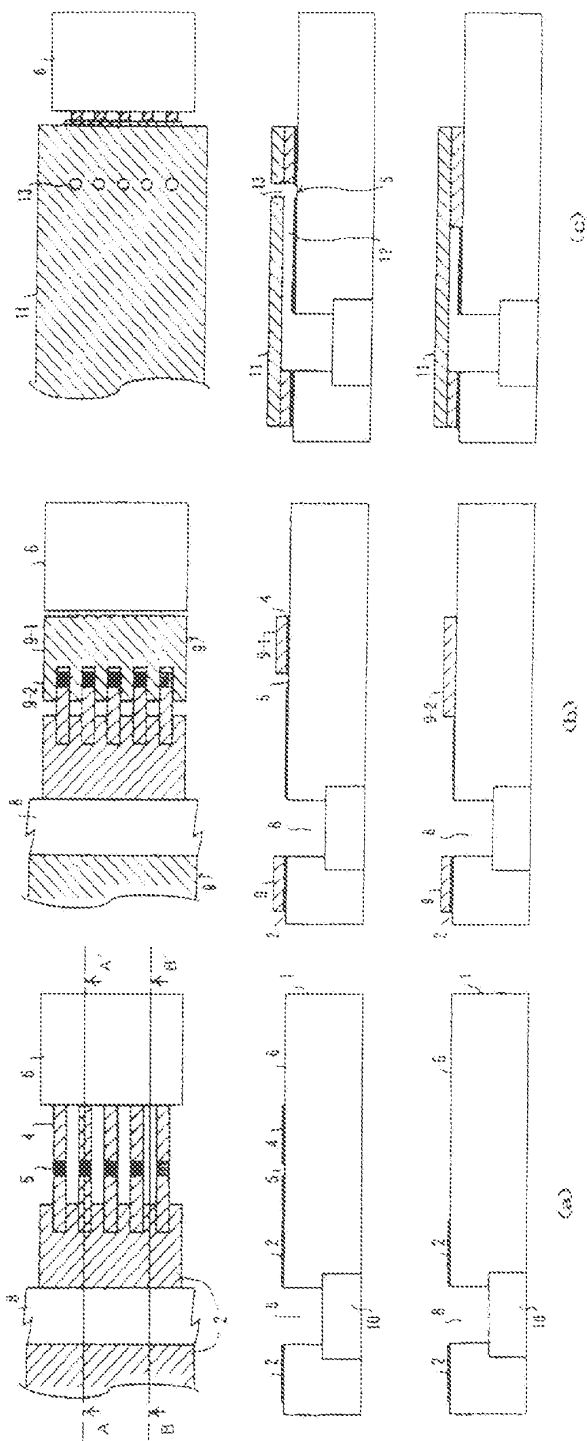
[Drawing 8]



[Drawing 6]



[Drawing 7]



[Translation done.]

* NOTICES *

JPO and INPIIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] (a) The top view in the middle of the manufacture process which shows the configuration of the thermal ink jet head for full color in the gestalt of ** 1 operation, and (b) It is the sectional view.

[Drawing 2] (a) The top view and (b) which show the finished product of the thermal ink jet head for full color which completed the ***** process and was started as a simple substance It is the sectional view.

[Drawing 3] (a) Drawing and (b) which show typically solid printing by the nozzle train of one train of a ** thermal ink jet head Drawing and (c) which show the arrangement relation of the nozzle hole of two trains of the same color It is drawing showing that it prints to the same printing area in the nozzle train of two trains, and twice as many dot density as this can be realized.

[Drawing 4] (a) Drawing and (b) which show the path of the printing dot of color ink as a modification of ** nozzle hole formation It is drawing showing the path of the printing dot of black ink with the same dilation ratio.

[Drawing 5] (a) is the top view showing the configuration of the thermal ink jet head in the gestalt of other operations, and (b). It is the sectional view.

[Drawing 6] (a), (b), and (c) It is the top view and sectional view of an outline showing the manufacture approach of the printing section of the conventional thermal ink jet head in order of a process.

[Drawing 7] (a), (b), and (c) It is drawing showing the A-A' cross-section view Fig. to the middle, and showing a B-B' cross-section view Fig. for the detailed expansion part plan of the conventional printing section on the upper case at the lower berth.

[Drawing 8] It is drawing showing the condition of having constituted the full color thermal ink jet head for the conventional printing section 4 *****s.

[Description of Notations]

- 1 Silicon Substrate
- 2 Common Electrode
- 3 Common Electrode Electric Supply Terminal
- 4 Individual Wiring Electrode
- 5 Resistance
- 6 Drive Circuit
- 7 Drive Circuit Terminal
- 8 (8a, 8b, 8c, 8d) Ink supply way
- 9 Septum Member
- 9-1 Drum Equivalent Part of Comb
- 9-2 Gear-Tooth Equivalent Part of Comb
- 10 Ink Feed Holes
- 11 Sheet Metal Member
- 12 Ink Guidance Way
- 13 Nozzle Hole

14 (14a, 14b, 14c, 14d) Exoergic head
20 Thermal Ink Jet Head
21 Silicon Substrate
22 (22a, 22b, 22c, 22d) Drive circuit
23 (23a, 23b, 23c, 23d, 23e) Common electrode
24 (24-1, 24-2...24-7, 24-8) Individual wiring electrode
25 (25-1, 25-2...25-7, 25-8) Resistance (heater element)
26a, 26b, 26c, 26d, 26e Electric supply terminal
27 (27a, 27b, 27c, 27d) Drive circuit terminal
28a, 28b, 28c, 28d Ink supply way
31 Septum Member
32 (32a, 32b, 32c, 32d, 32e) Orifice plate
33 (33-1, 33-2, ..., 33-7, 33-8) Nozzle hole

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a thermal ink jet head.

[0002]

[Description of the Prior Art] In recent years, the printer using a thermal ink jet method is occupying the mainstream. This thermal ink jet method is set like the drop formation fault of the ink injected for printing, heats ** heater, and generates nucleus air bubbles on a heater side. ** These nucleus air bubbles coalesce and film air bubbles are produced. ** These film air bubbles carry out adiabatic expansion, and grow up. ** The grown-up film air bubbles have heat taken by surrounding ink, and contract. ** just -- being alike -- film air bubbles disappeared and it is realized by performing a series of processes of waiting for the next heater heating in an instant. And the film-boiling phenomenon is used for the process of above ** - **.

[0003] It is based on the approach for the film-boiling phenomenon in which it is used for a thermal ink jet printer "to raise, rapidly the skin temperature of the body which touches a liquid" for the latter, although a film-boiling phenomenon is discovered when the body heated by the elevated temperature like quenching of iron was soaked into the liquid, and when the skin temperature of the body which touches a liquid is raised rapidly.

[0004] Moreover, a film-boiling phenomenon is used in this way, ink in three primary colors is breathed out, and, generally the print head (thermal ink jet head) of an ink jet printer which performs full color printing is manufactured using Silicon LSI and a thin film technology.

[0005] And if resolution is the print head of 360dpi (dots per inch), for example, the approach of making a drive circuit correspond separately, respectively, bundling up 128 ink regurgitation nozzles, and manufacturing is learned for the manufacture approach. Moreover, if it is the case where resolution is 720dpi, 256 ink regurgitation nozzles will be formed with each drive circuit.

[0006] If this is explained briefly, a drive circuit and its terminal will be first formed in a silicon substrate 4 inches or more by LSI formation processing as a process 1. Next, detailed resistance of the electrode by nickel etc., Ta-Si-SiO₂, etc. is formed by the thin film technology as a process 2. Then, an ink supply way and ink feed holes are formed in the above-mentioned silicon substrate by wet etching or the sandblasting method as a process 3. Furthermore, the laminating of the septum is carried out that the ink slot corresponding to each ink delivery should be formed using organic materials, such as photosensitive polyimide, as a process 4. And the ink slot which stuck the sheet metal member which becomes with attached steel sheet metal or polyimide, such as epoxy resin adhesive, as a process 5 on the silicon substrate, and was formed by the above-mentioned septum is covered, and the detailed path according to individual (ink guidance way) is formed in it. Furthermore, a 40 micrometers - 20 micrometers hole is vacated for the part corresponding to the above-mentioned detailed resistance of the above-mentioned sheet metal member by excimer laser etc. as a process 6, and package formation of many nozzle holes (it is also called an orifice) is carried out. So far, it is processed in the state of a wafer. And finally, cutter TENGU of the dicing saw etc. is used and carried out as a process 7, and it

divides according to an individual for every unit. In addition, generally an orifice is the hole for energy transfers formed in termination or wall surfaces, such as a waveguide, or the kind of an aperture.

[0007] Drawing 6 (a), (b), and (c) And drawing 7 (a), (b), and (c) It is drawing showing the manufacture approach of the exoergic head of the above-mentioned thermal ink jet head in order of a process.

drawing 6 (a), (b), and (c) respectively -- the top view and sectional view of an outline -- being shown -- **** -- drawing 7 (a), (b), and (c) respectively -- an upper case -- drawing 6 (a), (b), and (c) The A-A' cross-section view Fig. of an upper case is shown in a detail expansion partial diagrammatic view and the middle, and the B-B' cross-section view Fig. of an upper case is shown in the lower berth.

[0008] In addition, in these drawings, although the expedient top of explanation and all show only one exoergic head, in fact, two or more such exoergic heads stand in a row, and are formed on the silicon substrate of one sheet. moreover, drawing 6 (a), (b), and (c) each -- the sectional view shown below -- drawing 7 (a), (b), and (c) It is each the same as that of the A-A' cross-section view Fig. shown in the middle.

[0009] Above-mentioned drawing 6 (a) And drawing 7 (a) The condition immediately after completing the process 1 mentioned above - a process 3 is shown. That is, on the silicon substrate 1, the common electrode 2, the common electrode electric supply terminal 3 (refer to drawing 6 (a)), the individual wiring electrode 4, resistance 5, the drive circuit 6, the drive circuit terminal 7 (refer to drawing 6 (a)), the ink supply way 8, and the ink feed holes 10 (refer to drawing 7 (a)) are formed.

[0010] Next, drawing 6 (b) And drawing 7 (b) The condition immediately after completing the above-mentioned process 4 is shown. That is, the laminating of the septum member 9 is carried out between the part located in the left-hand side of the ink supply way 8 of the common electrode 2, the part in which the individual wiring electrode 4 is arranged, and each resistance 5 and resistance 5. The part 9-2 into which the part by which a laminating is carried out between each above-mentioned resistance 5 of the septum member 9 begins to be extended between the drum of a comb, then each resistance 5 in the part 9-1 on the individual wiring electrode 4 is making the configuration equivalent to the gear tooth of a comb. Thereby, the detailed ink guide rail to which resistance 5 is located in the root part between that gear tooth and gear tooth is formed only for the number of resistance 5 by using the gear tooth of this comb as a septum. This septum member 9 has the thickness of 10 micrometers or more.

[0011] And drawing 6 (c) And drawing 7 (c) The condition immediately after completing the process 5 and process 6 which were mentioned above is shown. That is, the sheet metal member 11 has covered the drive circuit 6 and all the fields except the part of the electric supply terminals 3 and 7, and the above-mentioned ink guide rail also has a top covered, and forms the ink guidance way 12 of the height corresponding to 10 micrometers in thickness of the septum member 9. And the nozzle hole 13 is formed in the part corresponding to resistance 5. and, thereby, the exoergic head 14 equipped with the nozzle hole 13 of one train is completed.

[0012] Usually, in full color printing, the black (Bk) sole possession of is taken by the amount of [of an alphabetic character or an image] Kurobe is added to three colors of the yellow (Y) which is subtractive primary colors, a Magenta (M), and cyanogen (C), and the ink of a total of four colors is needed for them. Therefore, also at the lowest, the nozzle train of four trains is required. And according to the manufacture approach mentioned above, it is possible to constitute the component of four trains in a monolithic, and it is possible to also arrange the physical relationship of each train correctly by the manufacturing technology of today's semi-conductor.

[0013] Drawing 8 is drawing showing the condition of having constituted the full color thermal ink jet head for the silicon substrate 1 shown in above-mentioned drawing 6 and above-mentioned drawing 7, the common electrode 2, the common electrode electric supply terminal 3, the individual wiring electrode 4, resistance 5, the drive circuit 6, the drive circuit terminal 7, the ink supply way 8, the septum member 9, the ink feed holes 10, the sheet metal member 11, and the component (exoergic head) 14 that becomes considering each part of a nozzle hole 13 as 1 set 4 *****. In addition, the exoergic heads 14 of this drawing are 4 ***** -- in order to show a configuration intelligibly -- drawing 6 (a) The thing in the condition of having ended to the shown process 1 - the process 3 is shown.

[0014] As shown in this drawing, the thermal ink jet head 15 Four exoergic heads 14 (14a, 14b, 14c,

14d) are located in a line, and are arranged. For example, Y ink is supplied to the ink guidance way 12 (refer to drawing 6 (c) and drawing 7 (c)) of exoergic head 14a from ink supply way 8a. M ink is supplied to the ink guidance way 12 of exoergic head 14b from ink supply way 8b, and C ink is supplied to the ink guidance way 12 of exoergic head 14c from ink supply way 8c. From 8d of ink supply ways, Bk ink is supplied to the exoergic head 14d ink guidance way 12.

[0015] On the occasion of printing, resistance 5 energizes alternatively according to printing information, it generates heat in an instant, a film-boiling phenomenon is generated, and an ink droplet is breathed out from the nozzle hole 13 corresponding to the resistance 5. By such ink jet method, an ink droplet is breathed out in the abbreviation globular form of the magnitude corresponding to the path of a nozzle hole 13, on space, serves as magnitude of a twice as many diameter as ****, and is printed.

[0016] Thus, if the full color thermal ink jet head obtained is the case where resolution is 360dpi, it will be equipped with 128 nozzle x4 train =640 nozzle, and will be formed in outline 8.5mmx19.0mm magnitude. Moreover, if it is the case where resolution is 720dpi, 256 nozzle x4 train =1280 nozzle will be mostly formed into 8.5mmx19.0mm magnitude.

[0017]

[Problem(s) to be Solved by the Invention] By the way, the path and its arrangement spacing of a nozzle hole are designed by the resolution (resolution of an image) of printing. As mentioned above, since the ink droplet breathed out by the shape of a globular form of the magnitude corresponding to the path of a nozzle hole spreads in the path of the magnitude of **** on space, the path of a nozzle hole is designed by one half of the magnitude of the dot pitch to print. For example, if it is the case where resolution is 360dpi, a dot pitch will be about 70 micrometers, therefore the path of a nozzle hole will be formed in 30-40 micrometerphi. Moreover, a dot pitch is about 35 micrometers, therefore, in the case of 720dpi, the path of a nozzle hole is set to 15-20 micrometerphi, for example.

[0018] Thus, if a pitch becomes detailed, the problem that it becomes difficult for adhesion sides with the other party (gear-tooth equivalent part 9-2 of the comb of the septum member 9) at the time of sticking an orifice plate (sheet metal member 11) on a silicon substrate 1 by which a laminating is carried out to decrease in number, and to realize stable adhesion will occur.

[0019] however -- another side -- printing -- in order to raise resolution, many trains-ization which prints Isshiki with the exoergic head of two or more trains is desired, and the demand of the formation of many nozzles and highly-minute-izing has been increasing increasingly.

[0020] Although the thermal ink jet head for full color needs the exoergic head of at least 4 trains as mentioned above, these exoergic heads have the drive circuit 6 independent according to an individual, as shown in drawing 8, and the drive circuit terminal 7 is arranged in these. Moreover, it also has the feeder to an electrode common to each heater element (resistance 5) for every exoergic head. Therefore, many connections occur in connection with this thermal ink jet head and external circuit, and a more advanced technique is required of this connection.

[0021] Moreover, since there are not only it but many the circuits by which a laminating is independently carried out in this way for every exoergic head, electrodes, the numbers of connection terminals, etc., fertilization of the exoergic head which needs a big area for the silicon chip by which a laminating is carried out in these, therefore is formed in a monolithic (monolithic) is checked.

[0022] For example, drawing 6 (a), (b), and (c) Since the exoergic head which has the nozzle hole 13 of one train is constituted from a shown example, the width of face of 2mm of abbreviation is needed. And with a full color thermal ink jet head, since the four trains of the above-mentioned exoergic heads are formed successively, as mentioned above, it becomes 8.5mmx19.0mm magnitude about. It follows, for example, only about 55 above-mentioned 8.5mmx19.0mm chips cannot be formed with about 30 pieces and a 5 inches silicon wafer on a 4 inches silicon wafer. Thus, since there were very few thermal ink jet heads for full color which can be taken from one wafer, it also had the problem of causing the rise of a manufacturing cost.

[0023] The technical problem of this invention is offering the thermal ink jet head in which the laminating by which are high resolution and the small volume and the component member's was stabilized is possible in view of the above-mentioned conventional actual condition.

[0024]

[Means for Solving the Problem] Below, the configuration of the thermal ink jet head of this invention is described. First, the thermal ink jet head of invention according to claim 1 Prepare two or more exoergic heads which arranged two or more heater elements in the shape of an array, and the ink supplied on the above-mentioned heater element is heated in the above-mentioned heater element. It is the thermal ink jet head which carries out the regurgitation of the ink droplet from the orifice corresponding to this heater element by making the interface of the above-mentioned ink and the above-mentioned heater element generate air bubbles. It is prepared between the adjoining exoergic heads, and it has the single ink supply way which supplies the above-mentioned ink in common to the heater element of the exoergic head of these both sides, and is constituted.

[0025] Next, the thermal ink jet head of invention according to claim 2 Prepare two or more exoergic heads which arranged two or more heater elements in the shape of an array, and the ink supplied on the above-mentioned heater element is heated in the above-mentioned heater element. It is the thermal ink jet head which carries out the regurgitation of the ink droplet from the orifice corresponding to this heater element by making the interface of the above-mentioned ink and the above-mentioned heater element generate air bubbles. The driving means which is established between the 1st exoergic head and the 2nd exoergic head, and supplies a driving signal common to the n-th heater element in the exoergic head of the above 1st, and the m-th heater element in the exoergic head of the above 2nd. Supply of the above-mentioned driving signal by this driving means, and the common electrode of the exoergic head of the above 1st and the common electrode of the exoergic head of the above 2nd By choosing it as time sharing, it has the control means which controls the above-mentioned driving means to carry out the time-sharing drive of the heater element of the exoergic head of the above 1st, and the heater element of the exoergic head of the above 2nd, and is constituted.

[0026] Furthermore, the thermal ink jet head of invention according to claim 3 Prepare two or more exoergic heads which arranged two or more heater elements in the shape of an array, and the ink supplied on the above-mentioned heater element is heated in the above-mentioned heater element. It is the thermal ink jet head which carries out the regurgitation of the ink droplet from the orifice corresponding to this heater element by making the interface of the above-mentioned ink and the above-mentioned heater element generate air bubbles. Make n into an integer and the common electrode of the exoergic head of eye the n+1st trains and the exoergic head of eye the n+2nd trains is constituted from a single common electrode. The common electrode of the exoergic head of eye the n+3rd trains and the exoergic head of eye the n+4th trains is constituted from other single common electrodes, and it has the driving means which carries out the time-sharing drive of the heater element in the exoergic head of eye the n+2nd trains of the above, and the heater element in the exoergic head of eye the n+3rd trains of the above, and is constituted.

[0027] And by making m into an integer, like claim 4 publication, the heater element in the exoergic head of eye the m+1st trains of the above and the heater element of the exoergic heads of eye the m+2nd trains are the same pitches, and only 1/2 pitch shifts a location and is arranged. Moreover, for example like claim 5 publication, the exoergic head of eye the m+1st trains and the exoergic head of eye the m+2nd trains are constituted so that the regurgitation of the ink of the same color may be carried out. Moreover, the dot density according to claim 6 which is made to breathe out black ink from the exoergic head of eye the 1st train and the exoergic head of the last train, and is made to breathe out color ink from other exoergic heads like and by which this color ink is breathed out is constituted the twice of the dot density by which the above-mentioned black ink is breathed out, for example.

[0028]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 (a) It is the top view showing the configuration of the thermal ink jet head in the gestalt of 1 operation, and is this drawing (b). It is the sectional view. In addition, this drawing (a) and (b) The shown thermal ink jet head 20 In the manufacture process same in order to show a configuration intelligibly as the conventional exoergic head shown in drawing 6 and drawing 7 Form a drive circuit and its terminal in a silicon substrate, and an electrode and resistance are formed by

the thin film technology. Although the condition by the place which formed the ink supply way by wet etching or the sandblasting method is shown and it was formed in the silicon wafer at the monolithic, only one piece is started and shown from inside.

[0029] This thermal ink jet head 20 is drawing 1 (a) and (b). Four drive circuits 22a, 22b, 22c, and 22d are formed in the silicon substrate 21 so that it may be shown. On the other hand, resistance 25-1 is connected and formed through the individual wiring electrode 24-1 between 1st common electrode 23a, and resistance 25-2 is connected and formed in 1st drive circuit 22a through the individual wiring electrode 24-2 between 2nd common electrode 23b.

[0030] On the other hand, resistance 25-3 is connected and formed through the individual wiring electrode 24-3 between common electrode 23b of the above 2nd, and resistance 25-4 is connected and formed in 2nd drive circuit 22b through the individual wiring electrode 24-4 between 3rd common electrode 23c.

[0031] Similarly, on the other hand, resistance 25-5 is connected and formed through the individual wiring electrode 24-5 between common electrode 23c of the above 3rd, and resistance 25-6 is connected and formed through the individual wiring electrode 24-6 at 3rd drive circuit 22c between 23d of 4th common electrode.

[0032] And on the other hand, resistance 25-7 is connected and formed through the individual wiring electrode 24-7 between 23d of common electrodes of the above 4th, and resistance 25-8 is connected and formed in 22d of 4th drive circuit through the individual wiring electrode 24-8 between 5th common electrode 23e.

[0033] The electric supply terminals 26a-26e are connected, and it is formed, and the drive circuit terminals 27a-27d connect with the five above-mentioned common electrodes 23a-23e, respectively, and it is formed in four drive circuits 22a-22d at them, respectively.

[0034] And along with a longitudinal direction, a center section cuts and lacks the common electrodes 23a-23e, respectively, and the ink supply ways 28a-28d are formed in the lower part. Although not illustrated, the ink feed holes which penetrate a silicon substrate 21 are open for free passage in especially these ink supply ways 28a-28d, and it is formed in them, respectively.

[0035] From those ink feed holes, Bk ink is supplied to 1st ink supply way 28a and 5th ink supply way 28e in this example. And Y ink is supplied to 2nd ink supply way 28b, M ink is supplied to 3rd ink supply way 28c, and C ink is supplied to 28d of 4th ink supply way.

[0036] Drawing 2 (a) In the same manufacture process as the conventional exoergic head further shown in drawing 6 and drawing 7 from the above-mentioned condition Carry out the laminating of the septum which forms the ink slot corresponding to each resistance 25 (25-1, 25-2...25-7, 25-8), and stick an orifice plate, form an ink guidance way, and package formation of the nozzle hole is carried out by excimer laser. It is the top view showing the finished product of the thermal ink jet head for full color started as a simple substance, and is this drawing (b). It is the sectional view. Drawing 1 (a) and (b) which were mentioned above It is drawing 2 (b) in piles to some common electrodes 23 (23a-23e) and the part of the individual wiring electrode 24 (24-1 to 24-8) in the condition which showed. So that it may be shown the part the laminating of the septum member 31 is carried out, and excluding the arrangement section of the drive circuit 22 (22a-22d) to a it top -- the orifice plate 32 (32a, 32b, 32c, 32d, 32e) of five sheets -- this drawing (a) and (b) It is stuck so that it may be shown.

[0037] In orifice plate 32a, the nozzle hole 33 (33-1, 33-2, ..., 33-7, 33-8) of a predetermined path (if the resolution of this thermal ink jet head 20 is 360dpi, in this example, it will mention later about 15-20micrometerphi and this) bundles up at the predetermined spacing (about 70 micrometers), and is formed in the location corresponding to resistance 25-1 at it, respectively.

[0038] Bk ink of 1st ink supply way 28a mentioned above is supplied to the nozzle train of the nozzle hole 33-1 of orifice plate 32a, and Bk ink of 5th ink supply way 28e is supplied to the nozzle train of the nozzle hole 33-8 of orifice plate 32e.

[0039] And Y ink of 2nd ink supply way 28b The nozzle train of the nozzle hole 33-2 of orifice plate 32b and the nozzle train of a nozzle hole 33-3 are supplied. M ink of 3rd ink supply way 28c The nozzle train of the nozzle hole 33-4 of orifice plate 32c and the nozzle train of a nozzle hole 33-5 are supplied,

and C ink of 28d of 4th ink supply way is supplied to the nozzle train of the nozzle hole 33-6 of 32d of orifice plates, and the nozzle train of a nozzle hole 33-7.

[0040] Thus, the ink supply way 28 which is equipped with the nozzle train of eight trains for every color, the nozzle train, i.e., 4 classification-by-color sum total, of two trains, and supplies ink to those nozzle holes 33 consists of five [fewer / three / than the number of nozzle trains], and there are also five common electrodes 32. Moreover, the number of the drive circuits 22 which carry out the exoergic drive of the resistance 25 corresponding to those nozzle trains is four, and that of the drive circuit terminals 27 (27a-27d) is four.

[0041] Thus, it consists of four drive circuits 22 so that the exoergic drive of the resistance 25 of the nozzle hole 33 of the double number of trains may be controlled by time sharing. Thus, it is 1kHz - 10kHz (1 m seconds - 100-microsecond spacing), a period, i.e., a regurgitation repeat frequency, for the energization pulse width to the resistance for the regurgitation of ink (heater element) to be 1 microsecond, and for that a time-sharing drive is possible make ink breathe out by the following signal from the same nozzle hole in a thermal ink jet head. Therefore, there are time allowances of enough as a drive circuit which can operate with several 10mHz or the period beyond it, and it is made to drive resistance of the nozzle train of two trains by time sharing using these time allowances.

[0042] Moreover, since sufficient time allowances are between the first exoergic drive to the resistance same as mentioned above, and the next exoergic drive, even if it also considers the relation of the maximum allowed current of the exoergic head which is taken into consideration, for example in solid printing and performs the above-mentioned (vacating a time interval a little) time-sharing drive, the factor in which this time-sharing drive reduces printing speed does not become.

[0043] And while this thermal ink jet head 20 is equipped with the nozzle train of two trains, and the nozzle train of a total of eight trains for every color, the whole magnitude consists of dimensions without the thing and great difference of the nozzle train of four conventional trains shown in drawing 8.

[0044] Drawing 3 (a) Solid printing by the nozzle train of one train of the above-mentioned thermal ink jet head 20 is shown typically. If it is original, in the dot array of 360dpi, the magnitude of a nozzle hole is 30-40micrometerphi, the ink droplet had to spread twice in the pitch of 70.6 micrometers, and each printing dot must stick in the above-mentioned solid printing. However, in the gestalt of this operation, in order to print by arrangement twice the resolution of a nozzle hole, the path of a nozzle hole is formed in 15-20 micrometerphi which corresponds in the dot array of 720dpi. And arrangement of the nozzle hole of the nozzle train of two trains of the same color is 2 pitch ** carried out [1 /], and is formed.

[0045] Drawing 3 (b) The arrangement relation of the nozzle hole of two trains of such same color is shown. This drawing (b) Timing is taken so that it may print to the same printing area of space in the nozzle train of two trains by actual printing, although the case where printing timing is shifted and printed in the nozzle train of two trains is shown in order to show a gap of 1/2 pitch, and it is drawing 3 (c). Printing is performed with the dot density of 1/2 pitch of the nozzle hole array of one train so that it may be shown. Thus, a small orifice (nozzle hole) can be formed and twice [in case an orifice train is the configuration of one train] as many resolution as this can be realized by using the orifice train of two trains 2 pitch ** carried out [1 /].

[0046] Thus, in the gestalt of this operation, by communalizing a drive circuit, a feeder circuit, and an ink supply way in the orifice train of two trains, the miniaturization of a chip can be attained, and a twice [over the past] as many nozzle train as this can be constituted with the same size almost as the former, without enlarging size of a thermal ink jet head. Moreover, the high definition thermal ink jet head which has twice as many resolution as this can consist of technical levels of the conventional micro processing practical.

[0047] In addition, although, as for a color picture, always fine high resolution is demanded, black printing of an alphabetic character etc. does not require high resolution so much. Moreover, generally, even if a printer is used [not only the object for office work but personal], it is used for printing of an alphabetic character (text) in many cases. Therefore, it is twice the pitch of the nozzle hole array of other colors, and you may make it form the nozzle hole array of the nozzle train of Bk ink sole possession of

is mainly taken by alphabetic character printing by the twice as many aperture as this.

[0048] Drawing 4 (a) The printing dot (the same as that of the printing dot shown in drawing 3 (a)) of such Y ink of the thermal ink jet head of a configuration, M ink, and C ink is shown, and it is drawing 4 (b). It is this drawing (a) about the printing dot of Bk ink. The same dilation ratio shows. Thus, if constituted, printing speed can be raised twice by sharing printing with the 1st train and the 8th train in the case of printing in the alphabetic character only by black (the odd number train of for example, printing data being printed with the head of eye the 1st train, and an even number train being printed with the head of eye the 8th train).

[0049] Moreover, it is made to carry out the regurgitation of the ink droplet (for example, black) of the same color from the orifice trains of all eight trains, nozzle hole arrangement of the orifice train of eight trains is shifted by the physical relationship of the integral multiple of a pitch which determines resolving power, respectively, and you may make it arrange in above-mentioned drawing 1 - drawing 3. Then, although it is a single color, a very high definition printing image can be obtained.

[0050] In addition, without restricting to this, the nozzle train for every color is constituted from one train, and you may make it drive resistance of the nozzle train by time sharing, although the gestalt of the above-mentioned operation showed the example which all constitutes the nozzle train of two trains for every color.

[0051] Drawing 5 (a) It is the top view showing the configuration of the thermal ink jet head in the gestalt of other operations, and is this drawing (b). It is the sectional view. This drawing (a) and (b) Although this thermal ink jet head 20' is equipped with the orifice train of resistance 25' of four trains, and four ink supply way 28' corresponding to this so that it may be shown, three drive circuit 22' of common electrode 23' is two configurations. This drive principle is the same as that of the case of the thermal ink jet head 20 shown in drawing 1 - drawing 3.

[0052] According to this configuration, it is the resolution of 360dpi, for example, and the configuration of 256 nozzles, then thermal ink jet head 20' can be about designed with a 20mmx6mm dimension in one train. In the conventional design shown in drawing 6 - drawing 8, it is a 20mmx8mm dimension, and although this becomes 30 chips on a 4 inches silicon wafer, it can form 40 chips as it is 20mmx6mm like this example. Moreover, in a 5 inches silicon wafer, 75 chips can be formed with the configuration of this example to 55 conventional pieces.

[0053] Thus, the number of the chip which can be taken from one silicon wafer serves as a difference which is 30 percent or 40 percent, and can contribute to improvement in productivity greatly. moreover, drawing 5 (a) from -- since the number of connection terminals with the exterior can also be reduced by half so that clearly, the maintenance service of the thermal ink jet head which serves as components with comparatively high exchange frequency in a color printer becomes mounting to the body of printer equipment is also easy, and easy for this reason, and a thermal ink jet head with more high practicality is realized.

[0054] In addition, with central common electrode 23', either, if only the number of arbitration is connected by making drive circuit 22' of one side into a lot, an orifice train can be extended at any cost like six trains or eight trains from four trains, and, as for the above-mentioned configuration, higher definition printing can be realized.

[0055]

[Effect of the Invention] Since according to this invention the orifice train of two trains is 2 ***** carried out [1 /], is arranged and only the diameter of an orifice is made detailed as explained to the detail above, it becomes possible easily to realize the thermal ink jet head which printing of the double resolution can be performed in the process tolerance of the usual laminating processing, therefore performs high definition printing.

[0056] Moreover, since the heater element of the adjoining orifice train is driven by time sharing in one drive circuit linked to this and juxtaposition, 1/2 of the number of orifice trains will be sufficient as the number of drive circuits, therefore the miniaturization of a thermal ink jet head of it is attained.

[0057] Moreover, since a thermal ink jet head becomes small similarly, the former can increase at least the number of the thermal ink jet head formed in one silicon substrate 40% or more, therefore the

productivity of a thermal ink jet head improves.

[0058] Moreover, since a drive circuit terminal is halved with a drive circuit, the maintenance service of the color printer to which the number of connection terminals with the exterior is halved, and mounting to the body of a printer becomes easy, therefore the exchange frequency of a print head becomes comparatively high becomes easy, thereby, user-friendliness becomes good and reliance of a customer can be obtained.

[Translation done.]

Electronic Acknowledgement Receipt	
EFS ID:	3609058
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	Methods and apparatuses for sensing temperature of multi-via heater chips
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Christopher Chan/Theresa Camp
Filer Authorized By:	Christopher Chan
Attorney Docket Number:	2005-0463.02
Receipt Date:	14-JUL-2008
Filing Date:	30-DEC-2005
Time Stamp:	13:49:26
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	Information Disclosure Statement Letter	IDS_TML.pdf	48389	no	2
			eb0684fe94c44b13f5ead36f92f8687fd7dc5c8b		

Warnings:

Information:

2	Information Disclosure Statement Letter	Disclosure_under_156.pdf	63494	no	2
			e9064148ed81e195603e092d46a3d101e7e52f76		
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Filed	US_IDS_Form__SB_08a.pdf	992088	no	5
			d1560ff91ea34b8bf487678127caf24897e6bd93		
Warnings:					
Information:					
4		Response.pdf	342431	yes	8
			84410d2d35e30fbc7100b4eb2c03315b6b6231b8		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment After Final		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	8	
Warnings:					
Information:					
5	Foreign Reference	JP11245409.pdf	20334798	no	30
			a36106eb2ef579f79b54b35aac9b6c41da4cc9f2		
Warnings:					
Information:					
Total Files Size (in bytes):			21781200		

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.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421
21972 7590 05/19/2008 LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			EXAMINER NGUYEN, LAM S	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 05/19/2008	DELIVERY MODE PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	11/323,809	BARKLEY ET AL.	
	Examiner	Art Unit	
	LAM S. NGUYEN	2853	

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

Period for Reply

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

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

Status

1) ☒ Responsive to communication(s) filed on 01 February 2008.

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

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-19 is/are rejected.

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

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

Application Papers

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

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

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

DETAILED ACTION

Terminal Disclaimer

The terminal disclaimer filed on 02/01/2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. patent associated with the application identified in the terminal disclaimer has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

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

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

1. Claims 1-3, 5-13, and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admission as prior art (*FIGs. 1-2*) in view of Askeland et al. (US 2003/0142159).

The applicant's admission as prior art (*FIGs. 1-2*) teaches a chip for use with a printing device, comprising:

a first/third heater array (208, 210), positioned substantially adjacent a first/second via (202, 204);

a second/fourth heater array (210, 212), positioned substantially adjacent a second/third via (204, 206);

a region, positioned between the first/third heater array and the second/fourth heater array (*The region that is defined by the cyan heater array and the magenta heater array*);
and

first and second temperature sensing elements (222, 224) operable to sense a temperature of the regions, the temperature being representative of the first/third heater array and the second/fourth heater array (*The temperature in the region is due by the heat generated by both Cyan heater array and Magenta heater array*).

The applicant's admission as prior art however does not teach wherein the temperature sensing element is substantially centrally disposed with respect to the region.

Askeland et al. discloses an ink jet printhead having at least first and second heater arrays (*FIG. 4: Two arrays of elements 318*) and a temperature sensing element (*FIG. 4, elements 440 and 430*) for sensing the temperature in a region between the arrays, wherein the temperature sensing element is substantially centrally disposed with respect to the region between the arrays.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the prior art printhead as admitted by the applicant to position the sensing element at the center of the region between the arrays as disclosed by Askeland et al. The motivation for doing so would have been to gain the accuracy of the sensed temperature in the region due to heat generated from both arrays as taught by Askeland et al. (*FIG. 4*).

- **The applicant's admission as prior art (*FIGs. 1-2*) also discloses the following claimed invention:**

Regarding to claims 2-3, 6, 12-13, 16: wherein the temperature sensing element comprises a temperature sensing resistor or a thermal sense resistor, wherein the temperature

sensing element is positioned substantially planar to each of the first heater array and the second heater array (*FIG. 2: Temperature/thermal sense resistors*).

Regarding to claims 5 and 15: The applicant's admission as prior art, in view of Askeland et al., discloses the claimed invention except wherein the temperature sensing element is positioned at least 300 microns from each of the first heater array and the second heater array. It would have been obvious to one having ordinary skill in the art at the time the invention was made to dispose the temperature sensing element at a desired location from either the array corresponding to the distance between the arrays, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Regarding to claims 7, 17: further comprising providing at least one control element operable to receive a temperature measured by the temperature sensing element and to heat the first heater array and the second heater array (*Specification, paragraph [0008]*).

Regarding to claims 9 and 19: wherein the temperature sensing element positioned between the first heater array and the second heater array is different than the second temperature sensing element positioned between the third heater array and the fourth heater array (*FIG. 2, elements 222 and 224*).

2. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admission as prior art (*FIGs. 1-2*) in view of Askeland et al. (US 2003/0142159), and further in view of Edelen et al. (US 2005/0052500).

The applicant's admission as prior art, as modified, discloses the claimed invention as discussed above except wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.

Edelen et al. discloses an ink jet printhead chip including temperature sensing resistors implanted in the chip, wherein the temperature sensing resistors are made of N-type material (*Abstract*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to make the temperature sensing resistors in the prior printhead by implanting N-type donor as disclosed by Edelen et al. to obtain higher temperature coefficient in order to easily detect temperature changes with more precise measurements (*paragraphs [0044]-[0045]*).

Response to Arguments

Applicant's arguments with respect to claims 1 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

/LAM S NGUYEN/
Primary Examiner, Art Unit 2853

Application/Control Number: 11/323,809
Art Unit: 2853

Page 7

Notice of References Cited	Application/Control No. 11/323,809		Applicant(s)/Patent Under Reexamination BARKLEY ET AL.	
	Examiner LAM S. NGUYEN		Art Unit 2853	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0052500	03-2005	Edelen et al.	347/061
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Index of Claims 				Application/Control No. 11/323,809 Examiner LAM S. NGUYEN		Applicant(s)/Patent under Reexamination BARKLEY ET AL. Art Unit 2853	
---	--	--	--	--	--	---	--

✓ Rejected = Allowed	– (Through numeral) Cancelled ÷ Restricted	N Non-Elected I Interference	A Appeal O Objected
---------------------------------------	---	---	--------------------------------------

Claim		Date						
Final	Original	5/16/08						
	1	✓						
	2	✓						
	3	✓						
	4	✓						
	5	✓						
	6	✓						
	7	✓						
	8	✓						
	9	✓						
	10	✓						
	11	✓						
	12	✓						
	13	✓						
	14	✓						
	15	✓						
	16	✓						
	17	✓						
	18	✓						
	19	✓						
	20							
	21							
	22							
	23							
	24							
	25							
	26							
	27							
	28							
	29							
	30							
	31							
	32							
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							

Claim		Date						
Final	Original							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							
	60							
	61							
	62							
	63							
	64							
	65							
	66							
	67							
	68							
	69							
	70							
	71							
	72							
	73							
	74							
	75							
	76							
	77							
	78							
	79							
	80							
	81							
	82							
	83							
	84							
	85							
	86							
	87							
	88							
	89							
	90							
	91							
	92							
	93							
	94							
	95							
	96							
	97							
	98							
	99							
	100							

Claim		Date						
Final	Original							
	101							
	102							
	103							
	104							
	105							
	106							
	107							
	108							
	109							
	110							
	111							
	112							
	113							
	114							
	115							
	116							
	117							
	118							
	119							
	120							
	121							
	122							
	123							
	124							
	125							
	126							
	127							
	128							
	129							
	130							
	131							
	132							
	133							
	134							
	135							
	136							
	137							
	138							
	139							
	140							
	141							
	142							
	143							
	144							
	145							
	146							
	147							
	148							
	149							
	150							

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas Barkley	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
/L.N./	1	5594488		1997-01-14	Tsushima, et al.	
/L.N./	2	5646660		1997-07-08	Murray	
/L.N./	3	5731828		1998-03-24	Ishinaga, et al.	
/L.N./	4	5812162		1998-09-22	Silverbrook	
/L.N./	5	6260952		2001-07-17	Feinn, et al.	
/L.N./	6	6382773		2002-05-05	Chang, et al.	
/L.N./	7	6386674		2002-05-14	Corrigan, et al.	
/L.N./	8	6398347		2002-06-04	Torgerson, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas Barkley	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

/L.N./	9	6474782		2002-11-05	Furukawa	
/L.N./	10	6488363		2005-05-10	Torgerson, et al.	
/L.N./	11	6499834		2002-12-31	Takizawa	
/L.N./	12	6601941		2003-08-05	Jones, et al.	
/L.N./	13	6641242		2003-11-04	Canti, et al.	
/L.N./	14	6644774		2003-11-11	Burger, et al.	
/L.N./	15	6663227		2003-12-16	Yamamoto, et al.	
/L.N./	16	6808843		2004-10-26	Markham, et al.	
/L.N./	17	6871929		2005-03-29	Crivelli, et al.	
/L.N./	18	6883904		2008-02-01	Jeanmarie, et al.	
/L.N./	19	6890064		2005-05-10	Torgerson, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809	
	Filing Date		2005-12-30	
	First Named Inventor	Lucas Barkley		
	Art Unit	2853		
	Examiner Name	Lam S. Nguyen		
	Attorney Docket Number	2005-0463.02		

/L.N./	20	6951378		2005-10-04	Yamada, et al.	
--------	----	---------	--	------------	----------------	--

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

Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/L.N./	1	20030142159		2003-07-31	Askeland, et al.	
/L.N./	2	20050162450		2005-07-28	Sakurai	
/L.N./	3	20050185023		2005-08-25	Furukawa, et al.	

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

Add

FOREIGN PATENT DOCUMENTS

Remove

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐

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

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas Barkley
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature	/Lam Nguyen/	Date Considered	05/16/2008
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

Application Number 	Application No. 11/323,809	Applicant(s) BARKLEY ET AL.	
	Terminal Disclaimer Filed: 02/01/08		

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Document Code - DISQ	This patent is subject to a Terminal Disclaimer	Reasons:
INTERNAL DOCUMENT – DO NOT MAIL		

U.S. Patent and Trademark Office

NOTE DISCLAIMER:

The term of this patent shall not extend
beyond the expiration date of Pat. No. , , , .

☒ **SHARON S. HOPPE**
PARALEGAL SPECIALIST
TECHNOLOGY CENTER 2800

☐ **RENEE M. PRESTON**
PARALEGAL SPECIALIST
TECHNOLOGY CENTER 2800

☐ **TREDELLE D. JACKSON**
PARALEGAL SPECIALIST
TECHNOLOGY CENTER 2800

☐ **NOVA M. CHAPMAN**
PARALEGAL SPECIALIST
TECHNOLOGY CENTER 2800

☐ **CASSANDRA B. PARIS**
PARALEGAL SPECIALIST
TECHNOLOGY CENTER 2800

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	Confirmation No.: 1421
	)	
Lucas Barkley, et al.	)	Art Unit: 2853
	)	
Serial No. 11/323,809	)	Customer No.: 29052
	)	
Filed: December 30, 2005	)	Examiner: Lam S. Nguyen
	)	
For: METHODS AND APPARATUSES FOR	)	
SENSING TEMPERATURE OF MULTI-VIA	)	
HEATER CHIPS	)	
	)	
Atty Docket No.: 2005-0463.02	)	
	)	

AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

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

Sir:

Responsive to the non-final Office Action dated November 1, 2007, Applicants submit the following amendments and remarks. In light of these amendments and remarks, Applicants respectfully assert that all of the claims of the patent application are patentable over the cited references, and that the application be allowed.

Amendments to the Specification begin on page 2 of this paper.

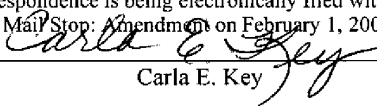
Amendments to the Claims are reflected in the listing of claims, which begins on page 3 of this paper.

Remarks begin on page 6 of this paper.

Conclusion begins on page 8 of this paper.

CERTIFICATE OF ELECTRONIC DELIVERY

I hereby certify that this correspondence is being electronically filed with the Commissioner for Patents,
 Mail Stop: Amendment on February 1, 2008.


 Carla E. Key

1790905.1

U.S. Serial No.: 11/323,809

Title: "Methods and Apparatuses for Sensing Temperature of Multi-Via Heater Chips"

Filed: December 30, 2005

Page 2 of 8

Amendments to the Specification

In Paragraph [0001], please insert the application serial number "11/324,167" of the related application in the space provided in the paragraph.

Amendments to the Claims

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

Listing of Claims:

1. (Currently Amended) A chip for use with a printing device, comprising:
 - a first heater array, positioned substantially adjacent a first via;
 - a second heater array, positioned substantially adjacent a second via;
 - a region, positioned between the first heater array and the second heater array; and
 - a temperature sensing element operable to sense ~~the~~ a temperature of the region, the temperature being representative of the first heater array and the second heater array, wherein the temperature sensing element is substantially centrally disposed with respect to the region.
2. (Original) The chip of claim 1, wherein the temperature sensing element comprises a temperature sensing resistor.
3. (Original) The chip of claim 2, wherein the temperature sensing element comprises a thermal sense resistor.
4. (Original) The chip of claim 3, wherein the temperature sensing element comprises an n-type implant donor thermal sensing resistor.
5. (Original) The chip of claim 1, wherein the temperature sensing element is positioned at least 300 microns from each of the first heater array and the second heater array.
6. (Original) The chip of claim 5, wherein the temperature sensing element is positioned substantially planar to each of the first heater array and the second heater array.
7. (Original) The chip of claim 1, further comprising at least one control element operable to receive a temperature measured by the temperature sensing element.
8. (Original) The chip of claim 1, further comprising:
 - a third heater array, positioned substantially adjacent the second via;
 - a fourth heater array, positioned substantially adjacent a third via;
 - a second region, positioned between the third heater array and the fourth heater array; and

a second temperature sensing element operable to sense the temperature of the second region, wherein the temperature sensing element is substantially centrally disposed with respect to the second region.

9. (Original) The method of claim 8, wherein the temperature sensing element positioned between the first heater array and the second heater array is different than the second temperature sensing element positioned between the third heater array and the fourth heater array.

10. (Currently Amended) A method of fabricating chips for use with a printing device, comprising:

providing a first heater array, positioned substantially adjacent a first via;

providing a second heater array, positioned substantially adjacent a second via; and

positioning a temperature sensing element in a region between the first heater array and the second heater array, wherein the temperature sensing element is operable to sense the a temperature of the region, the temperature being representative of the first heater array and the second heater array.

11. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing element in substantially the center of the region.

12. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region comprises positioning a temperature sensing resistor in the region.

13. (Original) The method of claim 12, wherein positioning a temperature sensing element in the region comprises positioning a thermal sense resistor in the region.

14. (Original) The method of claim 13, wherein positioning a temperature sensing element in the region comprises positioning an n-type implant donor thermal sensing resistor in the region.

15. (Original) The method of claim 10, wherein positioning a temperature sensing element in the region between the first heater array and the second heater array comprises positioning the temperature sensing element at least 300 microns from each of the first heater array and the second heater array.

16. (Original) The method of claim 15, wherein positioning a temperature sensing element in the region between the first heater array and the second heater array comprises positioning the

temperature sensing element substantially planar to each of the first heater array and the second heater array.

17. (Original) The method of claim 10, further comprising providing at least one control element operable to receive a temperature measured by the temperature sensing element.

18. (Original) The method of claim 17, further comprising:

providing a third heater array substantially adjacent the second via;

providing a fourth heater array substantially adjacent a third via; and

positioning a second temperature sensing element in a second region located between the third heater array and the fourth heater array, wherein the temperature sensing element is operable to sense the temperature of the second region, and wherein the temperature sensing element is substantially centrally disposed with respect to the second region.

19. (Original) The method of claim 18, wherein the temperature sensing element positioned between the first heater array and the second heater array is different than the second temperature sensing element positioned between the third heater array and the fourth heater array.

REMARKS

The present Amendment and Response is responsive to the non-final Office Action mailed November 1, 2007. Claims 1-19 are pending in the present application. By the present response, a terminal disclaimer is submitted. Furthermore, independent claims 1 and 10 have been amended to clarify the claimed invention.

Judicially Created Nonstatutory Double Patenting Rejection

In the non-final Office Action, Claims 1-19 were provisionally rejected on the grounds of the judicially created nonstatutory double patenting rejection over claims 1 and 12-19 of copending Application No. 11/324,167. In response to the Examiner's rejections, Applicants submit concurrently with the filing of this response a terminal disclaimer in compliance with 37 C.F.R. 1.321(c). By the submission of the terminal disclaimer, the double patenting rejection is believed to be traversed.

Amendments to the Claims

Independent claims 1 and 10 have been amended to clarify the claimed invention. In particular, in claim 1, the amended element "temperature sensing element operable to sense a temperature of the region, the temperature being representative of the first heater array and the second heater array" clarifies that the region between the first heater array and second heater array has a temperature representative of both heater arrays. In conventional printheads, such as U.S. Patent Publication No. 2003/0142159 to *Askeland, et al.* (hereinafter "*Askeland*"), a temperature sensing element resistor (TSR) (420) is located far from local ejection elements (416) such that "there are differences in the local temperature in ejection chambers 418 and the global temperature measured by the TSR 440." *See* Paragraph [0044]. *Askeland* describes the difficulties in placement of a TSR close to the ejection chambers since "heat must flow from the ejection elements 416 to the TSR before it can be measured ... [t]he time required for this heat to flow to the TSR where it can be measured creates a latency in the control system." *Id.* *Askeland* relates to an altogether different technique than described by the Applicants' claimed invention in that *Askeland* must use the TSR temperature measurements as well as the ejection history of the driver head to estimate the local ejection chamber temperature. *See* Paragraph

[0047]. Instead of using a single TSR for pair of opposing local ejection elements, *Askeland* relates to a relatively complicated solution to measuring temperature.

The Applicants' claimed invention would not have been obvious to try since *Askeland* discloses that "due to layout issues on the driver head 316 it is typically not feasible to locate the TSR 440 or DTS 430 close to the ejection elements 416 ... [a]s a consequence, there are differences in the local temperature in ejection chambers 418 and the global temperature measured by the TSR 440." See Paragraph [0044]. Thus in view of *Askeland*, layout issues would have discouraged placement of a temperature sensing element relatively close to the ejection elements, which is how the Applicants' temperature sensing element is positioned in the region relative to the first heater array and second heater array, such that the temperature of the region is representative of the first heater array and the second heater array. Therefore, it would not have been obvious in view of *Askeland*, or the art, to place a temperature sensing element in a region between a first heater array and a second heater array, wherein the temperature sensing element is operable to sense a temperature of a region, and the temperature being representative of the first heater array and the second heater array.

CONCLUSION

Applicants believe that the present application, as amended, is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The foregoing is submitted as a full and complete response to the non-final Office Action mailed November 1, 2007.

It is not believed that extensions of time or fees for addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fee required therefore (including fees for net addition of claims), or credit of any overpayment, is hereby authorized to be charged to Deposit Account No. 19-5029 (Reference No. 2004-0659.01). In addition, if there are any issues that can be resolved by a telephone conference or an Examiner's amendment, the Examiner is invited and encouraged to call the undersigned attorney at (404) 853-8049.

Respectfully submitted,



Christopher J. Chan
Attorney for Assignee
Registration No. 44,070

DATE: FEBRUARY 1, 2008

SUTHERLAND ASBILL & BRENNAN LLP
999 Peachtree Street, NE
Atlanta, Georgia 30309-3996
(404) 853-8000 (office)
(404) 853-8806 (fax)
SAB Internal No.: 19403-0063

Attorney Docket No.: 2005-0463.02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	Confirmation No.: 1421
Lucas Barkley, et al.	)	
	)	Art Unit: 2853
Serial No.: 11/323,809	)	
	)	Examiner: Lam S. Nguyen
Filed: December 30, 2005	)	
	)	
For: METHODS AND APPARATUSES FOR SENSING	)	
TEMPERATURE OF MULTI-VIA HEATER CHIPS	)	
	)	
Attorney Docket No. 2005-0463.02	)	
	)	

SUBMISSION OF SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

The citation of information on the attached Form PTO/SB/08A, "Information Disclosure Statement by Applicant" is made pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98.

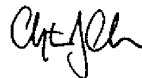
Pursuant to the Office's waiver of the requirement for submitting a copy of each cited U.S. patent and each U.S. patent application publication for all U.S. national patent applications, no copy of any cited U.S. patent or U.S. patent application publication is provided herewith.

The citation of this information does not constitute an admission of priority or that any cited item is available as a reference, or a waiver of any right applicant may have under applicable statutes, Rules of Practice in patent cases, or otherwise.

Applicant: Lucas Barkley, et al.
Application No.: 11/323,809
Filed: December 30, 2005
Page 2 of 2

This Statement is submitted under 37 C.F.R. § 1.97(c). Accordingly, the Commissioner is hereby authorized to charge the fee of \$180.00 required for consideration of this Statement to Deposit Account No. 19-5029. No additional fees are believed due; however, any additional fee required is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully submitted,



Christopher J. Chan
Attorney for Assignee
Registration No. 44,070

Date: 1 FEBRUARY 2008

SUTHERLAND ASBILL & BRENNAN LLP
999 Peachtree Street, NE
Atlanta, GA 30309
Telephone: 404-853-8000
Facsimile: 404-853-8806
SAB Internal No.: 19403-0063

Attorney Docket No. 2005-0463.02

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas Barkley	
	Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number	2005-0463.02	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	5594488		1997-01-14	Tsushima, et al.	
	2	5646660		1997-07-08	Murray	
	3	5731828		1998-03-24	Ishinaga, et al.	
	4	5812162		1998-09-22	Silverbrook	
	5	6260952		2001-07-17	Feinn, et al.	
	6	6382773		2002-05-05	Chang, et al.	
	7	6386674		2002-05-14	Corrigan, et al.	
	8	6398347		2002-06-04	Torgerson, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11323809
	Filing Date		2005-12-30
	First Named Inventor	Lucas Barkley	
	Art Unit		2853
	Examiner Name	Lam S. Nguyen	
	Attorney Docket Number		2005-0463.02

	9	6474782		2002-11-05	Furukawa	
	10	6488363		2005-05-10	Torgerson, et al.	
	11	6499834		2002-12-31	Takizawa	
	12	6601941		2003-08-05	Jones, et al.	
	13	6641242		2003-11-04	Canti, et al.	
	14	6644774		2003-11-11	Burger, et al.	
	15	6663227		2003-12-16	Yamamoto, et al.	
	16	6808843		2004-10-26	Markham, et al.	
	17	6871929		2005-03-29	Crivelli, et al.	
	18	6883904		2008-02-01	Jeanmarie, et al.	
	19	6890064		2005-05-10	Torgerson, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas Barkley
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

	20	6951378		2005-10-04	Yamada, et al.	
--	----	---------	--	------------	----------------	--

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

Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030142159		2003-07-31	Askeland, et al.	
	2	20050162450		2005-07-28	Sakurai	
	3	20050185023		2005-08-25	Furukawa, et al.	

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

Add

FOREIGN PATENT DOCUMENTS

Remove

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐

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

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11323809
	Filing Date	2005-12-30
	First Named Inventor	Lucas Barkley
	Art Unit	2853
	Examiner Name	Lam S. Nguyen
	Attorney Docket Number	2005-0463.02

If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	11323809
Filing Date	2005-12-30
First Named Inventor	Lucas Barkley
Art Unit	2853
Examiner Name	Lam S. Nguyen
Attorney Docket Number	2005-0463.02

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Christopher J. Chan/	Date (YYYY-MM-DD)	2008-02-01
Name/Print	Christopher J. Chan	Registration Number	44070

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 11/323,809
 Filed : December 30, 2005
 Applicant : Lucas Barkley, et al.
 Title : METHODS AND APPARATUSES FOR SENSING TEMPERATURE
 OF MULTI-VIA HEATER CHIPS

 Confirmation No. : 1421
 Art Unit : 2853
 Examiner : Lam S. Nguyen

 Attorney Docket No. : 2005-0463.02
 Customer No. : 29052

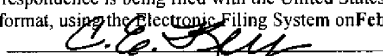
 TERMINAL DISCLAIMER IN APPLICATION

The Applicant named in the above-identified application and the owner of the entire interest in that application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the present application, which may extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of co-pending U.S. Patent Application No. 11/324,167, filed December 30, 2005. The applicant hereby agrees that any patent so granted on the present application shall be enforceable only for and during such period that any patent granted on U.S. Patent Application No. 11/324,167 are commonly owned. This agreement runs with any patent granted on the present application and is binding upon the grantee of such patent, and its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the present application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173 of any patent granted U.S. Patent Application No. 11/324,167 as shortened by any terminal disclaimer filed prior to the patent grant, in the event than any patent granted on U.S. Patent Application No. 11/324,167 expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims cancelled by a reexamination certificate, is reissued, or is in any manner terminated

 CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being filed with the United States Patent and Trademark Office, in electronic format, using the Electronic Filing System on February 1, 2008.


 Carla E. Key

7815707.1

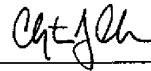
Serial No.: 11/323,809
Filed: December 30, 2005
Attorney Docket No.: 2005-0463.02

prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Please charge the \$130.00 fee required under 37 CFR § 1.20(d) for this terminal disclaimer, and any additional fees, or credit any overpayment, to Deposit Account No. 19-5029.

The undersigned is an attorney of record and is authorized to sign on behalf of the owner.

Respectfully submitted,



Christopher J. Chan
Attorney for the Assignee
Reg. No. 44,070

DATE: 1 FEBRUARY 2008

SUTHERLAND ASBILL & BRENNAN, LLP
999 Peachtree Street, NE
Atlanta, GA 30309-3996
(404) 853-8000
(404) 853-8806 (fax)
SAB Internal No.: 19403-0063

Attorney Docket No.: 2005-0463.02

7815707.1

Electronic Patent Application Fee Transmittal				
Application Number:		11323809		
Filing Date:		30-Dec-2005		
Title of Invention:		Methods and apparatuses for sensing temperature of multi-via heater chips		
First Named Inventor/Applicant Name:		Lucas David Barkley		
Filer:		Christopher Chan/Carla Key		
Attorney Docket Number:		2005-0463.02		
Filed as Large Entity				
Utility Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Processing Fee, except for Provis. apps	1808	1	130	130
Total in USD (\$)				310

Electronic Acknowledgement Receipt	
EFS ID:	2804806
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	Methods and apparatuses for sensing temperature of multi-via heater chips
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Christopher Chan/Carla Key
Filer Authorized By:	Christopher Chan
Attorney Docket Number:	2005-0463.02
Receipt Date:	01-FEB-2008
Filing Date:	30-DEC-2005
Time Stamp:	17:29:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$310
RAM confirmation Number	2340
Deposit Account	195029
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 1.21 (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 - After Non-Final Rejection	19403-0063_2005-0463-02-Response_NFOA.pdf	204003	no	8
			491d630fa38db2bc70a80604bf1ba8d9de32ab6b		
Warnings:					
Information:					
2	Information Disclosure Statement Letter	19403-0063_2005-0463-02-Suppl_IDS_Transmittal.pdf	36239	no	2
			a7f8acc45ac86ed5448257c4b6d7a1fc29cfd3fe		
Warnings:					
Information:					
3	Information Disclosure Statement Letter	19403-0063_2005-0463-02-Disclosure.pdf	42451	no	2
			0282d8bbb275b712f74eedaa461def03a52d4428		
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Filed	19403-0063_2005-0463-02_IDS.pdf	1575663	no	6
			108fa8f7640947bd89304b7b5ae2911f75484995		
Warnings:					
Information:					
5	Terminal Disclaimer Filed	19403-0063_2005-0463-02-Terminal_Disclaimer.pdf	51466	no	2
			3226b16651a29aa6fdee6db8f1df63a24cb764a		
Warnings:					
Information:					
6	Fee Worksheet (PTO-06)	fee-info.pdf	8338	no	2
			e5df5da1af5dba01bac73801e9b8be0cf7c27b90		
Warnings:					
Information:					
Total Files Size (in bytes):			1918160		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : **11/323,809**
 Filed : **December 30, 2005**
 Applicant : **Lucas Barkley, et al.**
 Title : **METHODS AND APPARATUSES FOR SENSING TEMPERATURE
 OF MULTI-VIA HEATER CHIPS**

Confirmation No. : **1421**
 Art Unit : **2853**
 Examiner : **Lam S. Nguyen**

Attorney Docket No. : **2005-0463.02**
 Customer No. : **29052**

DISCLOSURE UNDER 37 C.F.R. § 1.56

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

Sir:

The citation of information below and in the enclosed documents is made pursuant to 37 C.F.R. § 1.56.

The prosecution of the following U.S. patent application numbers may be relevant to pending U.S. Patent Application No. 11/323,809:

- (1) U.S. Patent Application No. 11/238,559 (filed September 29, 2005)
 - Non-final Office Action mailed March 22, 2007
 - Response to Non-final Office Action filed June 19, 2007
 - Final Office Action mailed August 31, 2007
 - Response to Final Office Action filed October 30, 2007
 - Advisory Action mailed November 13, 2007
 - Request for Continued Examination filed November 30, 2007
- (2) U.S. Patent Application No. 11/324,167 (filed December 30, 2005)
 - Non-final Office Action mailed December 26, 2007

Application No.: 11/323,809
Filed: December 30, 2005
Information Disclosure Statement

These Office Actions, Responses to Office Action, Advisory Opinions, and Notice of Allowances (if any) as well as additional information relating to the prosecution history of these granted and pending patent applications may be accessible through the Patent Application Information Retrieval System (PAIRS) located on the United States Patent and Trademark Office's website.

The citation of this information does not constitute an admission or a waiver of any right the Applicants may have under applicable statutes, Rules of Practice in patent cases, or otherwise. The citation of this information is made to ensure the Examiner is aware of and considers the prosecution history associated with these related patent applications and patents.

Respectfully submitted,



Christopher J. Chan
Attorney for the Assignee
Reg. No. 44,070

DATE: 1 FEBRUARY 2008

SUTHERLAND ASBILL & BRENNAN, LLP
999 Peachtree Street, NE
Atlanta, GA 30309-3996
(404) 853-8000
(404) 853-8806 (fax)
SAB Internal No.: 19403-0063

Attorney Docket No.: 2005-0463.02

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/323,809		Filing Date 12/30/2005		☐ To be Mailed	
---	--	--	--	--	---	--	----------------------------------	--	---------------------------------------	--

APPLICATION AS FILED – PART I					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)		SMALL ENTITY ☐		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			RATE (\$)	FEE (\$)	
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A				N/A		
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A				N/A		
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A				N/A		
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR		X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =				X \$ =		
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL				TOTAL		

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY						
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	02/01/2008	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)			RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 19	Minus	** 20	= 0	X \$ =		OR		X \$50=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$ =		OR		X \$210=	0
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		OR		TOTAL ADD'L FEE	0

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)			RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR		X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR		X \$ =	
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		OR		TOTAL ADD'L FEE	

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

Legal Instrument Examiner:
/VENICE M. WILLIAMS/

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.
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02	1421
21972 7590 11/01/2007 LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			EXAMINER NGUYEN, LAM S	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 11/01/2007	DELIVERY MODE PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	11/323,809	BARKLEY ET AL.	
	Examiner	Art Unit	
	LAM S. NGUYEN	2853	

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

Period for Reply

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

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

Status

1) ☐ Responsive to communication(s) filed on ____.

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

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) ☐ Claim(s) ____ is/are allowed.

6) ☒ Claim(s) 1-19 is/are rejected.

7) ☐ Claim(s) ____ is/are objected to.

8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

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

10) ☒ The drawing(s) filed on 30 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892) 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>12/30/05, 10/22/07</u>	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ 5) ☐ Notice of Informal Patent Application 6) ☐ Other: ____
---	--

DETAILED ACTION

Double Patenting

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

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

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

1. Claims 1-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 11/324167, respectively. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-9 of copending Application No. 11/324167 simply teaches all claimed limitations of the claimed invention.

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

Claim 1 of copending Application No. 11/324167 teaches a chip for use with a printing device, comprising:

a first heater array, positioned substantially adjacent a first via (*line 2*);
a second heater array, positioned substantially adjacent a second via (*line 3*);
a region, positioned between the first heater array and the second heater array
(*line 4*);

a temperature sensing element operable to sense the temperature of the region,
wherein the temperature sensing element is substantially centrally disposed with respect to the
region (*lines 6-8*).

2. Claims 10-19 are provisionally rejected on the ground of nonstatutory obviousness-type
double patenting as being unpatentable over claims 12-19 of copending Application No.
11/324167, respectively. Although the conflicting claims are not identical, they are not
patentably distinct from each other because claims 12-19 of copending Application No.
11/324167 simply teaches all claimed limitations of the claimed invention.

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

Claim 12 of copending Application No. 11/324167 teaches a method of fabricating chips
for use with a printing device, comprising:

providing a first heater array, positioned substantially adjacent a first via (*line 2*);
providing a second heater array, positioned substantially adjacent a second via
(*lines 3-4*); and

positioning a temperature sensing element in a region between the first heater
array and the second heater array, wherein the temperature sensing element is operable to sense
the temperature of the region (*lines 4-6*).

Application/Control Number:
11/323,809
Art Unit: 2853

Page 4

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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



LAM SON NGUYEN

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.

Substitute for form 1443A/PTO

Complete if Known

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet

of

Application Number	11/323,809
Filing Date	12/30/2005
First Named Inventor	Lucas David Barkley
Art Unit	3742 2853
Examiner Name	Unknown LAM NGUYEN
Attorney Docket Number	2005-0463.02

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document Number Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/LN/		US- 6357863 B1	03/19/2002	Anderson et al.	
/LN/		US- 2005/0052500 A1	03/10/2005	Edelen et al.	
/LN/		US- 6764163 B2	07/20/2004	Anderson et al.	
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Y ⁶

Examiner Signature	/Lam Nguyen/	Date Considered	10/26/2007
--------------------	--------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kind Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours in 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 contains a valid OMB control number.

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Complete if Known

Application Number	11/323809
Filing Date	12/30/05
First Named Inventor	Lucas D. Barkley
Art Unit	2853
Examiner Name	LAM NGUYEN
Attorney Docket Number	2005-0463.02

Sheet 1 of 1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
/LN/		US- 6951378	10-04-2005	Yamada et al.	
/LN/		US- 6883904	04-26-2005	Jeanmarie et al.	
/LN/		US- 6871929	03-29-2005	Crivelli et al.	
/LN/		US- 6808243	10-26-2004	Markham et al.	
/LN/		US- 6644774	11-11-2003	Burger et al.	
/LN/		US- 6641242	11-04-2003	Canti et al.	
/LN/		US- 6601941	08-05-2003	Jones et al.	
/LN/		US- 6382773	05-05-2002	Chang et al.	
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				

Examiner
Signature

/Lam Nguyen/

Date
Considered

10/26/2007

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, 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 (1-800-786-9199) and select option 2.

Index of Claims



Application/Control No.

11/323,809

Examiner

LAM S. NGUYEN

Applicant(s)/Patent under Reexamination

BARKLEY ET AL.

Art Unit

2853

✓	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim	Date
Final	
Original	10/26/07
1	✓
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	✓
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	

Claim	Date
Final	
Original	
51	
52	
53	
54	
55	
56	
57	
58	
59	
60	
61	
62	
63	
64	
65	
66	
67	
68	
69	
70	
71	
72	
73	
74	
75	
76	
77	
78	
79	
80	
81	
82	
83	
84	
85	
86	
87	
88	
89	
90	
91	
92	
93	
94	
95	
96	
97	
98	
99	
100	

Claim	Date
Final	
Original	
101	
102	
103	
104	
105	
106	
107	
108	
109	
110	
111	
112	
113	
114	
115	
116	
117	
118	
119	
120	
121	
122	
123	
124	
125	
126	
127	
128	
129	
130	
131	
132	
133	
134	
135	
136	
137	
138	
139	
140	
141	
142	
143	
144	
145	
146	
147	
148	
149	
150	

REFERENCE NO.
2005-0463.02

PATENT APPLICATION

1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Lucas David Barkley
Serial No.: 11/323,809
Filing Date: December 30, 2005
Group Art Unit: 3742
Title: *Methods and Apparatuses for Sensing Temperature of Multi-Via Heater Chips*

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

I hereby certify that this Information Disclosure Statement is being deposited with the United States Postal Service as Express Mail No. _____ addressed to: Mail Stop Amendment, Commissioner of Patents, Alexandria, VA 22313-1450, on the date shown below.

Name

Date

Dear Sir:

SECOND INFORMATION DISCLOSURE STATEMENT

Applicants respectfully request, pursuant to 37 C.F.R. §§1.56, 1.97 and 1.98, that the references listed on the attached PTO-1449 form be considered and cited in the examination of the above-identified application. Since the present Application was filed after June 30, 2003, a copy of any U.S. Patent and any U.S. Patent Application Publication cited on the attached PTO Form 1449 is not being submitted with this Information Disclosure Statement pursuant to the July 11, 2003 waiver of 37 C.F.R. §1.98(A)(2)(i) by the U.S. Patent and Trademark Office. Furthermore, pursuant to 37 C.F.R. §§1.97 (g) and (h), no representation is made that these references are material to the patentability of the present application.

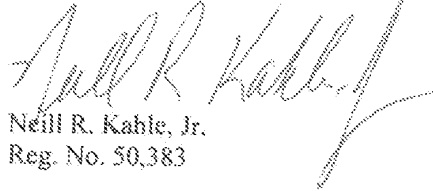
REFERENCE NO.
2005-0463.02

PATENT APPLICATION

2

Applicants believe no fees are due with this Information Disclosure Statement, however, the Commissioner is hereby authorized to charge any additional fees or credit any overpayments to Deposit Account No. 12-1213 of Lexmark International, Inc. in order to effectuate this filing.

Respectfully submitted,



Neill R. Kahle, Jr.
Reg. No. 50,383

Date: 10-22-2007

Correspondence Address:
Customer Number 21972
(859) 232-7892
FAX (859) 232-7850

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.

Complete if Known

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	2
-------	---	---

Application Number	11/323,809
Filing Date	12/30/2005
First Named Inventor	Lucas David Barkley
Art Unit	3742
Examiner Name	Unknown
Attorney Docket Number	2005-0463 02

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

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 to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP §61.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST 3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

Electronic Acknowledgement Receipt	
EFS ID:	2350187
Application Number:	11323809
International Application Number:	
Confirmation Number:	1421
Title of Invention:	Methods and apparatuses for sensing temperature of multi-via heater chips
First Named Inventor/Applicant Name:	Lucas David Barkley
Customer Number:	21972
Filer:	Neill R. Kahle./Lori Woods
Filer Authorized By:	Neill R. Kahle.
Attorney Docket Number:	2005-0463.02
Receipt Date:	22-OCT-2007
Filing Date:	30-DEC-2005
Time Stamp:	14:37:34
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	Information Disclosure Statement (IDS) Filed	2005-0463-02IDS.pdf	1524911 7e0c50bb24500ee7f10b69bfa7309813e13c85ec	no	3

Warnings:

Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	1524911
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.	

REFERENCE NO.
2005-0463.02

PATENT APPLICATION

1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Lucas David Barkley
Serial No.: 11/323,809
Filing Date: December 30, 2005
Group Art Unit: 3742
Title: *Methods and Apparatuses for Sensing Temperature of Multi-Via Heater Chips*

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

I hereby certify that this Information Disclosure Statement is being deposited with the United States Postal Service as Express Mail No. _____ addressed to: Mail Stop Amendment, Commissioner of Patents, Alexandria, VA 22313-1450, on the date shown below.

Name

Date

Dear Sir:

SECOND INFORMATION DISCLOSURE STATEMENT

Applicants respectfully request, pursuant to 37 C.F.R. §§1.56, 1.97 and 1.98, that the references listed on the attached PTO-1449 form be considered and cited in the examination of the above-identified application. Since the present Application was filed after June 30, 2003, a copy of any U.S. Patent and any U.S. Patent Application Publication cited on the attached PTO Form 1449 is not being submitted with this Information Disclosure Statement pursuant to the July 11, 2003 waiver of 37 C.F.R. §1.98(A)(2)(i) by the U.S. Patent and Trademark Office. Furthermore, pursuant to 37 C.F.R. §§1.97 (g) and (h), no representation is made that these references are material to the patentability of the present application.

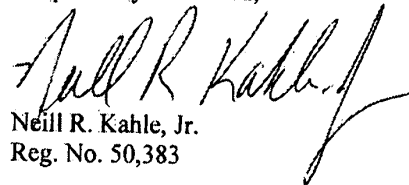
REFERENCE NO.
2005-0463.02

PATENT APPLICATION

2

Applicants believe no fees are due with this Information Disclosure Statement, however, the Commissioner is hereby authorized to charge any additional fees or credit any overpayments to Deposit Account No. 12-1213 of Lexmark International, Inc. in order to effectuate this filing.

Respectfully submitted,


Neil R. Kahle, Jr.
Reg. No. 50,383

Date: 10-22-2007

Correspondence Address:
Customer Number 21972
(859) 232-7892
FAX (859) 232-7850

~~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.~~

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	
-------	---	----	--

Complete if Known

Application Number	11/323,809
Filing Date	12/30/2005
First Named Inventor	Lucas David Barkley
Art Unit	3742
Examiner Name	Unknown
Attorney Docket Number	2005-0463.02

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

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 to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of Information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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



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
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02

CONFIRMATION NO. 1421

21972
LEXMARK INTERNATIONAL, INC.
INTELLECTUAL PROPERTY LAW DEPARTMENT
740 WEST NEW CIRCLE ROAD
BLDG. 082-1
LEXINGTON, KY40550-0999

Title: Methods and apparatuses for sensing temperature of multi-via heater chips

Publication No. US-2007-0153044-A1

Publication Date: 07/05/2007

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 703-305-3028.

Pre-Grant Publication Division, 703-605-4283



Practitioner's Docket No. 2005-0463.02

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Lucas David Barkley, Bruce David Gibson, Eric Spencer Hall, David G. King,
and George K. Parish

Application No.: 11/323.809

Group No.: 3742

Filed: December 30, 2005

Examiner:

For: METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER
CHIPS

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

COMPLETION OF FILING REQUIREMENTS
—NONPROVISIONAL APPLICATION

- I. This replies to the Notice to File Missing Parts of Application (PTO-1533) mailed February 15, 2006.

A copy of the Notice to File Missing Parts of Application--Filing Date Granted (Form PTO-1533) is enclosed.

DECLARATION OR OATH

- II. A new original oath or declaration is attached.

CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. § 1.8(a))

I hereby certify that this correspondence is, on the date shown below, being:

MAILING

☒ deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to the Commissioner for Patents, Washington, D.C. 20231.

FACSIMILE

☐ transmitted by facsimile to the Patent and Trademark Office, (703) _____

Signature

Edna L. Clark

(type or print name of person certifying)

Date: 3/30/06

* Only the date of filing (' 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under ' 1.8 continues to be taken into account in determining timeliness. See ' 1.703(f). Consider "Express Mail Post Office to Addressee" (' 1.10) or facsimile transmission (' 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

Completion of Filing Requirements—Nonprovisional Application--page 1 of 3

COMPLETION FEES

III.

1. Filing fee

Utility Patent Application 37 C.F.R. ' 1.16 (a)(1))	\$300.00
--	----------

2. Search fee

Utility (37 C.F.R. § 1.16(k))	\$500.00
-------------------------------	----------

3. Examination fee

Utility (37 C.F.R. § 1.16(o))	\$200.00
-------------------------------	----------

4. Surcharge Fees

Declaration or oath late payment of filing fee, search fee, examination fee, and/or late filing of original (37 C.F.R. § 1.16(f))	\$130.00
--	----------

Total Completion Fees	\$1,130.00
-----------------------	------------

EXTENSION OF TIME

IV. The proceedings herein are for a patent application, and the provisions of 37 C.F.R. § 1.136(a) apply.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

TOTAL FEE DUE

V. The total fee due is:

Completion fees	\$1,130.00
-----------------	------------

Extension fee (if any)	\$0.00
------------------------	--------

Total Fee Due	\$1,130.00
---------------	------------

PAYMENT OF FEES

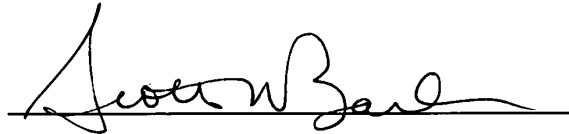
VI. Authorization is hereby made to charge the amount of \$1,130.00 to Deposit Account No. 12-1213.

Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

Date: 3/28/06

Reg. No.: 42,292
Tel. No.: 859-232-3668
Customer No.: 21972



Scott N. Barker
LEXMARK INTERNATIONAL, INC
740 West New Circle Road
Lexington, KY 40550
US

Completion of Filing Requirements—Nonprovisional Application--page 3 of 3

*IFW*

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	ATTORNEY DOCKET NUMBER
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02

CONFIRMATION NO. 1421

FORMALITIES
LETTER

21972
LEXMARK INTERNATIONAL, INC.
INTELLECTUAL PROPERTY LAW DEPARTMENT
740 WEST NEW CIRCLE ROAD
BLDG. 082-1
LEXINGTON, KY 40550-0999

Date Mailed: 02/15/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted*Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is unsigned.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1130** for a Large Entity

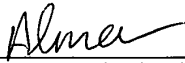
04/05/2006 AWONDAF1 00000049 121213 11323809
01 FC:1011 300.00 DA
02 FC:1051 130.00 DA
03 FC:1111 500.00 DA
04 FC:1311 200.00 DA

- **\$300** Statutory basic filing fee.
- **\$130** Surcharge.
- The application search fee has not been paid. Applicant must submit **\$500** to complete the search fee.

- The application examination fee has not been paid. Applicant must submit \$200 to complete the examination fee for a large entity

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 2 - COPY TO BE RETURNED WITH RESPONSE



PTO/SB/01 (10-05)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) ☐ Declaration Submitted With Initial Filing OR ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Attorney Docket Number	2005-0463.02
	First Named Inventor	Lucas David Barkley
	COMPLETE IF KNOWN	
	Application Number	11/323,809
	Filing Date	December 30, 2005
	Art Unit	3742
Examiner Name		

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHODS AND APPARATUSES FOR SENSING TEMPERATURE OF MULTI-VIA HEATER CHIPS

(Title of the Invention)

the specification of which

☐ is attached hereto**OR**☒ was filed on (MM/DD/YYYY) **12/30/2005** as United States Application Number or PCT InternationalApplication Number **11/323,809** and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

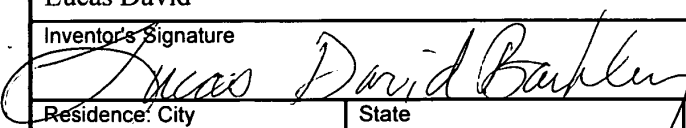
[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 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 contains a valid OMB control number.

DECLARATION — Utility or Design Patent Application

Direct all correspondence to:		☒ The address associated with Customer Number:	21972	OR	☐ Correspondence address below
Name					
Address					
City			State		ZIP
Country		Telephone		Email	
WARNING:					
Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.					
NAME OF SOLE OR FIRST INVENTOR:			☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])			Family Name or Surname		
Lucas David			Barkley		
Inventor's Signature					Date
					3/24/06
Residence: City	State	Country	Citizenship		
Lexington	KY	US	US		
Mailing Address 4800 Clifford Circle					
City	State	Zip	Country		
Lexington	KY	40515	US		
☒ Additional inventors or a legal representative are being named on the <u>2</u> supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.					

[Page 2 of 2]

DECLARATION	ADDITIONAL INVENTOR(S) Supplemental Sheet Page <u>1</u> of <u>2</u>
--------------------	---

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Bruce David		Gibson	
Inventor's Signature		Date <u>3-24-06</u>	
Lexington Residence: City	KY State	US Country	US Citizenship
4729 Scenicview Road Mailing Address			
Lexington City	KY State	40514 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Eric Spencer		Hall	
Inventor's Signature		Date <u>3-24-06</u>	
Lexington Residence: City	KY State	US Country	US Citizenship
1344 Copperfield Court Mailing Address			
Lexington City	KY State	40514 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
David G.		King	
Inventor's Signature		Date <u>3/24/06</u>	
Shelbyville Residence: City	KY State	US Country	US Citizenship
66 Goldenrod Court Mailing Address			
Shelbyville City	KY State	40065 Zip	US Country

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 (1-800-786-9199) and select option 2.

DECLARATION	ADDITIONAL INVENTOR(S) Supplemental Sheet Page <u>2</u> of <u>2</u>
--------------------	---

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
George K.		Parish	
Inventor's Signature		Date <u>3-26-06</u>	
Winchester Residence: City	KY State	US Country	US Citizenship
11 Fontaine Boulevard Mailing Address			
Winchester City	KY State	40391 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 (1-800-786-9199) 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 NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/323,809	12/30/2005	Lucas David Barkley	2005-0463.02

CONFIRMATION NO. 1421

FORMALITIES
 LETTER

21972
 LEXMARK INTERNATIONAL, INC.
 INTELLECTUAL PROPERTY LAW DEPARTMENT
 740 WEST NEW CIRCLE ROAD
 BLDG. 082-1
 LEXINGTON, KY 40550-0999

Date Mailed: 02/15/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted*Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 300 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is unsigned.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

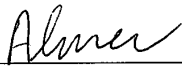
Total additional fee(s) required for this application is \$1130 for a Large Entity

- \$300 Statutory basic filing fee.
- \$130 Surcharge.
- The application search fee has not been paid. Applicant must submit \$500 to complete the search fee.

- The application examination fee has not been paid. Applicant must submit \$200 to complete the examination fee for a large entity

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 3 - OFFICE COPY



123005

PTO/SB/05 (05-05)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office. U.S. DEPARTMENT OF COMMERCE

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

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 2005-0463.02

First Inventor Lucas David Barkley

Title Methods And Apparatuses For Sensing Temperature of Multi-Via Heater Chips

Express Mail Label No. EQ 355785765 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☐ Applicant claims small entity status.
See 37 CFR 1.27.
3. ☒ Specification [Total Pages 17]
Both the claims and abstract must start on a new page
(For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 5]
5. Oath or Declaration [Total Sheets 4]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ A copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s)
name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or
Computer Program (Appendix)
 ☐ Landscape Table on CD
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, items a. - c. are required)
 - a. Computer Readable Form (CRF)
 - i. ☐ Computer Readable Form (CRF)
 - ii. ☐ Transfer Request (37 CFR 1.821(e))
 - b. Specification Sequence Listing on:
 - i. ☐ CD-ROM or CD-R (2 copies); or
 - ii. ☐ Paper
 - c. ☐ Statements verifying identity of above copies

ADDRESS TO: Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
Name of Assignee _____
10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
11. ☐ English Translation Document (if applicable)
12. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449)
☐ Copies of foreign patent documents, publications, & other information
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i).
Applicant must attach form PTO/SB/35 or equivalent.
17. ☐ Other: _____

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation☐ Divisional☐ Continuation-in-part (CIP)

of prior application No.: _____

Prior application information: Examiner _____

Art Unit: _____

19. CORRESPONDENCE ADDRESS

☒ The address associated with Customer Number:

21972

OR

☐ Correspondence address below

Name

Address

City

State

Zip Code

Country

Telephone

Email Address

Signature

Date

12/30/05

Name
(Print/Type)

Scott N. Barker

Registration No.
(Attorney/Agent)

42,292

This collection of information is required by 37 CFR 1.53(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.

**METHODS AND APPARATUSES FOR SENSING TEMPERATURE
OF MULTI-VIA HEATER CHIPS**

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is related to U.S. Patent Application Serial No. ____/____,____, filed contemporaneously herewith, and entitled “Methods and Apparatuses for Regulating the Temperature of Multi-Via Heater Chips.”

FIELD OF THE INVENTION

[0002] The present invention relates generally to printing devices, and more particularly to methods and apparatuses for sensing temperature of multi-via heater chips.

BACKGROUND OF THE INVENTION

[0003] A number of printers, copiers, and multi-function products utilize heater chips in their printing heads for discharging ink drops. The ink is supplied through one or more ink vias in the chip. These heater chips typically provide only one heater array for each ink via that is disposed along one side of the ink via. In particular, as shown in FIG. 1, a traditional heater chip **100** may include three ink vias—a cyan ink via **102**, a magenta ink via **104**, and a yellow ink via **106**. The cyan ink via **102** operates with the cyan heater array **108**; the magenta ink via **104** operates with the magenta heater array **110**; and the yellow ink via **106** operates with the yellow heater array **112**.

[0004] Similarly, FIG. 2 shows a heater chip which includes three ink vias, each connected to a single heater array. The cyan ink via **202** operates with the cyan heater array **208**; the magenta ink via **204** operates with the magenta heater array **210**; and the yellow ink via **206** operates with the yellow heater array **212**. However, the traditional use of single heater array on a single side of an ink via limits the achievable printing resolution, including the vertical resolution. The configurations shown in FIG. 1 and FIG. 2 may have significant difficulty providing ink drop sizes

of less than 4 pL (picoliters) while achieving a vertical resolution of about 1200 dpi (dots per inch) or better. Therefore, it is desirable to position heater arrays on both sides of the ink vias, which allow the ink vias to provide smaller ink drops in order to achieve higher printing resolutions.

[0005] Additionally, for proper functionality, inkjet heater chips need to monitor and maintain the silicon substrate of the heater chip at an acceptable temperature for printing. If the temperature is too low, the ink drops formed will be smaller and have a lower drop-weight than that required for good image quality. As the temperature rises, the drop-weight of the ink drop will rise. Variations in drop-weight will cause visible hue shifts in the printed image.

[0006] A thermal sense resistor (TSR) is typically used to sense the temperature of the silicon substrate. The temperature of the heater chip shown in FIG. 1 is measured by way of a metal serpentine temperature sense resistor **120**. The serpentine temperature sense resistor **120** is routed around the periphery of the heater chip and provides an average temperature of the entire die. This average measurement provides no discrimination between individual colors and does not provide any feedback on temperature differences between one area of the heater chip versus another. Thus, the metal serpentine temperature sense resistor **120** lacks the ability to control temperature on a per color or area basis.

[0007] The heater chip shown in FIG. 2 improves on that of FIG. 1 by providing for temperature sensing on a per color basis. Three temperature sense resistors **220**, **222**, and **224** are placed in close proximity to each of the heater arrays, each situated on the same side of their respective ink vias. As shown, a first TSR **220** is situated on the left side of the cyan ink via **202** and cyan heater array **208**; a second TSR **222** is situated on the left side of the magenta ink via **204** and magenta heater array **210**; and a third TSR **224** is situated on the left side of the yellow ink via **206** and the yellow heater array **212**. The ink vias **202**, **204**, and **206** act as a thermal barrier between the colors. All the thermal heater arrays **208**, **210**, and **212** are situated on only one side of their respective ink vias, ensuring that there is only a small amount of thermal crosstalk between the temperature sense resistors.

[0008] Once the temperature within the heater chip is measured, the temperature can be maintained and regulated at an acceptable temperature for printing. Some traditional heater chips use substrate heating elements to heat the silicon substrate to an acceptable temperature. Other heater chips apply fire pulses to selected heater arrays of a short duration to maintain desired temperature. The duration of the fire pulses is too short to cause the nucleation and subsequent ejection of an ink drop, but the pulses are sufficient to ensure that the heater chip operates within an acceptable temperature range.

[0009] In FIG. 2, fire pulses may be applied on a per color basis from the respective heater arrays **208**, **210**, and **212**. As previously mentioned, the ink vias **202**, **204**, and **206** function as thermal barriers between the colors. For example, heat generated by the magenta heater array **210** will not readily couple to the cyan heater array **208** and yellow heater array **212** on either side across the intervening ink vias **202** and **204**. Thus, an adequate operating temperature can be maintained for each color of the heater chip.

[0010] When a heater array is positioned on both sides of an ink vias, the temperature sensing and regulating devices utilized in the prior art do not provide adequate thermal control. A serpentine temperature sense resistor **120**, as depicted in FIG. 1 is not capable of discriminating between the individual colors of the heater arrays and does not provide any feedback on temperature difference between various areas of the heater chip. Further, monitoring and regulating the operating temperature on a per color basis by situating a temperature sense resistor on the same side of each respective ink via, as shown in FIG. 2, is insufficient due to the fact that heater arrays of more than one color now occupy the silicon region between ink vias. Without accurate temperature readings, the method of providing fire pulses to regulate thermal conditions on a per color basis would also be subject to error.

[0011] Accordingly, there is a need in the industry for heater chips that can provide for monitoring and regulating the various regions of a heater chip at a desired temperature when heater arrays are placed on both sides of the ink vias.

BRIEF SUMMARY OF THE INVENTION

[0012] According to one embodiment of the present invention, there is disclosed a chip for use with a printing device. The chip includes a first heater array, positioned substantially adjacent a first via, and a second heater array, positioned substantially adjacent a second via. The chip also includes a region, positioned between the first heater array and the second heater array, and a temperature sensing element operable to sense the temperature of the region, where the temperature sensing element is substantially centrally disposed with respect to the region.

[0013] According to one embodiment, the temperature sensing element may include a temperature sensing resistor. The temperature sensing element may also include a thermal sense resistor, such as an n-type implant donor thermal sensing resistor. According to another embodiment of the invention, the temperature sensing element may be positioned several hundred microns, such as at least 300 microns, from both the first heater array and the second heater array. According to yet another embodiment of the invention, the temperature sensing element is positioned substantially planar to each of the first heater array and the second heater array such that the temperature sensing element is not positioned directly above the first or second heater arrays.

[0014] According to another embodiment of the invention, the chip may include at least one control element operable to receive a temperature measured by the temperature sensing element. Additionally, the chip may include a third heater array, positioned substantially adjacent the second via, and a fourth heater array, positioned substantially adjacent a third via. The chip may also include a second region, positioned between the third heater array and the fourth heater array, and a second temperature sensing element operable to sense the temperature of the second region, where the temperature sensing element is substantially centrally disposed with respect to the second region. Furthermore, the temperature sensing element positioned between the first heater array and the second heater array may be different than the second temperature sensing element positioned between the third heater array and the fourth heater array.

[0015] According to another embodiment of the invention, there is disclosed a method of fabricating chips for use with a printing device. The method includes providing a first heater array, positioned substantially adjacent a first via, and providing a second heater array, positioned substantially adjacent a second via. The method also includes positioning a temperature sensing element in a region between the first heater array and the second heater array, where the temperature sensing element is operable to sense the temperature of the region.

[0016] According to one embodiment, positioning a temperature sensing element in the region includes positioning a temperature sensing element in substantially the center of the region. According to another embodiment of the invention, positioning a temperature sensing element in the region includes positioning a temperature sensing resistor in the region. Positioning a temperature sensing element in the region may also include positioning a thermal sense resistor in the region. Additionally, positioning a temperature sensing element in the region may also include positioning an n-type implant donor thermal sensing resistor in the region.

[0017] According to yet another embodiment of the invention, positioning a temperature sensing element in the region between the first heater array and the second heater array includes positioning the temperature sensing element several hundred microns, such as at least 300 microns, from each of the first heater array and the second heater array. Additionally, positioning a temperature sensing element in the region between the first heater array and the second heater array may include positioning the temperature sensing element substantially planar to each of the first heater array and the second heater array such that the temperature sensing element is not positioned directly above the first or second heater arrays.

[0018] According to yet another embodiment of the invention, the method may include providing at least one control element operable to receive a temperature measured by the temperature sensing element. The method may also include providing a third heater array substantially adjacent the second via, providing a fourth heater array substantially adjacent a third via, and positioning a second temperature sensing element in a second region located between the third heater array and the fourth heater array, where the temperature sensing element is operable to

sense the temperature of the second region, and where the temperature sensing element is substantially centrally disposed with respect to the second region. Additionally, the temperature sensing element positioned between the first heater array and the second heater array may be different than the second temperature sensing element positioned between the third heater array and the fourth heater array.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0019] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 illustrates a traditional heater chip utilizing a serpentine temperature sense resistor for providing an average temperature of the entire die.

FIG. 2 illustrates a traditional heater chip utilizing temperature sense resistors and heater arrays to monitor and regulate temperature on a by color basis.

FIG. 3 illustrates an exemplary configuration for a heater chip having a heater array positioned on both sides of each ink via, according to an illustrative embodiment of the present invention.

FIG. 4 illustrates an exemplary configuration for a heater chip having regions defined between the ink vias, according to an illustrative embodiment of the present invention.

FIG. 5 illustrates an exemplary configuration for a heater chip in accordance with an illustrative embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS OF THE INVENTION

[0020] The present inventions now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0021] According to an exemplary embodiment of the present invention, heater arrays may be positioned on both sides of at least a portion of the ink vias, which can allow higher printing resolutions. Each of these heater arrays may include a plurality of individual heaters fabricated as resistors in the heater chips. For example, these resistors may be thin-film resistors in accordance with an exemplary embodiment of the invention. These thin-film resistors may be formed of a variety of materials, including platinum, aluminum, alloys, and other materials. The heaters may also be formed of other technologies besides thin-film resistors, as are known to those of ordinary skill in the art. When the heaters in the heater arrays are activated, they provide thermal energy to the nozzle chamber, and the ink is discharged through the nozzle.

[0022] FIG. 3 shows an illustrative heater chip 300 according to an embodiment of the present invention. The heater chip 300 illustrates the placement of a single via in between two corresponding heater arrays. With the heater arrays positioned on both sides of at least a portion of the ink vias, higher printing resolutions can be achieved. As shown in FIG. 3, the illustrative heater chip 300 is a CMYK (cyan-magenta-yellow-monochrome) heater chip that includes four ink vias each disposed between two heater arrays. In particular, a cyan ink via 302 is positioned between a first heater array 308 and a second heater array 314; a magenta ink via 304 is positioned between a first heater array 310 and a second heater array 316; a yellow ink via 306 is positioned between a first heater array 312 and a second heater array 318; and a monochrome (K) ink via 307 is positioned between a first heater array 313 and a second heater array 319.

[0023] Although the heater chip 300 illustrated in FIG. 3 shows only four ink vias, it will be appreciated by one of ordinary skill in the art that a greater number of vias and corresponding heater arrays may be utilized. As an example, an additional monochrome (K) ink via may be disposed between two additional heater arrays to form a CMYKK heater chip. Additionally, there may be numerous vias for a particular color within a heater chip. According to another embodiment of the invention, only some of the ink vias may be disposed between two heater arrays. For example, the monochrome ink via 307 may include only one monochrome heater array along a single side of the monochrome ink via 307.

[0024] The heater arrays 308, 310, 312, 313, 314, 316, 318, 319 shown in FIG. 3 may include one or more individual heaters fabricated as resistors in the heater chip. These resistors may be thin-film resistors in accordance with an exemplary embodiment of the invention. Thin-film resistors may be formed of one or more materials, including platinum (Pt), gold (Au), silver (Ag), copper (Cu), aluminum (Al), tantalum (Ta), titanium tungsten (TiW), silicon-nitrogen (SiN), silicon carbide (SiC), diamond-like carbon (DLC) coating, etc. Other metals, alloys, or materials appreciable by one of ordinary skill in the art may also be used. The heater arrays may also be formed of other technologies besides thin-film resistors, as is known to those of ordinary skill in the art.

[0025] It will be appreciated that the placement of a single via in between two heater arrays presents a challenge in attempting to sense the temperature of individual colors. If there is a single TSR associated with each heater array in the illustrative embodiment of FIG. 2, then two TSRs will be placed next to each other between adjacent ink vias. For instance, if one TSR is associated with the left yellow heater array and another TSR is associated with the right magenta heater array, the region between the magenta and yellow vias would include two TSRs. If a print job is heavy in yellow and light in magenta, the thermal energy generated by the yellow heaters would rapidly couple through the common silicon to the magenta TSR positioned in between the yellow and magenta ink vias, providing a false high reading for magenta. Rather than try to sense temperature on a per color basis with TSR's in close proximity to heaters, the present invention senses temperature by silicon region.

[0026] According to an exemplary embodiment of the present invention, an adequate operating temperature is monitored and regulated for various thermal regions separated by insulating ink vias on the heater chip. FIG. 4 illustrates an exemplary configuration for a heater chip 400 having thermal regions defined between the ink vias, according to one embodiment of the present invention. In particular, a first region 430 is defined as the area between the left edge of the heater chip 400 and the cyan ink via 402; a second region 432 is defined as the area between the cyan ink via 402 and the magenta ink via 404; a third region 434 is defined as the area between the magenta ink via 404 and the yellow ink via 406; a fourth region 436 is defined as the area between the yellow ink via 406 and the mono ink via 407; and a

fifth region **438** is defined as the area between the mono ink via **407** and the right edge of the heater chip **400**. It will be understood by those of ordinary skill in the art that any number of thermal regions may be defined for monitoring and regulating temperature on the heater chip.

[0027] The heater chip **400** includes components, such as the ink vias **402, 404, 406, 407** and heater arrays **408, 414, 410, 416, 412, 418, 413, 419** connected to a substrate (not shown) made up of a semiconductor material. According to an exemplary embodiment of the present invention, the substrate may be a silicon substrate. It will be appreciated by those skilled in the art, however, that the substrate can be formed from a variety of solid crystalline substances used as a base material for electronic devices, such as germanium (Ge), having electrical conductivity greater than insulators but less than good conductors. The thermal regions **430, 432, 434, 436, and 438** are defined regions of the silicon substrate of the heater chip **400** situated around and between the ink vias **402, 404, 406, and 407**. The minimum width of the thermal regions **430, 432, 434, 436, and 438** is generally limited by the heater chip **400** circuitry.

[0028] According to an exemplary embodiment of the present invention, temperature of the heater chip **400** is measured on a per thermal region basis. A temperature sensing element is placed in each of the thermal regions, and each is operable to measure the temperature of the silicon substrate in a corresponding thermal region. According to an exemplary embodiment of the present invention, the temperature sensing elements are n-type implant donor thermal sensing resistors (NSD sense resistors), as will be understood by those skilled in the art. As the substrate temperature of the heater chip **400** increases, the resistance of the TSRs increases, allowing a temperature measurement to be taken. It will also be appreciated by those of ordinary skill in the art that many other temperature sensing elements can be used, including but not limited to metal resistors and p-type implant donors.

[0029] With particular reference to FIG. 5, a TSR is positioned within each of the thermal regions **430, 432, 434, 436, 438**. Thus, a first TSR **540** is situated in the first region **430**; a second TSR **542** is situated in the second region **432**; a third TSR **544** is situated in the third region **434**; a fourth TSR **546** is situated in the fourth

region 436; and a fifth TSR 548 is situated in the fifth region 438. The TSRs 540, 542, 544, 546, and 548 are placed well away from the heater arrays 408, 410, 412, 413, 414, 416, 418, 419, at a distance 550 of several hundred microns, rather than in close proximity to the heater arrays. For the first region 430 the first TSR 440 is centered between the left edge (i.e., the left edge of the substrate) of the heater chip 400 and the cyan ink via 402. Similarly, for the fifth region 438 the fifth TSR 448 is centered between the right edge of the heater chip 400 and the mono ink via 402. The remaining TSRs 542, 544, 546 are centered between heater arrays from adjacent ink vias corresponding to different colors (i.e., heater arrays 414 and 410, 416 and 412, and 418 and 413, respectively). It will be understood by those skilled in the art that the TSRs 540, 542, 544, 546, and 548 need not be centered within their respective thermal regions 430, 432, 434, 436, and 438, but rather, they can be positioned at any point within their respective thermal regions.

[0030] Due to the relative high thermal conductivity of the silicon substrate, each of the thermal regions 430, 432, 434, 436, 438 have a very uniform temperature across the width of that region. Because of this conductivity, the TSRs 540, 542, 544, 546, 548 can be placed in the center of their respective thermal regions 430, 432, 434, 436, and 438 and still provide an accurate temperature measurement for the region. The ink vias 402, 404, 406, 407, on the other hand, act as thermal insulators between the thermal regions 430, 432, 434, 436, 438. As an example, if the right cyan heater array 414 fires, then the adjacent left magenta heater array 410 will quickly be at the same temperature as the right cyan heater array 414. A temperature reading from the second region 432 represents the temperature of both the magenta and cyan heater arrays 414 and 410 in the second region. As previously mentioned, the minimum width of the thermal regions 430, 432, 434, 436, and 438 is generally limited by the heater chip 400 circuitry. It will be appreciated by those of ordinary skill in the art that the maximum practical width for temperature sensing accuracy depends on a combination of the printing rate and the frequency at which the temperature is read from a thermal region. For instance, if the right cyan heater array 414 is firing at a high frequency, then the width of the second region 432 would need to be small enough to ensure uniform temperature across the second region 432 for a given temperature sampling rate of the second TSR 542.

[0031] According to one embodiment of the invention, each TSR **540, 542, 544, 546, 548** makes up half of a wheatstone bridge circuit, as is known to those of ordinary skill in the art for use in measuring small changes in resistance. The other half of the bridge circuit feeds into a differential op-amp, the output of which is provided as input to an A/D converter. The A/D converter may be included in an Application Specific Integrated Circuit (ASIC) that controls the functioning of the printhead. Firmware running on the system, in conjunction with the ASIC may monitor the measured temperature from each TSR. According to one embodiment of the invention, the temperature may be monitored continuously prior to the beginning of printing. As described in detail below, this information can allow the heater arrays to be fired at a high frequency to maintain a desired temperature in each region. According to another embodiment of the invention, the monitoring of temperature in each region may not be monitored during printing.

[0032] According to yet another embodiment of the present invention, the temperature of the heater chip **400** is regulated on a per region basis. The heater chip **400** may use non-nucleating heating (NNH) to maintain an adequate substrate temperature for the heater chip **400** in each region in order to ensure the best print quality. NNH includes applying fire pulses to selected heater arrays **408, 410, 412, 413, 414, 416, 418** of a duration too short to cause nucleation and the subsequent ejection of an ink drop from an ink via **402, 404, 406, and 407**. NNH is applied on a per thermal region basis rather than on a per color basis. According to one embodiment of the invention, NNH pulses are applied to heaters within each region. Additionally, the heaters used in each region may vary, and the firing of pulses in two or more heaters may be asynchronous to minimize the current and power required for maintaining a desired temperature in each region. Instructions for firing heaters may be provided via one or more data streams used to control heater address data, the printhead, and like elements. Those skilled in the art will recognize that other methods for heating the various thermal areas can be used, including but not limited to substrate heating elements.

[0033] As shown in FIG. 5, the first region **430** is heated by the left cyan heater array **408**; the second region **432** is heated by the right cyan heater array **414** and the left magenta heater array **410**; the third region **434** is heated by the right

magenta heater array **416** and the left yellow heater array **412**; the fourth region **436** is heated by the left yellow heater array **418** and the mono heater array **413**; and the fifth region **438** is heated by the right mono heater array **419**. According to one embodiment of the invention, one or more of the regions may not be heated by both adjacent heater arrays due to hardware constraints. For instance, the fourth region **436** may be heated only by the left mono heater array **413** rather than by both the left mono heater array **413** and the right yellow heater array **418**. As described above, the firing of pulses in two or more heaters may be asynchronous to minimize the current and power required for maintaining a desired temperature in each region. Based on the average thermal region temperature measurements provided by the TSRs **540**, **542**, **544**, **546**, **548**, if heating is required in a particular thermal region, NNH is applied to each heater array situated in that thermal region. Thus, each thermal region can be regulated at its optimal operating temperature.

[0034] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

THAT WHICH IS CLAIMED:

- 1 1. A chip for use with a printing device, comprising:
2 a first heater array, positioned substantially adjacent a first via;
3 a second heater array, positioned substantially adjacent a second via;
4 a region, positioned between the first heater array and the second heater array;
5 and
6 a temperature sensing element operable to sense the temperature of the region,
7 wherein the temperature sensing element is substantially centrally disposed with
8 respect to the region.
- 1 2. The chip of claim 1, wherein the temperature sensing element comprises a
2 temperature sensing resistor.
- 1 3. The chip of claim 2, wherein the temperature sensing element comprises a
2 thermal sense resistor.
- 1 4. The chip of claim 3, wherein the temperature sensing element comprises an n-
2 type implant donor thermal sensing resistor.
- 1 5. The chip of claim 1, wherein the temperature sensing element is positioned at
2 least 300 microns from each of the first heater array and the second heater array.
- 1 6. The chip of claim 5, wherein the temperature sensing element is positioned
2 substantially planar to each of the first heater array and the second heater array.
- 1 7. The chip of claim 1, further comprising at least one control element operable
2 to receive a temperature measured by the temperature sensing element.
- 1 8. The chip of claim 1, further comprising:
2 a third heater array, positioned substantially adjacent the second via;
3 a fourth heater array, positioned substantially adjacent a third via;
4 a second region, positioned between the third heater array and the fourth
5 heater array; and

6 a second temperature sensing element operable to sense the temperature of the
7 second region, wherein the temperature sensing element is substantially centrally
8 disposed with respect to the second region.

1 9. The method of claim 8, wherein the temperature sensing element positioned
2 between the first heater array and the second heater array is different than the second
3 temperature sensing element positioned between the third heater array and the fourth
4 heater array.

1 10. A method of fabricating chips for use with a printing device, comprising:
2 providing a first heater array, positioned substantially adjacent a first via;
3 providing a second heater array, positioned substantially adjacent a second
4 via; and
5 positioning a temperature sensing element in a region between the first heater
6 array and the second heater array, wherein the temperature sensing element is
7 operable to sense the temperature of the region.

1 11. The method of claim 10, wherein positioning a temperature sensing element in
2 the region comprises positioning a temperature sensing element in substantially the
3 center of the region.

1 12. The method of claim 10, wherein positioning a temperature sensing element in
2 the region comprises positioning a temperature sensing resistor in the region.

1 13. The method of claim 12, wherein positioning a temperature sensing element in
2 the region comprises positioning a thermal sense resistor in the region.

1 14. The method of claim 13, wherein positioning a temperature sensing element in
2 the region comprises positioning an n-type implant donor thermal sensing resistor in
3 the region.

1 15. The method of claim 10, wherein positioning a temperature sensing element in
2 the region between the first heater array and the second heater array comprises

3 positioning the temperature sensing element at least 300 microns from each of the
4 first heater array and the second heater array.

1 16. The method of claim 15, wherein positioning a temperature sensing element in
2 the region between the first heater array and the second heater array comprises
3 positioning the temperature sensing element substantially planar to each of the first
4 heater array and the second heater array.

1 17. The method of claim 10, further comprising providing at least one control
2 element operable to receive a temperature measured by the temperature sensing
3 element.

1 18. The method of claim 17, further comprising:
2 providing a third heater array substantially adjacent the second via;
3 providing a fourth heater array substantially adjacent a third via; and
4 positioning a second temperature sensing element in a second region located
5 between the third heater array and the fourth heater array, wherein the temperature
6 sensing element is operable to sense the temperature of the second region, and
7 wherein the temperature sensing element is substantially centrally disposed with
8 respect to the second region.

1 19. The method of claim 18, wherein the temperature sensing element positioned
2 between the first heater array and the second heater array is different than the second
3 temperature sensing element positioned between the third heater array and the fourth
4 heater array.

METHODS AND APPARATUSES FOR IMPLEMENTING
MULTI-VIA HEATER CHIPS

ABSTRACT OF THE DISCLOSURE

Heater chips for use with a printing device, such as heater chips that include a first heater array, positioned substantially adjacent a first via, and a second heater array, positioned substantially adjacent a second via. The heater chip can also include a region, positioned between the first heater array and the second heater array, and a temperature sensing element operable to sense the temperature of the region, where the temperature sensing element is substantially centrally disposed with respect to the region. According to one embodiment of the invention, the temperature sensing element comprises a temperature sensing resistor.

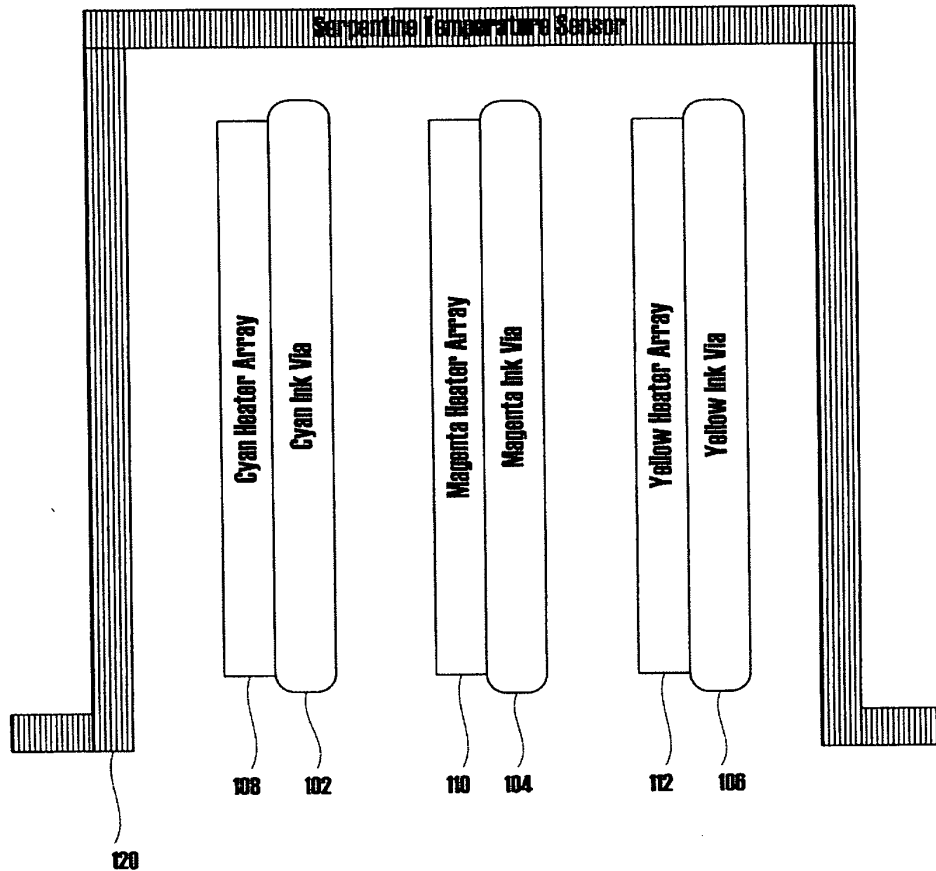


FIG. 1
(Prior Art)

Best Available Copy

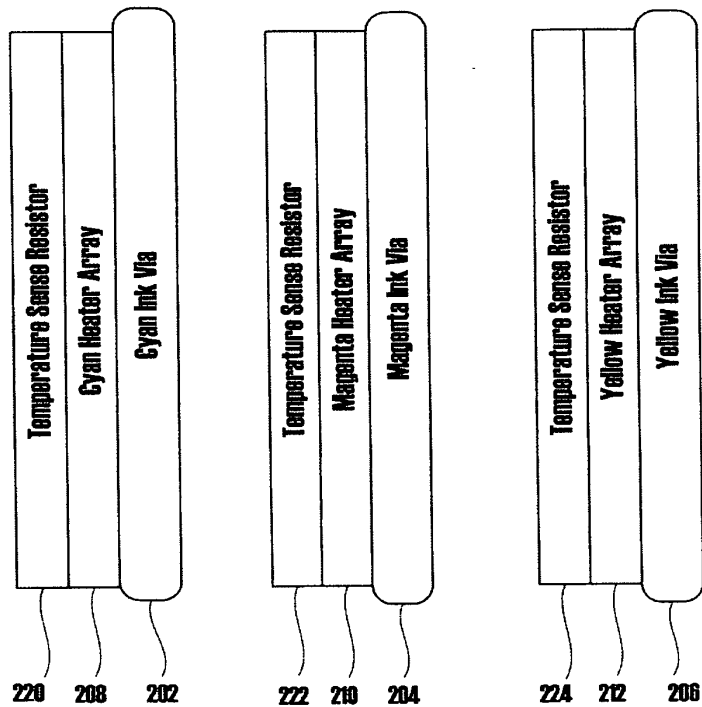


FIG. 2
(Prior Art)

Best Available Copy

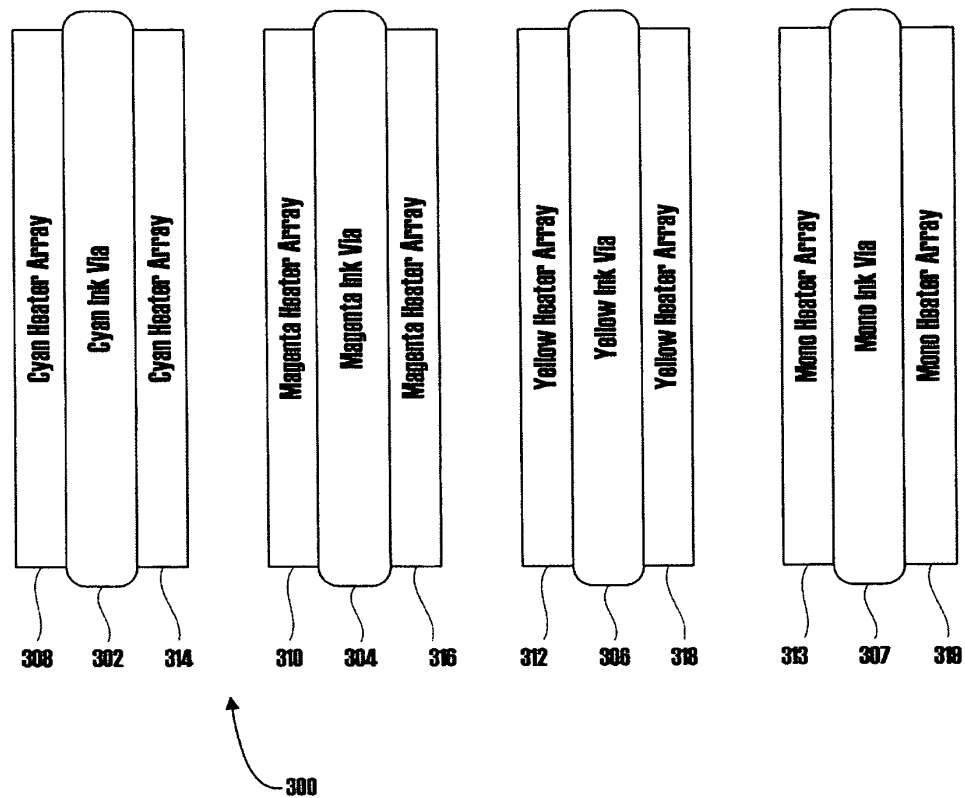
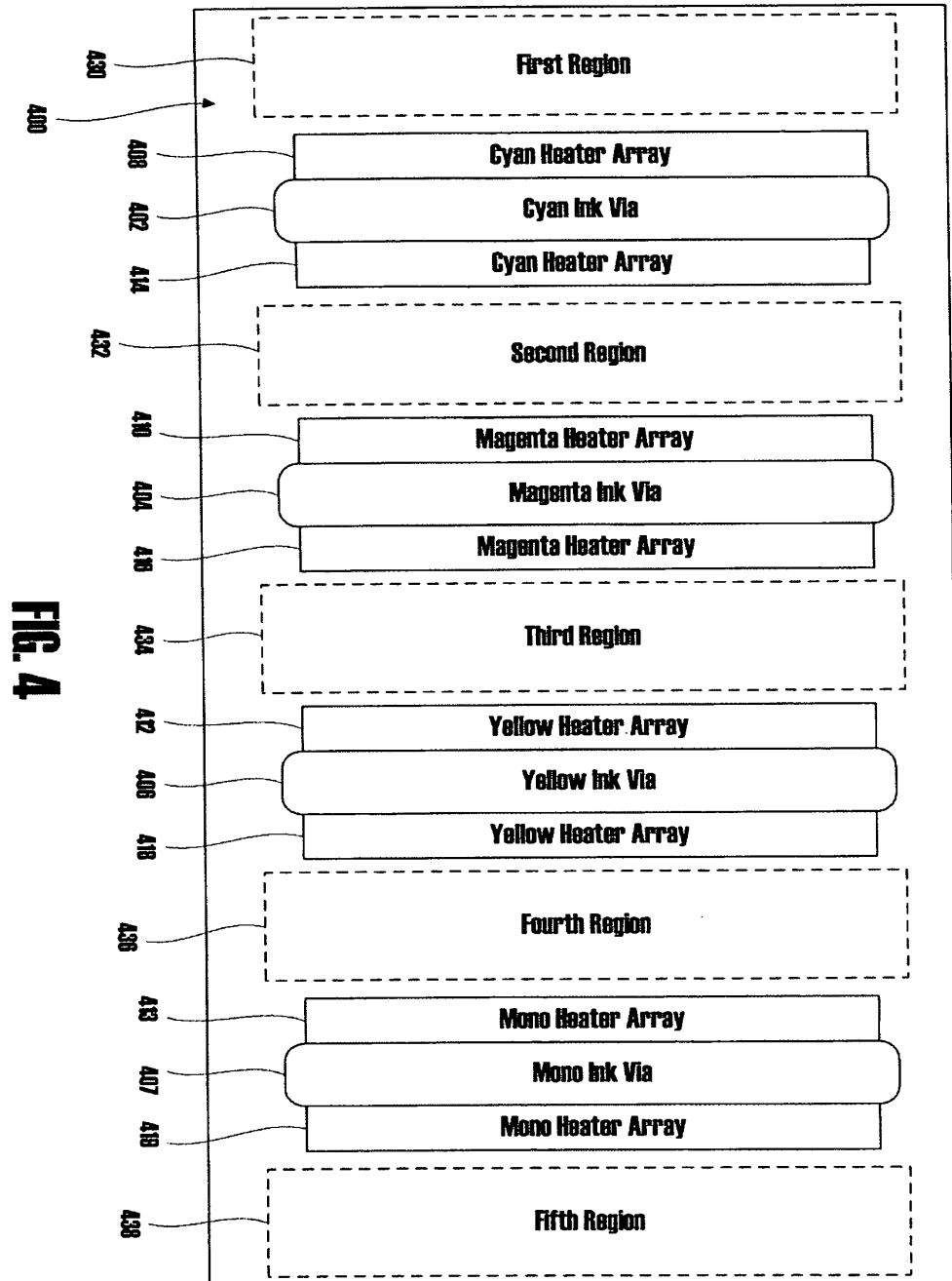


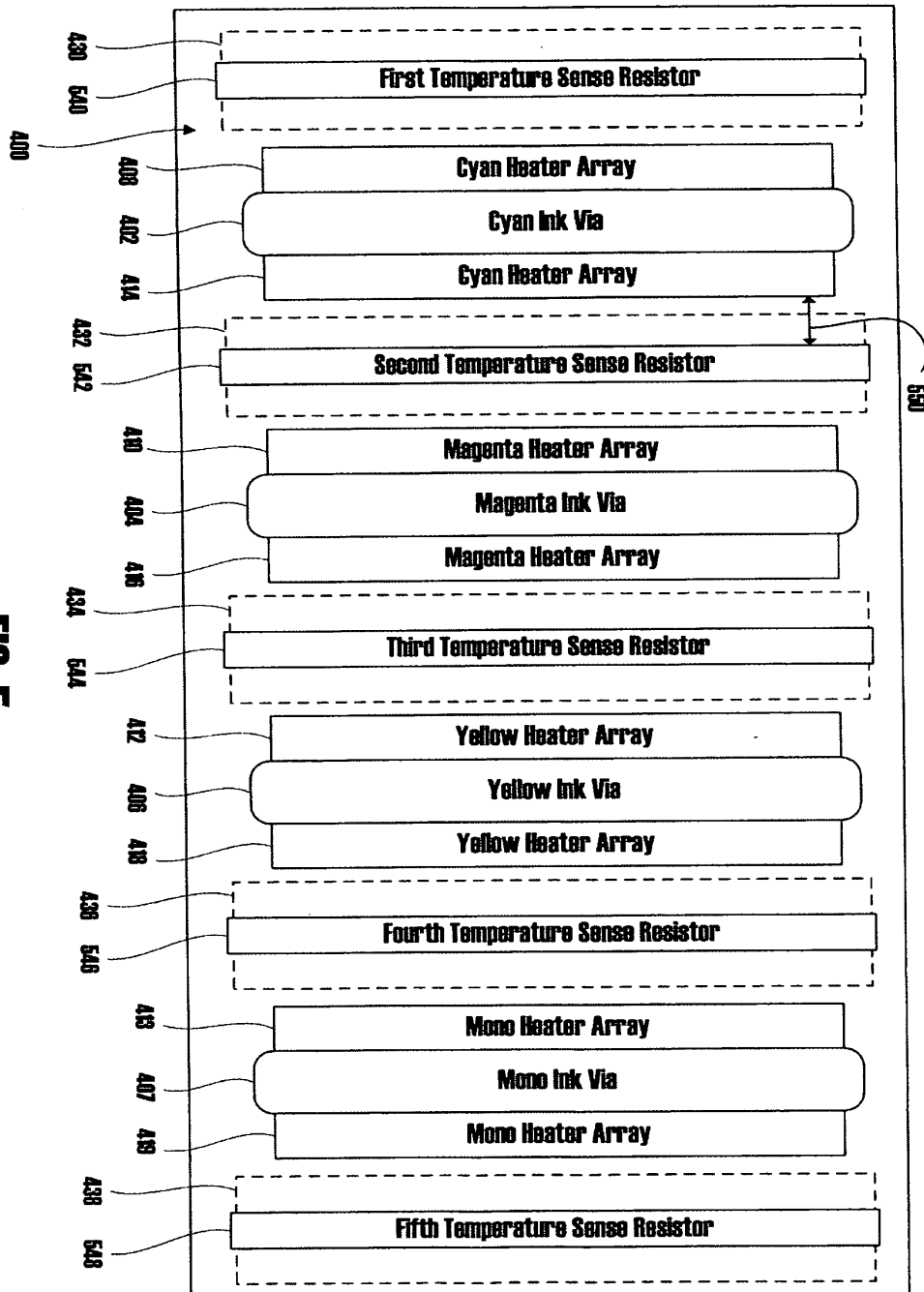
FIG. 3

Best Available Copy



Best Available Copy

FIG. 5



Best Available Copy

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.

**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☒ Declaration
Submitted
With Initial
Filing

OR

☐ Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket
Number

2005-0463.02

First Named Inventor

Lucas D. Barkley

COMPLETE IF KNOWN

Application Number

Filing Date

Art Unit

Examiner Name

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Methods and Apparatuses for Sensing Temperature of Multi-Via Heater Chips

(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 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 contains a valid OMB control number.

DECLARATION — Utility or Design Patent Application

Direct all correspondence to:		☒ The address associated with Customer Number:	21972	OR	☐ Correspondence address below
Name					
Address					
City			State		ZIP
Country		Telephone		Email	
WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.					
NAME OF SOLE OR FIRST INVENTOR:			☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])			Family Name or Surname		
Lucas David			Barkley		
Inventor's Signature					Date
Residence: City	State	Country	Citizenship		
Lexington	Kentucky	US	US		
Mailing Address					
4800 Clifford Circle					
City	State	Zip	Country		
Lexington	Kentucky	40515	US		
☒ Additional inventors or a legal representative are being named on the <u>2</u> supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.					

[Page 2 of 2]

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.

DECLARATION	ADDITIONAL INVENTOR(S) Supplemental Sheet
--------------------	---

Page 1 of 2

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Bruce David		Gibson	
Inventor's Signature		Date	
Lexington Residence: City	Kentucky State	US Country	US Citizenship
4729 Scenicview Road			
Mailing Address			
Lexington City	Kentucky State	40514 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Eric Spencer		Hall	
Inventor's Signature		Date	
Lexington Residence: City	Kentucky State	US Country	US Citizenship
1344 Copperfield Court			
Mailing Address			
Lexington City	Kentucky State	40514 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
David G.		King	
Inventor's Signature		Date	
Shelbyville Residence: City	Kentucky State	US Country	US Citizenship
66 Goldenrod Court			
Mailing Address			
Shelbyville City	Kentucky State	40065 Zip	US Country

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 (1-800-786-9199) and select option 2.

DECLARATION**ADDITIONAL INVENTOR(S)**

Supplemental Sheet

Page 2 of 2

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
George K.		Parish	
Inventor's Signature		Date	
Winchester Residence: City	Kentucky State	US Country	US Citizenship
11 Fontaine Boulevard			
Mailing Address			
Winchester City	Kentucky State	40391 Zip	US Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 21 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 (1-800-786-9199) and select option 2.

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

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	1
-------	---	----	---

Complete if Known

Application Number

Filing Date

First Named Inventor

Lucas D. Barkley

Art Unit

Examiner Name _____

Attorney Docket Number

2005-0463.02

[illegible][illegible]

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 to applicant. *Applicant's unique citation designation number (optional). *See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 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.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, 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 (1-800-786-9199) 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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11323809	
APPLICATION AS FILED – PART I15						
(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))						300
SEARCH FEE (37 CFR 1.16(k), (l), or (m))						500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))						200
TOTAL CLAIMS (37 CFR 1.16(i))	19		X\$ 25=		X\$50=	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	*	X\$100=		X\$200=	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))						
			TOTAL		TOTAL	1000
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		SMALL ENTITY		OR
OTHER THAN SMALL ENTITY						
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =
Application Size Fee (37 CFR 1.16(s))						
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
				TOTAL		TOTAL
				ADD'T FEE		ADD'T FEE
(Column 1)		(Column 2)		SMALL ENTITY		OR
OTHER THAN SMALL ENTITY						
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =
Application Size Fee (37 CFR 1.16(s))						
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
				TOTAL		TOTAL
				ADD'T FEE		ADD'T FEE
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.						

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

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/323,809		Filing Date 12/30/2005		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)		SMALL ENTITY ☐ OR			OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =			X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)		(Column 3)			SMALL ENTITY OR OTHER THAN SMALL ENTITY		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	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			
(Column 1)			(Column 2)		(Column 3)			SMALL ENTITY OR OTHER THAN SMALL ENTITY		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	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 number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/MARCUS PRIDGEN/

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.