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## NOTICE OF ALLOWANCE AND FEE(S) DUE

42532 7590 06/30/2015 PROSKAUER ROSE LLP

ONE INTERNATIONAL PLACE BOSTON, MA 02110 EXAMINER MCCORMACK, JASON L

ART UNIT PAPER NUMBER

2881

DATE MAILED: 06/30/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/448,258	07/31/2014	Donald K. Smith	EGQ-005CP3C2	8145

TITLE OF INVENTION: LASER-DRIVEN LIGHT SOURCE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	09/30/2015

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

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

#### HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

### Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE

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

or <u>Fax</u> (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.

Note: A certificate of mailing can only be used for domestic mailings of the

Authorized Signature

Typed or printed name

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)				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.			
PROSKAUER ROSE LLP ONE INTERNATIONAL PLACE BOSTON, MA 02110			I he Stat addı tran	Certificate of Mailing or Transmission reby certify that this Fee(s) Transmittal is being deposited with the Unite Postal Service with sufficient postage for first class mail in an envelopessed to the Mail Stop ISSUE FEE address above, or being facsimismitted to the USPTO (571) 273-2885, on the date indicated below.			
BOSTON, MA	02110					(Depositor's name)	
						(Signature)	
						(Date)	
APPLICATION NO.	FILING DATE		FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.	CONFIRMATION NO.	
3-700-3-700							
14/448,258 TITLE OF INVENTION	07/31/2014 N: LASER-DRIVEN LIG	HT SOURCE	Donald K. Smith		EGQ-005CP3C2	8145	
APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE	FEE TOTAL FEE(S) DUE	E DATE DUE	
nonprovisional	SMALL	\$480	\$0	\$0	\$480	09/30/2015	
EXAM	MINER	ART UNIT	CLASS-SUBCLASS	1			
MCCORMA	CK, JASON L	2881	250-503100	•			
<ol> <li>Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</li> <li>Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</li> <li>"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.</li> </ol>			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.				
PLEASE NOTE: Un	tless an assignee is ident th in 37 CFR 3.11. Comp	ified below, no assignee	THE PATENT (print or ty) data will appear on the p T a substitute for filing an (B) RESIDENCE: (CITY	atent. If an assigne assignment.		document has been filed for	
Please check the appropr	riate assignee category or	categories (will not be pr	rinted on the patent):	Individual 🖵 Cor	poration or other private gr	roup entity 🗖 Government	
4a. The following fee(s) are submitted:  ☐ Issue Fee ☐ Publication Fee (No small entity discount permitted) ☐ Advance Order - # of Copies			4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)  ☐ A check is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number (enclose an extra copy of this form).				
Applicant certifyi	ntus (from status indicate ng micro entity status. Se ng small entity status. See	ee 37 CFR 1.29	fee payment in the micro	entity amount will r	Entity Status (see forms PT not be accepted at the risk of er micro entity status, check	f application abandonment.	
Applicant changing to regular undiscounted fee status.			to be a notification of los	n of loss of entitlement to micro entity status.  this box will be taken to be a notification of loss of entitlement to small or micro			
NOTE: This form must I	he signed in accordance s	with 37 CFR 1 31 and 1 3	3. See 37 CFR 1.4 for sign		nd certifications		
1.0 11. 1ms form must t	oc orgina in accordance v	THE ST CLEX 1.51 and 1.5.	C. See St CI K 1.7 for sign	and requirements a	no continentono.		

Page 2 of 3

Date

Registration No. \_



# UNITED STATES PATENT AND TRADEMARK OFFICE

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42532 75	90 06/30/2015	EXAMINER			
PROSKAUER R		MCCORMACK, JASON L			
ONE INTERNATIONAL PLACE					
BOSTON, MA 021	10		ART UNIT	PAPER NUMBER	
			2881		

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

(Applications filed on or after May 29, 2000)

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

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

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

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

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

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### **Privacy Act Statement**

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

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

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

	Applicati		Applicant(s) SMITH, DONALD K.		
Notice of Allowability	Examiner  JASON MCCORMACK		Art Unit 2881	AIA (First Inventor to File) Status	
The MAILING DATE of this communication appear All claims being allowable, PROSECUTION ON THE MERITS IS (herewith (or previously mailed), a Notice of Allowance (PTOL-85) NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGOT OF THE OFFICE OFFICE OF THE OFFICE	OR REMA or other ap <b>GHTS.</b> Thi	NS) CLOSED in this or or opriate communicat s application is subject	application. If not ion will be mailed	t included in due course. <b>THIS</b>	
<ul> <li>1.  This communication is responsive to 6/15/2015.</li> <li>A declaration(s)/affidavit(s) under 37 CFR 1.130(b) was/</li> </ul>	were filed o	on <u>.</u>			
2. An election was made by the applicant in response to a restrict requirement and election have been incorporated into this ac		rement set forth durin	g the interview or	n; the restriction	
<ol> <li>The allowed claim(s) is/are 1-25. As a result of the allowed c         Highway program at a participating intellectual property offic         http://www.uspto.gov/patents/init_events/pph/index.jsp         or ser</li> </ol>	e for the co	rresponding application	on. For more info		
4. ☐ Acknowledgment is made of a claim for foreign priority under Certified copies:  a) ☐ All b) ☐ Some *c) ☐ None of the:  1. ☐ Certified copies of the priority documents have 2. ☐ Certified copies of the priority documents have 3. ☐ Copies of the certified copies of the priority documents have International Bureau (PCT Rule 17.2(a)).  * Certified copies not received:  Applicant has THREE MONTHS FROM THE "MAILING DATE" of noted below. Failure to timely comply will result in ABANDONMITHIS THREE-MONTH PERIOD IS NOT EXTENDABLE.  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must ☐ including changes required by the attached Examiner's Paper No./Mail Date  Identifying indicia such as the application number (see 37 CFR 1.4 each sheet. Replacement sheet(s) should be labeled as such in the deposit of Bil attached Examiner's comment regarding REQUIREMENT FO	been recei been recei uments have of this comments ENT of this be submitte Amendme Amendme B4(c)) should the header according	ved.  ved in Application No.  ve been received in the  nunication to file a rep application.  ed.  nt / Comment or in the  cording to 37 CFR 1.12  MATERIAL must be	oly complying with e Office action of wings in the front 21(d).	the requirements	
Attachment(s)  1. ☑ Notice of References Cited (PTO-892)  2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date See Continuation Sheet  3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material  4. ☐ Interview Summary (PTO-413), Paper No./Mail Date	(	5. ☐ Examiner's Ame 6. ☑ Examiner's State 7. ☐ Other			
/NICOLE IPPOLITO/ Primary Examiner, Art Unit 2881					

Continuation of Attachment(s) 2. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 6/15/2015, 3/30/2015, 3/11/2015, 2/11/2015, 1/15/2015.

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

### **DETAILED ACTION**

## Response to Arguments

2. Applicant's arguments see pages 6-10, filed 6/15/2015, with respect to the amendments to claims 1, 8, and 15, and the filing of the terminal disclaimer have been fully considered and are persuasive. The rejections of claims 1-20 have been withdrawn.

### Allowable Subject Matter

3. Claims 1-25 are allowed.

Regarding independent claims 1, 8, and 15; Hertz et al. U.S. PGPUB No. 2002/0044629 discloses a plasma-based light source "a plasma P emitting the desired X-ray and EUV radiation" [0033], comprising: a pressurized chamber (3) "it is necessary to provide a suitable gas atmosphere in the low-pressure chamber" [0005] configured to contain an ionized gas; a laser for providing a beam of laser energy to the ionized gas within the chamber to maintain a plasma "The energy beam is preferably a beam of electromagnetic radiation, such as laser radiation, which interacts with the jet and heats it to a plasma-forming temperature" [0024], the beam configured to maintain the plasma in an elongated forma having a plasma length that is greater than that of a plasma diameter "an elongated laser focus might be formed over a certain length of the jet, for example by means of one or more cylinder lenses (not shown) in combination with one or more spherical lenses, resulting in an elongated EUV emitting plasma" [0042] (the

Oxford English Dictionary defines "elongate" as "long in relation to width" thereby establishing that an "elongated" plasma is defined by having a length greater than its width); and a tool optically coupled to the chamber for collecting light generated by the plasma "A method and an apparatus is designed to produce X-ray or EUV radiation for use in lithography, microscopy, materials science, or medical diagnostics" [Abstract]. However, Hertz discloses that gas is urged under high pressure into the chamber [0034] but does not explicitly disclose that the chamber is maintained above 10 atmospheres during operation and does not disclose the wavelength of the laser 1.

Manning U.S. PGPUB No. 2006/0152128 discloses a lamp with "inner pressure to about 10 or 11 atm... The higher gas pressure essentially contained the expansion of the plasma during operation, confining the arc discharge" [0028] having "A sparker electrode 124 is positioned inside the envelope for generating a preionization of the gas, in order to obtain a more uniform discharge. The discharge across the arc gap can generate light that is reflected by a mirror assembly 126 positioned relative to the arc gap and/or transmitted through the light transmitting window 106" [0004]. The generated light has "a spectrum on the order of about 190 nm to about 4000 nm" [0018]. However, Manning does not disclose at least one substantially continuous laser for providing energy within a wavelength range from about 700 nm to 2000 nm to the ionized gas to sustain a plasma within the chamber to produce a plasma-generated light having wavelengths greater than 50 nm.

Cross et al. U.S. Patent No. 4,780,608 discloses that "Recently, free-standing continuous discharges have been produced by focusing the output of a sufficiently

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powerful cw-CO<sub>2</sub> laser into inert gases, molecular gases and mixtures thereof at atmospheric pressures or above... Although cw-laser radiation can maintain the continuous optical discharge, the output power of such light sources is generally insufficient to initiate the discharge. Consequently, such plasmas can be initiated using conventional electrode sparks or by the spark produced by a focused laser pulse superimposed on the focal volume of the cw-laser beam used to maintain the plasma" [col. 1; lines 30-52]. However, Cross is concerned with producing ions and does not describe that light is produced by the plasma, Cross therefore does not disclose producing light having a wavelength of at least 50 nm (and does not explicitly describe the claimed pressure, laser wavelength, or plasma-generated light wavelength values).

One of ordinary skill in the art at the time of the invention would not have combined Manning and Cross since they belong to different fields of endeavor; namely, Manning uses a plasma to generate light in a light source, while Cross uses a plasma to generate ions. Further, if Manning and Cross were combined, the references still fail to disclose at least one substantially continuous laser for providing energy within a wavelength range from about 700 nm to 2000 nm to the ionized gas to sustain a plasma within the chamber to produce a plasma-generated light having wavelengths greater than 50 nm (Cross does not disclose the wavelength of the disclosed laser, and does not disclose that the laser sustains the plasma for producing light, and therefore cannot disclose that light having wavelengths greater than 50 nm can be produced by a plasma sustained by a laser).

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The prior art fails to disclose at least one substantially continuous laser for providing energy within a wavelength range from about 700 nm to 2000 nm to an ionized gas to sustain a plasma within a chamber having greater than atmospheric pressure to produce a plasma-generated light having wavelengths greater than 50 nm, as claimed in independent claim 1, with similar limitations in independent claims 8 and 15.

Regarding dependent claims 2-7,9-14, and 16-25; these claims are allowable at least for their dependence, either directly or indirectly upon independent claims 1, 8, and 15.

### Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON MCCORMACK whose telephone number is (571)270-1489. The examiner can normally be reached on Monday - Thursday 7:00am - 3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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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.

/JASON MCCORMACK/ Examiner, Art Unit 2881 /NICOLE IPPOLITO/ Primary Examiner, Art Unit 2881