

To: PATDOCTC@fr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 26161

Apr 18, 2019 05:15:55 AM

Dear PAIR Customer:

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 26161 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Disclaimer:

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Application	Document	Mailroom Date	Attorney Docket No.
15279781	ISSUE.NTF	04/17/2019	15540-0370003

To view your correspondence online or update your email addresses, please visit us anytime at <https://portal.uspto.gov/secure/myportal/privatepair>.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM



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.
15/279,781	05/07/2019	10281656	15540-0370003	2586

26161 7590 04/17/2019
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

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

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

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

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY;
Rudolph Huber, Aldingen-Aixheim, GERMANY;
Wolfgang Andreasch, Weinstadt, GERMANY;
Martin Huonker, Schramberg, GERMANY;

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



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586

26161	7590	04/05/2019
FISH & RICHARDSON P.C. (BO)		
P.O. BOX 1022		
MINNEAPOLIS, MN 55440-1022		

EXAMINER	
ULLAH, AKM E	

ART UNIT	PAPER NUMBER
2874	

NOTIFICATION DATE	DELIVERY MODE
04/05/2019	ELECTRONIC

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

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

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

PATDOCTC@fr.com

CORRECTED Notice of Allowability	Application No. 15/279,781	Applicant(s) Huber et al.	
	Examiner Akm E Ullah	Art Unit 2874	AIA (FITF) Status No

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

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

1. ☐ This communication is responsive to _____.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☒ The allowed claim(s) is/are 13-27. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

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

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

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

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

Attachment(s)

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

/AKM E ULLAH/ Primary Examiner, Art Unit 2874	
--	--

Sheet 1 of 1

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 15540-0370003	Application No. 15/279,781
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant TRUMPF Laser- und Systemtechnik GmbH	
		Filing Date September 29, 2016	Group Art Unit 2874

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	6,819,815	11/16/2004	Corbalis et al.			

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	2.	WO 2009/155536	12/23/2009	WIPO	G02B	6/255		

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	3.	Copy of Indian Office Action for Indian Application No. 8560/CHENP/2012 by Controller Ambigaapathy A, dated November 20, 2017

Examiner Signature /AKM E ULLAH/	Date Considered 03/27/2019
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.E.U/

To: PATDOCTC@fr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 26161

Apr 05, 2019 04:09:57 AM

Dear PAIR Customer:

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
15279781	NOA	04/05/2019	15540-0370003
	1449	04/05/2019	15540-0370003

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UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Electronic Patent Application Fee Transmittal				
Application Number:		15279781		
Filing Date:		29-Sep-2016		
Title of Invention:		ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER		
First Named Inventor/Applicant Name:		Rudolph Huber		
Filer:		Yunbo Guo/Cheryl Forrest		
Attorney Docket Number:		15540-0370003		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt	
EFS ID:	35511637
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Lisa Peterson
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	25-MAR-2019
Filing Date:	29-SEP-2016
Time Stamp:	08:52:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$1000
RAM confirmation Number	032519INTEFSW00015604061050
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	ReplytoNOA.pdf	178441	no	2
			938495c8e591757711f366454cf4901bd9175b31		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30445	no	2
			690c5221f729089f05c2858e4d948675ba8e9fb8		
Warnings:					
Information:					
Total Files Size (in bytes):			208886		
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 send this form, together with applicable fee(s), by mail or fax, or via EFS-Web

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22314-1450

By fax, send to: (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)

26161 7590 03/18/2019

FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

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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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586

TITLE OF INVENTION: ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	LARGE	\$1000	\$0	\$0	\$1000	06/18/2019
EXAMINER	ART UNIT	CLASS-SUBCLASS				
ULLAH, AKME.	2874	385-018000				

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 03-09 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 Fish & Richardson P.C.
- (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 must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE
TRUMPF Laser- und Systemtechnik GmbH

(B) RESIDENCE: (CITY and STATE OR COUNTRY)
Ditzingen, Germany

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

4a. Fees Submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies

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

- ☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account No. 06-1050

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

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

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

NOTE: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.

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

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Yunbo Guo/

Date 03/25/2019

Typed or printed name Yunbo Guo

Registration No. 70,538

PTOL-85 Part B (08-18). Approved for use through 1/31/2020

OMB 0651-0033

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

23876231.doc

To: PATDOCTC@fr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 26161

Mar 18, 2019 03:42:10 AM

Dear PAIR Customer:

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

26161 7590 03/18/2019
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

ULLAH, AKM E

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 03/18/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586

TITLE OF INVENTION: ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	06/18/2019

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: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

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

By fax, send to: (571)-273-2885

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26161 7590 03/18/2019
FISH & RICHARDSON P.C. (BO)
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MINNEAPOLIS, MN 55440-1022

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(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586

TITLE OF INVENTION: ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER

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nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	06/18/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
ULLAH, AKME	2874	385-018000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

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☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

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

1 _____

2 _____

3 _____

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

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(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. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

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

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

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

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

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

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586
26161	7590	03/18/2019	EXAMINER	
FISH & RICHARDSON P.C. (BO)			ULLAH, AKM E	
P.O. BOX 1022				
MINNEAPOLIS, MN 55440-1022			ART UNIT	PAPER NUMBER
			2874	
DATE MAILED: 03/18/2019				

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 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.** Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 15/279,781	Applicant(s) Huber et al.	
	Examiner Akm E Ullah	Art Unit 2874	AIA (FITF) Status No

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

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

1. ☒ This communication is responsive to 12/7/2018.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☒ The allowed claim(s) is/are 13-27. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

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

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

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

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

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

* Certified copies not received: _____.

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

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

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

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

Attachment(s)

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

/AKM E ULLAH/ Primary Examiner, Art Unit 2874	
--	--

<i>Search Notes</i> 	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination Huber et al.
	Examiner Akm E Ullah	Art Unit 2874

CPC - Searched*		
Symbol	Date	Examiner
B23K 26/073 ; B23K 2203/06 ; G02B 6/03644 ; G02B 6/262 ; G02B 6/4206 ; B23K 26/067 ; G02B 6/02042 ; G02B 6/35 ; G02B 6/3508 ; B23K 26/064	11/7/2017	AU
Updated above	03/06/2019	AU

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
G02B	03/06/2019	AU

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST, ASSIGNEE and INVENTOR	11/7/2017	AU
G02B6/\$.CPC and B23K26/\$.CPC and combined with Text search	11/7/2017	AU
INOVATION Q IP. COM	11/8/2017	AU
Updated above	03/06/2019	AU

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G02B and B23K	limited search	03/06/2019	AU

/AKM E ULLAH/ Primary Examiner, Art Unit 2874	
--	--

Issue Classification 	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination Huber et al.
	Examiner Akm E Ullah	Art Unit 2874

CPC						
Symbol				Type	Version	
G02B	/	6	/	3508	F	2013-01-01
B23K	/	26	/	073	I	2013-01-01
G02B	/	6	/	03644	I	2013-01-01
G02B	/	6	/	262	I	2013-01-01
G02B	/	6	/	4206	I	2013-01-01
G02B	/	6	/	4296	I	2013-01-01
G02B	/	6	/	02042	I	2013-01-01
G02B	/	6	/	35	I	2013-01-01
B23K	/	26	/	064	I	2015-10-01
B23K	/	26	/	067	I	2013-01-01
B23K	/	2103	/	06	A	2018-08-01

CPC Combination Sets						
Symbol			Type	Set	Ranking	Version
	/		/			

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/AKM E ULLAH/ Primary Examiner, Art Unit 2874	06 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification 	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination Huber et al.
	Examiner Akm E Ullah	Art Unit 2874

INTERNATIONAL CLASSIFICATION			
CLAIMED			
G02B		6	35
G02B		6	42
B23K		26	064
NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/AKM E ULLAH/ Primary Examiner, Art Unit 2874	06 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification 	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination Huber et al.
	Examiner Akm E Ullah	Art Unit 2874

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
-	1	-	10	7	19										
-	2	-	11	8	20										
-	3	-	12	9	21										
-	4	1	13	10	22										
-	5	2	14	11	23										
-	6	3	15	12	24										
-	7	4	16	13	25										
-	8	5	17	14	26										
-	9	6	18	15	27										

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 15	
/AKM E ULLAH/ Primary Examiner, Art Unit 2874 (Primary Examiner) _____ (Date) 06 March 2019		O.G. Print Claim(s) 1	O.G. Print Figure 3

<i>Index of Claims</i> 	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination Huber et al.
	Examiner Akm E Ullah	Art Unit 2874

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	11/07/2017	03/06/2019							
-	1	✓	-							
-	2	✓	-							
-	3	✓	-							
-	4	✓	-							
-	5	✓	-							
-	6	✓	-							
-	7	✓	-							
-	8	✓	-							
-	9	✓	-							
-	10	✓	-							
-	11	✓	-							
-	12	✓	-							
1	13		=							
2	14		=							
3	15		=							
4	16		=							
5	17		=							
6	18		=							
7	19		=							
8	20		=							
9	21		=							
10	22		=							
11	23		=							
12	24		=							
13	25		=							
14	26		=							
15	27		=							

EAST Search History**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	7245	(method adj5 laser adj3 beam).clm.	USPAT	OR	OFF	2019/03/06 12:16
L4	1	(optical adj3 fiber adj10 core adj10 outer adj2 ring adj2 core).clm.	USPAT	OR	OFF	2019/03/06 12:17
L5	1554	(first adj3 laser adj3 beam adj10 second adj3 laser adj3 beam).clm.	USPAT	OR	OFF	2019/03/06 12:18
L6	2	(coupl\$4 adj3 laser adj3 beam adj10 inner adj2 fiber adj2 core).clm.	USPAT	OR	OFF	2019/03/06 12:20
L7	4	(inner adj3 fiber adj3 core with outer adj3 fiber adj3 core).clm.	USPAT	OR	OFF	2019/03/06 12:21
L8	1	3 and 4	USPAT	OR	OFF	2019/03/06 12:23
L9	430	3 and 5	USPAT	OR	OFF	2019/03/06 12:23
L10	0	9 and (optical adj3 fiber adj10 core adj10 outer adj2 ring adj2 core).clm.	USPAT	OR	OFF	2019/03/06 12:24
L11	0	9 and(coupl\$4 adj3 laser adj3 beam adj10 inner adj2 fiber adj2 core).clm.	USPAT	OR	OFF	2019/03/06 12:25
L12	2	9 and (second adj3 end adj3 fiber).clm.	USPAT	OR	OFF	2019/03/06 12:26

3/ 6/ 2019 12:28:04 PM

Bibliographic Data

Application No: 15/279,781

Foreign Priority claimed: ☒ Yes ☐ No

35 USC 119 (a-d) conditions met: ☒ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged:

Examiner's Signature

Initials

Title:

ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/29/2016	385	2874	15540-0370003
RULE			

APPLICANTS

TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY

INVENTORS

Rudolph Huber Aldingen-Aixheim, GERMANY

Wolfgang Andreasch Weinstadt, GERMANY

Martin Huonker Schramberg, GERMANY

CONTINUING DATA

This application is a CON of 14300138 06/09/2014 PAT 9482821

14300138 is a CON of 13639401 12/20/2012 PAT 8781269

13639401 is a 371 of PCT/EP2011/055484 04/08/2011

FOREIGN APPLICATIONS

GERMANY 102010003750.8 04/08/2010

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/11/2016

STATE OR COUNTRY

GERMANY

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FISH & RICHARDSON P.C. (BO)

P.O. BOX 1022

MINNEAPOLIS, MN 55440-1022

UNITED STATES

FILING FEE RECEIVED

\$1,740

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor :	Rudolph Huber	Art Unit :	2874
Application No. :	15/279,781	Examiner :	Akm E. Ullah
Filed :	September 29, 2016	Conf. No. :	2586
Title :	ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER		

Mail Stop Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

REPLY TO ACTION OF SEPTEMBER 11, 2018

Please consider the following reply.

List of claims (replacing prior versions).

1-12. (Cancelled).

13. (Previously Presented) A method for generating a laser beam, comprising:
coupling a first input laser beam and a second input laser beam into a first end of an optical fiber having an inner fiber core and an outer ring core surrounding the inner fiber core, wherein the coupling includes electively:
a. coupling the first input beam to the inner fiber core only;
b. coupling the second input beam into the outer ring core only; or
c. coupling the first input beam into the inner fiber core and coupling the second input beam into the outer ring core; and
emitting an output beam from at least one of the inner fiber core and the outer ring core at a second end of the optical fiber, wherein the electively coupling of the first input beam and the second input beam is performed so as to generate different output beam characteristics.

14. (Previously Presented) The method of claim 13, further comprising:
before the coupling, guiding the first input laser beam in a first optical input fiber and guiding the second input laser beam in a second optical input fiber, the first and second optical input fibers being disposed upstream from the first end of the optical fiber.

15. (Previously Presented) The method of claim 13, wherein the optical fiber includes an inner cladding surrounding the inner fiber core between the inner fiber core and the outer ring core and a ring cladding surrounding the ring core.

16. (Previously Presented) The method of claim 15, wherein the inner fiber core has a maximum diameter of approximately 200 μm .

17. (Previously Presented) The method of claim 15, wherein the inner cladding is between 5 μm and 10 μm thick.

18. (Previously Presented) The method of claim 13, wherein the optical fiber includes a second ring core surrounding the outer ring core, and
wherein the method further comprises: coupling a third input laser beam into the second ring core.

19. (Previously Presented) The method of claim 18, wherein the optical fiber includes a second ring cladding surrounding the second ring core.

20. (Previously Presented) The method of claim 13, wherein the first and second input laser beams have different beam qualities.

21. (Previously Presented) The method of claim 13, wherein the emitting of the output beam comprises:

- a) emitting the output beam from the inner fiber core only,
- b) emitting the output beam from the outer ring core only, or
- c) emitting the output beam from both the inner fiber core and the outer ring core.

22. (Previously Presented) The method of claim 13, further comprising:
processing a material using the output beam.

23. (Previously Presented) The method of claim 22, wherein the processing includes at least one of welding and cutting the material.

24. (Previously Presented) The method of claim 13, wherein the first and second input laser beams are sub-beams emitted from a single laser.

25. (Previously Presented) The method of claim 13, further comprising:
emitting the first input laser beam from a first laser and emitting the second input laser beam from a second laser.

First Named Inventor : Rudolph Huber
Application No. : 15/279,781
Filed : September 29, 2016
Page : 4 of 6

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

26. (Previously Presented) The method of claim 13, wherein the second end of the optical fiber includes the second end of the inner fiber core and the second end of the outer ring core, the second ends of the inner fiber core and the outer ring core being flush with one another.

27. (Previously Presented) The method of claim 13, wherein the output beam has a power of at least 1 kW.

First Named Inventor : Rudolph Huber
Application No. : 15/279,781
Filed : September 29, 2016
Page : 5 of 6

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

REMARKS

Claims 1-27 were pending, of which claims 1-12 were rejected and claims 13-27 were allowed. The applicant has cancelled claims 1-12. The applicant presents the pending claims for examination in view of the amendments and the following remarks.

Objections to Title

The title stands objected due to being not descriptive. The applicant respectfully submits that the title had been replaced with a new title in the previous response to address the objections and requests that the objections should be withdrawn.

If the Examiner keeps the objections, the applicant respectfully requests the Examiner to call the applicant's representative to discuss.

Claim Rejections – 35 USC § 103

Claims 1-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2009/155536A2 in view of 2002/0168139 A1 and/ or U.S. Pat. No. 6,819,815 B1. Claims 1-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over DE 42 00 587 ("Noboru") in view of U.S. Pat. Pub. No. 2015/0217402 ("Hesse").

Without conceding the propriety of the rejection, and in an effort to advance prosecution, the applicant has cancelled claims 1-12 and respectfully submits that the rejections should be withdrawn.

Allowed Claims

The applicant thanks the Examiner allowing claims 13 – 27 and respectfully requests a notice of allowance.

First Named Inventor : Rudolph Huber
Application No. : 15/279,781
Filed : September 29, 2016
Page : 6 of 6

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

Conclusion

By responding in the foregoing remarks only to particular positions taken in the action, the applicant does not acquiesce in other positions that have not been explicitly addressed. In addition, the applicant's selecting some particular arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist. Finally, the applicant's decision to amend or cancel any claim should not be understood as implying that the applicant agrees with any positions taken in the action with respect to that claim or other claims, or that the applicant adopts any position except as specifically stated in this paper. In particular, by amending or cancelling a claim the applicant does not necessarily concede that the claim prior to amendment or cancellation was unpatentable.

No fees are believed to be due. However, please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 12/7/2018

/Yunbo Guo/
Yunbo Guo
Reg. No. 70,538

Customer Number 26161
Fish & Richardson P.C.
Telephone: (512) 226-8108
Facsimile: (877) 769-7945

23812041.doc

Electronic Acknowledgement Receipt	
EFS ID:	34515338
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Cheryl Forrest
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	07-DEC-2018
Filing Date:	29-SEP-2016
Time Stamp:	10:26:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ReplytoOA.pdf	244323	yes	6
			1b23bab5f4da916de9a8b1a35fb0d9ff12fa7e22		

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject	1	1	
Claims	2	4	
Applicant Arguments/Remarks Made in an Amendment	5	6	

Warnings:

Information:

Total Files Size (in bytes):	244323
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/279,781		Filing Date 09/29/2016		☐ To be Mailed		
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO										
APPLICATION AS FILED - PART I										
		(Column 1)	(Column 2)							
FOR		NUMBER FILED	NUMBER EXTRA	RATE (\$)		FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A						
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A	N/A						
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A	N/A						
TOTAL CLAIMS (37 CFR 1.16(j))		minus 20 =	*	x \$80 =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$420 =						
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL						
APPLICATION AS AMENDED - PART II										
		(Column 1)	(Column 2)	(Column 3)						
AMENDMENT	12/07/2018	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(i))	* 15	Minus	** 27	= 0	x \$100 =		0		
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 4	= 0	x \$460 =		0		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
					TOTAL ADD'L FEE		0			
AMENDMENT		(Column 1)	(Column 2)	(Column 3)						
		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$0 =				
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$0 =				
	☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE					
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.					LIE					
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".					/RENEE D HAWKINS/					
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

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

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To: PATDOCTC@fr.com,,
From: PAIR_eOfficeAction@uspto.gov
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Sep 11, 2018 03:35:11 AM

Dear PAIR Customer:

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The following USPTO patent application(s) associated with your Customer Number, 26161 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
15279781	CTNF	09/11/2018	15540-0370003
	892	09/11/2018	15540-0370003
	1449	09/11/2018	15540-0370003
	1449	09/11/2018	15540-0370003

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586
26161 7590 09/11/2018 FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ULLAH, AKM E	
			ART UNIT 2874	PAPER NUMBER
			NOTIFICATION DATE 09/11/2018	DELIVERY MODE ELECTRONIC

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

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

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

PATDOCTC@fr.com

Office Action Summary	Application No. 15/279,781	Applicant(s) HUBER ET AL.	
	Examiner Akm Enayet Ullah	Art Unit 2874	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 5/17/2018.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-12 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-12 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

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

Application Papers

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

Priority under 35 U.S.C. § 119

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

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

- | | |
|---|--|
| 1) ☒ Notice of References Cited (PTO-892) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date <u>5/17/2018</u> . | 4) ☐ Other: ____. |

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

Detailed Action

Applicant cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Status of the Application

Parent Data:

This instant US application 15/279, 781, filed 09/29/2016 is a continuation of 14/300,138, filed 06/09/2014 ,now U.S. Patent #9482821 which is a continuation of 13639401, filed 12/20/2012 ,now U.S. Patent # 8781269 13/639,401 is a national stage entry of PCT/EP2011/055484 , International Filing Date: 04/08/2011 which also claims foreign priority to 102010003750.8 , filed 04/08/2010.

Applicant filed on 05/17/2018 a TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT is being considered and recorded in the file.

Claims 1- 27 are pending in this application.

Claims 13 - 27 are allowed over the prior art as of record.

If applicant is aware of any prior art or any other co- pending application not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

If applicant provides prior art, he/she is requested to cite it on form PTO- 1449 in accordance with the guideline set forth in MPEP 609.

The Title Of The Invention is Not Descriptive

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Notice re prior art available under both Pre-AIA and AIA

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO2009155536A2, (cited by applicant) in view of 2002/168139 A1 and/ or USPNO. 681981B1.

WO2009155536A2 discloses a fiber optical article of manufacture, and more particularly to fused (e.g., mode-selective) fiber optic coupler arrangements and methods for use thereof (in paragraph 0005 of the reference).

The article of manufacture, comprising: a first multi-clad fiber arrangement which comprises a first core and at least one first cladding which is structured to propagate at least one first electro-magnetic radiation therethrough; a second multi-clad fiber arrangement which comprises a second core and at least one second cladding which is structured to propagate at least one second electro-magnetic radiation

therethrough (claim 1, paragraph 0010 of the reference. the first and second multi-clad fiber arrangements are double-clad fiber arrangements (claim 10 of the reference).

A system, comprising: a first arrangement which is configured to provide at least one first electro-magnetic radiation; and a second arrangement which includes at least two multi-clad fiber arrangements at least one of which receives the at least one first electro-magnetic radiation from the first arrangement and outputs the least one first electro-magnetic radiation to a sample, each of the multi-clad fiber arrangements comprising a core and at least one cladding which is structured to propagate the at least one first electro-magnetic radiation therethrough, the second arrangement further comprising at least one portion in which at least one of the claddings of at least two of the multi-clad fiber arrangements are fused to one another, wherein at least first one of the multi-clad fiber arrangements receives at least one second electro-magnetic radiation from the sample which is associated with the at least one first electro-magnetic radiation, and propagates the at least one second electro-magnetic radiation via the core and the cladding thereof, and wherein the at least one second electro-magnetic radiation traveling along the cladding of the at least first one of the multi-clad fiber arrangements is at least one of modified or split in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements (claim 16). It is possible to, with at least first one of the multi-clad fiber arrangements, receive at least one second electro-magnetic radiation from the sample which can be associated with the first electro-magnetic radiation(s), and propagate the second electro-magnetic radiation(s) via the core and the cladding

thereof. In addition, it is possible to modify and/or splitting the second electro-magnetic radiation(s) traveling along the cladding of the first one of the multi-clad fiber arrangements in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements (para [0013]).

Clarkson et al.(USPub. no. 2002/168139 A1) discloses An optical coupler for coupling a signal light beam from a signal port {100} and a pump light beam from a pump port {110} into a common port (120) for coupling the pump and signal beams into a double- clad (DC) optical fiber (122) comprising a core (123), an inner clad (124) and an outer clad (125) (abstract). An optical coupler for coupling a signal light beam and a pump light beam into an optical fiber, comprising: (a) a signal port for delivering a signal light beam; (b) a pump port for delivering a pump light beam; (c) a common port for receiving the signal and pump light beams, the common port comprising an optical fiber having a core, an inner clad and an outer clad, and an extension piece joined to the common port optical fiber at an interface therebetween and terminating at an end face; and (d) an optical arrangement for directing the signal and pump light beams onto the common port, the optical arrangement being configured to focus the signal light beam onto the core at the interface between the common port optical fiber and the extension piece (claim 1).

The invention relates to optical couplers for coupling a signal light beam and a pump light beam into an optical fiber, to optical coupling methods, to optical fiber

terminations suitable for optical couplers, and to devices incorporating an optical coupler, such as fiber lasers and optical amplifiers. Double-clad (DC) optical fiber is a known type of fiber in which the cladding region of a conventional optical fiber is replaced with separate inner and outer cladding regions. DC fibers allow a multi-mode pump light beam to be coupled into an optical fiber in which the core is used to guide a signal light beam to be amplified (para [0001], [0002]). A method of coupling a signal light beam and a pump light beam into an optical fiber, comprising: (a) providing an optical fiber having a core, an inner clad and an outer clad, and an extension piece joined to the optical fiber at an interface therebetween and terminating at an end face; and (b) focusing the signal light beam onto a focal plane coincident with the interface between the common port optical fiber and the extension piece (claim 18).

Further, USPNO 6,819,815 discloses an optical switch embodiment includes a switching array of arranged to accomplish switching of input light beams to any of a plurality of output channels and an array of beam monitoring elements for indirectly measuring and providing information used for adjusting output beams. The beam monitoring element further includes means for measuring the angular misalignment and the positional misalignment of a monitor beam and adjusting the reflectors based on monitor beam information such that optical beams are output from the switch having the desired optical characteristics, such as optimized power. Another optical switch embodiment includes an array of rhomboid prism assemblies positioned to receive the output beams from the switching array and such that the beams are split into substantially parallel working and monitor beams. Whereby the working beams pass

into the plurality of output channels and the monitor beams pass into the plurality of beam monitoring elements where they are measured to provide information for adjusting the angular misalignment and the positional misalignment of the working beam (abstract).

An optical switch comprising an array of optical input channels each capable of carrying an associated input light beam, a switching array for coupling, a beam splitter (claim 1). Switching array comprises control circuitry, a movable reflector array, wherein the reflectors are positioned such that the input light beam pass onto the first reflector array (claim 9, fig 2). Also see col.3 line 27 to 59.

Please note that the above mentioned references are in the same field of laser coupling and transmission through optical fiber.

Therefore, it is obvious to have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the invention of WO2009/155536A1 in Clarkson et al. (2002/0168139) or Carbalis et al (USPNO. 6,819,815) as taught by Carbalis et al. coupling either a first laser beam into the inner fiber core alone or coupling a different, second laser beam into the outer ring core alone; and generating an output laser beam by interaction of the input laser beam with the optical fiber, wherein a beam profile characteristic of the output laser beam differs depending upon the elective coupling **since**, the embodiment also includes a beam splitter interposed between the switching array and the fiber array such that a portion of

the light from the light beams exiting the switching array is reflected by the beam splitter as monitor beams onto the physically separate beam monitoring elements (see under summary of the invention in USPNO. 6,819,815).

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 42 00 587 (Kobayashi, Noboru et al, cited by applicant) in view of Hesse et al (USPub.no. 2015/0217402).

DE 42 00 587 (Kobayashi, Noboru et al.) disclose an arrangement and a method for changing the beam profile of a laser beam (figure 3), where the laser beam (3) is coupled in the one fiber end (figure 5, right side) of a multi-clad fiber, more particularly of a double-clad fiber (figure 7), and is coupled out of the fiber end (figure 5, left side) of the multimode –clad fiber, and wherein for changing the beam profile of the coupled out laser beam, the laser beam is optically coupled wither at least in the interior fiber core (figure 7, core D) of the multi-clad fiber or at least one outer ring core (figure 7, core E) of the multi-clad fiber.

Hesse et al. in paragraph 0024 disclose ,the device 7 comprises in this instance, for example, the three different beam forming elements 7a-7c which may be diffractive and/or refractive optical elements. The device 7 may in principle also be formed by a single beam forming element 7a, 7b or 7c. The unprocessed laser beam 5 which is supplied using an optical fiber 9 is decoupled using a collimator 10 as a collimated beam, subsequently passes through the beam forming element 7a-7c which is located in the beam path and which changes the laser beam in each case in terms of

the laser characteristic thereof, for example, in terms of the laser beam intensity thereof, and is decoupled using a focusing lens from the processing head 6 as a processing laser beam 3a, 3b. The three beam forming elements 7a-7c may, as in this case, be provided on a rotary disc 11 which is rotated in accordance with the workpiece thickness D1, D2 to be processed manually using an operator or using **the control unit 8** until the beam forming element 7a-7c desired in each case is located in the beam path. **The control unit 8 is advantageously part of the NC machine control unit** of the laser cutting machine 1 in order to form in accordance with the programmed workpiece thickness of an NC program running on the NC machine control unit 8 either one or the other processing laser beam 3a, 3b. Alternatively, however, **the control unit 8** may also detect the work piece thickness using sensors which are not illustrated and control the rotary disc 11 accordingly.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the control unit of Hesse et al in DE 42 00 587 (Kobayashi, Noboru et al, cited by applicant) since in **paragraph 0028** states that the dual-clad fiber shown, multi-clad fibers which have an inner core fiber and a plurality of outer cladding fibers may also be provided so that, **by selective coupling into these fibers, many different laser beam characteristics may be produced. It is also possible that the inner core fiber and the outer cladding fiber, in a manner different from the round cross-section, may also have other cross-section shapes and/or cross-sectional**

surface-areas. For example, oval and/or rectangular cross-section shapes are conceivable.

EXAMINERS NOTE: A reference to specific paragraphs, columns, pages, or figures in a cited prior art reference is not limited to preferred embodiments or any specific examples. It is well settled that a prior art reference, in its entirety, must be considered for all that it expressly teaches and fairly suggests to one having ordinary skill in the art. Stated differently, a prior art disclosure reading on a limitation of Applicant's claim cannot be ignored on the ground that other embodiments disclosed were instead cited. Therefore, the Examiner's citation to a specific portion of a single prior art reference is not intended to exclusively dictate, but rather, to demonstrate an exemplary disclosure commensurate with the specific limitations being addressed. In re Heck, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting In re Lemelson, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). In re: Upsher-Smith Labs. v. PamLab, LLC, 412 F.3d 1319, 1323, 75 USPQ2d 1213, 1215 (Fed. Cir. 2005); In re Fritch, 972 F.2d 1260, 1264, 23 USPQ2d 1780, 1782 (Fed. Cir. 1992); Merck & Co. v. Biocraft Labs., Inc., 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989); In re Fracalossi, 681 F.2d 792, 794 n.1, 215 USPQ 569, 570 n.1 (CCPA 1982); In re

Art Unit: 2874

Lamberti, 545 F.2d 747, 750, 192 USPQ 278,280 (CCPA 1976); In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Claims Are Allowed

Claims 13 - 27 are allowed over the prior art as of record.

Citation Prior Art

Prior art made of record and not relied upon is considered pertinent to applicants disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does.

These references are:

USPNO. 5,475,704

US Pub. No.2011/0,305,249 and 2015/ 0,378,184

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akm Enayet Ullah whose telephone number is 571-272-2361. The examiner can normally be reached on Monday through Thursday from 6:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen-Chau Le, can be reached on 571-272-2397. 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).

/Akm Enayet Ullah/
Primary Examiner
Art Unit 2874

Notice of References Cited	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination HUBER ET AL.	
	Examiner Akm Enayet Ullah	Art Unit 2874	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5,475,704 A	12-1995	Lomashevich; Svyatoslav A.	G02B6/12004	372/21
*	B	US-6,819,815 B1	11-2004	Corbalis; Charles	G02B6/3588	385/16
*	C	US-2002/0168139 A1	11-2002	Clarkson, William Andrew	G02B6/262	385/27
*	D	US-2011/0305249 A1	12-2011	Gapontsev; Valentin	B23K26/043	372/6
*	E	US-2015/0217402 A1	08-2015	Hesse; Tim	B23K26/0648	219/121.72
*	F	US-2015/0378184 A1	12-2015	Tayebati; Parviz	G02F1/295	250/492.1
	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	CPC 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.

Sheet 1 of 1

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 15540-0370003	Application No. 15/279,781
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant TRUMPF Laser- und Systemtechnik GmbH	
		Filing Date September 29, 2016	Group Art Unit 2874

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	6,819,815	11/16/2004	Corbalis et al.			

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	2.	WO 2009/155536	12/23/2009	WIPO	G02B	6/255		

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	3.	Copy of Indian Office Action for Indian Application No. 8560/CHENP/2012 by Controller Ambigaapathy A, dated November 20, 2017

08/30/2018

Examiner Signature /AKM E ULLAH/	Date Considered 08/30/2018
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Sheet 1 of 1

Substitute Disclosure Form U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 15540-0370003	Application No. 15/279,781
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	Applicant TRUMPF Laser- und Systemtechnik GmbH	
	Filing Date September 29, 2016	Group Art Unit 2874

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.	6,819,815	11/16/2004	Corbalis et al.			

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Other Documents (include Author, Title, Date, and Place of Publication)		
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08/30/2018

Examiner Signature /AKM E ULLAH/	Date Considered 08/30/2018
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/279,781		Filing Date 09/29/2016		☐ To be Mailed	
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)							
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		X \$ =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL			
APPLICATION AS AMENDED – PART II									
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	05/17/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 10	Minus	** 20	= 0	X \$100 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$460 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

LIE
TRACEY HARRIS

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

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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/279,781		Filing Date 09/29/2016		☐ To be Mailed	
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FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)			
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☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A					
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INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		X \$ =					
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(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	05/17/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 27	Minus	** 20	= 7	X \$100 =		700	
	Independent (37 CFR 1.16(h))	* 4	Minus	***3	= 1	X \$460 =		460	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		1160	
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
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LIE
TRACEY HARRIS

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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

First Named Inventor :	Rudolph Huber	Art Unit :	2874
Serial No. :	15/279,781	Examiner :	Akm E. Ullah
Filed :	September 29, 2016	Conf. No. :	2586
Title :	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER		

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

REPLY TO ACTION OF NOVEMBER 17, 2017

Please consider the following reply.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 2 of 10

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

Amendments to the Specification:

Please replace the title as follows:

ELECTIVELY COUPLING A LASER BEAM INTO A MULTI-CLAD FIBER

List of claims (replacing prior versions).

1. (Original) A method comprising:
coupling an input laser beam into a fiber end of an optical fiber that has at least an inner fiber core and an outer ring core, wherein coupling an input laser beam comprises electively coupling a first laser beam into the inner fiber core alone or coupling a different, second laser beam into both the inner fiber core and the outer ring core; and
generating an output laser beam by interaction of the input laser beam with the optical fiber, wherein a beam profile characteristic of the output laser beam differs depending upon the elective coupling.
2. (Original) The method of claim 1, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core, the outer ring core, and a second cladding surrounding the outer ring core.
3. (Original) A method comprising:
coupling an input laser beam into a fiber end of an optical fiber that has at least an inner fiber core and an outer ring core, wherein coupling an input laser beam comprises electively coupling either a first laser beam into the inner fiber core alone or coupling a different, second laser beam into the outer ring core alone; and
generating an output laser beam by interaction of the input laser beam with the optical fiber, wherein a beam profile characteristic of the output laser beam differs depending upon the elective coupling.
4. (Original) The method of claim 3, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core, the outer ring core, and a second cladding surrounding the outer ring core.

5. (Original) A device for generating a laser beam with different beam profile characteristics, comprising:

an optical fiber having an inner fiber core and at least one outer ring core; and
a switchable coupling adjustment device configured to adjust a coupling of an input laser beam to a coupling-side face of the optical fiber between at least two switch positions, wherein, in a first of the at least two switch positions, a first laser beam is coupled into the inner fiber core alone and, in a second of the at least two switch positions, a different, second laser beam is coupled at least into the outer ring core.

6. (Original) The device of claim 5, wherein the switchable coupling adjustment device comprises:

a control device that, in the at least two switch positions, moves the coupling-side face of the optical fiber in a direction transverse to the input laser beam to varying extents depending on the switch position.

7. (Original) The device of claim 5, wherein the switchable coupling adjustment device comprises an optical element configured to be positioned in the at least two different switch positions transverse to an optical axis of the first or second laser beam.

8. (Original) The device of claim 7, wherein the optical element is configured to be arranged outside a beam path of the first or second laser beam in one of the at least two switch positions and is at least partially in the beam path of the first or second laser beam in another one of the at least two switch positions.

9. (Original) The device of claim 5, wherein a maximum diameter of the inner fiber core of the optical fiber is approximately 200 μm or less.

10. (Original) The device of claim 5, wherein a ring thickness of the at least one outer ring core of the optical fiber is no less than a diameter of the inner fiber core.

11. (Original) The device of claim 5, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core, the outer ring core, and a second cladding surrounding the outer ring core.

12. (Original) The device of claim 11, wherein, for the optical fiber, a numerical aperture of the first cladding is higher than a numerical aperture of the second cladding.

13. (New) A method for generating a laser beam, comprising:
coupling a first input laser beam and a second input laser beam into a first end of an optical fiber having an inner fiber core and an outer ring core surrounding the inner fiber core, wherein the coupling includes electively:
a. coupling the first input beam to the inner fiber core only;
b. coupling the second input beam into the outer ring core only; or
c. coupling the first input beam into the inner fiber core and coupling the second input beam into the outer ring core; and
emitting an output beam from at least one of the inner fiber core and the outer ring core at a second end of the optical fiber, wherein the electively coupling of the first input beam and the second input beam is performed so as to generate different output beam characteristics.

14. (New) The method of claim 13, further comprising:
before the coupling, guiding the first input laser beam in a first optical input fiber and guiding the second input laser beam in a second optical input fiber, the first and second optical input fibers being disposed upstream from the first end of the optical fiber.

15. (New) The method of claim 13, wherein the optical fiber includes an inner cladding surrounding the inner fiber core between the inner fiber core and the outer ring core and a ring cladding surrounding the ring core.

16. (New) The method of claim 15, wherein the inner fiber core has a maximum diameter of approximately 200 μm .

17. (New) The method of claim 15, wherein the inner cladding is between 5 μm and 10 μm thick.

18. (New) The method of claim 13, wherein the optical fiber includes a second ring core surrounding the outer ring core, and
wherein the method further comprises: coupling a third input laser beam into the second ring core.

19. (New) The method of claim 18, wherein the optical fiber includes a second ring cladding surrounding the second ring core.

20. (New) The method of claim 13, wherein the first and second input laser beams have different beam qualities.

21. (New) The method of claim 13, wherein the emitting of the output beam comprises:

- a) emitting the output beam from the inner fiber core only,
- b) emitting the output beam from the outer ring core only, or
- c) emitting the output beam from both the inner fiber core and the outer ring core.

22. (New) The method of claim 13, further comprising:
processing a material using the output beam.

23. (New) The method of claim 22, wherein the processing includes at least one of welding and cutting the material.

24. (New) The method of claim 13, wherein the first and second input laser beams are sub-beams emitted from a single laser.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 7 of 10

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

25. (New) The method of claim 13, further comprising:
emitting the first input laser beam from a first laser and emitting the second input laser beam from a second laser.

26. (New) The method of claim 13, wherein the second end of the optical fiber includes the second end of the inner fiber core and the second end of the outer ring core, the second ends of the inner fiber core and the outer ring core being flush with one another.

27. (New) The method of claim 13, wherein the output beam has a power of at least 1 kW.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 8 of 10

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

REMARKS

Claims 1-12 are presented for examination. New claims 13-27 have been added. Support for the new claims could be found in the Specification as originally filed, at least at FIG. 6 and page 13, line 20 to page 14, line 25. No new subject matter has been added. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks herein.

Objections to Title

The title stands objected due to being not descriptive. The title has been replaced with a new title. The applicant respectfully submits that the objections should be withdrawn.

Double Patenting Rejections

Claims 1-4 stand rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1, 6, 7, and 11 of U.S. Patent No. 9,482,821. Claims 5, 9, 14 stand rejected on the ground of nonstatutory double patenting as being unpatentable over claim 5, 7, 12 and 14 of U.S. Patent No. 8,781,269.

Without conceding the propriety of the obviousness-type double patenting rejections, the applicant is concurrently submitting a terminal disclaimer over U.S. Patent No. 8,781,269 and a terminal disclaimer over U.S. Patent No. 9,482,821, to obviate the rejections, so the rejection should be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over DE 4200587 (“Noboru”) in view of U.S. Pat. Pub. No. 2015/02174202 (“Hesse”). The rejection is respectfully traversed.

The applicant submits that Hesse does not qualify as prior art under pre-AIA 35 U.S.C. 102(b) and 102(e). As acknowledged in the Office Action, page 2, the effective US filing date of the claimed invention is December 20, 2012, which is earlier than the effective US filing date of Hesses April 17, 2015 and the earliest publication date of Hesse April 24, 2014.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 9 of 10

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

Because Hesse does not meet the provisions of pre-AIA 35 U.S.C. 102(b) and 102(e), Hesse is not available as prior art under either pre-AIA 35 U.S.C. 102 or 103. See MPEP 2136.03 and 2154.02(c). Accordingly, because the rejection of claims 1-12 relies on Hesse and Hesse is no longer available as prior art, the applicant respectfully requests that the rejection of claims 1-12 should be withdrawn.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 10 of 10

Attorney Docket: 15540-0370003 /
SP10120US(PCT)CON2; 18.01127; DS10502

CONCLUSION

By responding in the foregoing remarks only to particular positions taken in the action, the applicant does not acquiesce in other positions that have not been explicitly addressed. In addition, the applicant's selecting some particular arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist. Finally, the applicant's decision to amend or cancel any claim should not be understood as implying that the applicant agrees with any positions taken in the action with respect to that claim or other claims, or that the applicant adopts any position except as specifically stated in this paper. In particular, by amending or cancelling a claim the applicant does not necessarily concede that the claim prior to amendment or cancellation was unpatentable.

The applicant respectfully requests consideration of all filed IDSs not previously considered, by initialing and returning each Form PTO-1449.

The fees for excess claims and extension of time are being paid with this reply on the Electronic Filing System. Apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 05/17/2018

/Yunbo Guo/
Yunbo Guo
Reg. No. 70,538

Customer Number 26161
Fish & Richardson P.C.
Telephone: (512) 226-8108
Facsimile: (877) 769-7945

23769068.doc

TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 15540-0370003
In re Application of: TRUMPF Laser- und Systemtechnik GmbH Application No.: 15/279,781 Filed: September 29, 2016 For: Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber The applicant, TRUMPF Laser- und Systemtechnik GmbH, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent No. 8,781,269 as the term of said prior patent is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. Check either box 1 or 2 below, if appropriate. 1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee. I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both. 2. ☒ The undersigned is an attorney or agent of record. Reg. No. 70,538 <u>/Yunbo Guo/</u> Signature <u>05/17/2018</u> Date <u>Yunbo Guo</u> Typed or printed name <u>Attorney of Record</u> Title <u>(512) 472-5070</u> Telephone Number ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.	

This collection of information is required by 37 CFR 1.321. 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.

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First Named Inventor :	Rudolph Huber	Art Unit :	2874
Serial No. :	15/279,781	Examiner :	Akm E. Ullah
Filed :	September 29, 2016	Conf. No. :	2586
Title :	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER		

MAIL STOP AMENDMENT

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

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the enclosed PTO-SB-08 or Disclosure Form. Foreign patent documents and non-patent literature are enclosed; cited U.S. patents and patent application publications will be provided on request. A copy of a communication from a foreign patent office in a counterpart application is also enclosed.

This statement is being filed after a first action on the merits, but before receipt of a final action or a notice of allowance.

Certification under 37 CFR § 1.97(e)(1)

Each item of information contained in this 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 this information disclosure statement.

Apply any necessary charges or credits to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this statement.

First Named Inventor : Rudolph Huber
Serial No. : 15/279,781
Filed : September 29, 2016
Page : 2 of 2

Attorney Docket: 15540-
0370003 / SP10120US(PCT)CON2; 18.01127;
DS10502

Respectfully submitted,

Date: 05/17/2018

/Yunbo Guo/
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Reg. No. 70,538

Customer Number 26161
Fish & Richardson P.C.
Telephone: (512) 226-8108
Facsimile: (877) 769-7945

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Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 15540-0370003	Application No. 15/279,781
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant TRUMPF Laser- und Systemtechnik GmbH	
		Filing Date September 29, 2016	Group Art Unit 2874

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Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
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Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	2.	WO 2009/155536	12/23/2009	WIPO	G02B	6/255		

Other Documents (include Author, Title, Date, and Place of Publication)		
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Examiner Signature	Date Considered
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Substitute Disclosure Form

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 December 2009 (23.12.2009)

(10) International Publication Number
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- (71) Applicant (for all designated States except US): **THE GENERAL HOSPITAL CORPORATION** [US/US];
55 Fruit Street, Boston, MA 02114 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **YUN, Seok-hyun**
[KR/US]; 30 Cambridge Park Drive, Apt. 4128, Cambridge, MA 02140 (US).
- (74) Agent: **ACKERMAN, Paul**; Dorsey & Whitney LLP,
250 Park Avenue, New York, NY 10177 (US).

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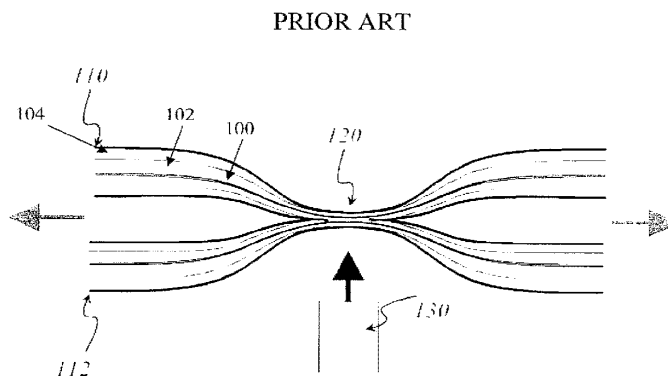


Fig. 3

(57) Abstract: Exemplary embodiments of an article of manufacture and method according to the present disclosure are provided. For example, a first multi-clad fiber arrangement can be provided that comprises a first core and at least one first cladding which is structured to propagate at least one first electro-magnetic radiation therethrough. A second multi-clad fiber arrangement can also be provided that comprises a second core and at least one second cladding which is structured to propagate at least one second electro-magnetic radiation therethrough. Further, at least one portion can be provided in which the first and second claddings are fused to one another.

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FUSED FIBER OPTIC COUPLER ARRANGEMENT AND METHOD FOR USE THEREOF

CROSS-REFERENCE TO RELATED APPLICATION(S)

5 **[0001]** This application relates to and claims the benefit of priority from U.S. Patent Application Serial No. 61/074,339, filed on June 20, 2008, the entire disclosure of which is incorporated herein by reference.

FIELD OF THE DISCLOSURE

10 **[0002]** The present disclosure relates to exemplary embodiments of a fiber optical article of manufacture, and more particularly to fused (e.g., mode-selective) fiber optic coupler arrangements and methods for use thereof.

BACKGROUND INFORMATION

15 **[0003]** As shown in Fig. 1, a conventional dual cladding fiber (DCF) has an internal structure typically consisting of a core 100, an inner cladding 102, an outer cladding 104, and a protection jacket 106. Both the core 100 and inner cladding 102 are structured to guide an optical wave along a longitudinal axis 108. A wave guiding mechanism is provided either by total internal reflection through an appropriate refractive-index profile (see Fig. 1) or Bragg band gap properties. The core 100 can typically be designed to guide only a single spatial mode, so called HE11 mode. The inner cladding 102 can guide hundreds to millions of multiple spatial modes. The DCF have been developed originally for optical fiber amplifiers and lasers. Signal light propagating in a rare-earth-ion-doped core of the DCF can be amplified while interacting with pump waves guided in the cladding. Recently, it was demonstrated that DCF can be applied in biomedical imaging. In particular, the probe light is delivered through the single-mode core to a biological sample, whereas the signal light
25 transmitted through or reflected from the sample can be collected by the inner cladding as

well as the core of DCF. This exemplary arrangement can be advantageous over more conventional method based on a single-mode fiber or multi-mode fiber in terms of spatial resolution, light collection efficiency, etc.

[0004] In such applications using the DCF, an arrangement or a technique to launch or
5 extract light in and out of either only the core or the inner cladding of the DCF can be used. Conventional arrangements generally include free-space optics. As shown in Fig. 2, the core mode in a DCF 110 is transmitted to the core 100 of a first receiving fiber 112 through lenses 113, a beam splitter 114, and a pinhole 115. The cladding modes of the DCF 110 are received by a second fiber 117 through a beam blocker 118. However, this conventional arrangement
10 may suffer from significant insertion loss due to beam splitting and mode profile mismatch.

[0005] Accordingly, there may be a need to address and/or overcome at least some of the deficiencies described herein above.

SUMMARY OF EXEMPLARY EMBODIMENTS OF THE DISCLOSURE

15 [0006] According to exemplary embodiments of the present disclosure, it is possible to provide an article of manufacture and a method which facilitates a smaller loss and the freedom from cumbersome and costly free-space alignment. One of the objects of the exemplary embodiments of the present disclosure is solve at least some of the deficiencies of the conventional arrangements and methods, and can facilitate a fused DCF coupler which
20 can provide efficient mode-selective beam splitting and/or combining.

[0007] In one exemplary embodiment, exemplary embodiments of an article of manufacture and method according to the present disclosure can be provided. For example, a first multi-clad fiber arrangement can be provided that comprises a first core and at least one first cladding which is structured to propagate at least one first electro-magnetic radiation
25 therethrough. A second multi-clad fiber arrangement can also be provided that comprises a

second core and at least one second cladding which is structured to propagate at least one second electro-magnetic radiation therethrough. Further, at least one portion can be provided in which the first and second claddings are fused to one another.

[0008] According to one exemplary embodiment of the present disclosure, the first and second cores can be separated from one another within the portion(s). The separation between the first and second cores within the portion(s) can be greater than a wavelength of at least one of the first and/or second electro-magnetic radiation. In addition, a core mode coupling ratio between the first and second cores within the portion(s) can be less than about 10%, 1%, 0.1%, etc. Further, a cladding mode coupling ratio between the first and second claddings within the portion(s) can be between about 10% and 90%. between about 40% and 60%, approximately 50%, etc.

[0009] According to another exemplary embodiment of the present disclosure, the first and second multi-clad fiber arrangements can be double-clad fiber arrangements. Optical properties of the first and second multi-clad fiber arrangements can be substantially identical. Further, at least one single mode fiber arrangement can also be provided which can be coupled to the first and/or second multi-clad fiber arrangement. The single mode fiber arrangement(s) can include at least one third cladding which can be structured to prevent a propagation of an electro-magnetic radiation therethrough.

[0010] According to still another exemplary embodiment of the present invention, system and method can be provided. For example, at least one first electro-magnetic radiation can be provided using a first arrangement. Further, the first electro-magnetic radiation(s) can be received from the first arrangement and outputted to a sample using at least one of at least two multi-clad fiber arrangements of a second arrangement. Each of the multi-clad fiber arrangements can comprise a core and at least one cladding which can be structured to propagate the first electro-magnetic radiation(s) therethrough. The second arrangement

further can comprise at least one portion in which at least one of the claddings of at least two of the multi-clad fiber arrangements are fused to one another.

[0011] Further, it is possible to, with at least first one of the multi-clad fiber arrangements, receive at least one second electro-magnetic radiation from the sample which can be associated with the first electro-magnetic radiation(s), and propagate the second electro-magnetic radiation(s) via the core and the cladding thereof. In addition, it is possible to modify and/or splitting the second electro-magnetic radiation(s) traveling along the cladding of the first one of the multi-clad fiber arrangements in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements. Additionally, a third arrangement can be provided which is configured to detect the at least one third electro-magnetic radiation. The second electro-magnetic radiation can be a fluorescence radiation or a scattered light.

[0012] These and other objects, features and advantages of the exemplary embodiment of the present disclosure will become apparent upon reading the following detailed description of the exemplary embodiments of the present disclosure, when taken in conjunction with the appended claims.

BRIEF DESCRIPTION OF THE DRAWING(S)

[0013] Further objects, features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying figures showing illustrative embodiments of the present invention, in which:

[0014] Fig. 1 is a perspective cross-sectional view of a structure of a conventional double clad fiber which includes a refractive index profile thereof;

[0015] Fig. 2 is a diagram of a conventional system which can implement free space coupling configurations;

[0016] Fig. 3 is a side view of an exemplary embodiment of a fabrication of a fused-type DCF coupler according to the present disclosure;

[0017] Figs. 4A-4C are side views the exemplary DCF coupler implementing exemplary operating principles according to the present disclosure;

5 [0018] Figs. 5A and 5B are side views further exemplary embodiments of the fused-type DCF coupler according to the present disclosure, and of an exemplary fabrication and/or implementation thereof;

[0019] Fig. 6 is a diagram of one exemplary embodiment of an imaging system utilized an exemplary embodiment of the DCF coupler in accordance with the present disclosure; and

10 [0020] Fig. 7 is a diagram of another exemplary embodiment of the imaging system utilized a further exemplary embodiment of the DCF coupler in accordance with the present disclosure.

[0021] Throughout the figures, the same reference numerals and characters, unless otherwise stated, are used to denote like features, elements, components or portions of the illustrated embodiments. Moreover, while the subject disclosure will now be described in
15 detail with reference to the figures, it is done so in connection with the illustrative embodiments. It is intended that changes and modifications can be made to the described exemplary embodiments without departing from the true scope and spirit of the subject disclosure as defined by the appended claims.

20 **DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS**

[0022] An exemplary embodiment of a method of fabricating a DCF coupler can be similar to a conventional method for fabricating fused single-mode fiber couplers or multimode fiber couplers. In this exemplary method, intermediate jacket-stripped sections of two identical fibers contact one another and are twisted together, which can be tapered
25 longitudinally by applying heat. The details of this exemplary fiber fusion method are known

in the art. The exemplary embodiment of the DCF fiber according to the present disclosure, at least a portion of which is shown as a side view in Fig. 3.

[0023] For example, as shown in Fig. 3, two DCF fibers 110 and 112, which can have identical and/or similar designs, can be tapered and fused in a middle portion 120 by a heat source 130. The heat source 130 can include, but not limited to, hydrogen-oxygen flame, graphite mini-furnace, and CO2 laser. For example, during a pulling process, a probe beam can be used to measure a coupling ratio *in situ* to generate control feedback to optimize optical characteristics of a fabricated device.

[0024] Figs. 4A-4C illustrate side views of the exemplary embodiment of the arrangement according to the present disclosure shown in Fig. 4 performing exemplary operating principle according to the present disclosure. For example, a signal light 200 (e.g., or any electro-magnetic radiation) propagated in the core 100 of a first fiber 110 can experience small or minimal, e.g., preferably less than 10%, coupling to the other fiber 112 after propagating through a coupler waist section/portion 120. As a result, the signal light (e.g., which can be any electro-magnetic radiation) can remain as the core mode 202 of the first fiber. On another hand, light or other electro-magnetic radiation guided in the inner cladding, or the cladding modes 210, may experience strong coupling, and the output can be provided into the two or more fibers 110, 112, e.g., with nearly equal intensity. This exemplary property can be achieved by controlling a degree of fusion of the coupler waist section/portion 120.

[0025] As the degree of fusion of the coupler waist section/portion 120 is increased, mode coupling between cladding modes of the fibers 110, 112 can start, increase gradually, and can reach to a strong coupling regime, before mode coupling between the core modes is even started. For example, the coupling between the core modes may typically begin when the V-value of the core mode is reduced to less than 1 by tapering. For the claddings modes,

the exemplary arrangement can act as a conventional multimode fiber coupler. The splitting ratio of an individual cladding mode can vary from about 0 to 100%, depending on the spatial order, wavelength, and polarization, likely yielding an overall power splitting ratio close to about 50/50 between the two outputs 212, 214. For minimum insertion loss, appropriate fiber types can preferably be selected.

[0026] Figs. 5A and 5B illustrate side views of further exemplary embodiments of the arrangements according to the present disclosure and exemplary performance of exemplary procedures using such arrangements, along with a fabrication and/or an implementation of the exemplary fused-type DCF coupler(s). In one exemplary embodiment, e.g., as shown in Fig. 5A, one port of the above-referenced exemplary DCF coupler can be connected to a single mode fiber 300 at an input side 310 thereof, e.g., by fusion splicing. According to another exemplary embodiment as shown in Fig. 5B, one port of the above-referenced exemplary DCF coupler can be connected to another single mode fiber 305 at an output side thereof, e.g., also by fusion splicing.

[0027] The single mode fiber(s) 300, 305 can act as a spatial mode filter can facilitate only the core mode (i.e., light and/or electro-magnetic radiation only being transmitted through the core 100) to be launched to the coupler (shown in Fig. 5A) and to be received from the coupler (shown in Fig. 5B). Thus, such exemplary single-mode fibers 300, 305 can prevent or reduce the transmission of the light and/or any other electro-magnetic radiation through cladding thereof. As illustrated in Fig. 5B, e.g., the cladding modes propagating in the first fiber 110, after the coupler waist section/portion 120 can be wasted by radiation to the air or absorption in the jacket of the single mode fiber. Indeed, the light/radiation propagating along the core 100 will continue to propagate along a core 320 of the single-mode fiber 305 as well. The cladding modes coupled to the second fiber 112 can continue to be guided in the inner cladding.

[0028] Fig. 6 shows a diagram of one exemplary embodiment of an optical imaging system based on the above-described exemplary DCF coupler in accordance with the present disclosure. For example, the single-mode fiber 300 can be connected to a light source or another electro-magnetic radiation source 400. The light source 400 can include, but not limited to, a monochromatic laser, a mode-locked laser, a Super-Luminescent Diode (SLD), an LED and/or a tunable source. An output of the light source 400 can be delivered to an optical probe 410 through the core 100 of the fiber 110 of the exemplary DCF. The probe light/radiation can illuminate a sample 420, which can be a biological sample. The light/radiation reemitted from the sample 420 via reflection, scattering, and/or fluorescence can be received by the optical probe 410. The optical probe 410 can comprises at least one or more of lens, such as, e.g., objective lens or GRIN lens. The optical energy coupled to the core 100 of the DCF can then be transmitted back toward the light source 400. Approximately a half of the optical energy initially coupled in the claddings 102, 104 of the first fiber 110 of the exemplary the DCF and returning from the sample 420 can be coupled to the second fiber 112 in the cladding 111, 116 thereof, and can be detected by a photo-receiver 430. The photo-receiver 430 can include, but not limited to, a photodiode, a CCD array and/or a CMOS array.

[0029] For example, the exemplary optical system shown in Fig. 6 can be realized for two-photon fluorescence imaging as described in M. T. Myaing et al., "Enhanced two-photon biosensing with double-clad photonic crystal fibers," Opt. Lett. 28, 1224-1226 (2003). In such exemplary embodiment, the light source 400 can be a pulsed laser emitting infrared light. The optical probe 410 can utilize a high NA objective lens focusing the core mode to the sample 420. The fluorescent light generated within the sample 420 and received by the cladding 116 of the DCF through the objective lens can then be measured at the photo-receiver 430 through a dielectric filter filtering the pump wave and transmitting, e.g., only the

fluorescence signal light. The optical probe 410 can include a beam scanning actuator to scan the probe beam transversely across the sample 420.

[0030] The exemplary embodiment of the imaging system shown in Fig. 6 can also be configured for spectrally-encoded endoscopy as described in D. Yelin et al., "Double clad fiber for endoscopy," Opt. Lett. 29, 2408-2410 (2004). In this exemplary case, the light source 400 can include a broadband SLD, and the probe 410 can utilize a diffraction grating and lens to focus different wavelengths to different spatial points in the sample 420. The reflected light captured in the cladding 111, 116 of the DCF can be detected by, e.g., a CCD array.

[0031] The exemplary imaging system architecture of another exemplary embodiment of the present disclosure can be extended for an interferometric imaging by adding a single-mode fiber coupler 500, a reference mirror 520, and a photodetector 540, as illustrated in Fig. 7. For an exemplary time-heterodyne detection, the reference mirror 520 can be scanned axially. Alternatively or in addition, the photodetector 540 can include a spectrometer which can have a diffraction grating and a detector array for spectral-domain detection. Further or alternatively, a wavelength-tunable light source can be used as a light source 430 for optical frequency domain imaging. Various exemplary techniques for interferometer-based optical imaging are known in the art.

[0032] Other exemplary embodiments of the imaging system with configurations modified from Fig. 6 can include reflectance confocal imaging, fluorescence detection, fluorescence confocal imaging, multi photon fluorescence microscopy, coherent Raman microscopy, and second- or third-harmonic generation microscopy. The exemplary DCF coupler can also be used in cladding-pumped optical amplifiers and lasers for combining or splitting the signal and pump waves.

[0033] The foregoing merely illustrates the principles of the invention. Various modifications and alterations to the described embodiments will be apparent to those skilled in the art in view of the teachings herein. Indeed, the arrangements, systems and methods according to the exemplary embodiments of the present invention can be used with imaging systems, and for example with those described in International Patent Publication WO 2005/047813 published May 26, 2005, U.S. Patent Publication No. 2006/0093276, published May 4, 2006, and U.S. Patent Publication No. 2005/0018201, published January 27, 2005, the disclosures of which are incorporated by reference herein in their entireties. It will thus be appreciated that those skilled in the art will be able to devise numerous systems, arrangements and methods which, although not explicitly shown or described herein, embody the principles of the invention and are thus within the spirit and scope of the present invention. In addition, to the extent that the prior art knowledge has not been explicitly incorporated by reference herein above, it is explicitly being incorporated herein in its entirety. All publications referenced herein above are incorporated herein by reference in their entireties.

What Is Claimed Is:

1. An article of manufacture, comprising:

a first multi-clad fiber arrangement which comprises a first core and at least one first cladding which is structured to propagate at least one first electro-magnetic radiation

5 therethrough;

a second multi-clad fiber arrangement which comprises a second core and at least one second cladding which is structured to propagate at least one second electro-magnetic

radiation therethrough; and

at least one portion in which the first and second claddings are fused to one another.

10

2. The article of manufacture according to claim 1, wherein the first and second cores are separated from one another within the at least one portion.

3. The article of manufacture according to claim 2, wherein a separation between the
15 first and second cores within the at least one portion is greater than a wavelength of at least one of the at least one first electro-magnetic radiation or the at least one second electro-magnetic radiation.

4. The article of manufacture according to claim 2, wherein a core mode coupling ratio
20 between the first and second cores within the at least one portion is less than about 10%.

5. The article of manufacture according to claim 2, wherein a core mode coupling ratio between the first and second cores within the at least one portion is less than about 1%.

6. The article of manufacture according to claim 2, wherein a core mode coupling ratio between the first and second cores within the at least one portion is less than about 0.1%.

7. The article of manufacture according to claim 1, wherein a cladding mode coupling ratio between the first and second claddings within the at least one portion is between about 10% and 90%.

8. The article of manufacture according to claim 1, wherein a cladding mode coupling ratio between the first and second claddings within the at least one portion is between about 40% and 60%.

9. The article of manufacture according to claim 1, wherein a cladding mode coupling ratio between the first and second claddings within the at least one portion is approximately 50%.

10. The article of manufacture according to claim 1, wherein the first and second multi-clad fiber arrangements are double-clad fiber arrangements.

11. The article of manufacture according to claim 1, wherein optical properties of the first and second multi-clad fiber arrangements are substantially identical.

12. The article of manufacture according to claim 1, further comprising at least one single mode fiber arrangement which is coupled to at least one of the at least one first multi-clad fiber arrangement and the least one second multi-clad fiber arrangement, wherein the at least

one single mode fiber arrangement includes at least one third cladding which is structured to prevent a propagation of an electro-magnetic radiation therethrough.

13. The article of manufacture according to claim 1,

5 wherein, after transmitting the at least one first electro-magnetic radiation, the first multi-clad fiber arrangement receives at least one third electro-magnetic radiation from a sample which is associated with the at least one first electro-magnetic radiation, and propagates the at least one third electro-magnetic radiation via the core and the at least one first cladding thereof, and

10 wherein the at least one third electro-magnetic radiation traveling along the at least one first cladding of the first multi-clad fiber arrangement is at least one of modified or split in the at least one portion to propagate at least one fourth electro-magnetic radiation along the at least one second cladding of the second multi-clad fiber arrangement.

15 14. The article of manufacture according to claim 13, further comprising a third arrangement which is configured to detect the at least one fourth electro-magnetic radiation.

15. The article of manufacture according to claim 13, wherein the at least one third electro-magnetic radiation is a fluorescence radiation or a scattered light.

20 16. A system, comprising:

a first arrangement which is configured to provide at least one first electro-magnetic radiation; and

a second arrangement which includes at least two multi-clad fiber arrangements at
25 least one of which receives the at least one first electro-magnetic radiation from the first arrangement and outputs the least one first electro-magnetic radiation to a sample, each of the

multi-clad fiber arrangements comprising a core and at least one cladding which is structured to propagate the at least one first electro-magnetic radiation therethrough, the second arrangement further comprising at least one portion in which at least one of the claddings of at least two of the multi-clad fiber arrangements are fused to one another,

5 wherein at least first one of the multi-clad fiber arrangements receives at least one second electro-magnetic radiation from the sample which is associated with the at least one first electro-magnetic radiation, and propagates the at least one second electro-magnetic radiation via the core and the cladding thereof, and

 wherein the at least one second electro-magnetic radiation traveling along the
10 cladding of the at least first one of the multi-clad fiber arrangements is at least one of modified or split in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements.

17. The system according to claim 16, further comprising a third arrangement which is
15 configured to detect the at least one third electro-magnetic radiation.

18. The system according to claim 16, the at least one second electro-magnetic radiation is a fluorescence radiation or a scattered light.

20 19. The system according to claim 16, wherein the cores of the multi-clad fiber arrangements are separated from one another within the at least one portion.

20. The system according to claim 19, wherein the cores of the multi-clad fiber arrangements within the at least one portion is greater than a wavelength of at least one of the
25 at least one first electro-magnetic radiation or the at least one second electro-magnetic radiation.

21. The system according to claim 19, wherein a core mode coupling ratio between the cores of the multi-clad fiber arrangements within the at least one portion is less than about 10%.

5

22. The system according to claim 19, wherein a core mode coupling ratio between the cores of the multi-clad fiber arrangements within the at least one portion is less than about 1%.

10

21. The system according to claim 19, wherein a core mode coupling ratio between the cores of the multi-clad fiber arrangements within the at least one portion is less than about 0.1%.

15

22. The system according to claim 19, wherein a cladding mode coupling ratio between the claddings of the multi-clad fiber arrangements within the at least one portion is between about 10% and 90%.

20

23. The system according to claim 19, wherein a cladding mode coupling ratio between the claddings of the multi-clad fiber arrangements within the at least one portion is between about 40% and 60%.

25

24. The system according to claim 19, wherein a cladding mode coupling ratio between the claddings of the multi-clad fiber arrangements within the at least one portion is approximately 50%.

25. The system according to claim 16, wherein the multi-clad fiber arrangements are double-clad fiber arrangements.

26. The system according to claim 16, wherein optical properties of the multi-clad fiber
5 arrangements are substantially identical.

27. The system according to claim 16, further comprising at least one single mode fiber arrangement which is coupled to at least one of the multi-clad fiber arrangements, wherein the at least one single mode fiber arrangement includes at least one further cladding which is
10 structured to prevent a propagation of at least one of the at least one first electro-magnetic radiation or the at least one second electro-magnetic radiation therethrough.

28. A method, comprising:
providing at least one first electro-magnetic radiation using a first arrangement;
15 receiving the at least one first electro-magnetic radiation from the first arrangement and outputting the least one first electro-magnetic radiation to a sample using at least one of at least two multi-clad fiber arrangements of a second arrangement, each of the multi-clad fiber arrangements comprising a core and at least one cladding which is structured to propagate the at least one first electro-magnetic radiation therethrough, the second
20 arrangement further comprising at least one portion in which at least one of the claddings of at least two of the multi-clad fiber arrangements are fused to one another;
using at least first one of the multi-clad fiber arrangements, receiving at least one second electro-magnetic radiation from the sample which is associated with the at least one first electro-magnetic radiation, and propagating the at least one second electro-magnetic
25 radiation via the core and the cladding thereof; and

at least one of modifying or splitting the at least one second electro-magnetic radiation traveling along the cladding of the at least first one of the multi-clad fiber arrangements in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements.

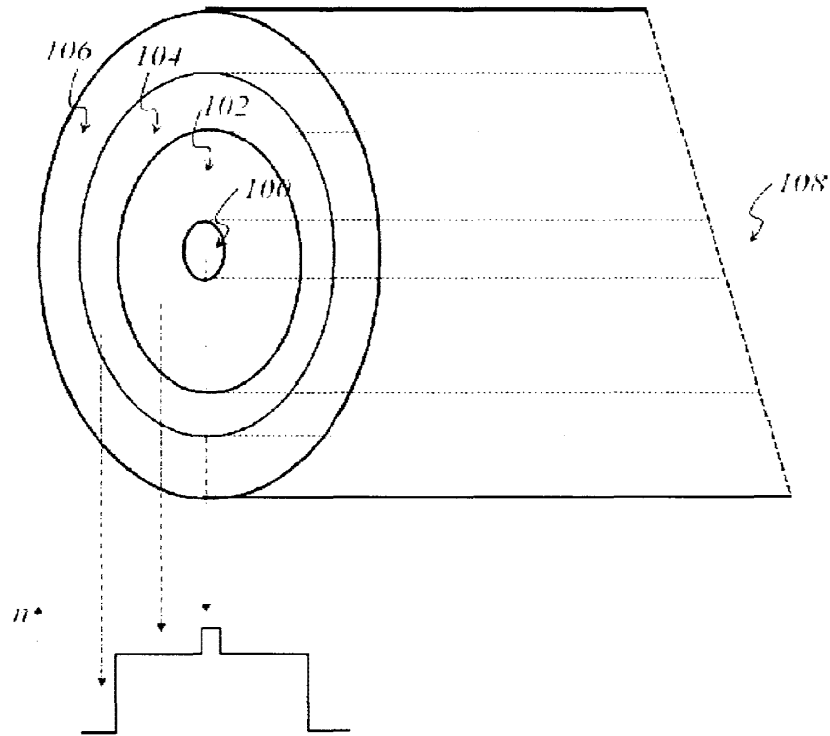


Fig. 1

PRIOR ART

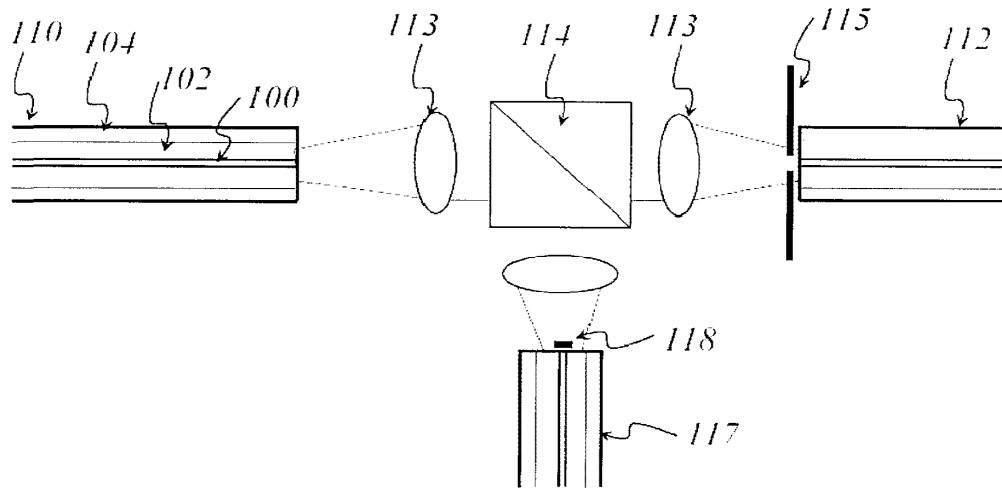


Fig. 2

PRIOR ART

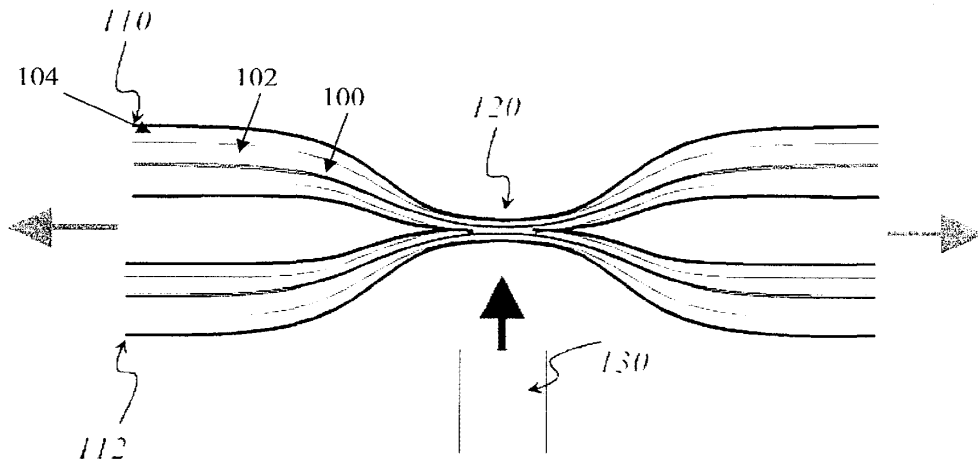


Fig. 3

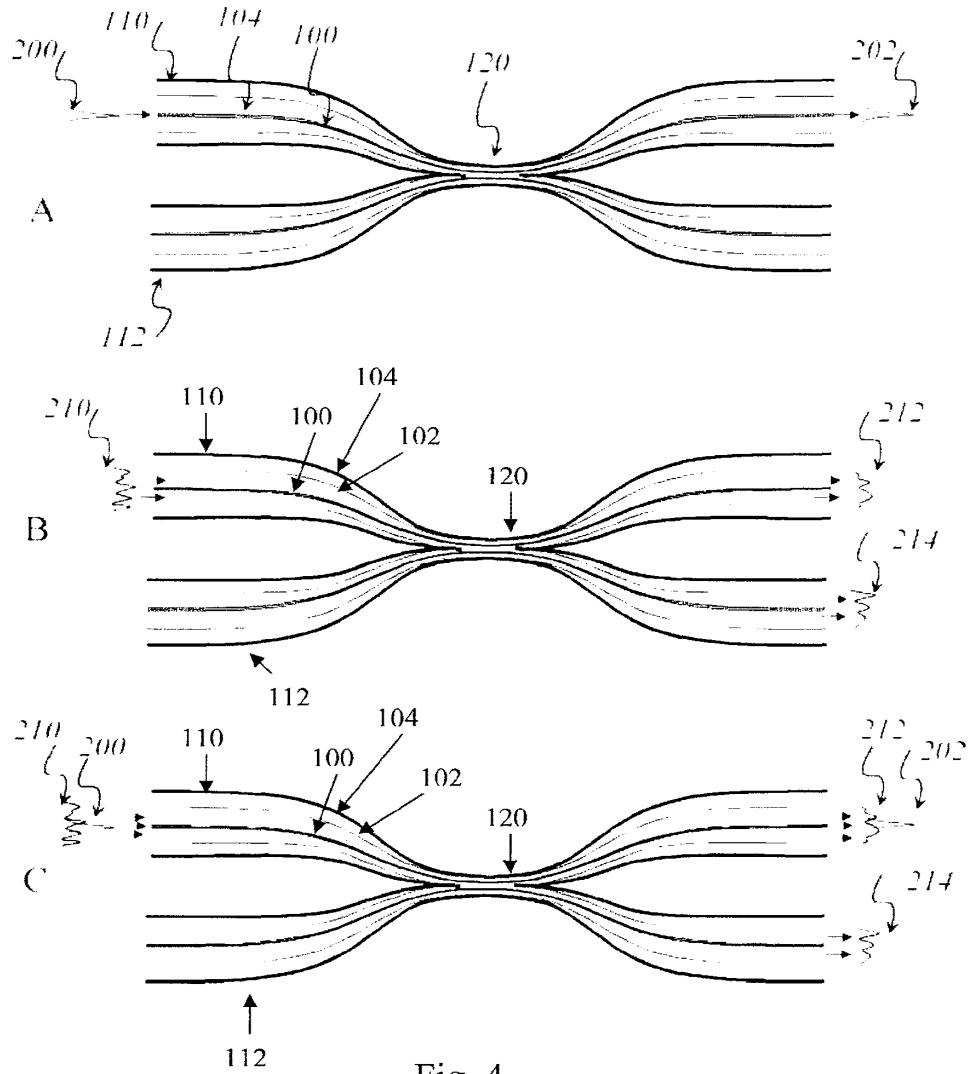


Fig. 4

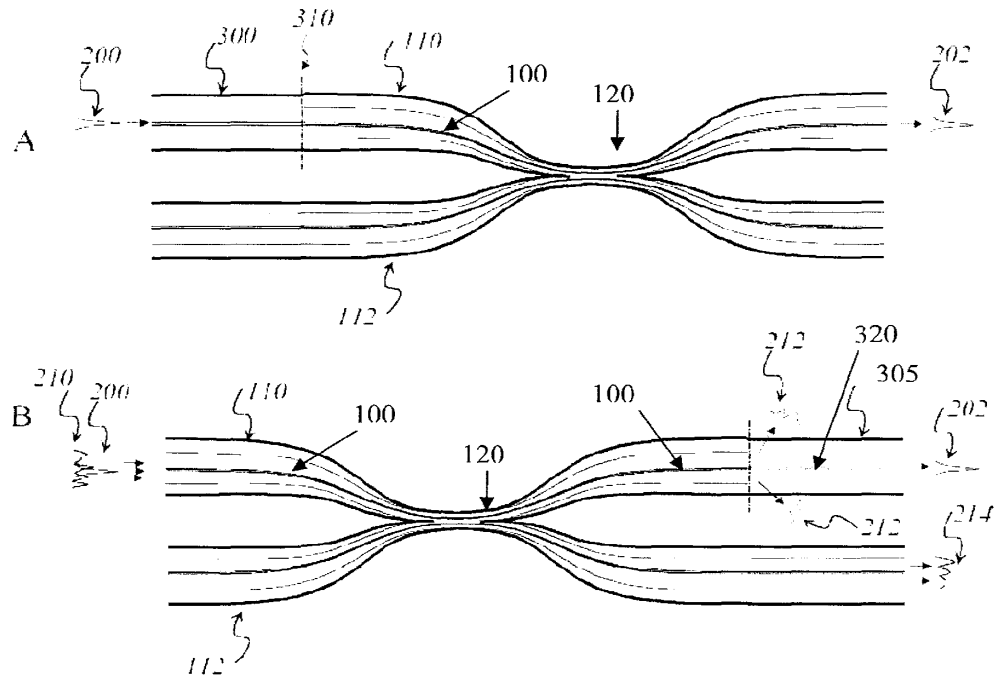


Fig. 5

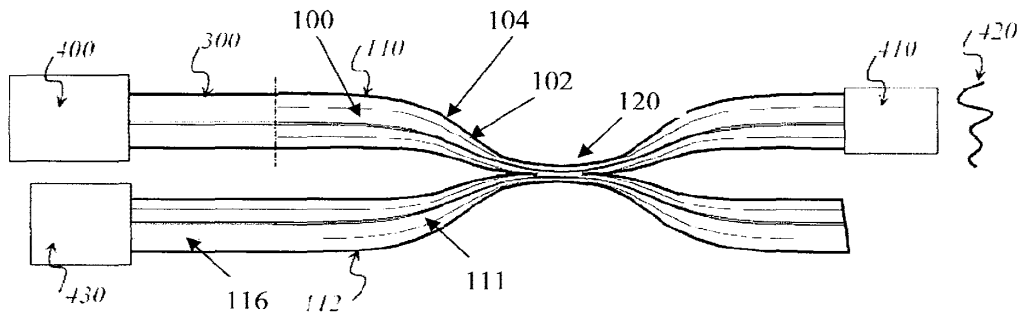


Fig. 6

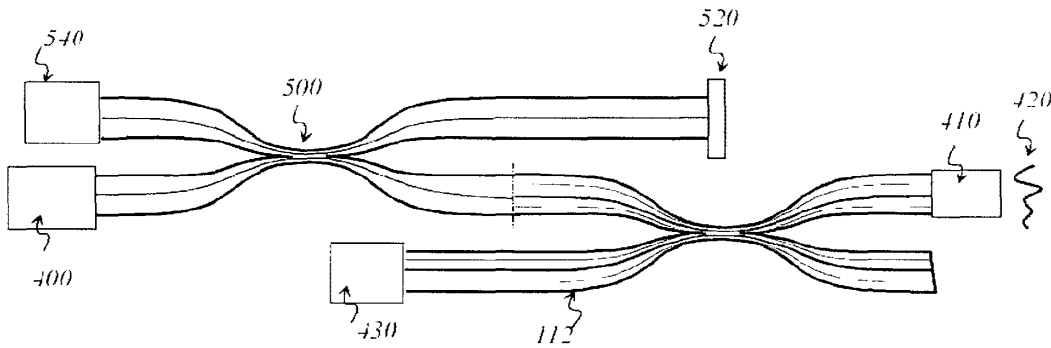


Fig. 7

THE PATENT OFFICE

3	US6819815B1	16/11/2004	Abstract, col. 3 line 27 to 59, fig 2	1	1 - 15
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(ख) गैर-पेटेंट साहित्य / (b). Non-patent literature

कोई दस्तावेज़ उद्धृत नहीं है / No Document Cited

ख. अधिनियम के तहत आवश्यकताओं पर विस्तृत टिप्पणियाँ / B. Detailed observations on the requirements under the Act:

(1). आविष्कारी कदम / INVENTIVE STEP:

(I) ऊपर उद्धरित दस्तावेज़(जों) के संदर्भ D1, D2 and D3 में स्पष्ट अध्यापन(जों) को ध्यान में रखते हुए, निम्नलिखित कारणों से दावा(वों) (1 - 15) में आविष्कारी कदम की कमी है

Claim(s) (1 - 15) lack(s) inventive step, being obvious in view of teaching (s) of cited document(s) above under reference D1, D2 and D3 for the following reasons:

Subject matter of claims 1-15 does not constitute an invention under Section 2(1)(j) of the Patents Act, 1970 (as amended) because it does not involve an inventive step in view of following documents:

D1: WO2009155536A2 PBD: 23/12/2009

D2: US2002168139A1 PBD: 14/11/2002

D3: US6819815B1 PBD: 16/11/2004

Below are the claimed features and citations in parentheses:

D1 discloses a fiber optical article of manufacture, and more particularly to fused (e.g., mode-selective) fiber optic coupler arrangements and methods for use thereof (para [0005]). An article of manufacture, comprising: a first multi-clad fiber arrangement which comprises a first core and at least one first cladding which is structured to propagate at least one first electro-magnetic radiation therethrough; a second multi-clad fiber arrangement which comprises a second core and at least one second cladding which is structured to propagate at least one second electro-magnetic radiation therethrough (claim 1, para [0010]). the first and second multi-clad fiber arrangements are double-clad fiber arrangements (claim 10).

A system, comprising: a first arrangement which is configured to provide at least one first electro-magnetic radiation; and a second arrangement which includes at least two multi-clad fiber arrangements at least one of which receives the at least one first electro-magnetic radiation from the first arrangement and outputs the least one first electro-magnetic radiation to a sample, each of the multi-clad fiber arrangements comprising a core and at least one cladding which is structured to propagate the at least one first electro-magnetic radiation therethrough, the second arrangement further comprising at least one portion in which at least one of the claddings of at least two of the multi-clad fiber arrangements are fused to one another, wherein at least first one of the multi-clad fiber arrangements receives at least one second electro-magnetic radiation from the sample which is associated with the at least one first electro-magnetic radiation, and propagates the at least one second electro-magnetic radiation via the core and the cladding thereof, and wherein the at least one second electro-magnetic radiation traveling along the cladding of the at least first one of the multi-clad fiber arrangements is at least one of modified or split in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements (claim 16). It is possible to, with at least first one of the multi-clad fiber arrangements, receive at least one second electro-magnetic radiation from the sample which can be associated with the first electro-magnetic radiation(s), and propagate the second electro-magnetic radiation(s) via the core and the cladding thereof. In addition, it is possible to modify and/or splitting the second electro-magnetic radiation(s) traveling along the cladding of the first one of the multi-clad fiber arrangements in the at least one portion to propagate at least one third electro-magnetic radiation along the cladding of at least second one of the multi-clad fiber arrangements (para [0013]).

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And D2 discloses An optical coupler for coupling a signal light beam from a signal port (100) and a pump light beam from a pump port (110) into a common port (120) for coupling the pump and signal beams into a double-clad (DC) optical fiber (122) comprising a core (123), an inner clad (124) and an outer clad (125) (abstract). An optical coupler for coupling a signal light beam and a pump light beam into an optical fiber, comprising: (a) a signal port for delivering a signal light beam; (b) a pump port for delivering a pump light beam; (c) a common port for receiving the signal and pump light beams, the common port comprising an optical fiber having a core, an inner clad and an outer clad, and an extension piece joined to the common port optical fiber at an interface therebetween and terminating at an end face; and (d) an optical arrangement for directing the signal and pump light beams onto the common port, the optical arrangement being configured to focus the signal light beam onto the core at the interface between the common port optical fiber and the extension piece (claim 1).

The invention relates to optical couplers for coupling a signal light beam and a pump light beam into an optical fiber, to optical coupling methods, to optical fiber terminations suitable for optical couplers, and to devices incorporating an optical coupler, such as fiber lasers and optical amplifiers. Double-clad (DC) optical fiber is a known type of fiber in which the cladding region of a conventional optical fiber is replaced with separate inner and outer cladding regions. DC fibers allow a multi-mode pump light beam to be coupled into an optical fiber in which the core is used to guide a signal light beam to be amplified (para [0001], [0002]). A method of coupling a signal light beam and a pump light beam into an optical fiber, comprising: (a) providing an optical fiber having a core, an inner clad and an outer clad, and an extension piece joined to the optical fiber at an interface therebetween and terminating at an end face; and (b) focusing the signal light beam onto a focal plane coincident with the interface between the common port optical fiber and the extension piece (claim 18).

Further D3 discloses an optical switch embodiment includes a switching array of arranged to accomplish switching of input light beams to any of a plurality of output channels and an array of beam monitoring elements for indirectly measuring and providing information used for adjusting output beams. The beam monitoring element further includes means for measuring the angular misalignment and the positional misalignment of a monitor beam and adjusting the reflectors based on monitor beam information such that optical beams are output from the switch having the desired optical characteristics, such as optimized power. Another optical switch embodiment includes an array of rhomboid prism assemblies positioned to receive the output beams from the switching array and such that the beams are split into substantially parallel working and monitor beams. Whereby the working beams pass into the plurality of output channels and the monitor beams pass into the plurality of beam monitoring elements where they are measured to provide information for adjusting the angular misalignment and the positional misalignment of the working beam (abstract).

An optical switch comprising an array of optical input channels each capable of carrying an associated input light beam, a switching array for coupling, a beam splitter (claim 1). Switching array comprises control circuitry, a movable reflector array, wherein the reflectors are positioned such that the input light beam pass onto the first reflector array (claim 9, fig 2). Also see col.3 line 27 to 59.

Since D1, D2 and D3 belongs to the same field of laser coupling and transmission through optical fibre, it is obvious to combine for a person skilled in the art. Hence in view of documents D1 – D3 the alleged invention is not inventive as required by Section 2(1) (j) of the patent act 1970.

(2).प्रकटन की दक्षता /SUFFICIENCY OF DISCLOSURE:

(3).अन्य आवश्यकताएँ /OTHERS REQUIREMENTS:

(I)

In case the applicant decides to amend the claims subsequent to this report, the same shall be drafted afresh to include the technical advancement over the prior art cited in SER as required u/s 2(1)(j) of the Patents Act. Please indicate in the response communication the support for such amendments claims in the original specification, as required u/s 10(4) of the Act. Care shall be taken that requirement section 59 (1) of the Act is also met. Please provide an additional copy of marked up amendments (highlighting the amendments) where ever applicable. b) In case the applicant decides to contest this report, the reasons therefore along with the

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technical significance thereof may please be indicated in the response communication.

भाग – III: औपचारिक आवश्यकताएँ /PART-III: FORMAL REQUIREMENTS

कोई आपत्ति नहीं /No Objections

भाग-IV: रिकॉर्ड में दस्तावेज़ /PART-IV: DOCUMENTS ON RECORD

निम्नलिखित दस्तावेज़ों के आधार पर यह परीक्षण रिपोर्ट तैयार की गयी है

The examination report has been prepared based on the following documents:

कार्यसूची तिथि / Docket Date	कार्यसूची संख्या /Docket Number	प्रविष्टि संख्या विवरण /Entry Number Description
05 Oct 2012	13142	1-New Application For Patent With Provisional /Complete Specification
22 Nov 2012	16418	OTHERS(NON CASH)
14 Dec 2012	18303	OTHERS(NON CASH)
08 Mar 2013	5378	18(i)-Amendment Of Application Before Grant - Form 13
13 Mar 2013	5645	OTHERS(NON CASH)
13 Mar 2013	5765	OTHERS(NON CASH)
13 Mar 2013	5765	OTHERS(NON CASH)
13 Mar 2013	5765	OTHERS(NON CASH)
12 Apr 2013	8982	28(i)-Request For Examination After 18 months Publication - Form 18
06 May 2013	10429	OTHERS(NON CASH)
10 Sep 2014	25942	OTHERS(NON CASH)
10 Sep 2014	25942	OTHERS(NON CASH)

नियंत्रक का नाम /Name of the Controller: Ambigaapathy A

नियंत्रक स्थान /Controller Location: Chennai

टिप्पणी: परीक्षण रिपोर्ट का उत्तर दाखिल करने की अंतिम तिथि / Note: Last date for filing response to the Examination Report:
20/05/2018

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परीक्षण रिपोर्ट /Examination Report

आवेदन संख्या /Application Number	8560/CHENP/2012
दाखिल करने की तिथि /Date of Filing	05/10/2012
पूर्विका दिनांक /Date of Priority	08/04/2010
पीसीटी अंतर्राष्ट्रीय आवेदन की तिथि /Date of PCT International Application	08/04/2011
आवेदक /Applicant	TRUMPF LASER- UND SYSTEMTECHNIK GMBH
परीक्षण हेतु अनुरोध की संख्या व दिनांक /Request for Examination No. & Date	4021/RQ-CHE/2013 12/04/2013
प्रकाशन की तिथि /Date of Publication	14/02/2014

इस परीक्षण रिपोर्ट के चार भाग हैं, अर्थात् रिपोर्ट का सारांश, विस्तृत तकनीकी रिपोर्ट, औपचारिक आवश्यकताएँ तथा रिकॉर्ड में दस्तावेज़ /
This examination report consists of four parts, namely summary of the report, detailed technical report, formal requirements and documents on record.

भाग -1: रिपोर्ट का सारांश

PART-I: SUMMARY OF THE REPORT

क्र. सं. /Sl. No.	अधिनियम के तहत आवश्यकताओं पर विस्तृत टिप्पणियाँ /Requirements under the Act	दावों की संख्या /Claim Numbers	टिप्पणी /Remarks
1.	धारा 2(1)(ब) के तहत आविष्कार /Invention u/s 2(1)(i)	नवीनता /Novelty	दावे /Claims: 1 - 15
			हाँ /Yes
		दावे /Claims:	नहीं /No
		आविष्कारी कदम / Inventive step	दावे /Claims:
			हाँ /Yes
		दावे /Claims: 1 - 15	नहीं /No
	औद्योगिक उपयोगिता /Industrial Applicability	दावे /Claims: 1 - 15	हाँ /Yes
		दावे /Claims:	नहीं /No

भाग -II विस्तृत तकनीकी रिपोर्ट

PART-II: DETAILED TECHNICAL REPORT

क. उद्धृत दस्तावेजों की सूची /A.List of documents cited:

(क) पेटेंट साहित्य / (a). Patent Literature :

क्र. सं. / Sl.no	दस्तावेजों का विवरण /Details of documents	प्रकाशन तिथि (दिन/माह/वर्ष) / Publication date	उद्धृत दस्तावेज का प्रासंगिक विवरण (पृष्ठ व अनुच्छेद संख्या) / Relevant description (page and paragraph no.) of cited document	उद्धृत दस्तावेज के प्रासंगिक दावे / Relevant claims of cited document	अभिकथित आविष्कार के दावे /Claims of alleged invention
1	D1: WO2009155536A2	23/12/2009	[0005], [0010], [0013]	1, 10, 16	1 - 15
2	US2002168139A1	14/11/2002	abstract, [0001], [0002]	1, 18	1 - 15
			abstract, col 3 line 27		



**INTELLECTUAL
PROPERTY INDIA**

एकस्व/PATENTS|अभिकल्प/DESIGNS|

व्यापार चिह्न/TRADE MARKS|भौगोलिक

उपदर्शन/GEOGRAPHICAL INDICATIONS



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

एकस्व कार्यालय / THE PATENT OFFICE

बौद्धिक सम्पदा भवन / I.P.O. BUILDING

जी.एस.टी. रोड, गिन्डी / G.S.T. Road, Guindy,

चेन्नई/ Chennai- 600032

दूरभाष / Tel. No. : (091)(044)22502081-84

फैक्स / Fax: 044 22502066

Email/ई मेल : Chennai-patent@nic.in

वेबसाइट /Website: <http://ipindia.nic.in>

सं.संख्या/Ref.No /आवेदन संख्या/Application No/ 8560/CHENP/2012

दिनांक/Date of Dispatch/Email: 20/11/2017

सेवा मे,/To

C/O LAKSHMI KUMARAN & SRIDHARAN 2 Wallace garden 2nd Street Chennai - 600 006 India Email :
lsmds@lakshmisri.com

विषय: एकस्व अधिनियम, 1970 की धारा 12 व 13 तथा एकस्व नियम, 2003 के अधीन परीक्षण रिपोर्ट

Subject: Examination report under sections 12 & 13 of the Patents Act, 1970 and the Patents Rules, 2003.

1. उपर्युक्त आवेदन के संदर्भ में परीक्षण रिपोर्ट (अर्थात्, एकस्व नियम, 2003 (यथा संशोधित) के नियम 24-ख(3) में विनिर्दिष्ट आपत्तियों का प्रथम कथन) इसके साथ संलग्न है। यह रिपोर्ट परीक्षण हेतु अनुसूच दिनांक 12/04/2013 के उत्तर में जारी की गयी है। परीक्षण रिपोर्ट का उत्तर दाखिल करने की अंतिम तिथि (अर्थात्, इस रिपोर्ट में लगाई गयी सभी आवश्यकताओं के अनुपालन की अवधि) आवेदक को आपत्तियों का प्रथम कथन जारी होने की तिथि से छः माह है।

Please find enclosed herewith an Examination Report (i.e. a first statement of objections as specified in Rule 24-B(3) of The Patents Rules, 2003 (as amended)) in respect of above-mentioned application. This report is issued with reference to a request for examination dated 12/04/2013. The last date for filing a response to the Examination Report (i.e. a period to comply with all the requirements raised in this examination report) is six months from the date on which the first statement of objections is issued to the Applicant.

2. यदि रिपोर्ट के अंतर्गत लगाई गयी आवश्यकताओं का अनुपालन एकस्व नियम, 2003 (यथा संशोधित) के नियम 24 ख(5) में विनिर्दिष्ट अवधि के भीतर अंदर अनुपालन नहीं किया गया तो एकस्व अधिनियम 1970 की धारा 21(1) के अधीन वर्तमान आवेदन को परित्यक्त माना जाएगा।
The instant application shall be deemed to have been abandoned under Section 21(1) of The Patents Act, 1970, unless all the requirements raised in this report are complied with in the period as specified in Rule 24-B (5) of The Patents Rules, 2003 (as amended).

3. आपका ध्यान एकस्व नियम, 2003 के नियम 24 ख(6) के प्रावधानों की ओर भी आमंत्रित किया जाता है।
Your attention is also invited to the provisions of Rule 24-B (6) of the Patents Rules 2003.

4. आपको सलाह दी जाती है कि शीघ्र निपटान हेतु अपना उत्तर शीघ्र प्रस्तुत करें।
You are advised to file the reply at the earliest for early disposal.

Ambigaapathy A
नियंत्रक पेटेंट/ Controller of Patents

संलग्न/Enclosed: अपरोक्त अनुसार/As above

टिप्पणी: यह इलेक्ट्रॉनिक रूप से उत्पन्न रिपोर्ट है।

NOTE: This is an electronically generated report.

सभी पत्राचार नियंत्रक एकस्व को उपरोक्तलिखित पते पर भेजा जाये।

All communications should be sent to the Controller of Patents at the above mentioned address.

Electronic Patent Application Fee Transmittal				
Application Number:		15279781		
Filing Date:		29-Sep-2016		
Title of Invention:		Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		
First Named Inventor/Applicant Name:		Rudolph Huber		
Filer:		Yunbo Guo/Cheryl Forrest		
Attorney Docket Number:		15540-0370003		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	7	100	700
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	460	460
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1400	1400
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
STATUTORY OR TERMINAL DISCLAIMER	1814	2	160	320
Total in USD (\$)				3120

Electronic Acknowledgement Receipt	
EFS ID:	32648177
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Cheryl Forrest
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	17-MAY-2018
Filing Date:	29-SEP-2016
Time Stamp:	10:07:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$3120
RAM confirmation Number	051718INTEFSW00010552061050
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Reply.pdf	95709	yes	10
			9da740e58d9970d06ae83f33eb373b6c2c6db725		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Specification		2	2	
	Claims		3	7	
	Applicant Arguments/Remarks Made in an Amendment		8	10	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	TermDisc1.pdf	60568	no	1
			e2d8851390f2aa5372533148b89ef1b05279bbac		
Warnings:					
Information:					
3	Terminal Disclaimer Filed	TermDisc2.pdf	60572	no	1
			91d41729e39a3e831d881e36b8c9054c547d10bf		
Warnings:					
Information:					
4		IDS.pdf	149049	yes	3
			362a8f068ac4d28876199162dcd11d1268d6ec5b		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	

	Transmittal Letter		1	2
	Information Disclosure Statement (IDS) Form (SB08)		3	3
Warnings:				
Information:				
5	Foreign Reference	FA.pdf	795359 e878374632b084553be5677db58f82dc6e2e9dd0	no 23
Warnings:				
Information:				
6	Other Reference-Patent/App/Search documents	OTHER.pdf	463373 66eb48ea76f144239251734e268926afa6a2752f	no 6
Warnings:				
Information:				
7	Fee Worksheet (SB06)	fee-info.pdf	37260 31beee6d7aa24b79d2224596da676b4e0e861747	no 2
Warnings:				
Information:				
Total Files Size (in bytes):			1661890	
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.				

TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 15540-0370003
In re Application of: TRUMPF Laser- und Systemtechnik GmbH Application No.: 15/279,781 Filed: September 29, 2016 For: Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber The applicant, TRUMPF Laser- und Systemtechnik GmbH, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent No. 9,482,821 as the term of said prior patent is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. Check either box 1 or 2 below, if appropriate. 1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee. I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both. 2. ☒ The undersigned is an attorney or agent of record. Reg. No. 70,538 <u>/Yunbo Guo/</u> Signature <u>05/17/2018</u> Date <u>Yunbo Guo</u> Typed or printed name <u>Attorney of Record</u> Title <u>(512) 472-5070</u> Telephone Number ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.	

This collection of information is required by 37 CFR 1.321. 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.

Application Number 	Application/Control No. 15/279,781	Applicant(s)/Patent under Reexamination HUBER ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 17 May, 2018	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
<u>PAMELA YOUNG</u> Technology Center: <u>PLRC</u> Telephone: _____ 2 TD

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/279,781	09/29/2016	Rudolph Huber	15540-0370003	2586
26161 7590 11/17/2017 FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ULLAH, AKM E	
			ART UNIT 2874	PAPER NUMBER
			NOTIFICATION DATE 11/17/2017	DELIVERY MODE ELECTRONIC

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

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

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

PATDOCTC@fr.com

Office Action Summary	Application No. 15/279,781	Applicant(s) HUBER ET AL.	
	Examiner Akm Enayet Ullah	Art Unit 2874	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☐ Responsive to communication(s) filed on _____.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____.; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-12 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1-12 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

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

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 9/29/2016 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

- a) ☒ All b) ☐ Some** c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

- | | |
|---|---|
| 1) ☒ Notice of References Cited (PTO-892) | 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date <u>9/29/2016</u> . | 4) ☐ Other: _____ |

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

Detailed Action

Applicant cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Status of the Application

Parent Data:

This instant US application 15/279, 781, filed 09/29/2016 is a continuation of 14/300,138, filed 06/09/2014 ,now U.S. Patent #9482821 which is a continuation of 13639401, filed 12/20/2012 ,now U.S. Patent # 8781269 13/639,401 is a national stage entry of PCT/EP2011/055484 , International Filing Date: 04/08/2011 which also claims foreign priority to 102010003750.8 , filed 04/08/2010.

Claims 1- 12 are pending in this application.

If applicant is aware of any prior art or any other co- pending application not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

If applicant provides prior art, he/she is requested to cite it on form PTO- 1449 in accordance with the guideline set forth in MPEP 609.

The Title Of The Invention is Not Descriptive

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Foreign Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Notice re prior art available under both Pre-AIA and AIA

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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 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); *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 nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1 - 4 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1, 6, 7, and 11 of U.S. Patent No. 9, 482,821. Although the claims at issue are not identical, they are not patentably distinct from each other because the invention in the US Patent no. 9,482,821 is broadly encompasses the instant invention.

Claims 5, 9 , 14 are also rejected on the ground of nonstatutory double patenting as being unpatentable over claim 5, 7,12 and 14 of U.S. Patent No. 8,781,269. Although the claims at issue are not identical, they are not patentably distinct from each other because the invention in the patent no. 9,482,821 is broadly encompasses the instant invention.

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 42 00 587 (Kobayashi, Noboru et al, cited by applicant) in view of Hesse et al (USPub.no. 2015/02174202).

DE 42 00 587 (Kobayashi, Noboru et al.) disclose an arrangement and a method for changing the beam profile of a laser beam (figure 3), where the laser beam (3) is coupled in the one fiber end (figure 5, right side) of a multi-clad fiber, more particularly of a double-clad fiber (figure 7), and is coupled out of the fiber end (figure 5, left side) of the multimode –clad fiber, and wherein for changing the beam profile of the coupled out laser beam, the laser beam is optically coupled wither at least in the interior fiber core (figure 7, core D) of the multi-clad fiber or at least one outer ring core (figure 7, core E) of the multi-clad fiber.

Hesse et al. in paragraph 0024 disclose ,the device 7 comprises in this instance, for example, the three different beam forming elements 7a-7c which may be diffractive and/or refractive optical elements. The device 7 may in principle also be formed by a single beam forming element 7a, 7b or 7c. The unprocessed laser beam 5 which is supplied using an optical fiber 9 is decoupled using a collimator 10 as a collimated beam, subsequently passes through the beam forming element 7a-7c which is located in the beam path and which changes the laser beam in each case in terms of the laser characteristic thereof, for example, in terms of the laser beam intensity thereof, and is decoupled using a focusing lens from the processing head 6 as a processing laser beam 3a, 3b. The three beam forming elements 7a-7c may, as in this case, be provided on a rotary disc 11 which is rotated in accordance with the workpiece thickness D1, D2 to be processed manually using an operator or using **the control unit 8** until the beam forming element 7a-7c desired in each case is located in the beam path. **The control unit 8 is advantageously part of the NC machine control unit** of the laser cutting machine 1 in order to form in accordance with the programmed workpiece thickness of an NC program running on the NC machine control unit 8 either one or the other processing laser beam 3a, 3b. Alternatively, however, **the control unit 8** may also detect the workpiece thickness using sensors which are not illustrated and control the rotary disc 11 accordingly.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the control unit of Hesse et al in DE 42 00 587 (Kobayashi,

Noboru et al, cited by applicant) since in **paragraph 0028** states that the dual-clad fiber shown, multi-clad fibers which have an inner core fiber and a plurality of outer cladding fibers may also be provided so that, **by selective coupling into these fibers, many different laser beam characteristics may be produced. It is also possible that the inner core fiber and the outer cladding fiber, in a manner different from the round cross-section, may also have other cross-section shapes and/or cross-sectional surface-areas. For example, oval and/or rectangular cross-section shapes are conceivable.**

EXAMINERS NOTE: A reference to specific paragraphs, columns, pages, or figures in a cited prior art reference is not limited to preferred embodiments or any specific examples. It is well settled that a prior art reference, in its entirety, must be considered for all that it expressly teaches and fairly suggests to one having ordinary skill in the art. Stated differently, a prior art disclosure reading on a limitation of Applicant's claim cannot be ignored on the ground that other embodiments disclosed were instead cited. Therefore, the Examiner's citation to a specific portion of a single prior art reference is not intended to exclusively dictate, but rather, to demonstrate an exemplary disclosure commensurate with the specific limitations being addressed. In re Heck, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting In re Lemelson, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). In re: Upsher-Smith Labs. v.

Art Unit: 2874

Pamlab, LLC, 412 F.3d 1319, 1323, 75 USPQ2d 1213, 1215 (Fed. Cir. 2005); In re Fritch, 972 F.2d 1260, 1264, 23 USPQ2d 1780, 1782 (Fed. Cir. 1992); Merck & Co. v. Biocraft Labs., Inc., 874 F.2d 804,807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989); In re Fracalossi, 681 F.2d 792,794 n.1,215 USPQ 569, 570 n.1 (CCPA 1982); In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278,280 (CCPA 1976); In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Citation Prior Art

Prior art made of record and not relied upon is considered pertinent to applicants disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does.

These references are:

USPNO. 5,475,704

US Pub. No.2011/0,305,249 and 2015/ 0,378,184

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akm Enayet Ullah whose telephone number is 571-272-2361. The examiner can normally be reached on Monday through Thursday from 6:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen-Chau Le, can be reached on 571-272-2397. 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).

/Akm Enayet Ullah/
Primary Examiner
Art Unit 2874

Notice of References Cited	Application/Control No. 15/279,781	Applicant(s)/Patent Under Reexamination HUBER ET AL.	
	Examiner Akm Enayet Ullah	Art Unit 2874	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2015/0378184 A1	12-2015	Tayebati; Parviz	G02F1/295	250/492.1
*	B	US-2011/0305249 A1	12-2011	Gapontsev; Valentin	B23K26/043	372/6
*	C	US-5,475,704 A	12-1995	Lomashevich; Svyatoslav A.	G02B6/12004	372/21
*	D	US-2015/0217402 A1	08-2015	Hesse; Tim	B23K26/0648	219/121.72
*	E	US-8,781,269 B2	07-2014	Huber; Rudolf	B23K26/073	385/147
*	F	US-9,482,821 B2	11-2016	Huber; Rudolf	B23K26/073	1/1
	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	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

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

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(laser adj3 beam with defferent adj5 beam)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/11/08 10:16
L2	12585	(laser adj3 beam with different adj5 beam)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/11/08 10:16
L3	4240	(switch\$6 near5 coupl\$6 near5 adjust\$6)	US-PGPUB; USPAT	OR	ON	2017/11/08 10:18
L4	5	2 and 3	US-PGPUB; USPAT	OR	ON	2017/11/08 10:19
L5	105927	G02B6/\$.cpc.	US-PGPUB; USPAT	OR	ON	2017/11/08 10:37
L6	366	2 and 5	US-PGPUB; USPAT	OR	ON	2017/11/08 10:37
L7	62	3 and 5	US-PGPUB; USPAT	OR	ON	2017/11/08 10:37
L8	2	6 and 7	US-PGPUB; USPAT	OR	ON	2017/11/08 10:37
L9	0	3 and (control adj5 device with traverse)	US-PGPUB; USPAT	OR	ON	2017/11/08 11:02
L10	25	3 and (control with traverse)	US-PGPUB; USPAT	OR	ON	2017/11/08 11:02
L11	0	3 and (control with switch\$4 with traverse)	US-PGPUB; USPAT	OR	ON	2017/11/08 11:02
L12	45	("20170031105" "9482821" "8781269" "20150293306" "20130223792" "20170293084" "5677778" "9459101" "7259907" "5974019" "9620925" "20060233511" "20060140570" "20110142082" "20140044143" "8254417" "7372877" "7599406" "20050238065" "20110305249" "20130329756" "9557489" "4732450" "7245381" "20090086787" "7430225" "6882429" "20160070071" "20040114935" "20170090119" "6246657" "20070189339" "20060132788" "7751055" "7050677" "9172202" "7106928" "5394242" "6654517" "20150372444" "6868236" "20080137091" "6683892" "9031098"	US-PGPUB; USPAT	OR	ON	2017/11/08 11:10

EAST Search History

		"9356420").pn.				
L13	6	3 and 12	US-PGPUB; USPAT	OR	ON	2017/11/08: 11:10
L14	13	2 and 12	US-PGPUB; USPAT	OR	ON	2017/11/08: 11:14

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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L16	4484	(switch\$4 with coupl\$4 with laser)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/11/08 18:04
L17	1	(switch\$4 adj5 position with different with coupl\$4 with ring adj1 core)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/11/08 18:05
L18	1	(switch\$4 adj5 position with different with coupl\$4)same (ring adj1 core)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/11/08 18:10
L19	3054863	(switch\$4 with coupl\$4 with adjust\$4) or (spl\$4) or (divid\$6)	US-PGPUB; USPAT	OR	OFF	2017/11/08 18:12
L20	1710	16 and 19	US-PGPUB; USPAT	OR	OFF	2017/11/08 18:12
L21	4	20 and (inner adj1 fiber adj core) and (outer adj1 ring adj2 core)	US-PGPUB; USPAT	OR	OFF	2017/11/08 18:14
L22	19	20 and (multi adj5 clad adj5 fiber)	US-PGPUB; USPAT	OR	OFF	2017/11/08 18:18

11/ 8/ 2017 6:35:02 PM**C:\ Users\ aullah\ Documents\ e-Red Folder\ 148999000\ 14899000.wsp**

EAST Search History**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	0	1 and (motor with control adj2 device)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:27
L3	11447	switch\$4 same (motor with control adj2 device)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:27
L4	5036	switch\$4 same (motor near10 control adj2 device)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:28
L5	5	4 and (laser adj2 beam with different adj5 profile)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:28
L6	89	4 and (laser adj2 beam)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:29
L7	5	6 and (outer adj2 ring adj3 core)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:30
L8	0	(lasr adj2 beam with different adj2 beam adj5 profile) and (outer adj2 ring adj3 core)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:34
L9	5	(laser adj2 beam with different adj2 beam adj5 profile) and (outer adj2 ring adj3 core)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:34
L10	5	(laser adj2 beam with coupl\$4 with fiber with multi adj2 clad)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:38
L11	4	10 and switch\$4	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:41
L12	2	(laser adj2 beam with different adj2 beam) and (outer adj2 ring adj3 core) and (adjust adj3 coupl\$4)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:43
L13	3	(laser adj2 beam with different adj2 beam) and (adjust adj3 coupl\$4)	US-PGPUB; USPAT	OR	OFF	2017/11/09 14:43

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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	45	("20170031105" "9482821" "8781269" "20150293306" "20130223792" "20170293084" "5677778" "9459101" "7259907" "5974019" "9620925" "20060233511" "20060140570" "20110142082" "20140044143" "8254417" "7372877" "7599406" "20050238065" "20110305249" "20130329756" "9557489" "4732450" "7245381" "20090086787" "7430225" "6882429" "20160070071" "20040114935" "20170090119" "6246657" "20070189339" "20060132788" "7751055" "7050677" "9172202" "7106928" "5394242" "6654517" "20150372444" "6868236" "20080137091" "6683892" "9031098" "9356420").pn.	US- PGPUB; USPAT	OR	ON	2017/11/08 11:10
L13	6	3 and 12	US- PGPUB; USPAT	OR	ON	2017/11/08 11:10
L14	13	2 and 12	US- PGPUB; USPAT	OR	ON	2017/11/08 11:14

11/ 8/ 2017 11:16:36 AM**C:\ Users\ aullah\ Documents\ e-Red Folder\ 148999000\ 14899000.wsp**

Receipt date: 09/29/2016

15/279,781 - GAU: 2874

Doc code: IDS

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. 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	
	Filing Date	2016-09-29
	First Named Inventor	Rudolph Huber
	Art Unit	
	Examiner Name	
	Attorney Docket Number	15540-0370003

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	3941670	A	1976-03-02	Pratt	
	2	3975082	A	1976-08-17	Winzer	
	3	4475788	A	1984-10-09	Tomassini et al	
	4	4575181	A	1986-03-11	Ishikawa	
	5	5461692	A	1995-10-24	Nagel	
	6	5684642	A	1997-11-04	Zumoto et al	
	7	7372877	A	2008-05-13	Shirakawa et al	
	8	7379237	A	2008-05-27	Di Teodoro et al	

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

Application Number		
Filing Date		2016-09-29
First Named Inventor	Rudolph Huber	
Art Unit		
Examiner Name		
Attorney Docket Number	15540-0370003	

9	7379648	A	2008-05-27	Brooks et al	
10	7592568	A	2009-09-22	Varnham et al	
11	7720340	A	2010-05-18	Lewis et al	
12	7738166	A	2010-06-15	Murison et al	
13	7809225	A	2010-10-05	Bouma et al	
14	7839902	A	2010-11-23	Li et al	
15	7933479	A	2011-04-26	Gonthier et al	
16	8008600	A	2011-08-30	Nakamae et al	
17	8076632	A	2011-12-13	Kreysing et al	
18	8094370	A	2012-01-10	Lewis	
19	8326099	A	2012-12-04	Singer et al	

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

Application Number		
Filing Date		2016-09-29
First Named Inventor	Rudolph Huber	
Art Unit		
Examiner Name		
Attorney Docket Number		15540-0370003

	20	8456523	A	2013-06-04	Stork Gennant Wersborg	
	21	8781269	A	2014-07-15	Huber et al	

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	1	20020071647	A	2002-06-13	Manzur	
	2	20020168139	A	2002-11-14	Clarkson et al	
	3	20020172485	A	2002-11-21	Keaton et al	
	4	20050031261	A	2005-02-10	Tanaka	
	5	20060251367	A	2006-11-09	Seifert et al	
	6	20060263024	A	2006-11-23	Dong et al	
	7	20130064706	A	2013-03-14	Schwarze et al	

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Filing Date		2016-09-29
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Attorney Docket Number	15540-0370003	

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	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	1580865	CN	A	2005-02-16			
	2	3833992	DE	A1	1990-04-12			
	3	3833993	DE	A1	1990-04-12			
	4	4200587	DE	C1	1993-04-01			
	5	0362466	EP	A2	1990-09-26			
	6	2284892	FR	A1	1976-04-09			
	7	2449689	GB	A	2008-12-03			
	8	100750511	KR	B1	2007-08-13			
	9	WO2010009101	WO	A2	2010-01-21			
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2016-09-29
	First Named Inventor	Rudolph Huber	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		15540-0370003

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	Extended European Search Report dated July 1, 2013	
	2	International Search Report dated May 6, 2011	
	3	German Office Action dated November 22, 2010	

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EXAMINER SIGNATURE

Examiner Signature	/ARM E ULLAH/	Date Considered	11/07/2017
--------------------	---------------	-----------------	------------

*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		
Filing Date		2016-09-29
First Named Inventor	Rudolph Huber	
Art Unit		
Examiner Name		
Attorney Docket Number		15540-0370003

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.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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	/Yunbo Guo/	Date (YYYY-MM-DD)	2016-09-29
Name/Print	Yunbo Guo	Registration Number	70538

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

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Search Notes 	Application/Control No. 15279781	Applicant(s)/Patent Under Reexamination HUBER ET AL.
	Examiner AKM ULLAH	Art Unit 2874

CPC- SEARCHED		
Symbol	Date	Examiner
B23K 26/073 ; B23K 2203/06 ; G02B 6/03644 ; G02B 6/262 ; G02B 6/4206 ; B23K 26/067 ; G02B 6/02042 ; G02B 6/35 ; G02B 6/3508 ; B23K 26/064	11/7/2017	AU

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
EAST, ASSIGNEE and INVENTOR	11/7/2017	AU
G02B6/\$.CPC and B23K26/\$.CPC and combined with Text search	11/7/2017	AU
INOVATION Q IP. COM	11/8/2017	AU

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 15279781	Applicant(s)/Patent Under Reexamination HUBER ET AL.
	Examiner AKM ULLAH	Art Unit 2874

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant			☐ CPA			☐ T.D.			☐ R.1.47		
CLAIM		DATE									
Final	Original	11/07/2017									
	1	✓									
	2	✓									
	3	✓									
	4	✓									
	5	✓									
	6	✓									
	7	✓									
	8	✓									
	9	✓									
	10	✓									
	11	✓									
	12	✓									



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BIB DATA SHEET

CONFIRMATION NO. 2586

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
15/279,781	09/29/2016	385	2874	15540-0370003		
APPLICANTS TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY; INVENTORS Rudolph Huber, Aldingen-Aixheim, GERMANY; Wolfgang Andreasch, Weinstadt, GERMANY; Martin Huonker, Schramberg, GERMANY; ** CONTINUING DATA ***** This application is a CON of 14/300,138 06/09/2014 PAT 9482821 which is a CON of 13/639,401 12/20/2012 PAT 8781269 which is a 371 of PCT/EP2011/055484 04/08/2011 ** FOREIGN APPLICATIONS ***** GERMANY 102010003750.8 04/08/2010 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 10/11/2016						
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and /AKM E ULLAH/ Acknowledged Examiner's Signature		☐ Met after Allowance AU Initials	STATE OR COUNTRY GERMANY	SHEETS DRAWINGS 5	TOTAL CLAIMS 12	INDEPENDENT CLAIMS 3
ADDRESS FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022 UNITED STATES						
TITLE Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber						
FILING FEE RECEIVED 1740	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		

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15279781	CTNF	11/17/2017	15540-0370003
	892	11/17/2017	15540-0370003
	1449	11/17/2017	15540-0370003

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15279781	NTC.PUB	02/02/2017	15540-0370003

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/279,781	09/29/2016	Rudolph Huber	15540-0370003

CONFIRMATION NO. 2586

26161

FISH & RICHARDSON P.C. (BO)
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MINNEAPOLIS, MN 55440-1022

PUBLICATION NOTICE



OC000000088929637

Title:Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber

Publication No.US-2017-0031105-A1

Publication Date:02/02/2017

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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/279,781	09/29/2016	Rudolph Huber	15540-0370003

CONFIRMATION NO. 2586

POA ACCEPTANCE LETTER

26161
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MINNEAPOLIS, MN 55440-1022



Date Mailed: 01/03/2017

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

Application Number	15/279,781		
Filing Date	September 29, 2016		
First Named Inventor	Rudolph Huber		
Title	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER		
Art Unit			
Examiner Name			
Attorney Docket Number	15540-0370003		
SIGNATURE of Applicant or Patent Practitioner			
Signature	/Yunbo Guo/	Date (Optional)	
Name	Yunbo Guo	Registration Number	70,538
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			
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18.01.27
12.12.20

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I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

TRUMPF Laser- und Systemtechnik GmbH

- ☐ Inventor or Joint Inventor (title not required below)
- ☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- ☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
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SIGNATURE of Applicant for Patent

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Signature	Date (Optional)
<i>Annegetz Schmid</i>	07.11.2016
Name	
Title	
<i>Gruppenleitung Patente</i>	
<i>i.V. A. Schmid</i>	
TRUMPF Laser- und Systemtechnik GmbH	

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 form is submitted.

Name	Registration Number
J. Peter Fasse	32,983
John F. Hayden	37,640
James W. Babineau	42,276
Michael R. Hamlin	54,149
Chris C. Bowley	55,016
Joseph Valentino	62,396
Yunbo Guo	70,538
Erin L. Baker	70,596

Electronic Acknowledgement Receipt	
EFS ID:	27890001
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Matthew Doherty
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	23-DEC-2016
Filing Date:	29-SEP-2016
Time Stamp:	09:45:54
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	Oath or Declaration filed	Dec0370003.pdf	778881	no	3
			d029e12c29c1695915a23d8c539e76c2f87a1294		
Warnings:					

Information:					
2	Power of Attorney	POA0370003.pdf	219988	no	3
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Information:					
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6.01.22
7/5/2022

ERKLÄRUNG (37 CFR 1.63) FÜR UTILITY- ODER DESIGNANMELDUNG MITTELS EINES ANMELDEFORMULARS
DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET
(37 CFR 1.76)

Bezeichnung der Erfindung Title of Invention	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER
Als unten benannter Erfindern erkläre ich hiermit: As the below named inventor, I hereby declare that:	
Diese Erklärung bezieht sich auf: This declaration is directed to:	
☐ Die beigefügte Anmeldung, oder The attached application, or	
☒ United States Anmeldung oder PCT internationale Anmeldung mit der Anmeldenummer <u>15/279.781</u> eingereicht am <u>September 29, 2016</u> . United States application or PCT international application number <u>15/279.781</u> filed on <u>September 29, 2016</u> .	
Die oben genannte Anmeldung wurde von mir getätigt oder autorisiert. The above-identified application was made or authorized to be made by me.	
Ich glaube, dass ich der ursprüngliche Erfinder oder ein ursprünglicher Miterfinder einer beanspruchten Erfindung in der Anmeldung bin. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.	
Ich nehme hiermit zur Kenntnis, dass jede vorsätzliche falsche Aussage in dieser Erklärung gemäß 18 USC 1001 mit Geldstrafe oder mit Freiheitsstrafe von bis zu fünf (5) Jahren, oder mit beidem ahndbar ist. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.	
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RECHTSGÜLTIGER NAME DES ERFINDERS LEGAL NAME OF INVENTOR	
Erfinder: <u>Wolfgang Andreasch</u>	Datum (freiwillig): <u>09.11.2016</u>
Inventor: _____	Date (Optional): _____
Unterschrift: _____	
Signature: _____	
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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 1 minute 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.

18.01127
72551044

ERKLÄRUNG (37 CFR 1.63) FÜR UTILITY- ODER DESIGNANMELDUNG MITTELS EINES ANMELDEFORMULARS
DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET
(37 CFR 1.76)

Bezeichnung der Erfindung Title of Invention	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER
Als unten benannter Erfindern erkläre ich hiermit: As the below named inventor, I hereby declare that:	
Diese Erklärung bezieht sich auf: This declaration is directed to:	
☐ Die beigefügte Anmeldung, oder The attached application, or	
☒ United States Anmeldung oder PCT internationale Anmeldung mit der Anmeldenummer <u>15/279.781</u> eingereicht am <u>September 29, 2016</u> . United States application or PCT International application number <u>15/279.781</u> filed on <u>September 29, 2016</u> .	
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RECHTSGÜLTIGER NAME DES ERFINDERS LEGAL NAME OF INVENTOR	
Erfinder: <u>Rudolph Huber</u> Datum (freiwillig): <u>17.11.2016</u>	
Inventor: _____ Date (Optional): _____	
Unterschrift: <u>[Signature]</u>	
Signature: _____	
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Attorney Docket No. 15540-0370003
/ Client Ref. SP10120US(PCT)CON2; 18.01127; DS10502

18.01127
TLC 520hr

ERKLÄRUNG (37 CFR 1.63) FÜR UTILITY- ODER DESIGNANMELDUNG MITTELS EINES ANMELDEFORMULARS
DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET
(37 CFR 1.76)

Bezeichnung der Erfindung **TITLE OF INVENTION** **METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER**

Als unten benannter Erfindern erkläre ich hiermit:
As the below named inventor, I hereby declare that:

Diese Erklärung
bezieht sich auf:
This declaration
is directed to:

☐ Die beigefügte Anmeldung, oder
The attached application, or

☐ United States Anmeldung oder PCT internationale Anmeldung mit der Anmeldenummer 15/279.781
eingereicht am September 29, 2016.
United States application or PCT international application number 15/279.781
filed on September 29, 2016.

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WARNING:

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RECHTSGÜLTIGER NAME DES ERFINDERS
LEGAL NAME OF INVENTOR

Erfinder: Martin Huonker Datum (freiwillig): _____
Inventor: _____ Date (Optional): _____
Unterschrift: [Signature]
Signature: _____

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Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/279,781	09/29/2016	2874	1740	15540-0370003	12	3

CONFIRMATION NO. 2586

CORRECTED FILING RECEIPT

26161

FISH & RICHARDSON P.C. (BO)

P.O. BOX 1022

MINNEAPOLIS, MN 55440-1022



0000000088891417

Date Mailed: 10/25/2016

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Inventor(s)

Rudolph Huber, Aldingen-Aixheim, GERMANY;
Wolfgang Andreasch, Weinstadt, GERMANY;
Martin Huonker, Schramberg, GERMANY;

Applicant(s)

TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/300,138 06/09/2014 PAT 9482821
which is a CON of 13/639,401 12/20/2012 PAT 8781269
which is a 371 of PCT/EP2011/055484 04/08/2011

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)
GERMANY 102010003750.8 04/08/2010

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page 1 of 3

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/279,781**

Projected Publication Date: 02/02/2017

Non-Publication Request: No

Early Publication Request: No
Title

Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile
Characteristic by Means of a Multi-Clad Fiber

Preliminary Class

385

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Oct 25, 2016 05:27:18 AM

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P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
15279781	APP.FILE.REC	10/25/2016	15540-0370003

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor :	Rudolph Huber	Art Unit :	Unknown
Serial No. :	15/279,781	Examiner :	Unknown
Filed :	September 29, 2016	Conf. No. :	2586
Title :	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER		

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

REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT

Please correct the Filing Receipt for the above-referenced application to include the correct filing date of priority document PCT/EP2011/055484 filed April 8, 2011.

Please supply a corrected Filing Receipt to the undersigned with respect to this application. A copy of the original Filing Receipt showing the desired changes is attached for your convenience.

No fee is believed to be due. If, however, there are any necessary charges or credits, please apply them to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

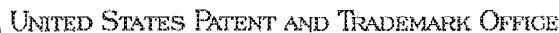
Date: 10/13/2016

/Yunbo Guo/

Yunbo Guo
Reg. No. 70,538

Customer Number 26161
Fish & Richardson P.C.
Telephone: (512) 226-8108
Facsimile: (877) 769-7945

23576801.doc



APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY DOCKET NO	TOT CLAIMS	IND CLAIMS
5/279.78	09/29/2016		740	5540-0370003	12	3

26161
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

FILING RECEIPT



Date Mailed: 10/13/2016

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Inventor(s)

Rudolph Huber, Aldingen-Aixheim, GERMANY;
Wolfgang Andreasch, Weinstadt, GERMANY;
Martin Huonker, Schramberg, GERMANY;

Applicant(s)

TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/300,138 06/09/2014 PAT 9482821

which is a CON of 13/639,401 12/20/2012 PAT 8781269

which is a 371 of PCT/EP2011/055484-04/08/2011

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)
GERMANY 102010003750.8 04/08/2010

Permission to Access Application via Priority Document Exchange: Yes

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If Required, Foreign Filing License Granted: 10/11/2016

page 1 of 3

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/279,781**

Projected Publication Date: 01/19/2017

Non-Publication Request: No

Early Publication Request: No
Title

Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile
Characteristic by Means of a Multi-Clad Fiber

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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NOT GRANTED

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	<u>15/279,781</u>
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.			

Secrecy Order 37 CFR 5.2

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78. When referring to the current application, please leave the "Application Number" field blank.			
Prior Application Status			
Application Number	Continuity Type	Prior Application Number	Filing Date (MM/DD/YYYY)
	Continuation of	14300138	06/09/2014

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78. When referring to the current application, please leave the "Application Number" field blank.			
Prior Application Status			
Application Number	Continuity Type	Prior Application Number	Filing Date (MM/DD/YYYY)
14300138	Continuation of	13639401	12/20/2012

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78. When referring to the current application, please leave the "Application Number" field blank.			
Prior Application Status			
Application Number	Continuity Type	Prior Application Number	Filing Date (MM/DD/YYYY)
13639401	A 371 of International	PCT/EP2011/055484	~~04/08/2010~~ 04/08/2011

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	15540-0370003
	Application Number	<u>15/279,781</u>
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber	

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country	Filing Date (MM/DD/YYYY)	Access Code (if applicable)
102010003750.8	DE	04/08/2010	

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Yunbo Guo/			Date (MM/DD/YYYY)	10/13/2016
First Name	Yunbo	Last Name	Guo	Registration Number	70,538

23576773.doc

Electronic Acknowledgement Receipt	
EFS ID:	27230919
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Matthew Doherty
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	17-OCT-2016
Filing Date:	29-SEP-2016
Time Stamp:	13:08:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	Request0370002.pdf	338218	no	4
			71dc744feb2b631e69a6ebeb64e586d90d164f72		

Warnings:

Information:					
2	Application Data Sheet	SuppADS0370003.pdf	75241	no	2
			7db191a6aa72685bbca6680372d959ad8c873160		
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
Total Files Size (in bytes):			413459		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/279,781				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		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	280			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720			
TOTAL CLAIMS (37 CFR 1.16(i))	12	minus 20 = *			OR	x 80 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *			OR	x 420 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1600			
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
TOTAL ADD'L FEE								OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
TOTAL ADD'L FEE								OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/279,781	09/29/2016		1740	15540-0370003	12	3

CONFIRMATION NO. 2586

26161
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

FILING RECEIPT



0000000086395586

Date Mailed: 10/13/2016

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Inventor(s)

Rudolph Huber, Aldingen-Aixheim, GERMANY;
Wolfgang Andreasch, Weinstadt, GERMANY;
Martin Huonker, Schramberg, GERMANY;

Applicant(s)

TRUMPF Laser- und Systemtechnik GmbH, Ditzingen, GERMANY;

Power of Attorney: None

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GERMANY 102010003750.8 04/08/2010

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Projected Publication Date: 01/19/2017

Non-Publication Request: No

Early Publication Request: No
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Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile
Characteristic by Means of a Multi-Clad Fiber

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/279,781	09/29/2016	Rudolph Huber	15540-0370003

CONFIRMATION NO. 2586

26161
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

INFORMAL NOTICE



Date Mailed: 10/13/2016

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

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Minneapolis, MN 55440-1022
512 472 5070 main
512 320 8935 fax

Presented for filing is a new continuation patent application of:

Inventors: RUDOLPH HUBER, WOLFGANG ANDREASCH AND MARTIN HUONKER

Title: METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM
HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF
A MULTI-CLAD FIBER

Enclosed are the following papers, including those required to receive a filing date under 37
C.F.R. § 1.53(b):

	<u>Pages</u>
Specification	14
Claims	3
Abstract	1
Drawings	5

Enclosures:

- Application Data Sheet, 9 pages.
- New disclosure information, including:
PTO Form SB08a, 7 pages.
References, 40 items listed, none enclosed.

Basic Filing Fee			\$280
Search Fee			\$600
Examination Fee			\$720
Total Claims 12	over 20	0 x \$80	\$0
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Respectfully submitted,

/Yunbo Guo/

Yunbo Guo
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Enclosures

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Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation of and claims priority under 35 U.S.C. §120 to U.S. Serial No. 14/300,138, filed on June 9, 2014, which is a continuation of U.S. Serial No. 13/639,401, filed on December 20, 2012, which is a 371 National Phase Application of PCT Application No. PCT/EP2011/055484 filed on April 8, 2011, which claims
10 priority to German Application No. DE 10 2010 003750.8, filed on April 1, 2010. The entire contents of these priority applications are incorporated herein by reference.

TECHNICAL FIELD

 The invention concerns a method and arrangement for the generation of a laser beam with different beam profile characteristics.

BACKGROUND

15 In materials processing by means of laser beams, different processes and applications have different requirements for characteristic laser beam parameters such as focal diameter, intensity distribution or beam profile quality at the processing point. Therefore, changing a process or application in a laser machining system usually involves
20 the necessary resetting work, which may range from relatively simple replacement of individual optical components to transfer to a different system.

 For example, DE 38 33 992 A1 describes a method for achieving specific laser beam properties in which the laser beams of two laser beam sources are coupled into a conventional optical fiber at different coupling angles. A beam is thus created, depending
25 on the coupling angles of the two laser beams, with various wavelengths which are selected to suit the biological or medical processing task at hand. In addition to the use of two laser sources, this method may also employ just one laser source with a variable

wavelength. The coupling conditions into the optical fiber depend greatly on the wavelength here. However, if, for example, the applications do not have different wavelengths or rather even require the use of a single wavelength, the method outlined proves not to be optimum on account of its disproportionate complexity for such cases and its limiting specialisation in applications of a different type. Moreover, the method proposed is limited to the beam formation dependent on the wavelength which, in turn, leads to limitations for its potential applications.

SUMMARY

Therefore, the object of the present invention is to indicate a method for generating a laser beam with different laser beam profile characteristics which, using several laser beam sources or just one laser beam source, in particular with a single wavelength, allows an application-specific change to the laser beam characteristics with relatively little effort, and to provide an arrangement for this method. A further aim is to expand the range of adaptation potential of beam profile characteristics to miscellaneous applications as far as possible, while reducing the complexity of the arrangement and the method.

In accordance with the invention, this object is solved by a method in which a laser beam is coupled into one fiber end of a multi-clad fiber, in particular a double-clad fiber, and coupled out of the other end of the multi-clad fiber and, to generate different beam profile characteristics of the output laser beam, the input laser beam is electively coupled either at least into the inner fiber core of the multi-clad fiber or at least into at least one outer ring core of the multi-clad fiber or, however, electively a first laser beam is coupled at least into the inner fiber core of the multi-clad fiber and a different, second laser beam is coupled at least into at least one outer ring core of the multi-clad fiber.

In this invention, a multi-clad fiber means a fiber with one inner fiber core and at least one outer ring core, for example a double-clad fiber with a single outer ring core or also a triple-clad fiber with an additional outer ring core adjacent to the first outer ring

core. To change the beam profile characteristics of the output laser beam, the input laser beam is coupled variously into one or more of the cores of the multi-clad fiber.

For the sake of simplicity, the invention will be described in the following using a double-clad fiber. It will be clear to an expert that the principle of the invention can easily
 5 also be transferred to multi-clad fibers with additional outer ring cores adjacent to the first outer ring core.

A double-clad fiber with two cores has an inner fiber core and cladding surrounding this fiber core that is as thin and low-refractive as possible. This is followed by a single outer ring core which is also surrounded by low-refractive second cladding.
 10 This may be followed by an additional layer of glass which determines the external diameter of the fiber but has no influence on its function in terms of beam guidance. This is completed by a coating of a synthetic material such as silicone and/or nylon which serves to protect the fiber.

By using a double-clad fiber, the present invention makes it possible to choose
 15 between different beam profile characteristics at the fiber output, depending on whether the beam is coupled into the inner fiber core, the outer ring core or into both the inner fiber core and the outer ring core. In material processing using laser beams, in particular using high power in the kW range, the ability to switch between these coupling variants makes it possible, for example to choose between a comparatively good beam quality
 20 with a sharp focus as is required, for example, for a laser cutting process, and, in contrast, a 'reduced' beam quality with a 'blurred' focus with almost uniform intensity distribution in the beam cross-section, which is particularly suitable for welding processes.

To achieve a high laser beam quality, the laser beam is coupled into the inner fiber core of the double-clad fiber, which, in this case, behaves like a conventional
 25 standard fiber, the fiber core of which is surrounded by low-refractive cladding. However, if a laser beam with a wider profile and, for example, with uniform intensity is required, the laser beam is coupled into the outer ring core or into both the inner fiber core and the outer ring core. Depending on the application, therefore, at the output of the double-clad fiber, a laser beam can be achieved with a filled circular profile in
 30 accordance with the inner fiber core, with a ring profile in accordance with the outer ring

core, with a filled circular profile in accordance with the two core areas together (with a narrow missing ring through the first cladding) or with the corresponding intermediate stages of the stated profile characteristics.

5 In a preferred version of the method in accordance with the invention, for the elective coupling of the laser beam into the double-clad fiber, relative motion takes place between the input laser beam and the coupling-side face of the double-clad fiber in a direction transverse to the laser beam, in particular in the form of parallel displacement. If the coupling-side face of the double-clad fiber is moved transverse to the laser beam, no additional optical elements are required to switch between the various couplings. With
10 sufficiently long free beam propagation of the laser beam before it strikes the double-clad fiber, angular deflection of the laser beam, which is also understood as deflection transverse to the axis of the coupling-side face, is also possible in order to couple the laser beam into the inner fiber core and/or into the outer ring core of the double-clad fiber. In this case, this involves rotation of the laser beam axis about a point instead of
15 displacement, whereby the change in the angle of incidence should remain negligible for the coupling.

In another preferred version of the method in accordance with the invention, for electively coupling of the laser beam into the double-clad fiber, the input laser beam is projected with different beam cross-sections, in particular with different beam diameters,
20 onto the coupling-side face of the double-clad fiber. These different beam diameters can be set, for example with optics that can travel along the laser beam axis such as a lens or aperture which, depending on its travel position, couples the laser beam either only into the inner fiber core or into the outer ring core or into both the inner fiber core and the outer ring core. Alternatively, a different beam cross-section or diameter can also be set
25 by optics such as a lens or aperture being electively moved into or out of the beam path of the laser beam. In another alternative, the beam cross-section or diameter can be adapted to desired coupling conditions into the double-clad fiber using a laser source with alternative guidance options via optical fibers with different beam guidance characteristics, which can, for example, be set via the diameter of the beam guidance
30 optical fiber core. This principle of choosing the coupling conditions into the double-clad

fiber can also be applied to the use of the laser beam sources assigned to the upstream optical fibers, in particular to laser beam sources of different beam qualities.

In another preferred version of the method in accordance with the invention, for the coupling of the laser beam both into the inner fiber core and into the at least one outer ring core, the input laser beam is divided into at least two sub-beams, each of which is coupled into one of the two cores of the double-clad fiber. This allows the division of the beam power between the inner fiber core and the outer ring core to be particularly well controlled if they are to be used simultaneously. With the two sub-beams, it is also possible, in a particularly easy fashion, to omit the area of the first cladding of the double-clad fiber in connection with coupling. Specifically for applications in the high-power area, it is important that no laser beam is coupled into the first or second cladding of the double-clad fiber. Any such beam coupled into the cladding is propagated with a large angle in relation to the fiber axis in the inner fiber core or outer ring core and emerges at the fiber end also with a large angle, as a result of which connecting optics can become heated. In addition, a beam in the second cladding can destroy the coating of the fiber. To safely prevent the propagation of the laser beam in the cladding, mode strippers can be used, for example. Accordingly, it is preferred also not to couple any laser beam into the double-clad fiber during the switching process in order to prevent any propagation in the cladding. This can be done, for example, by switching the laser off or deflecting the beam into an absorber by using beam shutters.

In another aspect, the invention also concerns an arrangement suitable for implementing the method described above. The arrangement in accordance with the invention comprises a double-clad fiber with one inner fiber core and at least one outer ring core and a switchable device with at least two switch positions in which the input laser beam is electively coupled either at least into the inner fiber core of the double-clad fiber or at least into the at least one outer ring core of the double-clad fiber or, electively, a first laser beam is coupled at least into the inner fiber core of the multi-clad fiber and a different, second laser beam is coupled at least into one outer ring core of the multi-clad fiber.

In a preferred embodiment of the arrangement in accordance with the invention, the switchable device is formed by adjustable deflection optics which, in their at least two switch positions, deflect an input laser beam in a direction transverse to the axis of the coupling-side face of the double-clad fiber to varying extents or formed by a control device which, in its at least two switch positions, moves the coupling-side face in a direction transverse to the input laser beam to varying extents. Deflection optics in accordance with the invention mean any adjustable optics that couples a laser beam, depending on the adjustment position, into at least partially different fiber areas of the double-clad fiber.

In another preferred embodiment of the arrangement in accordance with the invention, the switchable device is formed by mobile optics or a mobile aperture which, in their at least two switch positions, project the input laser beam with different beam cross-sections, in particular with different beam diameters, onto the coupling-side face of the double-clad fiber. The mobile optics can, for example, be prisms, plane-parallel (glass) plates, convex and concave lenses, mirrors, diffractive optical elements, etc. individually or in combinations.

It is particularly preferred for the optics to be formed by a beam divider, in particular by an optical wedge plate that can be moved into the laser beam, to divide the input laser beam into at least two sub-beams, each of which is coupled into one of the cores of the double-clad fiber. Advantageously, the division of the intensity between the inner fiber core and the outer ring core depends on how far the beam divider intervenes in the beam path. This makes it possible to adapt the intensity division and thus the beam profile of the output laser beam optimally to each application.

However, the wedge plate can also be used as a beam switch to couple the laser beam in its entirety either into the inner fiber core or into the outer ring core. Moving/displacing the coupling optics transverse to the optical axis of the laser beam causes a comparable effect. In this version, the coupling optics are located in the beam path in the switchable states, producing different beam deflections, depending on the position of the coupling optics. As the beam is not divided here and the intensities cannot

be divided via sub-beams, it is preferred to deflect either into the inner fiber core or into the outer ring core and to switch between at least two states representing these positions.

Preferably, the diameter of the inner fiber core of the double-clad fiber is maximum approximately 200 μm , in particular maximum approximately 150 μm , preferably maximum approximately 120 μm . For example, with a diameter of the inner fiber core of approximately 100 μm , a good quality of the output laser beam can be achieved for demanding laser applications, such as laser cutting processes, in connection with the beam being coupled into the inner fiber core.

The ring thickness of the at least one outer ring core of the double-clad fiber is preferably greater than or equal to the diameter of the inner fiber core. The outer ring diameter corresponds to the wider laser beam profile required for specific applications, such as laser welding, and is approximately 600 μm or 400 μm , for example, depending on the application.

In an advantageous embodiment of the arrangement in accordance with the invention, the numerical aperture of the first cladding surrounding the inner fiber core is higher than the numerical aperture of the second cladding surrounding the at least one outer ring core in a double-clad fiber. As a result, a beam coupled inadvertently into the first cladding can penetrate the second cladding and be emitted and displayed there by a mode stripper. This facilitates the adjustment of the inner fiber core and fault monitoring. For example, the first cladding has a standard numerical aperture of 0.22 (tolerance ± 0.02), whereby the second cladding in this case preferably has a numerical aperture of 0.18 (tolerance ± 0.015) and should be thick enough to guide the laser beam well, for example 10 μm thick, preferably less, such as 3 to 5 μm , with a cladding core diameter ratio (CCDR) of 1.2. The first cladding forms a conventional transport fiber with the inner fiber core.

In another preferred embodiment, the switchable device has, on the input side, at least two optical fibers via which at least two different laser beams can be supplied, whereby the switchable device electively couples one laser beam at least into the inner fiber core of the multi-clad fiber and the other laser beam at least into at least one outer ring core of the multi-clad fiber.

The embodiments described with the use of one or more laser beam sources can also be used in combination, for example within a cascaded system.

Further advantages of the invention are provided in the following description and the drawing. The embodiments shown and described should not be considered to be an exhaustive list. They are instead examples for the purposes of describing the invention. Similarly, the above-mentioned characteristics and those described below can be used individually or in any combinations.

The invention is presented in a number of embodiments in the drawing and will be described in further detail in the following description. The presentation in the figures in the drawing should only be considered to be an outline. It contains no restrictions in respect of details or dimensions and is not to scale.

DESCRIPTION OF DRAWINGS

Figs. 1, 2A, 2B, and 3 show three arrangements in accordance with the invention for generating a laser beam with different beam profile characteristics, in which a laser beam is coupled into the fiber end of a double-clad fiber and emitted from the other fiber end of the double-clad fiber.

Fig. 4 shows the radial course of the refractive index of the double-clad fiber shown in Figs. 1 to 3.

Figs. 5A, 5B and 5C show various possible beam profiles of the laser beam emitted from the double-clad fiber in Figs. 1 to 3.

Fig. 6 shows another arrangement in accordance with the invention for generating a laser beam with different beam profile characteristics, whereby, electively, a first laser beam is coupled into the inner fiber core of a double-clad fiber and a different, second laser beam is coupled both into the inner fiber core and into the outer ring core of the double-clad fiber.

DETAILED DESCRIPTION

Figs. 1 to 3 show three different arrangements 10, 20, 30 for generating a laser beam with different beam profile characteristics, whereby the laser beam is coupled into

one fiber end 1a of a multi-clad fiber 1, which is a double-clad fiber 1 in the present case, and is emitted from the other fiber end 1b of the double-clad fiber 1. The input laser beam is labelled 2 and the emitted laser beam is labelled 3.

As shown in Fig. 1, the double-clad fiber 1 has an inner fiber core 4 (for example of undoped quartz glass) with a refractive index n_1 and thin first cladding 5 (for example of doped quartz glass) surrounding the inner fiber core 4, the refractive index n_2 of which is lower than n_1 . This is followed by an outer ring core 6 (for example of undoped quartz glass) with refractive index n_3 which is also surrounded by low-refractive second cladding 7 (for example of doped quartz glass) with refractive index n_4 . The refractive indices n_1 and n_3 can be the same or different; the same applies to the refractive indices n_2 and n_4 . This may be followed by an additional layer of glass (not shown) which determines the external diameter of the fiber but has no influence on its function in terms of beam guidance. This is typically completed by a coating (not shown) of a synthetic material such as silicone and/or nylon which serves to protect the fiber.

Fig. 4 shows an outline of the radial dependence of the refractive index n within the double-clad fiber 1, where $n_1 = n_3$ and $n_2 = n_4$. The figure shows an area with radius r_1 and high refractive index n_1 corresponding to the inner fiber core 4, a ring area between radii r_1 and r_2 with lower refractive index n_2 corresponding to the first cladding 5, a ring area with external radius r_3 and high refractive index n_1 corresponding to the outer ring core 6 and, finally, the second cladding 7 with low refractive index n_2 . On account of the lower refractive index of the cladding 5, 7, light is guided in the inner fiber core 4 and in the outer ring core 6 by means of total reflection.

To change the beam profile characteristics of the emitted laser beam 3, it is possible, as described below in detail, for the input laser beam 2 striking the coupling-side face 8 of the double-clad fiber 1 to be coupled, by means of a switchable device, electively either into the inner fiber core 4 or into the outer ring core 6 or both into the inner fiber core 4 and into the outer ring core 6 of the double-clad fiber 1.

In the arrangement 10 shown in Fig. 1, the switchable device for electively coupling the laser beam 2 into the double-clad fiber 1 is formed by adjustable deflection optics 11 with two switch positions, which are represented by continuous and dotted

lines. In these two switch positions, the laser beam 2 focused on the coupling-side face 8 is deflected in a direction 12 transverse to the axis of the coupling-side face 8 to varying extents, in particular displaced in parallel to varying extents. In one switch position, the laser beam 2 is coupled centrally or eccentrically to the fiber axis only into the inner
5 fiber core 4 and in the other switch position it is coupled eccentrically to the fiber axis only into the outer ring core 6. In the first case, the emitted laser beam 3 has the beam profile shown in Fig. 5A, i.e. a narrow filled circular profile 51 corresponding to the inner fiber core 4, and a comparatively high beam quality with a sharp focus, as is required for material processing, for example for a laser cutting process. In the second case, the
10 emitted laser beam 3 has the wider beam profile shown in Fig. 5B, i.e. a ring profile 52 corresponding to the outer ring core 6, and a comparatively lower beam quality, as is required for material processing, for example for a laser welding process. Under suitable coupling conditions into the outer ring core 6, the emitted laser beam 3 has a top hat ring beam profile, the quality of which is suitable for many applications.

15 The deflection optics 11, the components of which are not shown individually in Fig. 1, are based on beam deflection principles familiar to an expert. In particular, a deflection mirror can be used here. The location of the coupling into the coupling-side face of the double-clad fiber 1 can be determined by the angular position of the deflection mirror or the deflection mirror can deflect the beam, depending on position, to various
20 outputs which, in turn, define various coupling areas. A semireflecting deflection mirror or a deflection mirror that is only partially in the beam path can also perform the described function of a beam divider. Preferably, the deflection optics 11 contain additional means for coupling the laser beam 2 into the coupling-side face 8 of the double-clad fiber 1, such as, for example, a focusing lens, which can alternatively also be
25 arranged before or after the deflection optics 11.

A sufficiently long double-clad fiber 1 also allows for angularly homogeneous intensity distribution in the output laser beam 3 with eccentric coupling of the laser beam 2 to the fiber axis into the inner fiber core 4 or the outer ring core 6.

If, however, the beam is coupled both into the inner fiber core 4 and into the outer
30 ring core 6 of the double-clad fiber 1, the output laser beam 3 has the uniformly filled

wide beam profile 53 shown in Fig. 5C with an omitted ring corresponding to the first cladding 5.

Alternatively (or in addition) to the deflection optics 11, the switchable device for electively coupling the laser beam 2 into the double-clad fiber 1 can also be formed, for example, by a motor-driven control device 13 which displaces the coupling-side face 8 of the double-clad fiber 1 in a direction 12 transverse to the input laser beam 2 to varying extents, whereby the laser beam 2 focused on the coupling-side face 8 can be coupled either into the inner fiber core 4 or into the outer ring core 6.

In the arrangement 20 shown in Fig. 2A, the switchable device for electively coupling the laser beam 2 into the double-clad fiber 1 is formed by adjustable telescopic/expansion optics 21 which are shown here only in outline. In their switch positions, not shown here, the telescopic/expansion optics 21 expand the input laser beam 2 to different beam diameters. Depending on the beam diameter, the laser beam 2 is then projected by coupling optics (for example a lens) 22 with different beam diameters, in this case different focal diameters, onto the coupling-side face 8 of the double-clad fiber 1. As shown with continuous and dotted lines, the laser beam 2 is, for example, coupled centrically only into the inner fiber core 4 in one switch position of the telescopic/expansion optics 21 and coupled centrically both into the inner fiber core 4 and into the outer ring core 6 in another switch position. In the first case, the output laser beam 3 has beam profile 51 and in the second case beam profile 53.

Via the diameter of the expanded laser beam 2, the proportion of the laser beam coupled into the outer ring core 6 can be set continuously and thus also the intensity distribution into the inner fiber core 4 and the outer ring core 6, allowing the beam profile of the output laser beam 3 to be adapted to each application optimally.

In the arrangement 20 shown in Fig. 2B, the switchable device for electively coupling the laser beam 2 into the double-clad fiber 1 is formed by focusing optics 23 shown here as a lens which can be displaced along the laser beam axis to various switch positions, which are represented by continuous, dotted, and dashed and dotted lines. In these switch positions, the input laser beam 2 is coupled by the focusing optics 23 with different beam diameters onto the coupling-side face 8 of the double-clad fiber 1. In one

switch position, the focused laser beam 2 is coupled centrally only into the inner fiber core 4. In the two other switch positions, the defocused laser beam 2 is coupled centrally both into the inner fiber core 4 and into the outer ring core 6. In the first case, the output laser beam 3 has beam profile 51 and in the second case beam profile 53.

5 In the arrangement 30 shown in Fig. 3, the switchable device for electively coupling the laser beam 2 into the double-clad fiber 1 is formed by a beam switch implemented here only by way of example as an optical wedge plate 31 which can be adjusted continuously between two end positions that are shown with continuous and dotted lines. In one of its end positions, the optical wedge plate 31 is arranged outside the
10 beam path of the input laser beam 2 so that the entire input laser beam 2 is coupled via coupling optics (for example a lens) 32 only into the inner fiber core 4, whereby the output laser beam 3 has beam profile 51. In its other end position, shown by the dotted line, the wedge plate 31 is arranged in the entire beam path of the laser beam 2 so that the entire laser beam 2 is deflected by the wedge plate 31 and is coupled via the coupling
15 optics 32 only into the outer ring core 6, whereby the output laser beam 3 has beam profile 52.

Moving/displacing the coupling optics 32 transverse to the optical axis of the laser beam 2 causes a comparable effect. In this version, the coupling optics 32 are located in the beam path in the switchable states, producing different beam deflections, depending
20 on the position of the coupling optics 32. As the beam is not divided here and the intensities cannot be divided via sub-beams, it is preferred to deflect either into the inner fiber core 4 or into the outer ring core 6 and to switch between at least two states representing these positions.

As indicated with a dotted line, partially introducing the wedge plate 31 into the
25 input laser beam 2 creates two sub-beams 2a, 2b, so that here, for example, the optical wedge plate 31 acts as a beam divider. The first sub-beam 2a is not influenced by the wedge plate 31 and thus continues to be coupled via the coupling optics 32 into the inner fiber core 4, while the second sub-beam 2b is deflected by the wedge plate 31 in relation to the first sub-beam 2a and coupled via the coupling optics 32 into the outer ring core 6.
30 The output laser beam 3 has beam profile 53. Partially introducing the wedge plate 31

into the input laser beam 2 therefore creates two sub-beams 2a, 2b, with a division of intensity between the inner fiber core 4 and the outer ring core 6, depending on the degree of introduction, whereby the beam profile of the output laser beam 3 can be optimally adapted to each application.

5 Moreover, the two sub-beams 2a, 2b offer the significant advantage that they omit the area of the first cladding 5 in connection with coupling. Specifically for applications in the high-power area, it is important that no laser beam is coupled into the inner or outer cladding 5, 7. This beam is propagated with a large angle in the inner core or outer ring core and emerges at the fiber end also with a large angle, as a result of which connecting
10 optics can become heated. In addition, the beam in the outer cladding 7 can destroy the coating of the fiber 1.

 A diameter of the inner fiber core 4 of approximately 100 μm guarantees, for typical applications with high power in the kW range, the production of good beam profile quality in connection with coupling the laser beam 2 into the inner fiber core 4.
15 The first cladding 5 is already sufficiently thick, at approximately 10 μm , preferably at approximately 5 μm , to guide the laser beam well. With a ring thickness of the outer ring core 6 of approximately 240 μm , the external diameter of the outer ring core 6 is approximately 600 μm . For certain applications, such as laser welding, this corresponds to the necessary widening of the laser beam profile.

20 Fig. 6 shows another arrangement 60 for generating a laser beam with different beam profile characteristics, whereby, electively, a first laser beam 61 is coupled into the inner fiber core 4 of the double-clad fiber 1 and a different, second laser beam 62 is coupled both into the inner fiber core 4 and into the outer ring core 6 of the double-clad fiber 1. The two laser beams 61, 62, which can, for example, have different beam
25 qualities, are guided in optical fibers 63, 64 to switching optics 65 (for example an optical switch system), shown here only in outline, which can be switched between two switch positions. In one switch position, the first laser beam 61 with the higher beam quality is coupled into the inner fiber core 4 of the double-clad fiber 1 and, in the second switch position, the second laser beam 62 is coupled both into the inner fiber core 4 and into the
30 outer ring core 6 of the double-clad fiber 1. In the first case, the output laser beam 3 has

beam profile 51 and in the second case beam profile 53. The double-clad fiber 1 leads to a laser processing machine (not shown) so that the arrangement 60 is used to switch laser beams 61, 62 with different beam qualities for the laser processing machine. However, the laser beam 62 can also only be directed at the outer ring core 6 of the double-clad fiber 1 via the switching optics 65.

Up to now, laser processing machines that are to be supplied with several laser beams of different beam qualities needed several sockets for the various optical fibers and a corresponding optical switch system to allow the various laser beams to be coupled into the following beam path. For a desired laser beam, the appropriate optical fiber cable has to be manually replugged, which is undesirable on account of an increased risk of soiling, or beam guidance optics are required on the laser processing machines themselves. This is disadvantageous as several optical fiber cables have to be laid within the laser processing machine, the entire switching optics have to be mounted and moved on the axis system of the laser processing machine and the size of the switching optics, in connection with the space available, limits the possibilities or the possible optical concepts.

In the arrangement 60, the switching optics 65 are supplied on the input side by two lasers with the two laser beams of different beam qualities, and the respective laser beams 61, 62 are coupled into the central double-clad fiber 1 via the switching optics 65. In this way, the switching between the two laser beams 61, 62 is separated from the axis system of the laser processing machine and takes place outside the laser processing machine itself. The laser beams are then supplied to the machine via the double-clad fiber 1. One or more additional light-guiding ring cores around the outer ring core 6 are also conceivable so that additional laser beams with different beam qualities can be guided via the switching optics 65.

A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method comprising:

coupling an input laser beam into a fiber end of an optical fiber that has at least an inner fiber core and an outer ring core, wherein coupling an input laser beam comprises electively coupling a first laser beam into the inner fiber core alone or coupling a
5 different, second laser beam into both the inner fiber core and the outer ring core; and
generating an output laser beam by interaction of the input laser beam with the optical fiber, wherein a beam profile characteristic of the output laser beam differs depending upon the elective coupling.

10 2. The method of claim 1, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core, the outer ring core, and a second cladding surrounding the outer ring core.

3. A method comprising:

15 coupling an input laser beam into a fiber end of an optical fiber that has at least an inner fiber core and an outer ring core, wherein coupling an input laser beam comprises electively coupling either a first laser beam into the inner fiber core alone or coupling a different, second laser beam into the outer ring core alone; and
generating an output laser beam by interaction of the input laser beam with the
20 optical fiber, wherein a beam profile characteristic of the output laser beam differs depending upon the elective coupling.

4. The method of claim 3, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core,
25 the outer ring core, and a second cladding surrounding the outer ring core.

5. A device for generating a laser beam with different beam profile characteristics, comprising:

an optical fiber having an inner fiber core and at least one outer ring core; and

a switchable coupling adjustment device configured to adjust a coupling of an input laser beam to a coupling-side face of the optical fiber between at least two switch positions, wherein, in a first of the at least two switch positions, a first laser beam is coupled into the inner fiber core alone and, in a second of the at least two switch positions, a different, second laser beam is coupled at least into the outer ring core.

6. The device of claim 5, wherein the switchable coupling adjustment device comprises:

a control device that, in the at least two switch positions, moves the coupling-side face of the optical fiber in a direction transverse to the input laser beam to varying extents depending on the switch position.

7. The device of claim 5, wherein the switchable coupling adjustment device comprises an optical element configured to be positioned in the at least two different switch positions transverse to an optical axis of the first or second laser beam.

8. The device of claim 7, wherein the optical element is configured to be arranged outside a beam path of the first or second laser beam in one of the at least two switch positions and is at least partially in the beam path of the first or second laser beam in another one of the at least two switch positions.

9. The device of claim 5, wherein a maximum diameter of the inner fiber core of the optical fiber is approximately 200 μm or less.

10. The device of claim 5, wherein a ring thickness of the at least one outer ring core of the optical fiber is no less than a diameter of the inner fiber core.

11. The device of claim 5, wherein the optical fiber is a multi-clad fiber comprising at least the inner fiber core, a first cladding surrounding the inner fiber core, the outer ring core, and a second cladding surrounding the outer ring core.

12. The device of claim 11, wherein, for the optical fiber, a numerical aperture of the first cladding is higher than a numerical aperture of the second cladding.

ABSTRACT

The invention concerns a method for generating a laser beam (3) with different beam profile characteristics, whereby a laser beam (2) is coupled into one fiber end (1a) of a multi-clad fiber (1), in particular a double-clad fiber, and emitted from the other fiber end (1b) of the multi-clad fiber (1) and whereby, to generate different beam profile characteristics of the output laser beam (3), the input laser beam (2) is electively coupled either at least into the inner fiber core (4) of the multi-clad fiber (1) or at least into at least one outer ring core (6) of the multi-clad fiber (1), as well as a corresponding arrangement (10).

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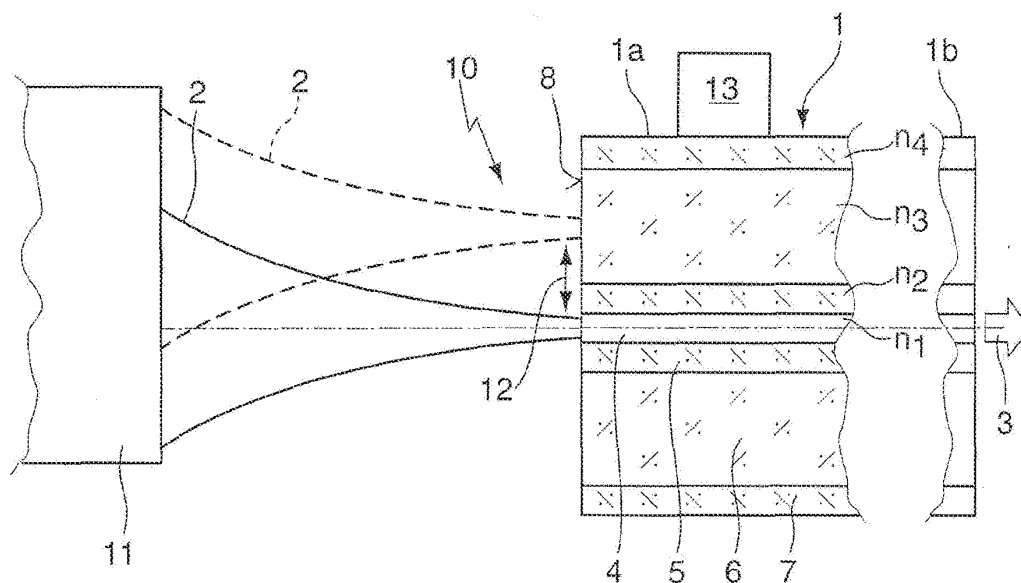


Fig. 1

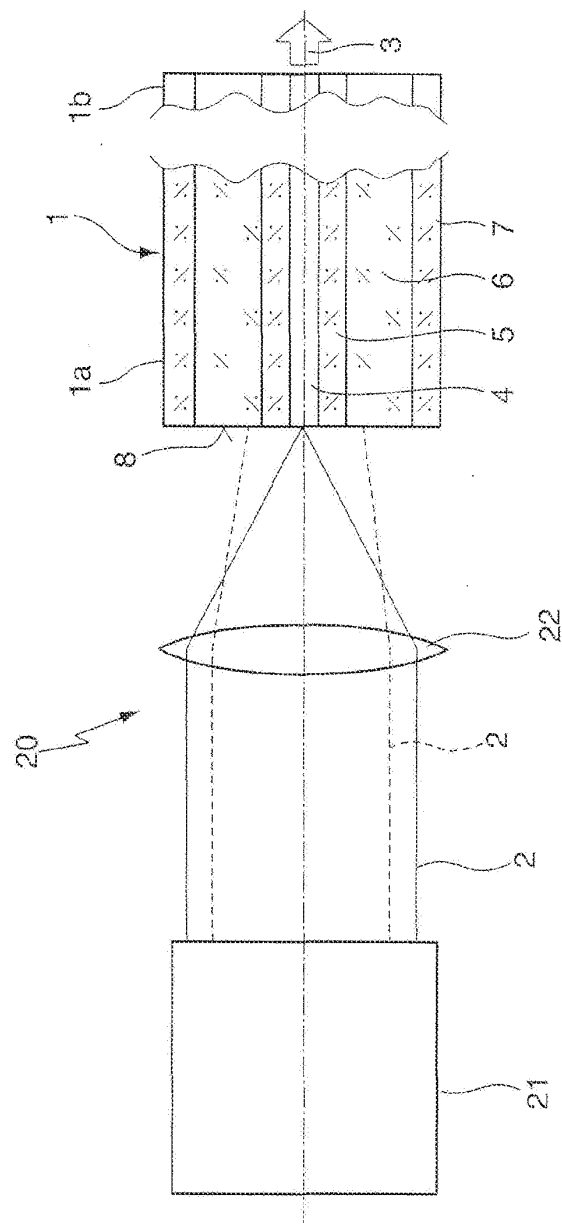


Fig. 2A

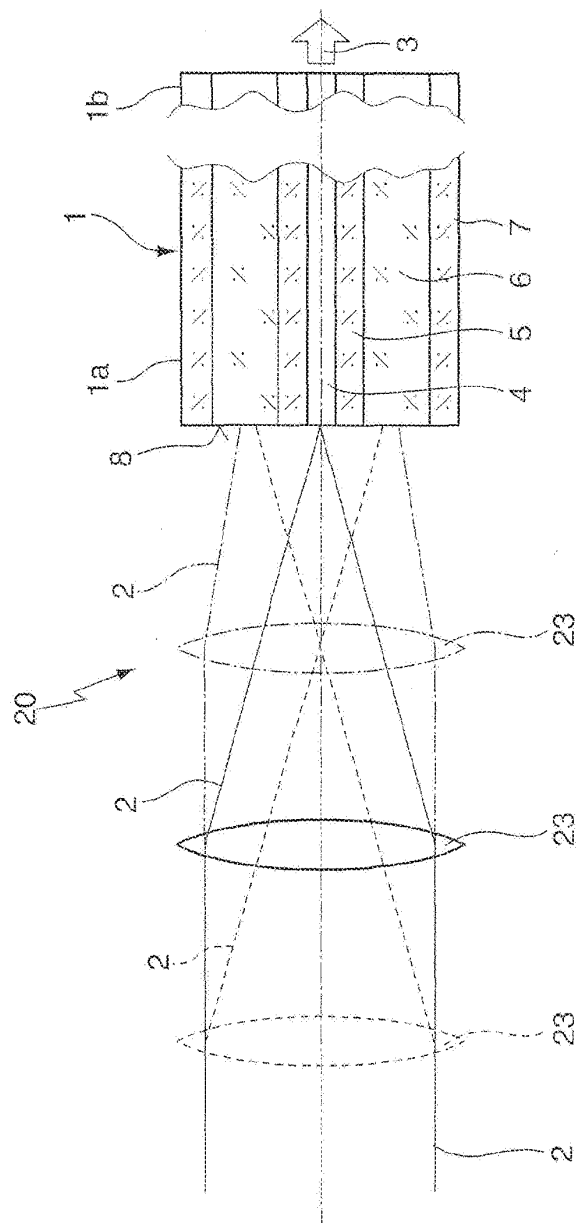


Fig. 2B

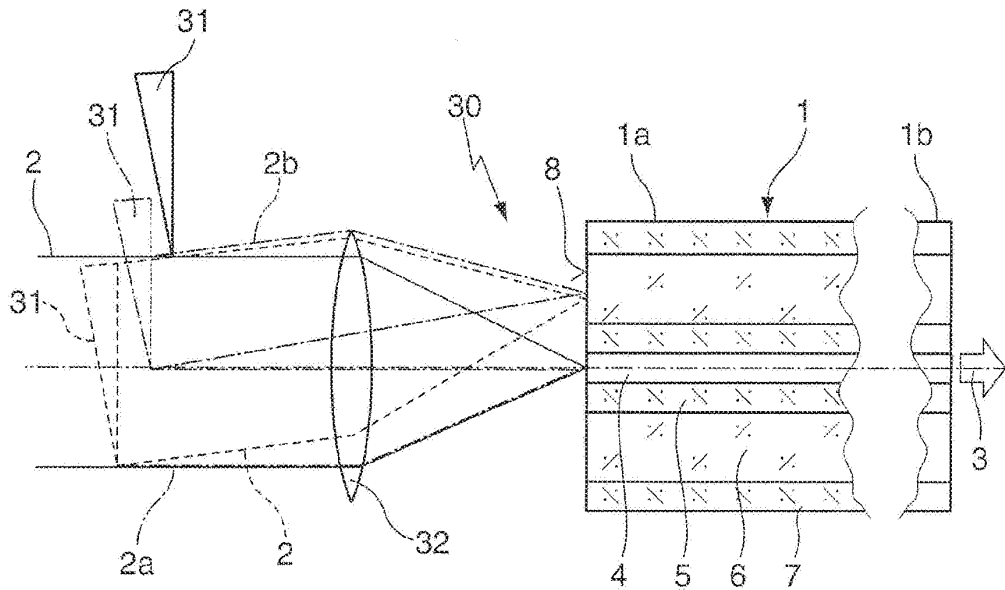


Fig. 3

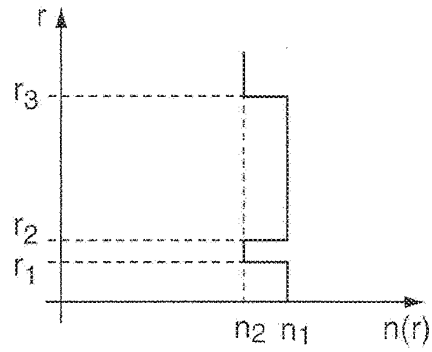


Fig. 4

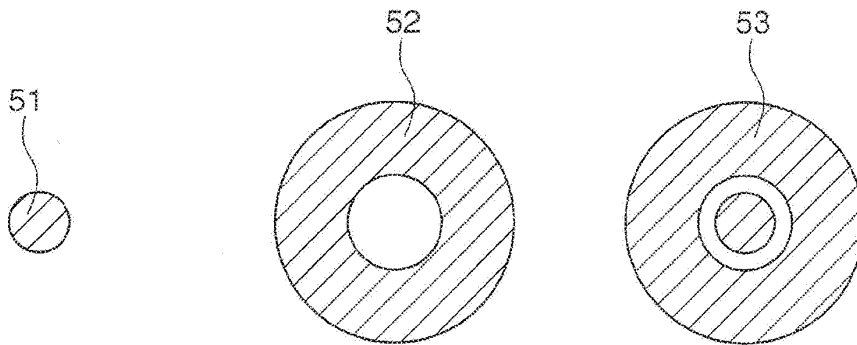


Fig. 5A

Fig. 5B

Fig. 5C

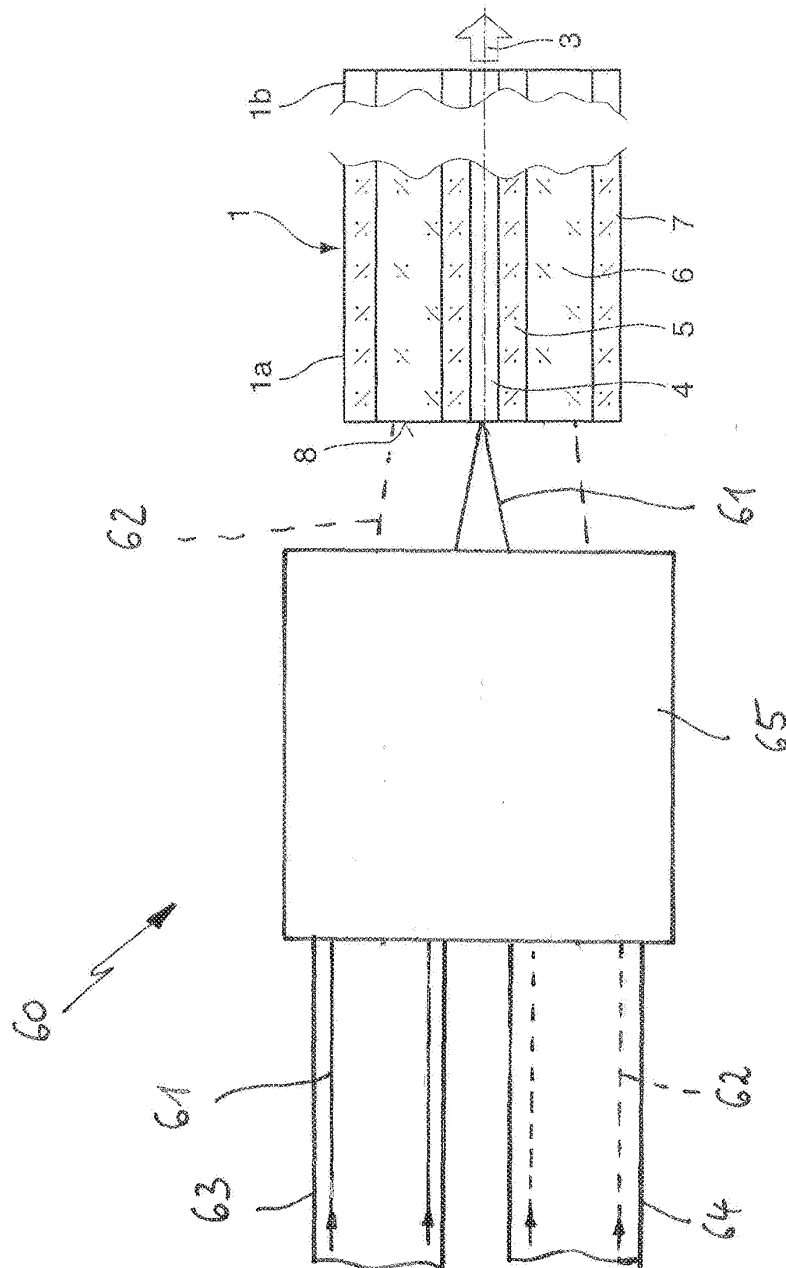


Fig. 6

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	
	Filing Date	2016-09-29
	First Named Inventor	Rudolph Huber
	Art Unit	
	Examiner Name	
	Attorney Docket Number	15540-0370003

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	3941670	A	1976-03-02	Pratt	
	2	3975082	A	1976-08-17	Winzer	
	3	4475788	A	1984-10-09	Tomassini et al	
	4	4575181	A	1986-03-11	Ishikawa	
	5	5461692	A	1995-10-24	Nagel	
	6	5684642	A	1997-11-04	Zumoto et al	
	7	7372877	A	2008-05-13	Shirakawa et al	
	8	7379237	A	2008-05-27	Di Teodoro et al	

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	Filing Date		2016-09-29
	First Named Inventor	Rudolph Huber	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		15540-0370003

	9	7379648	A	2008-05-27	Brooks et al	
	10	7592568	A	2009-09-22	Varnham et al	
	11	7720340	A	2010-05-18	Lewis et al	
	12	7738166	A	2010-06-15	Murison et al	
	13	7809225	A	2010-10-05	Bouma et al	
	14	7839902	A	2010-11-23	Li et al	
	15	7933479	A	2011-04-26	Gonthier et al	
	16	8008600	A	2011-08-30	Nakamae et al	
	17	8076632	A	2011-12-13	Kreysing et al	
	18	8094370	A	2012-01-10	Lewis	
	19	8326099	A	2012-12-04	Singer et al	

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	Examiner Name			
	Attorney Docket Number		15540-0370003	

	20	8456523	A	2013-06-04	Stork Gennant Wersborg	
	21	8781269	A	2014-07-15	Huber et al	

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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	20020071647	A	2002-06-13	Manzur	
	2	20020168139	A	2002-11-14	Clarkson et al	
	3	20020172485	A	2002-11-21	Keaton et al	
	4	20050031261	A	2005-02-10	Tanaka	
	5	20060251367	A	2006-11-09	Seifert et al	
	6	20060263024	A	2006-11-23	Dong et al	
	7	20130064706	A	2013-03-14	Schwarze et al	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2016-09-29
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	Art Unit		
	Examiner Name		
	Attorney Docket Number		15540-0370003

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	1	1580865	CN	A	2005-02-16			
	2	3833992	DE	A1	1990-04-12			
	3	3833993	DE	A1	1990-04-12			
	4	4200587	DE	C1	1993-04-01			
	5	0362466	EP	A2	1990-09-26			
	6	2284892	FR	A1	1976-04-09			
	7	2449689	GB	A	2008-12-03			
	8	100750511	KR	B1	2007-08-13			
	9	WO2010009101	WO	A2	2010-01-21			
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2016-09-29
	First Named Inventor	Rudolph Huber	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		15540-0370003

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	Extended European Search Report dated July 1, 2013	
	2	International Search Report dated May 6, 2011	
	3	German Office Action dated November 22, 2010	

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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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		
	Filing Date		2016-09-29
	First Named Inventor	Rudolph Huber	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		15540-0370003

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.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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	/Yunbo Guo/	Date (YYYY-MM-DD)	2016-09-29
Name/Print	Yunbo Guo	Registration Number	70538

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.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Rudolph		Huber		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	Aldingen-Aixheim		Country of Residenceⁱ	DE	
Mailing Address of Inventor:					
Address 1	Albstrasse 31				
Address 2					
City	Aldingen-Aixheim		State/Province		
Postal Code	D-78554		Countryⁱ	DE	
Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Wolfgang		Andreasch		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	Weinstadt		Country of Residenceⁱ	DE	
Mailing Address of Inventor:					
Address 1	Weinbergstrasse 2/1				
Address 2					
City	Weinstadt		State/Province		
Postal Code			Countryⁱ	DE	
Inventor	3				Remove
Legal Name					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Prefix	Given Name	Middle Name	Family Name	Suffix
	Martin		Huonker	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	Schramberg	Country of Residence ⁱ	DE	
Mailing Address of Inventor:				
Address 1	Aichhalder Strasse 39			
Address 2				
City	Schramberg	State/Province		
Postal Code	D-78713	Country ⁱ	DE	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).	
☐ An Address is being provided for the correspondence Information of this application.	
Customer Number	26161
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Application Information:

Title of the Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		
Attorney Docket Number	15540-0370003	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country ⁱ

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:			
☒	Customer Number	☐	Limited Recognition (37 CFR 11.9)
Customer Number	26161		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	14300138	2014-06-09
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14300138	Continuation of	13639401	2012-12-20
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13639401	a 371 of international	PCT/EP2011/055484	2010-04-08
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add			

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)	Remove
102010003750.8	DE	2010-04-08		

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant	1	Remove	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.			
		Clear	
☐ Assignee	Legal Representative under 35 U.S.C. 117		Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor:			
If the Applicant is an Organization check here. ☒			
Organization Name	TRUMPF Laser- und Systemtechnik GmbH		
Mailing Address Information For Applicant:			
Address 1	Johann-Maus-Strasse 2		
Address 2			
City	Ditzingen	State/Province	
Country	DE	Postal Code	D-71254
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button. Add			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
				Remove
If the Assignee or Non-Applicant Assignee is an Organization check here.				☐
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Yunbo Guo/		Date (YYYY-MM-DD)	2016-09-29
First Name	Yunbo	Last Name	Guo	Registration Number
				70538
Additional Signature may be generated within this form by selecting the Add button.				Add

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	15540-0370003
		Application Number	
Title of Invention	Method and Arrangement for Generating a Laser Beam Having a Differing Beam Profile Characteristic by Means of a Multi-Clad Fiber		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

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

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER		
First Named Inventor/Applicant Name:		Rudolph Huber		
Filer:		Yunbo Guo/Matthew Doherty		
Attorney Docket Number:		15540-0370003		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	140	140
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1740

Electronic Acknowledgement Receipt	
EFS ID:	27070392
Application Number:	15279781
International Application Number:	
Confirmation Number:	2586
Title of Invention:	METHOD AND ARRANGEMENT FOR GENERATING A LASER BEAM HAVING A DIFFERING BEAM PROFILE CHARACTERISTIC BY MEANS OF A MULTI-CLAD FIBER
First Named Inventor/Applicant Name:	Rudolph Huber
Customer Number:	26161
Filer:	Yunbo Guo/Paul Stovenour
Filer Authorized By:	Yunbo Guo
Attorney Docket Number:	15540-0370003
Receipt Date:	29-SEP-2016
Filing Date:	
Time Stamp:	12:50:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$1740
RAM confirmation Number	092916INTEFSW00013760061050
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	PAPltr0370003.pdf	100451	no	2
			533a4ed2dcea1420bcd8df2360d47c02c5cd4501		
Warnings:					
Information:					
2		Spec0370003.pdf	138299	yes	18
			9518fcb84b49850ee6d9973f6f48595bf365c6fd		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	14	
	Claims		15	17	
	Abstract		18	18	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	Figs0370003.pdf	1780762	no	5
			9fc4745d8b5ee89dc350ce4abb58659cc3514575		
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	IDS0370003a.pdf	613090	no	7
			3d4859c83716d70aa7f7b820785486581cd046f		
Warnings:					
Information:					
5	Application Data Sheet	ADS0370003.pdf	1823285	no	9
			43153f1cd09a9228cde21c7b54a6c9d580da8b8a		

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	36912	no	2
			0330195bb2082726f6beaaae9e83915fd19f6 bcdf		
Warnings:					
Information:					
Total Files Size (in bytes):			4492799		
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