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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 February 2008 (28.02.2008)

PCT

(10) International Publication Number
WO 2008/024145 A3

(51) International Patent Classification:
H01S 3/067 (2006.01) *H01S 3/08* (2006.01)
H01S 3/102 (2006.01)

(21) International Application Number:
PCT/US2007/013020

(22) International Filing Date: 31 May 2007 (31.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/810,094 31 May 2006 (31.05.2006) US
11/809,177 30 May 2007 (30.05.2007) US

(71) Applicant *(for all designated States except US)*: **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA** [US/US]; 1111 Franklin Street, Oakland, CA 94607-5200 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BEACH, Raymond, J.** [US/US]; 1599 Cross Creek Place, Livermore, CA 94550 (US). **DAWSON, Jay, W.** [US/US]; 2779 Vernazza Dr., Livermore, CA 94550 (US). **MESSERLY, Michael, J.** [US/US]; 563 El Capitan Drive, Danville, CA 94526 (US). **BARTY, Christopher** [US/US]; 3316 Ridgeview Pi., Hayward, CA 94541 (US).

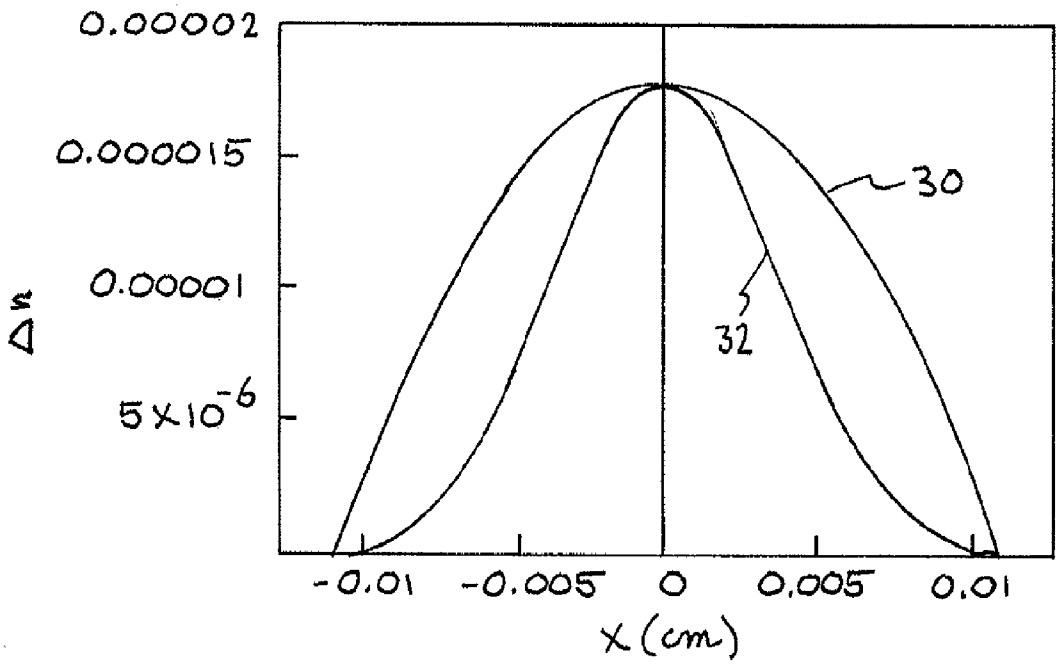
(74) Agent: **WOOLDRIDGE, John, P.**; P.o. Box 808 L-703, Livermore, CA 94550 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: FIBRE AMPLIFIER WITH PUMP INDUCED THERMAL WAVEGUIDING



(57) Abstract: Single, or near single transverse mode waveguide definition is produced using a single homogeneous medium to transport both the pump excitation light and generated laser light. By properly configuring the pump deposition and resulting thermal power generation in the waveguide device, a thermal focusing power is established that supports perturbation-stable guided wave propagation of an appropriately configured single or near single transverse mode laser beam and/ or laser pulse.

WO 2008/024145 A3

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
24 April 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/013020

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01S3/067 H01S3/102
ADD. H01S3/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01S G02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SIEGMAN A E: "Propagating modes in gain-guided optical fibers" JOURNAL OF THE OPTICAL SOCIETY OF AMERICA - A, OPTICAL SOCIETY OF AMERICA, WASHINGTON, US, vol. 20, no. 8, August 2003 (2003-08), pages 1617-1628, XP009096393 ISSN: 1084-7529 page 1617 - page 1620, left-hand column page 1625 - page 1626, left-hand column; figures 1,2,5,7,9,11	1-26
X	US 5 805 754 A (ZHANG YONG FANG [US]) 8 September 1998 (1998-09-08)	1,2,9, 13,14, 21,26
Y	column 3, line 25 - column 7, line 4; figures 1-8	1-26

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 February 2008	05/03/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Laenen, Robert

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/013020

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TANG SINDY ET AL: "Optical waveguiding using thermal gradients across homogeneous liquids in microfluidic channels" APPLIED PHYSICS LETTERS, AIP, AMERICAN INSTITUTE OF PHYSICS, MELVILLE, NY, US, vol. 88, no. 6, 8 February 2006 (2006-02-08), pages 61112-61112, XP012082702 ISSN: 0003-6951	1,2,9,26
Y	pages 061112-1 - pages 061112-2; figures 1-3	1-26
X	DAVIS M K ET AL: "Thermal Effects in Doped Fibers" JOURNAL OF LIGHTWAVE TECHNOLOGY,, vol. 16, no. 6, June 1998 (1998-06), pages 1013-1023, XP011029146 ISSN: 0733-8724	1,2,5,6, 8-10,13, 14,17, 18, 20-22, 25,26
Y	page 1013, left-hand column - page 1021, right-hand column; figures 1-4; table 1	1-26
X	GUNTAU M ET AL: "Novel method to measure bulk absorption in optically transparent materials" REVIEW OF SCIENTIFIC INSTRUMENTS, AMERICAN INSTITUTE OF PHYSICS, US, vol. 71, no. 6, June 2000 (2000-06), pages 2279-2282, XP012038321 ISSN: 0034-6748 page 2279 - page 2280; figure 1	1,2,8,9, 13,14, 20,21,26
X	US 4 185 889 A (ALLANIC JACQUES [FR] ET AL) 29 January 1980 (1980-01-29) column 2, line 53 - column 6, line 49; figures 3-6	1,2,9,26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/013020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5805754 A	08-09-1998	NONE	
US 4185889 A	29-01-1980	CA 1095758 A1	17-02-1981
		FR 2399040 A1	23-02-1979
		GB 2004081 A	21-03-1979
		JP 55004080 A	12-01-1980