

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 July 2010 (15.07.2010)

PCT

(10) International Publication Number
WO 2010/080649 A3

(51) International Patent Classification:

H01S 3/038 (2006.01) H01S 3/034 (2006.01)
H01S 3/03 (2006.01) H01S 3/0971 (2006.01)

(21) International Application Number:

PCT/US2009/069176

(22) International Filing Date:

22 December 2009 (22.12.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/142,981 7 January 2009 (07.01.2009) US
12/487,730 19 June 2009 (19.06.2009) US

(71) Applicant (for all designated States except US): COHERENT, INC. [US/US]; 5100 Patrick Henry Drive, Santa Clara, CA 95054 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): HUA, Gongxue [US/US]; 39 Merriman Street, Unionville, CT 06085 (US).

(74) Agents: STALLMAN, Michael, A. et al.; Morrison & Foerster LLP, 425 Market Street, San Francisco, CA 94105-2482 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
26 August 2010

(54) Title: PARTICLE DAMAGE PROTECTION FOR HIGH POWER CO2 SLAB LASER MIRRORS

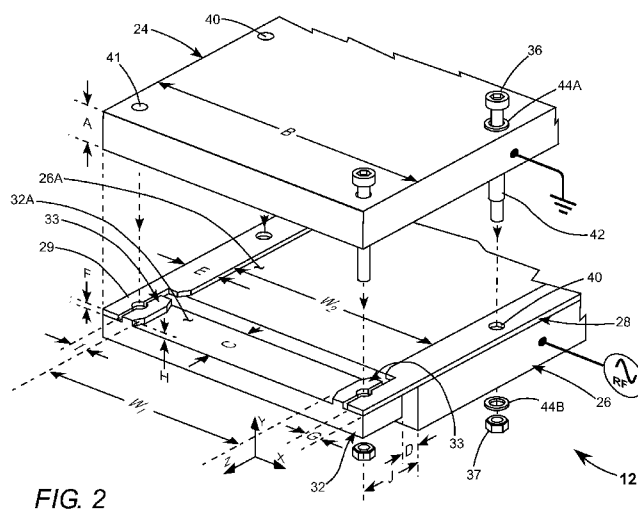


FIG. 2

(57) Abstract: A CO2 gas discharge laser 10 includes elongated planar live and ground electrodes (24, 26) vertically spaced and electrically insulated from each. The electrodes are spaced apart by ceramic spacer strips (28) arranged along the edges of the electrodes. An auxiliary electrode (32) is located at each end of the live electrode, co-planar with the live electrode, longitudinally spaced part from the live electrode vertically spaced apart from, but electrically connected to, the ground electrode. The auxiliary electrode has two raised portions (33) spaced apart by a distance less than the distance between inside edges of the ceramic strips. The raised portions of the auxiliary electrode prevent erosion of the ceramic strips by laser radiation generated in the resonator when the laser is operating.

WO 2010/080649 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/069176

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01S3/038 H01S3/03 H01S3/034 H01S3/0971
 ADD.

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

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, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/078877 A1 (COHERENT INC [US]; SHACKLETON CHRISTIAN J [US]; GARDNER PHILLIP J [US]) 25 August 2005 (2005-08-25)	10-12
A	figure 1a page 7, line 24 - page 8, line 5	1-9, 13, 14
A	US 2006/029116 A1 (SHACKLETON CHRISTIAN J [US] ET AL) 9 February 2006 (2006-02-09) figure 1b paragraph [0025]	1-9
A	US 5 216 689 A (GARDNER PHILLIP J [US] ET AL) 1 June 1993 (1993-06-01) figures 3-5,9	1-9

Further documents are listed in the continuation of Box C.

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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

25 June 2010

Date of mailing of the international search report

05/07/2010

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

Authorized officer

Lendroit, Stéphane

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/069176

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005078877	A1 25-08-2005	DE 112005000288 T5 JP 2007520894 T	01-02-2007 26-07-2007
US 2006029116	A1 09-02-2006	DE 112005001820 T5 JP 2008509556 T WO 2006020373 A1	14-06-2007 27-03-2008 23-02-2006
US 5216689	A 01-06-1993	NONE	