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(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, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

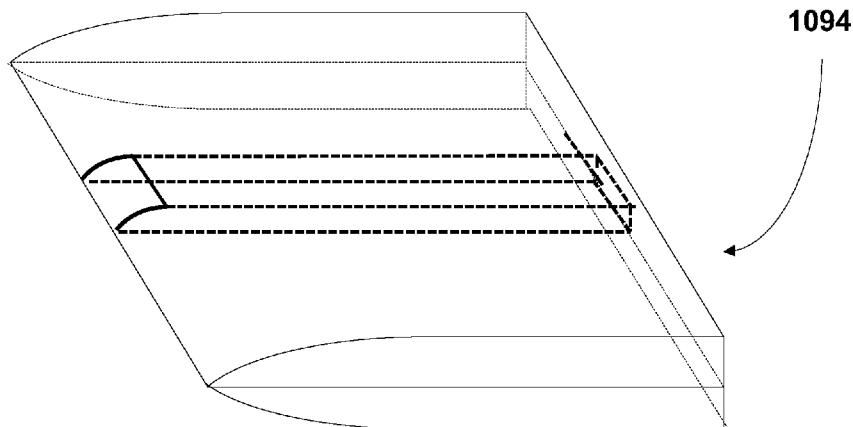
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[Continued on next page]

(54) Title: MEDICAL INSTRUMENTS AND METHODS FOR FABRICATING SAME



(y)

(57) Abstract: The present invention provides novel medical instruments and methods for fabricating them by using nano-technology processes.





(88) Date of publication of the international search report:
14 February 2013

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/029931**A. CLASSIFICATION OF SUBJECT MATTER***A61B 17/00(2006.01)i, A61B 17/32(2006.01)i, A61B 17/16(2006.01)i, A61B 17/14(2006.01)i, B21G 1/00(2006.01)i*

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)

A61B 17/00; A61M 5/32; B05D 3/00; A61F 2/06; G03F 7/00; A61K 9/50; B29C 41/20; B21K 11/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: medical instruments, fabricating, etching, pattern, substrate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2009-0176042 A1 (COHEN, ADAM L.) 09 July 2009 See abstract; paragraphs 51-53; claims 1-2.	1-6,9,16 7-8,10-15,17-29
X A	US 2006-0105275 A1 (MALONEY, JOHN M. et al.) 18 May 2006 See abstract; fig. 8A; claims 1, 7.	1-2,4,16 3,5-15,17-29
X A	US 2007-0178221 A1 (SIMS, DANIEL D. et al.) 02 August 2007 See abstract; fig. 1; claims 1, 2, 5, 15.	1 2-29
X A	US 6503231 B1 (PRAUSNITZ, MARK R. et al.) 07 January 2003 See abstract; figs. 1-3; claim 2.	1 2-29
X A	US 05317938 A (DE JUAN, JR., EUGENE et al.) 07 June 1994 See abstract; figs. 1-3; claim 1.	1 2-29



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

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"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

18 SEPTEMBER 2012 (18.09.2012)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/029931**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 30-31
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0176042 A1	09.07.2009	AU 2002-351289 A1	23.06.2003
		AU 2002-360464 A1	17.06.2003
		AU 2002-360464 A8	17.06.2003
		AU 2003-228973 A1	11.11.2003
		AU 2003-228973 A8	11.11.2003
		AU 2003-228974 A1	11.11.2003
		AU 2003-228974 A8	11.11.2003
		AU 2003-228975 A1	11.11.2003
		AU 2003-228975 A8	11.11.2003
		AU 2003-228976 A1	11.11.2003
		AU 2003-228976 A8	11.11.2003
		AU 2003-229025 A1	11.11.2003
		AU 2003-233119 A1	11.11.2003
		AU 2003-233119 A8	11.11.2003
		AU 2003-234397 A1	11.11.2003
		AU 2003-234397 A8	11.11.2003
		AU 2003-234398 A1	11.11.2003
		AU 2003-234398 A8	11.11.2003
		AU 2003-279763 A1	23.04.2004
		AU 2003-279763 A8	23.04.2004
		AU 2003-280468 A1	19.01.2004
		CA 2544063 A1	02.06.2005
		CN 101445945 A	03.06.2009
		CN 101724875 A	09.06.2010
		CN 1659317 C0	24.08.2005
		CN 1665964 C0	07.09.2005
		CN 1669177 C0	14.09.2005
		CN 1692181 C0	02.11.2005
		EP 1256050 A2	13.11.2002
		EP 1256050 B1	09.11.2011
		EP 1495482 A2	12.01.2005
		EP 1506329 A1	16.02.2005
		EP 1518822 A2	30.03.2005
		EP 1518822 A3	28.02.2007
		EP 1520321 A1	06.04.2005
		EP 1576206 A2	21.09.2005
		EP 1576206 A3	05.10.2005
		EP 1576207 A2	21.09.2005
		EP 1576207 A3	05.10.2005
		GB 2425199 A	18.10.2006
		JP 04434013 B2	08.01.2010
		JP 04554357 B2	23.07.2010
		JP 2005-524775 A	18.08.2005
		JP 2005-532015 A	20.10.2005
		JP 2006-503176 A	26.01.2006
		JP 2009-038806 A	19.02.2009
		JP 2010-059550 A	18.03.2010
		KR 10-0994887 B1	16.11.2010
		KR 10-2005-0016867 A	21.02.2005

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		TW 267567 A	01.12.2006
		TW 267567 B	01.12.2006
		US 2002-0188691 A1	12.12.2002
		US 2003-0183008 A1	02.10.2003
		US 2003-0222738 A1	04.12.2003
		US 2003-0234179 A1	25.12.2003
		US 2004-0000489 A1	01.01.2004
		US 2004-0004001 A1	08.01.2004
		US 2004-0004002 A1	08.01.2004
		US 2004-0007468 A1	15.01.2004
		US 2004-0007470 A1	15.01.2004
		US 2004-0014662 A1	22.01.2004
		US 2004-020782 A1	05.02.2004
		US 2004-134772 A1	15.07.2004
		US 2004-140862 A1	22.07.2004
		US 2004-146650 A1	29.07.2004
		US 2004-251142 A1	16.12.2004
		US 2005-023144 A1	03.02.2005
		US 2005-023148 A1	03.02.2005
		US 2005-032362 A1	10.02.2005
		US 2005-032375 A1	10.02.2005
		US 2005-067292 A1	31.03.2005
		US 2005-072681 A1	07.04.2005
		US 2005-104609 A1	19.05.2005
		US 2005-121411 A1	09.06.2005
		US 2005-142739 A1	30.06.2005
		US 2005-173374 A1	11.08.2005
		US 2005-176238 A1	11.08.2005
		US 2005-176285 A1	11.08.2005
		US 2005-179458 A1	18.08.2005
		US 2005-184748 A1	25.08.2005
		US 2005-189958 A1	01.09.2005
		US 2005-189959 A1	01.09.2005
		US 2005-194258 A1	08.09.2005
		US 2005-194348 A1	08.09.2005
		US 2005-199583 A1	15.09.2005
		US 2005-202660 A1	15.09.2005
		US 2005-202667 A1	15.09.2005
		US 2005-212539 A1	29.09.2005
		US 2005-215023 A1	29.09.2005
		US 2005-215046 A1	29.09.2005
		US 2005-221529 A1	06.10.2005
		US 2005-221644 A1	06.10.2005
		US 2005-223543 A1	13.10.2005
		US 2005-230261 A1	20.10.2005
		US 2005-246510 A1	03.11.2005
		US 2005-253606 A1	17.11.2005
		US 2005-257062 A1	17.11.2005
		US 2005-268068 A1	01.12.2005
		US 2006-006888 A1	12.01.2006

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2006-011486 A1	19.01.2006
		US 2006-051948 A1	09.03.2006
		US 2006-053625 A1	16.03.2006
		US 2006-108678 A1	25.05.2006
		US 2006-109016 A1	25.05.2006
		US 2006-112550 A1	01.06.2006
		US 2006-134831 A1	22.06.2006
		US 2006-226015 A1	12.10.2006
		US 2006-238209 A1	26.10.2006
		US 2006-282065 A1	14.12.2006
		US 2006-286829 A1	21.12.2006
		US 2007-015367 A1	18.01.2007
		US 2007-039828 A1	22.02.2007
		US 2007-045121 A1	01.03.2007
		US 2007-045122 A1	01.03.2007
		US 2007-100361 A1	03.05.2007
		US 2007-109004 A1	17.05.2007
		US 2007-112338 A1	17.05.2007
		US 2007-158200 A1	12.07.2007
		US 2007-170940 A1	26.07.2007
		US 2007-170943 A1	26.07.2007
		US 2007-181431 A1	09.08.2007
		US 2007-198038 A1	23.08.2007
		US 2007-199822 A1	30.08.2007
		US 2007-199825 A1	30.08.2007
		US 2007-202693 A1	30.08.2007
		US 2007-205374 A1	06.09.2007
		US 2007-219459 A1	20.09.2007
		US 2007-265648 A1	15.11.2007
		US 2008-037777 A1	14.02.2008
		US 2008-050524 A1	28.02.2008
		US 2008-062638 A1	13.03.2008
		US 2008-091894 A1	17.04.2008
		US 2008-093424 A1	24.04.2008
		US 2008-100315 A1	01.05.2008
		US 2008-100326 A1	01.05.2008
		US 2008-105355 A1	08.05.2008
		US 2008-105557 A1	08.05.2008
		US 2008-105646 A1	08.05.2008
		US 2008-105647 A1	08.05.2008
		US 2008-106280 A1	08.05.2008
		US 2008-108221 A1	08.05.2008
		US 2008-111573 A1	15.05.2008
		US 2008-121343 A1	29.05.2008
		US 2008-157793 A1	03.07.2008
		US 2008-174332 A1	24.07.2008
		US 2008-211524 A1	04.09.2008
		US 2008-213276 A1	04.09.2008
		US 2008-230391 A1	25.09.2008
		US 2008-246558 A1	09.10.2008

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2008-256173 A1	16.10.2008
		US 2009-015903 A1	15.01.2009
		US 2009-093874 A1	09.04.2009
		US 2009-139869 A1	04.06.2009
		US 2009-149944 A1	11.06.2009
		US 2009-165295 A1	02.07.2009
		US 2009-176004 A1	09.07.2009
		US 2009-194425 A1	06.08.2009
		US 2009-197371 A1	06.08.2009
		US 2009-212009 A1	27.08.2009
		US 2009-256583 A1	15.10.2009
		US 2009-320990 A1	31.12.2009
		US 2010-033202 A1	11.02.2010
		US 2010-042804 A1	18.02.2010
		US 2010-051466 A1	04.03.2010
		US 2010-065431 A1	18.03.2010
		US 2010-065432 A1	18.03.2010
		US 2010-094320 A1	15.04.2010
		US 2010-133109 A1	03.06.2010
		US 2010-133952 A1	03.06.2010
		US 2010-134131 A1	03.06.2010
		US 2010-136851 A1	03.06.2010
		US 2010-155253 A1	24.06.2010
		US 2010-176834 A1	15.07.2010
		US 2010-213068 A1	26.08.2010
		US 2010-241027 A1	23.09.2010
		US 2010-270165 A1	28.10.2010
		US 2010-276077 A1	04.11.2010
		US 2010-313039 A1	09.12.2010
		US 2010-314257 A1	16.12.2010
		US 2010-314258 A1	16.12.2010
		US 2011-022207 A1	27.01.2011
		US 2011-073479 A1	31.03.2011
		US 2011-080236 A1	07.04.2011
		US 2011-087851 A1	14.04.2011
		US 2011-092988 A1	21.04.2011
		US 2011-132767 A1	09.06.2011
		US 6418478 B1	09.07.2002
		US 7109118 B2	19.09.2006
		US 7160429 B2	09.01.2007
		US 7185542 B2	06.03.2007
		US 7195989 B2	27.03.2007
		US 7198704 B2	03.04.2007
		US 7209972 B1	24.04.2007
		US 7229542 B2	12.06.2007
		US 7239219 B2	03.07.2007
		US 7241689 B2	10.07.2007
		US 7250101 B2	31.07.2007
		US 7252861 B2	07.08.2007
		US 7259640 B2	21.08.2007

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7265562 B2	04.09.2007
		US 7265565 B2	04.09.2007
		US 7273812 B2	25.09.2007
		US 7277941 B2	02.10.2007
		US 7303663 B2	04.12.2007
		US 7315923 B2	01.01.2008
		US 7363705 B2	29.04.2008
		US 7372616 B2	13.05.2008
		US 7384530 B2	10.06.2008
		US 7401154 B2	15.07.2008
		US 7412767 B2	19.08.2008
		US 7488686 B2	10.02.2009
		US 7501328 B2	10.03.2009
		US 7504840 B2	17.03.2009
		US 7511523 B2	31.03.2009
		US 7517462 B2	14.04.2009
		US 7524427 B2	28.04.2009
		US 7531077 B2	12.05.2009
		US 7557595 B2	07.07.2009
		US 7567089 B2	28.07.2009
		US 7581077 B2	25.08.2009
		US 7611616 B2	03.11.2009
		US 7640651 B2	05.01.2010
		US 7679388 B2	16.03.2010
		US 7686770 B2	30.03.2010
		US 7739381 B2	15.06.2010
		US 7811427 B2	12.10.2010
		US 7811822 B2	12.10.2010
		US 7828952 B2	09.11.2010
		US 7830228 B2	09.11.2010
		US 7861050 B2	28.12.2010
		US 7878385 B2	01.02.2011
		US 7962642 B2	14.06.2011
		US 8019963 B2	13.09.2011
		US 8131964 B2	06.03.2012
US 2006-0105275 A1	18.05.2006	US 2009-024113 A1	22.01.2009
		US 7413846 B2	19.08.2008
		WO 2006-055593 A2	26.05.2006
		WO 2006-055593 A3	19.04.2007
US 2007-0178221 A1	02.08.2007	AU 2007-211284 A1	09.08.2007
		CA 2640731 A1	09.08.2007
		EP 1983970 A2	29.10.2008
		JP 2009-525138 A	09.07.2009
		US 2011-0056909 A1	10.03.2011
		US 7736687 B2	15.06.2010
		US 8247020 B2	21.08.2012
		WO 2007-089912 A2	09.08.2007
		WO 2007-089912 A3	15.01.2009

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029931

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6503231 B1	07.01.2003	AT 449841 T	15.12.2009
		AU 1999-45616 A1	30.12.1999
		AU 1999-45616 B2	30.10.2003
		AU 2000-54613 A1	28.12.2000
		CA 2330207 A1	16.12.1999
		CA 2330207 C	30.08.2005
		CA 2376128 A1	14.12.2000
		CA 2376128 C	06.01.2009
		CA 2510389 A1	16.12.1999
		DE 69941696 D1	07.01.2010
		EP 1086214 A1	28.03.2001
		EP 1086214 B1	25.11.2009
		EP 1187653 A2	20.03.2002
		EP 1187653 B1	31.03.2010
		ES 2356337 T3	07.04.2011
		JP 2002-517300 A	18.06.2002
		JP 2009-119296 A	04.06.2009
		US 2002-0138049 A1	26.09.2002
		US 2003-0208167 A1	06.11.2003
		US 2005-0137531 A1	23.06.2005
		US 2007-0225676 A1	27.09.2007
		US 2009-0131905 A1	21.05.2009
		US 2010-0312191 A1	09.12.2010
		US 6334856 B1	01.01.2002
		US 6611707 B1	26.08.2003
		US 6743211 B1	01.06.2004
		US 7226439 B2	05.06.2007
		US 7344499 B1	18.03.2008
		US 8257324 B2	04.09.2012
		WO 00-74763 A2	14.12.2000
		WO 99-64580 A1	16.12.1999
US 05317938 A	07.06.1994	None	