



- (51) **International Patent Classification:**  
*A61B 17/29* (2006.01)    *A61B 19/00* (2006.01)
- (21) **International Application Number:**  
PCT/US2012/050988
- (22) **International Filing Date:**  
15 August 2012 (15.08.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
13/210,142    15 August 2011 (15.08.2011)    US  
13/210,196    15 August 2011 (15.08.2011)    US
- (71) **Applicant (for all designated States except US):** **INTUITIVE SURGICAL OPERATIONS, INC.** [US/US]; 1266 Kifer Road, Bldg. 101, Sunnyvale, California 94086 (US).
- (72) **Inventor; and**
- (75) **Inventor/Applicant (for US only):** **BLUMENKRANZ, Stephen J.** [US/US]; 25223 La Loma Drive, Los Altos Hills, California 94022-4540 (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, BN, 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.

(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, 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))

(88) **Date of publication of the international search report:**  
10 May 2013

(54) **Title:** MEDICAL INSTRUMENT WITH FLEXIBLE JAW AND/OR FLEXIBLE WRIST MECHANISMS

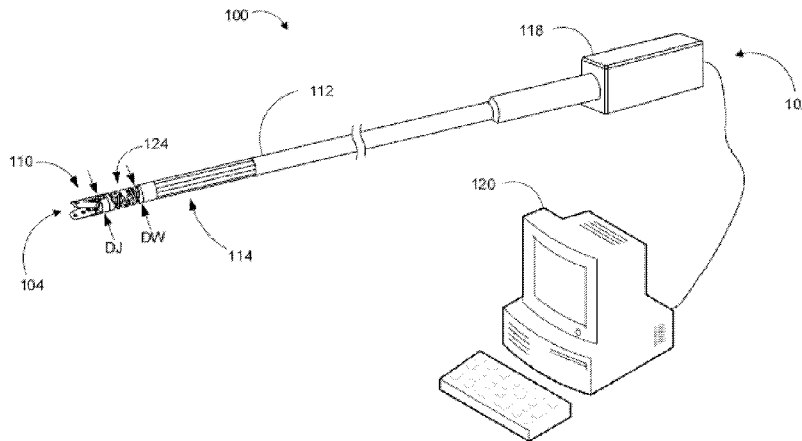


FIG. 1

(57) **Abstract:** A medical instrument includes a unitary jaw structure having: a connector portion, a first jaw portion flexibly integral with the connector portion, a first arm portion integral with the first jaw portion, and an actuator portion flexibly integral with the first arm portion for causing rotating motion of the first jaw portion upon linear motion of the actuator portion. The medical instrument includes a unitary wrist structure having: a first connector portion having a lower stop surface, a compact flexure integral with the first connector portion, and a second connector portion integral with the compact flexure with the second connector portion having an upper stop surface integral with the compact flexure below the lower stop surface and forming an angle with the lower stop surface.



## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/050988****A. CLASSIFICATION OF SUBJECT MATTER***A61B 17/29(2006.01)i, A61B 19/00(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 17/29; A61B 10/00; A61B 17/00; A61B 17/32; A61B 17/28; A61B 17/04

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) &amp; Keywords: unitary jaw, wrist, flexible connector, flexible jaw, medical jaw

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003-0036748 A1 (THOMAS G. COOPER et al.) 20 February 2003 See abstract; paragraphs [0141]-[0146]; claims 1, 14; figures 38, 38A, 40.	1-46
A	US 2004-0260198 A1 (ROTHBERG ELLIOTT et al.) 23 December 2004 See abstract; paragraph [0056]; claims 1, 18; figure 6.	1-46
A	US 05906630A A (ANDERHUB; OTTO E. et al.) 25 May 1999 See abstract; column 3, line 10-column 4, line 7; claims 1, 18; figure 1.	1-46
A	US 2010-0030238 A1 (VIOLA FRANK et al.) 04 February 2010 See abstract; paragraphs [0297]-[0312]; claims 1, 18; figures 1, 4.	1-46
A	US 2009-0198272 A1 (KERVER LAWRENCE et al.) 06 August 2009 See abstract; paragraphs [0027]-[0041]; claim 1; figures 1, 2.	1-46

 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 application or patent 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 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

19 FEBRUARY 2013 (19.02.2013)

Date of mailing of the international search report

**20 FEBRUARY 2013 (20.02.2013)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan  
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHO, Woo Yeon

Telephone No. 82-42-481-5617



## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2012/050988**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003-0036748 A1	20.02.2003	AU 2002-318461 A1	03.03.2003
		AU 2002-318461 A8	23.04.2009
		AU 2002-322374 B2	26.10.2006
		AU 2003-293353 A1	30.06.2004
		AU 2003-293353 A8	30.06.2004
		CA 2451824 A1	09.01.2003
		CA 2792000 A1	09.01.2003
		CN 101181167 A	21.05.2008
		CN 101340853 A	07.01.2009
		CN 101978928 A	23.02.2011
		CN 102028545 A	27.04.2011
		CN 1728972 A	01.02.2006
		CN 1728972 C0	28.05.2008
		EP 1408846 A2	21.04.2004
		EP 1408846 B1	07.03.2012
		EP 1575439 A2	21.09.2005
		EP 1575439 B1	04.04.2012
		EP 1585425 A2	19.10.2005
		EP 1585425 A4	23.02.2011
		EP 1853193 A1	14.11.2007
		EP 1965718 A2	10.09.2008
		EP 2338434 A2	29.06.2011
		JP 04-332031 B2	26.06.2009
		JP 04-347043 B2	24.07.2009
		JP 04-486503 B2	02.04.2010
		JP 04-938753 B2	02.03.2012
		JP 05-021607 B2	22.06.2012
		JP 2005-502398 A	27.01.2005
		JP 2005-502398 T	27.01.2005
		JP 2005-507679 A	24.03.2005
		JP 2006-508765 A	16.03.2006
		JP 2007-175502 A	12.07.2007
		JP 2008-531222 A	14.08.2008
		JP 2009-136684 A	25.06.2009
		JP 2009-148557 A	09.07.2009
		JP 2010-099530 A	06.05.2010
		JP 2011-131071 A	07.07.2011
		JP 2011-131072 A	07.07.2011
		JP 2012-143581 A	02.08.2012
		JP 2012-152562 A	16.08.2012
		KR 10-1026692 B1	07.04.2011
		KR 10-1057002 B1	17.08.2011
		KR 10-1087996 B1	01.12.2011
		KR 10-1118049 B1	24.02.2012
		KR 10-2008-0089579 A	07.10.2008
		US 2003-0018323 A1	23.01.2003
		US 2004-0138700 A1	15.07.2004
		US 2004-0162547 A1	19.08.2004
		US 2005-0090809 A1	28.04.2005

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2012/050988**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2005-0182298 A1	18.08.2005
		US 2006-0178556 A1	10.08.2006
		US 2006-0199999 A1	07.09.2006
		US 2007-0156119 A1	05.07.2007
		US 2007-0239203 A1	11.10.2007
		US 2010-0228284 A1	09.09.2010
		US 2011-0028991 A1	03.02.2011
		US 2011-0118755 A1	19.05.2011
		US 2011-0125166 A1	26.05.2011
		US 6699235 B2	02.03.2004
		US 6817974 B2	16.11.2004
		US 7066926 B2	27.06.2006
		US 7320700 B2	22.01.2008
		US 7691098 B2	06.04.2010
		US 7736356 B2	15.06.2010
		US 7862580 B2	04.01.2011
		US 8142421 B2	27.03.2012
		US 8337521 B2	25.12.2012
		WO 03-001986 A2	09.01.2003
		WO 03-001986 A3	09.01.2003
		WO 03-001987 A2	09.01.2003
		WO 03-001987 A3	09.01.2003
		WO 2004-052171 A2	24.06.2004
		WO 2004-052171 A3	24.06.2004
		WO 2006-094242 A1	08.09.2006
		WO 2007-120353 A2	25.10.2007
		WO 2007-120353 A3	25.10.2007
US 2004-0260198 A1	23.12.2004	AT 502579 T	15.04.2011
		AU 2004-251613 A1	06.01.2005
		CA 2529434 A1	06.01.2005
		DE 602004031950 D1	05.05.2011
		EP 1653863 A2	10.05.2006
		EP 1653863 B1	23.03.2011
		EP 2294984 A2	16.03.2011
		EP 2294984 A3	01.06.2011
		JP 04-842809 B2	14.10.2011
		JP 2006-527633 A	07.12.2006
		US 2004-0260337 A1	23.12.2004
		WO 2005-000125 A2	06.01.2005
		WO 2005-000125 A3	06.01.2005
US 05906630A A	25.05.1999	AU 1999-39718 A1	17.01.2000
		AU 1999-39718 B2	31.10.2002
		CA 2335831 A1	06.01.2000
		CA 2335831 C	23.10.2007
		EP 1091693 A1	18.04.2001
		EP 1091693 B1	01.10.2008
		JP 2002-519092 A	02.07.2002
		WO 00-00091 A1	06.01.2000

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2012/050988**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0030238 A1	04.02.2010	AU 2007-307024 A1	17.04.2008
		AU 2007-307032 A1	17.04.2008
		AU 2007-307067 A1	17.04.2008
		AU 2007-307087 A1	17.04.2008
		AU 2007-307101 A1	17.04.2008
		CA 2664319 A1	17.04.2008
		CA 2664415 A1	17.04.2008
		CA 2664495 A1	17.04.2008
		CA 2664657 A1	17.04.2008
		CA 2665627 A1	17.04.2008
		CN 101522092 A	02.09.2009
		CN 101522092 B	03.08.2011
		CN 101522108 A	02.09.2009
		CN 101522119 A	02.09.2009
		CN 101522121 A	02.09.2009
		CN 101522121 B	14.09.2011
		CN 101522122 A	02.09.2009
		CN 101522122 B	06.07.2011
		CN 102274056 A	14.12.2011
		EP 2081481 A2	29.07.2009
		EP 2083702 A2	05.08.2009
		EP 2083727 A2	05.08.2009
		EP 2083728 A2	05.08.2009
		EP 2083729 A2	05.08.2009
		EP 2083730 A2	05.08.2009
		EP 2086438 A2	12.08.2009
		EP 2097020 A2	09.09.2009
		JP 2010-505519 A	25.02.2010
		JP 2010-505519 T	25.02.2010
		JP 2010-505523 A	25.02.2010
		JP 2010-505523 T	25.02.2010
		JP 2010-505524 A	25.02.2010
		JP 2010-505524 T	25.02.2010
		JP 2010-505525 A	25.02.2010
		JP 2010-505525 T	25.02.2010
		US 2010-0010512 A1	14.01.2010
		US 2010-0030028 A1	04.02.2010
		US 2010-0030239 A1	04.02.2010
		US 2010-0076460 A1	25.03.2010
		US 2010-0076461 A1	25.03.2010
		US 2010-0094083 A1	15.04.2010
		US 2010-0217282 A1	26.08.2010
		US 2010-0274265 A1	28.10.2010
		US 8177794 B2	15.05.2012
		US 8226667 B2	24.07.2012
		US 8246637 B2	21.08.2012
		US 8292905 B2	23.10.2012
		US 8292906 B2	23.10.2012
		US 8337515 B2	25.12.2012
		US 8372090 B2	12.02.2013

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/050988**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2008-045333 A2	17.04.2008
		WO 2008-045333 A3	17.04.2008
		WO 2008-045353 A2	17.04.2008
		WO 2008-045353 A3	17.04.2008
		WO 2008-045355 A2	17.04.2008
		WO 2008-045355 A3	17.04.2008
		WO 2008-045361 A2	17.04.2008
		WO 2008-045361 A3	17.04.2008
		WO 2008-045367 A2	17.04.2008
		WO 2008-045367 A3	17.04.2008
		WO 2008-045376 A2	17.04.2008
		WO 2008-045376 A3	17.04.2008
		WO 2008-045385 A2	17.04.2008
		WO 2008-045385 A3	17.04.2008
		WO 2008-045386 A2	17.04.2008
		WO 2008-045386 A3	17.04.2008
		WO 2008-045394 A2	17.04.2008
		WO 2008-045394 A3	05.06.2008
US 2009-0198272 A1	06.08.2009	AU 2009-212240 A1	13.08.2009
		CA 2713983 A1	13.08.2009
		CN 101938946 A	05.01.2011
		EP 2240095 A2	20.10.2010
		JP 2011-510800 A	07.04.2011
		JP 2011-510800 T	07.04.2011
		KR 10-2010-0118573 A	05.11.2010
		MX 2010008634 A	02.12.2010
		WO 2009-100366 A2	13.08.2009
		WO 2009-100366 A3	12.11.2009