

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 July 2007 (05.07.2007)

PCT

(10) International Publication Number
WO 2007/075882 A3

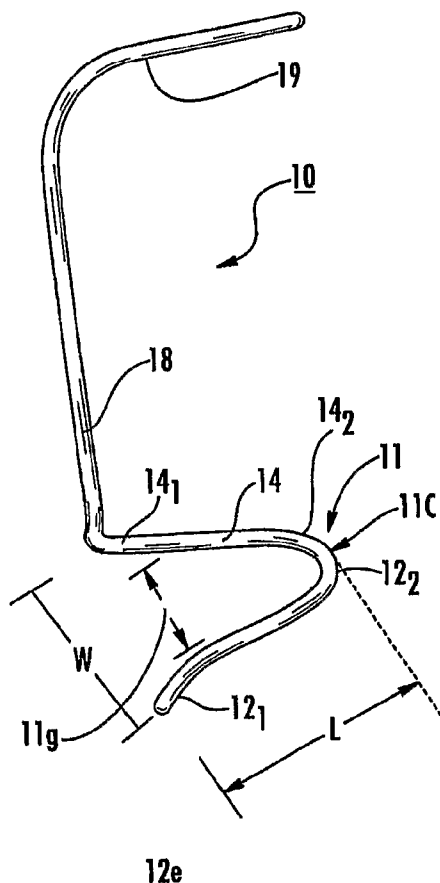
- (51) **International Patent Classification:**
A61J 11/00 (2006.01)
- (21) **International Application Number:**
PCT/US2006/048782
- (22) **International Filing Date:**
21 December 2006 (21.12.2006)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
60/754,112 27 December 2005 (27.12.2005) US
- (71) **Applicant (for all designated States except US):** EAST CAROLINA UNIVERSITY [US/US]; 2200 Charles Boulevard, Greenville Centre, Room 2400, Greenville, North Carolina 27858 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** ISHIKAWA, Norihiko [JP/JP]; 1-159 Matsumura, Kanazawa, Ishikawa 920-0348 (JP). NIFONG, L. Wiley [US/US]; 300 Queen Anne

Road, Greenville, North Carolina 27858 (US). SUN, You Su [US/US]; 109 Knight Drive, Winterville, North Carolina 28590 (US).

- (74) **Agent:** MYERS BIGEL SIBLEY & SAJOVEC, P.A.; Po. Box 37428, Raleigh, North Carolina 27627 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, 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, LV, LY, MA, MD, 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,

[Continued on next page]

(54) **Title:** ATRAUMATIC CURVILINEAR ATRIAL RETRACTORS AND RELATED METHODS



(57) **Abstract:** Cardiac retractors include a rod having opposing forward and rearward portions and a length sufficient to position the rearward portion of the rod outside a patient's body and the forward portion inside a patient proximate a lumen of cardiac tissue. The forward portion comprises a distal curvilinear portion that is sized and configured to reside in the left atrium and lift a roof of the left atrium. The retractors may be sized and configured to enter the body through a single small incision into the trans-thoracic cavity. The devices may be sized and configured to reside in situ proximate the mitral valve site at a left atria to splint open the mitral valve in response to robotic controlled direction of a surgeon for a mitral valve repair.

WO 2007/075882 A3



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, 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).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

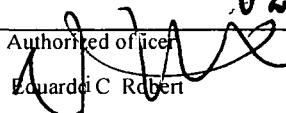
(88) Date of publication of the international search report:

3 July 2008

INTERNATIONAL SEARCH REPORT

International application No

PCI7US06/48782

A CLASSIFICATION OF SUBJECT MATTER		
IPC A61J 11/00 (2006 01)		
USPC 606/235		
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) U S 606/235		
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 practicable, search terms used)		
C DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 2004/0073242 A1 (CHANDUSZKO) 15 April 2004 (15 04 2004), see whole document	1-22
<input type="checkbox"/> Further documents are listed in the continuation of Bo.\ C <input type="checkbox"/> See patent family annex		
<ul style="list-style-type: none"> • 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 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 	<ul style="list-style-type: none"> T later document published after the international filing date or priority date and not in contact 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 14 April 2008 (14 04 2008)	Date of mailing of the international search report 02 MAY 2008	
Name and mailing address of the ISA/US Mail Stop PCT, AU/ISA/US Commissioner for Patents P O Box 1450 Alexandria, Virginia 223 13-1450 Facsimile No (57 1) 273-3201	Authorized officer  Eduardo C Rdbert Telephone No (57 1) 272-47 19	