

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 November 2007 (08.11.2007)

PCT

(10) International Publication Number
WO 2007/127653 A3

(51) International Patent Classification:

A61F 2/30 (2006.01) A61F 2/46 (2006.01)
A61F 2/44 (2006.01) A61F 2/28 (2006.01)

(21) International Application Number:

PCT/US2007/066877

(22) International Filing Date: 18 April 2007 (18.04.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

11/412,559 27 April 2006 (27.04.2006) US

(71) Applicant (for all designated States except US): **WARSAW ORTHOPEDIC, INC.** [US/US]; 2500 Silveus Crossing, Warsaw, Indiana 46581 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DICKSON, Andrew M.** [US/US]; 75 Mary Ann, Memphis, Tennessee 38117 (US). **BRADDOCK, Danny H. Jr.** [US/US]; 3015 Circle Gate Drive, Germantown, Tennessee 38138 (US). **HARROP, James S.** [US/US]; 909 Walnut Street,

Philadelphia, Pennsylvania 19107 (US). **KARAHALIOS, Dean G.** [US/US]; 1105 Emmons Court, Lake Forest, Illinois 60045 (US). **POTTS, Eric A.** [US/US]; 6160 Sunset Lane, Indianapolis, Indiana 46228 (US). **SHAF-FREY, Christopher I.** [US/US]; 3325 Rosedale Lane, Charlottesville, Virginia 22902 (US).

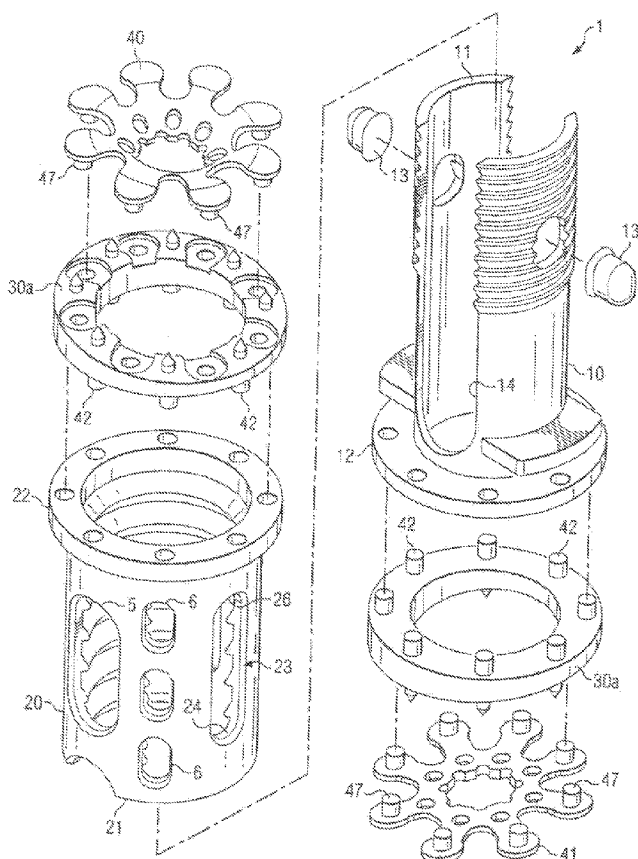
(74) Agents: **JARO, Michael J.** et al.; 710 Medtronic Parkway MS LC340, Minneapolis, Minnesota 55432 (US).

(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, 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, 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,

[Continued on next page]

(54) Title: EXPANDABLE IMPLANT, INSTRUMENT, AND METHOD



(57) Abstract: Embodiments of the invention include expandable, implantable devices and methods. Devices expand linearly along a ratchet mechanism to provide secure fixation between or among anatomical structures. In some embodiments, an implant replaces one or more vertebral bodies of the spine. An implant is disclosed comprising two tubular members (10, 20) and a key pin (13) fixed to one member and guided in a slot (23) of the second member. Pressure applied to the key pin releases the ratcheting mechanism and allows compression of the implant. Also disclosed is an end cap (30, 40) for a medical implant, providing an interface with the skeletal structure.

WO 2007/127653 A3



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).

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:
10 April 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/066877A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F2/30 A61F2/44 A61F2/46 A61F2/28

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)
A61F

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98/46173 A (SYNTHES AG [CH]; SCHAEER MANUEL [CH]; HATEBUR ALEX [CH]; SCHLAEPFER FRI) 22 October 1998 (1998-10-22)	1-7
A	page 2, paragraph 3 - page 7, paragraph 2	9,10
X	DE 196 22 827 A1 (ULRICH HEINRICH [DE]) 11 December 1997 (1997-12-11)	1,2,4, 6-8
Y	column 3, line 10 - column 4, line 31	3
Y	US 4 554 914 A (KAPP JOHN P [US] ET AL) 26 November 1985 (1985-11-26)	3
X	FR 2 850 563 A1 (SCIENT X [FR]) 6 August 2004 (2004-08-06)	1,2,4,6, 8
	page 5, line 1 - page 9, line 24	

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

Date of the actual completion of the international search

11 October 2007

Date of mailing of the international search report

29/02/2008

Name and mailing address of the ISA/

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

Authorized officer

Buchmann, Gerhard

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/066877

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.:
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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

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.:

see additional sheet(s)

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

An expandable implant comprising two tubular members and a key pin fixed to the first member and positioned in a slot of the second member.

2. claims: 11-17

An expandable implant comprising two tubular members which intermittently lock relative to each other and an insertion instrument comprising first and second tips and a spreader mechanism.

3. claims: 18-33

An end member for a medical implant.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/066877

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 9846173	A	22-10-1998	AT 225150 T	15-10-2002
			AU 723279 B2	24-08-2000
			AU 2285597 A	11-11-1998
			DE 59708392 D1	07-11-2002
			EP 0975288 A1	02-02-2000
			JP 3955883 B2	08-08-2007
			JP 2001518824 T	16-10-2001
			US 6176881 B1	23-01-2001
			<hr/>	
DE 19622827	A1	11-12-1997	AT 214578 T	15-04-2002
			WO 9747258 A1	18-12-1997
			EP 0848603 A1	24-06-1998
			ES 2171947 T3	16-09-2002
			JP 11510720 T	21-09-1999
			JP 3826405 B2	27-09-2006
			US 6015436 A	18-01-2000
<hr/>				
US 4554914	A	26-11-1985	NONE	
<hr/>				
FR 2850563	A1	06-08-2004	EP 1589906 A2	02-11-2005
			WO 2004071355 A2	26-08-2004
			US 2006200244 A1	07-09-2006
<hr/>				