



PCT

(10) International Publication Number
WO 2006/096306 A3

(43) International Publication Date
14 September 2006 (14.09.2006)

- (51) **International Patent Classification:**
F25B 1/00 (2006.01)
- (21) **International Application Number:**
PCT/US2006/005811
- (22) **International Filing Date:**
17 February 2006 (17.02.2006)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/073,325 4 March 2005 (04.03.2005) US
- (71) **Applicant** (*for all designated States except US*): **DEPUY SPINE SARL** [CH/CH]; Chemin Blan 36, Le Locle, CH-2400 (CH).
- (72) **Inventors; and**
- (75) **Inventors/Applicants** (*for US only*): **CHAO, Nam** [US/US]; 45 Perry Lane, Marlborough, Massachusetts 01752 (US). **SIU, Simon** [US/US]; 39 West Elm Avenue, Quincy, Massachusetts 02170 (US). **SACHER, Ronald** [US/US]; 39 Bancroft Street, Needham, Massachusetts 02492 (US). **GURLEY, Jerold** [US/US]; 30941 Arlington Circle, Bay Village, Ohio 44140 (US).
- (74) **Agents:** **CANNING, Kevin** et al.; Lahive & Cockfield, LLP, One Post Office Square, Boston, MA 02109-2127 (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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, 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, GO, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

- (88) Date of publication of the international search report:
6 December 2007

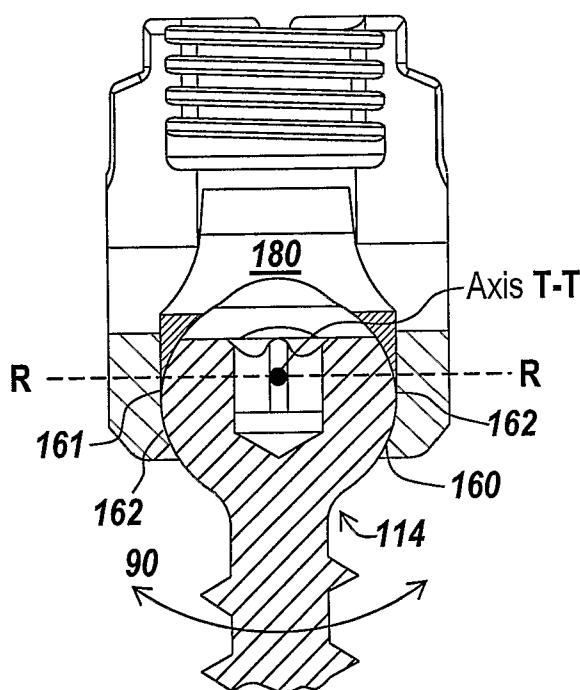
- (15) Information about Correction:**

Previous Correction:

see PCT Gazette No. 12/2007 of 22 March 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

- (54) Title:** CONSTRAINED MOTION BONE SCREW ASSEMBLY




- (57) Abstract:** A bone screw assembly includes an anchor portion and a head portion, such as a rod-receiving portion, movably mounted to the anchor portion to allow for controlled angulation between the anchor portion and the head portion. The anchor portion is pivotable in one or more selected directions about an axis relative to the head portion. A restriction member, which may be a rod seat, prevents the anchor portion from pivoting in one or more different directions about another axis relative to the head portion and/or a spinal fixation element received in the head portion. The restriction member may be inserted in the head portion to control direction that the anchor portion pivots relative to the head portion. The restriction member may also serve as a compression member and/or rod seat for seating a spinal rod coupled to the bone screw assembly.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/05811

A. CLASSIFICATION OF SUBJECT MATTER IPC: F25B 1/00 (2006.01) USPC: 62/115 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. : 62/115 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	DE 20-207851 UI (METZ-STAVENHAGEN) 14 NOVEMBER 2002 (14.11.2002), SEE ENTIRE DOCUMENT.	1-9, 11-14, 16-18
X, P --- Y	US 2005/0283244 A1 (GORDON ET AL.) 22 DECEMBER 2005 (22.12.2005), SEE ENTIRE DOCUMENT.	19-21 ----- 22
Y, P	US 2005/0261687 A1 (GARAMSZEGI ET AL.) 24 NOVEMBER 2005 (24.11.2005), SEE ENTIRE DOCUMENT.	22
A, P	US 2005/0288668 A1 (BRINKHAUS) 29 DECEMBER 2005 (29.12.2005), SEE ENTIRE DOCUMENT.	1-9, 11-14, 16-22
A	US 6,050,997 A (MULLANE) 18 APRIL 2000 (18.04.2000), SEE ENTIRE DOCUMENT.	1-9, 11-14, 16-22
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
*	Special categories of cited documents:	"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
"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	
Date of the actual completion of the international search 23 April 2007 (23.04.2007)		Date of mailing of the international search report <div style="font-size: 1.2em; font-weight: bold;">13 SEP 2007</div>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer <div style="text-align: center;">  Allan Shoap Telephone No. 571-272-3750 </div>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/05811

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.: 10 and 15
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:
Please See Continuation Sheet
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:

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 additional fees, this Authority did not invite payment of any 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.:

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

International application No.
PCT/US06/05811

Continuation of Box II Reason 2:

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 10 states, "The bone anchor assembly of claim 9, wherein the proximal head includes a projection for mating with a recess on the protrusion". The examiner is unable to find any written description towards this claim in the specification. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 15 states, "The bone anchor assembly of claim 14, wherein the rod seat has a longitudinal axis that is perpendicular to the first axis of the proximal head about which the shaft pivots". The examiner is unable to find any written description towards this claim in the specification.