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14/876,914 7 October 2015 (07.10.2015) US
- (71) **Applicant:** MEDOS INTERNATIONAL SARL [CH/CH]; Chemin-Blanc 38, 2400 Le Locle (CH).
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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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

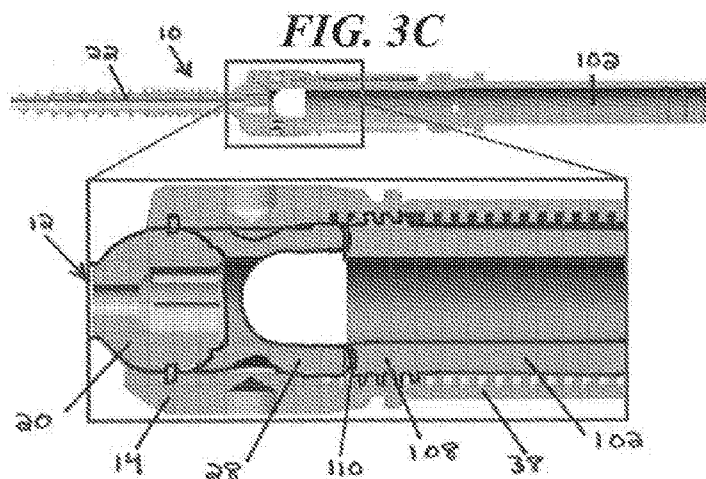
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

**Published:**

- with international search report (Art. 21(3))

[Continued on next page]

(54) **Title:** SYSTEMS AND METHODS FOR MANIPULATING BONE



(57) **Abstract:** Systems and methods are disclosed in which a distraction sleeve can be attached to a bone anchor assembly to lock or limit the polyaxial degree of freedom of the bone anchor assembly and facilitate true parallel distraction. In some embodiments, the distraction sleeve can lock polyaxial movement of the bone anchor assembly without directly engaging the shank of the bone anchor assembly, without directly engaging the exterior of the receiver member of the bone anchor assembly, and/or without requiring that a rod or closure mechanism be installed in the bone anchor assembly. The distraction sleeve can be preloaded onto the bone anchor assembly prior to inserting the bone anchor assembly using a selectively detachable driver, thereby providing simplified, streamlined insertion and facilitating use with protection and/or retraction sheaths. Countertorque tubes, torque wrenches, and other related instrumentation are also disclosed herein.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

**(88) Date of publication of the international search report:**  
29 June 2017

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2016/055412

## 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.: 20-30  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
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 all searchable 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.:

1-9

### 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/US2016/055412
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. A61B17/70 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) A61B		
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) EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 286 748 A1 (BIEDERMANN MOTECH GMBH [DE]) 23 February 2011 (2011-02-23)	1,2,4-8
Y	paragraph [0028]; figures 1,3,10-11 -----	3
X	EP 1 935 358 A1 (BIEDERMANN MOTECH GMBH [DE]) 25 June 2008 (2008-06-25)	1,2,4-8
Y	figures 1,3 -----	3
X	WO 2014/052117 A1 (MEDOS INT SARL [CH]; DEPUY SYNTHES PRODUCTS LLC [US])	1-8
Y	3 April 2014 (2014-04-03) figures 1,3 -----	3
A	US 2005/131408 A1 (SICVOL CHRISTOPHER W [US] ET AL) 16 June 2005 (2005-06-16)	1,4,7
	abstract; figures 7,16,21 -----	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <span style="margin-left: 100px;"><input checked="" type="checkbox"/> See patent family annex.</span>		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance	"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	
"E" earlier application or patent but published on or after the international filing date	"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	
"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)	"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	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"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	Date of mailing of the international search report	
31 January 2017	10/05/2017	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Nice, Philip	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/055412

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/US2016/055412

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		WO 2005058386 A2	30-06-2005

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-9

Bone anchor assembly with extension tabs and distraction sleeve with threading spaced from its distal end

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2. claims: 10, 11

Bone anchor assembly with extension tabs and distraction sleeve with pocket to receive them

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3. claims: 12-15

Bone anchor assembly, distraction sleeve and driver assembly

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4. claim: 16

Bone anchor assembly, distraction sleeve and torque wrench

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5. claims: 17-19

Bone anchor assembly, distraction sleeve and retraction sheath

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