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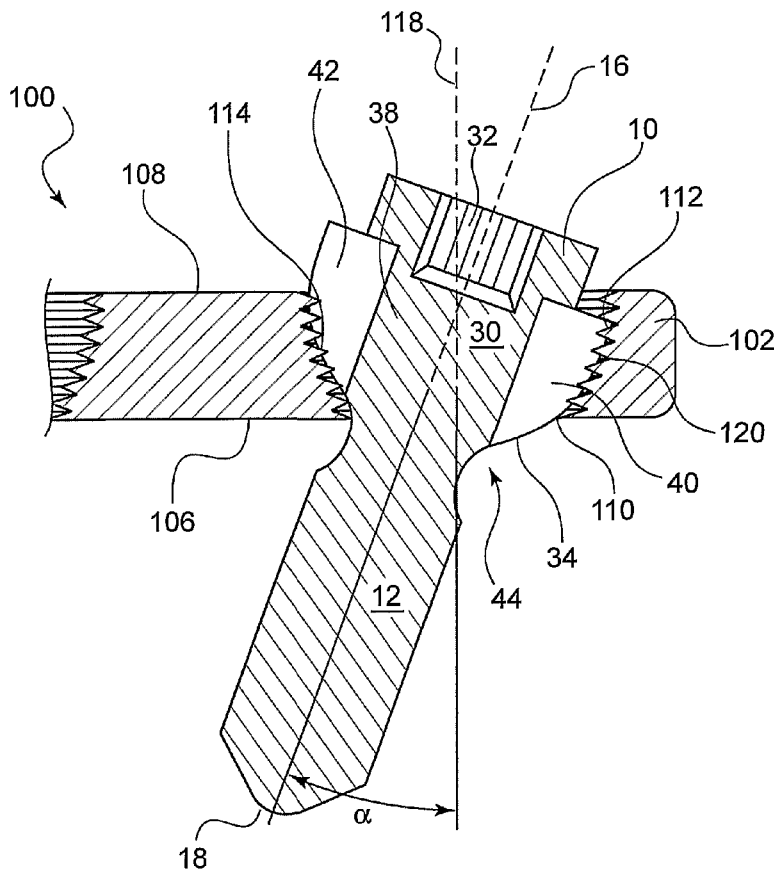
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(54) Title: POLYAXIAL FASTENER SYSTEMS AND METHODS



(57) Abstract: Embodiments of the present invention provide a bone fixation assembly that can provide polyaxial fixation. The polyaxial fixation may be provided by differing materials interfacing with one another to provide a secure lock.

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/029044

A. CLASSIFICATION OF SUBJECT MATTER  
 INV. A61B17/80 A61B17/86 A61B17/70

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

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	US 2004/260306 A1 (FALUN T WADE [US] ET AL) 23 December 2004 (2004-12-23)  paragraphs [0052], [0056] - [0058]; figures 3,5A	1-5,8,9, 11-21, 24,25
Y	-----	6,7,22, 23
X	US 2005/049593 A1 (DUONG LAN ANH NGUYEN [US] ET AL) 3 March 2005 (2005-03-03) paragraph [0214]; figure 29	1
X	US 2004/073218 A1 (DAHNER'S LAURENCE E [US]) 15 April 2004 (2004-04-15) paragraph [0046]; figure 7  ----- -/~	1,10

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
- '&' document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2006/029044

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 824 247 A (TUNC DEGER C [US]) 20 October 1998 (1998-10-20) figure 1 -----	6,7,22, 23
A	WO 02/34159 A2 (SDGI HOLDINGS INC [US]; TRIEU HAI H [US]; OUSTIS JEFF R [US]; DREWRY T) 2 May 2002 (2002-05-02) figures 6a, 6b -----	1-9, 11-25
A	US 2004/010257 A1 (CACHIA VICTOR V [US] ET AL CACHIA VICTOR V [US] ET AL) 15 January 2004 (2004-01-15) paragraph [0065]; figure 7 -----	6,7
A	WO 00/18309 A (BIONX IMPLANTS OY [FI]; TORMALA PERTTI [FI]; TASTO JAMES P [US]) 6 April 2000 (2000-04-06) figure 5 -----	6,7

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2006/029044**Box 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.: 26-28  
because they relate to subject matter not required to be searched by this Authority, namely:  
  
Pursuant to Rule 39.1(iv) PCT, the subject-matter of claims 26-28 has not been searched, since it is directed to a method for treatment of the human body by surgery (they all contained one step of securing the bone plate to bone).
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 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 fee, this Authority did not invite payment of any additional fee.
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.

No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ASA/ 210

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

1. claims: 1-9, 11-25

A polyaxial bone fixation assembly including a bone plate and a fastener having a head, the head having an inner portion integral with the shaft of the fastener and a ring around the inner portion, wherein the ring is injection molded onto the inner portion for simplifying the manufacturing process of the fastener.

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2. claims: 1, 10

A polyaxial bone fixation assembly including a fastener having a head and a bone plate having an opening with a seating surface, wherein the seating surface comprises an at least partial thread for engaging the head more easily as it is being inserted in the opening and for making the opening capable of receiving more types of fastener.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2006/029044
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Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
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