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(54) Title: VERTEBRAL OSTEOSYNTHESIS EQUIPMENT

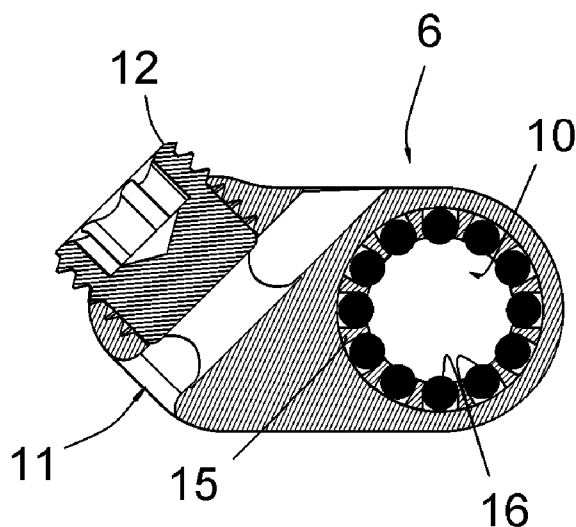


FIG. 4

(57) Abstract: This equipment comprises at least one rigid connecting bar (2), first and second bone anchoring members (3, 4) and first and second connecting parts (5, 6), capable of connecting the connecting bar (2) to said bone anchoring members (3, 4). According to the invention, -each second bone anchoring member is in the form of a flexible ligament (4) capable of being engaged around the lamina (101) or an apophysis of a vertebra (100); -each second connecting part (6) comprises a conduit (11) receiving said ligament (4) and means (12) for blocking said ligament (4) in the conduit, with tensing of the ligament (4), and -each contact member includes at least one rotating part (16; 17) mounted in said second connecting part (6), capable of coming into contact with said connecting bar (2) by a point.



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VERTEBRAL OSTEOSYNTHESIS EQUIPMENT

The present invention relates to vertebral osteosynthesis equipment.

It is well known to correct the position of a portion of a vertebral column, or to immobilize such a portion, using vertebral osteosynthesis equipment comprising rigid
5 connecting bars, capable of connecting several vertebrae, bone anchoring members, capable of being anchored in the vertebrae, and connecting parts making it possible to rigidly connect the connecting bars to said bone anchoring members so as to anchor said connecting bars to the vertebrae.

The use of such equipment is, however, problematic when the patient is a child
10 or adolescent, the equipment not being able to adapt itself to the growth of the patient and requiring periodic repeat surgical operations to adapt the position of the connecting parts relative to the connecting bars.

To try to resolve this problem, percutaneously maneuverable systems have been designed. The systems are, however, complex and not fully satisfactory.

15 Furthermore, the publication of American patent application Nr. US 2011/270314 A1 describes equipment comprising:

- at least one rigid connecting bar, capable of connecting several vertebrae,
- first bone anchoring members and first connecting parts, capable of anchoring the connecting bar to the vertebrae with immobilization of that bar relative to the first
20 connecting parts, and
- second bone anchoring members secured to second connecting parts capable of anchoring the connecting bar to the vertebrae with sliding of the bar relative to the second connecting parts; each of these two bone anchoring members is formed by a screw body and each of these two connecting parts comprises a receiving conduit
25 through which the bar is received slidingly and includes a contact member therein forming a contact interface between said second connecting part and said bar.

In the applicant's opinion, this equipment may be problematic in terms of the complexity of placement and rapid wear of said contact members. Furthermore, a risk of blocking the sliding of the bar relative to said second connecting parts, following the
30 growth of bone cells around said bar and said second connecting parts, cannot be ruled out, thereby making the equipment ineffective.

The present invention aims to resolve these essential problems.

The equipment according to the invention comprises, in a known manner:

- at least one rigid connecting bar, capable of connecting several vertebrae,
- first bone anchoring members and first connecting parts, capable of anchoring the connecting bar of the vertebrae with immobilization of that bar relative to the first
- 5 connecting parts, and
- second bone anchoring members and second connecting parts, capable of anchoring the connecting bar to the vertebrae with sliding of the bar relative to the second connecting parts; each second connecting part comprises a receiving conduit through which the bar is received, slidingly, and includes a contact member therein
- 10 forming a contact interface with said second connecting part and said bar.

According to the invention,

- each second bone anchoring member is in the form of a flexible ligament capable of being engaged around the lamina or an apophysis of a vertebra;
- each second connecting part comprises a conduit receiving said ligament and
- 15 means for blocking said ligament in the conduit, with tensing of the ligament, and
- each contact member includes at least one rotating part mounted in said second connecting part, capable of coming into contact with said connecting bar by a point.

The invention thus provides equipment combining (i) bone anchoring of said

20 second connecting parts using ligaments and (ii) rotating parts forming said contact members, in point contact with the connecting bar.

The applicant was in fact able to determine that the complete resistance of said contact members to wear generated, over a long period of time, by the repeated micro-movements exerted by the vertebrae on that equipment, involved providing said

25 contact members in the form of rotating parts with point contact with the bar. It nevertheless found that the use of such rotating parts involved perfect alignment of the two connecting parts with the connecting bar, which led it to anchor the second connecting parts to the vertebrae using flexible ligaments. In fact, said ligaments, due to their flexibility, make it possible to absorb any alignment flaws of the two connecting

30 parts with the connecting bar, while being able to be fully tensioned between the connecting bar and the vertebrae, using said locking means, so as to enable a correction of the position of said vertebrae.

Furthermore, the applicant was able to determine that the piercing of the vertebrae making it possible, according to the prior art, to screw said second connecting parts in the vertebrae, led to a risk of proliferation of bone cells around said second connecting parts and around the bar, and therefore, over time, to a risk of blocking the sliding made possible by those parts. Using flexible ligaments eliminates
5 any piercing and consequently avoids that risk of proliferation.

A method for implanting the equipment according to the invention comprises the following steps:

- placing said first bone anchoring members and said first connecting parts at a
10 vertebra situated in a central area of the vertebral portion to be straightened or immobilized;

- engaging said flexible ligaments around the laminae or apophyses of one or more vertebrae situated at one end or both ends of the vertebral portion to be straightened or immobilized;

15 - in any order, engaging the ligaments in the receiving conduits comprised by said second connecting parts and engaging said second connecting parts on the connecting bar(s); and

- tensing the ligaments and tightening said locking means to maintain that tension.

20 Said at least one contact member can in particular include a series of beads supported by an annular cage placed coaxially to the conduit comprised by said second connecting part for the engagement of the connecting bar.

Said at least one contact member can also include a series of cylinders or rollers mounted freely rotating in cylindrical housings formed in the body of said second
25 connecting part.

The invention will be understood, and other features and advantages thereof will appear, in reference to the appended diagrammatic drawing, showing, as non-limiting examples, several possible embodiments of the concerned equipment.

Figure 1 is a view of the various types of elements comprised by the equipment;

30 Figure 2 is a view of some of the elements in the assembled state;

Figure 3 is a view of a connecting part comprised by said equipment, according to a first embodiment;

Figure 4 is a view of said connecting part in cross-section along line IV-IV of Figure 3;

Figure 5 is a cross-sectional view along line V-V of Figure 3;

Figure 6 is a view of said connecting part similar to Figure 5, after the engagement of the connecting bar in the connecting part;

Figure 7 is a view of the connecting part comprised by said equipment, according to a second embodiment;

Figures 8 and 9 are cross-sectional views along lines VIII-VIII and IX-IX, respectively, of Figure 7;

Figure 10 is a view of said connecting part similar to Figure 8, after the engagement of the connecting bar in the connecting part;

Figure 11 is a very diagrammatic rear view of a vertebral column portion to be immobilized;

Figure 12 is a view similar to Figure 11, after placement of two anchoring pedicle screws in the vertebra situated at the center of said vertebral column portion and the placement of ligaments around the laminae of the superjacent and underlying vertebrae;

Figure 13 is a view similar to Figure 12, after complete placement of the equipment; and

Figure 14 is a view similar to Figure 13, following growth of the patient over several months or years.

Figure 1 shows various types of elements comprised by vertebral osteosynthesis equipment, said equipment being particularly designed to treat a growing patient, namely a child or adolescent.

The equipment comprises: two rigid connecting bars 2, capable of connecting several vertebrae, bone anchoring members in the form of polyaxial pedicle screws 3 and ligaments 4, capable of anchoring said connecting bars 2 to the vertebrae, two types of connecting parts 5, 6, making it possible to connect the connecting bars 2 to said bone anchoring members 3, 4, and nuts 7 for tightening the connecting parts 5 on the screws 3. In Figure 1, only one bar 2 is shown, from the side; two screws 3 are shown, one from the side on the right in Figure 1, with its articulated proximal slug 3a inclined relative to the base screw body 3b, and the other is shown from the top on the

left side of the figure, with said slug 3a in the axis of the body 3b; a single ligament 4 shown in Figure 1 (the equipment comprises four such ligaments); two connecting parts 5 and two connecting parts 6 are shown, those situated on the right in Figure 1 being shown from the side and those on the left in said Figure being shown from above.

The connecting bars 2, screws 3, connecting parts 5 and nuts 7 are of a known type, making it possible to anchor the bar 2 so as to be fixed to the vertebrae, i.e., without possibility of the bar 2 moving relative to the vertebrae. In the illustrated example, these elements are as described in document no. WO 98 55038, whereof the applicant is the holder.

At least one connecting bar 2 can be rectilinear, as shown in figures 1 or 2; it may also be curved, as shown in figures 6 or 10, so as to be adapted to the anatomical curvature of the treated vertebral column portion, in particular when it involves the lumbar vertebrae.

It will be understood that the screws 3 and connecting parts 5 maybe of other types; for example, the screws may be of the "tulip" or "top loading" type, in which case the connecting parts are set screws that can be mounted on said screws to immobilize the bars 2 relative to said screws. The screw bodies 3b may be replaced by laminar hooks.

Each ligament 4 is also of a known type, for example made up of a polyester braid, with a circular or flat cross-section.

In reference to figures 3 to 10, it appears that each connecting part 6 comprises a conduit 10 designed to receive the bar 2, as shown in figures 2, 13 and 14, and a conduit 11 designed to receive the two strands of a ligament 4 surrounding the lamina 101 of a vertebra 100 (cf. Figure 12). The conduit 11 extends in a plane substantially perpendicular to the axis of the conduit 10 and is inclined relative to the conduit 10, with a lower opening of that conduit 11 (i.e., situated for the side of the part 6 designed to be turned toward a vertebra) further from the conduit 10 than the upper opening. A set screw 12 emerges in the conduit 11, making it possible to grip the strands of the ligaments 4 so as to immobilize those strands relative to the part 6.

In the first embodiment shown in figures 3 to 6, the connecting part 6 comprises an annular cage 15 positioned in the conduit 10, coaxial thereto, serving as a seat for

a series of beads 16, said beads 16 rolling freely relative to said cage 15. The assembly forms a contact member making up an interface between the second connecting part 6 and the bar 2, such that the bar 2 can easily slide inside the conduit 10.

5 In the second embodiment of the connecting part 6 shown in figures 3 to 6, this part 6 comprises four cylinders 17 mounted freely rotating in cylindrical housings formed in the body of the part 6.

In practice, as shown in figures 11 to 13, the equipment according to the invention is implanted as follows:

10 - implantation of two screws 3 in the pedicles of the vertebra 100 situated at the center of the vertebral column portion to be treated;

- engagement of pairs of ligaments 4 around the laminae 101 of the two vertebrae 100 adjacent to the central vertebra (cf. Figure 12);

15 - rigid connection of the connecting bars 2 to the screws 3 using connecting parts 5;

- in any order: sliding engagement of connecting parts 6 on each connecting bar 2, connection of each of the parts 6 to the corresponding ligament 4 by engaging two strands of the ligament 4 in the conduit 11;

20 - tensing the ligament 4 relative to the connecting part 6;
- immobilizing said ligament relative to the connecting part 6 by tightening the screw 12 (cf. Figure 13).

The association of each ligament 4 with the corresponding connecting part 6 makes it possible to obtain anchoring of the connecting bar 2 to said adjacent vertebrae by tensing the ligament 4, then immobilizing the part 6 relative to that
25 ligament; this anchoring does not, however, hinder the possibility of sliding of each connecting part 6 relative to the connecting bar 2.

This possibility of sliding anchoring makes it possible to perform the desired correction or immobilization of a vertebral column segment while enabling the equipment to adapt itself to growth of the patient, as shown by comparing figures 13
30 and 14.

The invention was described above in reference to the embodiments provided as examples. It is of course not limited to these embodiments, but on the contrary encompasses all other embodiments covered by the appended claims.

CLAIMS

1. Vertebral osteosynthesis equipment comprising:
 - at least one rigid connecting bar (2), capable of connecting several vertebrae (100),
 - 5 - first bone anchoring members (3) and first connecting parts (5), capable of anchoring the connecting bar (2) of the vertebrae (100) with immobilization of that bar relative to the first connecting parts (5), and
 - second bone anchoring members (4) and second connecting parts (6), capable of anchoring the connecting bar (2) to the vertebrae (100) with sliding of the bar
 - 10 relative to the second connecting parts (6); each second connecting part (6) comprises a receiving conduit (10) through which the bar is received, slidingly, and includes a contact member (16 ; 17) therein forming a contact interface with said second connecting part (6) and said bar (2);
 - wherein
 - 15 - each second bone anchoring member is in the form of a flexible ligament (4) capable of being engaged around the lamina (101) or an apophysis of a vertebra (100);
 - each second connecting part (6) comprises a conduit (11) receiving said ligament (4) and means (12) for blocking said ligament (4) in the conduit, with tensing
 - 20 of the ligament (4), and
 - each contact member includes at least one rotating part (16; 17) mounted in said second connecting part (6), capable of coming into contact with said connecting bar (2) by a point.
2. Equipment according to claim 1, characterized in that said at least one
- 25 contact member includes a series of beads (16) supported by an annular cage (15) placed coaxially to the conduit (10) comprised by said second connecting part (6) for the engagement of the connecting bar (2).
3. Equipment according to claim 1, characterized in that said at least one
- contact member includes a series of cylinders or rollers (17) mounted freely rotating in
- 30 cylindrical housings formed in the body of said second connecting part (6).
4. Method for implanting the equipment according to one of claims 1-3, characterized in that it comprises the following steps:

- placing said first bone anchoring members (3) and said first connecting parts (5) at a vertebra (100) situated in a central area of the vertebral portion to be straightened or immobilized;

5 - engaging said flexible ligaments (4) around the laminae (101) or apophyses of one or more vertebrae (100) situated at one end or both ends of the vertebral portion to be straightened or immobilized;

- in any order, engaging the ligaments (4) in the receiving conduits (11) comprised by said second connecting parts (6) and engaging said second connecting parts (6) on the connecting bar (2); and

10 - tensing the ligaments (4) and tightening said locking means (12) to maintain that tension.

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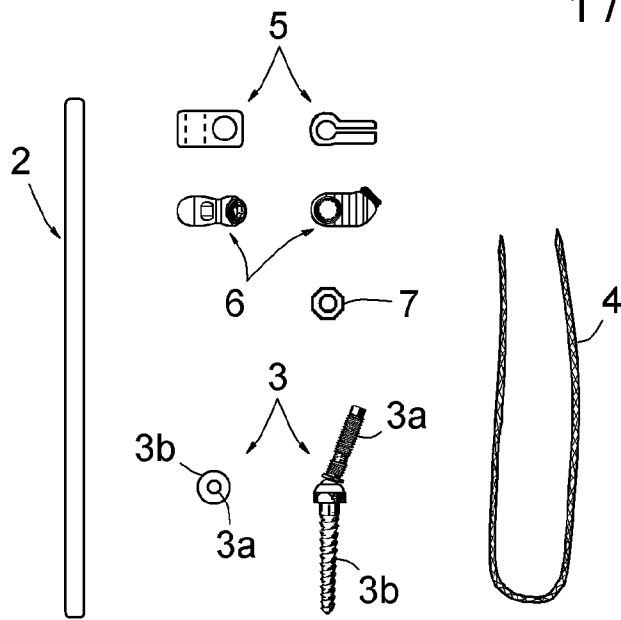


FIG. 1

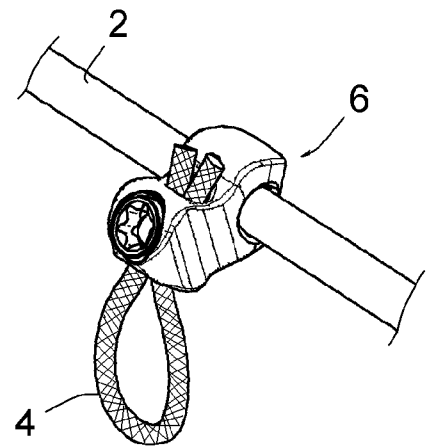


FIG. 2

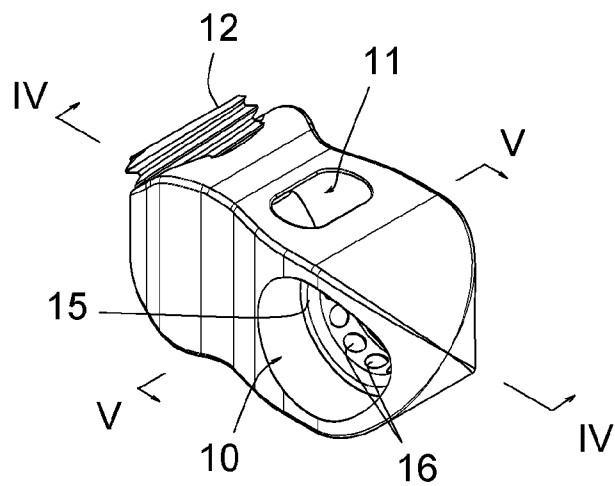


FIG. 3

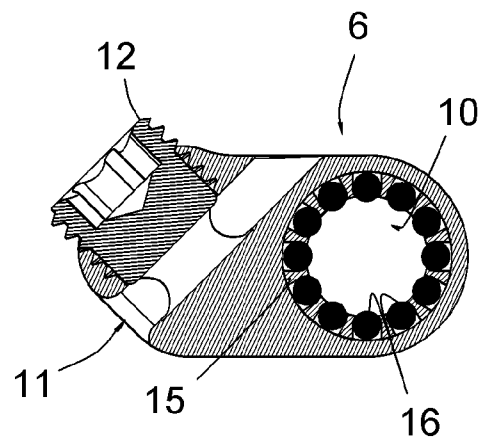


FIG. 4

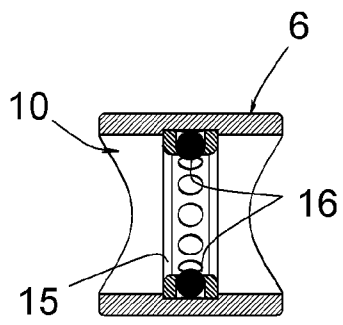


FIG. 5

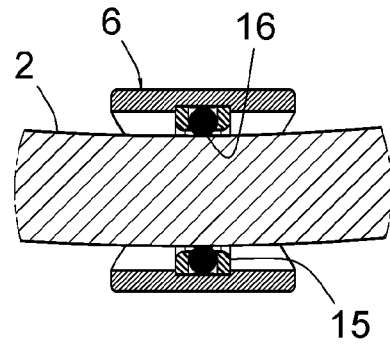


FIG. 6

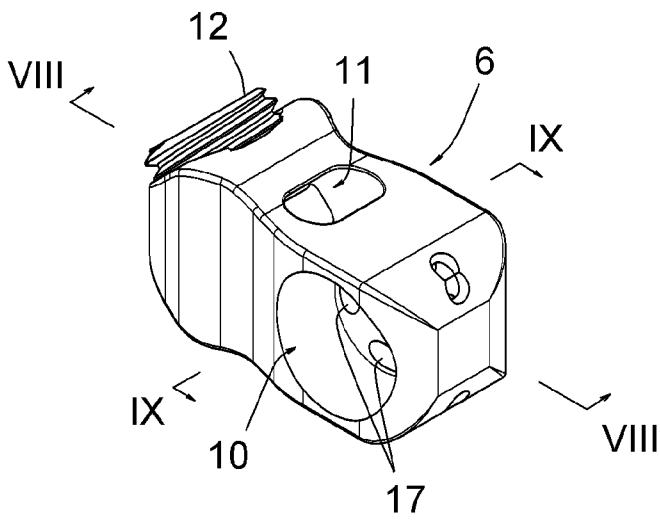


FIG. 7

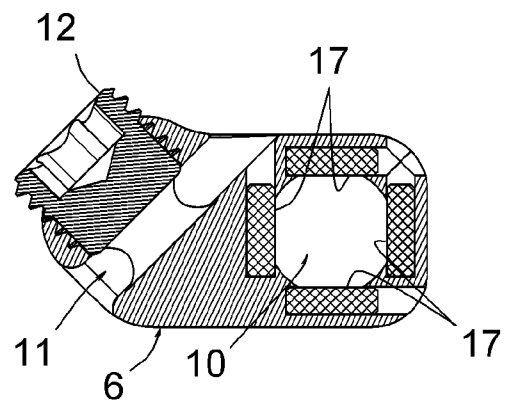


FIG. 8

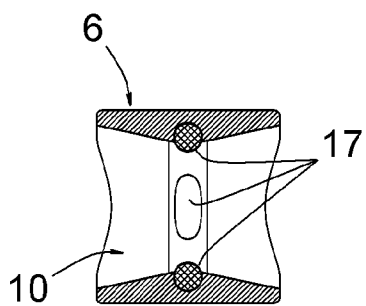


FIG. 9

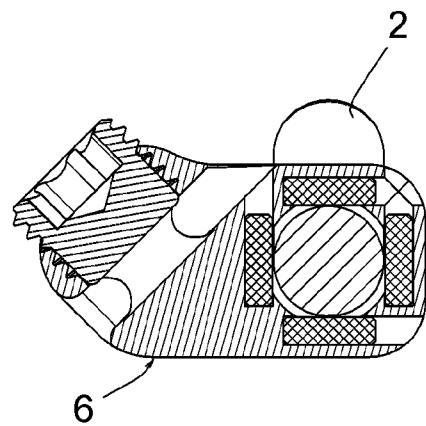


FIG. 10

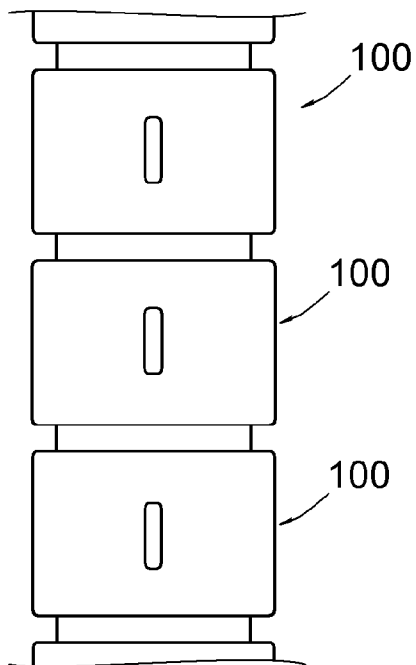


FIG. 11

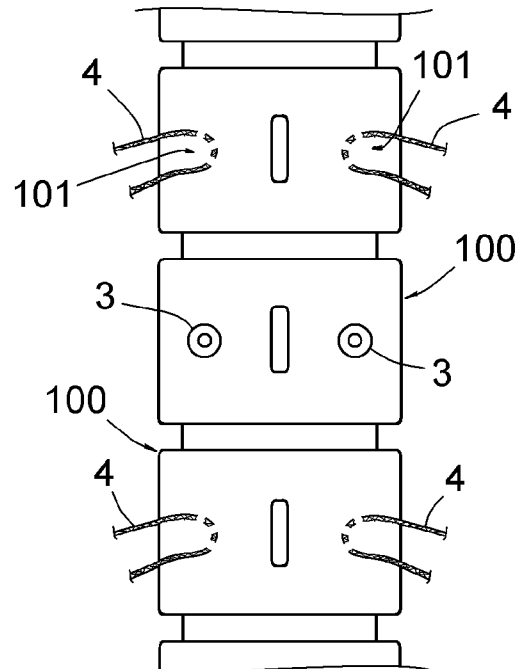


FIG. 12

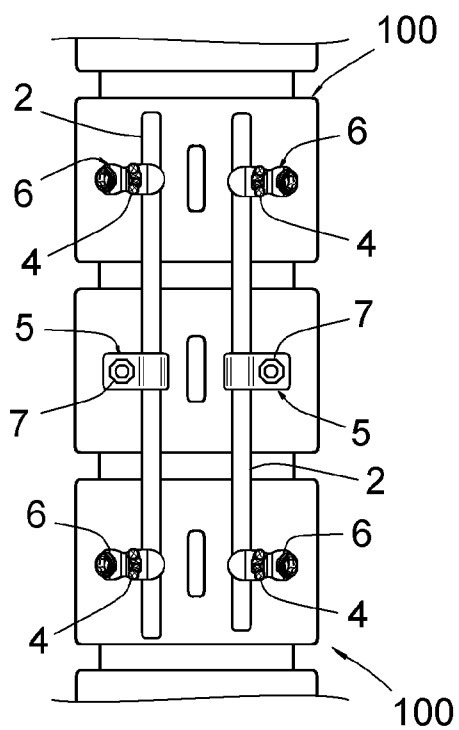


FIG. 13

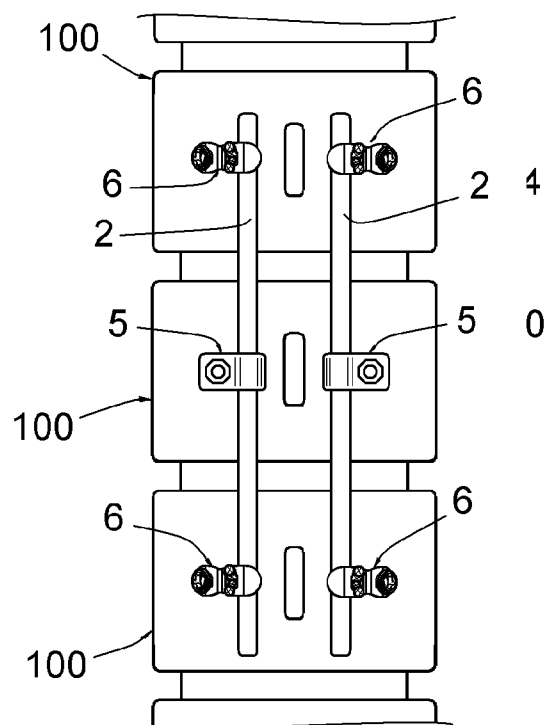


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2013/052625

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B17/70
ADD.

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 practicable, 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.
A	US 2011/270314 A1 (MUELLER MARCEL [CH] ET AL) 3 November 2011 (2011-11-03) cited in the application paragraph [0059]; figures 2-4 paragraph [0072]; figure 6 -----	1
A	US 6 086 590 A (MARGULIES JOSEPH Y [US] ET AL) 11 July 2000 (2000-07-11) column 3, line 21 - column 5, line 36; examples 1-6 -----	1
A	US 2008/262545 A1 (SIMONSON PETER M [US]) 23 October 2008 (2008-10-23) paragraph [0117]; figures 1-3,14 -----	1
A	US 5 486 174 A (FOURNET-FAYARD JACQUES [FR] ET AL) 23 January 1996 (1996-01-23) abstract; figures 1-4 ----- -/-	1



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 application or patent 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

7 June 2013

Date of mailing of the international search report

18/06/2013

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Ducreau, Francis

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/052625

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2 279 707 A1 (ZIMMER SPINE [FR]) 2 February 2011 (2011-02-02) paragraph [0030] - paragraph [0042]; figure 3 -----	1
A	US 2005/033295 A1 (WISNEWSKI PAUL [US]) 10 February 2005 (2005-02-10) paragraph [0030] - paragraph [0044]; figures 1-3 paragraph [0051] - paragraph [0052]; figures 8,9 -----	1
A	WO 98/55038 A1 (TAYLOR JEAN [FR]; VILLARET BERNARD [FR]) 10 December 1998 (1998-12-10) cited in the application figures 2-4 -----	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2013/052625

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.: 4
because they relate to subject matter not required to be searched by this Authority, namely:
Non-establishment of opinion with regard to novelty, inventive step and industrial applicability 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:

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.:

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

Information on patent family members

International application No

PCT/IB2013/052625

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011270314	A1	03-11-2011	AT 548982 T 15-03-2012
		CA 2736616 A1 18-03-2010	
		CN 102149342 A 10-08-2011	
		EP 2337512 A1 29-06-2011	
		ES 2384311 T3 03-07-2012	
		JP 2012501808 A 26-01-2012	
		KR 20110073438 A 29-06-2011	
		US 2011270314 A1 03-11-2011	
		WO 2010030906 A1 18-03-2010	
US 6086590	A	11-07-2000	NONE
US 2008262545	A1	23-10-2008	US 2005101956 A1 12-05-2005
			US 2008262545 A1 23-10-2008
			US 2012184997 A1 19-07-2012
			WO 2005046515 A2 26-05-2005
US 5486174	A	23-01-1996	DE 69415054 D1 21-01-1999
			DE 69415054 T2 06-05-1999
			EP 0612507 A1 31-08-1994
			ES 2126090 T3 16-03-1999
			FR 2702362 A1 16-09-1994
			US 5486174 A 23-01-1996
EP 2279707	A1	02-02-2011	CN 202821564 U 27-03-2013
			EP 2279707 A1 02-02-2011
			EP 2459087 A1 06-06-2012
			US 2012130373 A1 24-05-2012
			WO 2011012690 A1 03-02-2011
US 2005033295	A1	10-02-2005	AU 2004263122 A1 17-02-2005
			CA 2535257 A1 17-02-2005
			CN 1849099 A 18-10-2006
			EP 1659965 A2 31-05-2006
			JP 2007501674 A 01-02-2007
			US 2005033295 A1 10-02-2005
			US 2010249848 A1 30-09-2010
			WO 2005013839 A2 17-02-2005
WO 9855038	A1	10-12-1998	CA 2292748 A1 10-12-1998
			DE 69826999 D1 18-11-2004
			DE 69826999 T2 13-10-2005
			DE 69838626 T2 28-08-2008
			DE 69839406 T2 20-05-2009
			EP 0986339 A1 22-03-2000
			EP 1415602 A2 06-05-2004
			EP 1415603 A2 06-05-2004
			ES 2229509 T3 16-04-2005
			ES 2295496 T3 16-04-2008
			ES 2304482 T3 16-10-2008
			IE S77331 B2 03-12-1997
			JP 4399554 B2 20-01-2010
			JP 2002510998 A 09-04-2002
			PT 986339 E 31-01-2005
			PT 1415602 E 30-01-2008
			PT 1415603 E 09-06-2008
			US RE42626 E1 16-08-2011
			US 6267765 B1 31-07-2001

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/052625

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		W0 9855038 A1	10-12-1998
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