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(54) Title: TRANSLATION FEATURED PEDICLE SCREW AND ITS METHOD OF APPLICATION

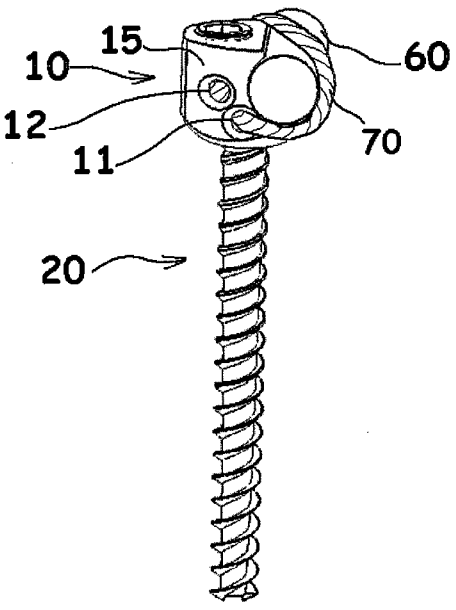

Figure-3

(57) Abstract: The invention relates to the pedicle screw and its method, which is used in spinal cord region surgical interventions, and in order to provide fitting of the rod (60) in the said rod duct (13), it comprises cable (70) having two ends (72) providing fitting via distribution of the forces exerted on the screw head to other screws by gradual translation and having retainer piece (71) at one of the ends (72); the 1st cable duct (11), through which one end (72) of the cable extending laterally from one end to the other end of the said head (10) is passed; the 2nd cable duct (12), through which the end of the cable (70) that is previously passed through the said 1st cable duct (11) is passed after being wrapped around the rod (60) positioned at the rod duct (13), and which laterally extends from one end to the other end of the said head (10); cable locking hole (14) extending from the said head upper surface (16) towards the 1st cable duct (11) and/or the 2nd cable duct (12); and cable tightening screw (50), which makes pressure on the cable (70) by being screwed at the cable locking hole (14), and which provides locking of the said cable (70) to the 1st cable duct (11) and/or the 2nd cable duct (12).

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DESCRIPTION

TRANSLATION FEATURED PEDICLE SCREW AND ITS METHOD OF APPLICATION

THE RELATED ART

The invention relates to a pedicle screw, which is a fixation tool used in spine surgery, and which is neuroprotective and configured in accordance with the anatomic regions of vertebra.

The invention relates to the pedicle screw and its method, which is used in spinal cord region surgical interventions, and in order to provide fitting of the rod (60) in the said rod duct, it comprises cable having two ends providing fitting via distribution of the forces exerted on the screw head to other screws by gradual translation and having retainer piece at one of the ends; the 1st cable duct, through which one end of the cable extending laterally from one end to the other end of the said head is passed; the 2nd cable duct, through which the end of the cable that is previously passed through the said 1st cable duct is passed after being wrapped around the rod positioned at the rod duct, and which laterally extends from one end to the other end of the said head; cable locking hole extending from the said head upper surface towards the 1st cable duct and/or the 2nd cable duct; and cable tightening screw, which makes pressure on the cable by being screwed at the cable locking hole, and which provides locking of the said cable to the 1st cable duct and/or the 2nd cable duct.

THE PRIOR ART

Pedicle screws are internal fixation tools commonly used in spine surgery. Outside of the screw part entering the bone, on the screw, the head parts are found, which provide connection of the consecutively placed screws via a rod. At these head parts, said metal rods are attached via either tightening screws or connectors.

Especially in deformity operations, screws can not be placed on a straight line and elevation or level differences occur between them, since they are placed in accordance with the curvatures of the spine. During adaptation of metal rods on the screw heads, although the natural shape of the spine is given to these rods, they are not compatible with abnormal curvatures. Screws are translated towards the rods via special retainer tools placed at their heads and thus the attachment operation is implemented. During this translation operation, the load corresponding to the screw head is excessive and sometimes the screws are unpinned from the bone and lose their retaining force. Moreover, rod presser, persuader, rocker etc. tools have to be found in the sets for this operation and this causes the sets get larger, more crowded, and heavier.

A purpose of the translation operation is to provide placement of the rods in the heads, while another purpose is to ensure correction of the curvature during the translation operation. In the past, the translation concept is applied by using sublaminar and subtransverse cables; however,

since the operation of passing below the lamina has neurological risks and it is not always possible to pass cable below the transverse protrusion, today, these techniques are almost abandoned.

Present day screw designs:

Cause excessive loading at the screw head for fitting of the rod (especially in deformity cases) and sometimes cause loosening.

They do not permit translation operation by cable via the screw.

Today, it is known that there are a lot of applications related to pedicle screw. One of these applications is the American application with no **US5876403** and it relates to a bone fixation mechanism. The invention is connected with the pedicle screw to be implanted in the bone and with the connector having shaft to position the bones at the desired reference.

As a result, improvement is to be made in translation pedicular screws and thus novel embodiments, which would eliminate the above said drawbacks and bring in solutions to the present systems, are needed.

PURPOSE OF THE INVENTION

The present invention relates to the pedicle screw, which meets the above said requirements, eliminates all of the drawbacks and brings about some additional advantages.

The invention is a pedicle screw and in the stage of fitting of the metal rod, it has a form providing fitting of the rod via gradual translation operation by using metal cables by distributing the loads corresponding on the screw heads to the other screws.

The pedicle screw of the invention has monoaxial structure and its head part retaining the metal rod is combined with the screw part entering in the bone. There are holes at the head part, on which the rod would fit, allowing passage of metal cables. After the cables are passed through the screw head, they are also passed around the metal rod and then the metal rod is translated (pulled) towards the screw via gradual tightening of the metal rod and the screw and the metal rod come together. Since this operation is made by more than one screw at the same time, excessive force is not exerted on a single screw and this eliminates the risk of loosening and unpinning of the screw.

With this way of operation, this screw permits application of the translation concept via the pedicle screw. Moreover, use of persuader, rocker, and rod presser etc. tools are not necessary anymore and thus sets become lighter and simpler.

In order to achieve the above said advantages which will be better understood from the below detailed description, the present invention relates to the pedicle screw, which is used in spinal cord region surgical interventions; provides backbone stabilization in spine disorders; and

comprises screw head (10) having grooved body (20) entering into the bone and rod duct (13) left out of the bone found at the upper part of the said grooved body (20) and having opening (131) in which the rod (60) is placed, and it is characterized in that; in order to provide fitting of the rod (60) in the said rod duct (13), it comprises cable (70) having two ends (72) providing fitting via distribution of the forces exerted on the screw head to other screws by gradual translation and having retainer piece (71) at one of the ends (72);

- The 1st cable duct (11), which is formed at the screw head (10), wherein the rod duct (13) on which the rod (60) would fit is found; and through which one end (72) of the cable extending laterally from one end to the other end of the said head (10) is passed;
- The 2nd cable duct (12), through which the end of the cable (70) that is previously passed through the said 1st cable duct (11) is passed after being wrapped around the rod (60) positioned at the rod duct (13), and which laterally extends from one end to the other end of the said head (10);
- Cable locking hole (14) extending from the said head upper surface (16) towards the 1st cable duct (11) and/or the 2nd cable duct (12); and
- Cable tightening screw (50), which makes pressure on the cable (70) by being screwed at the cable locking hole (14), and which provides locking of the said cable (70) to the 1st cable duct (11) and/or the 2nd cable duct (12).

In a preferred application of the invention, the invention comprises retainer cover (40), which provides attachment of the said rod (60) on the head (10); and which comprises housing (41) at the same level with the 1st cable duct (11) and/or the 2nd cable duct (12) covering the upper surface (16) of the said head; and the clutch region (42) surrounding the rod (60).

In another preferred application of the invention, the invention comprises cover tightening screw (30) having the head (10), which provides locking of the cable (70) via the cable being tightened at the 1st cable duct (11) and/or the 2nd cable duct (12) after passing through the said retainer cover housing (41) and being screwed at the cable locking hole (14).

In another preferred application of the invention, on the said head (10), it comprises the 1st cable duct (11) and the 2nd cable duct (12) positioned transverse and extending lateral to the head (10).

In another preferred application of the invention, the cable tightening screw (50) comprises screwed surface (51).

In another preferred application of the invention, on the said head upper surface (16), the lateral surfaces of the cable locking hole (14) extending up to the 1st cable duct (11) and/or the 2nd cable duct (12) are grooved (141).

In another preferred application of the invention, said cable ducts (11, 12) extend from one side of the head lateral surfaces (15) all along up to its other lateral surface (15).

The invention is the method of application of the pedicle screw on the spinal cord, which is used in spinal cord region surgical interventions; provides backbone stabilization in spine disorders; and comprises screw head (10) having grooved body (20) entering into the bone and rod duct (13) left out of the bone found at the upper part of the said grooved body (20) and having opening (131) in which the rod (60) is placed, and it is characterized in that; it comprises the operation steps of:

- Placement of the grooved body (20) of the screw in the bone;
- After the grooved body (20) of the screw has completely entered in the bone, the cable end (72) is passed through the 1st cable duct (11);
- Placement of a rod (60), which has lateral surface suited to the rod duct (13), on the rod duct (13);
- Passing of the cable end (72), which is previously passed through the 1st cable duct (11), through the 2nd cable duct (12) by being wrapped around the rod (60);
- Pulling of the rod (60) towards the pedicle screw by pulling of the cable (70) that is passed through the 2nd cable duct (12) and fitting in the rod duct (13); and
- Tightening of the cables via the cable tightening screw (30) to be placed in the cable locking hole (14) found at the screw head (10).

In another preferred application of the invention, the retainer cover (40) comprising housing (41) at the same level with the 1st cable duct (11) and/or the 2nd cable duct (12) and clutch region (42) wrapping around the rod (60) covers the head upper surface (16); and the cover tightening screw (30) screwed at the cable locking hole (14) by being passed through the said retainer cover housing (41) locks the cable (70).

In another preferred application of the invention, the screw is placed in the bone via its head part (10) by using a screwdriver.

The structural and characteristic features of the invention and all advantages will be understood better in detailed descriptions with the figures given below and with reference to the figures, and therefore, the assessment should be made taking into account the said figures and detailed explanations.

BRIEF DESCRIPTION OF THE FIGURES

For better understanding of the embodiment of present invention and its advantages with its additional components, it should be evaluated together with below described figures.

Figure 1 is the representative perspective front view of the retainer cover.

Figure 2 is the representative perspective view of the cover tightening screw.

Figure 3 is the representative perspective view of the rod duct found on the screw head, in which the rod is mounted.

Figure 4 is the representative perspective view of the screw head, on which the rod, the retainer cover, and the cover tightening screw are mounted.

Figure 5 is the representative two-dimensional side view of the grooved body and the screw head.

Figure 6 is the representative perspective view of the grooved body, screw head, and cable.

Figure 7 is the representative mounted perspective view of the screw head, rod, retainer cover, and cover tightening screw.

Figure 8 is the representative perspective view of the cable tightening screw.

REFERENCE NUMBERS

10	Screw head
11	1st Cable duct
12	2nd Cable duct
13.	Rod duct
131.	Opening
14.	Cable locking hole
141.	Grooved surface
15.	Lateral surfaces
16.	Upper surface
20	Grooved body
21.	Terminal part
30.	Cover tightening screw

31. Cover tightening screw head

40. Retainer cover

41. Housing

42. Clutch region

50. Cable tightening screw

51. Screwed surface

60. Rod

70. Cable

71. Retainer piece

72 Cable end

DETAILED DESCRIPTION OF THE INVENTION

In this detailed description, the preferred embodiments of the translation pedicle screw, which is the subject of the invention, will only be disclosed for better understanding of the subject, and will not form any limiting effect.

As it is seen in Figure-5, the translation pedicle screw, which is the subject of the invention, comprises: the screw head (10), which is the part of the screw remaining out of the bone, and the grooved body (20), which enters in the bone. At the lateral surfaces (15) of the said screw head (10), the 1st cable duct (11) wherein the cable (70) would enter and the 2nd cable duct (12) through which the cable (70) would pass after being wrapped around the rod (60) are found. Said cable ducts (11, 12) extend from one side of the lateral surface (15) up to the other lateral surface (15). At one side of the said head (10), the rod duct (13) seen in Figure-5 and providing bearing of the rod (60) is found. Said rod duct (13) has opening (131). Cable locking hole (14) seen in Figure-6 is formed at the upper surface (16) of the said head (10). Said cable locking hole (14) lateral parts have grooved surface (141). After fitting of the said rod (60) on the rod duct (13) seen in Figure-3, the retainer cover (40) seen in figure-1 and figure-7 is used to press on the said rod (60) in order to prevent it from leaving its place. Housing (41) and clutch region (42) are found on the said retainer cover (40). In order to prevent loosening of the cables (70) after passing through the 1st cable duct (11) and the 2nd cable duct (12), the cover tightening screw (30) seen in Figure-2 is used to make tightening operation. Moreover, the said cover

tightening screw (30) also tightens the retainer cover (40) and maintains it remain in its place. Head (31) is found at the said cover tightening screw (30). In Figure-6, the representative views of the grooved body (20), screw head (10), and cable (70) are given and in Figure-7, the mounted representative views of the screw head (10), rod (60), retainer cover (40), and cover tightening screw (30) are given. Retainer piece (71) is found at the end (72) of the said cable in order to prevent the said cable end (72) from getting out of their places after passing through the ducts (11, 12).

The method of application of the pedicle screw, which is the subject of the invention, is as follows:

- Said grooved body (20) is placed in the bone from the screw head (10) part via a screwdriver.
- Pedicle screws are placed also at the other places, on which the operation is to be performed.
- After the grooved body (20) of the screw has completely entered in the bone, the end of a cable (70) without retainer piece is passed through the 1st cable duct (11) (thanks to the end (72) of the cable (70) having retainer piece (71), the cable (70) is prevented from getting out of the 1st cable duct (11)).
- A rod (60) with a suitable size is placed on the rod duct (13).
- The non-retainer cable end of the cable (70), which is previously passed through the 1st cable duct (11), is passed through the 2nd cable duct (12) by being wrapped around the rod (60) (see figure-3, figure-4, and figure-7).
- The rod (60) is pulled towards the pedicle screw by pulling of the cable end (72) that is passed through the 2nd cable duct (12) and then it is fitted in the rod duct (13); and
- After the cable (70) is thoroughly pulled and tightened, two types of locking operations can be conducted:

Locking operations:

1. If the retainer cover (40) is not going to be used, the cables (70) are tightened by a screw (50) having cable tightening screwed surface (51) shown in figure-8 to be placed in the cable locking hole (14) found at the screw head (10).

2. If the retainer cover (40) is going to be used, a retainer cover (40) is placed in the screw head (10). The clutch region (42) (inclination found in the front) of the retainer cover (40) is used to clutch the front part of the rod (60). Said retainer cover housing (41) is brought to the same level with the cable locking hole (14). Afterwards, a tightening screw (30) is again placed at the cable

locking hole (14) and then tightened. In this way, said cover tightening screw (30) both presses on and tightens the cables (70) and the cover (40) at the same time.

In alternative embodiments of the translation pedicle screw, which is the subject of the invention:

- The head (10) part of the pedicle screw can be made in different shapes; it can be more spherical or angular.

- Present structure is monoaxial, but it can be formed in bi-axial or polyaxial forms.

- Some external notches can be added in order to facilitate application of screwdriver.

- While the neck part of the pedicle screw can have a straight cylindrical shape, it can also be configured in hourglass form.

- While the grooved body (20) of the pedicle screw can have single-strand helical structure, it can also be configured in the form of nested double or triple-strand helical.

- In order to further facilitate entering of the screw in the terminal part (21) bone, it can be produced with a sharp notched structure.

- In order to provide the screw terminal part (21) with the facility to pave the way in the bone, it can be configured in the form of a non-grooved thin cylindrical protrusion.

- The area left outside the notch at the middle part of the screw can be configured in semi-grooved or jagged form.

- The screw can be made of various materials such as steel, chrome-cobalt-molybdenum, titanium etc. alloys or porous metals. The screw can be coated with carbon, hydroxyapatite, or silver.

- The screw can be used together with "U" shaped or "I" shaped heads or other connection components with different designs.

- The screw can be used with rods made of different elastic materials to be used in dynamic applications.

- For dynamic application, the screw can be modified in a way that it would enclose the polyethylene coverings to be placed on the rod.

While metal cable (70) can be used for the translation function of the screw; non-metal cables made of plastic, rubber etc. polymer material, surgical sutures, and meshes can also be used.

CLAIMS

1. The invention relates to the pedicle screw, which is used in spinal cord region surgical interventions; provides backbone stabilization in spine disorders; and comprises screw head (10) having grooved body (20) entering into the bone and rod duct (13) left out of the bone found at the upper part of the said grooved body (20) and having opening (131) in which the rod (60) is placed, and it is ***characterized in that;*** in order to provide fitting of the rod (60) in the said rod duct (13), it comprises cable (70) having two ends (72) providing fitting via distribution of the forces exerted on the screw head to other screws by gradual translation and having retainer piece (71) at one of the ends (72);

- The 1st cable duct (11), which is formed at the screw head (10), wherein the rod duct (13) on which the rod (60) would fit is found; and through which one end (72) of the cable extending laterally from one end to the other end of the said head (10) is passed;
- The 2nd cable duct (12), through which the end of the cable (70) that is previously passed through the said 1st cable duct (11) is passed after being wrapped around the rod (60) positioned at the rod duct (13), and which laterally extends from one end to the other end of the said head (10);
- Cable locking hole (14) extending from the said head upper surface (16) towards the 1st cable duct (11) and/or the 2nd cable duct (12); and
- Cable tightening screw (50), which makes pressure on the cable (70) by being screwed at the cable locking hole (14), and which provides locking of the said cable (70) to the 1st cable duct (11) and/or the 2nd cable duct (12).

2. A translation pedicle screw according to Claim 1 and it is ***characterized in that;*** it comprises retainer cover (40), which provides attachment of the said rod (60) on the head (10); and which comprises housing (41) at the same level with the 1st cable duct (11) and/or the 2nd cable duct (12) covering the upper surface (16) of the said head; and the clutch region (42) surrounding the rod (60).

3. A translation pedicle screw according to Claim 2 and it is ***characterized in that;*** it comprises cover tightening screw (30) having the head (10), which provides locking of the cable (70) via the cable being tightened at the 1st cable duct (11) and/or the 2nd cable duct (12) after passing through the said retainer cover housing (41) and being screwed at the cable locking hole (14).

4. A translation pedicle screw according to Claims 1 to 3, and it is ***characterized in that;*** on the said head (10), it comprises the 1st cable duct (11) and the 2nd cable duct (12) positioned transverse and extending lateral to the head (10).

5. A translation pedicle screw according to Claims 1 to 4, and it is ***characterized in that;*** the cable tightening screw (50) comprises screwed surface (51).

6. A translation pedicle screw according to Claims 1 to 5, and it is ***characterized in that;*** on the said head upper surface (16), the lateral surfaces of the cable locking hole (14) extending up to the 1st cable duct (11) and/or the 2nd cable duct (12) are grooved (141).

7. A translation pedicle screw according to Claims 1 to 3, and it is ***characterized in that;*** said cable ducts (11, 12) extend from one side of the head lateral surfaces (15) all along up to its other lateral surface (15).

8. The invention is the method of application of the pedicle screw on the spinal cord, which is used in spinal cord region surgical interventions; provides backbone stabilization in spine disorders; and comprises screw head (10) having grooved body (20) entering into the bone and rod duct (13) left out of the bone found at the upper part of the said grooved body (20) and having opening (131) in which the rod (60) is placed, and it is ***characterized in that;*** it comprises the operation steps of:

- Placement of the grooved body (20) of the screw in the bone;
- After the grooved body (20) of the screw has completely entered in the bone, the cable end (72) is passed through the 1st cable duct (11);
- Placement of a rod (60), which has lateral surface suited to the rod duct (13), on the rod duct (13);
- Passing of the cable end (72), which is previously passed through the 1st cable duct (11), through the 2nd cable duct (12) by being wrapped around the rod (60);
- Pulling of the rod (60) towards the pedicle screw by pulling of the cable (70) that is passed through the 2nd cable duct (12) and fitting in the rod duct (13); and
- Tightening of the cables via the cable tightening screw (30) to be placed in the cable locking hole (14) found at the screw head (10).

9. Method of application of the translation pedicle screw on the spinal cord according to Claim 7 and it is ***characterized in that***; the retainer cover (40) comprising housing (41) at the same level with the 1st cable duct (11) and/or the 2nd cable duct (12) and clutch region (42) wrapping around the rod (60) covers the head upper surface (16); and the cover tightening screw (30) screwed at the cable locking hole (14) by being passed through the said retainer cover housing (41) locks the cable (70).

10. Method of application of the translation pedicle screw on the spinal cord according to Claims 8 to 9, and it is ***characterized in that;*** the screw is placed in the bone via its head part (10) by using a screwdriver.

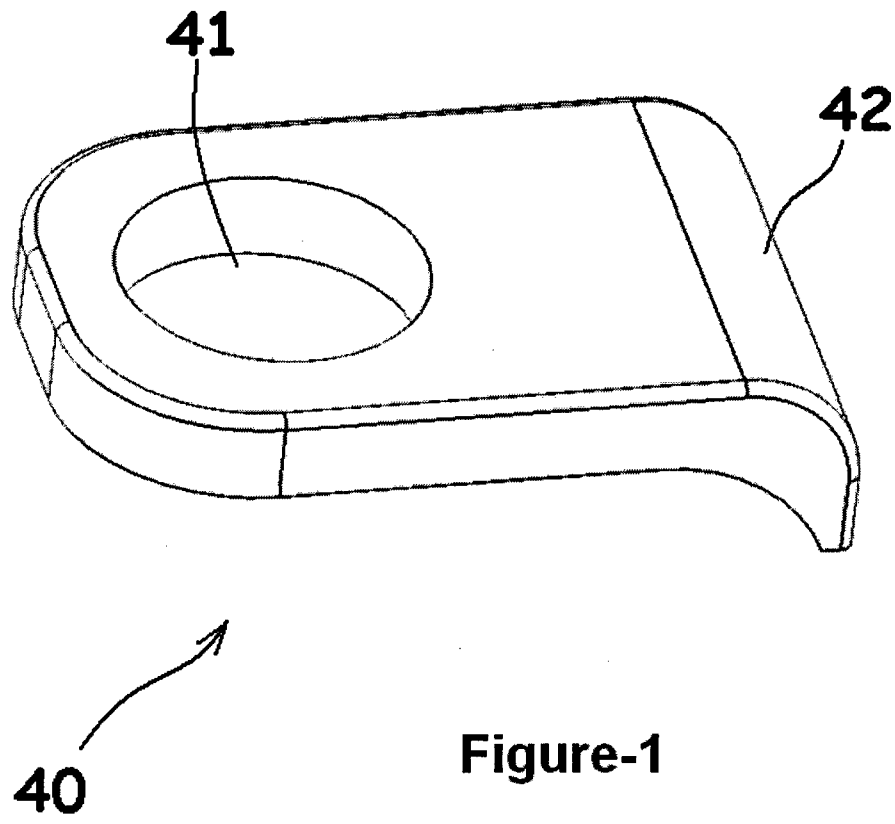

Figure-1

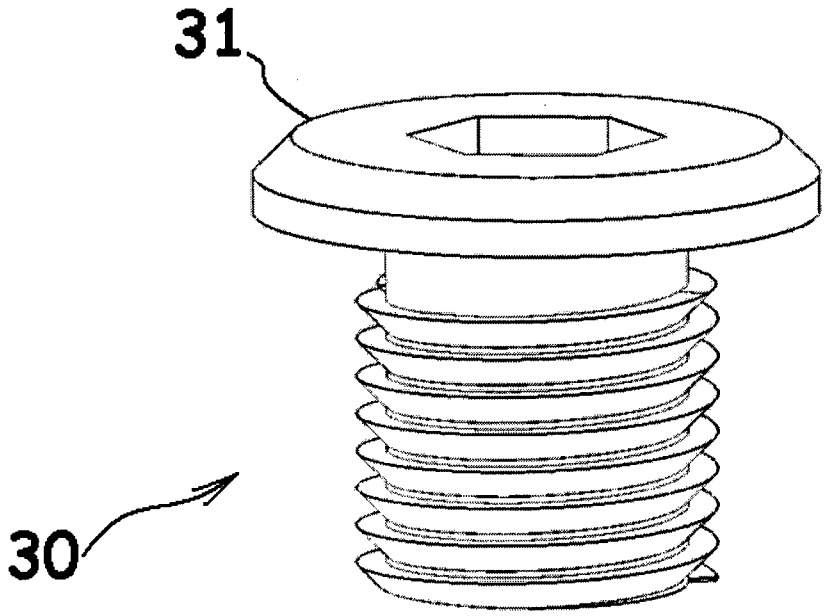

Figure-2

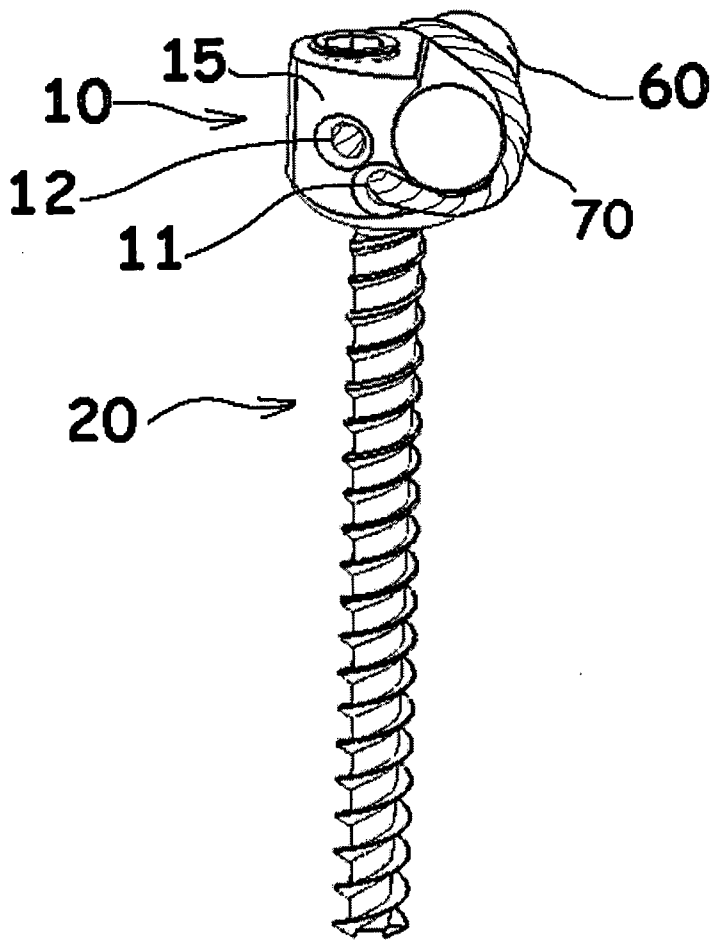

Figure-3

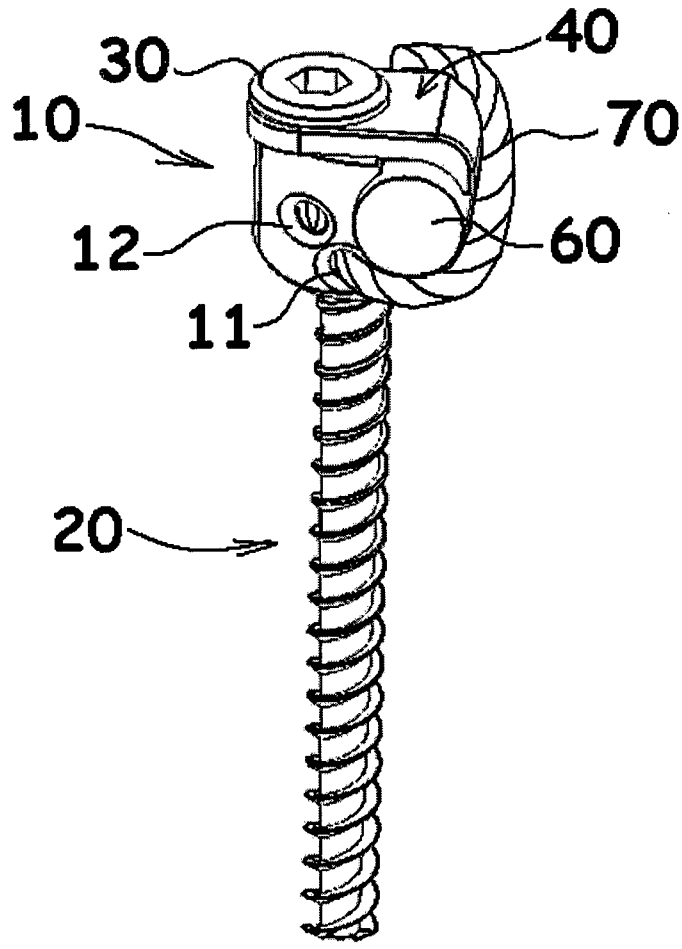

Figure-4

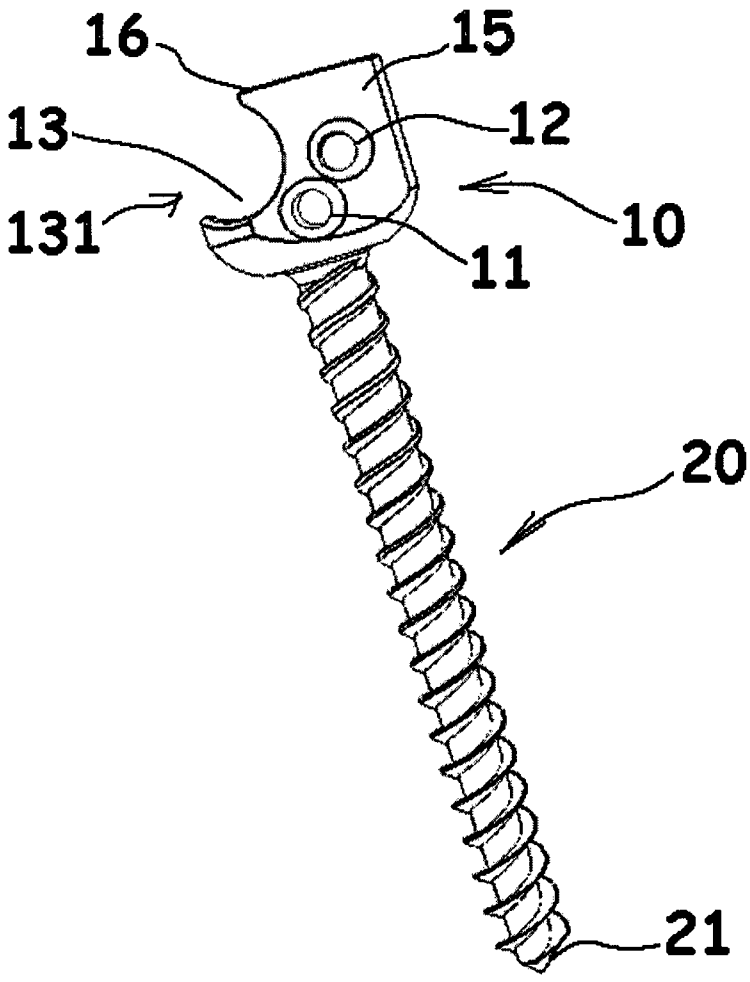

Figure-5

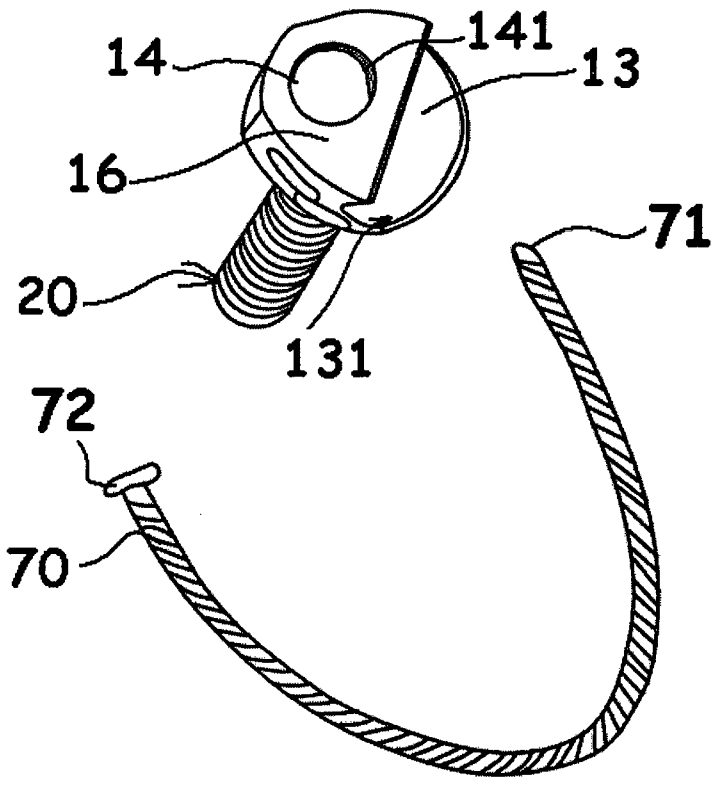

Figure-6

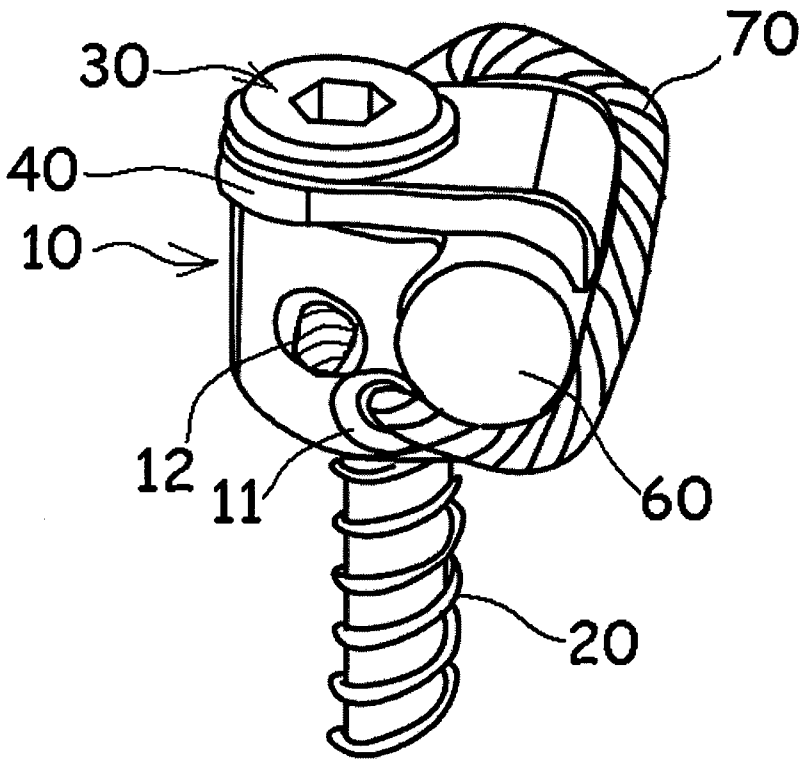

Figure-7

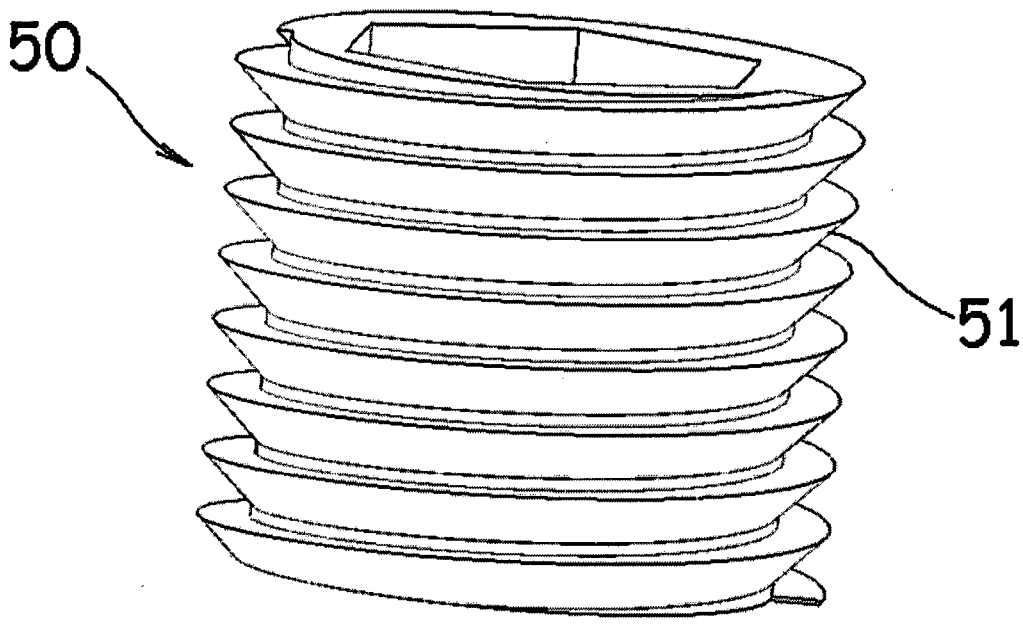

Figure-8

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2011/000182

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B17/70 A61B17/84
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 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.
A	US 6 325 802 B1 (FRIGG ROBERT [CH]) 4 December 2001 (2001-12-04) column 3, line 17 - line 48; figures 1-8	1
A	FR 2 801 492 A1 (MARTIN JEAN JACQUES [FR]) 1 June 2001 (2001-06-01) page 3, line 23 - page 5, line 33; figures 1-9	1
A	US 2008/058818 A1 (SCHWAB FRANK J [US]) 6 March 2008 (2008-03-06) paragraph [0021]; figures 1,2 paragraph [0024]; figure 4 paragraph [0027]; figure 6	1
A	US 5 415 658 A (KILPELA THOMAS S [US] ET AL) 16 May 1995 (1995-05-16) figure 3	1

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[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
13 December 2011	21/12/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Ducreau, Francis

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2011/000182

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008/300599 A1 (ANAPLIOTIS EMMANUEL [DE] ET AL) 4 December 2008 (2008-12-04) figure 3 -----	1

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/TR2011/000182

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. [X] Claims Nos.: 8-10
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 applicabilityRule 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/TR2011/000182

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6325802 B1	04-12-2001	NONE	
FR 2801492 A1	01-06-2001	NONE	
US 2008058818 A1	06-03-2008	NONE	
US 5415658 A	16-05-1995	NONE	
US 2008300599 A1	04-12-2008	DE 202004015582 U1	23-12-2004
		EP 1796562 A1	20-06-2007
		US 2008300599 A1	04-12-2008
		WO 2006039900 A1	20-04-2006