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(54) Title: BONE ANCHOR SYSTEM HAVING MOVABLE MEDIAL EYELET

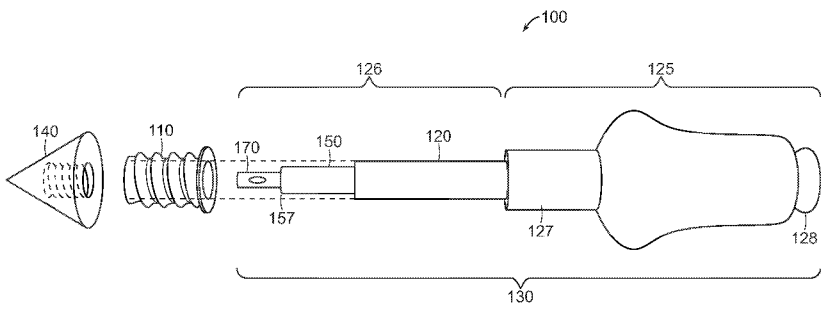


FIG. 1

(57) Abstract: A bone anchor system is provided. In one aspect, the bone anchor system includes an anchor driver having an outer shaft, a middle shaft, and an inner shaft; an anchor body slidably coupled to the outer shaft; a tip configured to releasably mate with a distal end of the middle shaft; and an eyelet including a proximal end configured to releasably mate with an interference coupling element of the inner shaft, and a distal end configured to mechanically couple with the tip. In one aspect, the inner shaft is configured to transport the eyelet from a first position distant from the tip to a second position proximate the tip.

BONE ANCHOR SYSTEM HAVING MOVABLE MEDIAL EYELET

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The subject application claims priority to U.S. Provisional Application No. 62/137,385, filed March 24, 2015 and entitled "BONE ANCHOR SYSTEM HAVING MOVABLE MEDIAL EYELET," the contents of which are hereby incorporated herein in their entirety.

TECHNICAL FIELD

[0002] This present disclosure relates to a bone anchor system and, more particularly, to a bone anchor system having a movable medial eyelet.

BACKGROUND

[0003] Arthroscopic surgery is a minimally-invasive surgical procedure during which an interior portion of the human body, such as a knee or shoulder joint, is examined or operated on using an arthroscope. The arthroscope is a type of endoscope or miniature camera that is passed through a cannula which is inserted into the joint through a small incision in the skin to enable a surgeon to view the joint and/or perform a surgical operation without fully opening the joint.

[0004] Bone anchors are useful devices for fixing soft tissue such as tendons and ligaments to bone during arthroscopic surgery. A typical bone anchor is inserted into the bone by pounding the anchor directly into bone or into a pre-drilled bone hole. The bone anchor can be configured as a screw mechanism or an interference fit device and may be made of metal, plastic or bioreabsorbable material (which dissolves in the body over time). The bone anchor can include an eyelet that allows a suture to pass therethrough and link the bone anchor and the soft tissue.

[0005] In some surgeries, it is advantageous to pass the suture through the eyelet before the bone anchor is driven into the bone. However, in other cases, the suture is preferably passed through the eyelet after a portion of the bone anchor has already been inserted into bone. Current bone anchor systems typically provide a distal tip eyelet, making it difficult, if not impossible, for a surgeon to pass a suture through the eyelet that is already embedded in the repair site.

[0006] Accordingly, there is a need for a bone anchor system that allows a surgeon to more conveniently load a suture while a portion of the bone anchor is embedded into bone.

SUMMARY

[0007] The present disclosure provides a bone anchor system that allows a suture to pass into a movable eyelet. The surgeon can insert sutures through the movable eyelet when the eyelet is positioned away from the repair site and then drive the movable eyelet towards the repair site. The movable eyelet can then collapse, impinge, clamp, plug, or screw over the suture in the eyelet, thereby immobilizing the suture. The bone anchor system enables a repair suture to be placed into bone without requiring an eyelet in the distal tip. In addition, the bone anchor system enables a surgeon to apply a requisite amount of tension to a suture and secure the suture with the requisite amount of tension prior to the fixation of the bone anchor in the bone or bone hole.

[0008] One example of the present disclosure includes a bone anchor system having an anchor driver with an outer shaft, a middle shaft and an inner shaft. The inner shaft has an eyelet with an opening sized to receive one or more sutures therethrough and a proximal end releasably mated with an interference coupling element of the inner shaft. The bone anchor system also includes an anchor body slidably coupled to the outer shaft and a tip configured to releasably mate with a distal end of the middle shaft. The distal end of the eyelet is configured to mechanically couple with the tip.

[0009] In other examples of the present disclosure, the middle shaft of the anchor driver includes an aperture configured to allow one or more sutures to pass through the opening of the eyelet. The aperture extends from the distal end of the middle shaft to an intermediate position of the middle shaft proximate a distal end of the outer shaft. The bone anchor system further includes a plug between the proximal end of the eyelet and a distal end of the inner shaft, the plug being configured to clamp the sutures as the eyelet is mechanically coupled with the tip. In one example, the eyelet is made of a flexible material and is collapsible in the hole to clamp the sutures. The tip comprises a threaded hole at a proximal end of the tip, while the eyelet comprises a threaded member at the distal end of the eyelet, the threaded hole being configured to receive and securely engage the threaded member.

[0010] Still other examples of the present disclosure include an anchor driver including an outer shaft coupled to an anchor body, a middle shaft coupled with the outer shaft and having a distal end releasably mated with a tip, and an inner shaft received in the outer shaft and the middle shaft, the inner shaft having an interference coupling device at a distal end thereof, wherein the interference coupling device is configured to releasably mate with an eyelet, and the

inner shaft is configured to transport the eyelet from a first position distant from the tip to a second position proximate the tip.

[0011] For a better understanding of the present disclosure, together with other and further needs thereof, reference is made to the accompanying drawings and the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 illustrates an exploded view of the bone anchor system in accordance with an example of the present disclosure.

[0013] FIG. 2A illustrates a sectional view of the bone anchor system in accordance with an example of the present disclosure.

[0014] FIG. 2B illustrates a sectional view of a tip of the bone anchor shown in FIG. 2A.

[0015] FIG. 3 illustrates a sectional view of the inner shaft and eyelet shown in FIG. 2A.

[0016] FIGs. 4 and 5 illustrate sectional views of the bone anchor system in accordance with another example of the present disclosure.

[0017] FIGs. 6 and 7 illustrate sectional views the bone anchor system in accordance with still another example of the present disclosure.

[0018] FIGs. 8A-B illustrate a method of using the bone anchor system in accordance with still another example of the present disclosure.

DETAILED DESCRIPTION

[0019] Examples of the bone anchor systems and methods of will now be discussed with reference to the figures.

[0020] In the description that follows, like components have been given the same reference numerals, regardless of whether they are shown in different examples. To illustrate example(s) in a clear and concise manner, the drawings may not necessarily be to scale and certain features may be shown in somewhat schematic form. Features that are described and/or illustrated with respect to one example may be used in the same way or in a similar way in one or more other examples and/or in combination with or instead of the features of the other examples.

[0021] Comprise, include, and/or plural forms of each are open ended and include the listed parts and can include additional parts that are not listed. And/or is open ended and includes one or more of the listed parts and combinations of the listed parts.

[0022] Referring now to FIG. 1, an example of the bone anchor system 100 is illustrated. The bone anchor system 100 includes a tip 140, an anchor body 110, and a driver 130. The anchor body 110 and the tip 140 can be referred to, collectively, as the anchor 105. The driver 130 includes a multi-part handle 125 and a multi-part shaft 126. The multi-part shaft 126 includes an outer shaft 120, a middle shaft 150 and an inner shaft 170. The outer shaft 120 and inner shaft 170 are each capable of independent movement from one other. The anchor body 110 is configured to slidably couple to the outer shaft 120, while the tip 140 releasably mates with a distal terminus 157 of a middle shaft 150 as further described below. The multi-part handle 125 in turn includes an inner shaft element 128 which, when rotated in a clockwise direction, distally advances the inner shaft 170 (and vice versa). The multi-part handle 125 also includes an outer shaft element 127 which, when rotated in a clockwise direction, distally advances the outer shaft 120 (and vice versa). Thus, the moveable elements of the multi-part shaft 126 can be advanced through a cannula to a repair site using the multi-part handle 125.

[0023] FIG. 2A shows a sectional view of the driver 130. Here, the anchor body 110 is shown as slidably coupled to the outer shaft 120, while the tip 140 is shown as assembled to the distal terminus 157 of the middle shaft 150. Disposed within the middle shaft 150 is a transverse aperture 155 which is sized to allow passage of one or more sutures 200 therethrough, as well as advancement (i.e., distal movement) and retraction (i.e., proximal movement) of the inner shaft 170. The aperture 155 may extend from a distal terminus 157 of the middle shaft 150 to an intermediate position within the middle shaft 150. In one example, the aperture 155 may be formed in a U-shape with two tines 148a, 148b that are substantially parallel with each other. The distal ends of the two tines 148a, 148b may be shaped to engage with the tip 140, e.g., as shown in FIG. 2B. A transverse eyelet 160 is located at the distal end 164 of the inner shaft 170 and includes a threaded member 166 extending toward the distal terminus 157 of the middle shaft 150. In this configuration, a surgeon can pass a suture 200 through both the aperture 155 and the eyelet 160 at a position proximal to a bone fixture site 20, and then transport the eyelet 160 with the suture 200 to the bone fixture site 20 for implantation.

[0024] In FIG. 2B, the distal terminus 157 of the middle shaft 150 is shown in more detail. The tip 140 is shown as assembled to the middle shaft 150 by forming an interference fit with the tines 148a, 148b of the aperture 155. The tip 140 also includes a threaded hole 146 (e.g., female screw threads) which is configured to receive and securely engage the threaded member 166 (e.g., male screw threads, shown in FIG. 2A) formed on a distal end 164 of the eyelet 160 once the eyelet 160 has been advanced to the repair site 20. In alternative embodiments, other engagement mechanisms may be utilized for securing eyelet 160 relative to tip 140 once the eyelet 160 has been advanced to the repair site 20. For example, in some embodiments, a clip/ratchet mechanism may be utilized to secure the eyelet relative to the tip 140. In some embodiments, securing may be achieved by rotational movement of the inner shaft 170, which causes the eyelet 160 to rotate along a longitudinal axis relative to the tip 140. In other embodiments, securing may be achieved by translational movement of the inner shaft 170, which causes the eyelet 160 to translate (e.g., advance) along a longitudinal axis relative to the tip 140. In further embodiments, other actuation mechanisms/techniques may be utilized to control the engagement mechanism and secure the eyelet 160 relative to the tip 140.

[0025] FIG. 3 shows an example of the inner shaft 170 and the eyelet 160 in more detail. The eyelet 160 is shown with the threaded member 166 and an opening 165 that is sized to receive one or more sutures 200 therethrough. A proximal end 162 of the eyelet 160 is configured to releasably mate with interference coupling elements 172a and 172b of the inner shaft 170. Notably, the interference coupling elements 172a and 172b may advantageously allow the inner shaft 170 to effect both translational and rotational movement of the eyelet 160. Thus, e.g., the interference coupling elements 172a and 172b may be configures to engage with corresponding slots or grooves defined in the proximal end 162 of the eyelet. Once the sutures 200 have been loaded into the eyelet 160, various forms of immobilization can be employed. For example in some embodiments, immobilization of the sutures 200 may be achieved by way of securing the eyelet 160 relative to the tip 140. The eyelet may, in some embodiments, be partially or fully imbedded in a cavity formed in the tip 140 (e.g., threaded hole 146) when engaged thereby resulting in an interference immobilization of the one or more sutures compressed between the eyelet 160 and the tip 140. Alternatively, in some embodiments, the eyelet may be collapsed/deformed upon engagement with the tip, to form an interference fit. In yet further embodiments, an independent locking mechanism may be utilized to secure the

sutures within eyelet 160. Thus, in some embodiments, securing the sutures 200 within the eyelet 160 may be effected by the securing of the eyelet 160 relative to the tip 140 while in other embodiments securing the sutures 200 within the eyelet 160 may be independent of securing the eyelet 160 relative to the tip 140. Examples of suture immobilization within the eyelet 160 are further described in FIGs. 4-7 below.

[0026] FIG. 4 illustrates a sectional view of a bone anchor system 400 in accordance with another example of the present disclosure. Like bone anchor system 100, bone anchor system 400 includes anchor body 410 slidably coupled to outer shaft 420, a tip 440, and an aperture of a driver (not shown). The anchor body 410 and the tip 440 can be referred to, collectively, as the anchor 405. FIG. 4, however, shows a collapsible eyelet 460 disposed at a distal terminus of the inner shaft 470. In this example, the collapsible eyelet 460 can be made of a flexible or deformable material, such as a soft metal, a soft plastic, a rubber, a resin, or the like. The collapsible eyelet 460 has a proximal end 462 releasably coupled to interference coupling elements 472a, 472b of the inner shaft 470. A distal end 464 of the collapsible eyelet 460 includes protrusions 466a, 466b configured to mate with recesses 448a, 448b on an inner surface of the tip 440.

[0027] When the collapsible eyelet 460 is advanced into an open area 446 with the inner shaft 470, the collapsible eyelet 460 can be deformed to fill the open area 446, as shown in FIG. 5. After compression of the inner shaft 470 on the collapsible eyelet 460, the proximal end 462 is released from interference coupling elements 472a, 472b by retraction in a proximal direction of the inner shaft 470, thereby immobilizing the sutures 200 and leaving the collapsible eyelet 460 securely engaged in the open area 446.

[0028] FIG. 6 illustrates a sectional view of a bone anchor system 600 in accordance with still another example of the present disclosure. Like bone anchor systems 100 and 400, bone anchor system 600 includes anchor body 610 slidably coupled to outer shaft 620, and a tip 640. The anchor body 610 and the tip 640 can be referred to, collectively, as the anchor 605. An eyelet 660, which may be made of a rigid material, such as a hard metal, a hard plastic, and the like, has an opening 665 for receiving one or more sutures 200 therethrough. In this example, the bone anchor system 600 additionally includes a plug 690 disposed between the proximal end 662 of the eyelet 660 and the inner shaft 670. The plug 690 includes a head portion 612 and a threaded portion 614. In a retracted position, the head portion 612 is engaged with a driving

portion 672 of the inner shaft 670 (shown in more detail in FIG. 7) and the threaded portion 614 projects through the proximal wall 680 of the eyelet 660. The eyelet 660 also includes a threaded/ridged portion 666 at a side of the distal end 664, such that the eyelet 660 can be engaged with the threaded hole 646 on the inner surface of tip 640 by a twisting and/or pushing force exerted on the inner shaft 670 and transferred to the eyelet 660 through the plug 690. In an alternative embodiment (not shown) the engagement may be between a barb engaged with a groove. Other engagement mechanisms may likewise be employed.

[0029] As shown in FIG. 7, in an engaged position, after the eyelet 660 is securely coupled with the tip 640, the inner shaft 670 may be further rotated or twisted to drive the plug 690 into the opening 665 of the eyelet 660, thereby clamping the sutures 200 between the plug 690 and the inner surface of eyelet 660. After the sutures 200 are clamped by the plug 690, further rotation of the inner shaft 670 can disengage the interference coupling device 672 from the head portion 612, because the static friction between the plug 690 and the eyelet 660 is greater than the static friction between the eyelet 660 and the tip 640. As a result, when the inner shaft 670 advances the eyelet 660 to the tip 640 and is rotated or twisted, the rotational force first drives the eyelet 660 into the threaded hole 646 until the eyelet 660 is securely engaged.

[0030] FIGs. 8A and 8B further illustrate an example of the method of using the bone anchor system of FIGs. 1-3. In FIG. 8A, the tip 140 is first inserted into bone or a bone hole at the repair site 20. One or more sutures 200 are then passed through the aperture 155 and the eyelet 160. The inner shaft 170 is advanced until the threaded member 166 contacts the threaded hole 146 of the tip 140. The inner shaft 170 is then rotated and/or advanced to engage (e.g., screw) the eyelet 160 into the tip 140 and to impinge the sutures 200 in the eyelet 160, e.g., in one of the manners described herein.

[0031] In FIG. 8B, the outer shaft 120 of the driver 130 is used to further drive the anchor 110 into the bone at repair site 20. The inner shaft 170 is then rotated to decouple the proximal end 162 of the eyelet 160 from the interference coupling elements 172a and 172b of the inner shaft 170. With the anchor 110 now flush with the surface of the bone, the driver 130, including the outer shaft 120, the middle shaft 150 and the inner shaft 170, is extracted from the repair site. The tip 140, the suture 200 and the anchor 110 remain in the repair site 20.

[0032] It is appreciated that other examples of the bone anchor system are possible to one skilled in the art. For example, instead of a medial eyelet having a round opening, a U-shaped

wedge may be used in place of the medial eyelet and attached to the inner shaft, such that the U-shaped wedge can grab the repair suture when inner shaft advances toward the tip, so long as the repair suture is placed within the aperture of the middle shaft. Once the inner shaft reaches its final position, the U-shaped wedge can be attached to the tip and disengaged from the inner shaft when the shaft and driver are removed from the body. Accordingly, the medial eyelet and/or the U-shaped wedge of the present disclosure do not need to be at a distal position when a surgeon passes the repair suture therethrough.

[0033] Although the present disclosure has been described with respect to various examples, it would be apparent to one of ordinary skill in the art that various other examples are possible, without departing from the spirit and scope as defined in the appended claims.

CLAIMS

1. A bone anchor system comprising:
an anchor driver comprising:
an outer shaft;
a middle shaft; and
an inner shaft, the inner shaft including an eyelet comprising:
an opening sized to receive one or more sutures therethrough; and
a proximal end releasably mated with an interference coupling element of the inner shaft;
an anchor body slidably coupled to the outer shaft; and
a tip configured to releasably mate with a distal end of the middle shaft;
wherein a distal end of the eyelet is configured to mechanically couple with the tip.

2. The system of claim 1, wherein the middle shaft of the anchor driver comprises an aperture configured to allow one or more sutures to pass through the opening of the eyelet.

3. The system of claim 2, wherein the aperture extends from the distal end of the middle shaft to an intermediate position of the middle shaft proximate a distal end of the outer shaft.

4. The system of claim 1, further comprising a plug between the proximal end of the eyelet and a distal end of the inner shaft.

5. The system of claim 4, wherein the plug is configured to clamp the sutures as the eyelet is mechanically coupled with the tip.

6. The system of claim 1, wherein the eyelet is made of a flexible material.

7. The system of claim 6, wherein the tip includes an open area, and the eyelet is collapsible into the open area to clamp one or more sutures by the collapsed eyelet.

8. The system of claim 1, wherein the tip comprises a threaded hole at a proximal end of the tip and the eyelet comprises a threaded member at the distal end of the eyelet, the threaded hole of the tip being configured to receive and securely engage with the threaded member of the eyelet.

9. The system of claim 1, wherein the outer shaft and inner shaft are each capable of independent movement from one other.

10. An anchor driver comprising:

an outer shaft coupled to an anchor body;

a middle shaft coupled with the outer shaft and having a distal end releasably mated with a tip;

an inner shaft received in the outer shaft and the middle shaft, the inner shaft having an interference coupling element at a distal end thereof, wherein the interference coupling element is configured to releasably mate with an eyelet;

wherein the inner shaft is configured to transport the eyelet from a first position distant from the tip to a second position adjacent to the tip.

11. The anchor driver of claim 10, wherein the middle shaft comprises an aperture configured to allow one or more sutures to pass through an opening of the eyelet.

12. The anchor driver of claim 11, wherein the aperture extends from a distal terminus of the middle shaft to an intermediate position of the middle shaft which is proximate to a distal terminus of the outer shaft.

13. The anchor driver of claim 11, further comprising a plug between the inner shaft and the eyelet, wherein the plug is configured to clamp the sutures when the eyelet is mechanically coupled with the tip.

14. The anchor driver of claim 10, wherein the eyelet is made of a flexible material.

15. The anchor driver of claim 14, wherein the tip includes an open area, and the eyelet is collapsible into the open area to clamp one or more sutures.

16. The anchor driver of claim 10, wherein the tip comprises a threaded hole at a proximal end of the tip and the eyelet comprises a threaded member at a distal end of the eyelet, the threaded hole of the tip being configured to receive and securely engage with the threaded member of the eyelet.

17. The anchor driver of claim 10, wherein the outer shaft and inner shaft are each capable of independent movement from one other.

18. A method of inserting a bone anchor into bone comprising:

providing a bone anchor system near a repair site, the bone anchor system comprising:

an anchor driver comprising:

an outer shaft;

a middle shaft; and

an inner shaft, the inner shaft including an eyelet comprising:

an opening sized to receive one or more sutures therethrough; and

a proximal end releasably mated with an interference coupling element of the inner shaft;

an anchor body slidably coupled to the outer shaft; and

a tip configured to releasably mate with a distal end of the middle shaft;

wherein a distal end of the eyelet is configured to mechanically couple with the tip;

inserting the tip into bone;

passing the one or more sutures through the opening;

advancing and/or rotating the inner shaft until the distal end of the eyelet mechanically couples with the tip and the one or more sutures are impinged within the opening; and

decoupling the eyelet from the shaft.

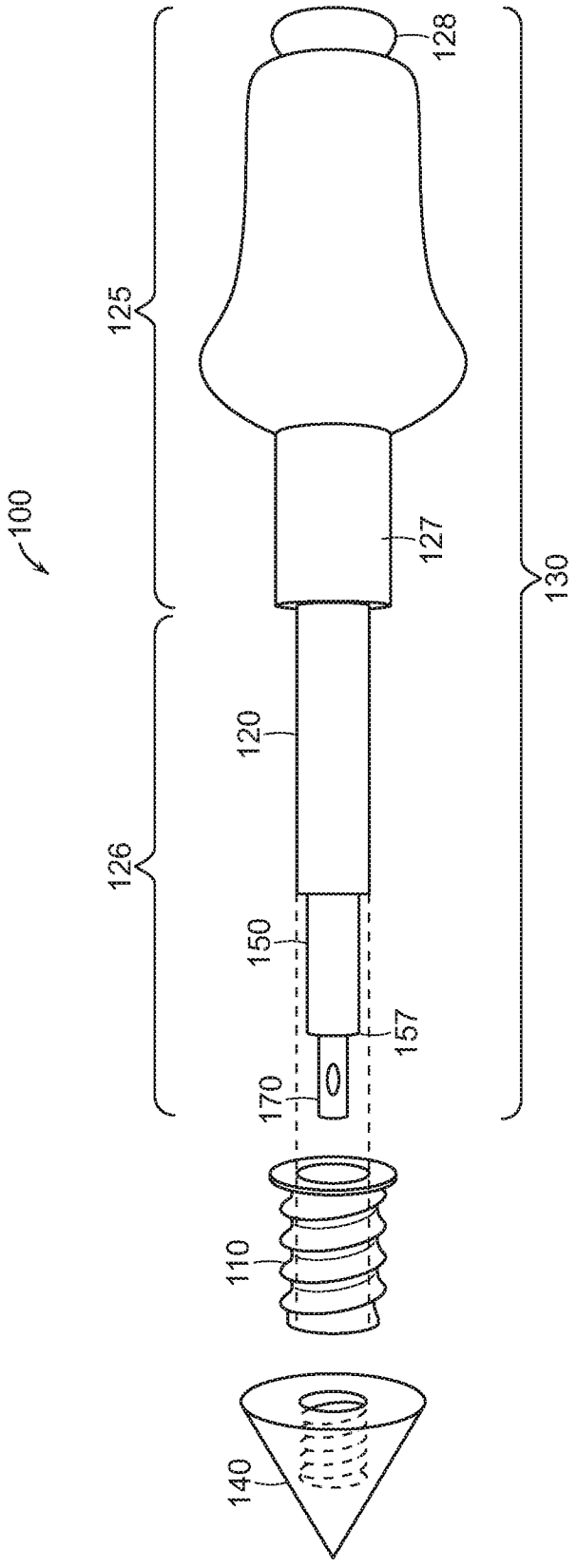


FIG. 1

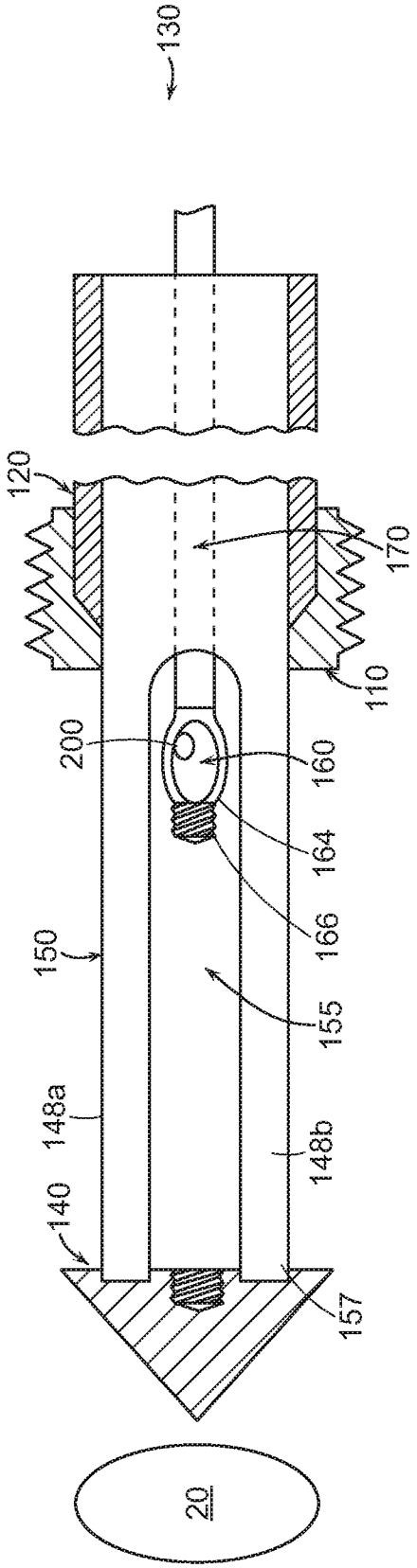


FIG. 2A

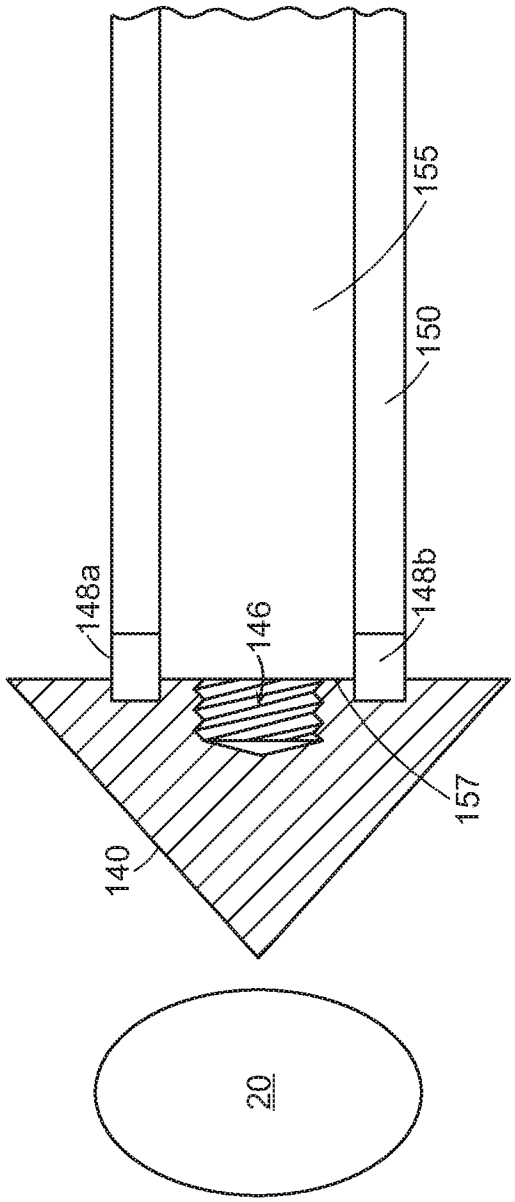


FIG. 2B

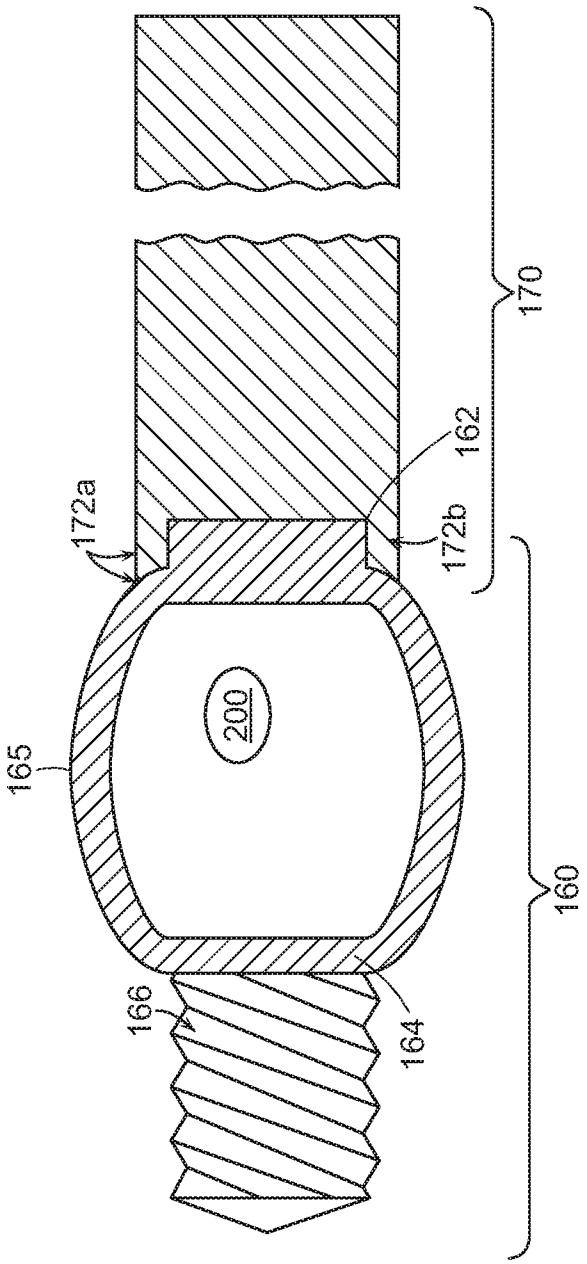
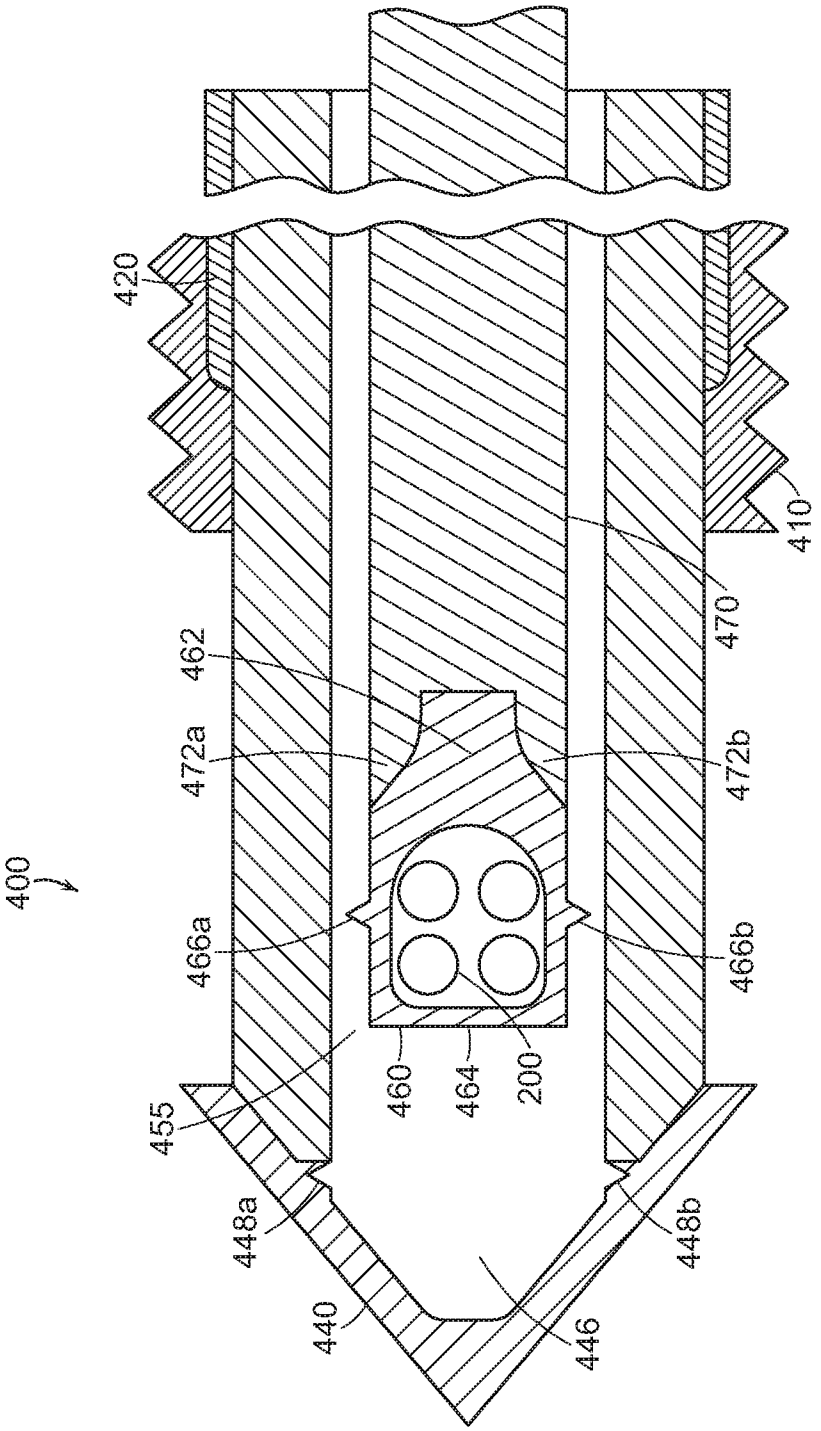


FIG. 3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466b
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200
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448a
448b
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FIG. 4

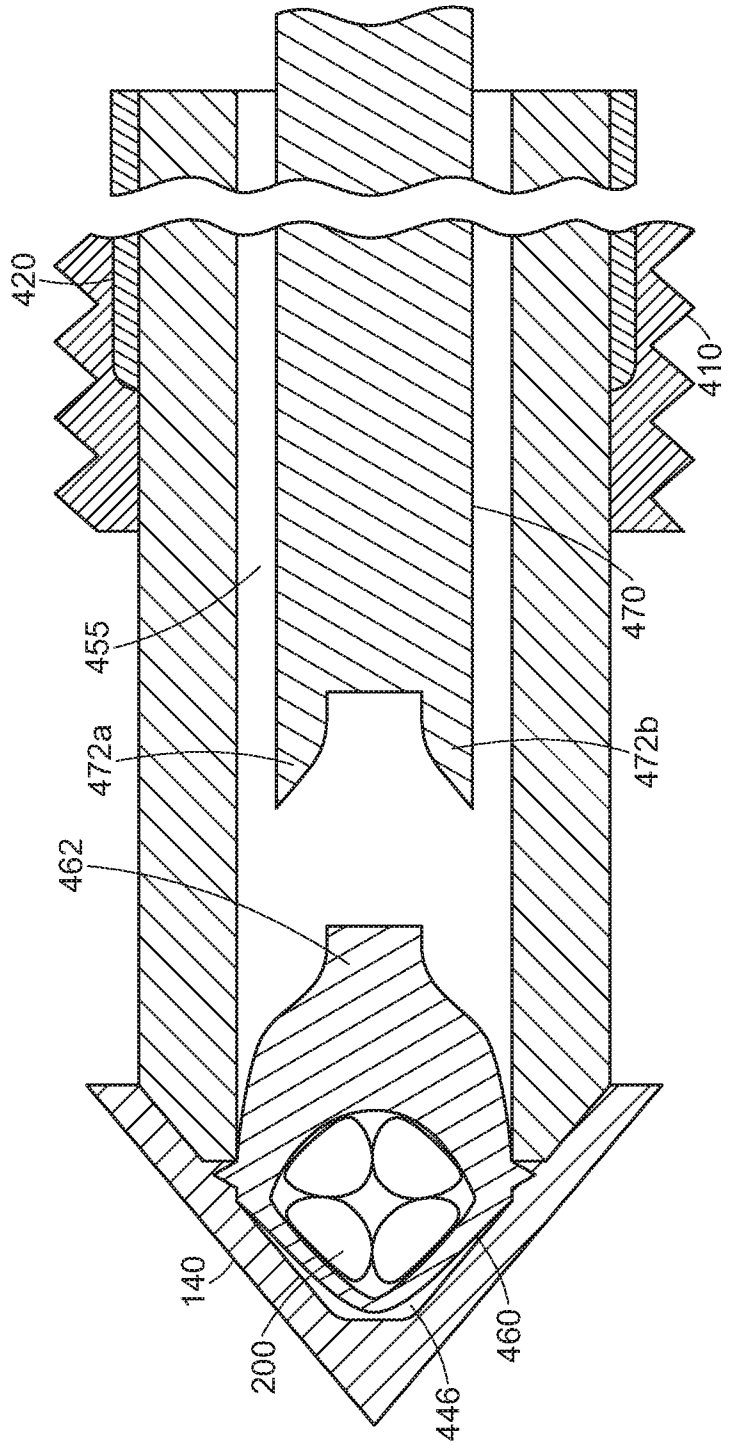

FIG. 5

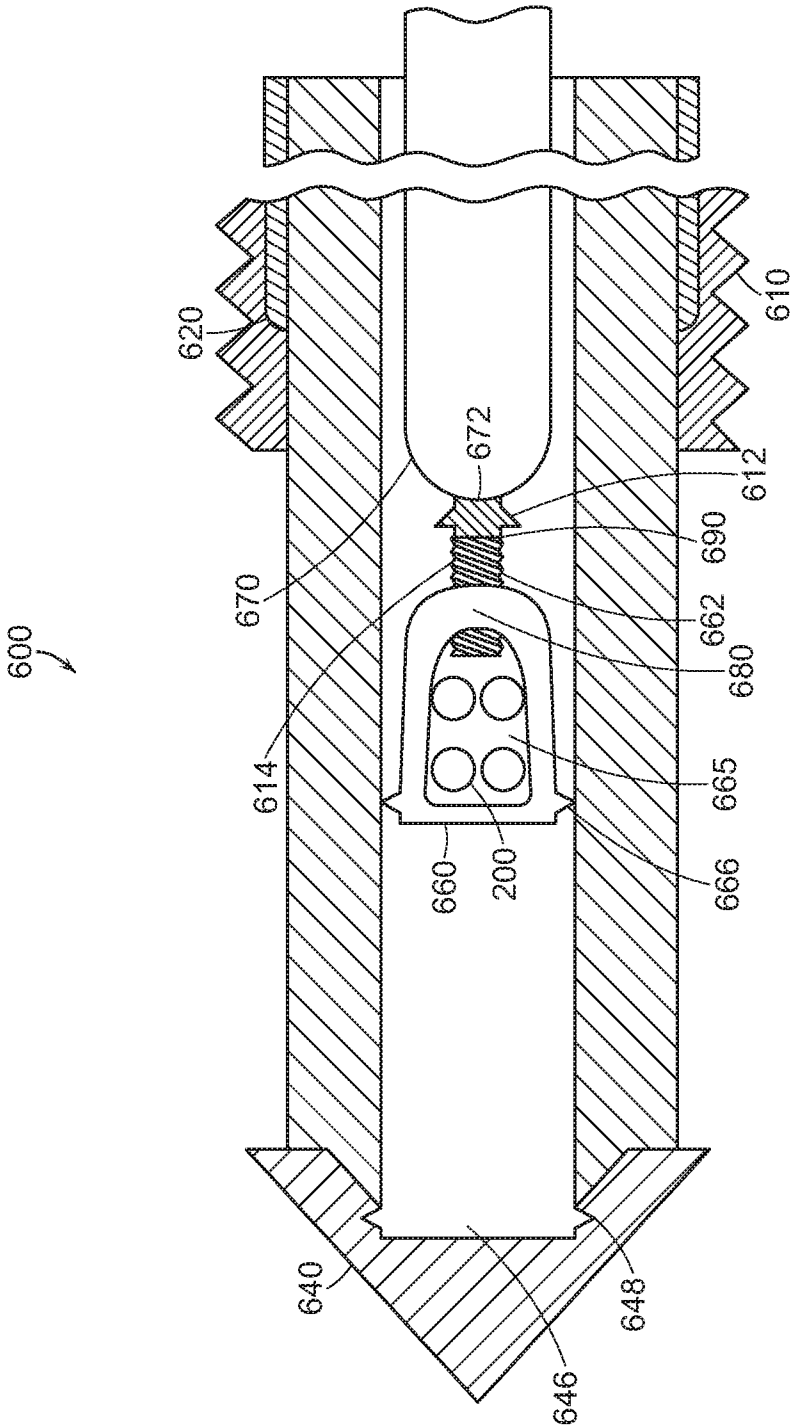
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FIG. 6

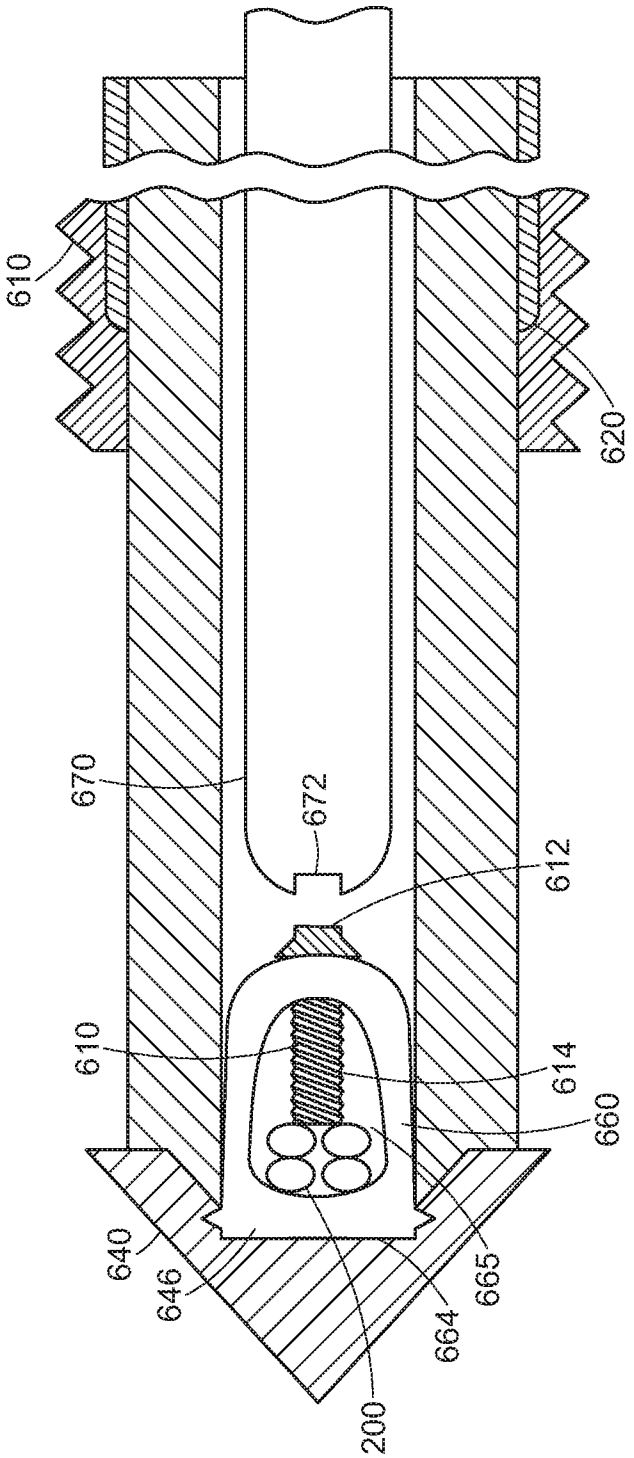

FIG. 7

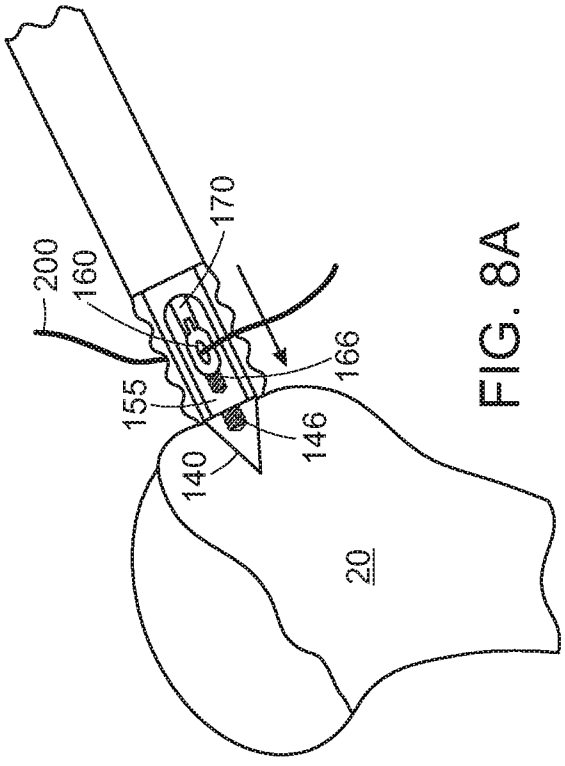
200
160
170
155
166
146
140
20

FIG. 8A

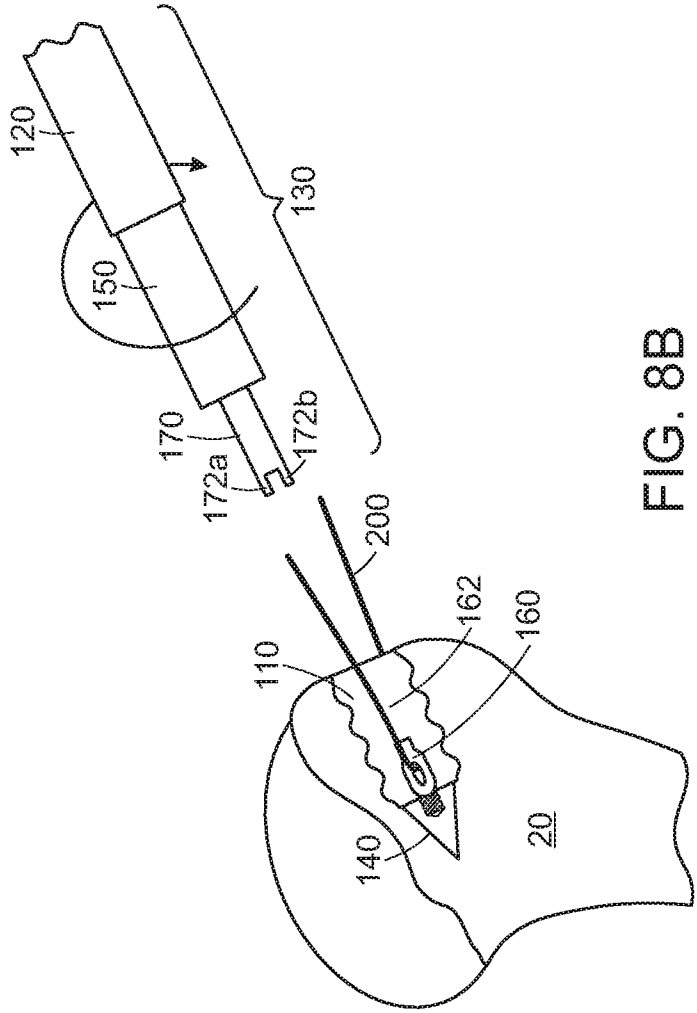
120
130
150
170
172a
172b
200
110
162
160
140
20

FIG. 8B

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/023960

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B17/04
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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2014/277129 A1 (ARAI TATSUYA [US] ET AL) 18 September 2014 (2014-09-18)	10
A	figures 1A-1I, 4A-4F paragraph [0031] - paragraph [0033] paragraph [0037] - paragraph [0044] -----	1,4,9, 13,17
A	US 2010/016869 A1 (PAULK DAVID A [US] ET AL) 21 January 2010 (2010-01-21) figures 1, 2, 7-13, 15A paragraph [0030] - paragraph [0037] -----	1,4,10, 13
A	US 2012/083841 A1 (DIMATTEO KRISTIAN [US] ET AL) 5 April 2012 (2012-04-05) figures 1, 4-6 paragraph [0021] - paragraph [0023] paragraph [0026] - paragraph [0030] ----- -/--	1,6,10, 14

[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 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	Date of mailing of the international search report
24 May 2016	03/06/2016

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	Etienne, Nicolas

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

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/023960

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 02/11630 A1 (CLEVELAND CLINIC FOUNDATION [US]) 14 February 2002 (2002-02-14) figures 1-4, 8-12, 15-24 page 7, line 8 - page 8, line 19 page 9, line 9 - page 12, line 12 page 11, line 11 - page 14, line 23 -----	1,8-10, 16,17

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/023960

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.: 18
because they relate to subject matter not required to be searched by this Authority, namely:

Pursuant to Article 17(2)(a)(i) PCT, this Authority is not required to search the subject-matter of claim 18, since the method as defined in said claim is a method for treatment of the human or animal body by surgery (Rule 39.1(iv) and Rule 43bis PCT). Indeed, inserting an anchor into bone is a surgical step.

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/US2016/023960

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