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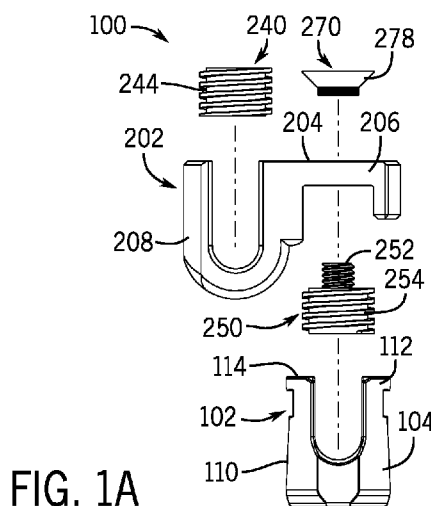
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(54) Title: TULIP SIDECAR DEVICES, SYSTEMS, AND METHODS



(57) Abstract: Devices and systems for securing an adaptor device to a tulip structure on a pedicle screw is disclosed. The devices and systems may be configured to accept a spinal rod, and may include one or more of an adaptor, a set screw, a lock nut, and a tool, useful in securing the adaptor to the tulip and/or spinal rods to the adaptor and/or tulip. Additional embodiments of the devices and systems may include a tulip configured to engage the adaptor and other system components and/or an adaptor-to-adaptor device for connecting to the adaptor.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 23/72287

A. CLASSIFICATION OF SUBJECT MATTER

IPC - INV. A61B 17/70 (2023.01)

ADD. A61B 17/86 (2023.01)

CPC - INV. A61B 17/7049, A61B 17/7032, A61B 17/7037

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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)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/0228518 A1 (Medos International Sari) 16 August 2018 (16.08.2018), entire document, especially Fig 1A-B, para [0061]-[0065], para [0071]-[0072], para [0078]	1-4, 9-12
A	US 2018/0228516 A1 (Warsaw Orthopedic, Inc.) 16 August 2018 (16.08.2018), entire document	1-4, 9-12
A	US 2021/0085372 A1 (Koutsoumbelis) 25 March 2021 (25.03.2021), entire document	1-4, 9-12

☐ 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

"D" document cited by the applicant in the international application

"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

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 23/72287

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.:
because they relate to subject matter not required to be searched by this Authority, namely:
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.: 5-8, 13-15, 20, 24-30
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- see extra sheet -

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-4, 9-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 23/72287

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I: Claims 1-4, 9-12 directed to an adaptor to engage a tulip and spinal rod including an adaptor set screw and tulip set screw.

Group II: Claims 16-19 directed to a screw-type fastener for fastening first and second components.

Group III: Claims 21-23 and 31-32 directed to an adaptor to engage a tulip including a rod engagement feature.

Group IV: Claim 33 directed to an adaptor to engage a tulip and spinal rod including a rotatably adjustable channel.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

SPECIAL TECHNICAL FEATURES

The invention of Group I includes the special technical features of an adaptor set screw; and a tulip set screw, not required by the claims of Groups II-IV.

The invention of Group II includes the special technical features of a screw-type fastening device comprising a first coupling assembly proximate a first end, a first fastener surface, wherein the first fastener surface has threading, not required by the claims of Group I or III-IV.

The invention of Group III includes the special technical features of wherein a first channel capable of receiving a first spinal rod is defined between the tulip and the yoke; an engagement feature extending from the device and engaging the first spinal rod; wherein the engagement structure is axially spaced from the yoke, not required by the claims of Group I-II or IV.

The invention of Group IV includes the special technical features of an extension extending from a side of the yoke away from the tulip screw, the extension defining a first portion of a joint; a rotatably adjustable channel shaped to receive a spinal rod and defining a second portion of a joint, the second portion coupling to the first portion to define the joint; wherein the rotatably adjustable channel can be rotatable and angled about the joint, not required by the claims of Group I-III.

COMMON TECHNICAL FEATURES

Groups I and III-IV share the common technical features of a device comprising a channel configured to accept and hold a spinal rod, and a yoke configured to engage a tulip screw. However, this shared technical feature does not represent a contribution over prior art as being anticipated by US 2018/0228518 A1 to Medos International Srl (hereinafter 'Medos').

Medos discloses a device (see 130, Fig 1B; connector 130, para [0061]) comprising a channel (see a channel of 150, Fig 1B; rod-receiving channel 152 of 150, para [0071]) configured to accept and hold a spinal rod (see how the channel is configured to accept and hold a spinal rod 107, Fig 1A; rod-receiving channel 152 for receiving rod 107, para [0071]), and a yoke (see a yoke 140, Fig 1B) configured to engage a tulip screw (see how the yoke is configured to engage a tulip screw 101, Fig 1A-B, 140 fits over a head of a bone anchor 101, para [0061]; such as polyaxial screw including U-shaped channel, para [0062]-[0063]).

Groups III and IV further share the common technical feature of the yoke extending over a top of the tulip screw. However, this shared technical feature does not represent a contribution over prior art as being anticipated by Medos.

Medos discloses the yoke extending over a top of the tulip screw (see how the yoke 140 extends over a top of 101, Fig 1A-B, 140 fits over a head of the bone anchor 101, para [0061]).

Groups I and II share the common technical features of a screw type fastener device. However, this shared technical feature does not represent a contribution over prior art as being anticipated by Medos.

Medos discloses a screw type fastener device (see 108, Fig 1A-B; set screw 108, para [0061]).

As the common technical features were known in the art at the time of the invention, these cannot be considered special technical features that would otherwise unify the groups.

Therefore, Groups I-IV lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.

**Note (Item 4): Claims 5-8, 13-15, 20, 24-30 are unsearchable because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).