



- (51) International Patent Classification:
A61B 17/072 (2006.01)
- (21) International Application Number:
PCT/US2014/070808
- (22) International Filing Date:
17 December 2014 (17.12.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
14/138,554 23 December 2013 (23.12.2013) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,

MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) Date of publication of the international search report:
6 August 2015

(54) Title: SURGICAL INSTRUMENTS WITH ARTICULATABLE SHAFT ARRANGEMENTS

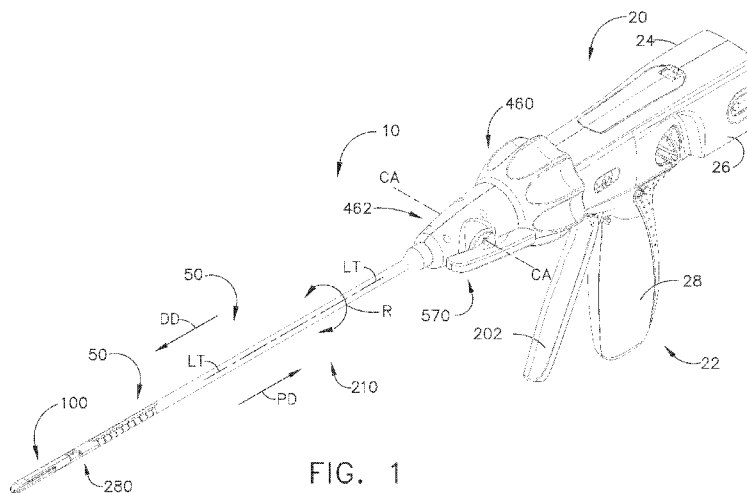


FIG. 1

(57) Abstract: A surgical instrument (10) that can comprise a surgical end effector (100) that is configured to perform at least one surgical procedure upon application of at least one control motion thereto. The surgical instrument may further include an elongated shaft assembly (50) that defines a longitudinal tool axis and is operably coupled to the surgical end effector. The elongated shaft assembly may operably support at least one control component and include a flexible articulation portion (260) for facilitating articulation of the surgical end effector relative to the longitudinal tool axis. The flexible articulation portion may comprise a longitudinally-extending, elongated articulation spine (262) that includes a plurality of ribs (510, 520) that extend from each lateral side of the articulation spine. Each rib may include at least one anti-twist feature (530) for preventing the flexible articulation portion from twisting about the longitudinal tool axis during articulation of the surgical end effector.

WO 2015/100100 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/070808

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B17/072
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 2004/034343 A1 (GILLESPIE WALTER D [US] ET AL) 19 February 2004 (2004-02-19)	1-4,6,8
A	paragraph [0026] - paragraph [0027] paragraph [0040] paragraph [0042] paragraph [0044] - paragraph [0047] paragraph [0055] figures 3,4(b),5	12-14
X	US 2013/334281 A1 (WILLIAMS JUSTIN [US]) 19 December 2013 (2013-12-19)	11,15-18
A	paragraph [0107] - paragraph [0116] figures 1,9-13	8-10,19,20
A	US 5 673 841 A (SCHULZE DALE R [US] ET AL) 7 October 1997 (1997-10-07) column 25, line 47 - column 28, line 28 figures 36-42	1-10,19,20
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 29 June 2015	Date of mailing of the international search report 13/07/2015
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Ebbinghaus, M
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/070808

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 R E38 335 E1 (AUST GILBERT M [US] ET AL) 25 November 2003 (2003-11-25) column 17, line 21 - line 61 figure 28 -----	1,4-7
A	US 5 704 534 A (HUITEMA THOMAS W [US] ET AL) 6 January 1998 (1998-01-06) column 11, line 45 - column 12, line 47 figures 22,25-27 -----	1
A	EP 2 184 014 A2 (TYCO HEALTHCARE [US]) 12 May 2010 (2010-05-12) paragraph [0030] figure 17 -----	11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/070808

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.:
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 additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional 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/US2014/070808

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			US 2010152746 A1	17-06-2010

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-10, 19, 20

A surgical instrument comprising an elongated shaft assembly with an articulation spine that tapers along its length

2. claims: 11-18

A surgical instrument comprising a flexible articulation portion with a plurality of ribs comprising anti-twist protrusions and detents
