



- (51) International Patent Classification:
A61B 17/3205 (2006.01)
- (21) International Application Number:
PCT/US2011/060882
- (22) International Filing Date:
15 November 2011 (15.11.2011)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/413,925 15 November 2010 (15.11.2010) 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, 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, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, ML, MR, NE, SN, TD, TG).

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:
19 July 2012



WO 2012/068181 A3

(54) Title: TISSUE REMOVAL SYSTEM WITH RETENTION MECHANISM

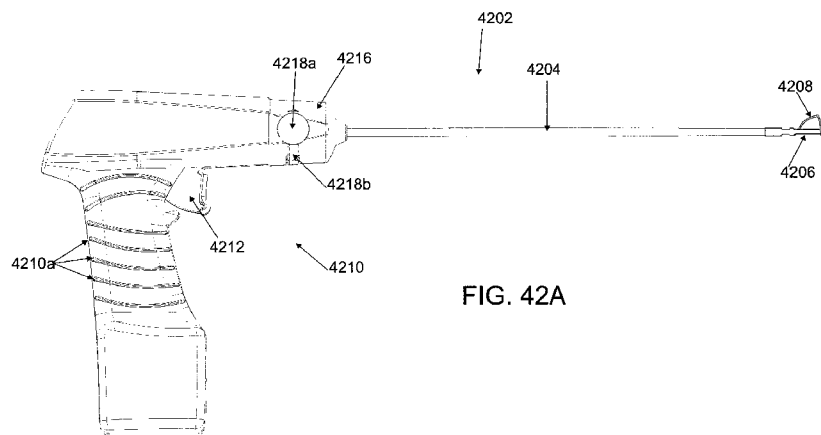


FIG. 42A

(57) Abstract: Systems and methods for minimally invasive discectomy procedures are described herein. In some variations, a tissue removal system may comprise a handheld housing, an outer shaft comprising a distal portion and a proximal portion coupled to the handheld housing, a distal sheath coupled to the distal portion of the outer shaft, a motor, an inner shaft coupled to the motor, where the inner shaft is located partially within the outer shaft and partially within the distal sheath, a tip portion coupled to a distal portion of the inner shaft, and an elongate member distally extending through a distal opening of the inner shaft, the elongate member having a retracted configuration and an extended configuration, where the distal sheath comprises at least one element (e.g. at least one protrusion) that engages the tip portion to couple the tip portion to the distal sheath.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 11/60882

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A61B 17/3205 (2012.01) USPC - 606/80 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) IPC(8) - A61B 17/3205 (2012.01) USPC - 606/80 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched IPC(8) - A61B 17/3205 (2012.01) USPC - 600/562, 564, 565, 568; 606/1, 53, 60, 79, 80, 246, 279 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST (PGPB, USPT, EPAB, JPAB); Google (Patents, Scholar, Web) Search terms:		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009/0292287 A1 (CRAGG et al.) 26 November 2009 (26.11.2009) Fig. 7-9, 33-34; para [0060]-[0064], [0069], [0098]-[0101]	1-14
Y	US 2004/0230211 A1 (MOUTAFIS et al.) 18 November 2004 (18.11.2004) Fig. 1-2C, 7A; para [0088], [0096]-[0097], [0123]-[0124]	1-14
Y	US 6,328,703 B1 (MURAKAMI) 11 December 2001 (11.12.2001) Fig. 7, 9; col 6, ln 49 to col 7, ln 8	2-4
Y	WO 2010/115134 A1 (TO et al.) 07 October 2010 (07.10.2010) Fig. 40A; para [0149]	7-9
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 09 May 2012 (09.05.2012)		Date of mailing of the international search report 23 MAY 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

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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 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.:
1-14

- 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.

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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 examined, the appropriate additional examination fees must be paid.

Group I, claims 1-14, are directed to a tissue removal system wherein the distal sheath comprises at least one element that engages the tip portion to couple the tip portion to the distal sheath.

Group II, claims 15-22, are directed to a tissue removal system comprising a means for limiting shaft shaft movement.

The inventions listed as Groups I-II 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:

The special technical feature of Group I is wherein the distal sheath comprises at least one element that engages the tip portion to couple the tip portion to the distal sheath; not required by the claims of Group II. The special technical feature of Group II is a means for limiting movement by the inner shaft; not required by the claims of Group I.

The technical features shared between Groups I and II fail to make a contribution over the prior art of WO 2010/115134 A1 to To et al. (hereinafter "TO") as follows:

TO discloses a handheld housing, (ref. WO 2010/115134 A1 to To et al.; Fig 5A-5B, 40A-40C, para [0059], "The housing 6 contains one or more components configured to control the tissue removal assembly 8 and other optional features of the tissue removal device 2.", [0060], [0123], "The handle housing 3530 may be ergonomically sized and shaped", [0151]-[0154]);

an outer shaft comprising a distal portion and a proximal portion coupled to the handheld housing, (ref. WO 2010/115134 A1 to To et al.; Fig 5A-5B, 40A-40C, para [0059], "FIG. 5A depicts one embodiment of a tissue removal device 2, comprising an outer tube 4 coupled to a housing 6", [0060], [0149]-[0154]);

a distal sheath coupled to the distal portion of the outer shaft, (ref. WO 2010/115134 A1 to To et al.; Fig 40A-40C, para [0149] "Tissue removal assembly 4000 comprises a tubular member 4004 attached distally to the outer tube 4002", [0149]-[0153]);

a motor, (ref. WO 2010/115134 A1 to To et al.; Fig 5A-5B, para [0059], "Optional components may include, but are not limited to, a motor configured to rotate or move the tissue removal assembly", [0060], [0151]-[0153]);

an inner shaft coupled to the motor, wherein the inner shaft is located partially within the outer shaft and partially within the distal sheath, (ref. WO 2010/115134 A1 to To et al.; Fig 5A, 5B, 40A-40C, para [0085], "and an elongate drive member configured to mechanically couple the motor to the tissue removal assembly", [0086], [0087], [0148], "an inner tube 3944 that is affixed to the distal portion of an outer tube 3950, a rotatable drive member 3942 in outer tube and extending through the inner tube...a motor may rotate the rotatable drive member 3948, the rotatable cable shaft 3942", [0149]-[0153]);

a tip portion coupled to a distal portion of the inner shaft, (ref. WO 2010/115134 A1 to To et al.;

Fig 40A-40C, para [0149], "a rotatable cable shaft 4010 attached distally to the rotatable drive member 4030, and an elongate member as previously described and configured", [0150] "shaft 4010 may comprise a distal tip 4018", [0151]-[0154]); and

an elongate member distally extending through a distal opening of the inner shaft, the elongate member having a retracted configuration and an extended configuration, (ref. WO 2010/115134 A1 to To et al.; Fig 5A-6B, 40A-40D, para [0061] "The elongate member 202 has a retracted configuration, shown in FIG. 5A, and an extended configuration, shown in FIG. 5B...In some embodiments, transformation of the elongate member 202 between configurations may include sliding its distal section 206 in or out of the distal opening 214, in addition to or in lieu of movement between the proximal section 204 and the proximal opening 212", [0067] "the elongate member 202 may have a retracted configuration and an extended configuration", [0149] "a rotatable cable shaft 4010 attached distally to the rotatable drive member 4030, and an elongate member as previously described and configured").

Accordingly, unity of invention is lacking under PCT Rule 13.1 because the inventions do not share a same or corresponding special technical feature providing a contribution over the prior art.