(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 September 2017 (21.09.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/160781 A3

(51) International Patent Classification:
*A61M 25/10* (2006.01) *A61M 19/00* (2006.01)
*A61B 17/70* (2006.01) *A61K 9/00* (2006.01)
*A61B 17/34* (2006.01)

(21) International Application Number:
PCT/US2017/022218

(22) International Filing Date:
14 March 2017 (14.03.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
15/070,195 15 March 2016 (15.03.2016) US

(71) Applicant: **KYPHON SÀRL** [CH/CH]; Pierre-à-Bot 97, 2000 Neuchatel (CH).

(72) Inventor; and

(71) Applicant *(for US only)*: **GOSHAYESHGAR, Mojan** [US/US]; 710 Medtronic Parkway NE, Minneapolis, Minnesota 55432 (US).

(74) Agent: **WATKINS, Richard D.** et al.; 710 Medtronic Parkway NE, MS: LC340, Minneapolis, MN 55432, Minneapolis, Minnesota 55432 (US).

(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, DJ, 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, KH, KN, KP, KR, KW, 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 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))*

(88) Date of publication of the international search report:
23 August 2018 (23.08.2018)

(54) Title: DEVICES FOR DELIVERING A CHEMICAL DENERVATION AGENT AND METHODS OF USE

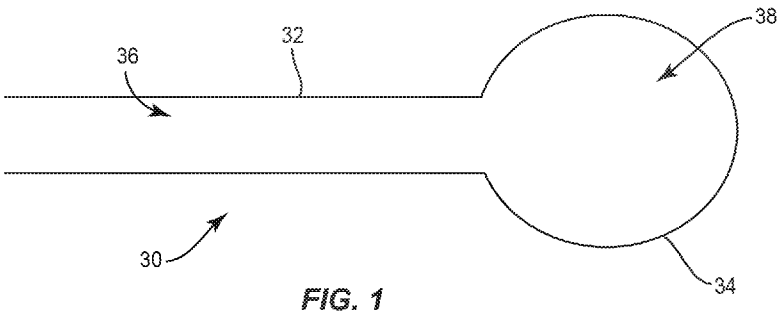



FIG. 1

(57) Abstract: A method for treating back pain in a patient in need of such treatment is provided. The method includes positioning a balloon catheter in or adjacent to a treatment zone containing a basivertebral nerve. A chemical denervation agent is administered with the balloon catheter such that the chemical denervation agent chemically ablates at least a portion of the basivertebral nerve. Kits, systems and methods are disclosed.

WO 2017/160781 A3

# INTERNATIONAL SEARCH REPORT

International application No.
**PCT/US2017/022218**

**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.: 1-15
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 1-15 pertain to methods for treatment of the human body and thus relate to a subject-matter which this International Searching Authority is not required, under PCT Article 17(2)(a)(i) and PCT Rule 39.1(iv), to search.

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 addtional 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 any 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**

International application No.
**PCT/US2017/022218**

**A. CLASSIFICATION OF SUBJECT MATTER**

**A61M 25/10(2006.01)i, A61B 17/70(2006.01)i, A61B 17/34(2006.01)i, A61M 19/00(2006.01)i, A61K 9/00(2006.01)i**

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)
A61M 25/10; A61M 29/00; A61K 9/00; A61B 17/60; A61B 18/18; A61F 7/00; A61B 17/70; A61B 17/34; A61M 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & keywords: balloon, catheter, denervation, cannula, basivertebral, vertebral, porous

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | US 2013-0006233 A1 (PELLEGRINO et al.) 03 January 2013<br>See paragraphs [0064]-[0132]; figures 4A-4F. | 16-20 |
| Y | US 2003-0158517 A1 (KOKISH) 21 August 2003<br>See paragraph [0020]; claims 1-11. | 16-20 |
| Y | US 2014-0271717 A1 (KYPHON SARL) 18 September 2014<br>See paragraphs [0102]-[0103]; claims 1-7; figures 3-4. | 16-20 |
| Y | US 5213576 A (ABIUSO et al.) 25 May 1993<br>See column 3, lines 42-47; claim 1; figures 1, 4 | 16-20 |
| A | US 2006-0206178 A1 (KIM) 14 September 2006<br>See the whole document. | 16-20 |

☐ 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
"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 |
|---|---|
| 14 June 2017 (14.06.2017) | **22 June 2017 (22.06.2017)** |


Name and mailing address of the ISA/KR
International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea
Facsimile No. +82-42-481-8578

Authorized officer
HAN, Inho
Telephone No. +82-42-481-3362

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.
**PCT/US2017/022218**

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2013-0006233 A1 | 03/01/2013 | US 2004-0064137 A1 | 01/04/2004 |
| | | US 2005-0209659 A1 | 22/09/2005 |
| | | US 2010-0094269 A1 | 15/04/2010 |
| | | US 2010-0185161 A1 | 22/07/2010 |
| | | US 2010-0324506 A1 | 23/12/2010 |
| | | US 2011-0034884 A9 | 10/02/2011 |
| | | US 2012-0330300 A1 | 27/12/2012 |
| | | US 2013-0006232 A1 | 03/01/2013 |
| | | US 2013-0012933 A1 | 10/01/2013 |
| | | US 2013-0012935 A1 | 10/01/2013 |
| | | US 2013-0012936 A1 | 10/01/2013 |
| | | US 2013-0325001 A1 | 05/12/2013 |
| | | US 2014-0316405 A1 | 23/10/2014 |
| | | US 2014-0324051 A1 | 30/10/2014 |
| | | US 2014-0336667 A1 | 13/11/2014 |
| | | US 2015-0335349 A1 | 26/11/2015 |
| | | US 2015-0335382 A1 | 26/11/2015 |
| | | US 6907884 B2 | 21/06/2005 |
| | | US 7749218 B2 | 06/07/2010 |
| | | US 8361067 B2 | 29/01/2013 |
| | | US 8419730 B2 | 16/04/2013 |
| | | US 8419731 B2 | 16/04/2013 |
| | | US 8425507 B2 | 23/04/2013 |
| | | US 8613744 B2 | 24/12/2013 |
| | | US 8623014 B2 | 07/01/2014 |
| | | US 8628528 B2 | 14/01/2014 |
| | | US 9017325 B2 | 28/04/2015 |
| | | US 9023038 B2 | 05/05/2015 |
| | | US 9173676 B2 | 03/11/2015 |
| US 2003-0158517 A1 | 21/08/2003 | EP 2512542 A1 | 24/10/2012 |
| | | US 2006-0280858 A1 | 14/12/2006 |
| | | US 2010-0189876 A1 | 29/07/2010 |
| | | US 6544223 B1 | 08/04/2003 |
| | | US 7115299 B2 | 03/10/2006 |
| | | US 7658966 B2 | 09/02/2010 |
| | | US 8277868 B2 | 02/10/2012 |
| | | WO 2011-075309 A1 | 23/06/2011 |
| US 2014-0271717 A1 | 18/09/2014 | None | |
| US 5213576 A | 25/05/1993 | US 5318531 A | 07/06/1994 |
| | | US 5405472 A | 11/04/1995 |
| US 2006-0206178 A1 | 14/09/2006 | US 2006-0206118 A1 | 14/09/2006 |
| | | WO 2006-099285 A2 | 21/09/2006 |
| | | WO 2006-099285 A3 | 02/11/2006 |