



- (51) **International Patent Classification:**
A61N 1/04 (2006.01) *A61N 1/05* (2006.01)
- (21) **International Application Number:**
PCT/US2014/048899
- (22) **International Filing Date:**
30 July 2014 (30.07.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/859,839 30 July 2013 (30.07.2013) 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, LT, 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, 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))*
- *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:

26 March 2015

(54) **Title:** SYSTEMS AND METHODS FOR DELIVERING CHEMICAL AND ELECTRICAL STIMULATION ACROSS ONE OR MORE NEURAL CIRCUITS

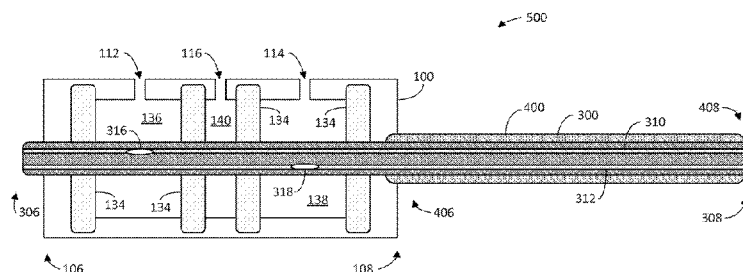


FIG. 5

(57) **Abstract:** Systems, devices, and methods are provided for delivering chemical and electrical stimulation across one or more neural circuits. The systems, devices, and methods can also be used for sensing and recording specific neural activity. In certain embodiments, a system includes first and second fluid reservoirs, a manifold, and a delivery tube. The manifold may include first and second chambers therein. The first chamber may be in fluid communication with the first reservoir, and the second chamber may be in fluid communication with the second reservoir. The delivery tube may include a first conduit in fluid communication with the first chamber, a second conduit in fluid communication with the second chamber, and a third conduit configured to house an electrode therein. In this manner, a distal tip of the delivery tube is configured to be positionable adjacent to the one or more neural circuits for providing chemical and electrical stimulation thereto.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2014/048899

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61N1/04 A61N1/05
 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)
 A61N

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.
Y	US 5 081 990 A (DELETIS VEDRAN [US]) 21 January 1992 (1992-01-21) the whole document -----	1-24,32, 33
Y	US 5 004 457 A (WYATT RICHARD J [US] ET AL) 2 April 1991 (1991-04-02) column 4, lines 5-68 -----	1-24,32, 33
Y	US 2007/106143 A1 (FLAHERTY J C [US]) 10 May 2007 (2007-05-10) paragraph [0220] -----	1-24,32, 33
Y	US 2011/257715 A1 (JAROCH DAVID BENJAMIN [US] ET AL) 20 October 2011 (2011-10-20) paragraph [0027] -----	1,10,11, 17,18, 23,24



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

16 September 2014

Date of mailing of the international search report

02/02/2015

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/048899

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.: 34-38
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
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.:
1-24, 32, 33

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-24, 32, 33

An injectrode with manifold, chamber, delivery tube, conduit for housing an electrode and having a length of at least about 5cm and a volume hold up of less than about 10 microliters;

2. claims: 25-31

system for delivering chemical and electrical stimulations with two fluid reservoirs, a manifold with first and second chambers in fluid communication with the two fluid reservoirs, a delivery tube, a third conduit for housing an electrode to be positioned adjacent neural circuits;

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/048899

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5081990	A	21-01-1992	NONE	

US 5004457	A	02-04-1991	AU 4807090 A	26-06-1990
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			WO 2010063024 A1	03-06-2010
