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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.

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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))

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18 May 2017

(54) Title: IMPLANTABLE MODULAR ELECTRODE ARRAY ASSEMBLY

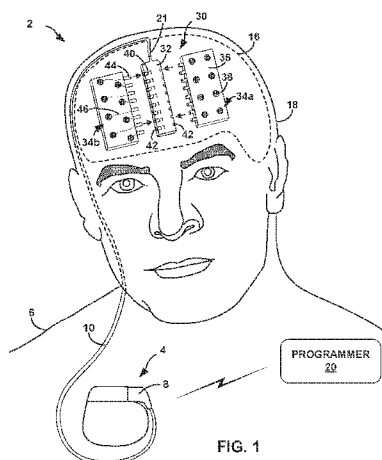


FIG. 1

(57) Abstract: This disclosure describes various modular electrode assemblies. For example, an implantable modular electrode assembly may include a hub including a plurality of electrical contacts configured to receive electrical signals from an implantable medical device, a first electrode module including a first substrate and a first plurality of electrodes on the first substrate, and a second electrode module including a second substrate and a second plurality of electrodes on the second substrate. The first and second electrode modules may be connectable to the hub, where the plurality of electrical contacts electrically communicate with the first and second plurality of electrodes.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2016/055687

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61N1/05 A61N1/375 H01R24/60
ADD. A61N1/372

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 A61B H01R

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)

EP0-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	WO 2009/148937 A1 (MEDTRONIC INC [US]; KAST JOHN [US]; ZIMMERMAN JAMES A [US]; PILARSKI C) 10 December 2009 (2009-12-10) figures 1, 3A, 3B paragraph [0026] - paragraph [0036] -----	1, 10, 11, 13
A	US 2005/203599 A1 (GARABEDIAN ROBERT J [US] ET AL) 15 September 2005 (2005-09-15) figures 5-7 paragraph [0061] - paragraph [0062] -----	1-5
A	WO 2015/123255 A1 (MEDTRONIC INC [US]) 20 August 2015 (2015-08-20) the whole document -----	1-5
A	EP 1 985 579 A2 (IMEC INTER UNI MICRO ELECTR [BE]; UNIV LEUVEN KATH [BE]) 29 October 2008 (2008-10-29) the whole document -----	1-5

☐ 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

19 January 2017

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04/04/2017

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/055687

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.:
1-5, 10, 11, 13

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: 1-5, 10, 11, 13

An implantable modular electrode assembly wherein either the hub or the first electrode module includes at least one rail that extends along at least a portion of its perimeter, wherein the first electrode module or the hub defines a slot that extends along at least a portion of its perimeter, wherein the slot is configured to receive the rail.

2. claim: 6

An implantable modular electrode assembly wherein a hub substrate defines a plurality of ports, wherein a respective port of the plurality of ports comprises a respective electrical contact of the plurality of electrical contacts, wherein the first electrode module comprises a plurality of electrical connectors on a surface of the first substrate, wherein the plurality of electrical connectors are configured to be received by the plurality of ports.

3. claims: 7-9

An implantable modular electrode assembly wherein the first plurality of electrodes form a first two-dimensional array on the surface of the first substrate.

4. claims: 12, 14

An implantable modular electrode assembly wherein the hub comprises a connector assembly configured to receive a lead, wherein the lead includes conductors to transmit the electrical signals from the implantable medical device to the hub.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/055687

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