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CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
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(54) Title: IMPLANTABLE NEUROSTIMULATOR

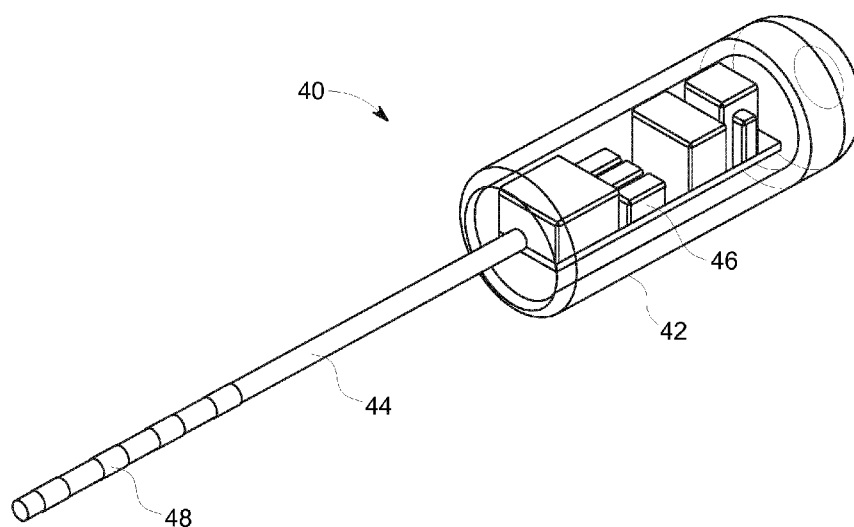


FIG. 2A

(57) Abstract: Provided is an implantable neurostimulator comprising: a housing configured to be implanted into a patient; at least two microchips disposed in the housing, the at least two microchips comprising a first microchip and a second microchip; at least two power antennae configured to receive power from an external source, wherein the at least two power antennae comprise a first power antenna and a second power antenna disposed in different planes and respectively associated with the first microchip and second microchip; wherein the at least two microchips comprise at least one microprocessor configured to use the power to create and deliver neurostimulation signals; a communication antenna configured to communicate with an external device; and at least one electrode configured to receive the neurostimulation signals and to apply the neurostimulation signals to target tissue. Also provided is a control system for configuring and transmitting neurostimulation parameters to the implantable neurostimulator, and a delivery system for





SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

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A61B5/04

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

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 2017/001003 A1 (PIVONKA DANIEL [US] ET AL) 5 January 2017 (2017-01-05)	1,2,5-13
Y	abstract; figures 1-19	4
A	paragraphs [0007] - [0065], [0110] - [0162]	3
Y	----- US 9 421 369 B2 (UNIV CALIFORNIA [US]) 23 August 2016 (2016-08-23)	4
A	abstract; figures 1-16 column 4, line 22 - column 12, line 54	1-3,5-13
A	----- US 2015/057722 A1 (FALTYS MICHAEL A [US] ET AL) 26 February 2015 (2015-02-26)	1-13
	abstract; figures 1-28 paragraphs [0021] - [0180] ----- -/-	



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

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"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 May 2020

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
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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 2015/057720 A1 (KO KWANG CHON [KR]) 26 February 2015 (2015-02-26) abstract; figures 1-7 paragraphs [0035] - [0064] -----	1-13
X	US 2011/257709 A1 (ACKERMANN DOUGLAS MICHAEL [US] ET AL) 20 October 2011 (2011-10-20) paragraphs [0041] - [0074]; figures 1-6 -----	14-21
X	US 2017/340891 A1 (BOGGS JOSEPH W [US] ET AL) 30 November 2017 (2017-11-30) paragraphs [0263] - [0269]; figures 1-2D, 16A-18B -----	14-21
X	US 2005/143781 A1 (CARBUNARU RAFAEL [US] ET AL) 30 June 2005 (2005-06-30) paragraphs [0026] - [0056]; figures 1-4 -----	14-21
X	US 2006/190048 A1 (GERBER MARTIN T [US]) 24 August 2006 (2006-08-24) paragraphs [0031] - [0076]; figures 1-7 -----	14-21
X	US 2009/204180 A1 (GELBART DANIEL [CA]) 13 August 2009 (2009-08-13) paragraphs [0012] - [0015]; figures 4-6 -----	22,23 24-37
X	WO 2014/153218 A1 (TYLER PERRYMAN LAURA [US]; ANDRESEN CHAD [US]) 25 September 2014 (2014-09-25) abstract; figures 1-16 pages 13-50 -----	22,23 24-37
Y	US 2011/224680 A1 (BARKER JOHN MICHAEL [US]) 15 September 2011 (2011-09-15) paragraphs [0039] - [0054]; figures 4-7B -----	24-37

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/072650

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-13

Implantable neurostimulator having a two power antennas located on two microchips in different planes and a communication antenna

2. claims: 14-21

A control system for configuring and transmitting neurostimulation parameters to an implantable neurostimulator

3. claims: 22-37

A delivery system adapted for delivering a neurostimulator into tissue having a first needle and a needle support

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2019/072650

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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