

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 April 2008 (24.04.2008)

PCT

(10) International Publication Number
WO 2008/048471 A3

- (51) International Patent Classification:
A61N 1/05 (2006.01)
- (21) International Application Number:
PCT/US2007/021756
- (22) International Filing Date: 12 October 2007 (12.10.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/851,386 13 October 2006 (13.10.2006) US
60/918,257 14 March 2007 (14.03.2007) US
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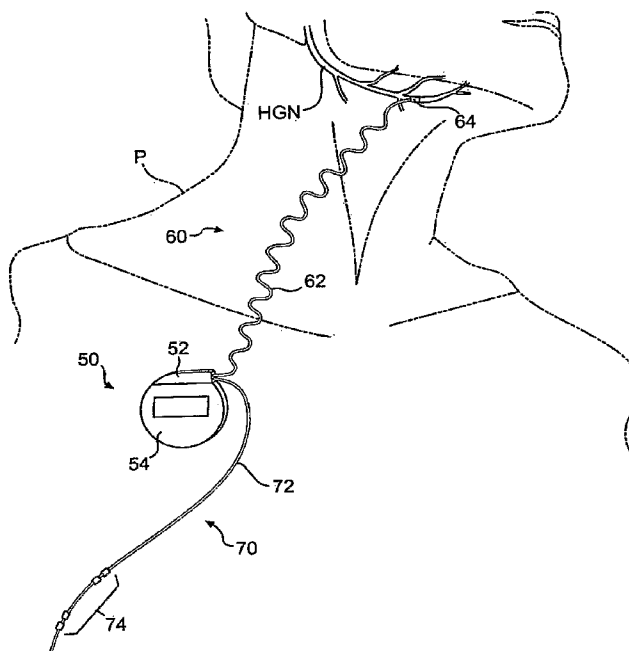
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: OBSTRUCTIVE SLEEP APNEA TREATMENT DEVICES, SYSTEMS AND METHODS



(57) Abstract: Devices, systems and methods for nerve stimulation for OSA therapy.

WO 2008/048471 A3



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

(88) Date of publication of the international search report:
4 December 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/021756

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61N1/05

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/004429 A1 (MRVA JOSEPH J [US] ET AL) 5 January 2006 (2006-01-05)	1-5
Y	paragraphs [0040], [0043], [0044], [0116] - [0120], [0130]; figures 1, 35-37, 38a, b, 39	6
Y	US 2006/041295 A1 (OSYPKA THOMAS P [US]) 23 February 2006 (2006-02-23) paragraphs [0021], [0022], [0036], [0037], [0045]; figures 3, 7	6
X	US 2006/149345 A1 (BOGGS JOSEPH W II [US] ET AL) 6 July 2006 (2006-07-06) paragraph [0291]; figures 30, 33	1

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 document 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

10 April 2008

Date of mailing of the international search report

13/08/2008

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/021756

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.: 13-17, 18-50, 61-63, 70-87, 90, 94-100, 116-152
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 allsearchable 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 reportcovers 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.:

1-6

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: 1-6

stimulation lead with anchoring means and a body having portions with differing flexibility

2. claims: 11,12

stimulation lead having a plurality of undulations

3. claim: 64

device for treating apnea comprising lead, stimulator, respiratory sensor and patient controller

4. claims: 65-69

electrode body with a plurality of electrodes, whereby, for a given pulse, one of the electrodes is adapted to deliver a charge density which is different from the other charge densities

5. claims: 88,89,91,92,93

system for treating apnea comprising a lead with electrode for implantation on a nerve and a tether for connection to tissue for relieving stress applied to the nerve and a pulse generator

6. claims: 101,102

nerve electrode with split cylindrical cuff an electrode disposed on an inside surface of the cuff

7. claims: 103,104,105,106,107

nerve electrode comprising a compliant sheet wrap configured to be wrapped about a nerve and comprising a plurality of fenestrations to accommodate nerve swelling

8. claim: 108

nerve electrode with a semi-cylindrical portion carrying electrodes and one or more strips configured to be wrapped around a nerve

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

9. claims: 109,110

electrode with a relatively long semi-cylindrical portion carrying a plurality of anodes, and a relatively short integral semi-cylindrical portion carrying a cathode

10. claim: 111

nerve electrode with a plurality of independent cuff electrodes each with independent leads

11. claim: 112

nerve electrode array with at least three independent cuff electrodes with a middle cuff comprising a cathode and two end cuff electrodes comprising anodes

12. claim: 113

a split cuff nerve electrode with a plurality of spaced electrode contacts to facilitate field steering

13. claim: 114

slit cylinder nerve electrode with longitudinal ends having a tapered thickness to reduce mechanical abrasion

14. claim: 115

nerve electrode with a housing to be connected to a nerve, the housing comprising a receptacle for removably receive a lead with ring electrodes and windows configured to align with the ring electrodes to permit electrical exposure of the ring electrodes to the nerve

15. claims: 7-10

method of manufacturing a sigmoid shaped lead by extruding silicone in a semi cross-linked state

16. claims: 51-60

method of selecting between electrodes for measuring bio-impedance

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/021756

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 2006004429	A1	05-01-2006	NONE	
US 2006041295	A1	23-02-2006	NONE	
US 2006149345	A1	06-07-2006	AU 2005331913 A1 CA 2608017 A1 EP 1885438 A1 US 2006173507 A1 WO 2006124068 A1	23-11-2006 23-11-2006 13-02-2008 03-08-2006 23-11-2006