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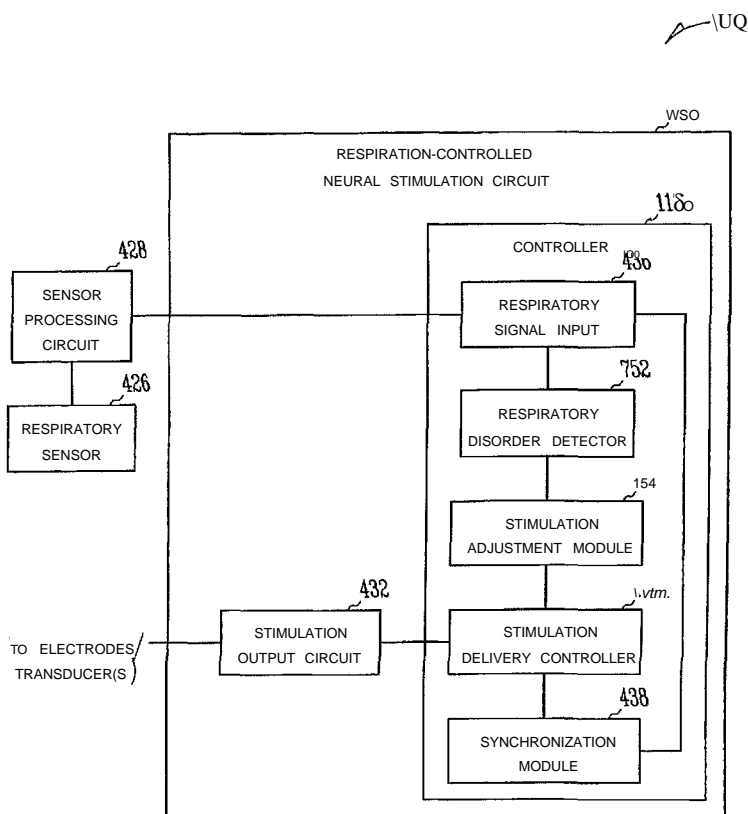
55014 (US). **JAMES, Kristofer, J.** [US/US]; 1073 Ticonderoga Trail, Eagan, Minnesota 55123 (US). **LEE, Kent** [US/US]; Dover Park View, Tower A # 01-02, Singapore, 138684 (US). **LIBBUS, Imad** [US/US]; 1726 Stanford Avenue, St. Paul, Minnesota 55105 (US). **CAPARSO, Anthony, V.** [US/US]; 80 Descanso Drive, Apt. 1325, San Jose, California 95134 (US). **KWOK, Jonathan** [CA/US]; 817 Buckland Ct., Denville, New Jersey 07834 (US). **PU, Yachuan** [CN/US]; 1811 Ulysses Street NE, Apt. 7, Minneapolis, Minnesota 55418 (US).

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[Continued on next page]

(54) Title: SYSTEM FOR NEURAL STIMULATION WITH RESPIRATORY FEEDBACK



(57) Abstract: A neural stimulation system controls the delivery of neural stimulation using a respiratory signal as a therapy feedback input. The respiratory signal is used to increase the effectiveness of the neural stimulation, such as vagal nerve stimulation, while decreasing potentially adverse side effects in respiratory functions. In one embodiment, the neural stimulation system synchronizes the delivery of the neural stimulation pulses to the respiratory cycles using a respiratory fiducial point in the respiratory signal and a delay interval. In another embodiment, the neural stimulation system detects a respiratory disorder and, in response, adjusts the delivery of the neural stimulation pulses and/or delivers a respiratory therapy treating the detected respiratory disorder.

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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.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

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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 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 Y A	<p>US 6 021 352 A (CHRISTOPHERSON MARK A [US] ET AL) 1 February 2000 (2000-02-01)</p> <p>column 6, line 32 - column 7, line 67 column 12, line 43 - column 15, line 47 column 18, line 1 - column 19, line 50 column 21, lines 1-38 column 24, line 39 - column 25, line 30 column 29,, line 64 - column 30, line 60 figures 5,6,14,15,16c,17a</p> <p style="text-align: center;">----- -/--</p>	<p>1-4,7,8, 12-14, 27-30 5,6,31, 32 9-11</p>



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

¹A¹ document defining the general state of the art which is not considered to be of particular relevance

¹E¹ earlier document but published on or after the International filing date

¹L¹ 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)

¹O¹ document referring to an oral disclosure, use, exhibition or other means

¹P¹ document published prior to the international filing date but later than the priority date claimed

¹T¹ 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

¹X¹ 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

¹Y¹ 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.

¹S¹ document member of the same patent family

Date of the actual completion of the international search

9 May 2008

Date of mailing of the international search report

27/05/2008

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Fischer , Olivier

INTERNATIONAL SEARCH REPORT

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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
X	US 2004/210261 A1 (KING GARY W [US] ET AL) 21 October 2004 (2004-10-21)	1-4,9
Y	paragraphs [0005] - [0009], [0012], [0032] - [0038], [0043] - [0047], [0072] - [0074];- figures 1,2,6 -----	31,32
X	US 2003/153953 A1 (PARK EULJOON [US] ET AL) 14 August 2003 (2003-03-14) paragraphs [0143] - [0153]; figures 8-10 -----	1,2,12, 13,27,30
X	US 2005/149127 A1 (LIBBUS IMAD [US]) 7 July 2005 (2005-07-07) paragraphs [0097] - [0100]; figures 17,19A-20B -----	1,9
Y	US 2005/039745 A1 (STAHMANN JEFFREY E [US] ET AL) 24 February 2005 (2005-02-24) paragraphs [0100] - [0105]; figures 5-8B -----	5,6
A	US 2005/085866 A1 (TEHRANI AMIR J [US]) 21 April 2005 (2005-04-21) abstract; figures 1-8 -----	1-14, 27-32
P, L, X	US 2006/271108 A1 (LIBBUS IMAD [US] ET AL) 30 November 2006 (2006-11-30) paragraphs [0037] - [0044], [0065] - [0069]; figures 2,4,6,13 -----	1-4,8-11

INTERNATIONAL SEARCH REPORT

international application NO
PCT/US2007/018846

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 15-26, 33-38
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, these claims pertain to the application of therapeutic neural stimulation to the human body
- 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 **D** 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 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 report covers only those claims for which fees were paid, specifically claims Nos
- 4 **D** 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

Information on patent family members

International application No

PCT/US2007/018846

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