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(74) Agent: GOLD, Bryant R.; 28464 Westinghouse Place, Valencia, California 91355 (US).

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(71) Applicant: VALENCIA TECHNOLOGIES CORPORATION [US/US]; 28464 Westinghouse Place, Valencia, California 91355 (US).

(72) Inventors: PETERSON, David K.L.; 28464 Westinghouse Place, Valencia, California 91355 (US). GREINER, Jeffrey H.; 28464 Westinghouse Place, Valencia, California 91355 (US). THENUWARA, Chuladatta; 28464 Westinghouse Place, Valencia, California 91355 (US). GREINER, Stacy O.; 28464 Westinghouse Place, Valencia, California 91355 (US).

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[Continued on next page]

(54) Title: IMPLANTABLE ELECTROACUPUNCTURE DEVICE EMPLOYING A HIGH IMPEDANCE COIN-CELL BATTERY AS A PRIMARY POWER SOURCE

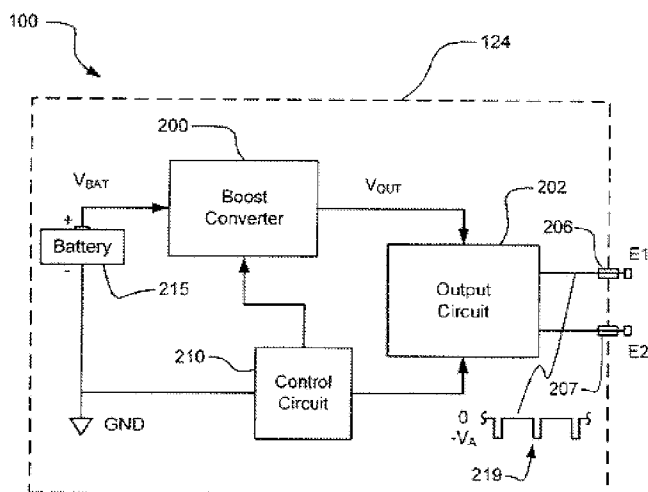


FIG. 8

(57) Abstract: An implantable electroacupuncture (E Ξ A) device provides stimulation pulses (219) applied at a specified acupoint or other target tissue location for the treatment of specific condition. In a preferred implementation, the EA device is implantable, thin, coin-sized, self-contained and leadless (FIG. 1) having at least two electrodes (110, 120) attached to an outside surface of its housing (122, 124). The EA device generates stimulation pulses in accordance with a specified stimulation regimen (FIGS. 15A, 15B). Power management circuitry (200, 210) within the device allows a thin, coin-cell primary battery (215), having a high internal impedance, to be used to power the device. The stimulation regimen generates stimulation pulses having an amplitude of up to 25 mA during a stimulation session of duration T3 minutes applied every T4 minutes. The duty cycle, or ratio T3/T4, is very low, no greater than 0.05. The low duty cycle and careful power management allow the device to perform its intended function for several years.



— *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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INTERNATIONAL SEARCH REPORT

International application No PCT/US2014/024430

A. CLASSIFICATION OF SUBJECT MATTER INV. A61N1/05 A61N1/36 A61N1/375 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.		
A	US 2003/195585 A1 (GRUZDOWICH GREGORY J [US] ET AL) 16 October 2003 (2003-10-16) abstract; figures 1-4 paragraphs [0019] - [0042] -----	1-27, 31-47		
A	US 7 013 177 B1 (WHITEHURST TODD K [US] ET AL) 14 March 2006 (2006-03-14) cited in the application abstract; figures 5-9 columns 4-17 -----	1-27, 31-47		
A	WO 02/00294 A1 (MARKO ENDRE [HU]) 3 January 2002 (2002-01-03) abstract; figures 1-3 pages 1-5 -----	1-27, 31-47		
----- -/--				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> </tr> </table>			"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
"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	Date of mailing of the international search report			
11 December 2014	23/12/2014			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lins, Stephanie			

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/024430

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 2009/192555 A1 (SCHLEICHER BRETT [US] ET AL) 30 July 2009 (2009-07-30) abstract; figures 1-18 paragraphs [0032] - [0076] -----	1-16, 38-47
A	US 2008/091255 A1 (CAPARSO ANTHONY V [US] ET AL) 17 April 2008 (2008-04-17) abstract; figures 1-16 paragraphs [0029] - [0069] -----	1-27, 31-47
A	WO 01/41869 A1 (UROSURGE INC [US]) 14 June 2001 (2001-06-14) abstract; figures 1-6 pages 1-9 -----	1-27, 31-47

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/024430

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.: 28-30, 48-50
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
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
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: 1-16, 38-47

an implantable electroacupuncture device

2. claims: 17-27, 31-37

a casing including at least one hermetically sealed feedthrough pin

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2014/024430

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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			WO 0141869 A1 14-06-2001
