



(51) International Patent Classification:
A61N 1/04 (2006.01)

(21) International Application Number:
PCT/IL2013/050069

(22) International Filing Date:
24 January 2013 (24.01.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/591,024 26 January 2012 (26.01.2012) US
61/662, 073 20 June 2012 (20.06.2012) US

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, 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.

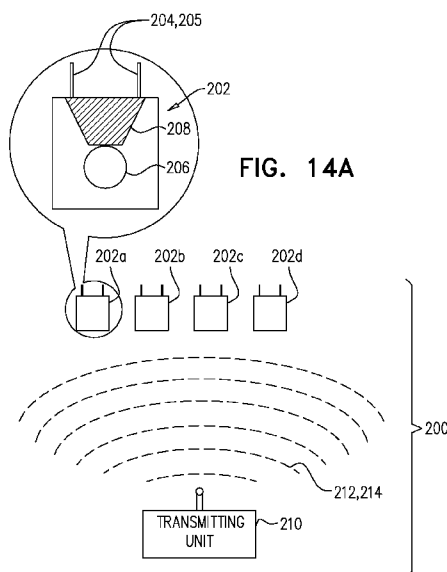
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

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))

[Continued on next page]

(54) Title: WIRELESS NEURQSTIMULATQRS



(57) Abstract: Apparatus for applying a treatment (216) to at least one tissue of a subject is described, the apparatus comprising a transmitting unit (210) configured to transmit a wireless power signal (214), a first implant (202a), and a second implant (202b), each of the implants being configured to receive the power signal and to apply the treatment asynchronously to each other, in response to the power signal. Other embodiments are also described.



(88) Date of publication of the international search report:

26 September 2013

INTERNATIONAL SEARCH REPORT

International application no.

PCT/IL2013/050069

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61N 1/04 (2013.01)

USPC - 600/372

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)

IPC(8) - A61B 5/04; A61N 1/04, 1/05, 1/06, 1/08, 1/18, 1/28, 1/372, 2/02, 2/04, 2/08, 2/10, 2/12 (2013.01)

USPC - 600/10, 12, 13, 14, 15, 372, 373, 374, 377, 378, 381, 393, 421, 422, 423

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC - A61B 5/04, 5/04001; A61N 1/0476, 1/05, 1/0529, 1/0556, 1/37205, 1/37211 (2013.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Orbit, Google Patents, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	WO 2009/110935 A1 (CAULLER et al) 11 September 2009 (11.09.2009) entire document	1-6, 8-11, 13-15, 18-22, 25-26, 84-86, 89-93, 95-97, 100-103 7, 12, 16-17, 23-24, 87-88, 94, 98-99, 104-108
Y	US 5,690,691 A (CHEN et al) 25 November 1997 (25.11.1997) entire document	7, 12, 16, 17, 88, 94, 98-99
Y	US 6,445,953 B1 (BULKES et al) 03 September 2002 (03.09.2002) entire document	23, 87, 104-108
Y	US 2004/0015205 A1 (WHITEHURST et al) 22 January 2004 (22.01.2004) entire document	24, 106
A	US 2005/0143789 A1 (WHITEHURST et al) 30 June 2005 (30.06.2005) entire document	1-26, 84-108
A	US 6,735,474 B1 (LOEB et al) 11 May 2004 (11.05.2004) entire document	1-26, 84-108
A	WO 02/09808 A1 (MEADOWS et al) 07 February 2002 (07.02.2002) entire document	1-26, 84-108
A	US 7,917,226 B1 (NGHIEM et al) 29 March 2011 (29.03.2011) figures 1, 2; column 4, lines 20-37, 45-47; column 5, lines 40-47, 56-67; column 7, lines 57-59; column 12, lines 18-24.	1-26, 84-108
A	US 6,332,089 B1 (ACKER et al) 18 December 2001 (18.12.2001) figure 9; column 14, lines 10-40.	1-26, 84-108

☐ Further documents are listed in the continuation of Box C.

* 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

04 July 2013

Date of mailing of the international search report

11 JUL 2013

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL2013/050069

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 extra 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 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.:
1-26, 84-108

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.

Continuation of Box III.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-26, 84-108, drawn to an apparatus and method comprising: a first implant and a second implant, each of the implants being configured to apply treatment asynchronously to each other in response to a power signal.

Group II, claims 27-65, 109-141, drawn to an apparatus comprising a component including a circuitry unit, which is implantable into the subject, and at least one of the components comprising an effector element, which is coupled to the circuitry unit, to apply treatment to the sensory fibers of the skin of the subject.

Group III, claims 66-68, drawn to an apparatus comprising: at least one anchor having a delivery configuration, and an anchoring configuration in which the anchor inhibits movement of the implant along a longitudinal axis thereof.

Group IV, claims 69-76, drawn to an apparatus comprising: a first transmitting unit, configured to transmit a first wireless signal; a second transmitting unit, configured to transmit a second wireless signal; the first wireless signal to apply treatment to a first implant implanted at a first implantation site of a subject; and a second implant, configured to be implanted at a second implantation site of the subject, to apply the at least one treatment to the subject in response to the second wireless signal, and not to apply the at least one treatment to the subject in response to the first wireless signal.

Group V, claims 77-83, drawn to a method comprising: percutaneously delivering at least part of at least one temporary electrode to the tissue of the subject; electrically stimulating the tissue of the subject for between 1 and 120 minutes, using the temporary electrode; receiving information indicative of a desired change in a sensation experienced by the subject between a time before a start of the electrical stimulation and a time after a start of the electrical stimulation; and at least in part responsively to the received information, implanting a medical implant at the tissue of the subject.

Group VI, claims 142-146, drawn to an implant having an array of microelectrodes coupled to a circuitry unit.

The inventions listed as Groups I, II, III, IV, V and VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: each of the implants being configured to apply treatment asynchronously to each other in response to a power signal as claimed therein is not present in the invention of Groups II, III, IV, V or VI. The special technical feature of the Group II invention: an effector element, which is coupled to the circuitry unit, to apply treatment to the sensory fibers of the skin of the subject as claimed therein is not present in the invention of Groups I, III, IV, V or VI. The special technical feature of the Group III invention: at least one anchor having a delivery configuration, and an anchoring configuration in which the anchor inhibits movement of the implant along a longitudinal axis thereof as claimed therein is not present in the invention of Groups I, II, IV, V or VI. The special technical feature of the Group IV invention: a first transmitting unit, configured to transmit a first wireless signal; a second transmitting unit, configured to transmit a second wireless signal; the first wireless signal to apply treatment to a first implant implanted at a first implantation site of a subject; and a second implant, configured to be implanted at a second implantation site of the subject, to apply the at least one treatment to the subject in response to the second wireless signal, and not to apply the at least one treatment to the subject in response to the first wireless signal as claimed therein is not present in the invention of Groups I, II, III or V or VI. The special technical feature of the Group V invention: percutaneously delivering at least part of at least one temporary electrode to the tissue of the subject; electrically stimulating the tissue of the subject for between 1 and 120 minutes, using the temporary electrode; receiving information indicative of a desired change in a sensation experienced by the subject between a time before a start of the electrical stimulation and a time after a start of the electrical stimulation; and at least in part responsively to the received information, implanting a medical implant at the tissue of the subject as claimed therein is not present in the invention of Groups I, II, III, IV or VI. The special technical feature of the Group VI invention: an array of microelectrodes coupled to a circuitry unit as claimed therein is not present in the invention of Groups I, II, III, IV or V.

Groups I, II, III, IV, V and VI lack unity of invention because even though the inventions of these groups require the technical feature of an apparatus for applying a treatment to at least one tissue of a subject, the apparatus comprising: a transmitting unit, a lead, an electrode and circuitry, the transmitter configured to transmit a wireless power signal; where the apparatus is implantable into the tissue of a subject, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of US 7,917,226 B1 (NGHIEM et al) 29 March 2011 (29.03.2011) figures 1, 2; column 4, lines 20-37, 45-47; column 5, lines 40-47, 56-67; column 7, lines 57-59; column 12, lines 18-24.

Groups II, III and V lack unity of invention because even though the inventions of these groups require the technical feature of an implant which is injectable into the tissue of a subject, the apparatus comprising an effector, and having more than one implant which is wirelessly driven, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of US 6,332,089 B1 (ACKER et al) 18 December 2001 (18.12.2001) figure 9; column 14, lines 10-40.

Since none of the special technical features of the Group I, II, III, IV, V or VI inventions are found in more than one of the inventions, unity of invention is lacking.