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(54) Title: DEEP BRAIN STIMULATOR AND METHOD OF USE

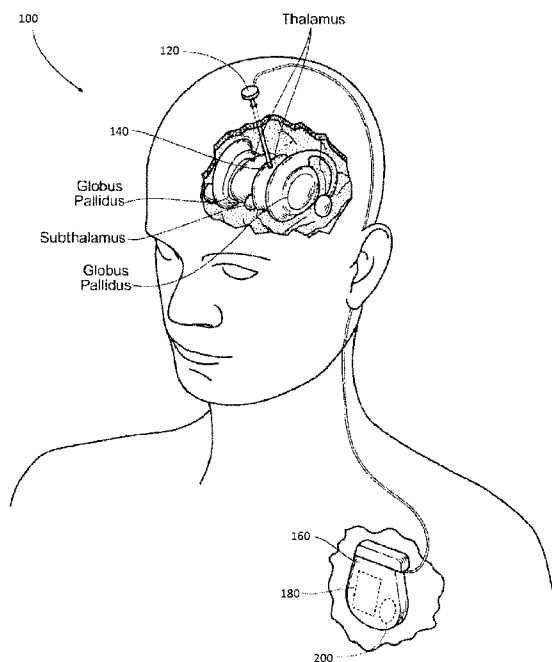


Fig. 1

(57) Abstract: A neurostimulation system is shown and de-
scribed. The neurostimulation system may include a stimula-
tion device implantable into a patient, a lead operatively
coupled with the stimulation device, a first power cell provid-
ing power to the stimulation device where the first power cell
is charged by an externally applied AC (High HF) magnetic
field.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/39168

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61N 1/378 (2014.01)

CPC - A61N 1/3787

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) - A61N 1/378 (2014.01)

CPC - A61N 1/3787

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 607/65

(Search term limited; see below)

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

PubWest (PGPB, USPT, EPAB, JPAB); Google; PatBase (All);

Search Terms: HFAC, high frequency, alternating, current, HF, AC, magnet*, induct*, transcutaneous*, trans cutaneous*, external*, wireless*, charg*, recharg*, power*, brain, cranial, neuro*, nerve, ganglion, sensory, afferent, efferent, cortex, stimulat*, neurostimulat*, i

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0143786 A1 (BOVEJA et al.) 30 June 2005 (30.06.2005) Entire document, especially Abstract, para[0085]- para[0088], para[0112]- para[0113], para[0142] and FIG. 33.	1-2
X -- Y	US 2009/0221896 A1 (RICKERT et al.) 03 September 2009 (03.09.2009) Entire document, especially Abstract, para[0111]- para[0115] and FIGS. 5, 7, 9.	1, 3, 6 ----- 4-5
X	US 2012/0245649 A1 (BOHORI et al.) 27 September 2012 (27.09.2012) Entire document, especially Abstract, para[0016]- para[0019] and FIG. 1.	1
Y	US 2009/0143696 A1 (NAJAFI et al.) 04 June 2009 (04.06.2009) Entire document, especially Abstract, para[0031]- para[0032], para[0037] and FIGS. 5-8.	4
Y	US 2012/0095524 A1 (NELSON et al.) 19 April 2012 (19.04.2012) Entire document, especially Abstract, para[0009]- para[0010], para[0061]- para[0062].	5
X	US 2002/0177884 A1 (AHN et al.) 28 November 2002 (28.11.2002) Entire document, especially Abstract, para[0025]- para[0028], para[0035], para[0042], para[0048]	1

☐ 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

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"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

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INTERNATIONAL SEARCH REPORT

International application No.

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----- Continuation of Box III: Observations where unity of invention is lacking (Continuation of item 3 of first sheet) -----

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 1-6: Directed towards externally powering a primary cell of a neurostimulator system with HF AC magnetic fields.

Group II: Claims 7-35, 43-49: Directed towards telemetry between external programmer/remote and an implantable neurostimulator system by modifying characteristics of the electrical signal, and further for cost-benefit and power savings by changing a first signal to a second signal.

Group III: Claims 36-42: Directed towards telemetry between a charger and a stimulator, specifically by using UHF telemetry wireless link.

Group IV: Claims 50-56: Directed towards a secondary power cell for a neurostimulator system configured to be implanted in the cranium within its own housing, the secondary cell configured to be externally charged.

The inventions listed as Groups I - IV 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:

Group IV shares with Groups II-III generally, an implantable neurostimulator system, and further shares with Group I, the feature of an externally charged power cell. However, said features are well known in the art as exemplified by US 2012/0239115 A1 to Lee, who describes an implantable neurostimulator system and externally charged power cells (FIG. 1; para[0072]-[0073],[0076]).

Group I shares with Groups II-III, the features of an implantable neurostimulator, a lead, and a power source. However, said features are well known in the art as exemplified by Lee who describes an implantable neurostimulator system, a lead and a power source (FIG. 1; para[0072]-[0073],[0076]).

Group II shares with Group III, the features of an implantable neurostimulator system with telemetry. However, said features are well known in the art as exemplified by Lee who describes an implantable neurostimulator system with telemetry (FIG. 1; para[0072]-[0073],[0076]).

Consequently, the groups comprise:

Group I: externally charging by HF AC magnetic fields, not required in any other group.

Group II: telemetry between external programmers/remotes and an implantable neurostimulator system by modifying characteristics of the electrical signal, and further for cost-benefit and power savings by changing a first signal to a second signal, not required in any other group.

Group III: telemetry between a charger and a stimulator, specifically by using UHF telemetry wireless link; not required in any other group.

Group IV: a secondary power cell for a neurostimulator system configured to be implanted in the cranium within its own housing, not required in any other group.

None of these special technical features are shared between groups, nor do they correspond to a special technical feature in other groups. Accordingly, unity of invention is lacking under PCT Rule 13 because the groups do not share a same or corresponding special technical feature providing a contribution over the prior art.