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[Continued on next page]

(54) Title: SURGICAL GENERATOR FOR ULTRASONIC DEVICES AND FOR ELECTROSURGICAL DEVICES

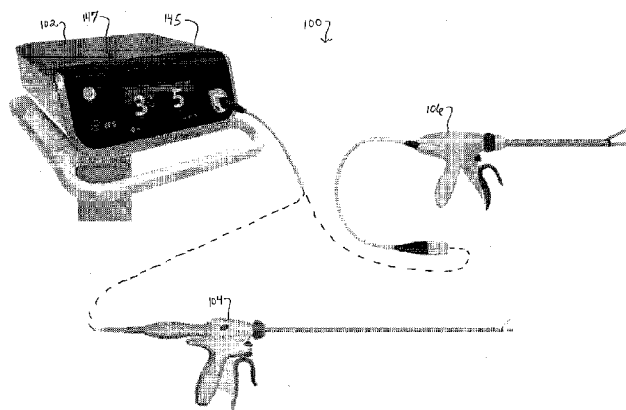


FIG. 1

(57) Abstract: A surgical generator (102) that may produce a drive signal or signals of particular voltages, currents, and frequencies, e.g. 55,500 cycles per second (Hz). The drive signal or signals may be provided to an ultrasonic surgical device (104), and specifically to a transducer. In one embodiment, the generator may be configured to produce a drive signal of a particular voltage, current, and/or frequency that can be stepped with high resolution, accuracy, and repeatability. Additionally, the surgical generator may generate a drive signal or signals with output power sufficient to perform bipolar electrosurgery using radio frequency (RF) energy. The drive signal may be provided, for example, to electrodes of the electrosurgical device (106). Accordingly, the generator may be configured for therapeutic purposes by applying electrical signals to an ultrasonic transducer or electrical energy to the tissue sufficient for treating the tissue (e.g., cutting, coagulation, cauterization, tissue welding).



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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, 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, PE, PG, PH, PL, PT, RO, RS, RU, 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.

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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
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(88) **Date of publication of the international search report:**

27 October 2011

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B18/12 B06B1/02 A61B18/14 A61B17/32 A61N7/02
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)

A61B A61N A61H B06B H01R

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)

EP0-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. |
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| X | US 2008/082098 A1 (TANAKA KAZUE [JP] ET AL) 3 April 2008 (2008-04-03) | 1,2, 8-15,27 |
| Y | paragraph [0021] - paragraph [0024] paragraph [0039] - paragraph [0043]; figures 1, 4 | 3-7, 16-21 |
| | ----- | |
| X | US 5 184 605 A (GRZESZYKOWSKI MIROSLAW [CA]) 9 February 1993 (1993-02-09) | 22 |
| Y | column 3, line 31 - line 68 column 4, line 41 - column 5, line 12 column 5, line 31 - column 6, line 47 column 7, line 47 - column 8, line 39; figures 1, 4-6 | 16-20, 23-26, 186 |
| | ----- | |
| | -/-- | |



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

16 August 2011

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
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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.: 113-125, 128-135, 138-143, 146-155, 166-176
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/051787

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/051787

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Information on patent family members

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-27

A generator with a sampling circuit and methods for using the sampled values to determine a current and to correct stored waveforms.

2. claims: 28-50

A surgical generator with a transformer and a capacitor.

3. claims: 51-92

A control circuit with circuit elements suitable for communicating with a surgical generator over a conductor pair.

4. claims: 93-112

A surgical generator with a receptacle assembly and/or a surgical device with an electrical connector assembly.

5. claims: 113-187

A surgical generator with means and methods for controlling a drive signal based on sensed tissue impedance.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 113-125, 128-135, 138-143, 146-155, 166-176

Claims 113-125, 128-135, 138-143, 146-155 and 166-176 relate to methods including the step of providing energy to a tissue of a patient. As these are methods for treatment of the human or animal body by therapy or surgery, the International Searching Authority is not required to search the subject-matter of claims 113-125, 128-135, 138-143, 146-155 and 166-176 according to Rule 39.1(iv) PCT.