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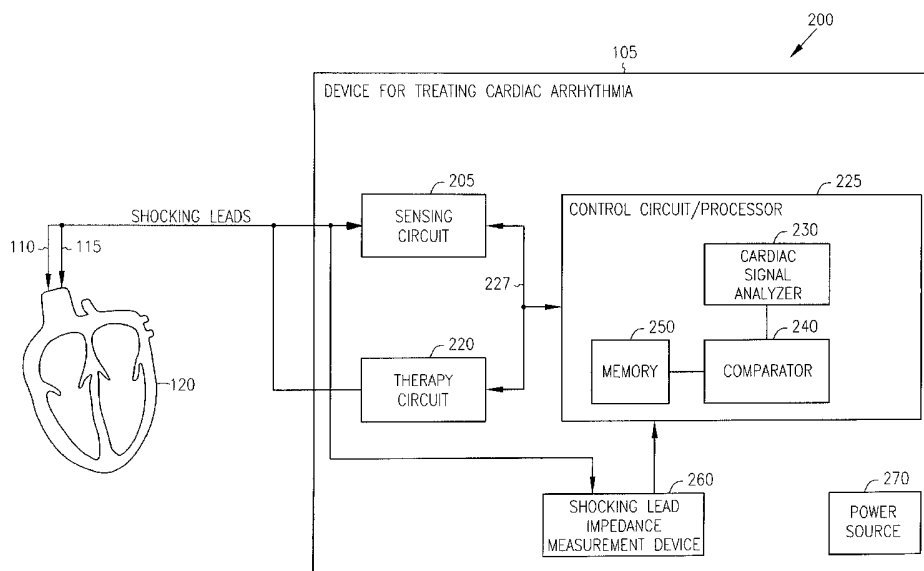
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[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR SHOCK LEAD IMPEDANCE MEASUREMENT



(57) Abstract: An apparatus and method of automatically measuring the lead impedance of a high energy shock lead before delivery of high energy therapy used to treat heart arrhythmia. In one example, an impedance measurement circuit measures the impedance between electrodes in a plurality of pairs of electrodes. The measured lead electrode impedance is compared to a predetermined value to detect if the lead is shorted to another lead. If a high-energy shock electrode is shorted to another lead, a shorted lead indicator is set to a fault state. Based on the state of the shorted lead indicator, a processor prevents or allows the delivery of high energy therapy. By checking for a lead short before delivery of the therapy, all of the energy of the therapy is delivered to the patient rather than being bypassed by a shorted lead connection.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Intern	Application No
PCT/US	03/24127

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A61N1/39 A61N1/37

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 7 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 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	US 5 224 475 A (BERG GARY L ET AL) 6 July 1993 (1993-07-06) abstract column 1, line 52 - line 66 column 3, line 34 - column 5, line 6 ---	1-3,6
X	US 5 755 742 A (GERING JONATHAN R ET AL) 26 May 1998 (1998-05-26) the whole document ---	1,2
A	EP 0 280 526 A (INTERMEDICS INC) 31 August 1988 (1988-08-31) column 12, line 40 - line 46 ---	1
A	US 5 897 577 A (CINBIS CAN ET AL) 27 April 1999 (1999-04-27) the whole document ---	1
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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- *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
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- *&* document member of the same patent family

Date of the actual completion of the international search

12 January 2004

Date of mailing of the international search report

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Inter I Application No
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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.
A	US 5 507 786 A (MANN BRIAN M ET AL) 16 April 1996 (1996-04-16) the whole document -----	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/24127

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.: 7-18
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
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 II Observations where unity of invention is lacking (Continuation of item 2 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 all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
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.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern Application No

PCT/US 03/24127

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