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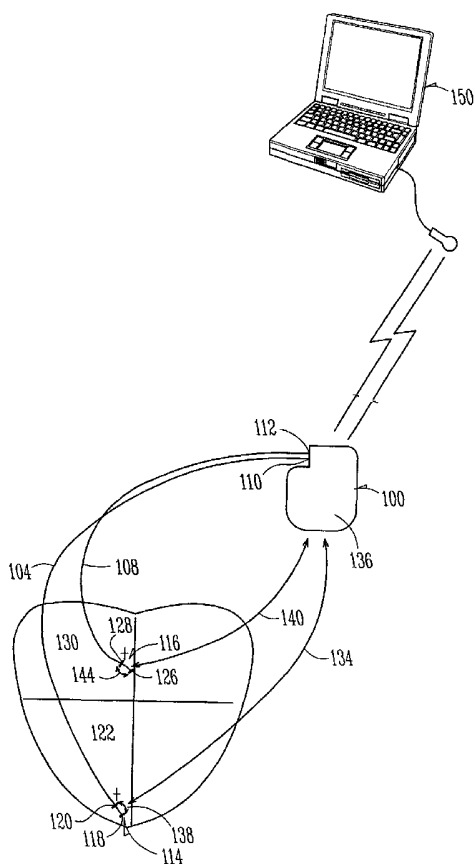
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(54) Title: PACING AND SENSING VECTORS



(57) Abstract: An apparatus and method for allowing cardiac signals to be sensed and pacing pulse to be delivered between two or more electrodes. In one embodiment, cardiac signals are sensed and pacing pulse vectors are delivered between least one of a first left ventricular electrode and a second left ventricular electrode. Alternatively, cardiac signals are sensed and pacing pulse vectors are delivered between different combinations of the first and second left ventricular electrodes and a first supraventricular electrode. In addition, cardiac signals are sensed and pacing pulse vectors are delivered between different combinations of the first and second left ventricular electrode, the first supraventricular electrode and a conductive housing. In an additional embodiment, a first right ventricular electrode is used to sense cardiac signals and provide pacing pulses with different combinations of the first and second left ventricular electrodes, the first supraventricular electrode and the housing.

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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

International Application No  
PCT/US 01/49648

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61N1/368

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 5 314 430 A (BARDY GUST H) 24 May 1994 (1994-05-24) the whole document	19
Y	---	1
Y	DE 199 30 264 A (BIOTRONIK MESS & THERAPIEG) 21 December 2000 (2000-12-21) the whole document	1
A	---	1
	US 5 269 319 A (SCHULTE THEODORE J ET AL) 14 December 1993 (1993-12-14) the whole document	
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☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

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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

Date of the actual completion of the international search

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Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

national application No.  
PCT/US 01/49648

### 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.: 20-27  
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

International Application No

PCT/US 01/49648

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5314430	A	24-05-1994	NONE	
DE 19930264	A	21-12-2000	US 6341234 B1 DE 19930264 A1	22-01-2002 21-12-2000
US 5269319	A	14-12-1993	US 5044375 A US 5545205 A EP 0526671 A1	03-09-1991 13-08-1996 10-02-1993