A61B 5/02 (2006.01)

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20 September 2007 (20.09.2007)

English

11/554,986 31 October 2006 (3.1.2006) US


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Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BH, BR, BW, BY, BZ, CA, CH, 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, [Continued on next page]

Title: MONITORING OF CHRONOBIOLOGICAL RHYTHMS FOR HEALTH MANAGEMENT

Abstract: The health state of a subject is automatically evaluated or predicted using at least one implantable device. In varying examples, health state is determined by sensing or receiving information about at least one physiological process having a circadian rhythm whose presence, absence, or baseline change is associated with impending disease, and comparing such rhythm to baseline circadian rhythm prediction criteria. Other chronobiological rhythms beside circadian may also be used. Baseline prediction criteria may be derived using one or more past physiological process observation of the subject or population of subjects in a non-disease health state. Prediction processing may be performed by at least one implantable device or by an external device in communication therewith. Systems and methods for invoking a therapy in response to the health state, such as to prevent or minimize the consequences of predicted impending heart failure, are also discussed.
Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

Date of publication of the international search report: 19 June 2008
A. CLASSIFICATION* SUBJECT MATTER
INV. A61B5/02

According to International Patent Classification (IPC) or to both national classification and IPC:

A61B

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols):

A61B

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

<table>
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<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>Y</td>
<td>WO 2006/050717 A (CHARITE UNIVERSITATMEDIZIN B [DE]; SCHIRDEWAN ALEXANDER [DE]; WESSEL) 18 May 2006 (2006-05-18) page 3, line 24 - page 4, line 29 page 5, line 19 - page 6, line 30 page 7, lines 11-15, claim 1; figures</td>
<td>1-5,8,9,12</td>
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Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search: 11 April 2008

Date of mailing of the international search report: 28/04/2008

Name and mailing address of the ISA:
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epc nl, Fax: (+31-70) 340-3016

Authorized officer: Küster, Gunilla

Form PCT/1S/V210 (second sheet) (April 2006)
<table>
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<td>A</td>
<td>FABER T.S. ETAL.: &quot;Beat-to-Beat Assessment of QT/RR Interval Ratio in Severe Heart Failure and Overt Myocardial Ischemia: A Measure of Electrical Integrity in Diseased Hearts&quot; PACING AND CLINICAL ELECTROPHYSIOLOGY: PACE vol.'26i April 2003 (2003-04), pages 836-842, XP002476088 the whole document</td>
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**INTERNATIONAL SEARCH REPORT**

**Box No. H** 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. **X** Claims Nos.: 13-20 because they relate to subject matter not required to be searched by this Authority, namely:
   
   Rule 39.1(iv) PCT - Diagnostic method practised on the human or animal body (see in particular step of "detecting, or identifying an occurrence of disease using the comparison" in claim 13); claims 17-20 furthermore relate to 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 No. III** Observations where unit/ of invention is lacking (Continuation of item 3 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 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. **[X]** 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.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)
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<td>US 2005137489 A1</td>
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