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(71) Applicant (for all designated States except US): GENERAL HOSPITAL CORPORATION [US/US]; 55 Fruit Street, Boston, MA 02114 (US).

(72) Inventors; and


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22 June 2006

[Continued on next page]

(54) Title: RESPIRATION MOTION DETECTION AND HEALTH STATE ASSESSMENT SYSTEM

(57) Abstract: A wearable platform embodied in a belt or flattened patch-like central body shaped to conform to the abdomen provides physiological monitoring of soldiers during field operations or trauma victims at accident sites and makes health state assessments. The platform includes sensors for heart rate, body motion, respiration rate and intensity, and temperature and further contains a microprocessor and short range transmitter. The respiration sensor uses conductive ink in a novel manner. A small square of the ink is coated on an arch-shaped structure so that flexing of the arch either to increase or decrease its radius of curvature modifies the resistance of the structure. This is utilized to set the unaltered resistances of the arch structure and to allow a greater range of resistance values capable of measuring distortions in different deformations of the arch. The respiration sensor supplements the motion information provided by an accelerometer sensor.
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

#### A. CLASSIFICATION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>IPC</th>
<th>A61B 5/08 (2006.01)</th>
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<tr>
<td>USPC</td>
<td>600/534</td>
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</table>

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)

U.S.: 600/534

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 practicable, search terms used)

**EAST**

#### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 6,385,473 B1 (HAINES et al) 07 May 2002 (07.05.2002), Figure 3, column 6, lines 52-62, and column 7, lines 40-57</td>
<td>1-21</td>
</tr>
<tr>
<td>A</td>
<td>US 6,461,307 B1 (KRISTBJARNARSON et al) 08 October 2002 (08.10.2002), Abstract and figure 1.</td>
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<tr>
<td>A</td>
<td>US 5,928,157 A (O'DWYER) 27 July 1999 (27.07.1999), Abstract and figures 3-5.</td>
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<td>A</td>
<td>US 5,235,989 A (ZOMER et al) 17 August 1993 (17.08.1993), Abstract and figure 2.</td>
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<td>A</td>
<td>EP 0448438 A2 (THE SLEEP DISORDERS DIAGNOSTIC AND TREATMENT CENTER LTD) 06 March 1991 (06.03.1991), Abstract and figures 1 and 3.</td>
<td>1</td>
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</table>

□ Further documents are listed in the continuation of Box C. □ See patent family annex.

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* Special categories of cited documents:

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- **P** document published prior to the international filing date but later than the priority date claimed.

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**"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.

**"A"** document member of the same patent family.

**Date of the actual completion of the international search**
21 February 2006 (21.02.2006)

**Date of mailing of the international search report**
04 APR 2006

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Form PCT/ISA/210 (second sheet) (April 2005)
**INTERNATIONAL SEARCH REPORT**

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<th>Box No. II</th>
<th>Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)</th>
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<td>This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:</td>
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<td>1.</td>
<td>☐ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:</td>
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<td>2.</td>
<td>☐ 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:</td>
</tr>
<tr>
<td>3.</td>
<td>☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).</td>
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<th>Box No. III</th>
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<td>This International Searching Authority found multiple inventions in this international application, as follows:</td>
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<tr>
<td>1.</td>
<td>☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.</td>
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<td>2.</td>
<td>☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.</td>
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<td>3.</td>
<td>☐ 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.:</td>
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<tr>
<td>4.</td>
<td>☒ 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.: 1-21</td>
</tr>
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**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.