Title: APPARATUS AND METHOD FOR DETECTING THE BENDING OF MEDICAL INVASIVE TOOLS IN MEDICAL INTERVENTIONS

Abstract: An apparatus for detecting the bending of a medical invasive tool (2) during its insertion in a body (4, 6) comprises an ultrasound transducer (8), and a position measuring system (29, 22, 26, 28) including position measuring components, and/or articulated arms (20, 22) being attached to the medical invasive tool (2). The expected position of the medical invasive tool is calculated according to the measurements produced by the position measuring system. Echo points, and/or segments of the medical invasive tool are identified on the ultrasound image (24). The comparison between the identified echo, and the calculated position of the invasive tool (without bending) is the base of detecting the bending of the medical invasive tool. Additionally, the identified echo points/segments are used in order to evaluate the actual shape of the invasive tool. Additionally, the expected position, and/or velocity of the invasive tool calculated, and a representation thereof is displayed on the image of the invasive tool calculated, and a representation thereof is displayed on the image viewable to the user. Similar apparatus can be utilized when employing a CT scanner or MI scanner.
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
   IPC(7) : A61B 8/12
   US CL : 600/439
   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)
   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
   Search Terms: ultraso$, tool$, ending, measur$, detect$, compar$, positio$n

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<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>Y, P</td>
<td>US 5,957,844 A (DEKEL et al.) 28 September 1999, col. 8 lines 26-65.</td>
<td>1-5, 7-16</td>
</tr>
<tr>
<td>A</td>
<td>US 5,724,978 A (TENHOFF) 10 March 1998, col 5 line 3 to col. 6 line 39.</td>
<td>1</td>
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</tbody>
</table>

Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search

18 SEPTEMBER 2000

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
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Date of mailing of the international search report

04 OCT 2000

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