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# (12) EUROPEAN PATENT APPLICATION

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**01963952.5 / 1 309 273**

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## (54) Device and method for segmental bioimpedance measurements of a dialysis patient

(57) The present invention includes a method of determining the dry body weight of a patient undergoing dialysis by means of segmental bioimpedance analysis. In preferred embodiments, dry body weight is determined by comparison to the bioimpedance values of normal subjects or by monitoring changes in bioimpedance during dialysis. One embodiment of the present invention is a device for determining dry body weight during dialysis.

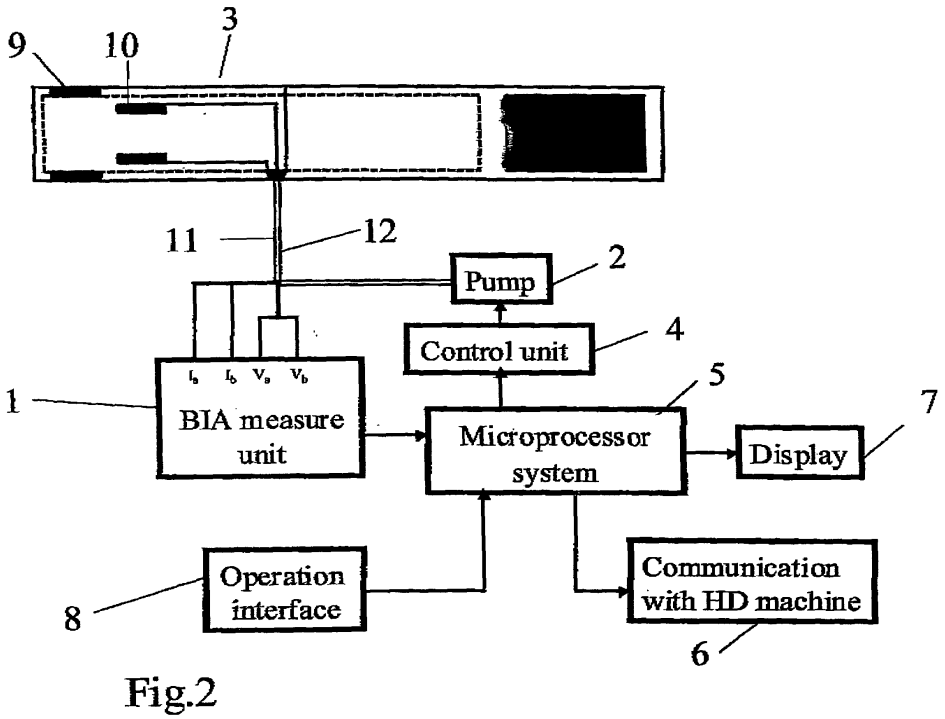


Fig.2

EP 1 645 227 A3

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# PARTIAL EUROPEAN SEARCH REPORT

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 05 02 7173

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | US 5 788 643 A (FELDMAN ET AL)<br>4 August 1998 (1998-08-04)<br>* column 2, lines 14-24 *<br>* column 2, lines 46-67 *<br>* column 4, lines 10-37 *<br>----- | 1 | INV.<br>A61B5/05<br>A61M1/16<br>A61B5/053<br>A61M1/16 |
| A | ZHU F ET AL: "VALIDATION OF CHANGES IN EXTRACELLULAR VOLUME MEASURED DURING HEMODIALYSIS USING A SEGMENTAL BIOIMPEDANCE TECHNIQUE"<br>ASAIO JOURNAL, J.B.LIPPINCOTT CO.,HAGERSTOWN,MD, US,<br>vol. 44, no. 5, September 1998 (1998-09), pages M541-M545, XP000802374<br>ISSN: 1058-2916<br>* the whole document *<br>----- | 1,7 | |
| A | US 5 449 000 A (LIBKE ET AL)<br>12 September 1995 (1995-09-12)<br>* abstract *<br>* column 2, line 60 - column 6, line 55 *<br>----- | 1 | |
| | -/-- | | TECHNICAL FIELDS SEARCHED (IPC)<br>A61M<br>A61B<br>A61N |

## INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

6

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 21 April 2006 | Rivera Pons, C |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C07)

European Patent Office

# PARTIAL EUROPEAN SEARCH REPORT

Application Number
EP 05 02 7173

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | CLASSIFICATION OF THE APPLICATION (IPC) |
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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | |
| A | KUBICEK W G ET AL: "DEVELOPMENT AND EVALUATION OF AN IMPEDANCE CARDIAC OUTPUT SYSTEM" AEROSPACE MEDICINE, AEROSPACE MEDICAL ASSOCIATION, WASHINGTON, DC, US, vol. 37, no. 12, December 1966 (1966-12), pages 1208-1212, XP009019391 ISSN: 0001-9402 * the whole document * | 6,12 | |
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| X | US 4 008 712 A (NYBOER ET AL) 22 February 1977 (1977-02-22) * the whole document * | 7 | |
| Y | | 8-10 | |
| Y | PATENT ABSTRACTS OF JAPAN vol. 1998, no. 08, 30 June 1998 (1998-06-30) & JP 10 071130 A (HITACHI LTD), 17 March 1998 (1998-03-17) * abstract * * paragraphs [0004] - [0012]; figures 1,2 * | 8-10 | |

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6

EPO FORM 1503 03.82 (P04C10)

European Patent Office

PARTIAL EUROPEAN SEARCH REPORT

Application Number
EP 05 02 7173

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | |
| A | FANSAN ZHU ET AL: "Estimation of volume of fluid in the peritoneal cavity by bioimpedance analysis" BMES/EMBS CONFERENCE, 1999. PROCEEDINGS OF THE FIRST JOINT ATLANTA, GA, USA 13-16 OCT. 1999, PISCATAWAY, NJ, USA,IEEE, US, vol. 2, 13 October 1999 (1999-10-13), page 798, XP010357829 ISBN: 0-7803-5674-8 * the whole document * | 7 | |
| A | US 5 063 937 A (EZENWA ET AL) 12 November 1991 (1991-11-12) * column 1, lines 23-30 * * column 4, line 56 - column 5, line 10 * | 7 | TECHNICAL FIELDS SEARCHED (IPC) |

6

EPO FORM 1503 03.82 (P04C10)

European Patent Office

**INCOMPLETE SEARCH SHEET C**

Application Number
EP 05 02 7173

Claim(s) not searched:
2-4

Reason for the limitation of the search (non-patentable invention(s)):

Article 52 (4) EPC - Method for treatment of the human or animal body by therapy

The hemodialysis procedure on a patient is considered a therapeutical step and the method of performing dialysis on a patient as well as those performed in paralell to the dialysis procedure are considered methods of treatment of the human or animal body by therapy.

The method of claim 1 has not been considered therapeutical under the assumption that the resistivity measurements are not done during dialysis, but either before or after the dialysis procedure.

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Application Number
EP 05 02 7173

## CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

## LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1,6-12

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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## LACK OF UNITY OF INVENTION
## SHEET B

Application Number
EP 05 02 7173

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claim: 1

Method for determining the hydration status of a patient.

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2. claim: 5

Method for monitoring the heart rate of a patient.

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3. claims: 6,12

Method for calculating cardiac output of a patient.

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4. claims: 7-11

Device for controlling a hemodialysis machine

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 02 7173

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-04-2006

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| US 5063937 A | 12-11-1991 | NONE | |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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|---|---|---|---|
| 专利名称(译) | 用于透析患者的节段生物阻抗测量的装置和方法 | | |
| 公开(公告)号 | EP1645227A3 | 公开(公告)日 | 2006-06-07 |
| 申请号 | EP2005027173 | 申请日 | 2001-08-13 |
| [标]申请(专利权)人(译) | 肾RES INST | | |
| 申请(专利权)人(译) | 肾脏研究院 | | |
| 当前申请(专利权)人(译) | 肾脏研究院 | | |
| [标]发明人 | ZHU FANSAN<br>LEVIN NATHAN | | |
| 发明人 | ZHU, FANSAN<br>LEVIN, NATHAN | | |
| IPC分类号 | A61B5/05 A61M1/16 A61B5/00 A61B5/022 A61B5/0245 A61B5/026 A61B5/053 A61M1/14 | | |
| CPC分类号 | A61B5/022 A61B5/0535 A61B5/0537 A61B5/4869 A61M1/16 A61M2205/3393 A61M2205/50 | | |
| 优先权 | 09/638657 2000-08-14 US | | |
| 其他公开文献 | EP1645227B1<br>EP1645227A2 | | |
| 外部链接 | Espacenet | | |


摘要(译)

本发明包括通过节段生物阻抗分析确定进行透析的患者的干燥体重的方法。在优选的实施方案中，通过与正常受试者的生物阻抗值比较或通过监测透析期间生物阻抗的变化来确定干体重。本发明的一个实施例是一种用于确定透析期间干体重的装置。


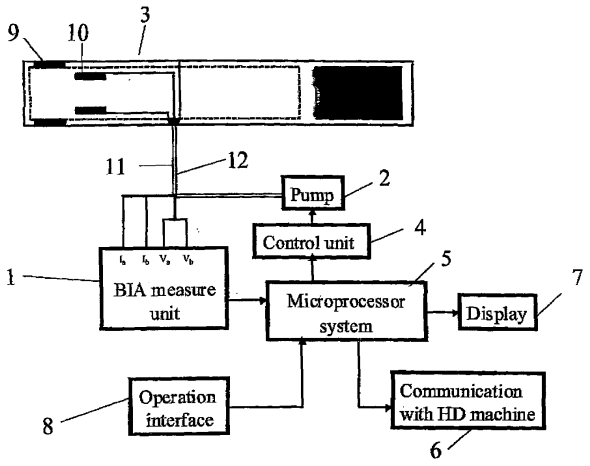


Fig.2