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Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

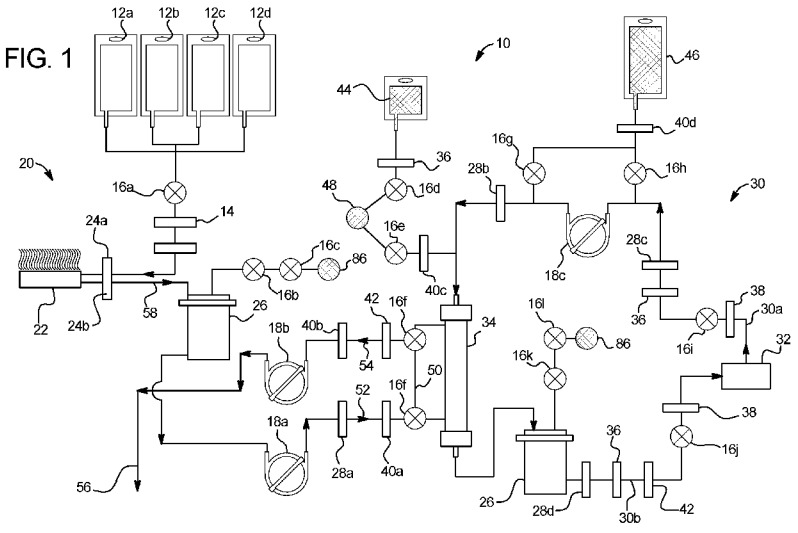
Published:

— *with international search report (Art. 21(3))*

[Continued on next page]

(54) Title: DIALYSIS SYSTEM HAVING NON-INVASIVE FLUID VELOCITY SENSING

FIG. 1



(57) Abstract: A dialysis system includes a dialyzer (34); a blood pump (18c) coupled operably to a dialyzer; a dialysate inlet pump (18a) coupled operably to a dialysate inlet of the dialyzer; a dialysate outlet pump (18b) coupled operably to a dialysate outlet of the dialyzer; a first non-invasive fluid velocity sensor (40a) positioned to sensor of inlet flowrate of dialysate pumped to the dialysate inlet by the dialysate inlet pump; and a second non-invasive fluid velocity sensor (40b) positioned to sense an outlet flowrate of dialysate pumped from the dialysate outlet by the dialysate outlet pump.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
3 September 2009

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61M1/16 G01F1/704

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)
A61M G01F

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.
Y	WO 00/06217 A (ALTHIN MEDICAL INC [US]) 10 February 2000 (2000-02-10) page 7, lines 6-30 page 8, lines 18-22; figure 1 page 10, lines 25,26 page 10, lines 2-7	1-10
Y	US 4 654 803 A (SELL JEFFREY A [US]) 31 March 1987 (1987-03-31) cited in the application abstract; figure 1	1-2,4-10
Y	US 2005/284815 A1 (SPARKS DOUGLAS R [US] ET AL) 29 December 2005 (2005-12-29) paragraphs [0014], [0017], [0026]; figures 1,2	3

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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	Date of mailing of the international search report
6 July 2009	10/07/2009

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/080175

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2005/044339 A (BAXTER HEALTHCARE CORP [US]; BAXTER HEALTHCARE SA [CH]; KELLY THOMAS D) 19 May 2005 (2005-05-19) page 15, lines 1-4 page 16, lines 29-31 page 23, lines 3-8; figure 1	11-22
Y	US 4 938 079 A (GOLDBERG JACK [US]) 3 July 1990 (1990-07-03) cited in the application column 5, line 1 - column 6, line 16; figures 1,2	11-22
Y	US 4 966 691 A (BROUS DONALD W) 30 October 1990 (1990-10-30) column 2, line 64 - column 2, line 7 column 5, lines 13-31; figure 1	23-30
Y	DE 195 47 624 A1 (HAHN SCHICKARD GES [DE]) 27 June 1996 (1996-06-27) column 3, line 49 - column 4, line 63; figure 1	23-30
A	US 3 592 057 A (BOE CHRISTIAN THORKILD ET AL) 13 July 1971 (1971-07-13) column 2, lines 31-57; figure 1	23-32

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/080175

Box No. II 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. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

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 unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable 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 reportcovers 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 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.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22

   A dialysis system comprising a dialysate inlet pump, a dialysate outlet pump and two non-invasive fluid velocity sensors.
   Problem to be solved: Providing a simple and cost effective system.

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2. claims: 23-32

   A dialysis flow control system comprising a dialysate line, a plurality of air detectors, an air pump and a control element.
   Problem to be solved: Facilitating flow velocity sensing via air injection

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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