

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 August 2002 (15.08.2002)

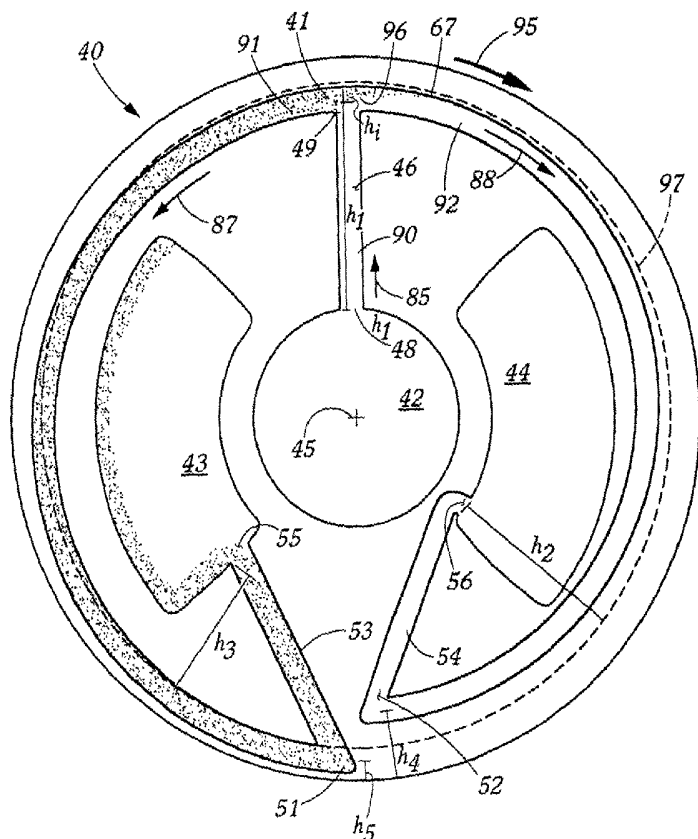
PCT

(10) International Publication Number
WO 02/062482 A3

- (51) International Patent Classification⁷: B04B 5/04, 7/08, 9/08
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- (21) International Application Number: PCT/US01/46940
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- (22) International Filing Date: 2 November 2001 (02.11.2001)
- (25) Filing Language: English
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (26) Publication Language: English
- (30) Priority Data: 60/245,282 2 November 2000 (02.11.2000) US
- (71) Applicant: GAMBRO, INC. [US/US]; Patent Department, 10810 West Collins Ave., Lakewood, CO 80215-4439 (US).
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: FLUID SEPARATION DEVICES, SYSTEMS AND METHODS



(57) Abstract: A centrifugal fluid separation system is disclosed for centrifugally separating a composite fluid into components thereof. This centrifugal separation system includes at least a centrifugal rotor (40) which has a composite fluid containment area (42), several fluid flow channels and at least two separated component collection areas defined therein. A composite fluid to be separated is delivered to the fluid containment area from which it travels through an inlet channel (46) to a substantially circumferential fluid separation channel (50) where under centrifugal forces the composite fluid is separated into components which each then travel to distinct first and second separated fluid outlet channels (53, 54), and thence on to exit therefrom into the respective collection areas. The first and second fluid outlet channels also have respective first and second heights which are related to each other so as to provide a balanced fluid pressure relationship for the respective separated component fluids flowing therethrough. Such a pressure balance controls the interface of the separated fluid components within the circumferential separation channel.



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patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

Published:

- *with international search report*

(88) Date of publication of the international search report:

28 August 2003

(15) Information about Correction:

Previous Correction:

see PCT Gazette No. 08/2003 of 20 February 2003, Section II

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

International Application No
PCT/US 01/46940

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 B04B5/04 B04B7/08 B04B9/08		
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) IPC 7 B04B		
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, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 043 072 A (ROCHAT JEAN DENIS) 11 October 2000 (2000-10-11) column 4, line 3 - line 53 column 7, line 11 - line 37 column 9, line 25 -column 10, line 24 figures 1,2 ---	1,17,31, 34,55
A	US 4 330 080 A (MATHIEU BERND) 18 May 1982 (1982-05-18) the whole document ---	1,17,31, 34,55
A	US 4 007 871 A (JONES ALAN LYTTON ET AL) 15 February 1977 (1977-02-15) figure 1 ---	1,17,31, 34,55
	-/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in 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 <p align="center">1 August 2002</p>		Date of mailing of the international search report <p align="center">11.12.02</p>
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 epo nl, Fax: (+31-70) 340-3016		Authorized officer <p align="center">Leitner, J</p>

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/46940

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 004, no. 135 (C-025), 20 September 1980 (1980-09-20) & JP 55 086552 A (TOMY SEIKOU:KK), 30 June 1980 (1980-06-30) abstract -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/46940

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

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. 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.:

1-36, 37-54

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. Claims: 1-36,55-64

A centrifugal separating device and method provided with fluid inlet channel, separation channel and fluid outlet channels and separated component collection areas, whereby the respective inlet and outlet channels have respective heights which are related to each other.

2. Claims: 37-54

A disposable separation container system with a fluid container connected by an inlet line to a separation vessel which is connected by an outlet line to a first separated component container.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/46940

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1043072	A	11-10-2000	EP 1043072 A1	11-10-2000
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			WO 0061295 A1	19-10-2000

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