

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
16 August 2007 (16.08.2007)

PCT

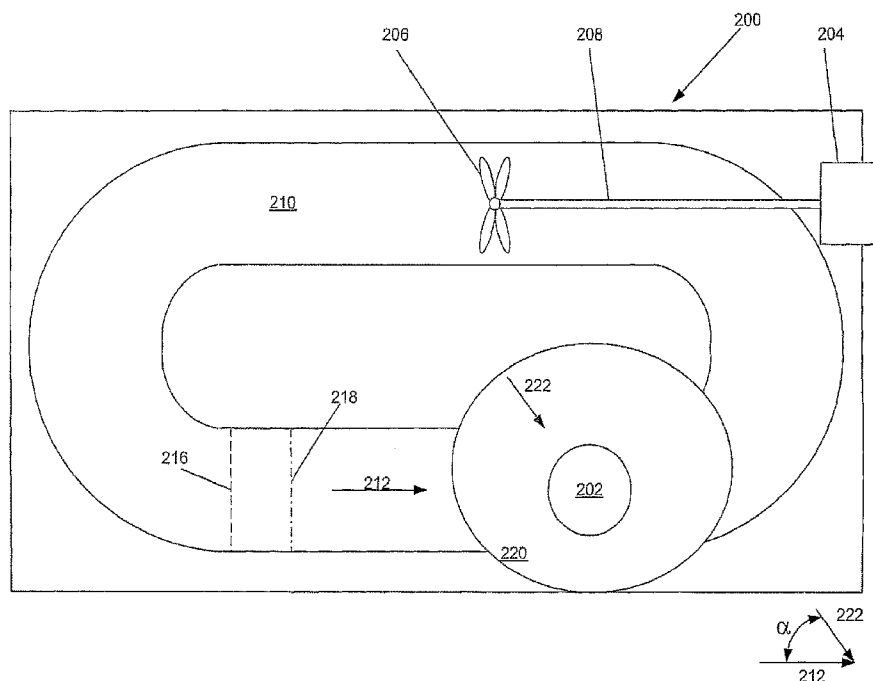
(10) International Publication Number  
**WO 2007/092925 A3**

- (51) **International Patent Classification:**  
*G01M 1/00* (2006.01)
- (21) **International Application Number:**  
PCT/US2007/061850
- (22) **International Filing Date:** 8 February 2007 (08.02.2007)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
60/771,647            9 February 2006 (09.02.2006)    US
- (71) **Applicant (for SM only): SHELL OIL COMPANY**  
[US/US]; One Shell Plaza, P.O. Box 2463, Houston, Texas 77252-2463 (US).
- (71) **Applicant (for all designated States except US): SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.** [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR The Hague (NL).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only): ALLEN, Donald Wayne** [US/US]; 4323 Lake Kempt Ct., Richmond, Texas 77469 (US). **HENNING, Dean Leroy** [US/US]; 3205 Hartledge Road, Needville, Texas 77461 (US). **MCMILLAN, David Wayne** [US/US]; 1502 Tulsa,

- Deer Park, Texas 77536 (US). **MENON, Raghunath** [US/US]; 24818 Brattle Drive, Katy, Texas 77494 (US). **UEHARA-NAGAMINE, Ernesto** [PE/US]; 14901 Richmond Avenue, Apt. #526, Houston, Texas 77082 (US). **WEST, Christopher Steven** [US/US]; 4109 Tawakon Drive, Pearland, Texas 77584 (US).
- (74) **Agent: HICKMAN, William, E.;** Shell Oil Company, One Shell Plaza, P.O. Box 2463, Houston, TX 77252-2463 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) **Title:** CURRENT TANK SYSTEMS AND METHODS



(57) **Abstract:** There is disclosed a current tank system comprising a first current tank adapted to produce a first current in a first direction, and a second current tank adapted to produce a second current in a second direction. There is also disclosed a method of testing a sample, comprising exposing the sample to a first current in a first current tank, and exposing the sample to a second current in a second current tank.

WO 2007/092925 A3



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,  
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,  
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
9 April 2009

**Published:**

— *with international search report*

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/US 07/61850

<p><b>A. CLASSIFICATION OF SUBJECT MATTER</b>                  IPC(8): G01M 01/00 (2007.01)                  USPC: 73/147                  According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p><b>B. FIELDS SEARCHED</b>                  Minimum documentation searched (classification system followed by classification symbols)                  USPC: 73/147</p>																	
<p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched                  USPC: all classes/subclasses (text search, see terms below)</p>																	
<p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                  PubWEST(PGPB,USPT,EPAB,JPAB);                  Search Terms: flow, current, direction, location, second, additional, further, angle, circulate, recirculate, loop</p>																	
<p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td align="center">X</td> <td>US 6,923,051 B2 (FLEMING) 02 August 2005 (02.08.2005), col 5, ln 8-40, col 7, ln 1-3, 17-37, 54-59, col 9, ln 26-56, col 10, ln 24-33, Fig 2-7</td> <td align="center">1-3, 12-14</td> </tr> <tr> <td align="center">A</td> <td>US 2003/0056580 A1 (SAWADA et al.) 27 March 2003 (27.03.2003), entire document</td> <td align="center">1-3, 12-14</td> </tr> <tr> <td align="center">A</td> <td>US 6,725,912 B1 (MOLL et al.) 27 April 2004 (27.04.2004), entire document</td> <td align="center">1-3, 12-14</td> </tr> <tr> <td align="center">A</td> <td>US 6,155,111 A (WICKERN et al.) 05 December 2000 (05.12.2000), entire document</td> <td align="center">1-3, 12-14</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 6,923,051 B2 (FLEMING) 02 August 2005 (02.08.2005), col 5, ln 8-40, col 7, ln 1-3, 17-37, 54-59, col 9, ln 26-56, col 10, ln 24-33, Fig 2-7	1-3, 12-14	A	US 2003/0056580 A1 (SAWADA et al.) 27 March 2003 (27.03.2003), entire document	1-3, 12-14	A	US 6,725,912 B1 (MOLL et al.) 27 April 2004 (27.04.2004), entire document	1-3, 12-14	A	US 6,155,111 A (WICKERN et al.) 05 December 2000 (05.12.2000), entire document	1-3, 12-14
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
X	US 6,923,051 B2 (FLEMING) 02 August 2005 (02.08.2005), col 5, ln 8-40, col 7, ln 1-3, 17-37, 54-59, col 9, ln 26-56, col 10, ln 24-33, Fig 2-7	1-3, 12-14															
A	US 2003/0056580 A1 (SAWADA et al.) 27 March 2003 (27.03.2003), entire document	1-3, 12-14															
A	US 6,725,912 B1 (MOLL et al.) 27 April 2004 (27.04.2004), entire document	1-3, 12-14															
A	US 6,155,111 A (WICKERN et al.) 05 December 2000 (05.12.2000), entire document	1-3, 12-14															
<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																	
<p>* Special categories of cited documents:</p> <table style="width:100%;"> <tr> <td style="width:50%;"> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%;"> <p>“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</p> <p>“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</p> <p>“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</p> <p>“&amp;” document member of the same patent family</p> </td> </tr> </table>			<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&amp;” document member of the same patent family</p>													
<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&amp;” document member of the same patent family</p>																
<p>Date of the actual completion of the international search 03 August 2007 (03.08.2007)</p>		<p>Date of mailing of the international search report <b>27 MAR 2008</b></p>															
<p>Name and mailing address of the ISA/US                  Mail Stop PCT, Attn: ISA/US, Commissioner for Patents                  P.O. Box 1450, Alexandria, Virginia 22313-1450                  Facsimile No. 571-273-3201</p>		<p>Authorized officer: Lée W. Young</p> <p>PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>															

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/61850

**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.: 4-11 and 15-21  
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:

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 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 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.:

**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.