

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 May 2008 (15.05.2008)

PCT

(10) International Publication Number
WO 2008/058243 A3

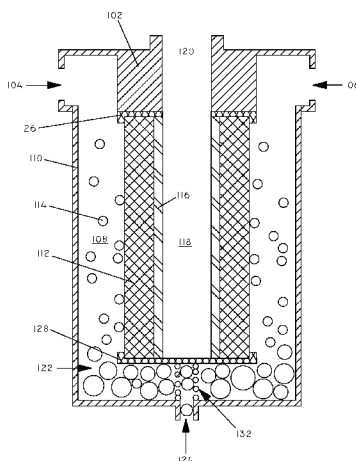
- (51) **International Patent Classification:**
B01D 25/00 (2006.01) *B01D 27/00* (2006.01)
- (21) **International Application Number:**
PCT/US2007/084101
- (22) **International Filing Date:**
8 November 2007 (08.11.2007)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/557,684 8 November 2006 (08.11.2006) US
- (71) **Applicant (for all designated States except US):** DON-ALDSON COMPANY, INC. [US/US]; 1400 West 94th Street, P.o. Box 1299, Minneapolis, MN 55440-1299 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** YANG, Chuan-fang [CN/US]; 13419 Caramel Trail, Eden Prairie, MN 55346 (US). PATEL, Kirit [US/US]; 3 Studdiford Way, Bridgewater, NJ 08807 (US). PANNEPACKER, Robert [US/US]; 314 Docs Court, Ambler, PA 19002 (US).
- (74) **Agent:** PAULY, Daniel, M.; Pauly, Devries Smith & Deffner, L.L.C., Plaza Vii, Suite 3000, 45 S. Seventh Street, Minneapolis, MN 55402-1630 (US).

- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, LY, MA, MD, ME, 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, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, 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).

Published:
— with international search report

(88) **Date of publication of the international search report:**
3 July 2008

(54) **Title:** SYSTEMS, ARTICLES, AND METHODS FOR REMOVING WATER FROM HYDROCARBON FLUIDS



(57) **Abstract:** The present invention relates to systems, articles, and methods for removing water from hydrocarbon fluids. In an embodiment, the invention includes a water/fuel separation system including a filter housing and a filter element disposed within the filter housing. The filter element can include a separation article including a porous polymer layer having and a porous substrate comprising a hydrophobic surface. In an embodiment, the invention includes a filter element for separating emulsified water from a hydrocarbon fluid. In an embodiment, the invention includes a method for filtering water out of a hydrocarbon fluid including passing a hydrocarbon fluid through a separation article including a polymer layer comprising polytetrafluoroethylene; and a porous substrate comprising a hydrophobic surface, the polymer layer disposed on the porous substrate.

WO 2008/058243 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/84101

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B01D 25/00; B01D 27/00 (2008.01)

USPC - 210/348

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)

USPC: 210/348

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC - 210/247, 210/315, 210/321.87 and IPC(8): B01D 25/00; B01D 27/00 (2008.01)

Google

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(USPT,PGPB,EPAB,JPAB); Google

Search Terms Used: water, separate, fuel, teflon, filter, fiberglass, PTFE, polytetrafluoroethylene

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,904,845 A (Gironi) 18 May 1999 (18.05.1999); col 2-3, Fig. 1, 3	1-32
Y	US 2004/0222156 A1 (Yu et al.) 11 November 2004 (11.11.2004) para [0011]	1-32
Y	US 4,892,667 A (Parker et al.) 09 January 1990 (09.01.1990); col 6	12-14, 17, 27-29
Y	US 4,777,137 A (Lemonnier) 11 October 1988 (11.10.1988); col 5	16
Y	US 6,422,396 B1 (Li et al.) 23 July 2002 (23.07.2002); col 7, 8	7-10, 22-25
Y	US 4,780,211 A (Lien) 25 October 1988 (25.10.1988) col 2	6, 21
Y	US 3,700,595 A (Kaiser) 24 October 1972 (24.10.1972) col 3	18

Further documents are listed in the continuation of Box C.

* 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 application or patent 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

02 March 2008 (02.03.2008)

Date of mailing of the international search report

03 APR 2008'

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

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774