



(51) International Patent Classification:

A61L 2/03 (2006.01) C02F 1/467 (2006.01)
A61L 2/10 (2006.01) A47L 11/40 (2006.01)
B08B 3/02 (2006.01) B29C 49/00 (2006.01)
B08B 3/10 (2006.01) B29C 49/58 (2006.01)
C02F 1/32 (2006.01) B29C 49/10 (2006.01)

(21) International Application Number:

PCT/US2013/044648

(22) International Filing Date:

7 June 2013 (07.06.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/657,330 8 June 2012 (08.06.2012) US

(71) Applicant: TENNANT COMPANY [US/US]; 701 North Lilac Drive, Minneapolis, MN 55422 (US).

(72) Inventors: FIELD, Bruce, F.; 4700 Circle Down, Golden Valley, MN 55416 (US). PYLKKI, Russell, J.; 1640 Hillcrest Avenue, St. Paul, MN 55116 (US). CITSAY, Mark, Steven; 12108 Marquess Ln N, Lake Elmo, MN 55042 (US). O'NEIL, Charles, W.; 8 Bridge Lane, Edina, MN 55424 (US).

(74) Agents: MORRISON, Brian, R. et al.; Westman, Champ- lin & Kelly, P.A., 900 Second Avenue South, Suite 1400, Minneapolis, MN 55402-3319 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available):

AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, 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, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

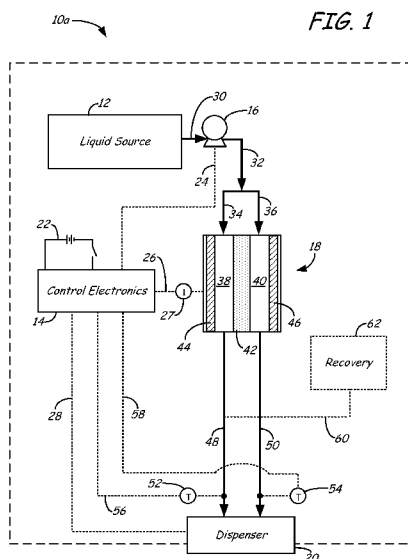
Published:

- with international search report (Art. 21(3))
- 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 April 2014

(54) Title: APPARATUS AND METHOD FOR GENERATING OXIDATIVELY AND THERMALLY-ENHANCED TREATMENT LIQUIDS



(57) Abstract: A cleaning system (10a-10g) comprising a liquid source (12) configured to provide a feed liquid at a first temperature, and an electrolysis cell (18) configured to receive the feed liquid and to electrochemically activate the feed liquid to provide an electrochemically-activated liquid, wherein the electrochemical activation also heats the feed liquid such that the electrochemically-activated liquid is at an elevated temperature that is greater than the first temperature. The cleaning system also includes a dispenser (20) configured to dispense the electrochemically-activated liquid.

WO 2013/184994 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/044648

A. CLASSIFICATION OF SUBJECT MATTER		
INV. A61L2/03	A61L2/10	B08B3/02
C02F1/467	A47L11/40	B29C49/00
ADD. B29C49/58	B29C49/10	
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) A61L B08B C02F A47L B29C		
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 practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/186368 A1 (FIELD BRUCE F [US] ET AL) 16 August 2007 (2007-08-16) cited in the application paragraph [0009] - paragraph [0066]; figures paragraph [0157] - paragraph [0161] -----	1-4,6-13
X	US 2009/301521 A1 (FIELD BRUCE F [US]) 10 December 2009 (2009-12-10)	1-3,8-10
A	paragraph [0011] - paragraph [0017]; figures	7
X	US 2011/219555 A1 (FIELD BRUCE F [US] ET AL) 15 September 2011 (2011-09-15) paragraphs [0025], [0042]; figures 1,3 ----- -/--	1,4,8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 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 3 October 2013		Date of mailing of the international search report 18/02/2014
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Kosicki, Tobias

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/044648

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/314651 A1 (FIELD BRUCE F [US] FIELD BRUCE F [US] ET AL) 24 December 2009 (2009-12-24) paragraph [0012]; figures -----	1,5,8
E	WO 2013/112807 A1 (TENNANT CO [US]) 1 August 2013 (2013-08-01) the whole document -----	1-5,8-11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/044648

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 all searchable 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 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.:

1-13

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-13

A cleaning system as well as a method for cleaning a surface with the additional potential special technical features that it further comprises a hand-held unit housing, wherein the liquid source, electrolysis cell and dispenser are carried by the housing (claim 5).

2. claims: 14-20

A method for cleaning a surface with the additional potential special technical features that it further comprises monitoring a temperature of the electrochemically-activated liquid in the fluid line; and controlling at least one of the pumping and the inducing of the current in response to the monitored temperature; (claim 14)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2013/044648

Patent document cited in search report	A1	Publication date		Patent family member(s)	Publication date
US 2007186368	A1	16-08-2007	US	2007186368 A1	16-08-2007
			US	2008210572 A1	04-09-2008
			US	2011132749 A1	09-06-2011

US 2009301521	A1	10-12-2009	EP	2291246 A2	09-03-2011
			US	2009301521 A1	10-12-2009
			WO	2009152149 A2	17-12-2009

US 2011219555	A1	15-09-2011	US	2011219555 A1	15-09-2011
			WO	2011112333 A1	15-09-2011

US 2009314651	A1	24-12-2009	CA	2728742 A1	23-12-2009
			CA	2728757 A1	23-12-2009
			CA	2729031 A1	23-12-2009
			CN	102112401 A	29-06-2011
			CN	102112402 A	29-06-2011
			CN	102112403 A	29-06-2011
			EP	2315724 A2	04-05-2011
			EP	2315725 A2	04-05-2011
			EP	2318317 A1	11-05-2011
			JP	2011525146 A	15-09-2011
			JP	2011525219 A	15-09-2011
			JP	2011527380 A	27-10-2011
			KR	20110031188 A	24-03-2011
			KR	20110031190 A	24-03-2011
			KR	20110048504 A	11-05-2011
			US	2009314651 A1	24-12-2009
			US	2009314654 A1	24-12-2009
			US	2009314655 A1	24-12-2009
			US	2009314657 A1	24-12-2009
			US	2009314658 A1	24-12-2009
			WO	2009155528 A1	23-12-2009
			WO	2009155543 A1	23-12-2009
			WO	2009155545 A2	23-12-2009
			WO	2009155546 A2	23-12-2009

WO 2013112807	A1	01-08-2013	US	2013193001 A1	01-08-2013
			WO	2013112807 A1	01-08-2013
