

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 January 2007 (11.01.2007)

PCT

(10) International Publication Number
WO 2007/005341 A3

(51) International Patent Classification:
G01F 3/20 (2006.01)

W. [US/US]; 750 Live Oak Drive, El Cajon, California 92020 (US).

(21) International Application Number:
PCT/US2006/024610

(74) Agents: **ROLNICKI, Joseph M.** et al.; Thompson Coburn LLP, One US Bank Plaza, St. Louis, Missouri 63101 (US).

(22) International Filing Date: 23 June 2006 (23.06.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/174,045 1 July 2005 (01.07.2005) US

(71) Applicants (for all designated States except US): **ICL PERFORMANCE PRODUCTS LP** [US/US]; 622 Emerson Road, St. Louis, Missouri 63141 (US). **UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF AGRICULTURE** [US/US]; Washington, District Of Columbia 20250 (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, 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, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

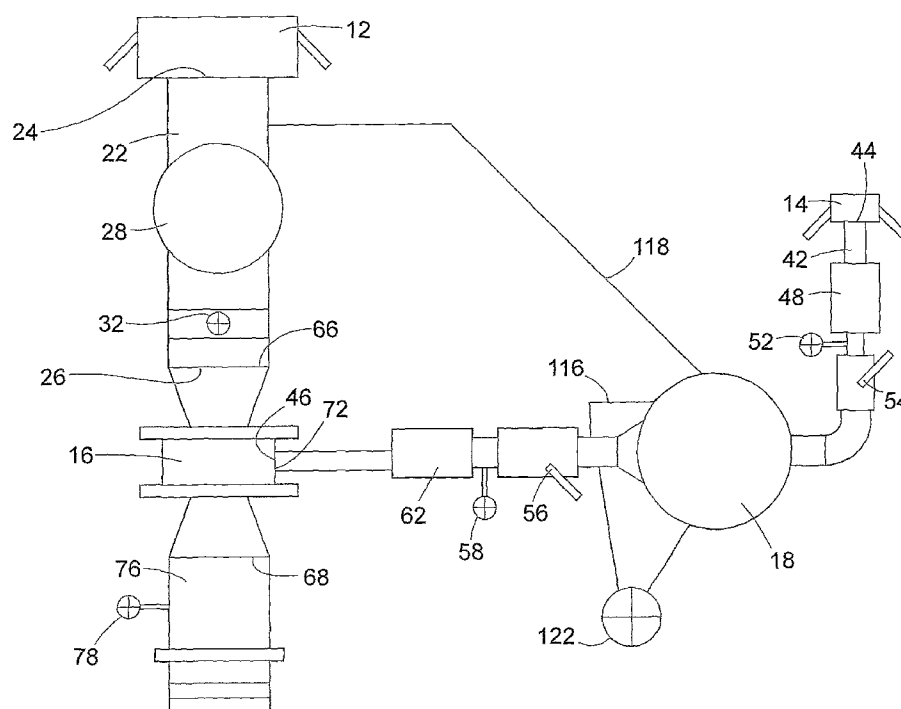
(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHARMA, Vinayak G.** [US/US]; 2038 Canyon Road, Arcadia, California 91006 (US). **LONG, Michael O.** [US/US]; 2735 Val Mar Circle, Highland, California 92346 (US). **GEORGE, Charles W.** [US/US]; 19755 Morgan Lane, Frenchtown, Montana 59834 (US). **MCKENZIE, Daniel**

(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, 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).

[Continued on next page]

(54) Title: LIQUID PROPORTIONING SYSTEM



(57) Abstract: A liquid proportioning system controls the mixing of water and a fire retardant concentrate through the operation of a diaphragm operated valve. The diaphragm valve controls the flow rate of concentrate in response to the sensed pressure of water supplied to a proportioner, so that a predetermined proportion of concentrate and water is maintained.

WO 2007/005341 A3

**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*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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

29 November 2007

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 06/24610

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01F 3/20 (2007.01)

USPC - 73/262

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(8): G01F 3/20 (2007.01)

USPC: 73/262

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 73/202, 262, 274, 279; 366/152.1

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

Electronic data base: USPTO WEST (PGPB, USPT, EPAB, JPAB); Google Scholar

Search Terms Used: liquid mix\$4, proportion\$4, diaphragm, valve, flow rate, fire retardant or suppressant, venturi

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2,152,394 A (Lewis) 7 August 1985 (07.08.1985) (FIG. 2, pg 1 ln 7-14, ln 27-34, ln 77-116, ln 127-pg 2 ln 1, pg 2 ln 5-12)	1-10
X	US 2004/0123991 A1 (Hanratty) 1 July 2004 (01.07.2004) (Abstract, FIG. 1, para [0052], [0065], [0085])	11-22
A	US 5,526,685 A (Davis) 18 June 1996 (18.06.1996)	1-22
A	US 6,491,421 B2 (Rondeau, et al.) 10 December 2002 (10.12.2002)	1-22
A	US 2005/0058016 A1 (Smith, et al.) 17 March 2005 (17.03.2005)	1-22

☐ 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

4 September 2007 (04.09.2007)

Date of mailing of the international search report

27 SEP 2007

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 06/24610

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:
Group 1 (Claims 1-10) is drawn to inventions related to liquid blending that includes non-hovel combinations of liquid sources, liquid conduits, and a diaphragm mixing valve.

Group 2 (Claims 11-22) is drawn to inventions related to liquid bending comprising a liquid proportioner for controlling liquid mixing.

The principle inventive feature of the applicants invention is the proportional control of the blending of two liquids. The groups do not share a common unknown technical feature such as a liquid proportioner that is capable controlling liquid stream outputs that would otherwise provide a unifying contribution over the prior art. Further, Group 1 is drawn to inventions that include the known elements of liquid sources, liquid conduits, and a control valve.

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.