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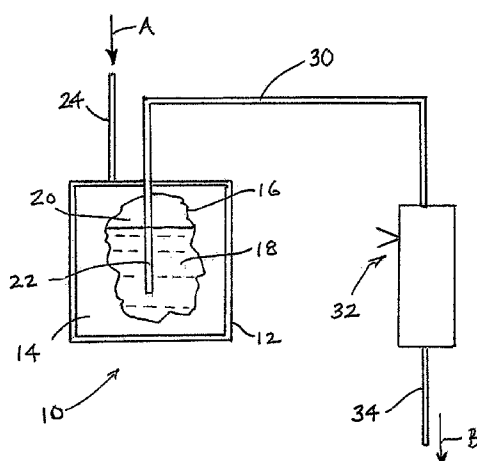
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[Continued on next page]

(54) Title: LINER-BASED LIQUID STORAGE AND DISPENSING SYSTEMS WITH EMPTY DETECTION CAPABILITY



(57) Abstract: Fluid supply systems for storage and dispensing of chemical reagents and compositions, e.g., high purity liquid reagents and chemical mechanical polishing compositions used to manufacture microelectronic device products, having capability for detection of an empty or near-empty condition when the contained liquid is at or approaching depletion during dispensing operation. Fluid delivery systems employing empty detect arrangements are described, including pressure transducer monitoring of dispensed material intermediate the supply package and a servo-hydraulic dispense pump, or monitoring of dispenser chamber replenishment times in a dispenser being replenished on a cyclic schedule to flow material from the dispenser to a downstream tool utilizing the dispensed material.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/15964

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **B67D 5/00**

USPC: 222/23

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)

U.S. : 222/23

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---------------|--|--|
| X --- Y | US 5,148,945 A (Geatz) 22 September 1992 (22.09.1992) column 4, line 18, to column 6, line 18. | 1-3, 6-8, 13-15, 27, 28, 54, 55, 65, 70-72, 75- 77, 82, 85, 95, 96, 119- 126, 135-137 ----- 4, 5, 9, 10, 12, 16, 18, 19, 26, 31-39, 56-59, 66-69, 73, 74, 78, 79, 81, 83, 84, 86, 99-101, 130, 132, 133, 140, 141 |



Further documents are listed in the continuation of Box C.



See patent family annex.

| | | | |
|--|---|-----|--|
| * Special categories of cited documents: | | "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 |
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| "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) | "&" | document member of the same patent family |
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| "P" | document published prior to the international filing date but later than the priority date claimed | | |

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---------------|---|--|
| X --- Y | US 2003/0205285 A (Kelly et al.) 06 November 2003 (06.11.2003) paragraphs 43-53. | 1-3, 6-8, 10-12, 14, 15, 17, 27, 28, 54-56, 59, 65, 70-72, 75-77, 79-82, 85, 95, 96, 104, 135-138 ----- 4, 5, 9, 16, 18, 19, 26, 31-37, 39, 57, 58, 66- 69, 73, 74, 78, 83, 84, 86, 99-101 |
| X --- Y | US 3,756,459 A (Bannister et al.) 04 September 1973 (04.09.1973) column 2, line 47, to column 4, line 17. | 1-3, 6, 8, 10-13, 17, 54-56, 70-72, 75, 77, 79-81, 85, 126-129, 131, 134, 139, 142 ----- 4, 5, 9, 14-16, 18, 19, 26, 31-37, 39, 57, 58, 66-69, 73, 74, 76, 78, 82-84, 86, 99-101, 104, 130, 132, 133, 140, 141 |
| Y | US 2004/0058453 A (Free et al.) 25 March 2004 (25.03.2004) paragraphs 7, 42 and 56-58. | 4, 5, 57, 58, 66-69, 73, 74 |
| Y | US 6,789,699 A (Clark et al.) 14 September 2004 (14.09.2004) column 9, line 35 to column 10, line 42. | 9, 10, 12, 14-16, 18, 19, 26, 31-39, 56, 59, 76, 78, 79, 81-84, 86, 99-101, 104 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/15964

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.: 111-118
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 any 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.