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(71) Applicant (for all designated States except US): APPLIED MATERIALS, INC. [US/US]; 3050 Bowers Avenue, Santa Clara, CA 95054 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): CHOI, Kenric T. [US/US]; 1115 South Daniel Way, San Jose, California 95128 (US).

(74) Agents: PATTERSON, B. Todd et al.; Patterson & Sheridan, L.L.P., 3040 Post Oak Blvd., Suite 1500, Houston, Texas 77056-6582 (US).

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(54) Title: LAMINAR FLOW IN A PRECURSOR SOURCE CANISTER

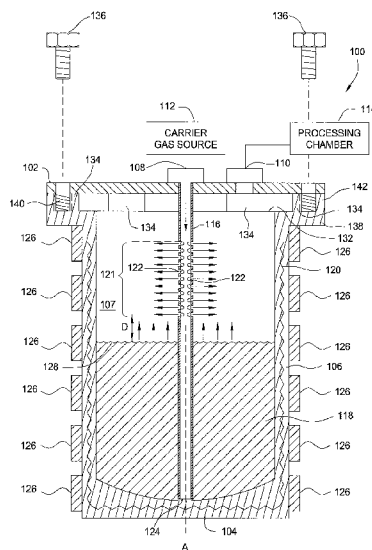


FIG. 1A

(57) Abstract: A canister apparatus for supplying a precursor material is disclosed. The canister apparatus includes a container defining an interior volume adapted to confine a precursor material, a tubular member adapted to introduce a carrier gas into the container, wherein the tubular member includes a distal end, and perforated portion spaced apart from the distal end that includes a plurality of radial holes, and an outlet adapted to flow out the precursor material and the carrier gas.

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A. CLASSIFICATION OF SUBJECT MATTER*C23C 16/448(2006.01)i, C23C 16/44(2006.01)i, H01L 21/205(2006.01)i*

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 C23C 16/448, C23C 16/44, H01L 21/205

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)

eKOMPASS (KIPO internal), USPTO, JPO & keywords: precursor, tube, vaporizer, bubbler

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/0013577 A1 (GANGULI, S. et al.) 22 January 2004 See figures 3 and 4.	1-10
Y	KR 10-2005-0021506 A (ASM AMERICA, INC.) 07 March 2005 See figures 14 and 15.	1-10
A	US 2003/0111014 A1 (DONATUCCI, M. B. et al.) 19 June 2003 See the whole document.	1-10
A	US 2008/0143002 A1 (STEIDL, T. A. et al.) 19 June 2008 See the whole document.	1-10

 Further documents are listed in the continuation of Box C. 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 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

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01 JULY 2010 (01.07.2010)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu,
Daejeon 302-701, Republic of Korea

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Authorized officer

Kim, Sang Joon

Telephone No. 82-42-481-8490



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 relates to an apparatus comprising: a container having an interior volume, an inlet, an outlet, an outer sidewall; and a tubular member extending through the inlet to a distal end adjacent a bottom, the tubular member having an upper portion with a plurality of holes configured to allow introduction of a carrier gas into the interior volume.

Group 2, claims 11-15 relates to a canister apparatus, comprising: an annular body having a first diameter coupled to an outwardly extending flange portion having a second diameter greater than the first diameter, an interior volume defined by the annular body; and a plurality of arcuate shoulder regions coupled to and extending inwardly away from the second inside diameter, each of the arcuate shoulder regions including a threaded openings.

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 fee, this Authority did not invite payment of any additional fee.

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.:
1-10

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/062999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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