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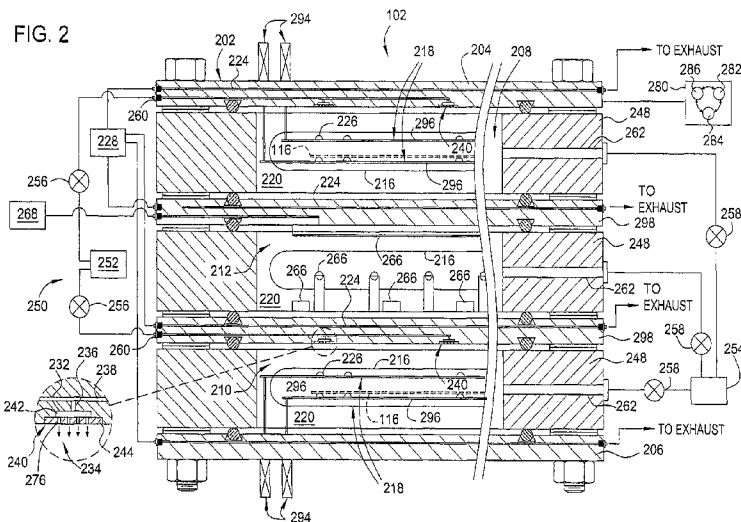
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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
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(54) Title: MULTIPLE SLOT LOAD LOCK CHAMBER AND METHOD OF OPERATION



(57) Abstract: Embodiments of the invention include a load lock chamber (104), a processing system (100) having a load lock chamber, and a method for transferring substrates (112) between atmospheric (102) and vacuum (110) environments. In one embodiment, the method includes maintaining a processed substrate within a transfer cavity (208, 210) formed in a chamber body (104) for two venting cycles. In another embodiment, the method includes transferring a substrate from a transfer cavity (208, 210) to a heating cavity (212) formed in the chamber body, and heating the substrate in the heating cavity. In another embodiment, a load lock chamber (104) includes a chamber body having a substrate support (218) disposed in a transfer cavity (208, 210). The substrate support is movable between a first elevation and a second elevation. A plurality of grooves (502) are formed in at least one of a ceiling or floor of the transfer cavity and configured to receive a portion (296) of the substrate support when located in the second elevation.

WO 2007/143567 A3

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US07/70246

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC: **B65G 49/07( 2006.01)**  
  
 USPC: 414/805  
 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. : 414/805, 939

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	US 6,918,731 B2 (TALMER) 19 July 2005 (19.07.2005), col. 7, lines 13-49.	1-3
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Y		4-13
Y	US 6,059,507 (ADAMS) 09 May 2000 (09.05.2000), Abstract, Fig. 2.	4-6
Y	US 6,729,824 B2 (LEI et al) 04 May 2004 (04.05.2004), Fig. 3A, col. 4, line 50 to col. 5, line 41.	7-13
A	US 6,053,686 (KYOGOKU) 25 April 2000 (25.04.2000).	
A	US 6,309,161 B1 (HOFMEISTER) 30 October 2001 (30.10.2001).	
A	US 6,719,517 B2 (BEAULIEU et al) 13 April 2004 (13.04.2004).	

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	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search: 27 August 2008 (27.08.2008)  
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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: James Keenan (signature), Telephone No. 571-272-0113

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/70246

## 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:  
Please See Continuation 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 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.: 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.

**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/US07/70246**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,734,950 B2 (NAKANO) 11 May 2004 (11.05.2004).	
A, P	US 7,207,766 B2 (KURITA et al) 24 April 2007 (24.04.2007).	
A, E	US 7,236,229 B2 (EDO) 26 June 2007 (26.06.2007).	

**BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-13, drawn to a method for transferring substrates between environments.

Group II, claim(s) 14-19, drawn to a method of transferring a substrate between environments.

Group III, claim(s) 20-27, drawn to a load lock chamber.

Group IV, claim(s) 28, drawn to a substrate processing system.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Group I relates to transferring multiple substrates between environments in a particular order, Group II relates to transferring an individual substrate between environments while processing the substrate in a particular manner, Group III relates to the structure of a particular load lock chamber having grooves, and Group IV relates to a substrate processing system utilizing a robot, wherein at least one special technical feature of each group is mutually exclusive relative to each of the other groups.