

# Exhibit 25



US010381247B2

(12) **United States Patent**  
**Madiwal et al.**

(10) **Patent No.:** **US 10,381,247 B2**  
(45) **Date of Patent:** **Aug. 13, 2019**

(54) **GAS SYSTEMS AND METHODS FOR CHAMBER PORTS**

(58) **Field of Classification Search**  
CPC ..... H01L 21/6719; H01L 21/67126; C23C 16/45563; C23C 14/566; C23C 14/564; C23C 16/4401; Y10T 29/49432  
See application file for complete search history.

(71) Applicant: **Applied Materials, Inc.**, Santa Clara, CA (US)

(72) Inventors: **Nagendra V. Madiwal**, Bangalore (IN); **Robert Irwin Decottignies**, Redwood City, CA (US); **Andrew Nguyen**, San Jose, CA (US); **Paul B. Reuter**, Austin, TX (US); **Angela R. Sico**, Round Rock, TX (US); **Michael Kuchar**, Georgetown, TX (US); **Travis Morey**, Austin, TX (US); **Mitchell DiSanto**, Georgetown, TX (US)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,951,770 A 9/1999 Perlov et al.  
6,287,386 B1 9/2001 Perlov et al.  
(Continued)

FOREIGN PATENT DOCUMENTS

CN 101158852 A 4/2008  
CN 101508111 A 8/2009  
(Continued)

OTHER PUBLICATIONS

Taiwan Search Report of Taiwanese Application No. 103133253 dated Oct. 30, 2018.

(Continued)

*Primary Examiner* — Yuechuan Yu

(74) *Attorney, Agent, or Firm* — Lowenstein Sandler LLP

(73) Assignee: **APPLIED MATERIALS, INC.**, Santa Clara, CA (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 200 days.

(21) Appl. No.: **15/238,604**

(22) Filed: **Aug. 16, 2016**

(65) **Prior Publication Data**

US 2016/0358792 A1 Dec. 8, 2016

**Related U.S. Application Data**

(62) Division of application No. 14/036,754, filed on Sep. 25, 2013, now Pat. No. 9,435,025.

(51) **Int. Cl.**  
**H01L 21/67** (2006.01)  
**C23C 14/56** (2006.01)

(Continued)

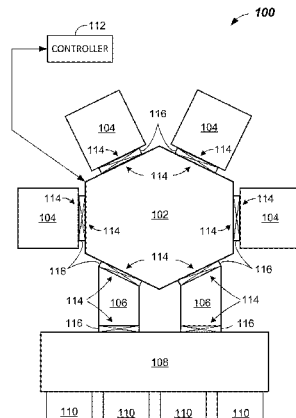
(52) **U.S. Cl.**  
CPC ..... **H01L 21/6719** (2013.01); **C23C 14/564** (2013.01); **C23C 14/566** (2013.01);

(Continued)

(57) **ABSTRACT**

An electronic device manufacturing system may include a chamber port assembly that provides an interface between a transfer chamber and a process chamber. In some embodiments, the chamber port assembly may be configured to direct a flow of purge gas into a substrate transfer area of the chamber port assembly. In other embodiments, a process chamber and/or the transfer chamber may be configured to direct a flow of purge gas into the substrate transfer area. The flow of purge gas into a substrate transfer area may prevent and/or reduce migration of particulate matter from chamber hardware onto a substrate being transferred between the transfer chamber and a process chamber. Methods of assembling a chamber port assembly are also provided, as are other aspects.

**11 Claims, 12 Drawing Sheets**



(51) **Int. Cl.**

**C23C 16/44** (2006.01)  
**C23C 16/455** (2006.01)

(52) **U.S. Cl.**

CPC .... **C23C 16/4401** (2013.01); **C23C 16/45563**  
 (2013.01); **H01L 21/67126** (2013.01); **Y10T**  
**29/49432** (2015.01)

(56)

**References Cited**

U.S. PATENT DOCUMENTS

6,468,353	B1	10/2002	Perlov et al.
6,575,737	B1	6/2003	Perlov et al.
6,916,397	B2	7/2005	Pfeiffer et al.
6,955,197	B2	10/2005	Elliott et al.
7,147,424	B2	12/2006	Weaver
7,299,831	B2	11/2007	Elliott et al.
7,720,655	B2	5/2010	Rice
7,857,570	B2	12/2010	Elliott et al.
2004/0081546	A1	4/2004	Elliott et al.
2005/0072716	A1	4/2005	Quiles et al.
2006/0011140	A1	1/2006	Blahnik et al.
2006/0028596	A1	2/2006	Leung et al.
2007/0059127	A1	3/2007	Guo et al.
2009/0062960	A1	3/2009	Krishnasamy et al.
2009/0108544	A1	4/2009	Sico et al.
2010/0022093	A1	1/2010	Yamaguchi et al.
2012/0325140	A1	12/2012	Schaller
2014/0262036	A1	9/2014	Reuter et al.
2014/0263165	A1	9/2014	Hongkham et al.
2015/0083330	A1	3/2015	Madiwal et al.

FOREIGN PATENT DOCUMENTS

JP	2003-109993	4/2003
JP	2004-186378	7/2004
JP	2006-147859	6/2006
JP	2008-251631	10/2008
JP	2009-038073	2/2009
JP	2011146717	7/2011
KR	100555258	3/2006
WO	WO 2009-031419	3/2009

OTHER PUBLICATIONS

Perlov et al., U.S. Appl. No. 10/193,605, titled: "Method and Apparatus for Improved Substrate Handling", filed Jul. 11, 2002.  
 International Search Report and Written Opinion of International Application No. PCT/US2014/057242 dated Jan. 19, 2015.  
 Restriction Requirement of U.S. Appl. No. 14/036,754 dated Feb. 11, 2016.  
 Apr. 7, 2016 Reply to Feb. 11, 2016 Restriction Requirement of U.S. Appl. No. 14/036,754.  
 International Preliminary Report on Patentability of International Application No. PCT/US2014/057242 dated Apr. 7, 2016.  
 Notice of Allowance of U.S. Appl. No. 14/036,754 dated Jun. 24, 2016.  
 Taiwan Search Report of Taiwan Application No. 103133253 dated Mar. 22, 2018.  
 Chinese Search Report of Chinese Application No. 201480049216.5 dated Apr. 21, 2017.

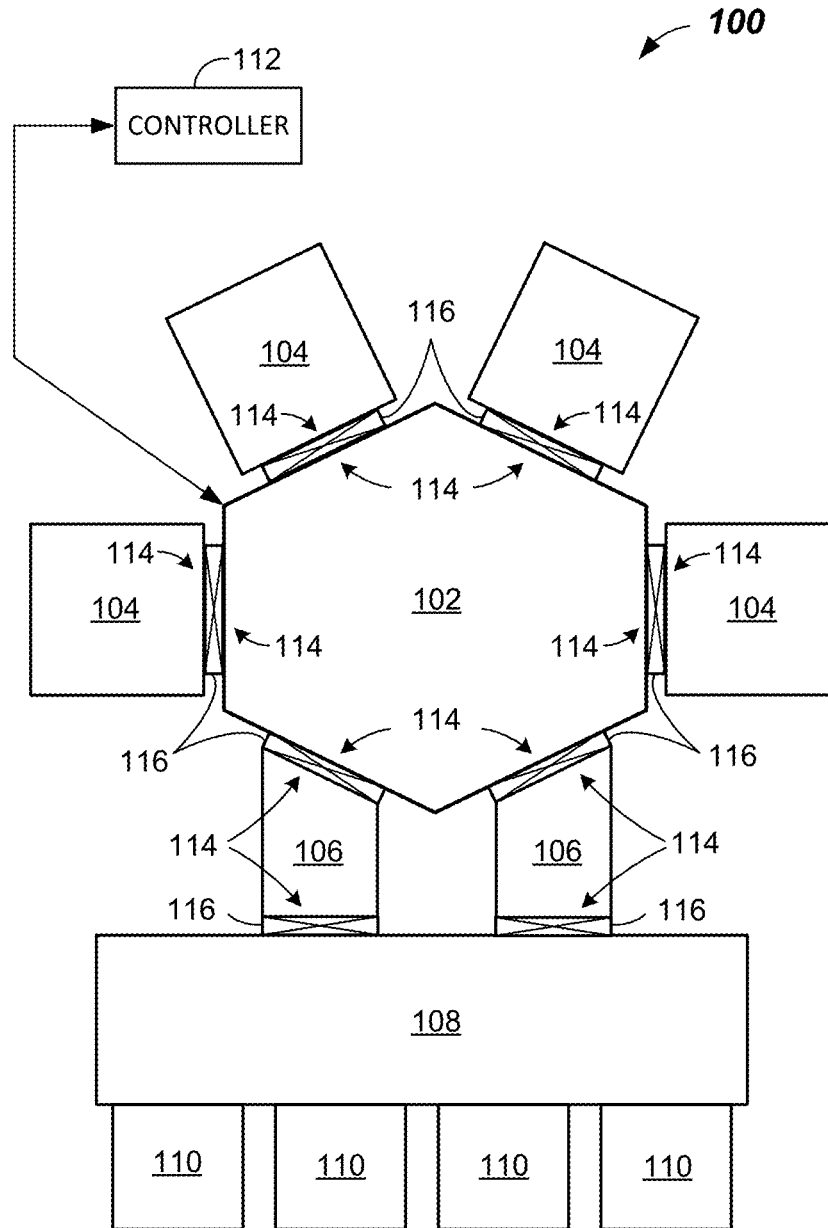
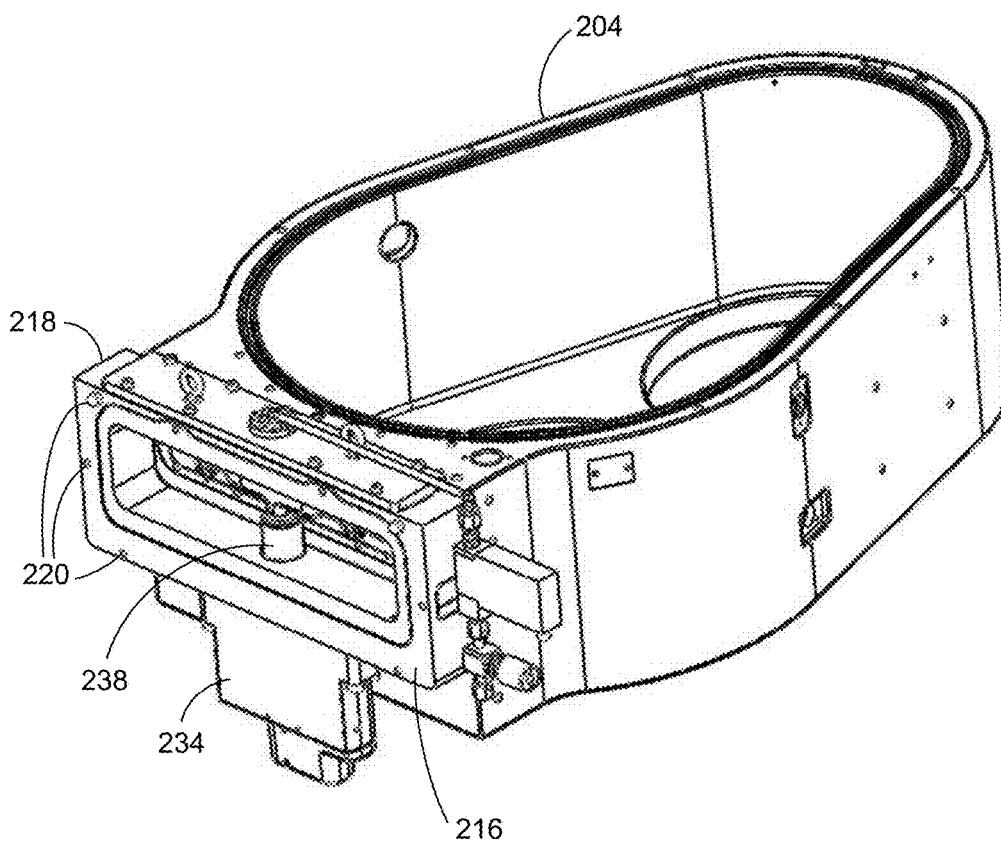


FIG. 1



**FIG. 2**

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.