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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
63/272,282	10/27/2021		300	E000618 PRV		

144034
ENTEGRIS, INC./OC
129 Concord Road, Building 2
Billerica, MA 01821

CONFIRMATION NO. 6106
UPDATED FILING RECEIPT



000000013683644

Date Mailed: 10/27/2022

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt identifying the requested changes, preferably by including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Mark V. Smith, Colorado Springs, CO;
Thomas H. Wilkie, Colorado Springs, CO;
Colton J. Harr, Monument, CO;
Matthew A. Fuller, Colorado Springs, CO;
Shawn D. Eggum, Lonsdale, MN;
Michael C. Zabka, New Prague, MN;

Applicant(s)

ENTEGRIS, INC., Billerica, MA;

Power of Attorney: The patent practitioners associated with Customer Number 144034

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
63/272,282	10/27/2021	Mark V. Smith	E000618 PRV

CONFIRMATION NO. 6106

144034
ENTEGRIS, INC./OC
129 Concord Road, Building 2
Billerica, MA 01821

**37 CFR 1.48(d)
ACKNOWLEDGEMENT LETTER**



Date Mailed: 10/27/2022

NOTICE OF ACCEPTANCE OF REQUEST UNDER 37 CFR 1.48(d)

This is in response to the applicant's request under 37 CFR 1.48(d) submitted on 10/25/2022.

">The request under 37 CFR 1.48(d) to correct the inventorship, to correct or update the name of an inventor, or to correct the order of names of joint inventors is accepted.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ttruong/

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
<input type="text"/>	Mark	V.	Smith	<input type="text"/>		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Colorado Springs	State/Province	CO	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	4110 Bobbie Kay Place					
Address 2						
City	Colorado Springs	State/Province	CO			
Postal Code	80908	Country i	US			
Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
<input type="text"/>	Thomas	H.	Wilkie	<input type="text"/>		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Colorado Springs	State/Province	CO	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	1129 N. Cedar Street					
Address 2						
City	Colorado Springs	State/Province	CO			
Postal Code	80903	Country i	US			
Inventor	3				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
<input type="text"/>	Colton	J.	Harr	<input type="text"/>		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

City	Monument	State/Province	CO	Country of Residence	US
------	----------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	19370 Glen Hollow Circle				
Address 2					
City	Monument	State/Province	CO		
Postal Code	80132	Country i	US		
Inventor	4	Remove			

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Matt <u>Matthew</u>	A <u>A</u>	Fuller <u>Fuller</u>	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Colorado Springs	State/Province	CO	Country of Residence	US
------	------------------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	4910 Sunbird Cliffs Drive				
Address 2					
City	Colorado Springs	State/Province	CO		
Postal Code	80919	Country i	US		
Inventor	5	Remove			

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Shawn	D.	Eggum	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Lonsdale	State/Province	MN	Country of Residence	US
------	----------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	6823 Jackson Avenue				
Address 2					
City	Lonsdale	State/Province	MN		
Postal Code	55046	Country i	US		
Inventor	6	Remove			

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael	C.	Zabka	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	New Prague	State/Province	MN	Country of Residence	US
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CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Mailing Address of Inventor:

Address 1	24496 W. Cedar Lake Drive		
Address 2			
City	New Prague	State/Province	MN
Postal Code	56071	Country	US
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.			

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	144034		
Email Address	ip_prosecution@entegris.com	Add Email	Remove Email

Application Information:

Title of the Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
Attorney Docket Number	E000618 PRV	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	144034		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	<input type="text"/>	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ^j	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)	<input type="button" value="Remove"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Additional Foreign Priority Data may be generated within this form by selecting the Add button.				

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐	<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
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CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	E000618 PRV
	Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	<input type="button" value="Remove"/>
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If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

☐ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor
--------------------------------	--	--------------------------------------

Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest
---	--

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	ENTEGRIS, INC.		
-------------------	----------------	--	--

Mailing Address Information For Applicant:

Address 1	129 Concord Road		
Address 2			
City	Billerica	State/Province	MA
Country	US	Postal Code	01821
Phone Number	978-436-6500	Fax Number	
Email Address	ip_prosecution@entegris.com		

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	E000618 PRV
	Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME	

Assignee	1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
<input type="button" value="Remove"/>				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1	<input type="text"/>			
Address 2	<input type="text"/>			
City	<input type="text"/>	State/Province	<input type="text"/>	
Country ⁱ	<input type="text"/>	Postal Code	<input type="text"/>	
Phone Number	<input type="text"/>	Fax Number	<input type="text"/>	
Email Address	<input type="text"/>			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. <input type="button" value="Add"/>				

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is **not** checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Eric D. Nielson/			Date (YYYY-MM-DD)	2022-10-25
First Name	Eric D.	Last Name	Nielson	Registration Number	72,825
Additional Signature may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

CORRECTED APPLICATION DATA SHEET

PTO/AIA/14 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	<u>63/272,282</u>
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

CORRECTED APPLICATION DATA SHEET

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: R48.REQ

Document Description: Request under Rule 48 correcting inventorship

PTO/AIA/40 (04-18)

Approved for use through 11/30/2020. OMB 0651-0031

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**REQUEST FOR CORRECTION IN A
PATENT APPLICATION RELATING TO
INVENTORSHIP OR AN INVENTOR
NAME, OR ORDER OF NAMES, OTHER
THAN IN A REISSUE APPLICATION (37
CFR 1.48)**

Application Number	63/272,282
Filing Date	2021-10-27
First Named Inventor	Mark V. Smith
Art Unit	
Examiner Name	
Practitioner Docket Number	E000618 PRV

**To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

Applicant hereby requests that the inventorship be corrected or changed, or that the name of the inventor or a joint inventor, or the order of the names of joint inventors, be changed, in the above-identified application. **Note:** 37 CFR 1.48 applies to any request to correct inventorship filed on or after September 16, 2012, regardless of the application filing date. **Do not submit this form after payment of the issue fee or if the application has been patented.** See 37 CFR 1.324 for correction of inventorship in a patent.

Please check the applicable box(es) below.

For a nonprovisional application:

- ☐ 1. This request is to correct or change the inventorship in a **nonprovisional** application (under 37 CFR 1.48(a)) and includes:
- ☐ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (e.g., underlining for insertions, strikethrough for deletions). See the Manual of Patent Examining Procedure (MPEP) section 601.05(a) for information about filing an ADS in an application filed on/after September 16, 2012. For information about filing a Supplemental ADS in an application filed before September 16, 2012, see MPEP 601.05(b).
- ☐ The processing fee set forth in 37 CFR 1.17(i). \$ _____
- ☐ An inventor is being added. An inventor's oath or declaration by any actual inventor who has not yet executed an oath or declaration is required (see 37 CFR 1.48(b)). See MPEP 602.01(a) for information about an inventor's oath or declaration for an application filed on/after September 16, 2012 (e.g., form **PTO/AIA/01**). For information about an inventor's oath or declaration for an application filed before September 16, 2012 (e.g., form **PTO/SB/01**), see MPEP 602.01(b).
- ☐ This request is being filed after the first Office action on the merits has been given or mailed (see 37 CFR 1.48(c) and 1.17(d)). Check one of the following:
- ☐ This request to correct or change the inventorship is due solely to the cancellation of claims in the application.
- OR
- ☐ The fee set forth in 37 CFR 1.17(d) is due (in addition to the fee set forth in 37 CFR 1.17(i)). \$ _____

[Page 1 of 2]

This collection of information is required by 37 CFR 1.48. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

REQUEST FOR CORRECTION IN A PATENT APPLICATION RELATING TO INVENTORSHIP OR AN INVENTOR NAME, OR ORDER OF NAMES, OTHER THAN IN A REISSUE APPLICATION **(37 CFR 1.48)**

- ☐ 2. This request is to correct or update the name of the inventor or a joint inventor, or the order of names of joint inventors, in a **nonprovisional** application (under 37 CFR 1.48(f)) and includes:
- ☐ An application data sheet in accordance with 37 CFR 1.76(c) identifying the complete inventive entity, including the corrected or updated name of the inventor, or the new order of names shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). See the MPEP 601.05(a) for information about filing an ADS in an application filed on/after September 16, 2012. For information about filing a Supplemental ADS in an application filed before September 16, 2012, see MPEP 601.05(b).
- ☐ The processing fee set forth in 37 CFR 1.17(i). \$ _____

For a provisional application:

- ☒ This request is to change or correct the inventorship, or correct or update the name of the inventor or a joint inventor, in a **provisional** application (under 37 CFR 1.48(d)) and includes:
- ☒ **Attached hereto** is a document that is signed by a party set forth in 37 CFR 1.33(b) and identifies each inventor by his or her legal name, in the preferred order. Note: the document may be an application data sheet in accordance with 37 CFR 1.76(c) that identifies the changes with markings (underlining for insertions, strikethrough for deletions).
- ☒ The processing fee set forth in 37 CFR 1.17(q). \$ 50

Fee Payment Information:

- ☐ Applicant asserts small entity status. See 37 CFR 1.27.
- ☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously
- ☐ A check in the amount of the fee is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 501908.
- ☒ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

- ☐ Applicant* ☒ attorney or agent of record ☐ attorney or agent acting under 37 CFR 1.34
- Registration number 72,825 Registration number _____

Signature /Eric D. Nielson/Typed or printed name Eric D. NielsonDate Oct. 25, 2022

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below**.

- ☐ ** Total of _____ forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:		63272282		
Filing Date:		27-Oct-2021		
Title of Invention:		PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
First Named Inventor/Applicant Name:		Mark V. Smith		
Filer:		Brian Edward Szymanski/Christy Coats		
Attorney Docket Number:		E000618 PRV		
Filed as Large Entity				
Filing Fees for Provisional				
Description		Fee Code	Quantity	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
PROCESSING FEE FOR PROVIS. APPLICATIONS	1807	1	50	50
Total in USD (\$)				50

Electronic Acknowledgement Receipt	
EFS ID:	46889545
Application Number:	63272282
International Application Number:	
Confirmation Number:	6106
Title of Invention:	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME
First Named Inventor/Applicant Name:	Mark V. Smith
Customer Number:	144034
Filer:	Brian Edward Szymanski/Jamie Ebach
Filer Authorized By:	Brian Edward Szymanski
Attorney Docket Number:	E000618 PRV
Receipt Date:	25-OCT-2022
Filing Date:	27-OCT-2021
Time Stamp:	17:32:11
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$50
RAM confirmation Number	E202200H33154850
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request under Rule 48 correcting inventorship	20221025_E000618PRV_CorrectedADS-SIGNED.pdf	987244	no	10
			9387cc6b1c15afa131373618c599879cd2df3ee6		
Warnings:					
Information:					
2	Request under Rule 48 correcting inventorship	20221025_E000618PRV_Request_for_Correction_to_Inventorship-SIGNED_RP.pdf	172660	no	3
			d253e916fb60bbe0c7b5040788ad34dd8293656d		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37942	no	2
			1704d4ced54228c4ec2223d0aeee491a2954e721		
Warnings:					
Information:					
Total Files Size (in bytes):			1197846		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
63/272,282	10/27/2021		300	E000618 PRV		

144034
ENTEGRIS, INC./OC
129 Concord Road, Building 2
Billerica, MA 01821

CONFIRMATION NO. 6106
FILING RECEIPT



00000000 129369944

Date Mailed: 11/04/2021

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt identifying the requested changes, preferably by including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Mark V. Smith, Colorado Springs, CO;
Thomas H. Wilkie, Colorado Springs, CO;
Colton J. Harr, Monument, CO;
Matt A. Fuller, Colorado Springs, CO;
Shawn D. Eggum, Lonsdale, MN;
Michael C. Zabka, New Prague, MN;

Applicant(s)

ENTEGRIS, INC., Billerica, MA;

Power of Attorney: The patent practitioners associated with Customer Number 144034

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 11/03/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 63/272,282**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR
PERFORMING THE SAME

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒

Practitioners associated with Customer Number: 144034

OR

☐

Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒

The address associated with Customer Number: 144034

OR

☐

Firm or individual name

Address

City

State

Zip

Country

Telephone

Email

Assignee name and address:
Entegris, Inc.
129 Concord Road
Billerica, MA 01821

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature

Date

Name Arlene Hornilla

Telephone 978-436-6582

Title VP, Deputy Gen. Counsel, Chief IP Counsel

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 16 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
First Named Inventor/Applicant Name:		Mark V. Smith		
Filer:		Brian Edward Szymanski/Jamie Ebach		
Attorney Docket Number:		E000618 PRV		
Filed as Large Entity				
Filing Fees for Provisional				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
PROVISIONAL APPLICATION FILING	1005	1	300	300
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				300

Electronic Acknowledgement Receipt	
EFS ID:	44134048
Application Number:	63272282
International Application Number:	
Confirmation Number:	6106
Title of Invention:	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME
First Named Inventor/Applicant Name:	Mark V. Smith
Customer Number:	144034
Filer:	Brian Edward Szymanski/Jamie Ebach
Filer Authorized By:	Brian Edward Szymanski
Attorney Docket Number:	E000618 PRV
Receipt Date:	27-OCT-2021
Filing Date:	
Time Stamp:	11:28:49
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 300
RAM confirmation Number	E20210QB29104447
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	20211027_E000618PRV_PRVCoverLetter-signed.pdf	2032445	no	4
			5990fa700f64eec7ed516748b9e8166db1e9e1b5		
Warnings:					
Information:					
2	Application Data Sheet	20211027_E000618PRV_ADS-signed.pdf	1256361	no	10
			c9c31301467a2a2fe62dd6c90f711bf65aa54f19		
Warnings:					
Information:					
3		20211027_E000618PRV_PRVAppAsFiled.pdf	470030	yes	26
			1e539dca89681a3b49898814de9c07ce30030e46		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	21	
	Claims		22	25	
	Abstract		26	26	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	20211027_E000618PRV_PRVFIGsAsFiled.pdf	2229493	no	9
			77fca0d3db543821498d815b7c093e767ac83413		
Warnings:					
Information:					
5	Power of Attorney	20180604_POA_144034.pdf	108236	no	1
			4c9e17fd53fa7fc00e6ff698dbb59b3f6fddb792		

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	37881	no	2
			62ead48c8f0e77e5fe06d28306f00ab8dd1683a3		
Warnings:					
Information:					
Total Files Size (in bytes):				6134446	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

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Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Mark	V.	Smith	Colorado Spring	CO	US

Inventor 2

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Thomas	H.	Wilkie	Colorado Spring	CO	US

Inventor 3

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Colton	J.	Harr	Monument	CO	US

Inventor 4

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Matt	A.	Fuller	Colorado Spring	CO	US

Inventor 5

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Shawn	D.	Eggum	Lonsdale	MN	US

Inventor 6

[Remove](#)

Given Name	Middle Name	Family Name	City	State	Country i
Michael	C.	Zabka	New Prague	MN	US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

[Add](#)

Title of Invention

PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME

Attorney Docket Number (if applicable)

E000618 PRV

Correspondence Address

Doc Code: **TR.PROV**

Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (02-18)

Approved for use through 11/30/2020. OMB 0651-0032

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Direct all correspondence to (select one):	
☒ The address corresponding to Customer Number	☐ Firm or Individual Name
Customer Number	144034

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.	
☐ No.	
Yes, the invention was made by an agency of the United States Government. The U.S. Government agency name is:	
Yes, the invention was under a contract with an agency of the United States Government. The name of the U.S. Government agency and Government contract number are:	

Entity Status**Applicant asserts small entity status under 37 CFR 1.27 or applicant certifies micro entity status under 37 CFR 1.29**

- ☐ Applicant asserts small entity status under 37 CFR 1.27
- ☐ Applicant certifies micro entity status under 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
- ☒ No

Warning

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Brian E. Szymanski/		Date (YYYY-MM-DD)	2021-10-27
First Name	Brian E.	Last Name	Szymanski	Registration Number (If appropriate)
				39523

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that : (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Mark	V.	Smith			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Colorado Springs	State/Province	CO	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	4110 Bobbie Kay Place					
Address 2						
City	Colorado Springs	State/Province	CO			
Postal Code	80908	Country i	US			
Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Thomas	H.	Wilkie			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Colorado Springs	State/Province	CO	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	1129 N. Cedar Street					
Address 2						
City	Colorado Springs	State/Province	CO			
Postal Code	80903	Country i	US			
Inventor	3				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Colton	J.	Harr			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		E000618 PRV	
		Application Number			
Title of Invention		PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME			

City	Monument	State/Province	CO	Country of Residence	US
------	----------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	19370 Glen Hollow Circle				
Address 2					
City	Monument	State/Province	CO		
Postal Code	80132	Country i	US		
Inventor	4				Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Matt	A.	Fuller	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Colorado Springs	State/Province	CO	Country of Residence	US
------	------------------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	4910 Sunbird Cliffs Drive				
Address 2					
City	Colorado Springs	State/Province	CO		
Postal Code	80919	Country i	US		
Inventor	5				Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Shawn	D.	Eggum	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Lonsdale	State/Province	MN	Country of Residence	US
------	----------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	6823 Jackson Avenue				
Address 2					
City	Lonsdale	State/Province	MN		
Postal Code	55046	Country i	US		
Inventor	6				Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael	C.	Zabka	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	New Prague	State/Province	MN	Country of Residence	US
------	------------	----------------	----	----------------------	----

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		E000618 PRV	
		Application Number			
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME				
Mailing Address of Inventor:					
Address 1	24496 W. Cedar Lake Drive				
Address 2					
City	New Prague	State/Province	MN		
Postal Code	56071	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					<input type="button" value="Add"/>

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	144034		
Email Address	ip_prosecution@entegris.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		
Attorney Docket Number	E000618 PRV	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	144034		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	<input type="text"/>	<input type="button" value="Remove"/>
Application Number	Continuity Type	Prior Application Number
<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.		<input type="button" value="Add"/>

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			<input type="button" value="Add"/>

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p>☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee

Legal Representative under 35 U.S.C. 117

Joint Inventor

Person to whom the inventor is obligated to assign.

Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here.



Organization Name

ENTEGRIS, INC.

Mailing Address Information For Applicant:**Address 1**

129 Concord Road

Address 2

City

Billerica

State/Province

MA

Country

US

Postal Code

01821

Phone Number

978-436-6500

Fax Number**Email Address**

ip_prosecution@entegris.com

Additional Applicant Data may be generated within this form by selecting the Add button.

Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
		Application Number	
Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

Assignee 1				
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E000618 PRV
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Title of Invention	PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER AND METHOD FOR PERFORMING THE SAME		

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**PURGE FLOW DISTRIBUTION SYSTEM FOR A SUBSTRATE CONTAINER
AND METHOD FOR PERFORMING THE SAME**

FIELD

[0001] This disclosure generally relates to a substrate container with a front opening for processing semiconductor devices. More specifically, this disclosure relates to a purge gas distribution system for distributing purge gas to the interior of the substrate container and method for performing the same.

BACKGROUND

[0002] Substrates in the form of wafers can be processed to form semiconductor devices. The wafer substrates, or simply substrates, undergo a series of process steps. Exemplary process steps can include, but are not limited to, material layer deposition, doping, etching, or chemically or physically reacting material(s) of the substrate. A substrate container is used to store and transport the in-process wafers between process steps within the fabrication facility. During some process steps, the substrates are processed by processing equipment within a clean environment (e.g., a clean room). During processing, gasses must be introduced and removed from the substrate container such as a front opening unified pods (FOUP), for example during purge processes, thus requiring that the FOUP have one or more locations at which gas may enter or leave the FOUP. Substrates can be transferred from the substrate container to the processing tool through an equipment front end module (EFEM). The EFEM generally includes a load port for receiving the substrate container, a transfer unit, a frame or “mini-environment”, and a fan filter unit used to generate gas flow within the EFEM.

[0003] In use, the substrate container is docked on a load port, and the door of the EFEM is opened. Next, the door is disengaged from the substrate container which permits the transfer unit housed within the EFEM to access the substrates contained within the substrate container for processing. A flow of gas introduced by the fan filter unit flows through the EFEM in a direction from a top of the EFEM to a bottom of the EFEM. When the front opening of the substrate container interfaces with the load port opening of the EFEM some of the gas flowing through the EFEM and across the load port opening may be inadvertently directed into the interior of the container, potentially interfering with the purging capabilities of the substrate container by

temporarily causing an increase in the relative humidity and/or oxygen levels within the microenvironment of substrate container, which can be undesirable.

SUMMARY

[0004] This disclosure is directed to a system for distributing purge gas for wafer or reticle carrying containers such as FOUPs or pods (e.g., reticle pods) that are used, for example, in semiconductor manufacturing. More specifically, this disclosure is directed to a purge flow distribution system within a FOUP or reticle pod for distributing the stream of purge gas into the interior space of the substrate container by dividing the stream of purge gas from a common input port to a plurality of discrete input purge ports for supplying a network of separate gas distributing devices.

[0005] In at least one example embodiment, a substrate container includes a shell defining an interior space, in which the shell includes a front opening, a first side wall, a second side wall, a rear wall, and a bottom wall including a front edge extending between the first side wall and the second side wall along the front opening of the shell. The substrate container also includes a purge flow distribution system configured to receive a stream of purge gas, in which the purge flow distribution system includes an inlet configured to receive the stream of purge gas and a network of separate gas distributing devices configured to distribute the stream of purge gas into the interior space. The purge flow distribution system further includes a supply line connected to the inlet that is configured to divide the stream of purge gas to the network of separate gas distributing devices. In accordance with at least one example embodiment, the supply line includes a first flow path to one of the network of separate gas distributing devices and a second flow path to another of the network of separate gas distributing devices. In an embodiment, one of the network of gas distributing devices is a first gas distributing device provided nearer the rear wall and the another of the network of gas distributing devices is a second gas distributing device, in which the second gas distributing device can be provided nearer the front opening, and wherein the first flow path is configured to supply a portion of the stream of purge gas to the first gas distributing device and the second flow path is configured to supply another portion of the stream of purge gas to the second gas distributing device. It is appreciated that the second gas distributing device can also be provided at other locations within the interior of the substrate container, e.g., provided at the rear or adjacent another gas distributing device, and is not limited

to the above embodiment. In accordance with at least one other example embodiment, the purge flow distribution system further includes a manifold base provided on the bottom wall that receives the stream of purge gas from the inlet to divide the stream of purge gas to the network of gas distributing device, in which the manifold base can be configured to divide the second flow path into at least a left side second flow path and a right side second flow path to supply the portion of the stream of purge gas to the second gas distributing device.

[0006] In at least one example embodiment, a method of purging a substrate container when having a front opening that is open that includes supplying, via an inlet port disposed in a wall of the substrate container, a stream of purge gas to an inlet of a purge flow distribution system disposed at least partly within the substrate container; and dividing, via a supply line of the purge flow distribution system, the purge gas to supply a network of separate gas distributing devices for distributing the stream of purge gas into an interior space of the substrate container, in which the supply line comprises at least a first flow path to one of the network of gas distributing devices and at least a second flow path to another of the network of separate gas distributing devices. In an embodiment, the method further includes setting a first portion of the stream of purge gas to a first gas distributing device via the first flow path and setting a second portion of the stream of purge gas to a second gas distributing device via the second flow path.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Both described and other features, aspects, and advantages of a substrate container and a method of purging a substrate container will be better understood with the following drawings:

[0008] FIG. 1 is a front prospective view of a substrate container, according to at least one example embodiment.

[0009] FIG. 2 is an exploded view of a substrate container, according to at least one example embodiment.

[0010] FIGS. 3A-3C are schematic views of a substrate container having a purge flow distribution system that is configured to divide the supply of purge gas, according to different embodiments.

[0011] FIG. 4A is a rear prospective view of a substrate container having a purge flow distribution system that is configured to divide the supply of purge gas, according to at least one example embodiment.

[0012] FIG. 4B is a top side sectional view of the substrate container of FIG. 4A, according to at least one example embodiment.

[0013] FIG. 5A is a rear prospective view of a substrate container having a purge flow distribution system that is configured to divide the supply of purge gas using a manifold base, according to at least one example embodiment.

[0014] FIG. 5B is a schematic view of the manifold base of FIG. 5A that is configured to divide the supply of purge gas, according to different embodiments

[0015] FIG. 5C is a bottom side view of the substrate container of FIG. 5A, according to at least one example embodiment.

[0016] FIG. 6 is a flow diagram for a method of purging a substrate container that includes dividing the supply of purge gas to a network of separate gas distributing devices, according to at least one example embodiment.

[0017] While the disclosure is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit aspects of the disclosure to the particular illustrative embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure.

DETAILED DESCRIPTION

[0018] When used herein the term “network of gas distributing devices” means a network that includes a plurality of separate and distinct gas distributing devices that are connected together by at least one supply line. The term “gas distributing device” means a device that includes at least one gas distributing surface, and is the combination of any plurality of the gas distributing surface(s) that are provided at certain specific locations in the substrate container, e.g., a front gas distributing device includes all of the gas distributing surfaces provided at the front of the substrate container. The term “gas distributing surface” means the structural part of the gas distributing device that distributes a portion of the purge gas from the gas distributing device into the interior space, in which the gas distributing device can include multiple gas distributing surfaces. The term “supply line” means the piping, tubing, plumbing that is connected to the inlet port that receives the purge gas and is used to divide and supply the purge gas to the input purge

port(s) for the gas distributing device(s) and/or gas distributing surface(s). That is, the supply line can be used to supply purge gas to a single input purge port for the gas distributing device/gas distributing surface or used to supply purge gas along multiple input purge ports for the gas distributing device/gas distributing surface. The term “pipe” or “piping” means structures that are used for distributing the flow of purge gas through the network of gas distributing devices and includes pipes, piping, tubing, pathways, connectors, valves, controllers, and similar structures that can be used for setting/adjusting the flow of gas through the network of gas distributing devices.

[0019] Also when used herein, while the terms “front” and “rear” and “right” and “left” are used for describe various elements, the elements are not limited by these terms. Rather, the terms are only used to distinguish one element from another. Instead, the terms are interpreted broadly to include any positional relationship between the elements including, the front, the back, the sides, the top, the bottom, or any combination thereof without departing from the scope of the present disclosure.

[0020] As used in this specification and the appended claims, the singular forms “a”, “an”, and “the” include plural referents unless the content clearly dictates otherwise. As used in this specification and the appended claims, the term “or” is generally employed in its sense including “and/or” unless the content clearly dictates otherwise.

[0021] The following detailed description should be read with reference to the drawings in which similar elements in different drawings are numbered the same. The detailed description and the drawings, which are not necessarily to scale, depict illustrative embodiments and are not intended to limit the scope of the invention. The illustrative embodiments depicted are intended only as exemplary. Selected features of any illustrative embodiment may be incorporated into an additional embodiment unless clearly stated to the contrary.

[0022] This disclosure generally relates to a purge flow distribution system for a substrate container having a front opening for accessing an interior space of the substrate container. More specifically, this disclosure relates to a purge flow distribution system configured to distribute a stream of purge gas into an interior space of the substrate container by dividing the stream of purge gas from a common source to a plurality of discrete input purge ports for supplying a network of separate gas distributing devices. In some embodiments, the purge flow distribution system may be configured to prevent ingress of gas into the front opening of the substrate

container while open or as an outlet to facilitate the exhaustion of purge gas from the substrate container when the substrate container is closed.

[0023] Substrates in the form of wafers can be processed to form semiconductor devices. A substrate container is a container for carrying the substrates during processing. The substrates can be stored within a substrate container before and during the different process steps. The substrate container is accessed through a front opening of the substrate container. The substrate container may be, for example, a front opening unified pod (FOUP). In an embodiment, the substrate container can be a container for a reticle, such as a reticle pod. In such an embodiment, the container body can be included as at least part of an outer pod configured to contain an inner pod, with the purge flow distribution system including flow distribution system base being configured to provide the purge gas to an interior space of the outer pod

[0024] FIGS. 1 – 2 show a substrate container 1 according to an embodiment of the disclosure. FIG. 1 is a front perspective view of the substrate container 1, while FIG. 2 illustrates the substrate container with the door removed (e.g., opened). As shown in FIG. 1, the substrate container 1 includes a front door 4 and a shell 6. The front door 4 is received within a front opening 12 of the shell 6, blocking the front opening 12.

[0025] FIG. 2 illustrates the substrate container 1 with the front door 4 removed (e.g., opened). As shown in FIG. 2, the shell 6 defines the interior space 8 of the substrate container, in which substrates are stored in the interior space 8 of the substrate container 1. The substrate container 1 can be accessed by moving (e.g., opening, removing) the door 4. For example, the door 4 in FIG. 1 is received in the shell 6 by inserting the door 4 into the shell 6. In an embodiment, one or more of the door 4 and the shell 6 can include a locking mechanism (not shown) to prevent accidental removal of the door 4.

[0026] As further shown in FIG. 2, the shell 6 includes a first side wall 14, a second side wall 16, a rear wall 18, and a top wall 20, and a bottom wall 22. The first side wall 14 is opposite to the second side wall 16, and the top wall 20 is opposite the bottom wall 22. The first side wall 14 can be referred to as the left side while the second side wall 16 can be referred to as the right side. The top wall 20 and bottom wall 22 each extend between the first side wall 14 and the second side wall 16. The shell 6 includes a front edge extending between opposing walls. The bottom wall 22 includes a front edge 24A that extends along the front opening 12. The front edge 24A also extends between the first side wall 14 and the second side wall 16 of the shell 6. The first

side wall 14 includes a front edge 24B that extends along the front opening 12. The front edge 24B of the first side wall 14 also extends between the top wall 20 and the bottom wall 22 of the shell 6. As shown in FIG. 2, the front edges 24A, 24B in an embodiment are each directly adjacent to the front opening 12.

[0027] The substrate container 1 can include an equipment hookup 26 on the top wall 20 of the shell 6. In an embodiment, the equipment hookup 26 allows a standard automated attachment (not shown) for moving the substrate container 1, such as but not limited to an automated arm, to be connected to the substrate container 1. For example, the automated arm may be used to move the substrate container 1 between different processing equipment. In an embodiment, the substrate container 1 may include one or more handles (not shown) to allow a user (e.g., a technician, etc.) to manually move the substrate container 1.

[0028] The substrate container 1 can include a plurality of shelves 28 for holding substrates (not shown) in the interior space 8. The portions of the shelves 28 on the second side wall 16 are obscured in FIG. 2, which have a similar configuration to the portions on the shelves 28 on the first side wall 14 (e.g., slots in the substrate container). The shelves 28 are sized to each hold a substrate (not shown) within the interior space 8. For example, the shelves 28 in an embodiment are sized to hold a specific size of substrate (e.g., 150 mm wafers, 200 mm wafers, etc.).

[0029] The substrate container 1 can include on the bottom wall 22, a plurality of inlet purge port(s) and/or outlet purge port(s) (e.g., 30A, 30B, 30C, etc. of FIG. 2) corresponding to inlet(s) and/or outlet(s) of the substrate container 1. The plurality of inlet purge port(s) (and outlet purge ports) can be connected to a purge flow distribution system, as further discussed below. The at least one outlet port can be provided for discharging gas in the interior space 8 out of the substrate container 1 and can be disposed in the bottom wall between the inlet and the second side wall. It is appreciated that the inlet purge port(s) and/or outlet purge port(s) can also be provided in different positions along the shell 6, e.g., in the rear wall 18, in which such embodiment, the inlet purge port and/or outlet purge port corresponds to the inlet and outlet of the substrate container.

[0030] The substrate container 1 also includes at least one inlet, e.g., inlet port, for receiving a stream of purge gas from a purge gas supply system. The purge gas supply system delivers purge gas which may generally be an inert gas. The purge gas can include, for example, but is not limited to, one or more of nitrogen, clean dry air (CDA), and extra clean dry air (xCDA).

[0031] In an embodiment, the inlet port is connected to the purge flow distribution system for supplying the purge gas to the inlet purge port(s) to distribute the purge gas into the interior space 8. When the substrate container 1 is open, the purge flow distribution system can be used to distribute the purge gas to the interior space 8 to reduce ingress of the external environment (e.g., gas, particles, humidity, etc.) through the front opening 12 into the substrate container 1. For example, the supplied purge gas is configured to flow out from interior space 8 through the front opening 12, which helps minimize any inward flows into the interior space 8 through the front opening 12.

[0032] Conversely, purge gas can continue to be supplied to the interior space 8 of the substrate container 1 when the door 4 is received within the front opening 12 and the substrate container 1 is closed. The purge gas can also be exhausted to the exterior of the substrate container 1 through the purge flow distribution system, such as described herein according to the various embodiments, which may serve as both an inlet and an outlet or as an outlet only depending on the configuration and desired application. A positive pressure of purge gas within the interior space 8 creates a diffusion gradient facilitating the flow of purge gas from the interior space through the one or more outlets and out of the substrate container.

[0033] FIG. 3A schematically shows an embodiment of the purge flow distribution system 340. The purge flow distribution system 340 is connected to the inlet port 305 to receive the purge gas from the purge supply system. The purge flow distribution system 340 further includes a network of separate gas distributing devices 350 for distributing the stream of purge gas into the interior space 8. A supply line 360 connected to the inlet is used to divide the stream of purge gas to the network of separate gas distributing devices 350. For example, in an embodiment, the supply line includes at least a first flow path 360A that is connected to a first gas distributing device 350A and at least a second flow path 360B that is connected to a second gas distributing device 350B. It is appreciated, however, that the supply line 360 can be separated into any number of different flow paths, as necessary, for the purging operation of the substrate container, e.g., an additional third, fourth, etc. flow path to supply the purge gas to separate and/or the same gas distributing device(s) in the substrate container 1. That is, the supply line 360 is configured to receive the supply of purge gas from a common input port, e.g., a purge gas source, and divide the supply of purge gas to a plurality of discrete input purge ports for supplying a plurality of gas distributing devices 350.

[0034] The network of separate gas distributing devices includes a plurality of separate and distinct gas distributing devices 350 that are connected together by the at least one supply line 360. Thus, the network of separate gas distributing devices includes the separate gas distributing devices 350 and the associated piping that connect(s) the separate distributing devices for the distribution of the purge gas flow to the interior of the substrate container 1.

[0035] The gas distributing devices 350 are devices that are separate and distinct devices from other gas distributing devices of the network, in which each gas distributing device includes at least one gas distributing surface, and is a combination of any of the plurality of gas distributing surface(s) 351A, 351B, 351C that are provided at certain specific locations in the substrate container, e.g., a front gas distributing device includes any and all of the gas distributing surfaces 351A, 351B provided at the front of the substrate container. That is, the gas distributing device(s) is the combination of any or all of a plurality of gas distributing surface(s) provided a specific location of the substrate container, in which the gas distributing surface is the structural part of the gas distributing device that distributes the portion of the purge gas from the gas distributing device into the interior space. It is appreciated that the gas distributing surface 351A, 351B, 351C is connected to at least one input purge port and includes structure(s) for distributing the purge gas into the interior space, for example, diffusers, manifolds, membranes, portions having slits or nozzles or is made of porous material, or similar structures that is able to direct the purge gas into the interior of the substrate container, and combinations of the same.

[0036] For example, in an embodiment, the first gas distributing device 350A is located at the rear section, e.g., nearer the rear wall 18, of the FOUP and can include at least one gas distributing surface(s) 351A, 351B, for example, a first and/or second diffuser, that is connected to at least one input purge port. The second gas distributing device 350B can be located at the front section, e.g., nearer the front opening 12, of the FOUP and can include at least one gas distributing surface(s) 351C that comprises a plurality of openings arranged along a length of the gas distributing surface between the first side wall and the second side wall or that extends vertically along one of a front edge of the first side wall or a front edge of the second side wall, e.g., a top/bottom manifold and/or a right/left manifold, that is connected to at least one other input purge port. The supply line 360 is divided into a first flow path 360A to supply at least a portion of the stream of purge gas to the input purge port for the first gas distributing device 350A and into a second flow path 360B to supply at least another portion of the stream of purge

gas to the input purge port for the second gas distributing device 350B. It is appreciated that the first and second gas distributing devices are not necessarily located at the rear and front sections, but are provided by way of example, and can be provided at varying (or the same) locations in the interior space of the substrate container.

[0037] The amount of the purge gas supplied to the first and second flow paths 360A, 360B to supply the separate gas distributing devices 350A, 350B can be set in a number of ways. For example, in an embodiment, valves can be provided in the supply line and set, e.g., setting the valve to a predetermined opening size, to divide the supply of purge gas to the first and second flow paths 360A, 360B to supply a predetermined amount of purge gas to the separate gas distributing devices 350A, 350B. The valves can include needle valves, ball valves, butterfly valves, non-return valves, or similarly structured valves that are used to set the amount of flow of purge gas to the different and separate gas distributing devices. It is appreciated that the amount of purge gas can also be set using an orifice, spring loaded diverter, or having one of the first or second flow paths have piping/pipes that have smaller or larger cross-sectional areas, as needed, to divide the supply of purge gas to the appropriate/predetermined amount to supply the gas distributing device(s), e.g., the dividing/supplying of the purge gas is based on differential pressure of the network. It is also appreciated that amount of purge gas can be set to each separate gas distributing surface 351A, 351B, 351C. In other words, the supply of purge gas from a single inlet port is divided and set so that the predetermined amount of purge gas is supplied to the plurality of discrete input purge ports for supplying the gas distributing devices and/or gas distributing surfaces, respectively.

[0038] FIG. 3B illustrates another embodiment of the purge flow distribution system 340, in which the inlet includes at least two inlet ports 305A and 305B. In the embodiment of FIG. 3B, the purge flow distribution system 340 is connected to both inlet ports 305A, 305B to receive the purge gas from the purge gas supply system. The purge flow distribution system further includes a network of separate gas distributing devices 350 for distributing the purge gas into the interior of the interior space 8. The supply line 360, however, in this embodiment is connected to both inlet ports 305A and 305B so that the supply of purge gas is combined and then divided into at least a first flow path 360A connected to a first gas distributing device 350A and a second flow path 360B that is connected to a second gas distributing device 350B. It is appreciated that the supply of purge gas can be mixed/combined from the joining of the piping of the supply line

from the inlet ports 305A, 305B, or mixed, e.g., using an in-line mixer, and then divided/separated into the different flow paths 360A, 360B. The first and second gas distributing devices 350A, 350B each include at least one gas distributing surface for distributing the purge gas into the interior of the substrate container, as discussed above.

[0039] The amount of the purge gas supplied to the first and second flow paths 360A, 360B to supply the separate gas distributing devices 350A, 350B can be set in a number of ways. For example, in an embodiment, valves can be provided upstream and/or downstream of the mixing/combining of the supply of purge gas from the inlet ports 305A, 305B and set to divide the supply of purge gas into the predetermined amount of purge gas for the separate gas distributing devices 350A, 350B and/or the separate gas distributing surfaces 351A, 351B, 351C. In other words, the supply of purge gas from both inlet ports 305A, 305B is divided and set so that the predetermined amount of purge gas is supplied to the plurality of discrete input purge ports for supplying the separate gas distributing devices and/or separate gas distributing surfaces, respectively.

[0040] FIG. 3C illustrates yet another embodiment of the purge flow distribution system 340, in which the inlet includes at least two inlet ports 305A and 305B, where the inlet ports are separately used to supply different networks of separate gas distributing devices. That is, the purge flow distribution system 340 includes at least two networks of separate gas distributing devices 350 for distributing the stream of purge gas into the interior space 8. In this embodiment, the purge flow distribution system 340 includes at least two separate supply lines 360, 370 that are each connected separately to the inlet ports 305A and 305B. The first supply line 360 connected to inlet port 305A is used to divide the supply of purge gas from inlet port 305A into at least a first flow path 360A connected to a first gas distributing device 350A having gas distributing surfaces 351A, 351B and a second flow path 360B that is connected to a second gas distributing device 350B having at least one gas distributing surface 351C. The second supply line 370 connected to inlet port 305B is used to divide the supply of purge gas from the inlet port 305B into at least a first flow path 370A connected to a third gas distributing device 350C having at least two gas distributing surfaces 351D, 351E and a second flow path 370B connected to a fourth gas distributing device 350D having at least one gas distributing surface 351F.

[0041] The amount of the purge gas supplied to the first and second flow paths of the at least two networks of separate gas distributing devices to supply the separate gas distributing devices

350A, 350B, 350C, 350D can be set in a number of ways. For example, in an embodiment, valves can be provided in the supply lines 360, 370 and set to divide the supply of purge gas into the predetermined amount of purge gas for the separate gas distributing devices 350A, 350B, 350C, 350D and/or the separate gas distributing surfaces 351A, 351B, 351C, 351D, 351E, 351F. In other words, the supply of purge gas from the inlet ports 305A, 305B are each used separately to supply a respective supply line, where each respective supply line is used to divide and set the predetermined amount of purge gas to be supplied to the plurality of discrete input purge ports for supplying the separate gas distributing devices.

[0042] It is appreciated that while FIGS. 3A-3C show that the supply line 360 (or 370) is divided prior to supplying the separate gas distributing devices, the supply line can be separated to any number of different flow paths that can be used to supply purge gas separately to any of the gas distributing devices and/or the gas distributing surfaces, as long as the predetermined amount of purge gas flow can be set to be divided and/or distributed to the respective gas distributing device, e.g., equal amount of flow of purge gas to all of the gas distributing devices in the network or more flow of purge gas to one of the gas distributing devices, as necessary. It is also appreciated that the inlet ports can be provided at different locations along the substrate container. For example, the bottom wall of the substrate container can include a rear inlet port for introducing the second stream of purge gas, in which the rear inlet port is disposed nearer the rear wall than the front opening or the bottom wall can include a second inlet port for introducing a second stream of purge gas, in which the second inlet port is disposed nearer the front opening than the rear wall, or other location along the substrate container. In other embodiments, the inlet port(s) (and/or outlet port) can be provided on the bottom wall of the substrate container in which if multiple inlet ports are provided, the purge gas can be combined before the purge gas is supplied to the purge flow distribution system.

[0043] While the foregoing has been described with respect to a FOUP, it is appreciated that any of the embodiments discussed herein can also be used to distribute purge gas in an interior space within a reticle pod, for example, within an outer pod of a reticle pod.

[0044] For example, FIGS. 4A and 4B illustrate another embodiment in which the supply line can be provided for dividing the supply of purge gas to the separate gas distributing device(s) and/or separate gas distributing surface(s). In the embodiment, the second flow path of the supply line is provided after the first flow path.

[0045] FIG. 4A shows the rear side of substrate container 400. The shell 406 defines the interior space 408 of the substrate container, in which substrates (not shown) are stored in the interior space 408 of the substrate container 400. The shell 406 includes a first side wall 414, a second side wall 416, a rear wall 418, and a top wall 420, and a bottom wall 422. The first side wall 414 is opposite to the second side wall 416, and the top wall 420 is opposite the bottom wall 422. The first side wall 414 can be referred to as the left side while the second side wall 416 can be referred to as the right side. The top wall 420 and bottom wall 422 each extend between the first side wall 414 and the second side wall 416. The substrate container 400 can also include a carrier plate 423 which can provide a base that the shell 406 can be attached to.

[0046] The purge flow distribution system can be included in the shell 406 of the substrate container 400 or connected thereto, for example, between or at least partially disposed between the shell 406 and carrier plate 423. The purge flow distribution system is connected to at least one inlet port that is connected to a purge gas supply system for supplying the purge gas to the network of separate gas distributing devices. The purge flow distribution system includes at least one supply line that is connected to at least one inlet purge port 430A, 430B on the bottom wall 422. The supply line includes a first flow path 460A connected to the inlet purge ports 430A, 430B for supplying purge gas to the rear gas distributing devices 450A, 450B, in which the rear gas distributing devices can include at least two diffusers. The at least two diffusers 450A, 450B include a plurality of openings for distributing the purge gas at the rear of the substrate container 400. At least one of the at least two diffusers 450A, 450B of the rear gas distributing device also includes an opening at a top end thereof that is nearer the top wall 420 of the substrate container 400 forming an input purge port that is connected to a second flow path 460B for supplying the purge gas to another gas distributing device, e.g., a second gas distributing device. In this embodiment, the second flow path 460B is connected to a front gas distributing device that includes at least one gas distributing surface, for example, a top manifold 450C provided near the top wall 420 of the substrate container 400.

[0047] As seen in FIG. 4B, the second flow path 460B includes a tubing, channel, or path provided along a top portion nearer the top wall 420 of the substrate container 400 for supplying at least a portion of the purge gas supplied to the first flow path 460A to be distributed to the front gas distributing device. For example, the amount of purge gas to the front gas distributing device can be set by sizing the cross-sectional area of the second flow path 460B to have a

predetermined amount of purge gas flow, e.g., in which flow is proportional to the cross-sectional area, and/or by setting the size, e.g., diameter, of the plurality of openings of the at least two diffusers 450A, 450B so that a predetermined amount of purge gas is supplied through the second flow path 460B dependent on the supply pressure, e.g., pressure differential. That is, the first gas distributing device is supplied with the purge gas to distribute a predetermined amount of purge gas through the openings of the diffusers 450A, 450B, while the remaining amount of purge gas is supplied to the second gas distributing device via the second flow path 460B for distributing the purge gas through the gas distributing surface(s) of the second (front) gas distributing device. It is appreciated that any of the gas distributing surfaces, while described herein relate to a top manifold and diffusers, can be any of the structures for distributing the purge gas into the interior of the substrate container 400, including, but not limited to, top/bottom/side manifold(s), top/bottom/side diffusers, top/bottom/side membranes, top/bottom/side portions having slits or nozzles or made of porous material. It is also appreciated that the supply line can also include valves or other structures for setting the amount of purge gas supplied to the first gas distributing device and/or the second gas distributing device.

[0048] FIG. 5A illustrates another embodiment and shows the rear side of substrate container 500. The shell 506 defines the interior space of the substrate container, in which substrates (not shown) are stored in the interior space of the substrate container 500. The shell 506 includes a first side wall 514, a second side wall 516, a rear wall 518, and a top wall 520, and a bottom wall 522. The first side wall 514 is opposite to the second side wall 516, and the top wall 520 is opposite the bottom wall 522. The first side wall 514 can be referred to as the left side while the second side wall 516 can be referred to as the right side. The top wall 520 and bottom wall 522 each extend between the first side wall 514 and the second side wall 516. The substrate container 500 can also include a carrier plate 523 which can provide a base that the shell 506 can be attached to.

[0049] The purge flow distribution system can be included in the shell 506 of the substrate container 500 or connected thereto, for example, between or at least partially disposed between the shell 506 and carrier plate 523. The purge flow distribution system 540 is connected to at least one inlet port 505 that is connected to a purge gas supply system for supplying the purge gas to the network of separate gas distributing devices. The purge flow distribution system 540 includes at least one supply line that is connected to at least one purge port on the bottom wall

522. In this embodiment, the purge flow distribution system 540 includes a manifold base 560 provided on the bottom wall 522 that is configured to divide the stream of purge gas to the network of gas distributing devices.

[0050] As seen in FIG. 5B, the manifold base 560 is connected to the network of separate gas distributing devices 550. The manifold base 560 includes a first flow path 560A connected to inlet purge port(s) for supplying purge gas to a first gas distributing device and a second flow path 560B connected to inlet purge port(s) for supplying purge gas to a second gas distributing device. The first gas distributing device can be a rear gas distributing device 550A that can include rear left and right diffusers 550A and 550B and the second gas distributing device can be a front gas distributing device that can include a front manifold 550C and left and right manifolds 550D and 550E for distributing the purge gas to the interior of the substrate container at a front side of the substrate container. The purge flow distribution system 540 is configured in a way such that the supply line can be adjusted to set the amount of purge gas that flows to at least one of the front gas distributing device and the rear gas distributing device, and/or can also be set to adjust the amount of purge gas to the separate gas distributing surfaces of the front gas distributing device and/or the rear gas distributing device. It is appreciated that the first and second gas distributing devices are not necessarily located at the rear and front sections, but are provided by way of example, and can be provided at varying (or the same) locations in the interior space of the substrate container.

[0051] For example, in this embodiment, an inlet supply line valve 580 can be adjusted to set the amount of purge gas supplied to the front gas distributing device and the rear gas distributing device. That is, by adjusting the supply line valve 580 a pressure differential can be created to divide the supply of purge gas to the first flow path 560A and the second flow path 560B to set the amount of purge gas supplied to the front gas distributing device and the rear gas distributing device that is necessary for the purging of the substrate container.

[0052] In addition to controlling the amount of purge gas to the front gas distributing device by setting the supply line valve 580, the amount of purge gas to the separate gas distributing surfaces 550C, 550D, 550E of the front gas distributing device can be adjusted using a plurality of adjustable valves 585A, 585B, 585C, 585D. For example, adjustable valve 585A can be set to control an amount of purge gas to the front right, e.g., right side, manifold 550E, adjustable valves 585B and 585C can be set to control an amount of purge gas to the front manifold 550C,

and adjustable valve 585D can be set to control an amount of purge gas to the front left, e.g., left side, manifold 550D. Thus, the manifold base 560 can be used to divide the purge gas from the supply line to the network of separate gas distributing devices and/or the separate gas distributing surfaces by setting the adjustable valves 580, 585A, 585B, 585C, 585D. In other words, the supply of purge gas from a single inlet port is divided and set so that the predetermined amount of purge gas is supplied to the plurality of discrete input purge ports for supplying the separate gas distributing devices 550, respectively.

[0053] As seen in FIG. 5C, the inlet port(s) connected to the purge flow distribution system 540 can be provided in a variety of locations. For example, while FIG. 5A generally shows that the inlet port 505 is provided below the manifold base 560 for supplying the purge gas from the purge gas distribution system, it is appreciated that the purge gas can be supplied to a number of inlet port(s) (or outlet port(s)) 505A, 505B, 505C, 505D provided through the carrier plate 523 depending on the nature of the application/docking arrangement for the substrate container. It is appreciated that the purge gas from the inlet ports 505A, 505B, 505C, 505D can be combined before being supplied to manifold base 560 or provided/combined as necessary to supply different purge flow distribution systems in the substrate container.

[0054] It is appreciated that the amount of purge gas can also be controlled or set using any combination of different structures that allow setting the pressure drop or flow rate based on the conservation of energy. For example, an orifice can be placed in either the first flow path and/or the second flow path to create a pressure differential to set the amount of purge gas supplied to the front gas distributing device and/or the rear gas distributing device and/or any of the separate gas distributing surfaces. Alternatively, or in addition to such structure, the cross-sectional area of the various piping(s) of the first flow path and/or the second flow path can be sized to set the amount of purge gas divided between the front gas distributing device and the rear gas distributing device and/or the gas distributing surfaces of the front and rear gas distributing devices. Thus, the purge flow distribution system 540 is configured so that the purge gas can be divided and supplied to the different gas distributing devices and/or gas distributing surfaces by adjusting and/or setting the different components of the purge flow distribution system 540 in the appropriate manner.

[0055] FIG. 6 shows an operational flow 600 for supplying purge flow to a substrate container, according to at least one example embodiment.

[0056] The operational flow 600 may include one or more operations, actions, or functions depicted by one or more blocks 610, 620, 630, and 640. Although illustrated as discrete blocks, various blocks may be divided into additional blocks, combined into fewer blocks, or eliminated, depending on the desired implementation. As a non-limiting example, the description of the method 600, corresponding to the depiction thereof in FIG. 6 and performed by one or more of the apparatuses or components described in the above embodiments, according to one or more example embodiments described herein, pertains to supplying purge flow in a substrate container. The processing flow 600 can begin at block 610.

[0057] Block 610 may refer to supplying a stream of purge gas into an interior of a container via inlet purge port(s) connected to a purge flow distribution system disposed at least partly in the substrate container, which may be a wafer or reticle container (*e.g.*, a FOUP or reticle pod). The stream of purge gas can include one or more of nitrogen, clean dry air (CDA), extra clean dry air (xCDA), gas for conditioning a container environment, or any other suitable fluid. Block 610 may be followed by block 620.

[0058] Block 620 may refer to dividing the purge gas to supply a network of separate gas distributing devices to distribute the stream of purge gas into the interior space of the substrate container via a supply line of the purge flow distribution system. In an embodiment in block 630, the dividing of the purge gas includes splitting the supply line into a first flow path to supply purge gas to at least one of the network of gas distributing devices and a second flow path to supply purge gas to another of the network of gas distributing devices. The amount of purge gas supplied to the first flow path and to the second flow path can be based on a number of predetermined operating conditions. For example, in one embodiment, one or more sensors can be used to detect at least one environmental condition in the interior of the substrate container during a predetermined period of time. The at least one environmental condition may include one or more of relative humidity (%RH), pressure (*e.g.*, absolute pressure), oxygen levels, temperature, a measured presence of airborne molecular contaminant, a measured presence of one or more volatile organic compounds, etc. Block 620/630 may be followed by block 640.

[0059] Block 640 may refer to setting a first portion or amount of the stream of purge gas to a first distributing device via the first flow path and setting a second portion or amount of the purge gas to a second gas distributing device via the second flow path based on the at least one detected environmental condition during a predetermined period of time.

[0060] In at least one example embodiment, the amount of purge gas to the front gas distributing device and/or the rear gas distributing device may be obtained or determined by, *e.g.*, achieving a desired (predetermined, or optimal) environmental response (*e.g.*, inside the container). The desired environmental response may include adjusting one or more of relative humidity (%RH), oxygen levels, temperature, a measured presence of airborne molecular contaminant, and/or a measured presence of one or more volatile organic compounds in the interior of the container to a respective predetermined threshold level. The desired environmental response may also include producing a desired pressure (*e.g.*, absolute pressure) in the interior of the container. The environmental response may be detected or measured by sensor(s) inside the container and the detected data may be communicated to outside of the container, *e.g.*, a controller.

[0061] The controller analyzes the environmental response(s) and determines the amount of purge gas to be supplied to the front gas distributing device (and/or the front gas distributing surfaces) and the rear gas distributing device necessary to reach applicable operational scenarios. In an embodiment, the controller analyzing the environmental response(s) and determining the amount of purge gas to reach applicable operational scenarios may be achieved via design of experiments (DOEs), a trained neural network, modeling, etc.

[0062] The amount of purge gas supplied to the at least one front distributing device and/or the rear distributing device can be set by setting valve(s) provided in the supply line of the purge flow distribution system. The valves can include needle valves, ball valves, butterfly valves, non-return valves, or similarly structured valves that can be used to control the flow of gas to the different and separate gas distributing devices. It is appreciated that the flow of purge gas can also be set using an orifice, spring loaded diverter, or by sizing the piping/pipes of one of the first or second flow paths to have cross-sectional areas to supply a predetermined amount of purge gas given the supply pressure for the division of the supply of purge gas, as necessary. In an embodiment, once the amount of purge gas supplied to the network of gas distributing devices is set, the amount, *e.g.*, valves, of purge gas supplied is not further adjusted until necessary, *e.g.*, passive control.

ASPECTS

[0063] Any of aspects 1 – 17 can be combined with any of aspects 18 and 19.

[0064] Aspect 1. A substrate container, comprising: a shell defining an interior space, the shell including a front opening, a first side wall, a second side wall, a rear wall, and a bottom wall including a front edge extending between the first side wall and the second side wall along the front opening of the shell; and a purge flow distribution system configured to receive a stream of purge gas, the purge flow distribution system comprising: an inlet configured to receive the stream of purge gas; and a network of separate gas distributing devices for distributing the stream of purge gas into the interior space, wherein the purge flow distribution system further comprises a supply line connected to the inlet that is configured to divide the stream of purge gas to the network of separate gas distributing devices.

[0065] Aspect 2. The substrate container of aspect 1, wherein the supply line comprises a first flow path to one of the network of separate gas distributing devices and a second flow path to another of the network of separate gas distributing devices.

[0066] Aspect 3. The substrate container of aspect 2, wherein the one of the network of gas distributing devices is a first gas distributing device provided nearer the rear wall and the another of the network of gas distributing devices is a second gas distributing device provided in the interior space of the substrate container, and wherein the first flow path is configured to supply a portion of the stream of purge gas to the first gas distributing device and the second flow path is configured to supply another portion of the stream of purge gas to the second gas distributing device.

[0067] Aspect 4. The substrate container of aspect 3, wherein the first flow path of the supply line to the first gas distributing device has a smaller or larger cross-sectional area than the second flow path of the supply line to the second gas distributing device or comprises an orifice, a spring loaded diverter, or valve to induce flow to the second flow path of the supply line to the second gas distributing device.

[0068] Aspect 5. The substrate container of aspect 3, wherein the second flow path is provided after the first flow path at an end of the first gas distributing device opposite the inlet.

[0069] Aspect 6. The substrate container of aspect 6, wherein the second flow path is provided at a top portion of the substrate container to supply the purge gas to the second gas distributing device.

[0070] Aspect 7. The substrate container of aspect 6, wherein the second gas distributing device comprises a gas distributing surface that comprises a plurality of openings arranged along a

length of the gas distributing surface between the first side wall and the second side wall or wherein the front gas distributing device comprises a gas distributing surface that extends vertically along one of a front edge of the first side wall or a front edge of the second side wall.

[0071] Aspect 8. The substrate container of any of aspects 1-3, wherein the purge flow distribution system further comprises a manifold base provided on the bottom wall that receives the stream of purge gas from the inlet to divide the stream of purge gas to the network of gas distributing device.

[0072] Aspect 9. The substrate container of aspect 8, wherein the manifold base is configured to divide the second flow path into at least a left side second flow path and a right side second flow path to supply the portion of the stream of purge gas to the second gas distributing device.

[0073] Aspect 10. The substrate container of aspect 9, wherein the manifold base comprises a plurality of adjustable valves to set at least one of the portion of the stream of purge gas to the first flow path to the first gas distributing device and the portion of stream of purge gas to the second flow path to the second gas distributing device.

[0074] Aspect 11. The substrate container of any of aspects 1-9, wherein one of the network of gas distributing devices comprises a gas distributing surface comprising porous material.

[0075] Aspect 12. The substrate container of any of aspects 1-11, wherein the purge flow distribution system is attached to an inlet purge port in the bottom wall of the shell.

[0076] Aspect 13. The substrate container of any of aspects 1-12, wherein one of the network of gas distributing devices includes a gas distributing surface that comprises a plurality of openings arranged along a length of the gas distributing surface between the first side wall and the second side wall of the shell.

[0077] Aspect 14. The substrate container of any of aspects 1-13, further comprising: an outlet port for discharging gas from the interior space, the outlet port being disposed in the bottom wall between the inlet and the second side wall.

[0078] Aspect 15. The substrate container of any of aspects 1-14, wherein the bottom wall includes a rear inlet port for introducing a second stream of purge gas into the interior space through the purge flow distribution system, the rear inlet port being disposed nearer the rear wall than the front opening.

[0079] Aspect 16. The substrate container of any of aspects 1-14, wherein the bottom wall includes a second inlet port for introducing a second stream of purge gas into the interior space

through the purge flow distribution system, the second inlet port being disposed nearer the front opening than the rear wall.

[0080] Aspect 17. The substrate container of any of aspects 1-16, further comprising: a door configured to be received within the front opening defined by the shell to enclose the interior space.

[0081] Aspect 18. The substrate container of any of aspects 1-17, wherein the inlet of the purge flow distribution system comprises a first inlet and a second inlet, wherein the supply line is configured to combine the stream of purge gas from the first inlet and the second inlet and then divide the stream of purge gas to the network of separate gas distributing devices.

[0082] Aspect 19. A method of purging a substrate container that is open, comprising: supplying, via an inlet port disposed in a wall of the substrate container, a stream of purge gas to an inlet of a purge flow distribution system disposed at least partly within the substrate container; dividing, via a supply line of the purge flow distribution system, the purge gas to supply a network of separate gas distributing devices for distributing the stream of purge gas into an interior space of the substrate container, wherein the supply line comprises a first flow path to one of the network of gas distributing devices and a second flow path to another of the network of gas distributing devices.

[0083] Aspect 20. The method of aspect 19, further comprising setting a first portion of the stream of purge gas to a first gas distributing device via the first flow path and setting a second portion of the stream of purge gas to a second gas distributing device via the second flow path

[0084] Having thus described several illustrative embodiments of the present disclosure, those of skill in the art will readily appreciate that yet other embodiments may be made and used within the scope of the claims hereto attached. Numerous advantages of the disclosure covered by this document have been set forth in the foregoing description. It will be understood, however, that this disclosure is, in many respect, only illustrative. Changes may be made in the details, particularly in matters of shape, size, and arrangement of parts without exceeding the scope of the disclosure. The disclosure's scope is, of course, defined in the language in which the appended claims are expressed.

CLAIMS

What is claimed is:

1. A substrate container, comprising:

a shell defining an interior space, the shell including a front opening, a first side wall, a second side wall, a rear wall, and a bottom wall including a front edge extending between the first side wall and the second side wall along the front opening of the shell; and

a purge flow distribution system configured to receive a stream of purge gas, the purge flow distribution system comprising:

an inlet configured to receive the stream of purge gas; and

a network of separate gas distributing devices for distributing the stream of purge gas into the interior space,

wherein the purge flow distribution system further comprises a supply line connected to the inlet that is configured to divide the stream of purge gas to the network of separate gas distributing devices.

2. The substrate container according to claim 1, wherein the supply line comprises a first flow path to one of the network of separate gas distributing devices and a second flow path to another of the network of separate gas distributing devices.

3. The substrate container according to claim 2, wherein the one of the network of gas distributing devices is a first gas distributing device provided nearer the rear wall and the another of the network of gas distributing devices is a second gas distributing device provided in the interior space of the substrate container, and wherein the first flow path is configured to supply a portion of the stream of purge gas to the first gas distributing device and the second flow path is configured to supply another portion of the stream of purge gas to the second gas distributing device.

4. The substrate container according to claim 3, wherein the first flow path of the supply line to the first gas distributing device has a smaller or larger cross-sectional area than the second flow path of the supply line to the second gas distributing device or comprises an orifice, a spring

loaded diverter, or valve to induce flow to the second flow path of the supply line to the front gas distributing device.

5. The substrate container according to claim 3, wherein the second flow path is provided after the first flow path at an end of the first gas distributing device opposite the inlet.

6. The substrate container according to claim 5, wherein the second flow path is provided at a top portion of the substrate container to supply the purge gas to the second gas distributing device.

7. The substrate container according to claim 6, wherein the second gas distributing device comprises a gas distributing surface that comprises a plurality of openings arranged along a length of the gas distributing surface between the first side wall and the second side wall or wherein the front gas distributing device comprises a gas distributing surface that extends vertically along one of a front edge of the first side wall or a front edge of the second side wall.

8. The substrate container according to claim 3, wherein the purge flow distribution system further comprises a manifold base provided on the bottom wall that receives the stream of purge gas from the inlet to divide the stream of purge gas to the network of gas distributing device.

9. The substrate container according to claim 8, wherein the manifold base is configured to divide the second flow path into at least a left side second flow path and a right side second flow path to supply the portion of the stream of purge gas to the second gas distributing device.

10. The substrate container according to claim 9, wherein the manifold base comprises a plurality of adjustable valves to set at least one of the portion of the stream of purge gas to the first flow path to the first gas distributing device and the portion of stream of purge gas to the second flow path to the second gas distributing device.

11. The substrate container according to claim 1, wherein one of the network of gas distributing devices comprises a gas distributing surface comprising porous material.

12. The substrate container of claim 1, wherein the purge flow distribution system is attached to an inlet purge port in the bottom wall of the shell.

13. The substrate container of claim 1, wherein one of the network of gas distributing devices includes a gas distributing surface that comprises a plurality of openings arranged along a length of the gas distributing surface between the first side wall and the second side wall of the shell.

14. The substrate container of claim 1, further comprising:

an outlet port for discharging gas from the interior space, the outlet port being disposed in the bottom wall between the inlet and the second side wall.

15. The substrate container of claim 1, wherein

the bottom wall includes a rear inlet port for introducing a second stream of purge gas into the interior space through the purge flow distribution system, the rear inlet port being disposed nearer the rear wall than the front opening.

16. The substrate container of claim 1, wherein

the bottom wall includes a second inlet port for introducing a second stream of purge gas into the interior space through the purge flow distribution system, the second inlet port being disposed nearer the front opening than the rear wall.

17. The substrate container of claim 1, further comprising:

a door configured to be received within the front opening defined by the shell to enclose the interior space.

18. The substrate container of claim 1, wherein the inlet of the purge flow distribution system comprises a first inlet and a second inlet, wherein the supply line is configured to combine the stream of purge gas from the first inlet and the second inlet and then divide the stream of purge gas to the network of separate gas distributing devices.

19. A method of purging a substrate container that is open, comprising:

supplying, via an inlet port disposed in a wall of the substrate container, a stream of purge gas to an inlet of a purge flow distribution system disposed at least partly within the substrate container;

dividing, via a supply line of the purge flow distribution system, the purge gas to supply a network of separate gas distributing devices for distributing the stream of purge gas into an interior space of the substrate container,

wherein the supply line comprises a first flow path to one of the network of gas distributing devices and a second flow path to another of the network of separate gas distributing devices.

20. The method of claim 19, further comprising setting a first portion of the stream of purge gas to a first gas distributing device via the first flow path and setting a second portion of the stream of purge gas to a second gas distributing device via the second flow path.

ABSTRACT

A substrate container includes a shell defining an interior space and a purge flow distribution system. The shell includes a front opening, a bottom wall, and a rear wall. The purge flow distribution system receives a stream of purge gas and includes an inlet and a network of separate gas distributing devices configured to distribute the stream of purge gas into the interior space. A supply line is also included that is connected to the inlet and configured to divide the supply of purge gas to the network of separate gas distributing devices. A method of purging an open substrate container includes supplying a stream of purge gas to an inlet of a purge flow distribution system and dividing the purge gas to supply a network of separate gas distributing devices to distribute the stream of purge gas into the interior space.

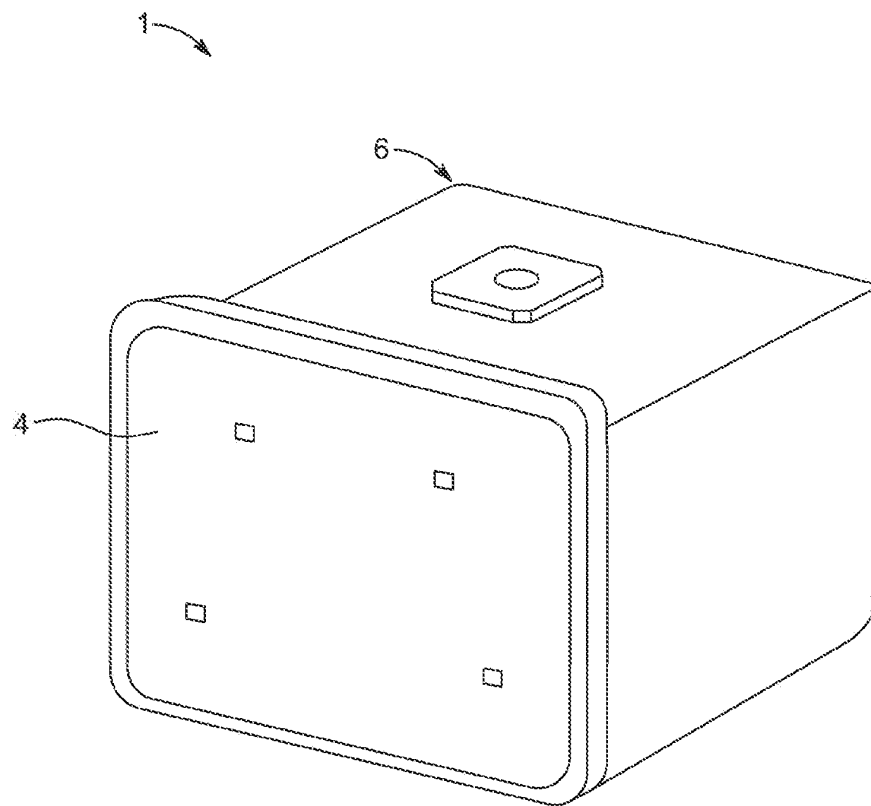


FIG. 1

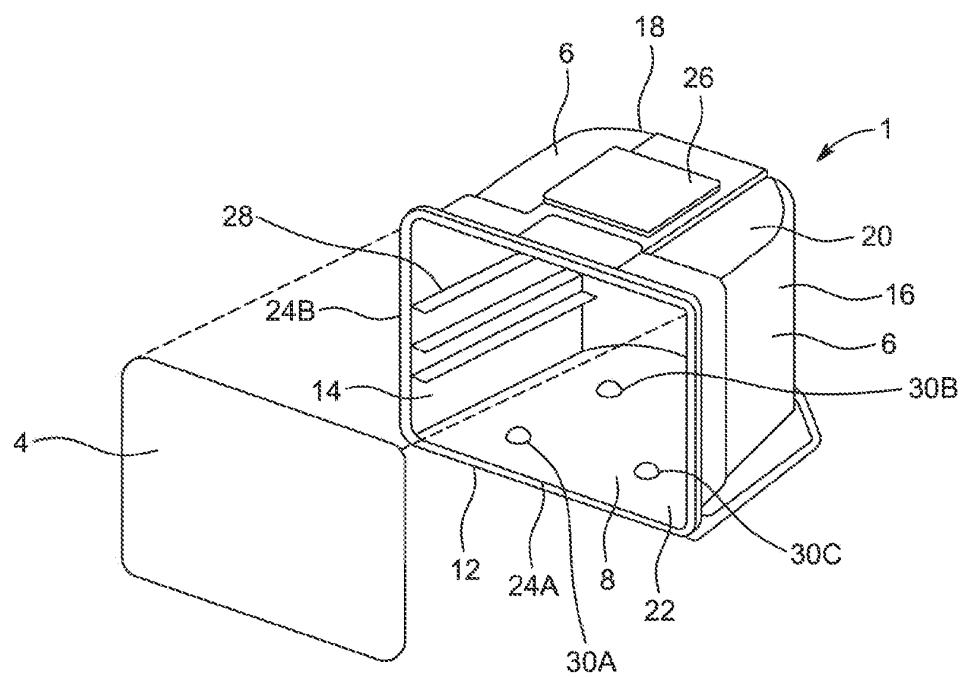


FIG. 2

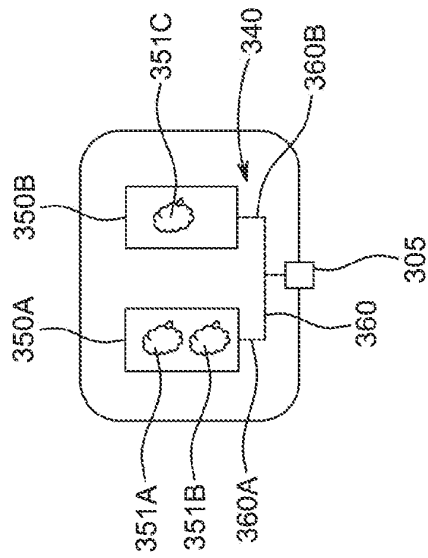


FIG. 3A

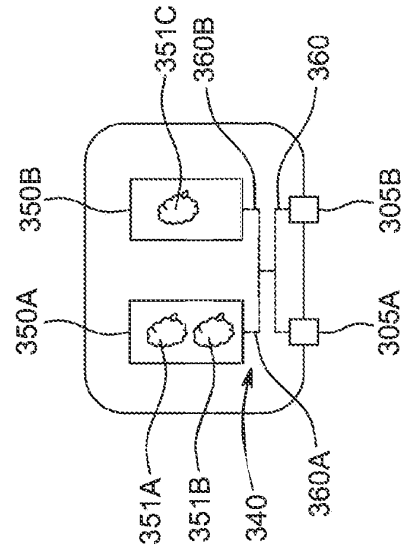


FIG. 3B

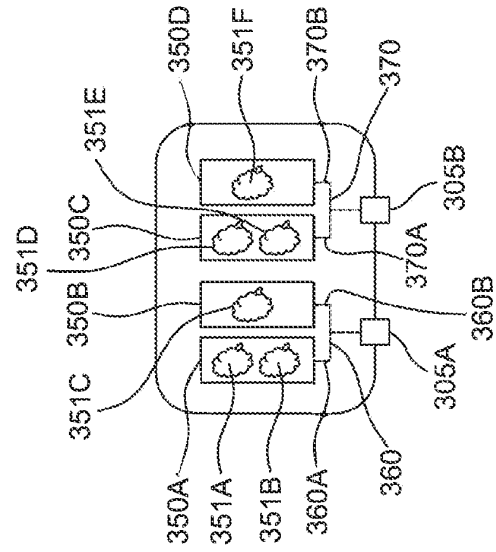


FIG. 3C

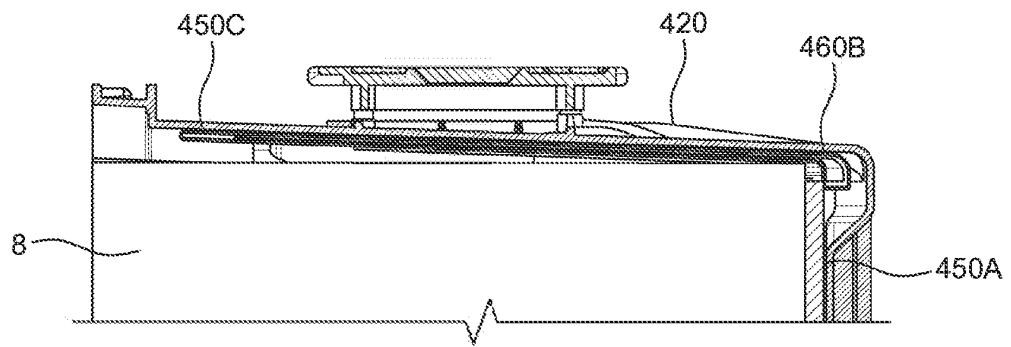


FIG. 4B

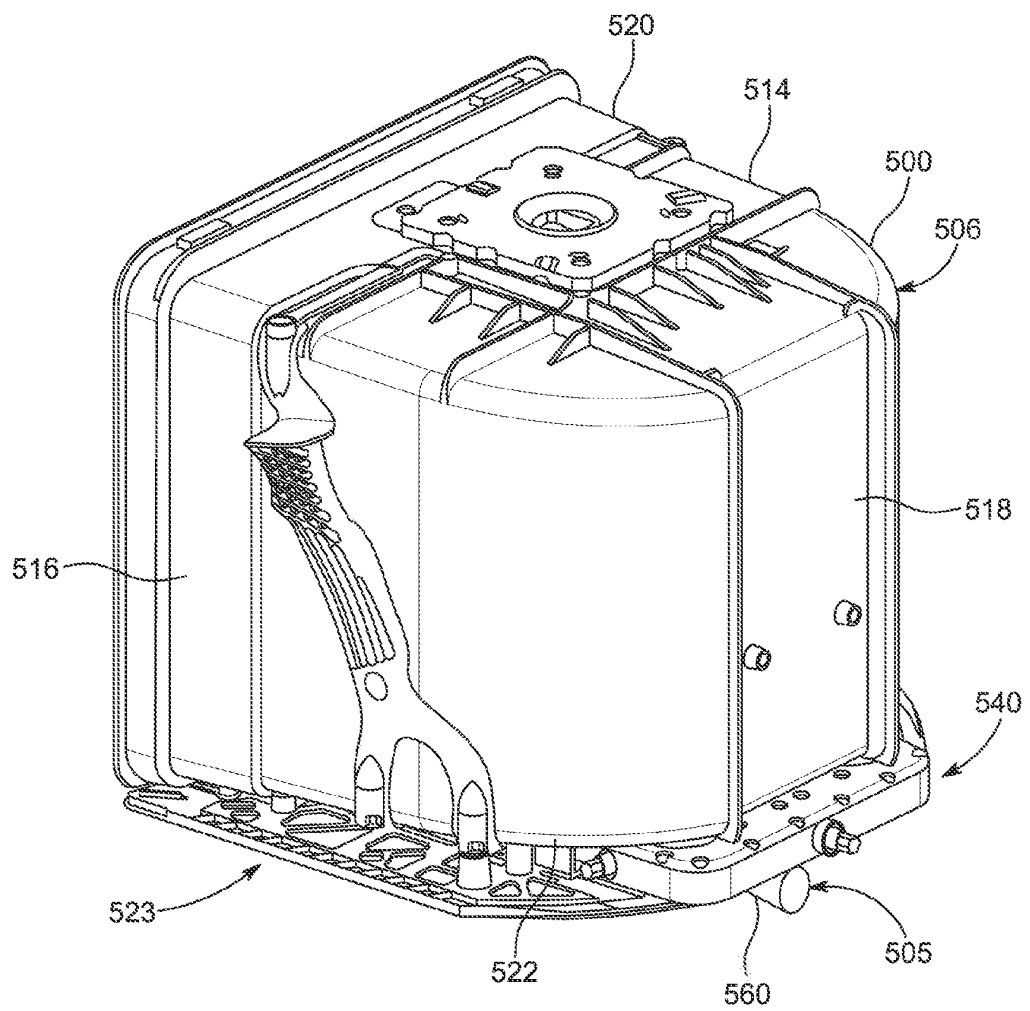


FIG. 5A

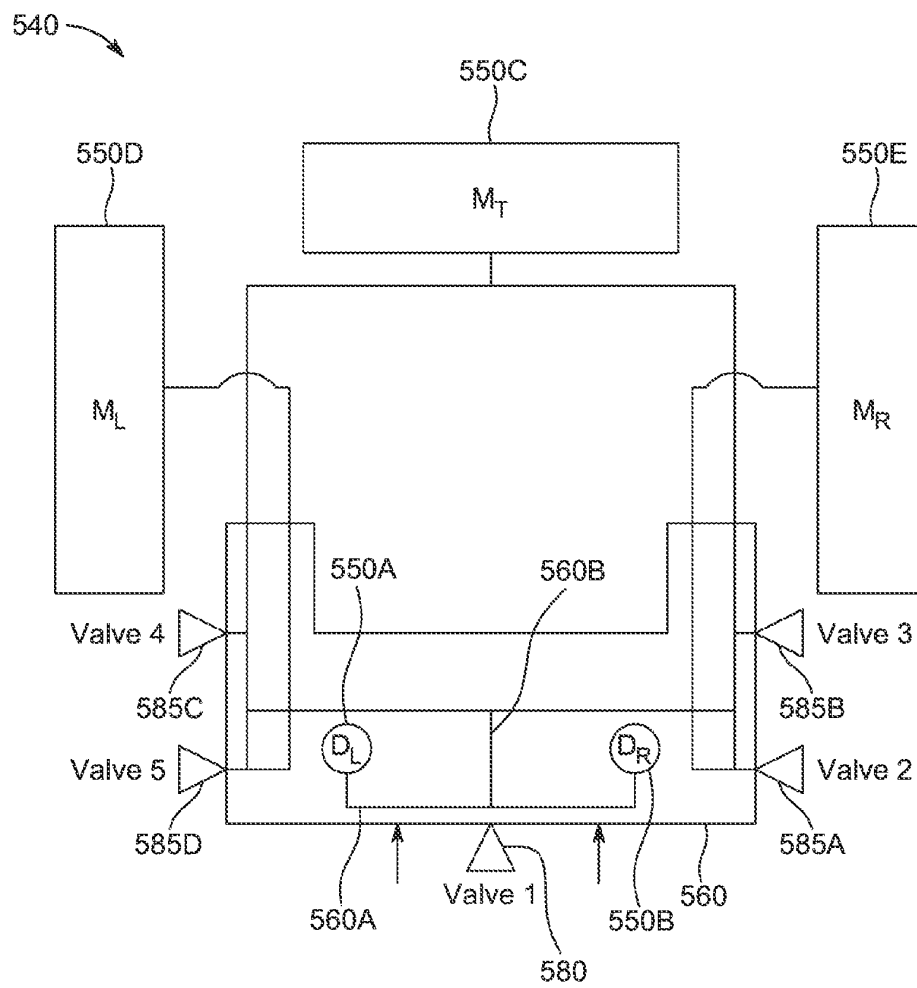


FIG. 5B

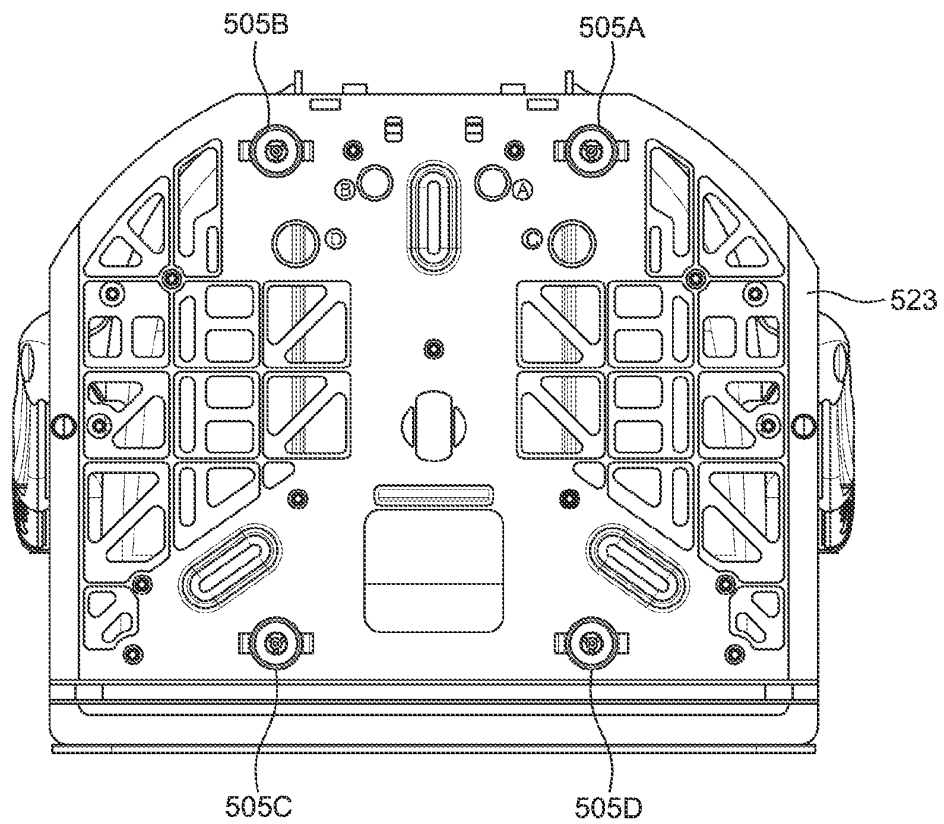


FIG. 5C

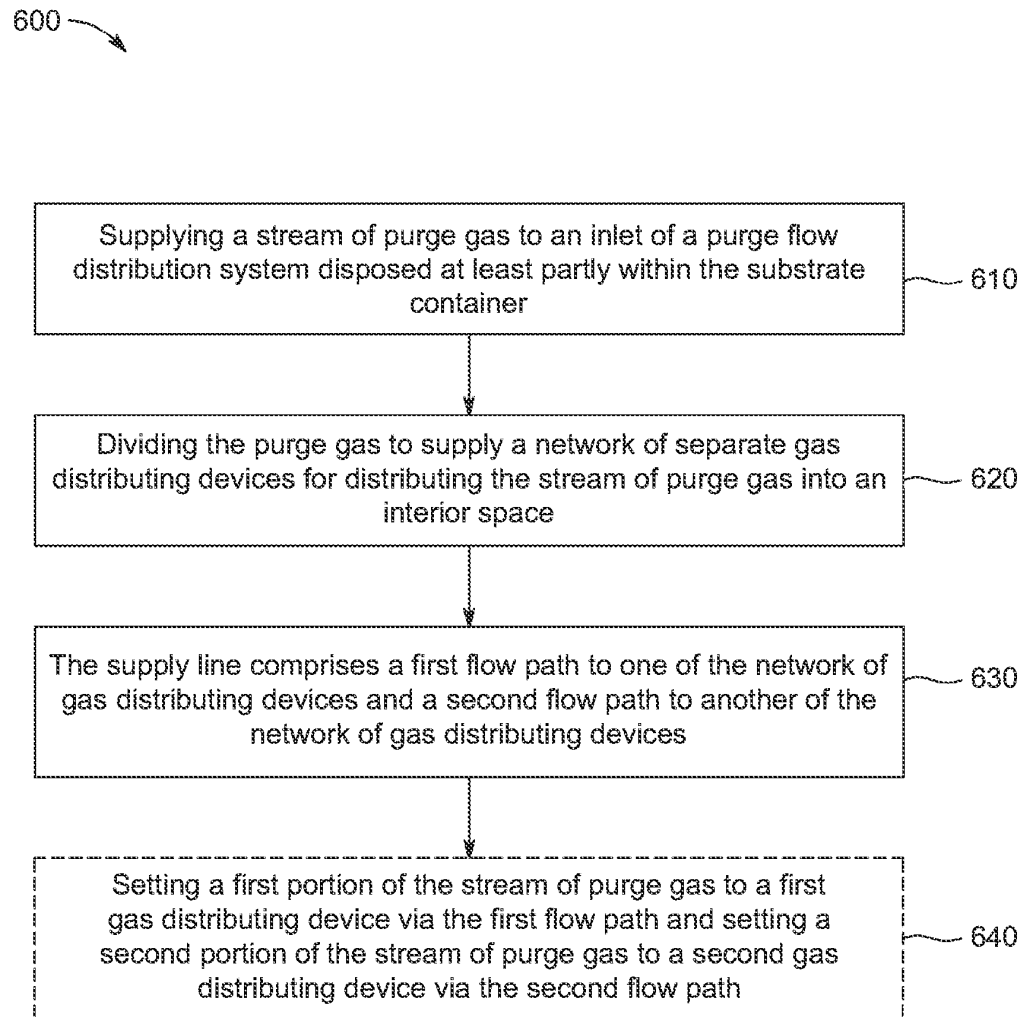


FIG. 6