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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
63/316,391	03/03/2022	MING-CHIEN CHIU	P07449-F052	7534

165335 7590 08/05/2024
Giant Group Corporation
8102 Postoak Road
Potomac, MD 20854

EXAMINER

ART UNIT	PAPER NUMBER
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NOTIFICATION DATE	DELIVERY MODE
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08/05/2024

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

irene@giant-group.com
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In re Application of :
Chiu et al. :
Application No. 63/316,391 : **DECISION ON PETITION**
Filed: March 3, 2022 :
For: WAFER CARRIER :

This is a notice regarding the request, filed October 18, 2023, for acceptance of a fee deficiency submission under 37 CFR 1.28.

The Office no longer investigates or rejects original or reissue applications under 37 CFR 1.56. **1098 Off. Gaz. Pat. Office 502 (January 3, 1989)**. Therefore, nothing in this Notice is intended to imply that an investigation was done.

The fee deficiency submission under 37 CFR 1.28 is hereby **ACCEPTED**.

This application is no longer entitled to small entity status. Accordingly, all future fees paid in this application must be paid at the undiscounted entity rate.

Inquiries regarding this decision may be directed to the undersigned at (571) 272-3206.

/LIANA S WALSH/
Lead Paralegal Specialist, OPET



United States Patent and Trademark Office

Office of the Chief Financial Officer

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Sale Accounting Date:07/31/2024

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63316391

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10/18/2023

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
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Sale Accounting Date:10/19/2023

Sale Item Reference Number	Effective Date
63316391	10/18/2023

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

1st Named Inventor : MING-CHIEN CHIU Confirmation No. : 7534
Application No. : 63/316,391
Filing Date : 03/03/2022
Docket No. : P07449-F052
Title : **WAFER CARRIER**

FEE DEFICIENCY PAYMENT

Dear Officer,

It is discovered that the status of a small entity was established in error for this application, and thus the entity status of this application has been changed online on August 04, 2023

The applicant respectfully provides the calculation and itemization of the deficiency owed as follows. Also, the credit card payment form (Form PTO-2038) is submitted along with this paper to pay the fee deficiency.

Application No.: 63/316,391

Page 2 of 2

Type of fee	Current fee amount for non-small entity	Fee erroneously paid as a small entity	Date Previously Paid	Deficiency owed amount
Provisional application filing fee	\$300	\$150	03/03/2022	\$150
Total of deficiency owed amounts				\$150

The applicant submits the credit card payment form (Form PTO-2038) along with this paper to pay the fee deficiency amount \$150.

Date: October 11, 2023

Respectfully submitted,

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE	REQUEST ID
63/316,391	03/03/2022	MING-CHIEN CHIU	P07449-F052	193474

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 08/04/2023 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

☒ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Ching-Yi Lu/
Name:	Ching-Yi Lu
Registration Number:	78374

Verification of Translation

U.S. Patent Application : 63/316,391

First Named Inventor : CHIU, MING-CHIEN

I, Peter Yang,

of Giant Group International Patent, Trademark and Law Office located
at 9F., No. 37, Dongxing Road, Xinyi District, Taipei City 110, Taiwan,
(R.O.C.),

am the translator of the document attached and I state that the following
is a true translation to the best of my knowledge and belief of U.S. Patent
Application US 63/316,391 of Mar. 3, 2022.

Dated this 24th day of Aug. 2022.

Peter Yang

Signature of Translator

Electronic Acknowledgement Receipt	
EFS ID:	46491579
Application Number:	63316391
International Application Number:	
Confirmation Number:	7534
Title of Invention:	WAFER CARRIER
First Named Inventor/Applicant Name:	MING-CHIEN CHIU
Customer Number:	165335
Filer:	Ching-Yi Lu/Giantgroup Giantgroup
Filer Authorized By:	Ching-Yi Lu
Attorney Docket Number:	P07449-F052
Receipt Date:	25-AUG-2022
Filing Date:	03-MAR-2022
Time Stamp:	23:44:31
Application Type:	Provisional

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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Specification	P07449-F052-Translation.pdf	12396674	no	16
			18431055f36933ac471efb5531bf317ae2d7e8		
Warnings:					

Information:					
2	Miscellaneous Incoming Letter	P07449-F045- Verification_of_Translation.pdf	211281	no	1
			847374155cd97cac943beae5f30ff8c090bf504c		
Warnings:					
Information:					
Total Files Size (in bytes):			12607955		
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. <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. <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. <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.					

WAFER CARRIER

2

Background of the Prior Art

1. A wafer carrier is usually used for storing a wafer and is placed on an inflatable plate to be inflated, such that the interior of the carrier can be applied with a drying gas (for example, dry air or nitrogen), allowing the interior of the carrier to rapidly achieve a humidity of less than 10%.
2. As shown in FIG. 1A, in the prior art, a conventional wafer carrier is provided with two air inlets, each of the inlets is correspondingly provided with a multi-pore tube in the carrier, and each air inlet is matched with a check valve and its filter membrane so that the interior of the carrier can be applied with the drying gas. However, as shown in FIG. 1B, one of the check valves of the air inlets may malfunction such that the air inlet is blocked, resulting in non-uniform air intake flow in the carrier. Alternatively, due to non-uniform air output that exceeds an upper limit of air output of a single multi-pore tube or the filter member, the total air output of the multi-core tube may be lowered. Moreover, conventional multi-pore tubes are mostly multi-porous in a single material, and issues such as breakage and air leakage caused by poor sealing can be easily caused when assembled to a container, in a way that the wafer placed in the carrier becomes susceptible to contamination.
3. Therefore, the present invention aims to solve the technical problems of a conventional wafer carrier configured with check valves on air inlets at two sides, including different amounts of air output from multi-pore tubes at two sides, and susceptibility to breakage and air leakage due to poor sealing caused by various factors.
4. In addition to the issue of the amounts of air output, the technical problem primarily to be solved by the present invention is the severe damage or reduced utilization life cycle of internal components caused by an internal high temperature. The reasons of the high internal temperature produced include, for example, an increased utilization life cycle of internal components caused by the heat of wafers during carrying and drying the wafer carrier (without wafers carried therein).

Conventional wafer carrier of the prior art

The wafer carrier is placed on a surface of an inflatable plate. In a normal operation, amounts of air output of the multi-pore tube are uniform, thus the interior of the carrier can be applied with a drying gas.

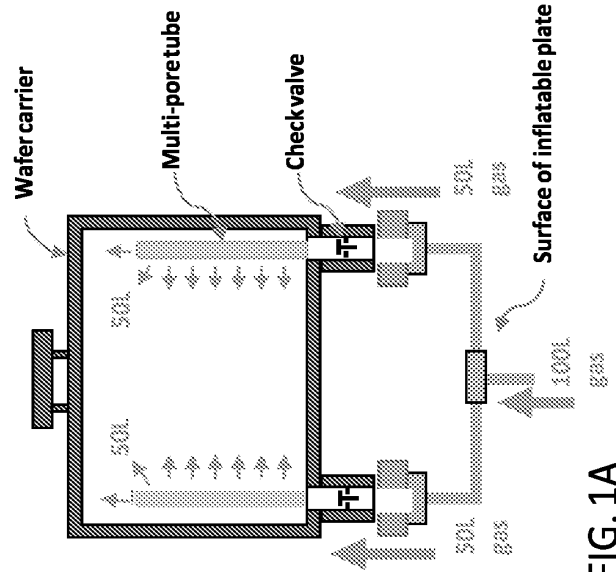


FIG. 1A

Conventional wafer carrier – malfunction of one of the check valves

Due to malfunction of a check valve in a conventional carrier, air flows are blocked from entering the multi-pore tube, causing non-uniform amounts of air output of the multi-pore tube.

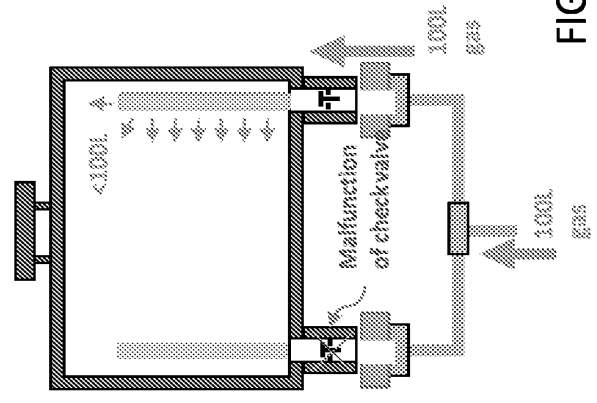


FIG. 1B

Means of the present invention for solving technical problems

1. Means of the present invention for solving the technical problems provides a buffer air chamber or a buffer space among the air inlet channels, as shown in FIG. 2A, and all the air in the buffer air chamber or the buffer space enter a wafer storage space of the carrier of the present invention through a plurality of multi-pore tubes.
2. Compared to a conventional wafer carrier, once inflation modules are configured for the air inlet channels, the limited space of each air inlet channel permits only the arrangement for a filter membrane for filtering air. However, a buffer air chamber or a buffer space configured in the present invention provides an inlet air accommodation space which can be placed with a desiccant, an organic absorbing agent or an additional particle filtering material, thereby improving air cleanliness of the wafer storage space.
3. In view of the issues such as the susceptibility to breakage and air leakage caused by poor sealing of a conventional multi-pore tube when assembled to a container, the present invention provides a solution, as shown in FIG. 2B; that is, a collar is disposed at an opening end of the multi-pore tube to prevent breakage at the opening end of the multi-pore tube, and an airtight sleeve (a component reinforcing the airtightness) is also arranged to prevent the issue of air leakage caused by poor sealing.
4. The internal high temperature caused by carrying and conveyance of wafers or by cleaning and drying a wafer carrier of a conventional wafer carrier aggravates the issues of damage and reduced utilization life cycle of internal components. Therefore, all internal components of the present invention are implemented by thermal resistant components made of thermal resistant materials.

Carrier of the present invention – during partial malfunction of check valves

The carrier of the present invention achieves the same amount of air output for multi-pore tube or filter membranes at two sides, by configuring a buffer air chamber or a buffer space for balancing the air pressures of air inlet channels.

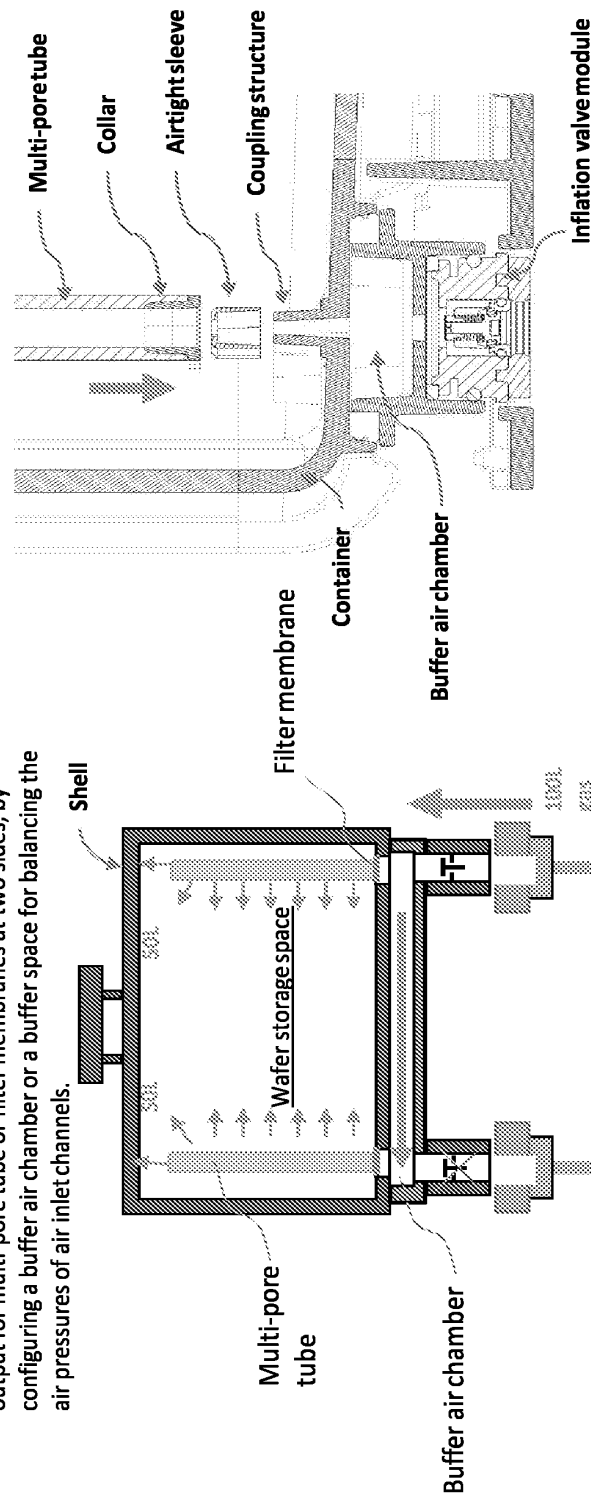
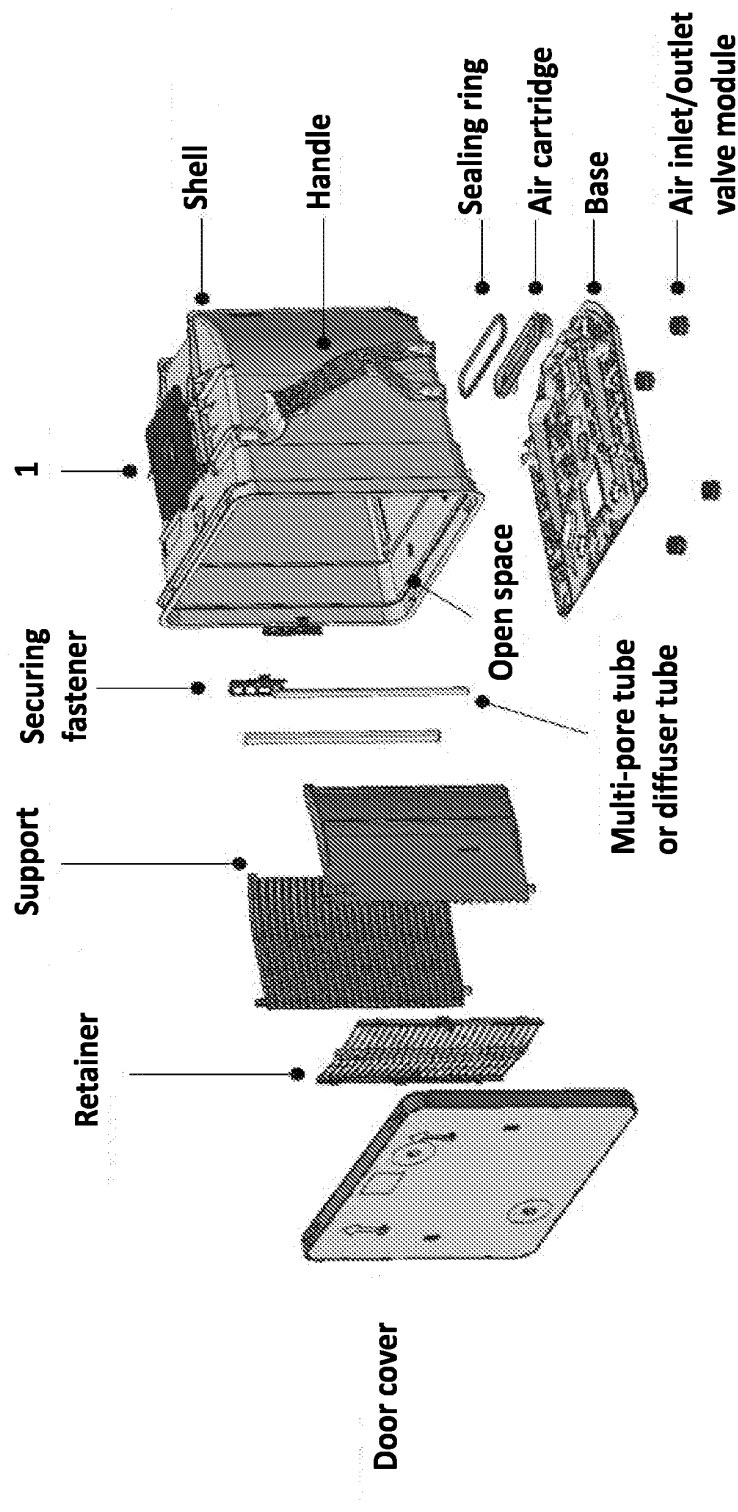


FIG. 2B

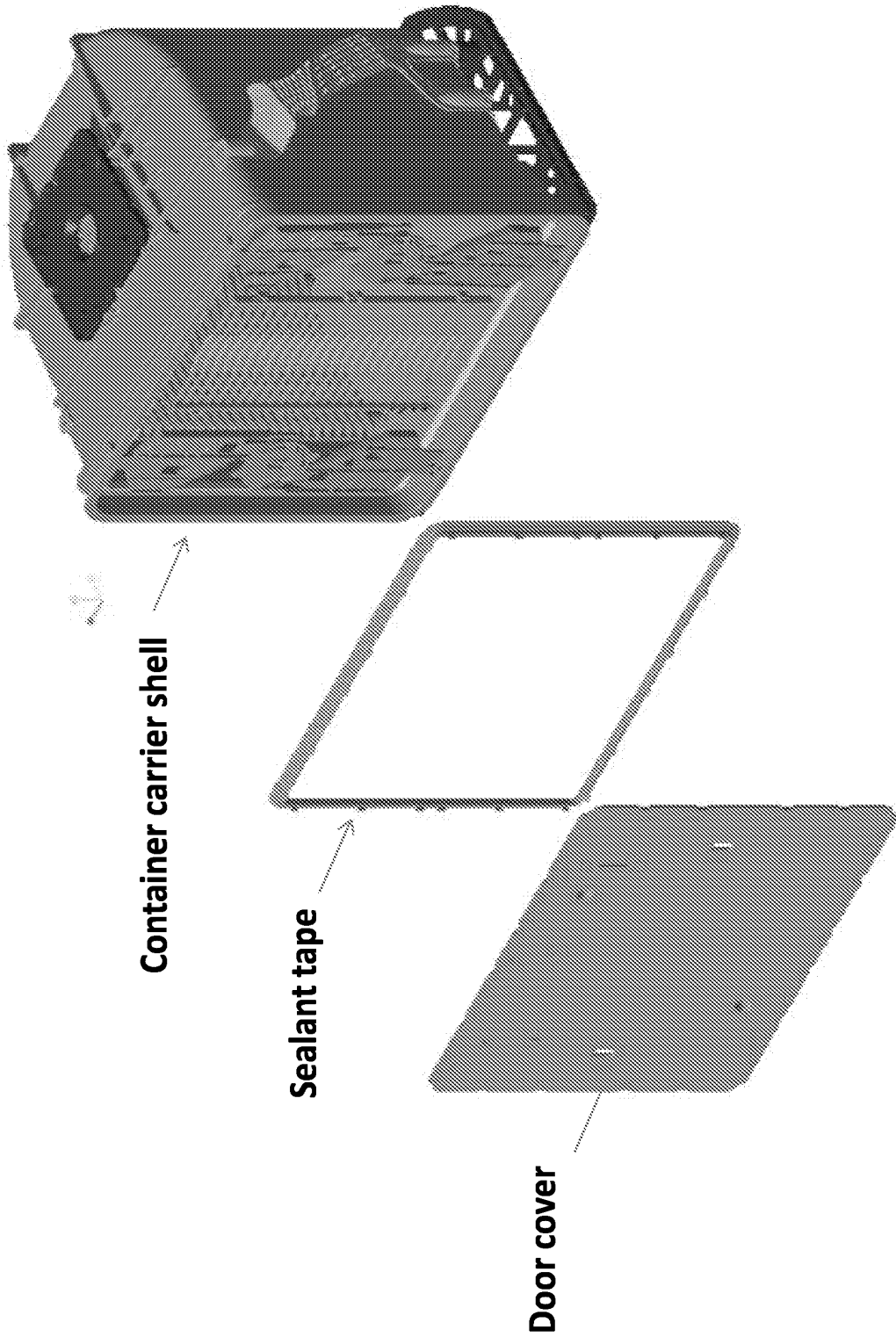
FIG. 2A

Exploded diagram of wafer carrier of the present invention



Thermal resistant components used	Coupling structure, securing fastener, shell, door cover, support, retainer, valve body, sealant tape												
Thermal resistant material	PEEK	HTPC	FKM	PPS	PPO	chlorinated polyether (CPE)	POB	TORLON	EP	PF	PEI	PI	LCP
Thermal resistant temperature °C	250	180	200	230	190	280	250	250	230	200	170	290	250

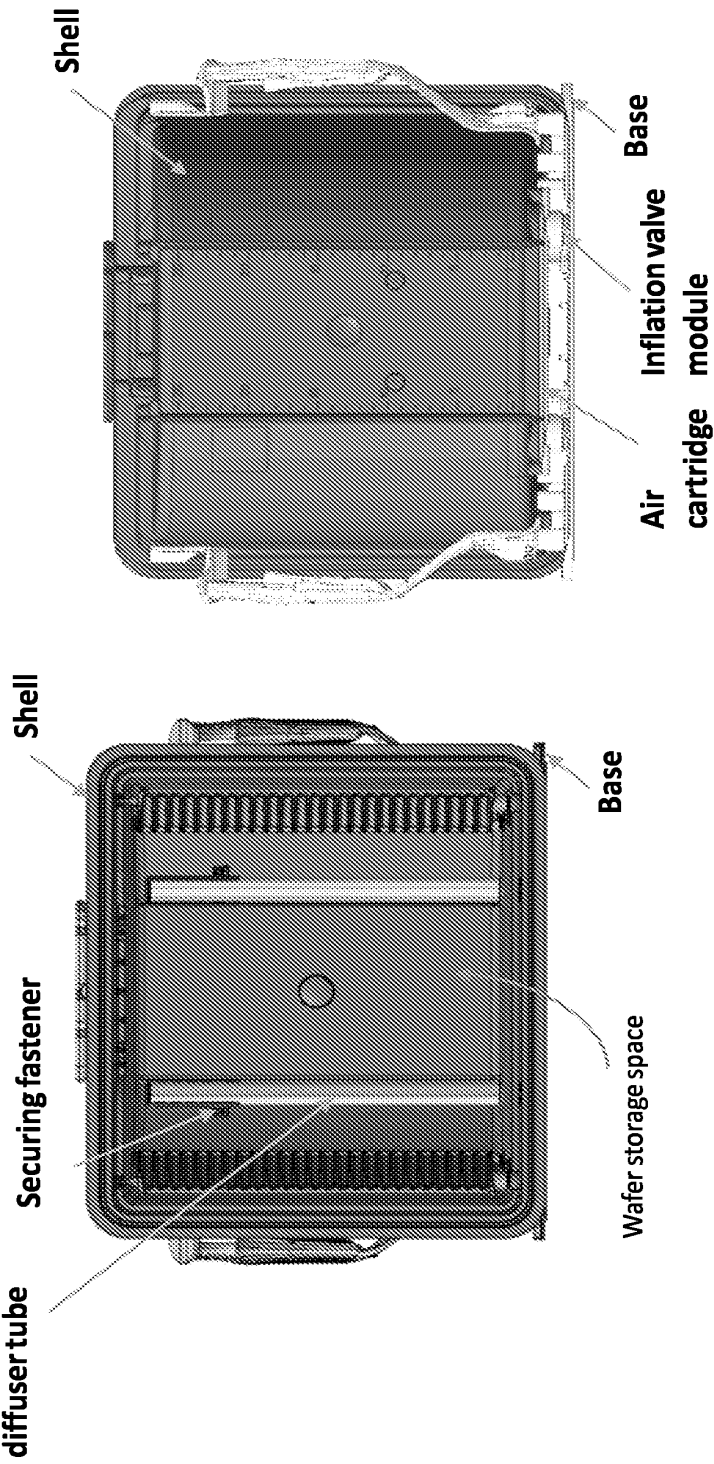
A base plate of the wafer carrier added with a wet material is capable of reducing friction and increasing lubricity, ensuring that the base plate is properly seated on the machine. The present invention aims to solve the problem that a base plate is incapable of sliding onto a positioning column of the machine when the friction of the base plate is overly large.



Front view and rear view of the shell of the carrier of the present invention

- The wafer storage space of the shell is an open space formed in an enclosing manner by a top plate, a bottom plate, a back plate and a pair of opposite side plates. When a door cover covers the opening of the shell, the wafer storage space then forms a sealed space.
- In one embodiment of the present invention, two multi-pore tubes are disposed in the wafer storage space and close to the back plate, and the multi-pore tubes are fixed by securing fasteners. Because the multi-pore tubes and the securing fasteners are disposed in the internal space, the multi-pore tubes and the securing fasteners are implemented by components made of thermal resistant materials, as the thermal resistant components, materials thereof and thermal resistant temperature conditions listed in the table above.

Multi-pore tube or diffuser tube



- FIG. 3A shows a perspective three-dimensional diagram of the shell of the present invention, wherein the blue line indicates a section line A-A.
- FIG. 3B shows a section diagram of FIG. 3A along the section line A-A. A base and an air cartridge having a buffer air chamber are installed below the bottom plate of the shell. The bottom plate forms a coupling structure defined with a through channel having a center axis, the through channel is communicated with the open space and the buffer air chamber, and an opening end of one multi-pore tube is installed to the coupling structure. An air inlet channel is provided at the bottom of the air cartridge, an inflation valve module is configured in the air inlet channel, and the inflation valve module includes a check valve so as to define an air having a single air inlet direction entering the buffer air chamber.
- The air cartridge has an upward opening, the upward opening covers the through channel configured at the bottom plate and seals the buffer air chamber by a sealing ring.
- The coupling structure is connected to the multi-pore tube and both are located in the internal space, these components may be damaged or have a reduced utilization life cycle due to the high internal temperature and hence degraded efficiency. In addition, the component performance of the air cartridge (sealing ring) that is in indirect contact is also affected by the high temperature. Thus, the coupling structure, the multi-pore tube and the air cartridge are also made of thermal resistant materials. In particular, the air outlet valve, which is primarily for discharging hot air from the internal space and is easily damaged under the influence of the high temperature, is also implemented by a component made of a thermal resistant material, such as thermal resistant materials and thermal resistant temperature conditions listed in the table above.

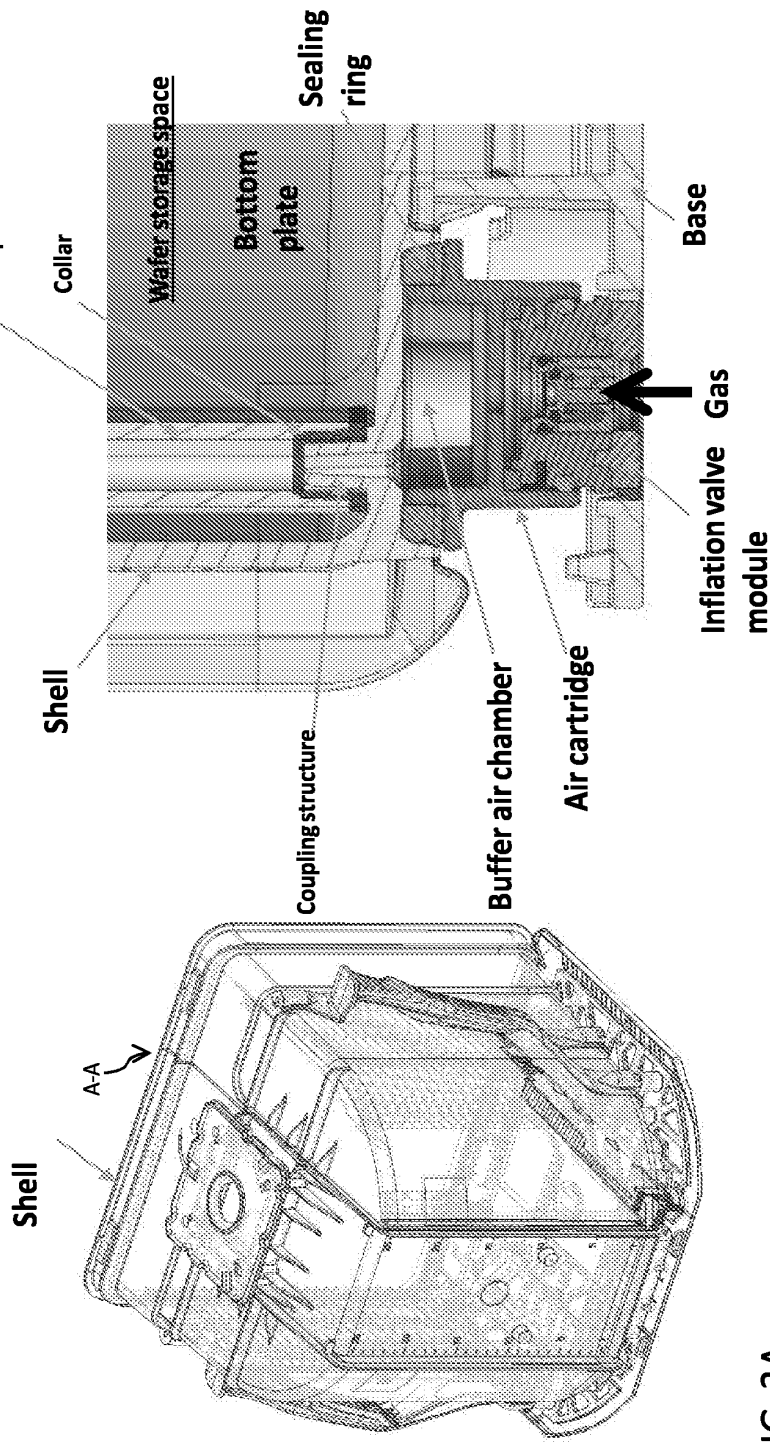
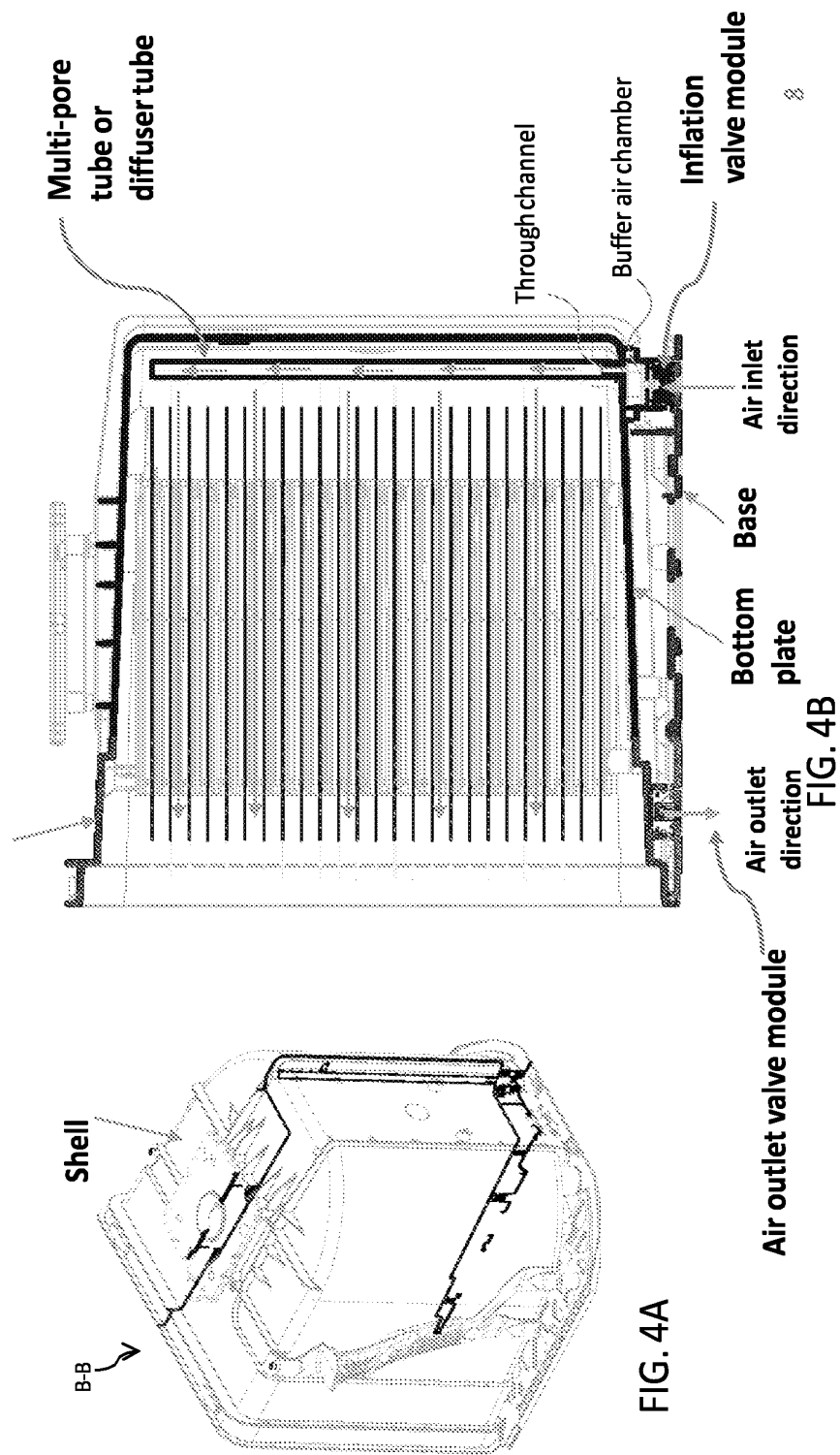


FIG. 3A

FIG. 3B

- FIG. 4A shows another three-dimensional diagram of the shell of the present invention, wherein the black line indicates a section line B-B.
- FIG. 4B shows a section diagram of FIG. 4A along the section line B-B. The multi-pore tube has a vertical space, and the buffer air chamber communicates with the vertical space via the through channel of the bottom. Air enters the buffer air chamber via the inflation valve module. When the air fills the vertical space of the multi-pore tube and the buffer air chamber of the air cartridge, and reaches as predetermined pressure, all the air in the buffer air chamber passes through all the through channels at the bottom plate and is uniformly diffused through all the multi-pore tubes to enter the wafer storage space, and is then discharged toward an opening direction of the shell.
- The height of the multi-pore tube extending from the bottom plate toward the top plate is designed to cover as much as possible a stacked height of a maximum number of wafers that can be accommodated in the shell, or is at least greater than that of an upper surface of the wafer at a highest position.

Shell



- FIG. 5A shows a perspective three-dimensional diagram of a shell of the present invention, wherein the black line represents a section line C-C. FIG. 5B shows a section diagram of FIG. 5A along the section line C-C.
- In one embodiment of the present invention, a plurality of air inlet channels are provided at the air cartridge disposed below the bottom plate, a soft sealant-5 is provided between the air cartridge and the bottom plate, each air inlet channel has a center axis, and the center axis passes through the buffer air chamber but not through the through channel at the bottom plate, such that the center axis is not in the vertical space of the multi-pore tube. In other words, the multi-pore tube and the inflation valve module do not have the same center axis.
- The opening end of the multi-pore tube sleeves the corresponding coupling structure so as to be assembled to the bottom plate, wherein an outer wall of the coupling structure is provided with an airtight sleeve to ensure airtightness of the opening end, and an inner wall of the opening end is provided with a collar to prevent breakage of the opening end.
- The inflation valve module is disposed in the corresponding air inlet channel of the air cartridge. The inflation valve module includes a plastic body having a center passage, which is provided with a check valve to define an air having a single air inlet direction entering the buffer air chamber. An outer periphery of the plastic body is engaged with a downwardly extending annular wall of the air cartridge, with soft sealants -2 and -3 disposed in between to ensure airtightness. In contrast, the air outlet valve module is structured similarly to the inflation valve module, with a difference merely being that the assembly direction of the check valve is opposite so as to define an air having a single air outlet to be discharged out of the internal space.

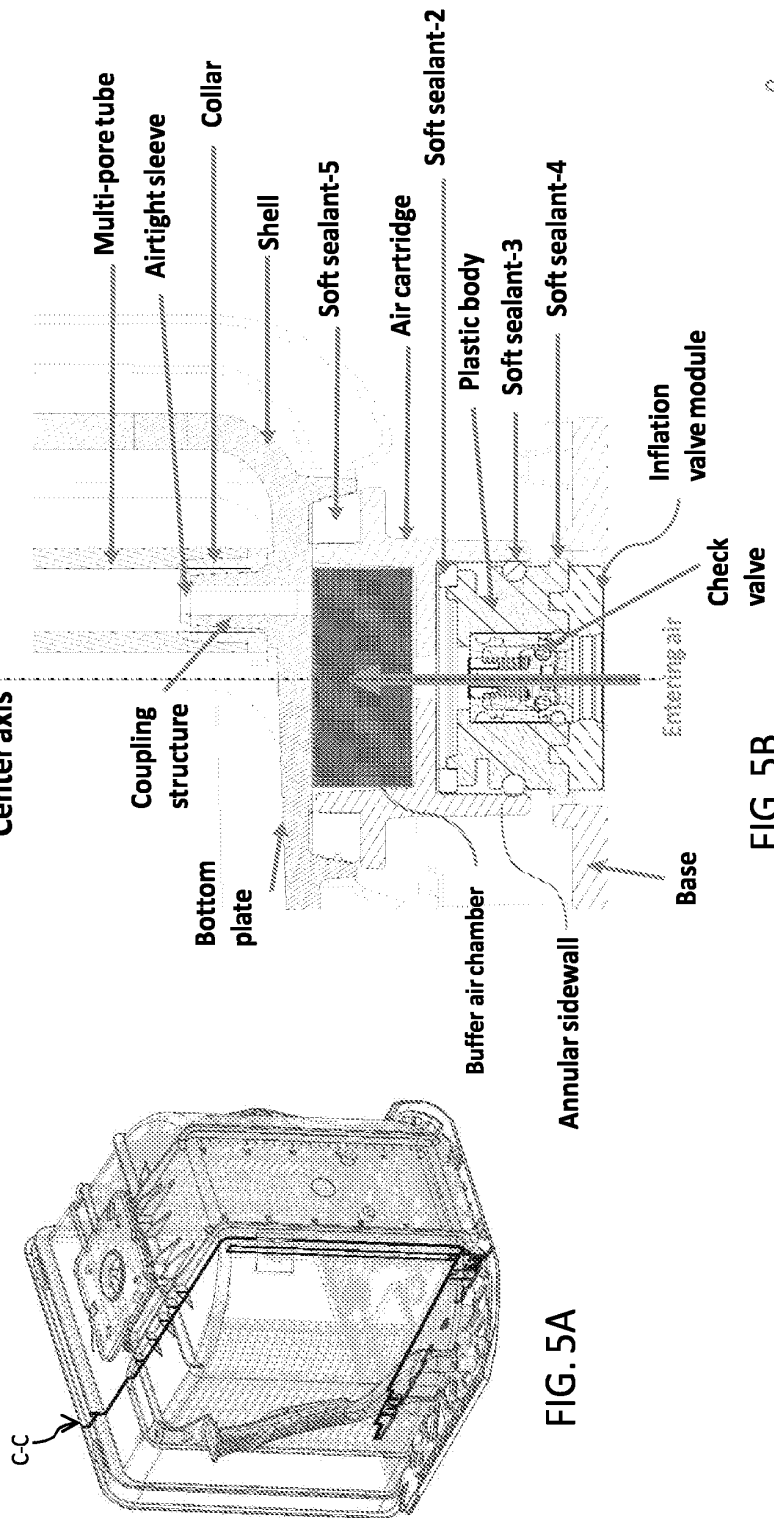


FIG. 5A

FIG. 5B

- FIG. 7A and FIG. 7B show an exploded three-dimensional diagram and a section diagram an assemblable multi-pore tube of the present invention. FIG. 7C shows a section diagram of a multi-pore tube of the present invention that is assembled.
- In one embodiment of the present invention, an inner wall at the opening end of the multi-pore tube is provided with a collar to prevent dust of broken opening end from contaminating an internal space. The bottom plate forms a coupling structure that has a through channel formed thereon. The through channel is in communication with the buffer air chamber and the vertical space of the multi-pore tube. Moreover, an outer wall of the coupling structure is sleeved with a soft airtight sleeve to ensure airtightness, wherein the soft airtight sleeve is also made of a thermal resistant material.

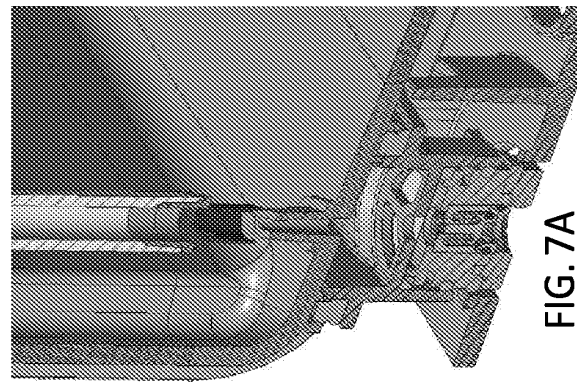


FIG. 7A

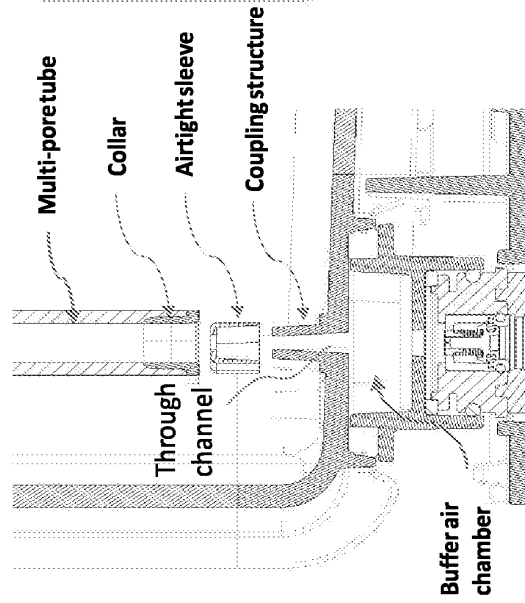


FIG. 7B

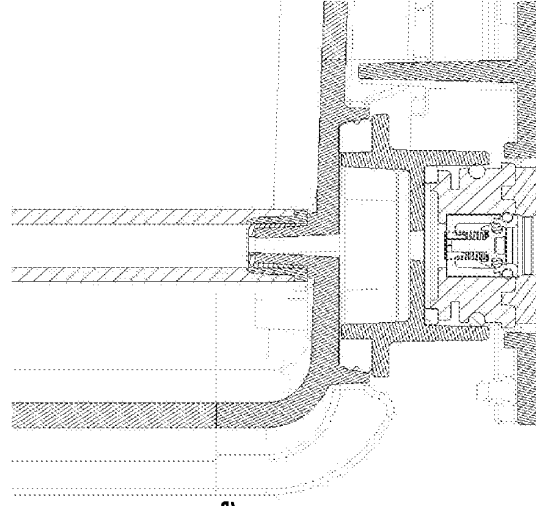
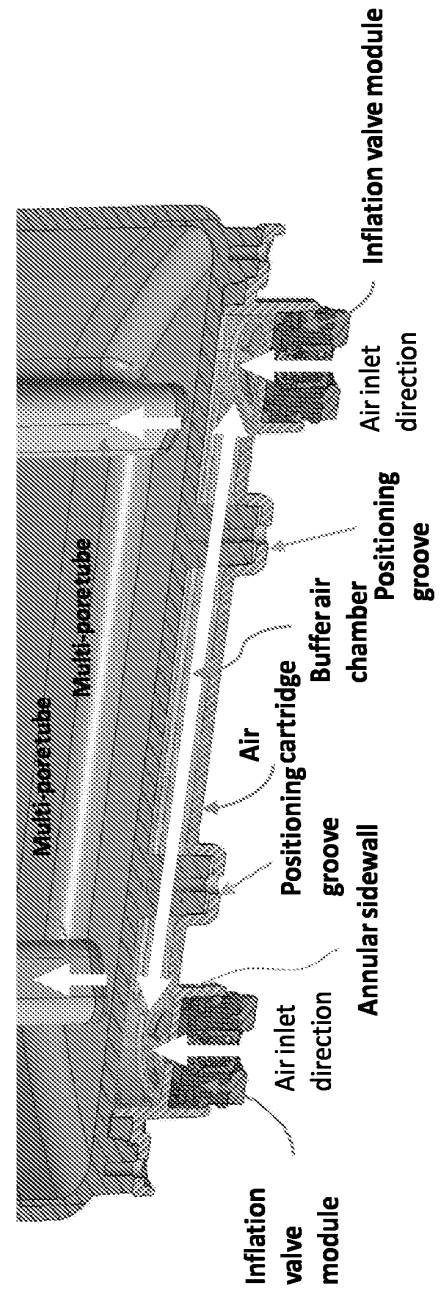
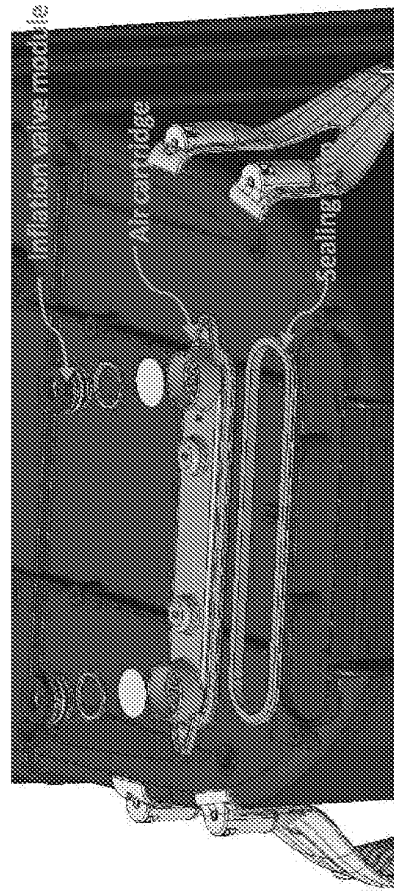


FIG. 7C

- Referring to the three-dimensional diagram and a section diagram of an assembled state of an air cartridge of the present invention, the air cartridge of the present invention has a space with an upward opening. When the air cartridge is installed to a lower surface of the bottom plate of the shell, the spaces of the upward openings of the air cartridges cover all the through channels communicating with the multi-pore tubes, and a buffer air chamber is defined by the air cartridge and the lower surface of the bottom plate of the shell.
- A plurality of air inlet channels and at least one positioning groove are provided at the bottom plate of the air cartridge. The positioning groove matches with a corresponding positioning pin extending downward from the lower surface of the bottom plate of the shell. A downwardly extending annular sidewall corresponding to the air inlet channel is formed at the lower surface of the bottom plate of the air cartridge, and the annular sidewall is for engaging with an inflation valve module so as to define an air inlet channel having a single air inlet direction.
- In the carrier of the present invention, a buffer air chamber of an additional space is provided at the air inlet channel of the shell. The buffer air chamber provides a residing space of a working fluid, and the space can further be placed with a desiccant, an organic absorbing agent and a particle filtering material, so as to purify air and reduce the possibility of contamination of the water.



Technical features to be protected by the present invention

1. A wafer carrier, comprising:

- a housing, having an internal space;
- an air diffusion structure, configured at a bottom portion of the housing, the air diffusion structure having a buffer air chamber, a plurality of communication channels and a plurality of air inlet channels, the communication channels being in communication with the internal space of the housing;
- a plurality of air valve modules, comprising an inflation valve and an air outlet valve, the inflation valve disposed at the corresponding air inlet channel to define an air having a single air inlet direction to enter to the buffer air chamber, the air outlet valve disposed at an air outlet channel of the housing to define a single air outlet direction to be discharge a high-temperature air from the internal space of the housing; and
- a plurality of multi-pore tubes, configured in the open space, respectively in communication with the corresponding communication channels, so that the air in the buffer air chamber enters the internal space of the housing through the plurality of multi-pore tubes;
 - wherein, the air diffusion structure, the plurality of air valve modules and the plurality of multi-pore tubes are made of thermal resistant materials, which includes one or a combination of at least two selected from a group consisting of PEEK, HTPC, FKM, PPS, PPO, chlorinated polyether (CPE), POB, TORLON, EP, PF, PEI, PI and LCP.

Technical features to be protected by the present invention

2. A wafer carrier, comprising:

a housing, having an internal space, the internal space provided with a plurality of coupling structures, each of the coupling structures defining a through channel having a center axis and being in communication with the internal space;

an air diffusion structure, disposed at a bottom portion of the housing, the air diffusion structure having a buffer air chamber, a plurality of communication channels and a plurality of air inlet channels, the communication channels being in communication with the internal space of the housing and the plurality of coupling structures;

a plurality of air valve modules, comprising an inflation valve and an air outlet valve, the inflation valve disposed at the corresponding air inlet channel to define an air having a single air inlet direction to enter to the buffer air chamber, the air outlet valve disposed at an air outlet channel of the housing to define a single air outlet direction to discharge a high-temperature air from the internal space of the housing; and

a plurality of multi-pore tubes, disposed in the open space, the coupling structures respectively correspondingly coupled to the multi-pore tubes, the plurality of multi-pore tubes respectively being in communication with the corresponding communication channels, so that the air in the buffer air chamber enters the internal space of the housing through the plurality of multi-pore tubes;

wherein, the air diffusion structure, the plurality of air valve modules, the plurality of multi-pore tubes and the plurality of coupling structures are made of thermal resistant materials, including one or a combination of at least two selected from a group consisting of PEEK, HTPC, FKM, PPS, PPO, chlorinated polyether (CPE), POB, TORLON, EP, PF, PEI, PI and LCP.

Technical features to be protected by the present invention

3. A wafer carrier, comprising:

- a housing, having an internal space;
an air diffusion structure, configured at a bottom portion of the housing, the air diffusion structure having a buffer air chamber, a plurality of communication channels and a plurality of air inlet channels, the communication channels being in communication with the internal space of the housing;
- a plurality of air valve modules, comprising an inflation valve and an air outlet valve, the inflation valve disposed at the corresponding air inlet channel to define an air having a single air inlet direction to enter to the buffer air chamber, the air outlet valve disposed at an air outlet channel of the housing to define a single air outlet direction to discharge a high-temperature air from the internal space of the housing; and
- a plurality of multi-pore tubes, disposed in the open space, respectively in communication with the corresponding communication channels, so that the air in the buffer air chamber enters the internal space of the housing through the plurality of multi-pore tubes, each of the multi-pore tubes having a longitudinal space having a closed end and an opening end, wherein a collar is provided at the opening end for buffering the multi-pore tube when assembled to a bottom plate of a wafer container so as to prevent breakage of the opening end; and
- wherein, the air diffusion structure, the plurality of air valve modules, the plurality of multi-pore tubes and the collar are made of thermal resistant materials, including one or a combination of at least two selected from a group consisting of PEEK, HTPC, FKM, PPS, PPO, chlorinated polyether (CPE), POB, TORLON, EP, PF, PEI, PI and LCP.

Technical features to be protected by the present invention

4. A wafer carrier, comprising:

- a housing, comprising a wafer opening and an internal space in communication with the wafer opening;
 - a door cover, having a sealing member, the door cover assembled in a sealed manner at the wafer opening of the housing by using the sealing member;*
 - an air diffusion structure, configured at a bottom portion of the housing, the air diffusion structure having a buffer air chamber, a plurality of communication channels and a plurality of air inlet channels, the communication channels being in communication with the internal space of the housing;
 - a plurality of air valve modules, comprising an inflation valve and an air outlet valve, the inflation valve disposed at the corresponding air inlet channel to define an air having a single air inlet direction to enter to the buffer air chamber, the air outlet valve disposed at an air outlet channel of the housing to define a single air outlet direction to discharge a high-temperature air from the internal space of the housing; and
 - a plurality of *multi-pore tubes, disposed in the internal space, respectively in communication with the corresponding communication channels, so that the air in the buffer air chamber enters the internal space of the housing through the plurality of multi-pore tube; and*
 - wherein, the air diffusion structure, the plurality of air valve modules, the plurality of multi-pore tubes and the sealing member are made of thermal resistant materials, including one or a combination of at least two selected from a group consisting of PEEK, HTPC, FKM, PPS, PPO, chlorinated polyether (CPE), POB, TORLON, EP, PF, PEI, PI and LCP.*

1. In the invention with a novel design, an air channel from the inflation valve to the multi-pore tube is modified to be straight through to the longitudinal space of the multi-pore tube, and a design concept of the multi-pore is modified from a circular shape to various shapes such that the shape of the multi-pore tube can be changed and implemented in any desired shape, achieving a change in the direction of airflow and an increased air outlet area.
2. This new model realizes a high-performance purging module. By changing the shape of the tube and modifying the route of air, and altering an air inlet channel from bending to straight-through, the purging ability is significantly increased to effectively reduce rising in internal humidity when the door is opened.
3. The novel design has an additional block plate behind the multi-pore tube, and the direction of airflow can be changed as desired by using the block plate.
4. In the novel design, the center axis of the inflation valve is located in the longitudinal space or in a cross section range of the multi-pore tube in different shapes, thus solving the issues of the prior art in which an air diffusion function is achieved by a restricted offset arrangement of an inflation valve and an entrance joint and a circular tube. However, being limited by the offset air channel, airflow is turned during traveling, leading to technical issues of delayed arrival time of airflow at the multi-pore tube and unsmooth flowing of airflow.



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
63/316,391	03/03/2022		150	P07449-F052		

165335
Giant Group Corporation
8102 Postoak Road
Potomac, MD 20854

CONFIRMATION NO. 7534 FILING RECEIPT



0000000132372610

Date Mailed: 03/11/2022

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)

MING-CHIEN CHIU, New Taipei City, TAIWAN;
CHIA-HO CHUANG, New Taipei City, TAIWAN;
KUO-HUA LEE, New Taipei City, TAIWAN;
SHU-HUNG LIN, New Taipei City, TAIWAN;

Applicant(s)

GUDENG PRECISION INDUSTRIAL CO., LTD., New Taipei City, TAIWAN;

Power of Attorney:

Ching-Yi Lu--78374

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: 03/10/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 63/316,391**

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

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

WAFER CARRIER

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).

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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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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
63/316,391	03/03/2022	MING-CHIEN CHIU	P07449-F052

165335
Giant Group Corporation
8102 Postoak Road
Potomac, MD 20854

CONFIRMATION NO. 7534
IMPROPER PROVISIONAL LETTER



Date Mailed: 03/11/2022

Letter re Non-English Language Application Papers in a Provisional Application

The above-identified provisional application was filed in a language other than English. An English-language translation of a non-English provisional application and a statement that the translation is accurate must be filed in the provisional application. See 37 CFR 1.78(a)(5). Applicants are strongly encouraged to file the English-language translation of the provisional application and the statement that the translation is accurate in the provisional application before a nonprovisional application claiming the benefit of the provisional application is filed, or, alternatively, when making a claim for the benefit of the provisional application in a nonprovisional application. If, however, an English translation and a statement that the translation is accurate have not been filed in the above-identified provisional application when a nonprovisional application is filed claiming the benefit of the filing date of the provisional application, the Office should mail a Notice requiring an English translation and the statement to be filed in the provisional application and a confirmation to be filed in the nonprovisional application.

In the event that the Office schedules a nonprovisional application that claims the benefit of a provisional application filed in a language other than English for publication without issuing a Notice requiring the applicant to file an English translation of the non-English provisional application, the applicant should file the English translation of the non-English provisional application and a statement that the translation is accurate as soon as possible in the provisional application.

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.

/s/brahim/

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	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		
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. 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.			

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	
	MING-CHIEN		CHIU		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	New Taipei City		Country of Residence ⁱ	TW	
Mailing Address of Inventor:					
Address 1	9F-5., No.2, Sec. 4, Zhongyang Rd., Tucheng Dist.				
Address 2					
City	New Taipei City		State/Province		
Postal Code	23678	Country ⁱ	TW		
Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	CHIA-HO		CHUANG		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	New Taipei City		Country of Residence ⁱ	TW	
Mailing Address of Inventor:					
Address 1	9F-5., No.2, Sec. 4, Zhongyang Rd., Tucheng Dist.				
Address 2					
City	New Taipei City		State/Province		
Postal Code	23678	Country ⁱ	TW		
Inventor	3				Remove
Legal Name					

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

Prefix	Given Name	Middle Name	Family Name	Suffix
	KUO-HUA		LEE	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	New Taipei City		Country of Residence ⁱ	TW

Mailing Address of Inventor:

Address 1	9F-5., No.2, Sec. 4, Zhongyang Rd., Tucheng Dist.			
Address 2				
City	New Taipei City	State/Province		
Postal Code	23678	Country ⁱ	TW	
Inventor	4	Remove		
Legal Name				

Prefix	Given Name	Middle Name	Family Name	Suffix
	SHU-HUNG		LIN	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	New Taipei City		Country of Residence ⁱ	TW

Mailing Address of Inventor:

Address 1	9F-5., No.2, Sec. 4, Zhongyang Rd., Tucheng Dist.			
Address 2				
City	New Taipei City	State/Province		
Postal Code	23678	Country ⁱ	TW	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. 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	165335		
Email Address	us@giant-group.com.tw	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

Application Information:

Title of the Invention	WAFER CARRIER		
Attorney Docket Number	P07449-F052	Small Entity Status Claimed	☒
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		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.

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	165335		

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	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

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		Remove
Application Number	Continuity Type	Prior Application Number
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.		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)	Remove
			Access Code ^j (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

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

☐ 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.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

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	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

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	GUDENG PRECISION INDUSTRIAL CO., LTD.		
Mailing Address Information For Applicant:			
Address 1	9F-5., No.2, Sec. 4, Zhongyang Rd., Tucheng Dist.		
Address 2			
City	New Taipei City	State/Province	
Country	TW	Postal Code	23678
Phone Number		Fax Number	
Email Address			
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	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

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.				
				Remove
If the Assignee or Non-Applicant Assignee is an Organization check here.				☐
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country ⁱ		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				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	/Ching-Yi Lu/		Date (YYYY-MM-DD)	2022-03-03
First Name	Ching-Yi	Last Name	Lu	Registration Number
				78374
Additional Signature may be generated within this form by selecting the Add button.				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	P07449-F052
		Application Number	
Title of Invention	WAFER CARRIER		

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.**

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.

晶圓載具

先前技術

1. 晶圓載具一般用於儲存放置晶圓片(Wafer)，並放置於充氣盤面充氣，使載具內部施加乾燥氣體(如乾燥空氣或氮氣)，讓載具內部快速達到10%濕度以下。
2. 如圖1A所示，傳統晶圓載具技術設置兩個進氣孔，每一進氣孔在載具內部分別對應配置一多孔管，且進氣孔各自搭配一逆止閥及濾膜使載具內部施加乾燥氣體。然而，如圖1B所示，其中之一的進氣孔內的逆止閥失效，將阻塞該進氣孔而造成載具內部進氣流不平均，也可能因不平均的出氣量超過單一多孔管或濾膜出氣上限，使多孔管的總出氣量下降。此外，習知多孔管為多孔單一材質，因此組裝至容器部時易產生破裂、密封度差造成漏氣等問題，容易導致載具內部所放置的晶圓片受汙染。
3. 因此，傳統晶圓載具的兩側進氣孔所配置充氣閥如各種因素造成兩側多孔管的出氣量不相同，及多孔管組裝易產生破裂、密封度差造成漏氣。

4. 除了上述出氣量問題之外，本發明主要欲解決的技術問題是因為內部高溫而造成內部零件的嚴重受損或是縮短使用壽命，產生內部高溫的原因如傳統晶圓載具因為晶圓的熱度而造成內部空間溫度升高、或晶圓載具(內未有晶圓)於清洗烘乾時所造成的高溫等。

• 傳統晶圓載具技術

晶圓載具放置充氣盤面，在正常運作下，各多孔管出氣量平均，使載具內部施加乾燥氣體

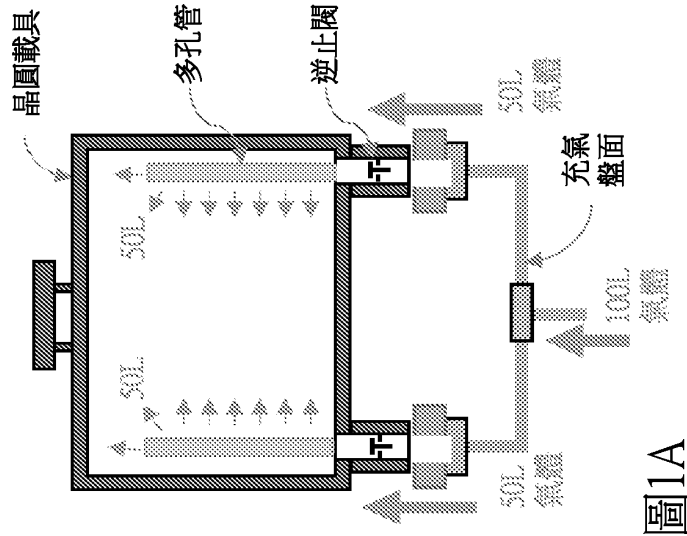


圖1A

• 傳統晶圓載具-其中之一逆止閥失效

傳統載具因逆止閥失效後阻塞氣流進入多孔管，造成多孔管出氣量不平均

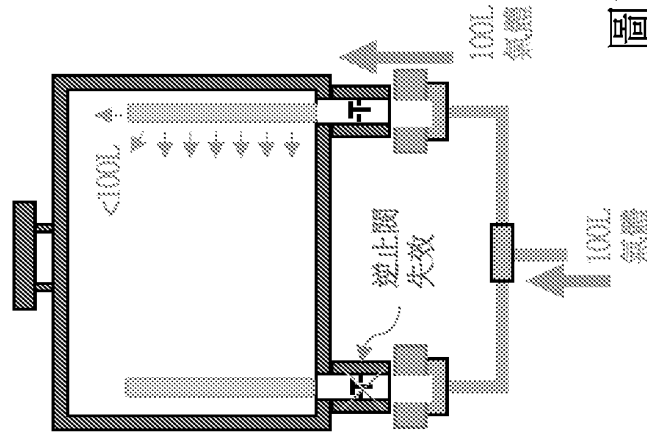


圖1B

本發明解決技術問題之手段

1. 本發明載具解決技術問題之手段係在各進氣通道之間設置一緩衝氣室或一緩衝空間，如圖2A所示，並使該緩衝氣室或該緩衝空間內所有氣體是通過複數個多孔管進入本發明載具的晶圓存放空間。
2. 相較於習知晶圓載具，各進氣通道配置充氣模組後，該進氣通道的有限空間僅能配置濾膜過濾氣體，本發明載具所配置的一緩衝氣室或一緩衝空間提供進氣容置空間，該進氣容置空間可放置乾燥劑、有機物吸附劑及額外的微塵過濾材料等，而提升該晶圓存放空間的氣體潔淨度。
3. 有鑑於習知多孔管因組裝至容器部時易產生破裂、密合度差造成漏氣等問題，本發明提出一解決方案，如圖2B所示，在多孔管的開口端處配置一套環以防止多孔管的開口端破裂，及一氣密套筒(補強氣密效果之元件)，以避免不良密合度造成漏氣的問題。
4. 由於習知的晶圓載具在傳載晶圓時或是晶圓載具在清洗烘乾時所造成的內部高溫，會加速內部元件的損壞與縮短使用壽命問題，因為本發明針對所有內部元件都使用耐熱材質的耐熱元件，

• 本發明載具技術-當部分逆止閥失效

本發明載具可藉由配置一緩衝氣室或一緩衝空間來平衡進氣通道的氣壓，使兩側多孔管或濾膜的出氣量相同

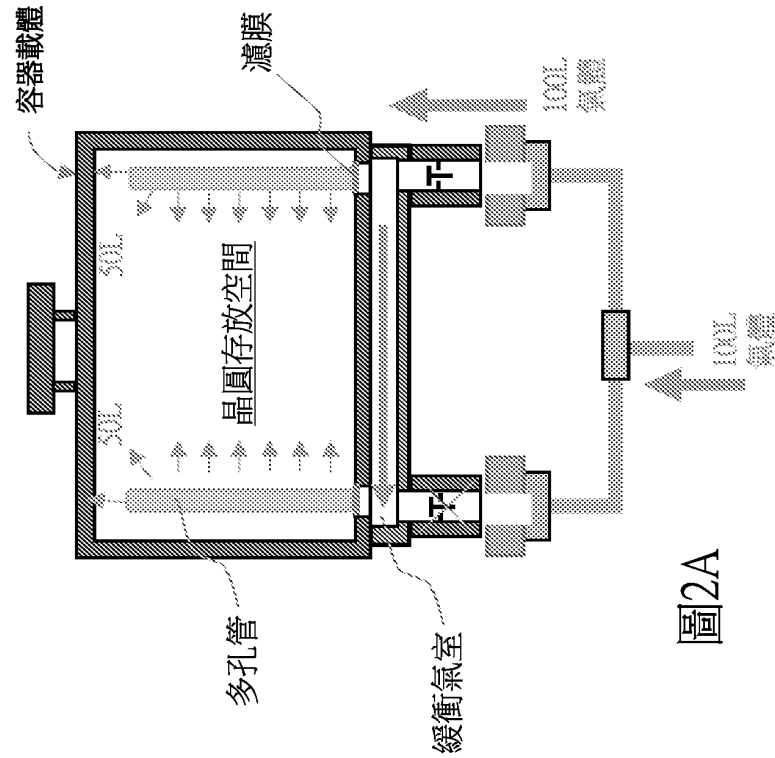


圖2A

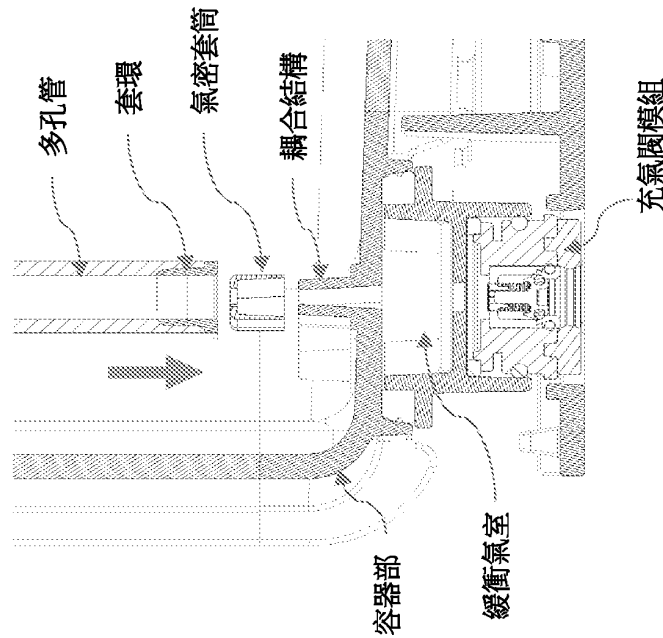
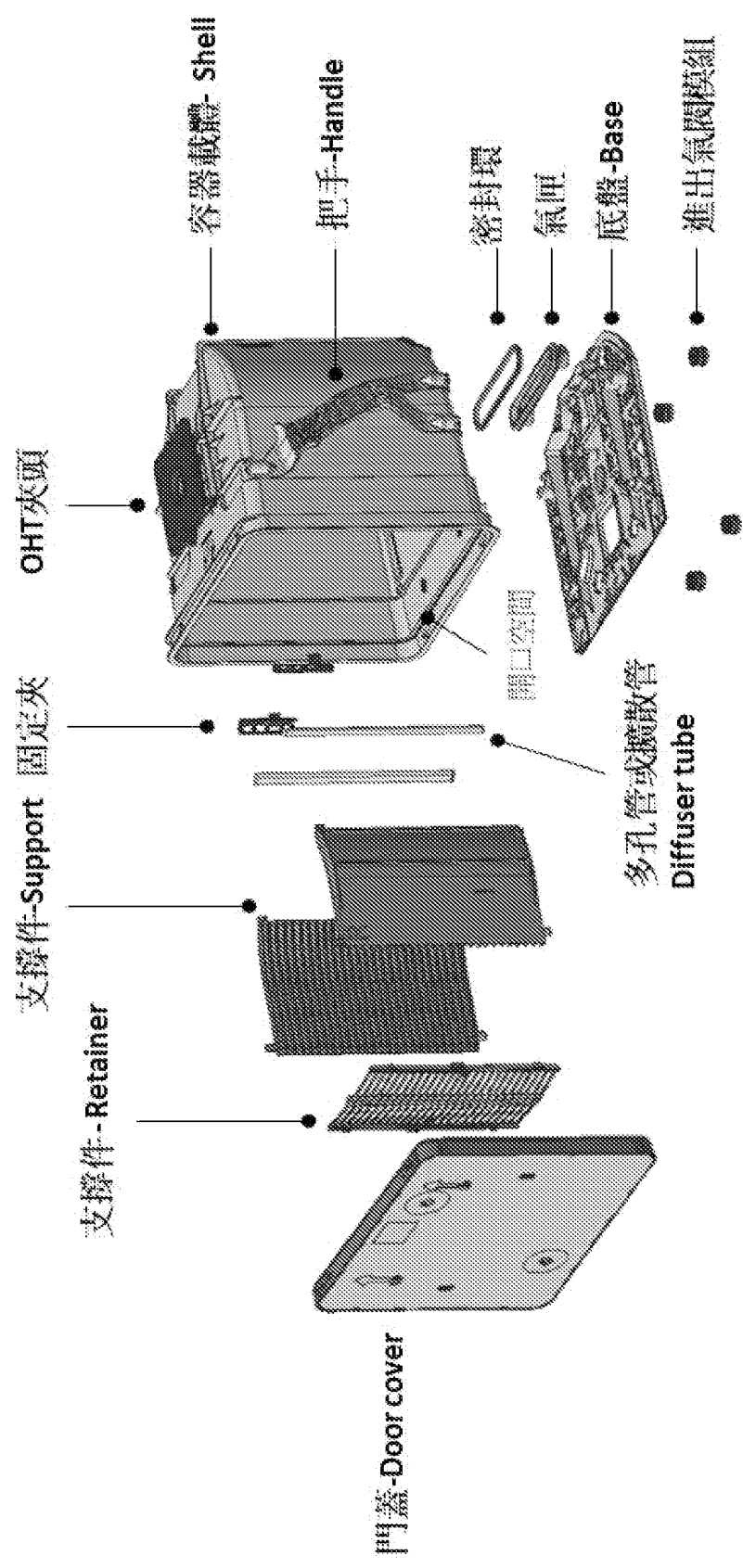


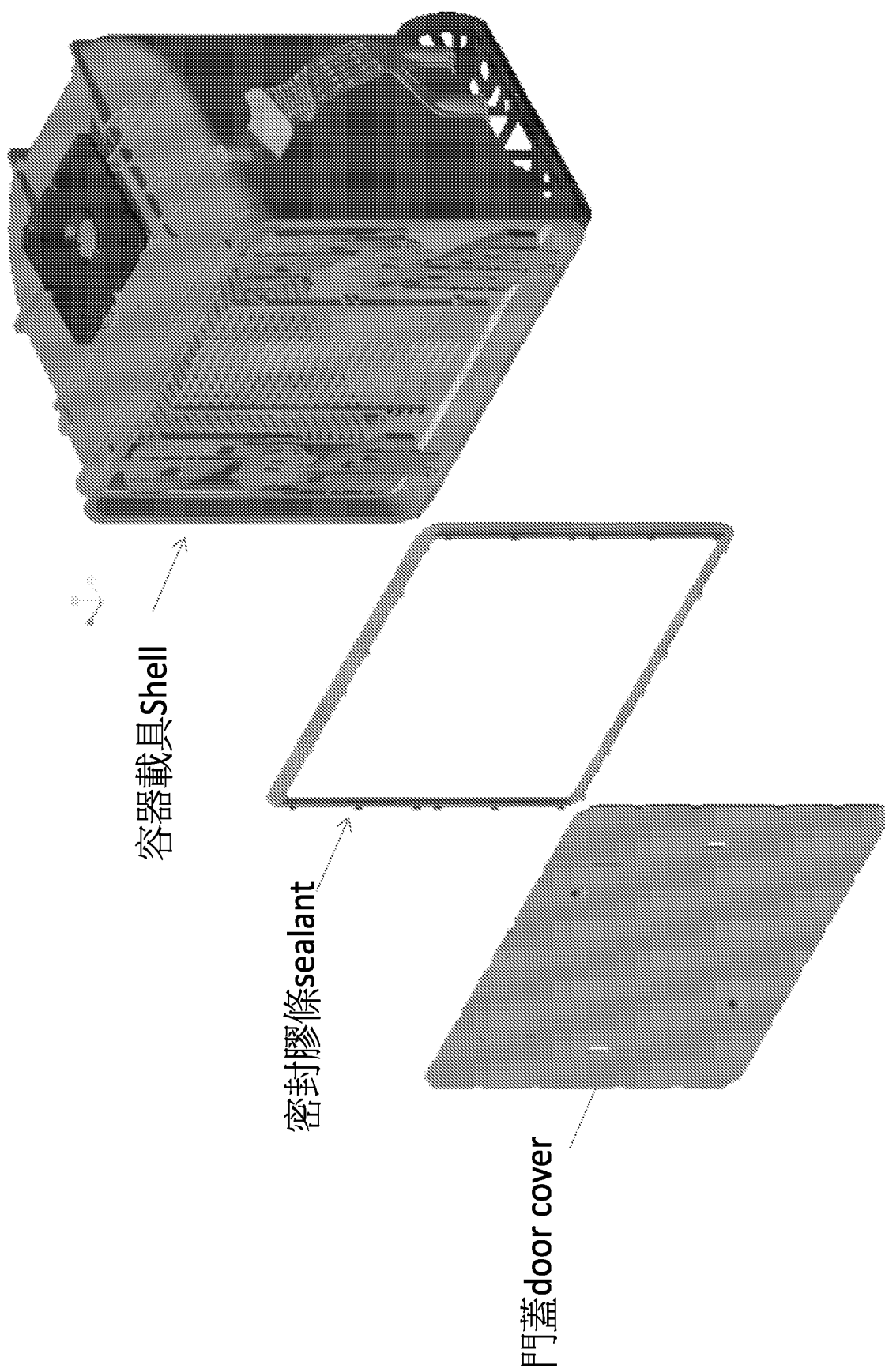
圖2B

本發明晶圓載具之爆炸圖



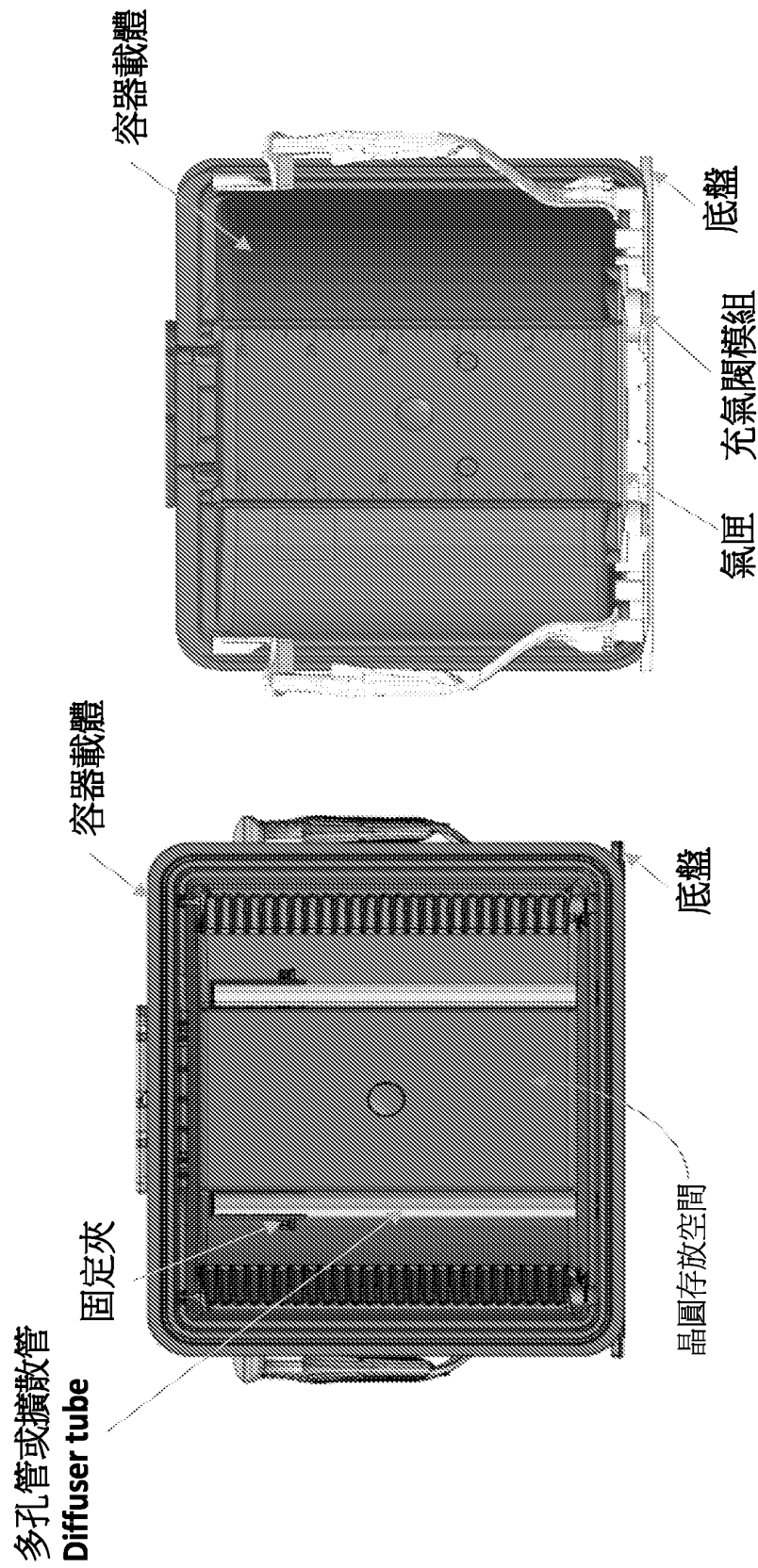
使用耐熱零件 耦合結構、固定夾、Shell、門蓋、Support、Support、Retainer、氣閥上件、密封膠條													
耐熱材質	PEEK	HTPC	FKM	PPS	PPO	氯化聚醚	POB	TORLON	EP	PF	PEI	PI	LCP
耐熱溫度℃	260	180	200	230	190	280	260	260	230	200	170	290	260

晶圓載具之底盤增加自潤性材質，可以減少摩擦力與增加潤滑性，確保底盤正確坐落於機器上。本發明欲解決的問題在於底盤的摩擦力太大時，底盤會無法滑入於機器的定位柱上



本發明載具之容器載體的前視圖與後視圖

- 容器載體的晶圓存放空間是由一頂板、一底板、一背板與一對相對的側板所環繞形成的一開口空間。當一門蓋蓋合於容器載體的開口時，該晶圓存放空間將形成一密封空間。
- 在本發明的一種實施例，該晶圓存放空間內設置兩多孔管靠近該背板，藉由固定夾將多孔管固定，由於多孔管與固定夾皆設置於內部空間內，所以多孔管與固定夾是使用耐熱材質的元件，如前述之耐熱元件及其材質、耐熱溫度條件表格。



- 圖3A顯示本發明容器載體的透明立體圖，其中藍線標示剖面線A-A。
- 圖3B顯示圖3A所示剖面線A-A之剖面圖。容器載體的底板下方安裝一底盤及一具有一緩衝氣室的氣匣，該底板形成一耦合結構，該耦合結構界定一具有一中心軸的貫穿通道，該貫穿通道連通該開口空間與該緩衝氣室，一多孔管的開口端安裝於該耦合結構。該氣匣的下方具有一進氣通道，該進氣通道內配置一充氣閥模組，且該充氣閥模組包含一逆止閥以界定一具有單一進氣方向之氣體進入該緩衝氣室。
- 該氣匣具有一朝上開口，該朝上開口涵蓋該底板所設置的貫穿通道且藉由一密封環來密封該緩衝氣室。
- 由於耦合結構連接於多孔管，且皆位於內部空間內，會因內部空間的高溫而受損或是縮短使用壽命而導致是效率變差，以及氣匣(密封環)也會間接接觸而受高溫影響元件性能，因此本發明耦合結構、多孔管、氣匣也都使用耐熱材質；尤以出氣閥主要是將內部空間的熱氣排掉，因出氣閥會直接受到高溫影響而受損，故也是使用耐熱材質的元件，如前述之耐熱材質、耐熱溫度條件表格。

多孔管

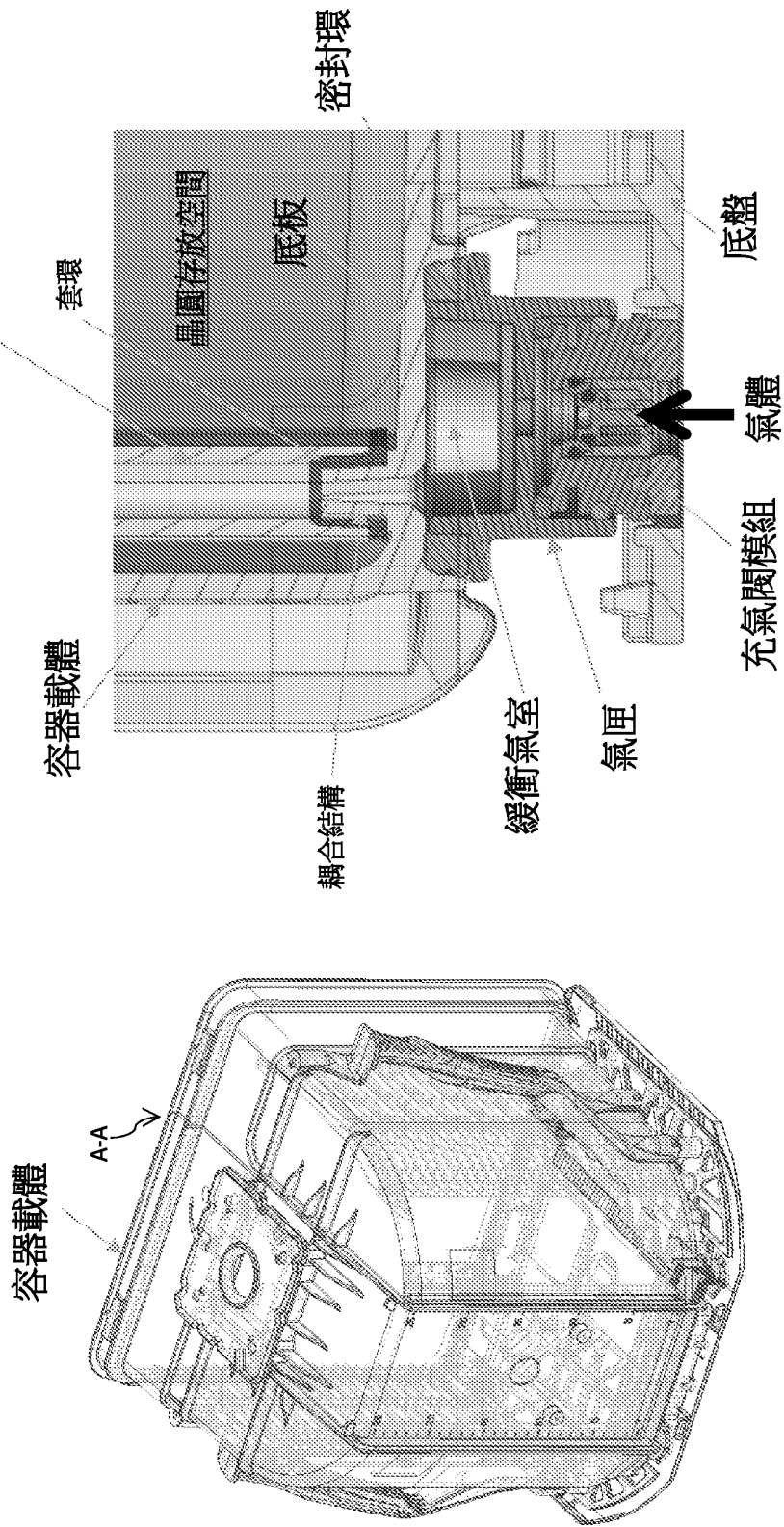


圖3A

圖3B

- 圖4A顯示本發明容器載體的另一立體圖，其中黑線標示剖面線B-B。
- 圖4B顯示圖4A所示剖面線B-B之剖面圖。多孔管具有一縱向空間，並藉由底板的貫穿通道連通縱向空間與緩衝氣室。經由充氣閥模組的氣體進入緩衝氣室，當該氣體填充該多孔管的縱向空間與該氣室的緩衝氣室達到一預設的壓力後，該緩衝氣室內的所有氣體會通過底板的所有貫穿通道經所有的多孔管均勻地擴散進入晶圓存放空間，並向著容器載體的開口方向出氣。
- 多孔管自底板往頂板所延伸的高度，盡可能覆蓋到該容器載具所能容納最大數量晶圓之堆疊高度，或至少大於最高位置的晶圓的上表面。

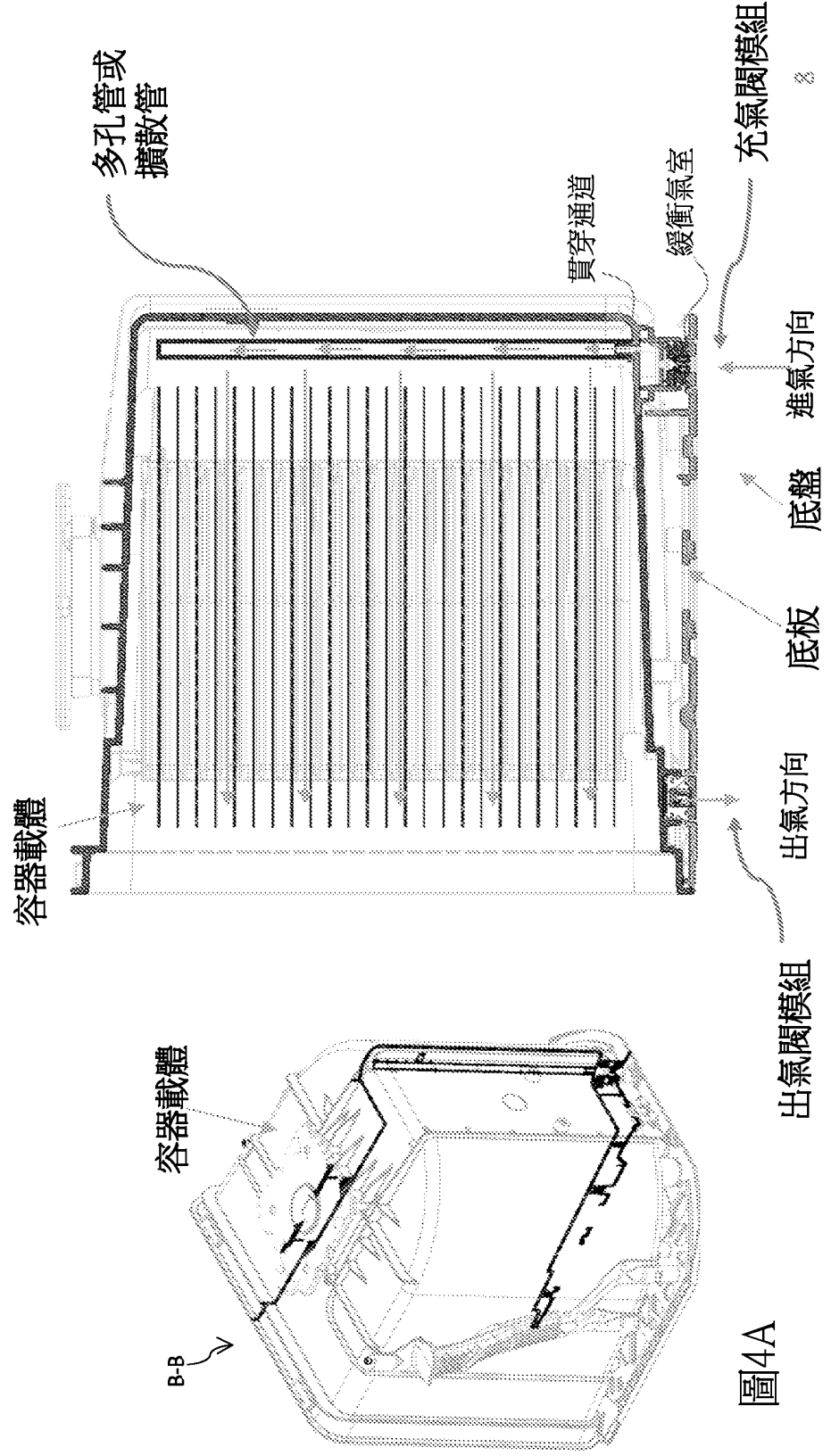


圖4B

- 圖5A顯示本發明容器載體的透明立體圖，其中黑線標示剖面線C-C。圖5B顯示圖5A所示剖面線C-C之剖面圖。
- 在本發明的一種實施例中，設置於底板下方的氣匣設置複數個進氣通道，且氣匣與底板間設置密封軟膠-5，每一進氣通道具有一中心軸線，該中心軸線經緩衝氣室，但未經該底板的貫穿通道，使該中心軸線不在多孔管的縱向空間內。換言之，多孔管與充氣閥模組不同中心軸線。
- 多孔管的開孔端套接於對應的耦合結構以組裝至底板，其中耦合結構的外壁設置一氣密套筒，以確保開孔端的氣密性，而開孔端的內壁設置一套環，以防止開孔端破裂。
- 充氣閥模組設置於氣匣對應的進氣通道內，該充氣閥模組包含一具有中央通道的塑膠本體，該中央通道設置逆止閥以界定單一進氣方向之氣體進入該緩衝氣室，塑膠本體外圍與氣匣往下延伸的環形側壁嚙合，其間設置密封軟膠-2、-3，以確保氣密性。反之，出氣閥模組設置在鄰近開口處，該出氣閥模組結構相似於該充氣閥模組，差異僅在於該逆止閥的組裝方向相反，以界定單一出氣方向之氣體排出該內部空間。

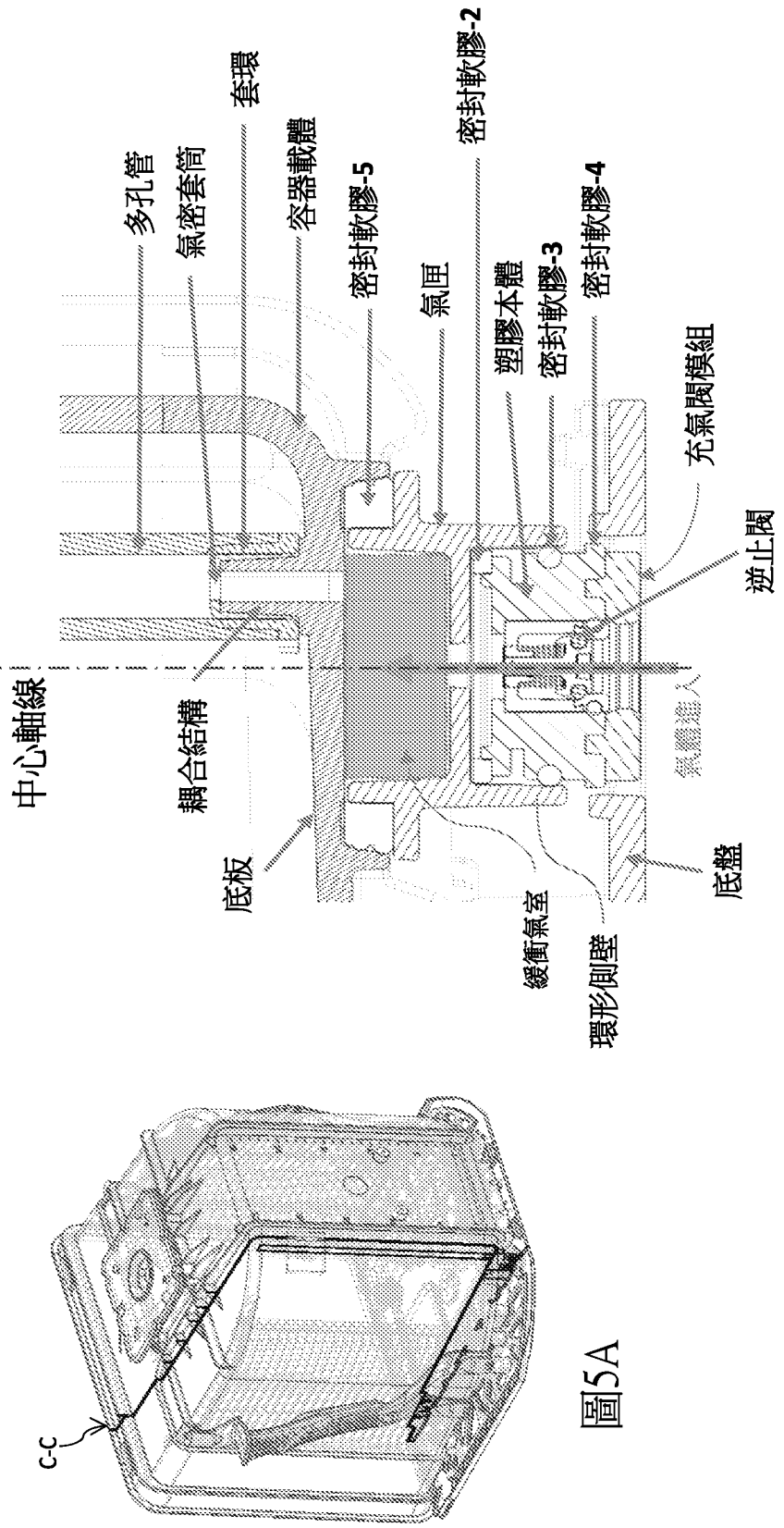


圖5B

- 圖7A,圖7B顯示本發明多孔管組裝的立體分解圖與剖面圖，圖7C顯示本發明多孔管組裝後的剖面圖。
- 在本發明的一種實施例中，多孔管的開孔端內壁設置一套環，以防止開孔端破裂的粉末汙染內部空間。底板形成一耦合結構，該耦合結構形成一貫穿通道，該貫穿通道連通緩衝氣室與多孔管的縱向空間，且耦合結構的外壁套接一軟質氣密套筒，以確保氣密性；軟質氣密套筒也是使用耐熱材質。

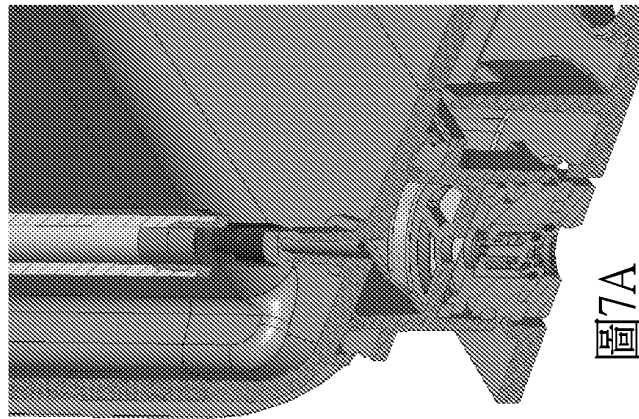


圖7A

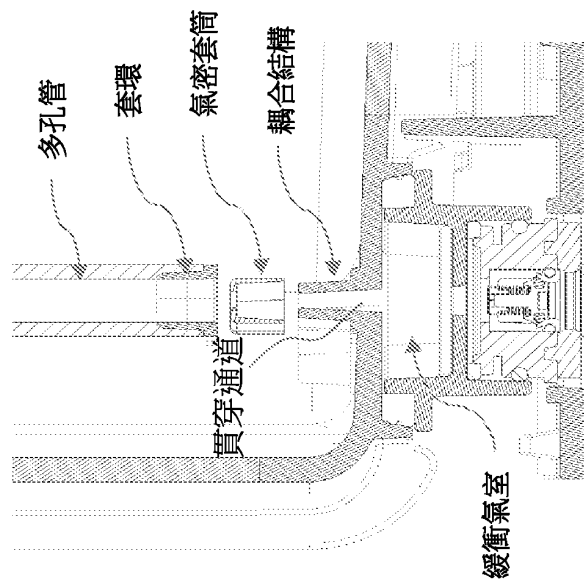


圖7B

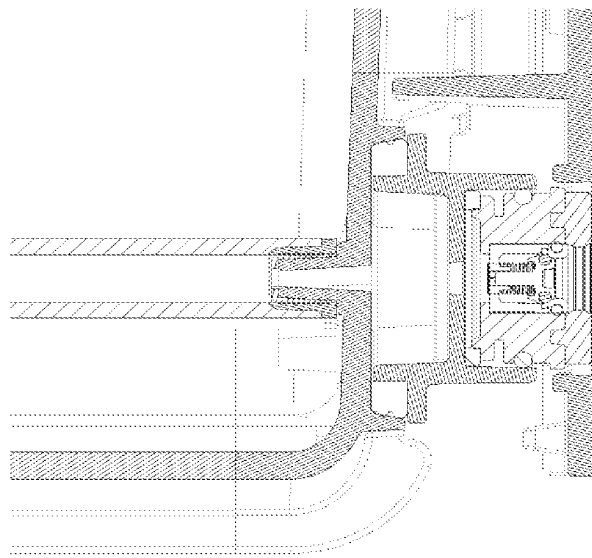
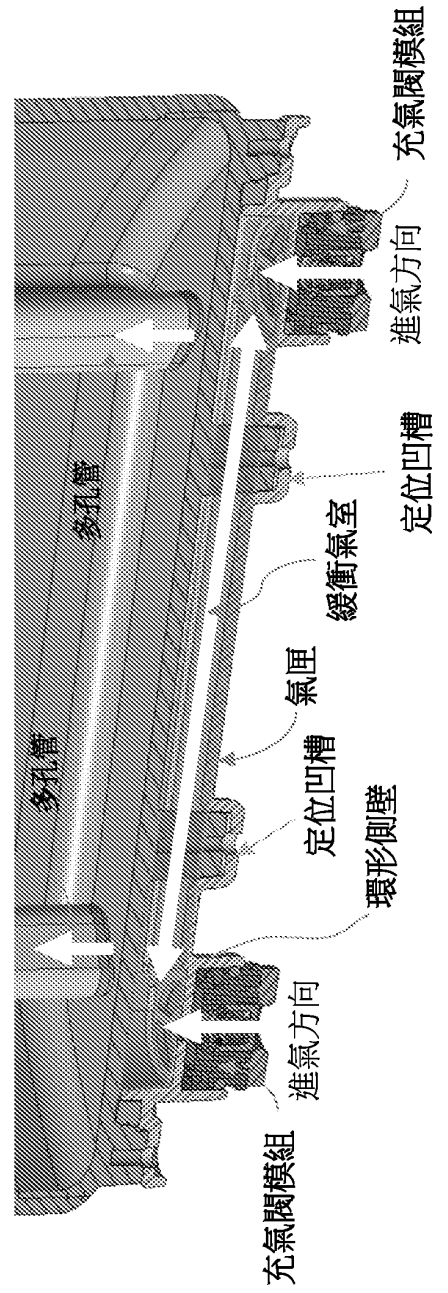
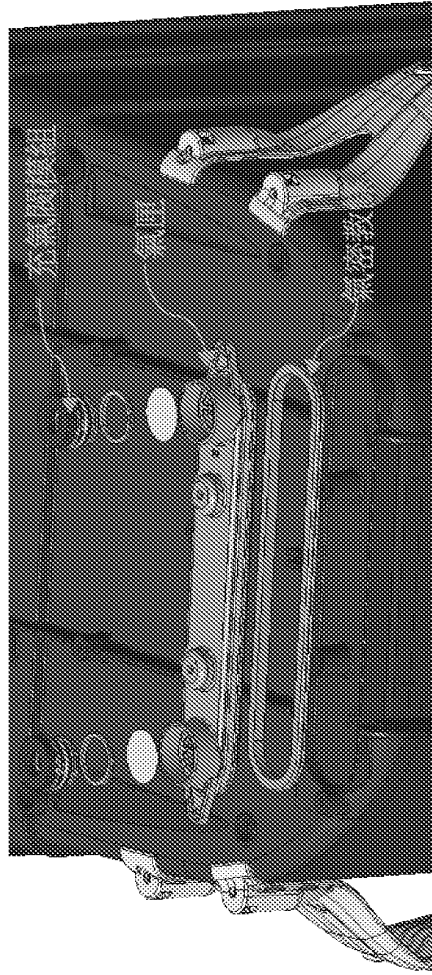


圖7C

- 請參考本發明氣匣的立體圖及組裝後的剖視圖，本發明氣匣具有一朝上開口之空間，當氣匣安裝於容器載具的底板下表面時，氣匣的朝上開口之空間涵蓋所有連通多孔管的貫穿通道，且氣匣與容器載具的底板下表面界定一緩衝氣室。
- 本發明氣匣的底板設置複數個進氣通道與至少一定位凹槽，該定位凹槽配合對應自容器載具的底板下表面往下延伸的定位柱。氣匣的底板下表面對應進氣通道形成一往下延伸的環形側壁，該環形側壁用以嚙合一充氣閥模組，以界定具有單一進氣方向的進氣通道。
- 本發明載具，在容器載具的進氣通道提供額外空間的緩衝氣室，該緩衝氣室除了可以提供工作流體的滯留空間之外，該空間亦可放置乾燥劑、有機物吸附劑、微塵過濾材等，以淨化氣體降低晶圓汙染可能。



本發明所欲保護之技術特徵

1. 一種晶圓載具，包含：
 - 一殼體，具有一內部空間；
 - 一氣體擴散結構，配置於該殼體的一底部，該氣體擴散結構具有一緩衝氣室、複數個連通通道以及複數個進氣通道，該連通通道與該殼體的該內部空間相連通；
 - 複數個氣閥模組，包括充氣閥與出氣閥，該充氣閥配置於對應的該進氣通道，以界定一具有單一進氣方向之氣體進入該緩衝氣室，該出氣閥配置於該殼體的出氣通道，以界定一具有單一出氣方向之氣體排出該殼體之該內部空間中的高溫氣體；以及
 - 複數個多孔管，配置於該開口空間內，且分別連通對應的該連通通道，使該緩衝氣室內氣體通過複數個多孔管進入該殼體的該內部空間；其中，該氣體擴散結構、複數個氣閥模組與複數個多孔管視為耐熱材質，該耐熱材質包括PEEK、HTPC、FKM、PPS、PPO、氯化聚醚、POB、TORLON、EP、PF、PEI、PI或LCP、或以上之至少兩種之組合。

本發明所欲保護之技術特徵

2.一種晶圓載具，包含：

一殼體，具有一內部空間，該內部空間設置有複數個耦合結構，每一該耦合結構界定一具有一中心軸的貫穿通道，並連通該內部空間；

一氣體擴散結構，配置於該殼體的一底部，該氣體擴散結構具有一緩衝氣室、複數個連通通道以及複數個進氣通道，該連通通道與該殼體的該內部空間與該耦合結構相連通；

複數個氣閥模組，包括充氣閥與出氣閥，該充氣閥配置於對應的該進氣通道，以界定一具有單一進氣方向之氣體進入該緩衝氣室，該出氣閥配置於該殼體的出氣通道，以界定一具有單一出氣方向之氣體排出該殼體之該內部空間的高溫氣體；以及

複數個多孔管，配置於該開口空間內，該耦合結構對應耦接於該多孔管，複數個多孔管分別連通對應的該連通通道，使該緩衝氣室內氣體通過複數個多孔管進入該殼體的該內部空間；

其中，該氣體擴散結構、複數個氣閥模組、複數個多孔管與複數個耦合結構為耐熱材質，該耐熱材質包括PEEK、HTPC、FKM、PPS、PPO、氯化聚醚、POB、TORLON、EP、PF、PEI、PI或LCP、或以上之至少兩種之組合。

本發明所欲保護之技術特徵

3.一種晶圓載具，包含：

一殼體，具有一內部空間；

一氣體擴散結構，配置於該殼體的一底部，該氣體擴散結構具有一緩衝氣室、複數個連通通道以及複數個進氣通道，該連通通道與該殼體的內部空間相連通；

複數個氣閥模組，包括充氣閥與出氣閥，該充氣閥配置於對應的該進氣通道，以界定一具有單一進氣方向之氣體進入該緩衝氣室，該出氣閥配置於該殼體的出氣通道，以界定一具有單一出氣方向之氣體排出該殼體之該內部空間的高溫氣體；

複數個多孔管，配置於該開口空間內，且分別連通對應的該連通通道，使該緩衝氣室內氣體通過複數個多孔管進入該殼體的該內部空間，每一該多孔管具有一縱向空間，該縱向空間具有一封閉端與一開孔端，其中，該開孔端設置一套環，該套環用以緩衝該多孔管組裝至一晶圓載具的一底板，以避免該開孔端破裂；以及

其中，該氣體擴散結構、複數個氣閥模組、複數個多孔管與該套環為耐熱材質，該耐熱材質包括PEEK、HTPC、FKM、PPS、PPO、氯化聚醚、POB、TORLON、EP、PF、PEI、PI或LCP、或以上之至少兩種之組合。

本發明所欲保護之技術特徵

4.一種晶圓載具，包含：

一殼體，包括一晶圓開口及其連通該晶圓開口的一內部空間；

一門蓋，具有一密封元件，該門蓋利用該密封元件以密封組裝於該殼體的該晶圓開口；

一氣體擴散結構，配置於該晶圓載具的一底部，該氣體擴散結構具有一緩衝氣室、複數個連通通道以及複數個進氣通道，該連通通道與該晶圓載具的內部空間相連通；

複數個氣閥模組，包括充氣閥與出氣閥，該充氣閥配置於對應的該進氣通道，以界定一具有單一進氣方向之氣體進入該緩衝氣室，該出氣閥配置於該晶圓載具的出氣通道，以界定一具有單一出氣方向之氣體排出該晶圓載具之該內部空間的高溫氣體；

複數個多孔管，配置於該開口空間內，且分別連通對應的該連通通道，使該緩衝氣室內氣體通過複數個多孔管進入該晶圓載具的該內部空間；以及其中，該氣體擴散結構、複數個氣閥模組、複數個多孔管與該密封元件為耐熱材質，該耐熱材質包括PEEK、HTPC、FKM、PPS、PPO、氯化聚醚、POB、TORLON、EP、PF、PEI、PI或LCP、或以上之至少兩種之組合。

1. 新設計發明主要針對從充氣閥進入多孔管的氣體通道修正為直通多孔管的縱長空間內，加上多孔管設計思維為由圓形變成多形狀，使其多孔管形體可以做任意的形狀改變，來達到改變氣流的方向及增大出氣面積。
2. 此新式樣實現了高性能吹洗模組，透過管子形體改變及修改氣體路徑，且進氣氣體通道由轉折變成直通，可以大幅度提升吹掃能力，有效降低開門時內部溼度回升。
3. 新式樣設計在多孔管後方增加檔板，藉由檔板可以任意改變氣流方向。
4. 新式樣設計使充氣閥的中心軸位於不同形體之多孔管的縱長空間內或截面範圍內可解決習知技術為將充氣閥及入口接頭做偏置，侷限於偏置加上圓形管達到氣體擴散功能。但受限氣體偏置會使氣流行進間繞折，導致氣流達到多孔管之時間及流暢度不順暢之技術問題。

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Title of Invention:		WAFER CARRIER		
First Named Inventor/Applicant Name:		MING-CHIEN CHIU		
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Attorney Docket Number:		P07449-F052		
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	P07449-F052-ADS.pdf	1256090	no	9
			2b4d63866249317940b65d33ee103622a1df386c		
Warnings:					
Information:					
2	Specification	P07449-F052-Content.pdf	8393056	no	16
			23e0e285cd307e47e58c28dff1d2a164d2e775ab		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	37359	no	2
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