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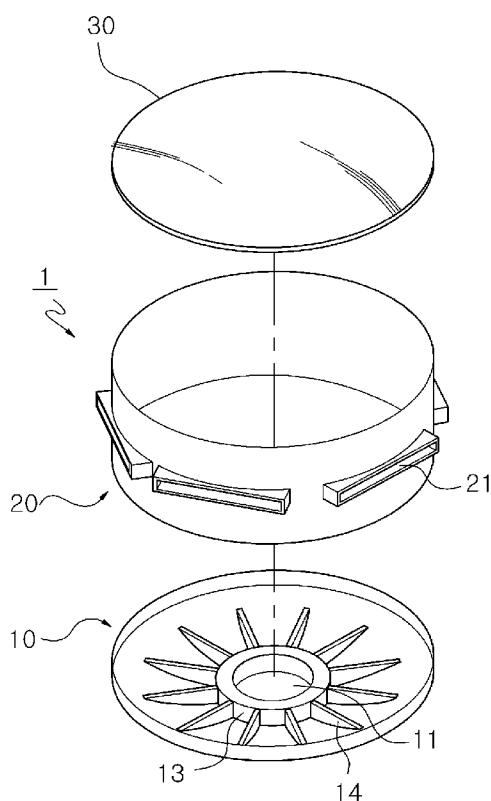
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[Continued on next page]

(54) Title: TRANSFER CHAMBER FOR VACUUM PROCESSING APPARATUS OF SUBSTRATE



(57) Abstract: The present invention relates to a transfer chamber for vacuum processing apparatus of substrate including a cylindrical side wall 20 having a round outer circumference surface and top and bottom plates 30 and 10 coupled to top and lower portions of the side wall 20 respectively. Also, the side wall 20 includes a plurality of gates 21, the top plate 30 is rounded upward, and the bottom plate 10 is rounded downward. Moreover, the bottom plate 10 includes a mounting hole 11 for mounting the transfer robot located at a center thereof.

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## **Description**

### **TRANSFER CHAMBER FOR VACUUM PROCESSING APPARATUS OF SUBSTRATE**

#### **Technical Field**

- [1] The present invention relates to a transfer chamber for vacuum processing apparatus of substrate, and more particularly, to a transfer chamber for vacuum processing apparatus of substrate in which a cylindrical side wall thereof has a round outer circumference surface, so that a vacuum pressure of the inside of the chamber is efficiently dispersed and a plurality of chamber pieces is separately formed and then, coupled to each other.

#### **Background Art**

- [2] Recently, according to a rapid progress and growth of market of a telecommunication technique, a flat panel display as a display element is in the limelight. The flat panel display divides into a liquid crystal display, a plasma display panel, an organic light emitting diodes and so on.
- [3] Here, the liquid crystal display is manufactured by an evaporation process for evaporating a dielectric material and so forth on the glass substrate in the form of a thin film, a photolithography process for exposing or covering up the selected areas of the thin film, and etching process for removing the selected areas in order to be patterned according to the intent, and a washing process for removing the residue. Each process is performed in a chamber of the optimum surroundings.
- [4] Here, the chamber for vacuum process can be arranged in process order or a plurality of chamber can be arranged around the transfer chamber in a cluster.
- [5] The conventional vacuum processing device of a cluster type includes a plurality of process chambers, the load-lock chamber connected to the process chambers around the transfer chamber, and a cassette for loading a plurality of substrates connected to one side surface of the load-lock chamber.
- [6] In this manner, since the substrates are carried in or out the plurality of process chambers by means of one transfer chamber, the transfer chamber should be larger than other process chamber. Moreover, according to the increasing of substrate in size, the phenomenon must of necessity be so.
- [7] However, it is difficult to manufacture the transfer chamber of a large volume. Also, there are problems in that it has difficulty in carrying the manufactured transfer chamber, layout in a job site, and maintenance and repair thereof.
- [8] In order to solve these problems, a plenty of studies have been made.
- [9] As a representative prior art, Korean patent publication No. 2005-0122090 discloses

a separating type vacuum chamber of a panel fabrication device for flat panel display including a top plate located at the upper portion of the chamber, a bottom plate opposed to the top plate and located at the lower portion of the chamber, a wall plate having an internal airtight space and a protrusion protruded along the inner circumference of the chamber in order to form a stepped portion at an end portion connected to the bottom plate, a cover member for covering the bottom plate and the upper portion of the protrusion formed at the end of the wall plate connected to the bottom plate along the inner circumference of the chamber, and a sealing member for shielding the inside of the chamber interposed between the bottom plate and the upper portion of the protrusion and the cover member.

- [10] Korean patent publication No. 2005-0113574 discloses a vacuum chamber for vacuum process device capable of freely separating including a chamber body of a polygonal frame type and an opening, a polygonal side frame attached and deattached to at least one side of the chamber body and having an opening, each top plate bonded to the each top surface of the chamber body and the side frame having the opening, and each bottom plate bonded to the each bottom surface of the chamber body and the side frame having the opening.
- [11] Korean patent publication No. 2005-0086265 discloses a separating vacuum chamber for fabricating a liquid crystal display, in that a chamber structure having a wall surface of the vacuum chamber is divided into at least two pieces and the manufactured pieces are assembled with the inner parts.
- [12] Korean patent publication No. 2005-0071933 discloses a window for vacuum chamber having an outer circumference portion of a metal material and a transparent central portion including a doorframe, a sealing portion made of an elastic material attached to a sealing member path formed at a predetermined region of the inside of the outer circumference portion, a plurality of link supporters protruded at a predetermined region of one side of the doorframe and having a first link coupling groove, a chamber coupling portion coupled to a predetermined region of the vacuum chamber body and having a second link coupling groove, a first link portion having the first link coupling groove and a first link pin, a second link portion having the second link coupling groove and a second link pin, a link connection portion having a third link groove connected to the first link coupling groove and the first link pin, a fourth link groove connected to the second link coupling groove and the second link pin, and a connector, and a coupling portion having a plurality of coupling bolts, which are penetrated through a plurality of coupling grooves formed at a predetermined area of the outer circumference portion, coupled to the vacuum chamber in order to couple the doorframe to the vacuum chamber.
- [13] Korean patent publication No. 2005-0062190 discloses a vacuum chamber vessel

including a top case, bottom case, a vacuum chamber touched with the top and bottom cases and having a part including an opening portion of a vacuum packing paper exposed to the inside thereof, a storage chamber for receiving the remainder of the vacuum packing paper touched with the top and bottom cases, an outer chamber touched with the top and bottom cases, and a vacuum valve for opening and closing the air passage passing through the outer chamber formed at any one side of the top case or bottom case, wherein the outer chamber surrounds the vacuum chamber and storage chamber and check valves are formed at the vacuum chamber and storage chamber so as to pass the internal air through the outer chamber.

- [14] Korean patent publication No. 2004-0060599 discloses a vacuum chamber including a first ingot having a bottom surface and a side surface, a second ingot having a side surface identical with that of the first ingot, and a bonding means for bonding and sealing the first ingot and the second ingot.
- [15] Japanese patent publication No. 2006-137995 discloses a vacuum chamber including a polyhedral chamber body having a processing space, an opening passing through the processing space, a sealing means for covering the opening and maintaining the vacuum status of the processing space, wherein the chamber body includes a plurality of chamber pieces and flange portions are extended from at least one bonding surface of each chamber piece, so that the opposed flange portions are bonded to each other to complete the assemble of the chamber body.
- [16] Japanese patent publication No. 2004-363601 discloses a transfer chamber for cluster having process chambers for processing a processing object and connecting to each other and a transfer space for transferring the processing object to each processing chamber, wherein the transfer chamber includes a first body and a second body connected to the first body and having a space for transferring the processing object with the first body.
- [17] The conventional transfer chamber will be described in detail below with reference to FIG. 1 and FIG. 2.
- [18] As shown in FIG. 1 and FIG. 2, the transfer chamber 100 for vacuum processing apparatus of substrate includes a central chamber 110 having a rectangular side wall 111 and top and bottom plates 112 and 113 coupled to the side wall 111, a side chamber 120 having a triangle side wall 121 and top and bottom plates 123 and 122 coupled to the side wall 121 separated from the central chamber 110, and a mounting hole 112a for mounting the transfer robot (not shown) located at a center thereof.
- [19] As shown in FIG. 2, two side chambers 120 are coupled to the central chamber 110 to constitute the hexagonal transfer chamber. The plurality of road-lock chambers and process chambers is coupled to each side of the transfer chamber 100.
- [20] However, in the conventional transfer chamber 100, since the side walls 111 and

121 of the central chamber 110 and side chamber 120 are in the form of a planar plate, the vacuum pressure is concentrated on the central portion thereof rather than the periphery thereof, as shown in FIG. 3 and FIG. 4. Accordingly, the bending phenomenon can be generated at the central portion of the side walls 111 and 121 that vacuum pressure is concentrated on. Also, in severe cases, a crack can be generated at the corner thereof.

[21] In order to overcome the problem, it is necessary to thicken the thickness  $t$  of the side wall of the chamber more than needs and add a reinforcement member. However, it can bring about the increase of the fabrication cost.

[22] Also, the substrates are repeatedly carried in and out the load-lock chamber through the transport robot of the transfer chamber. In this case, as time goes on, pieces of broken substrates or particles and so on can be generated at the inside of the transport chamber. Moreover, a resetting thereof is demanded according to the disorder of the transport robot or the operation surroundings thereof.

[23] In order to maintain and repair it, the top plate of the transport chamber is opened and a lid (not shown) is coupled to the opening portion through a screw. However, during the maintenance and repair thereof, the lid is opened through a crane in order to repair it.

[24] However, in this case, since the plurality of screws is released and the lid is lifted up through the crane, there are problems in that the operation is often effort and time consuming.

## **Disclosure of Invention**

### **Technical Problem**

[25] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is to provide to a transfer chamber for vacuum processing apparatus of substrate in which a cylindrical side wall thereof has a round outer circumference surface, so that a vacuum pressure of the inside of the chamber is efficiently dispersed and a plurality of chamber pieces is separately formed and then, coupled to each other.

[26] Another object of the present invention is to provide to a transfer chamber for vacuum processing apparatus of substrate in which a door for maintenance and repair is formed at a side wall thereof, whereby the maintenance and repair operation can be easily performed.

### **Technical Solution**

[27] To achieve the above object of the present invention, there is provided a transfer chamber for vacuum processing apparatus of substrate comprising: a cylindrical side wall having a round outer circumference surface; and top and bottom plates coupled to

top and lower portions of the side wall respectively.

[28] Preferably, the horizontal section thereof is a circular shape or an oval type.

[29] Preferably, the side wall and the top and bottom plates divide into at least two parts coupled to each other respectively.

[30] Preferably, the top plate is rounded upward and the bottom plate is rounded downward, so that it can effectively disperse the vacuum pressure of the inside of the chamber.

### **Advantageous Effects**

[31] As described above, according to the transfer chamber for vacuum processing apparatus of substrate, the cylindrical side wall thereof has the round outer circumference surface, so that a vacuum pressure of the inside of the chamber can be efficiently dispersed, whereby the bending phenomenon caused by the conventional plate type side wall can be prevented. Accordingly, the thickness of the side wall thereof becomes thin, so that it can decrease the fabrication cost.

[32] Also, the top plate is rounded upward and the bottom plate is rounded downward, so that the bending phenomenon can be prevented and a plurality of chamber pieces is separately formed and then, coupled to each other, so that the fabrication, transportation, and maintenance and repair thereof are very easy.

[33] Moreover, the door for maintenance and repair formed at the side wall thereof is opened to perform the maintenance and repair operation, so that the operation is very easy and the expenses, effort and time can be cut down without opening the lid by using a crane during maintenance and repair thereof.

### **Brief Description of the Drawings**

[34] The above as well as the other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[35] FIG. 1 is an exploded perspective view illustrating a conventional transfer chamber for vacuum processing apparatus of substrate;

[36] FIG. 2 is a perspective view illustrating the conventional transfer chamber for vacuum processing apparatus of substrate;

[37] FIG. 3 and FIG. 4 are distribution charts of a vacuum pressure of the conventional transfer chamber shown in FIG. 1 and FIG. 2;

[38] FIG. 5 is an exploded perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to the present invention;

[39] FIG. 6 is an exploded perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to another embodiment of the present invention;

- [40] FIG. 7 is a vertically sectional view illustrating a coupling status of FIG. 5;
- [41] FIG. 8 is an exploded perspective view illustrating a bottom plate according to the present invention;
- [42] FIG. 9 and FIG. 10 are distribution charts of a vacuum pressure of the transfer chamber shown in FIG. 5 and FIG. 6;
- [43] FIG. 11 through FIG. 15 are exploded perspective views illustrating transfer chambers for vacuum processing apparatus of substrate according to further another embodiment of the present invention;
- [44] FIG. 16 is a perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to further another embodiment of the present invention;
- [45] FIG. 17 is a perspective view illustrating a operation status of the transfer chamber shown in FIG. 16;
- [46] FIG. 18 is a planar view illustrating the transfer chamber shown in FIG. 16; and
- [47] FIG. 19 and FIG. 20 are planar views illustrating a transfer chamber for vacuum processing apparatus of substrate according to further another embodiment of the present invention.

### **Best Mode for Carrying Out the Invention**

- [48] A preferred embodiment of the invention will be described in detail below with reference to the accompanying drawings.
- [49] FIG. 1 is an exploded perspective view illustrating a conventional transfer chamber for vacuum processing apparatus of substrate, FIG. 2 is a perspective view illustrating the conventional transfer chamber for vacuum processing apparatus of substrate, FIG. 3 and FIG. 4 are distribution charts of a vacuum pressure of the conventional transfer chamber shown in FIG. 1 and FIG. 2, FIG. 5 is an exploded perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to the present invention, FIG. 6 is an exploded perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to another embodiment of the present invention, FIG. 7 is a vertically sectional view illustrating a coupling status of FIG. 5, FIG. 8 is an exploded perspective view illustrating a bottom plate according to the present invention, FIG. 9 and FIG. 10 are distribution charts of a vacuum pressure of the transfer chamber shown in FIG. 5 and FIG. 6, FIG. 11 through FIG. 15 are exploded perspective views illustrating transfer chambers for vacuum processing apparatus of substrate according to further another embodiment of the present invention, FIG. 16 is a perspective view illustrating a transfer chamber for vacuum processing apparatus of substrate according to further another embodiment of the present invention, FIG. 17 is a perspective view illustrating a operation status of the



transfer chamber shown in FIG. 16, FIG. 18 is a planar view illustrating the transfer chamber shown in FIG. 16, and FIG. 19 and FIG. 20 are planar views illustrating a transfer chamber for vacuum processing apparatus of substrate according to further another embodiment of the present invention.

- [50] As shown, the transfer chamber 1 for vacuum processing apparatus of substrate according to the present invention includes bottom plates 10, 10a, 10b, and 10c, a mounting hole 11, a central portion 12, a robot mounting portion 13, reinforced-wire materials 14, flanges 15a, 15a', 15b, and 15b', a bolt 16, side walls 20, 20a, 20b, and 20c, gates 21, 41, and 51, top plates 30, 30a, 30b, and 30c, connecting portions 40 and 50, chamfers 61, 62, 63, and 64, and a door 70.
- [51] As shown in FIG. 5 through FIG. 7, the transfer chamber 1 for vacuum processing apparatus of substrate according to the present invention includes a cylindrical side wall 20 having a round outer circumference surface and top and bottom plates 30 and 10 coupled to top and lower portions of the side wall 20 respectively.
- [52] Here, the side wall 20 includes a plurality of gates 21. Also, the top plate 30 is rounded upward and the bottom plate 10 is rounded downward. The bottom plate 10 includes a mounting hole 11 for mounting the transfer robot (not shown) located at a center thereof.
- [53] Also, as occasion demands, as shown in FIG. 6, the bottom plate 10 further includes a cylindrical robot mounting portion 13 formed along a periphery of the mounting hole 11 and reinforced-wire materials 14 formed radially around the cylindrical robot mounting portion 13.
- [54] Furthermore, as occasion demands, as shown in FIG. 8, the bottom plate 10 divides into three parts 10a, 10b and 10c. Accordingly, since the bottom plate 10 can be separated, the fabrication, transportation, and maintenance and repair thereof are very easy.
- [55] Moreover, as shown in FIG. 12 and FIG. 13, the side wall 20 and top plate 30 can divide into three parts respectively.
- [56] More concretely, as shown in FIG. 5 through FIG. 7, the transfer chamber 1 for vacuum processing apparatus of substrate according to the present invention includes the cylindrical side wall 20, the top plate 30, and the bottom plate 10. Here, the side wall 20 is in the form of a cylindrical type and has a round outer circumference surface.
- [57] Especially, it can be seen that the side wall 20 is roundly formed. Also, the side wall 20 is provided with the plurality of gates 21 for carrying the substrates in and out the adjacent load-lock chamber or processing chamber.
- [58] Since the side wall 20 is in the form of a cylindrical type, not a polygon one, it can effectively disperse the vacuum pressure.

- [59] Like the side wall having the round outer circumference surface, the top plate 30 is rounded upward and the bottom plate 10 is rounded downward.
- [60] Especially, the bottom plate 10 is rounded downward, so that the entire shape thereof is a hemisphere or similar to the hemisphere.
- [61] Also, the mounting hole 11 for mounting the transfer robot (not shown) is located at the center of the bottom plate 10. As occasion demands, the cylindrical robot mounting portion 13 is formed along the periphery of the mounting hole 11 and the reinforced-wire materials 14 can be formed radially around the cylindrical robot mounting portion 13.
- [62] The top plate 30 can be coupled to the top surface of the side wall 20 by means of a welding or a screw (note FIG. 14 and FIG. 15). Like the bottom plate 10, the top plate is protruded upward. Here, the top plate 30 is also, rounded downward, so that the entire shape thereof is a hemisphere or similar to the hemisphere.
- [63] The operation of the vacuum pressure of the transfer chamber 1 for vacuum processing apparatus of substrate according to the present invention will be described in detail below with reference to FIG. 9 and FIG. 10.
- [64] The process of the transfer chamber 1 is performed in a vacuum, so that the vacuum pressure is generated in the transfer chamber 1. Here, since the cylindrical side wall 20 has the round outer circumference surface, the vacuum pressure can be evenly dispersed.
- [65] Accordingly, it can prevent the side wall 20 from being bent owing to the vacuum pressure. Also, since the top plate 30 and bottom plate 10 are roundly formed, it can prevent them from being bent owing to the vacuum pressure.
- [66] In the meantime, as shown in FIG. 11, the side wall 20 shown in FIG. 5 and FIG. 6 divides into three parts 20a, 20b, and 20c and then, they can be coupled to each other. Accordingly, since the side wall 20 can be separated, the fabrication, transportation, and maintenance and repair thereof are very easy.
- [67] Also, as shown in FIG. 8, the bottom plate 10 and top plate 30 divide into three parts, respectively and then they can be coupled to each other.
- [68] Here, in the embodiment of the present invention, the side wall 20 and top plate 30 of the transfer chamber 1 divide into three parts, respectively. However, only side wall 20 of the transfer chamber 1 divides into three parts and the top plate 30 can be integrally formed.
- [69] FIG. 14 and FIG. 15 are exploded perspective views illustrating transfer chambers for vacuum processing apparatus of substrate according to further another embodiment of the present invention.
- [70] As shown, the top plate 30 including a central portion 30a and two side portions 30b and 30c is coupled to three parts 20a, 20b, and 20c of the side wall 20. That is, the

central portion 30a of the top plate 30 is coupled to the side wall 20 by means of the bolt and nut 16 and two side portions 30b and 30c of the top plate 30 are coupled to two side parts 20b and 20c of the side wall 20 by means of the welding.

[71] In other words, two side portions 30b and 30c of the top plate 30 are not separated from two side parts 20b and 20c of the side wall 20 while the central portion 30a of the top plate 30 can be attached and deattached to the side wall 20a.

[72] In order to attach and deattach the central portion of the top plate 30 thereto, the flanges 15a and 15b are integrally formed at the central portion 30a of the top plate 30 and the side wall 20a. Accordingly, in a status that the flanges 15a and 15b are adhered to each other, they are coupled to each other by means of the bolts 16. Here, in order to maintain the airtight, a sealing means (not shown) such as an O-ring and so on can be interposed between the flanges 15a and 15b.

[73] As shown in FIG. 14, the flange is extended to the outside of the side wall 20a. Meanwhile, as shown in FIG. 15, the flange is extended to the inside of the side wall 20a.

[74] Accordingly, since the central portion of the top plate 30 can be attached and deattached thereto, the central portion can be open to outside in order to maintain and repair it. Here, it is preferred that the side wall opened through the central portion can carry the transfer robot.

[75] FIG. 16 and FIG. 17 are perspective views illustrating transfer chambers for vacuum processing apparatus of substrate according to further another embodiment of the present invention.

[76] As shown in FIG. 16 and FIG. 17, the connecting portions 40 and 50 for connecting the load-lock chamber and processing chamber are formed at the side wall of an approximately rectangular pillar and the gates 41 and 51 for carrying the substrates in and out the adjacent load-lock chamber or processing chamber are provided.

[77] As shown in FIG. 18, the side wall further includes the chamfers 61, 62, 63, and 64 and the door 70 for maintenance and repair formed at the chamfers. That is, the door 70 for maintenance and repair is formed at the chamfers 61, 62, 63, and 64 formed between the connecting portions 40 and 50 connected to the load-lock chamber or processing chamber. Here, the door 70 for maintenance and repair is sealed by means of a well-known method.

[78] The door 70 for maintenance and repair can be formed at all chamfers 61, 62, 63, and 64. Of course, the door 70 for maintenance and repair can be formed on at least one chamfer. Also, it is not limited to the size of the door in the present invention.

[79] As shown in FIG. 17, in case of need of maintenance and repair, without opening the lid by using a crane, the door 70 for maintenance and repair can be opened to perform the operation.

[80] As shown in FIG. 19 and FIG. 20, the side wall further includes other chamfers 61', 62', and 63' formed at three corners of the side wall of a triangle pillar type and the door (not shown) for maintenance and repair is formed on at least one chamfer.

[81] Here, the present invention is no limited to the shape of the side wall. That is, the side wall may be in the form of various polygonal pillars.

[82] Referring to FIG. 20, the side wall includes the side surface having round surfaces and planar surfaces, a plurality of chamfers 61", 62", 63", and 64" formed at the corners thereof, and the door (not shown) for maintenance and repair is formed on at least one chamfer.

### **Industrial Applicability**

[83] The present invention relates to a transfer chamber for vacuum processing apparatus of substrate in which a cylindrical side wall thereof has a round outer circumference surface, so that a vacuum pressure of the inside of the chamber is efficiently dispersed and a plurality of chamber pieces is separately formed and then, coupled to each other.

[84] While this invention has been described in connection with what are presently considered to be the most practical and preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments and the drawings, but, on the contrary, it is intended to cover various modifications and variations within the spirit and scope of the appended claims.

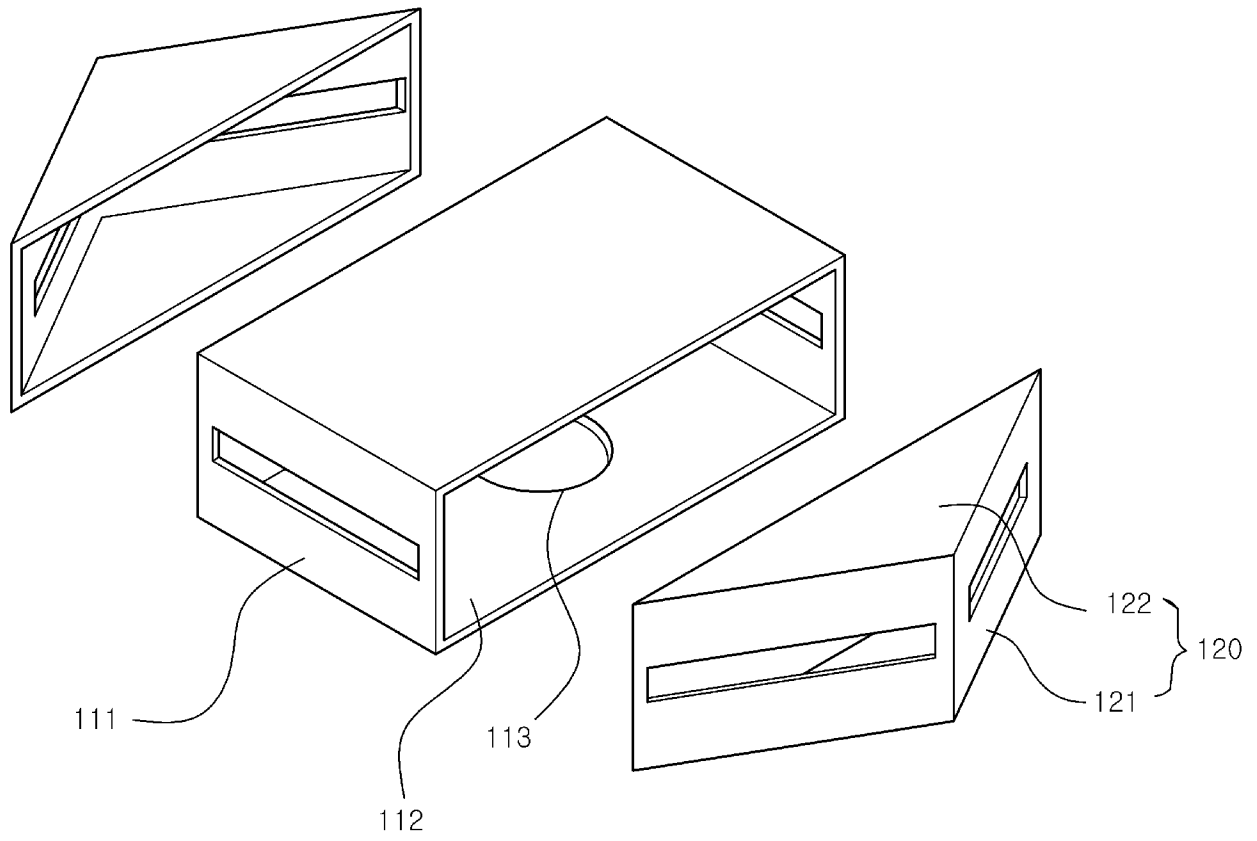
## Claims

- [1] A transfer chamber for vacuum processing apparatus of substrate comprising: a cylindrical side wall 20 having a round outer circumference surface; and top and bottom plates 30 and 10 coupled to top and lower portions of the side wall respectively.
- [2] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 1, wherein the side wall 20 has a plurality of gates 21.
- [3] 3. A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 1, wherein the top plate 30 is rounded upward
- [4] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 1, wherein the bottom plate 10 is rounded downward and has a mounting hole 11 for mounting a transfer robot located at a center thereof.
- [5] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 4, wherein the bottom plate further comprises a cylindrical robot mounting portion 13 formed along a periphery of the mounting hole 11 and reinforced-wire materials 14 formed radially around the cylindrical robot mounting portion 13.
- [6] A transfer chamber for vacuum processing apparatus of substrate as claimed in claims 4 or 5, wherein the bottom plate 10 divides into three parts coupled to each other.
- [7] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 2, wherein the side wall divides into three parts coupled to each other.
- [8] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 3, wherein the top plate divides into three parts coupled to each other.
- [9] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 3, wherein the top plate comprises a central portion and two side portions and the central portion is coupled to the side wall by means of a bolt and nut and two side portions are coupled by means of a welding.
- [10] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 9, wherein two side portions of the top plate are not separated from the side wall and the central portion of the top plate can be attached and deattached to the side wall.
- [11] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 10, wherein in order to attach and deattach the central portion of the top plate thereto, flanges are integrally formed at the central portions of the top plate and the side wall and they are coupled to each other by means of the bolts in a status that the flanges are adhered to each other.
- [12] A transfer chamber for vacuum processing apparatus of substrate as claimed in

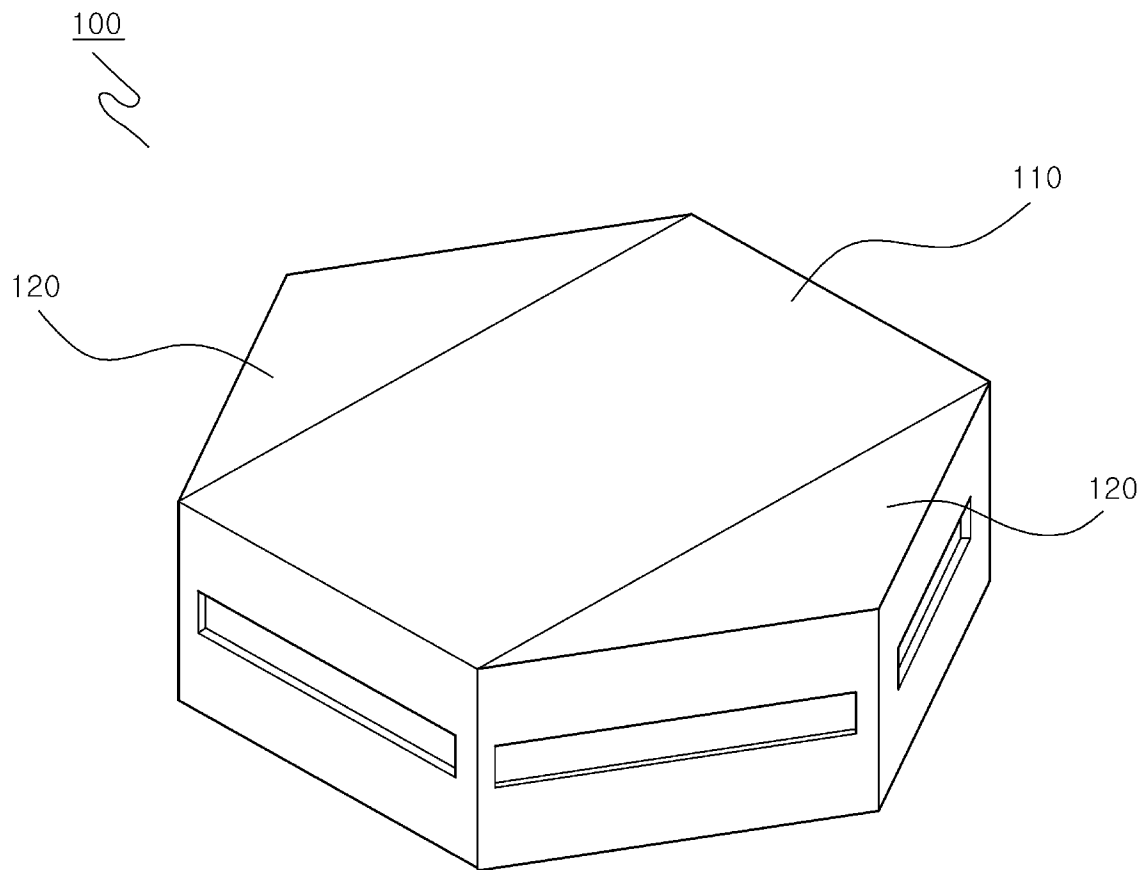
claim 11, wherein in order to maintain the airtight, a sealing means is interposed between the flanges.

- [13] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 1, wherein at least one door for maintenance and repair is formed at the side wall.
- [14] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 13, wherein the door for maintenance and repair is formed at connecting portions connected to a load-lock chamber or processing chamber.
- [15] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 14, wherein the side wall of the chamber having chamfers is in the form of a polygonal pillar and the door for maintenance and repair is formed on the chamfer.
- [16] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 15, wherein the side wall of the chamber having chamfers is in the form of a rectangular pillar.
- [17] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 15, wherein the side wall of the chamber having chamfers is in the form of a cylindrical pillar.
- [18] A transfer chamber for vacuum processing apparatus of substrate as claimed in claim 15, wherein the side wall of the chamber having round surfaces, planar surfaces, and chamfers is in the form of a polygonal pillar and the door for maintenance and repair is formed on the chamfer.

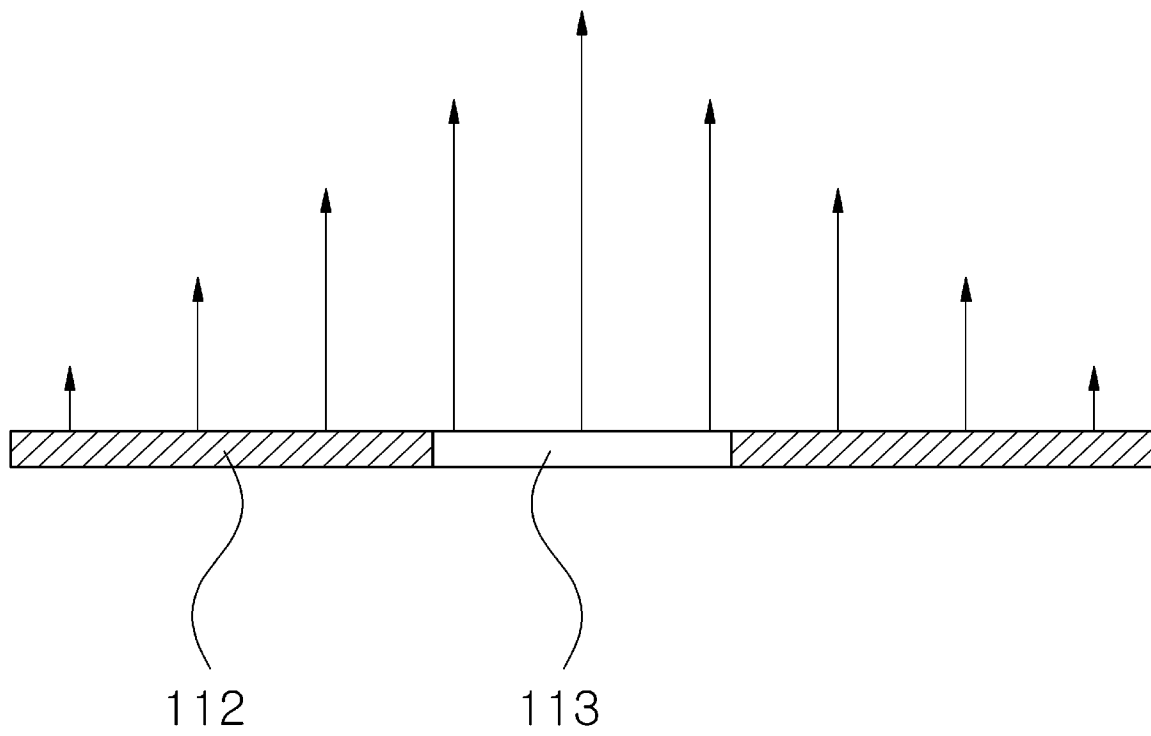
[Fig. 1]



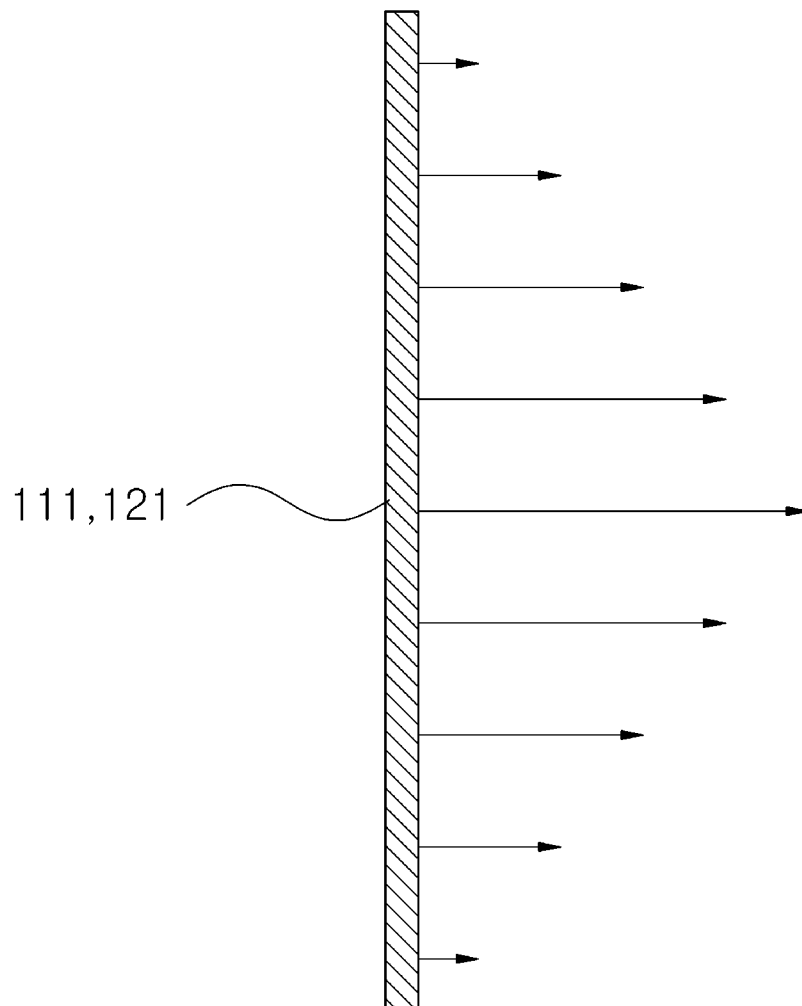
[Fig. 2]



[Fig. 3]

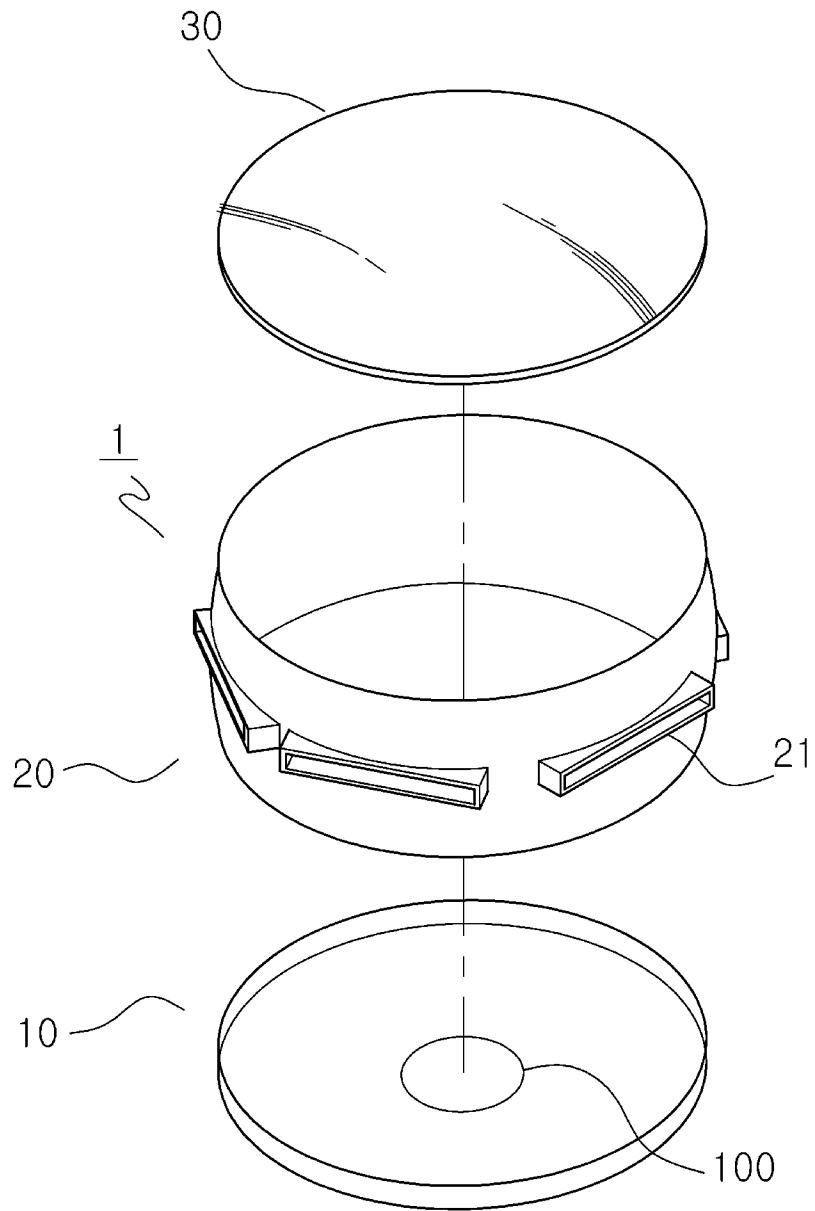


[Fig. 4]

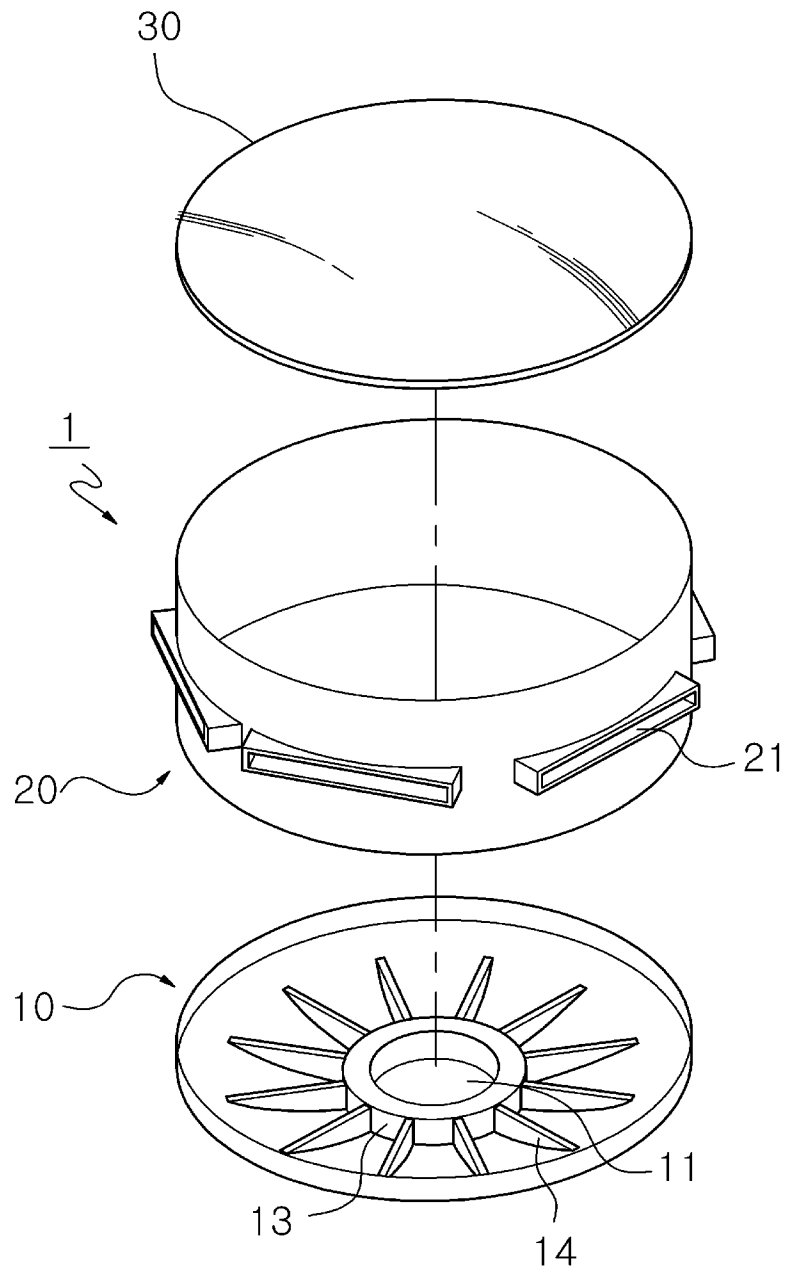




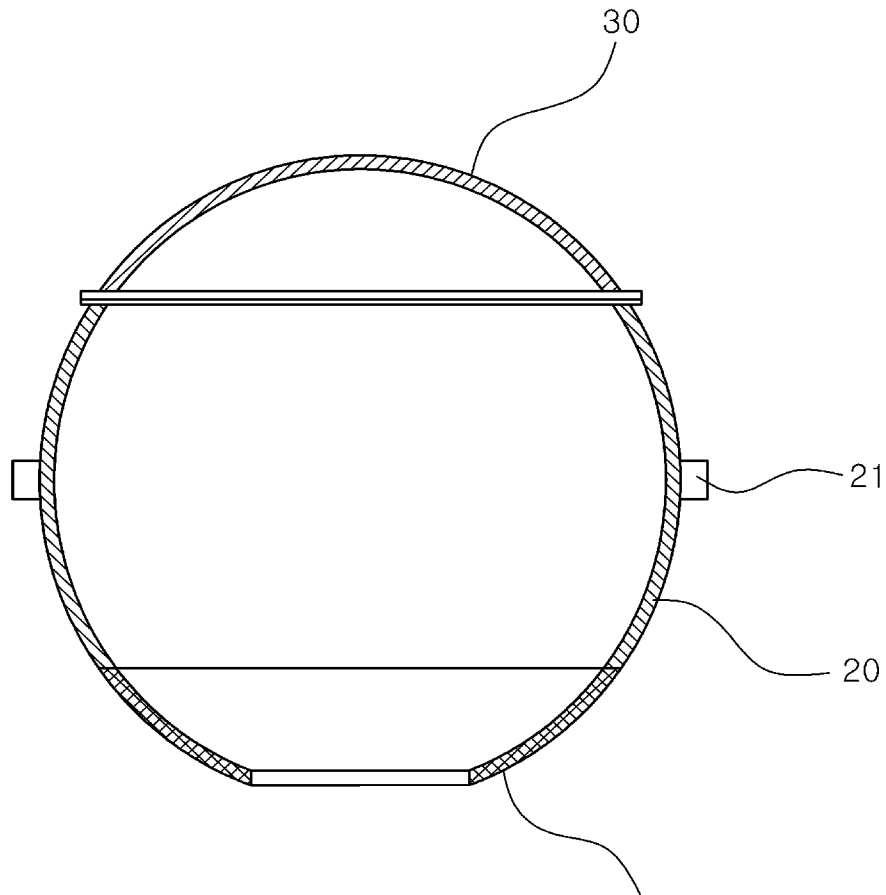
[Fig. 5]



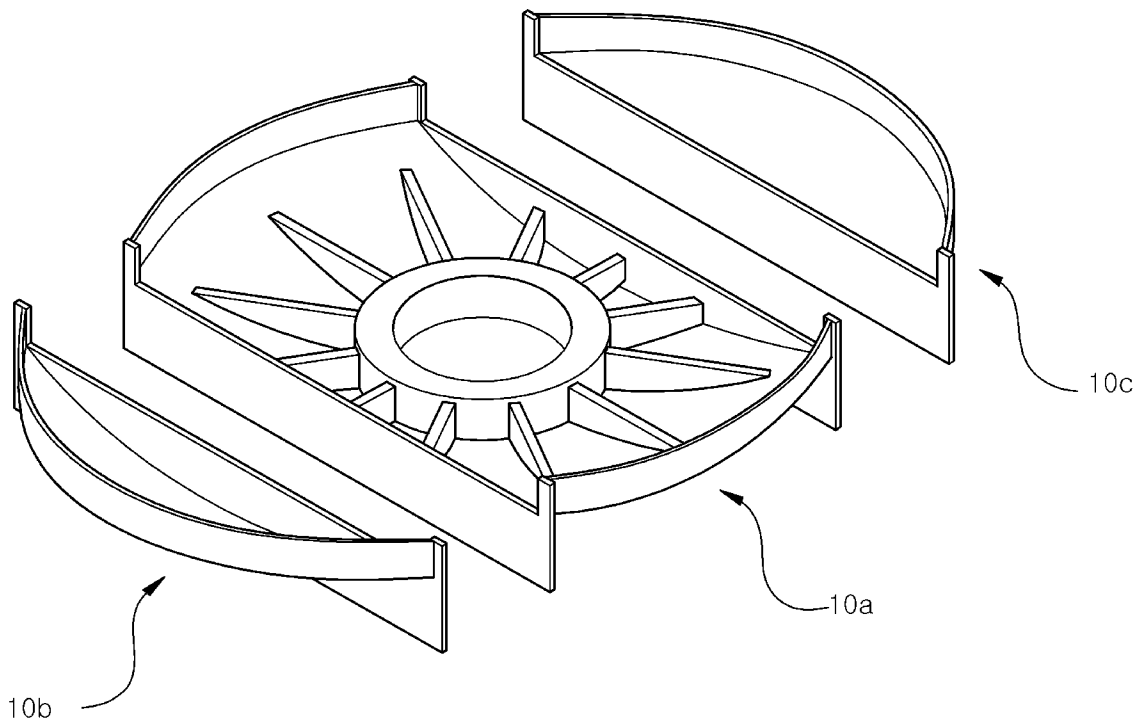
[Fig. 6]



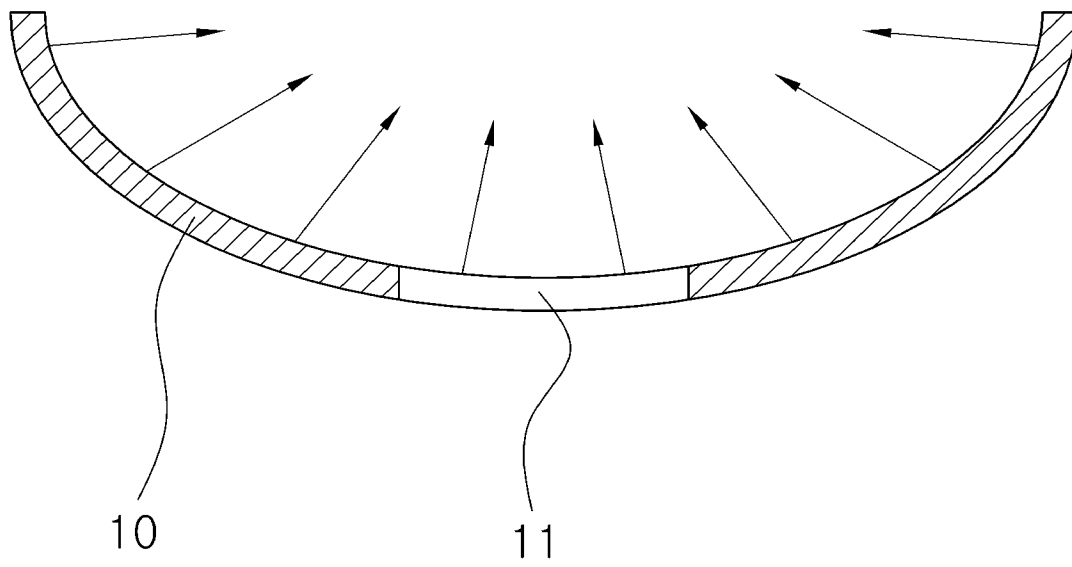
[Fig. 7]



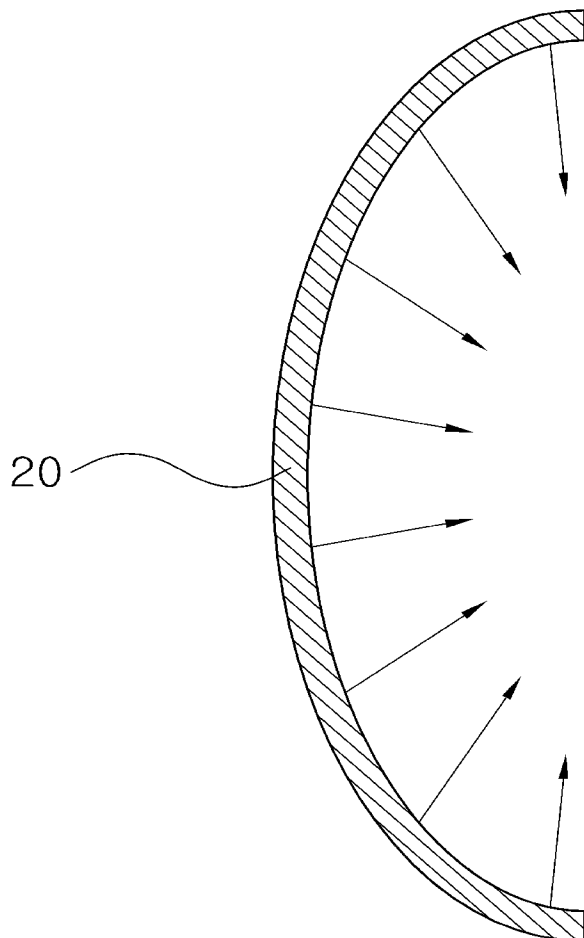
[Fig. 8]



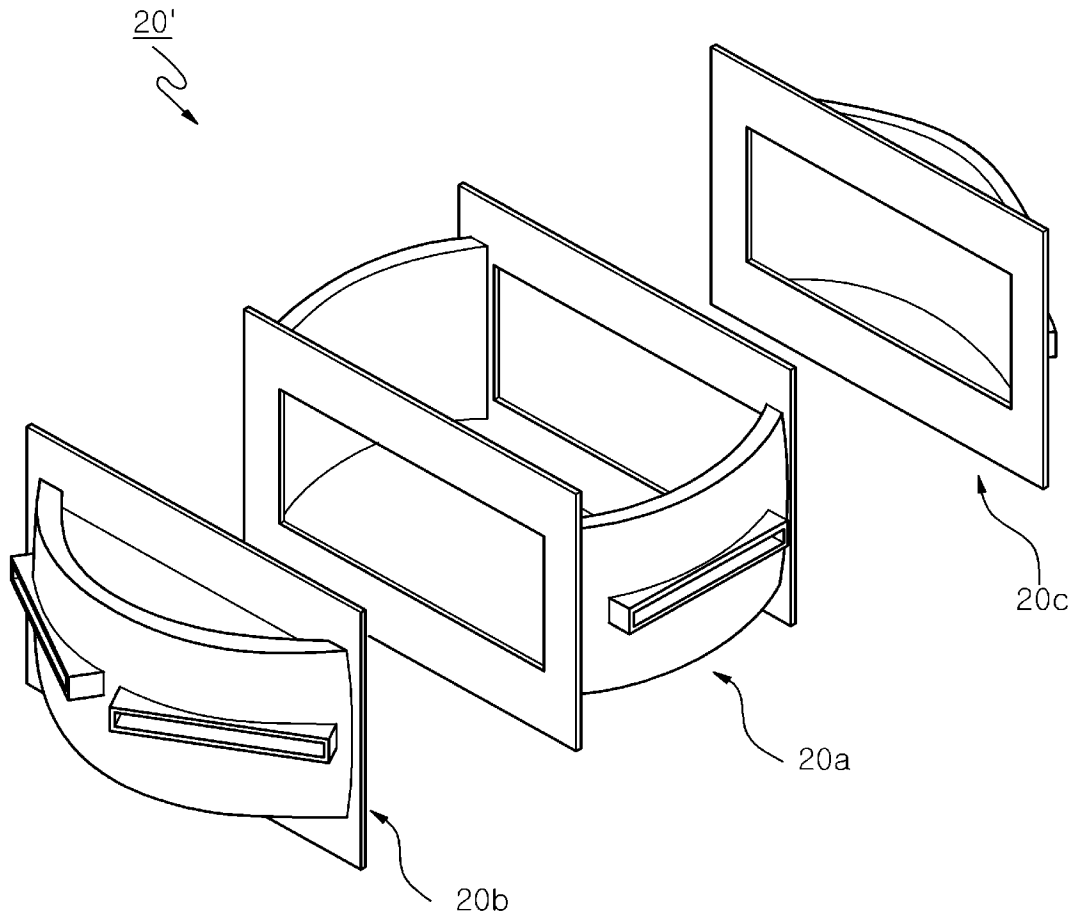
[Fig. 9]



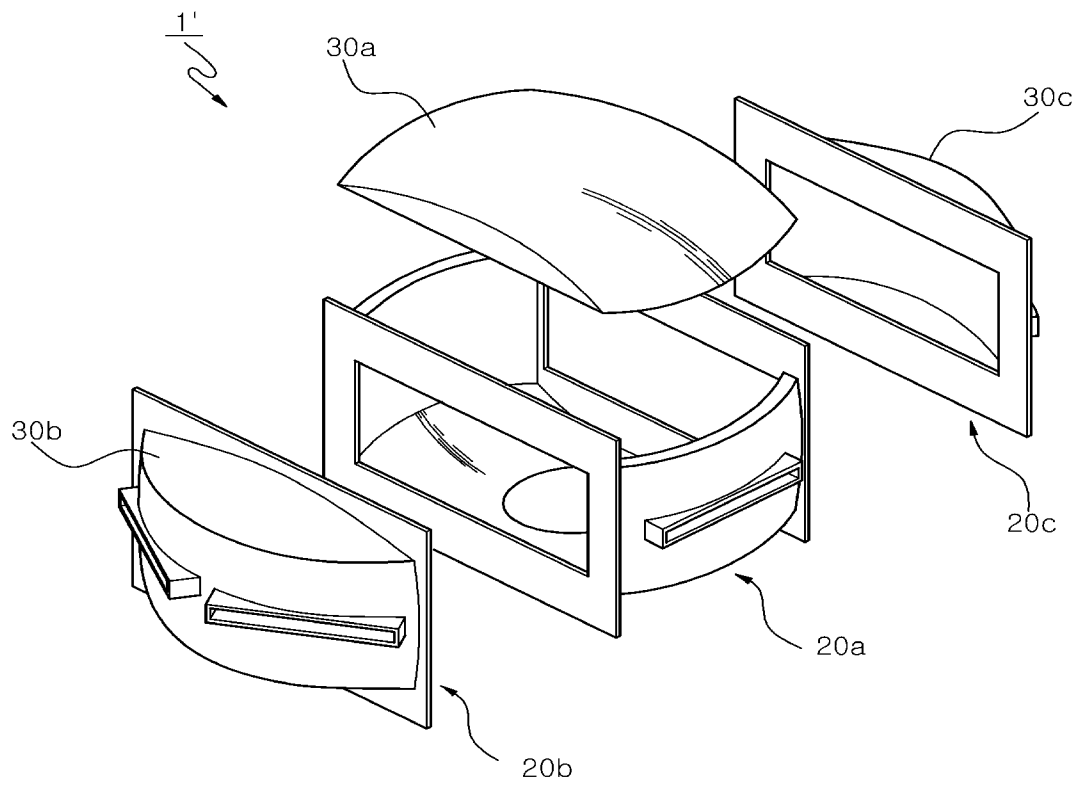
[Fig. 10]



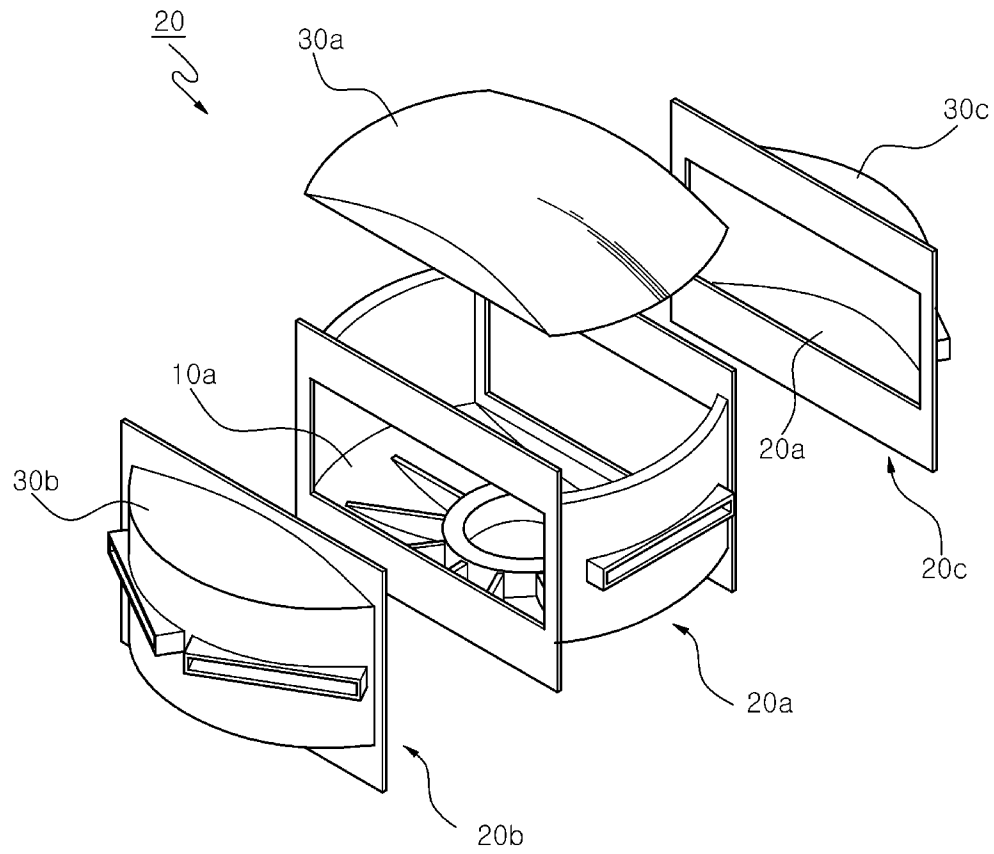
[Fig. 11]



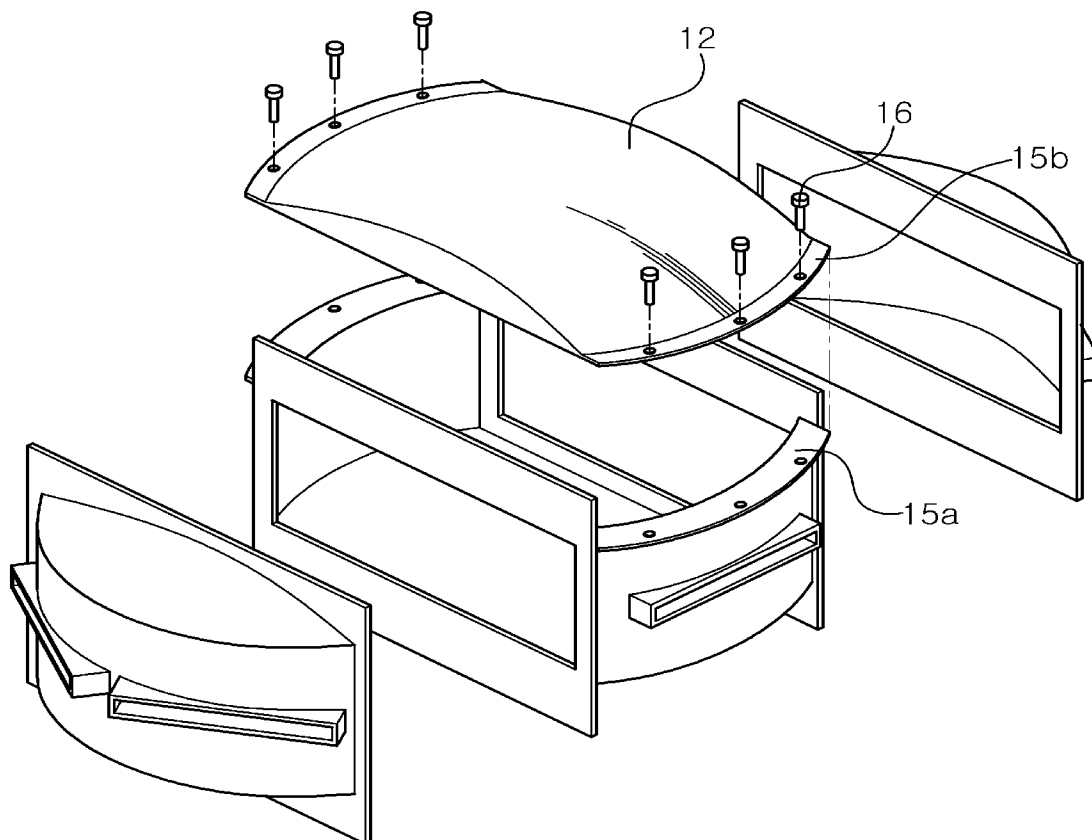
[Fig. 12]



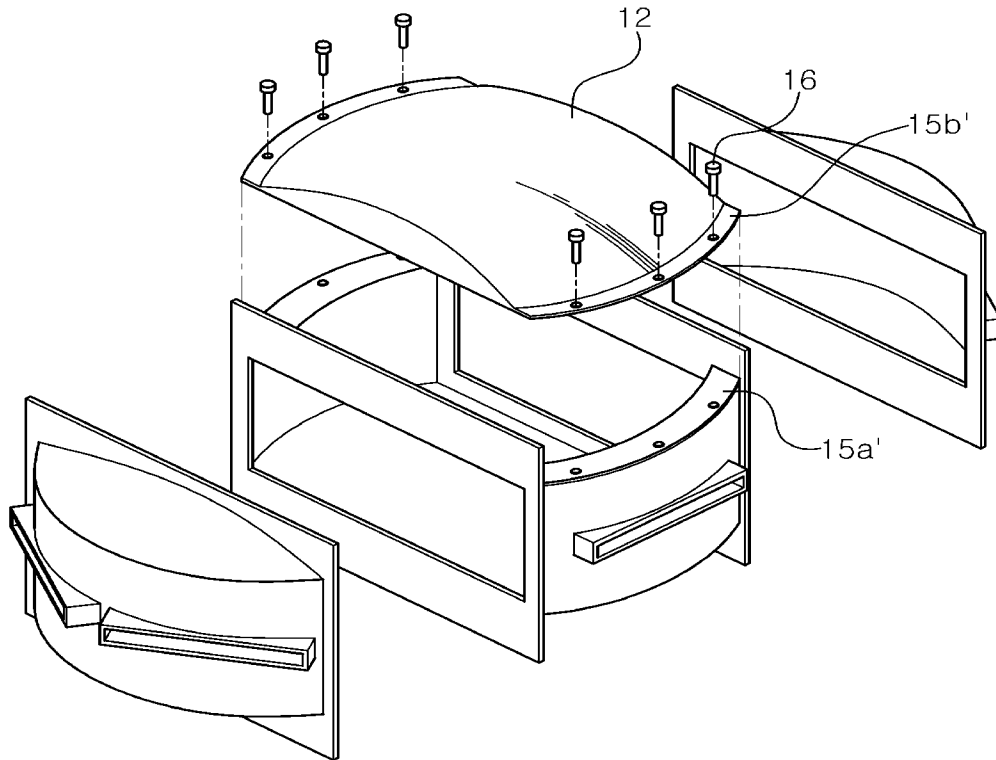
[Fig. 13]



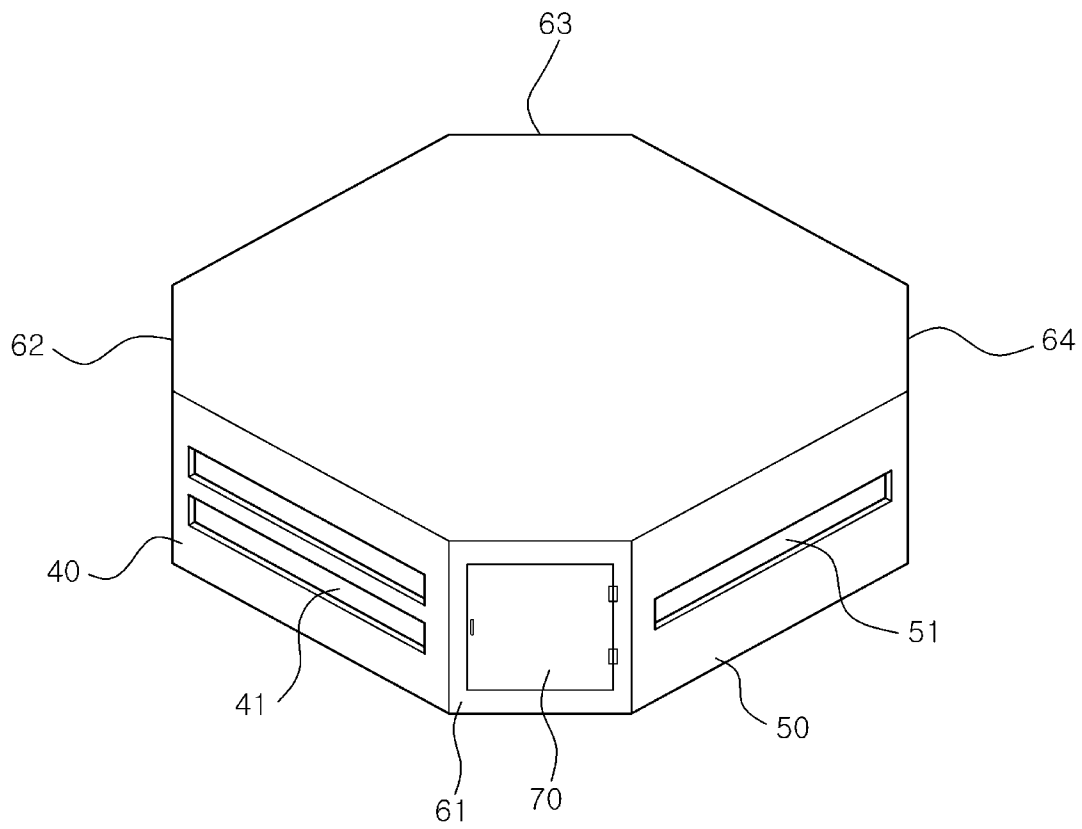
[Fig. 14]



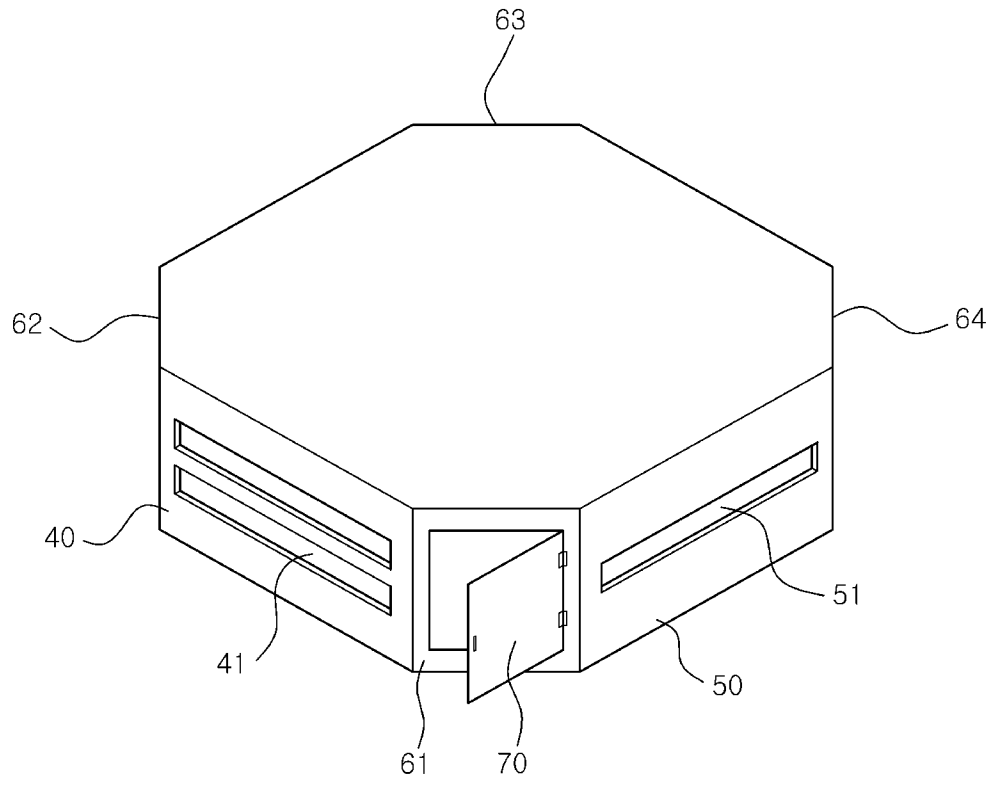
[Fig. 15]



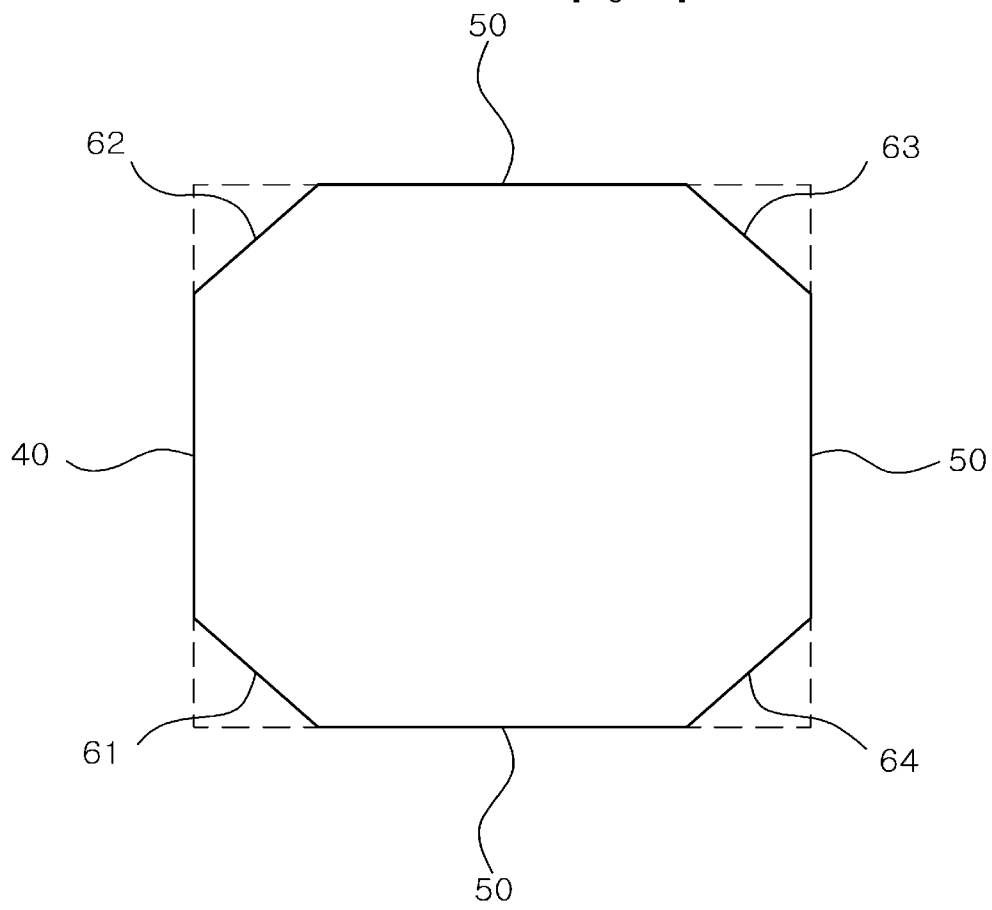
[Fig. 16]



[Fig. 17]

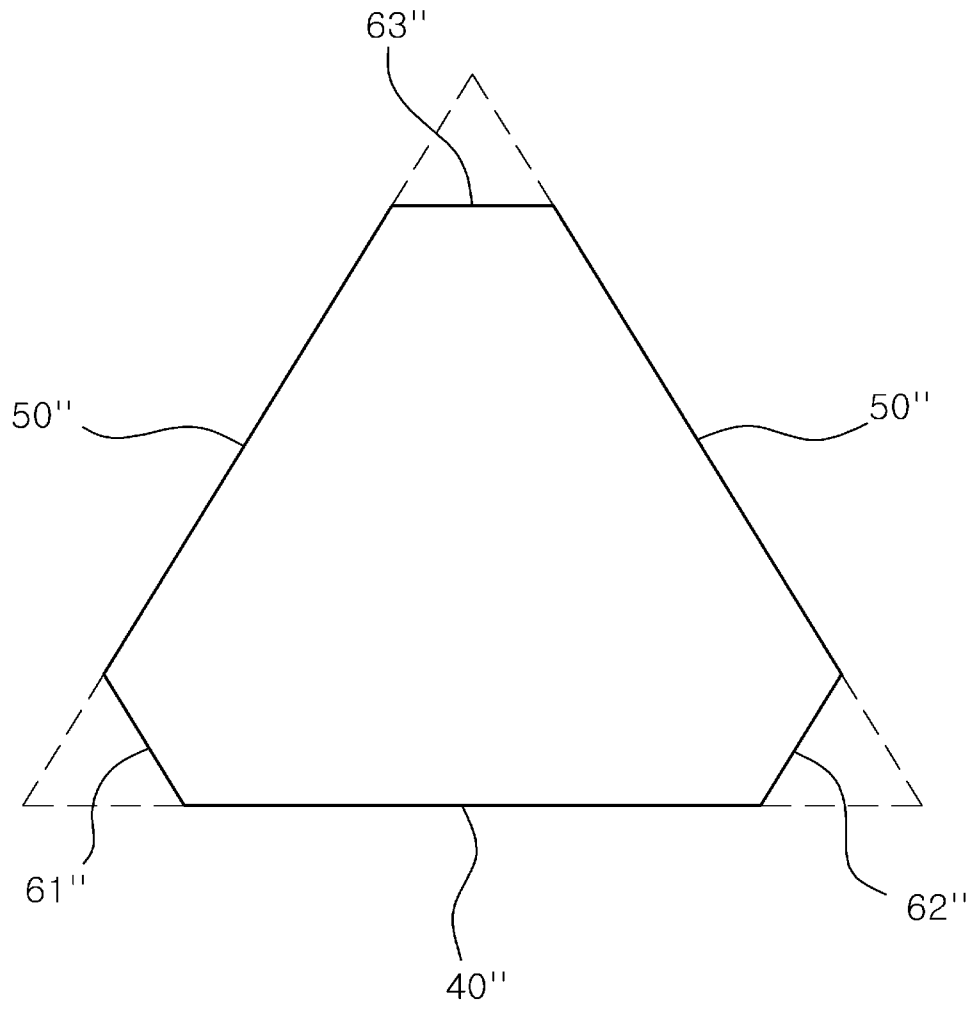


[Fig. 18]

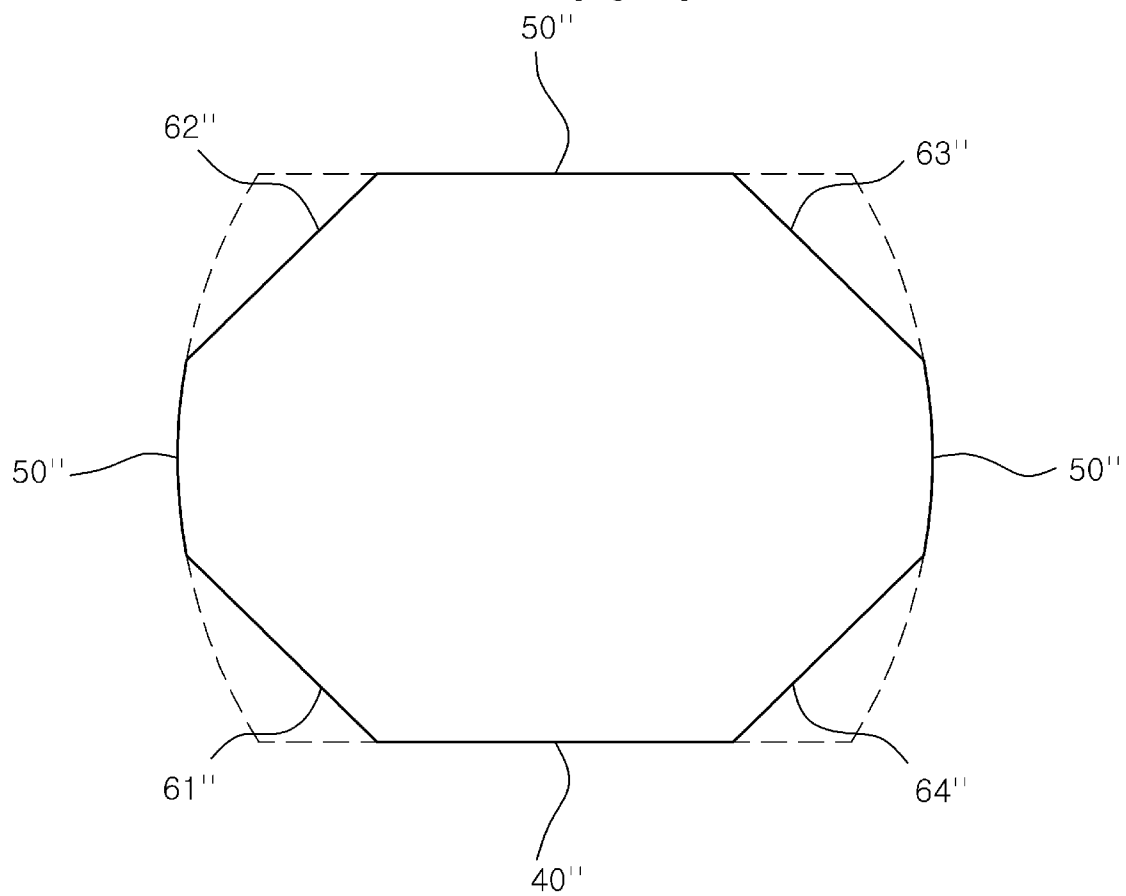




[Fig. 19]



[Fig. 20]



## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/KR2007/000795****A. CLASSIFICATION OF SUBJECT MATTER****H01L 21/68(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC8 : H01L 21/68, H01L 21/00,

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internal) &amp; Keywords: chamber, vacuum, gate, door, and similar terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US6736149 B2 (MAXIMILIAN A. B. ET AL.) 18 May 2004	1 - 12
A	See figure 5.	13 - 18
Y	JP2004335743 A (ULVAC JAPAN LTD.) 25 Nov 2004	1 - 12
A	See figures 1 - 2.	13 - 18
Y	US20040055537 A1 (SHINICHI KURITA ET AL.) 25 Mar 2004	4
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Y	JP10291575 A (MURAZUMI KOGYO KK) 04 Nov 1998	5
	See figures 3 - 4.	

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

29 MAY 2007 (29.05.2007)

Date of mailing of the international search report

**29 MAY 2007 (29.05.2007)**

Name and mailing address of the ISA/KR

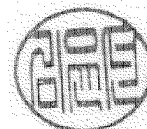
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KIM Yoon Sun

Telephone No. 82-42-481-8428



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/KR2007/000795**

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