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(54) **Title**: FOOD STEAMING APPARATUS

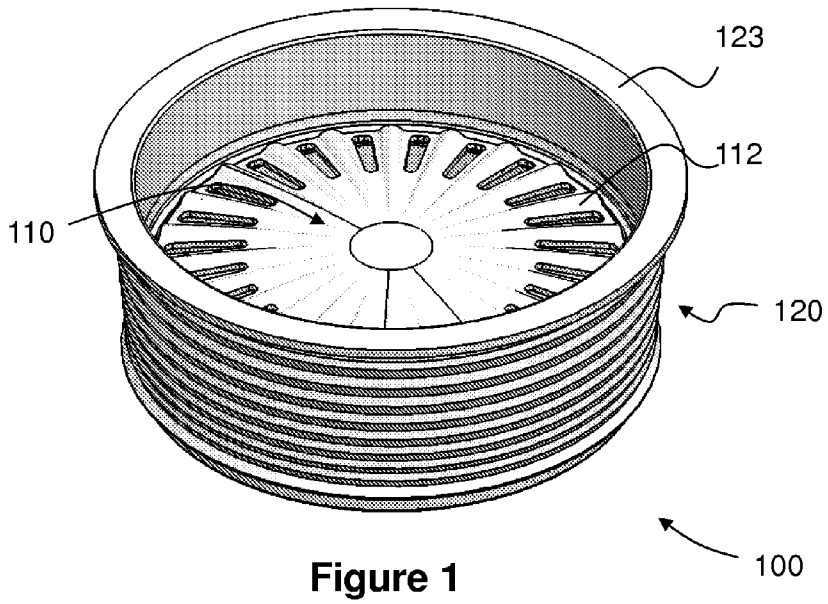

Figure 1

(57) **Abstract**: A food steaming tray comprises a perforated base defining a food support portion and a peripheral wall (120) surrounding the perforated base to form a food steaming compartment (130), the perforated base is arranged for allowing steam passage into the tray and for supporting food to be steamed The perforated base is shaped to direct condensation on the base portion (110) to flow towards the peripheral wall A food steaming tray comprises a perforated base which is shaped to direct or drain condensation away from the support section, preferably towards the peripheral wall (120).

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Food Steaming Apparatus

Field of the Invention

The present invention relates to food steaming apparatus, and more particularly to food steaming trays. More specifically, although not solely limited thereto, the present invention relates to molded food steamers.

Background of the Invention

Steaming is a traditional way of cooking which is now widely recognized as a healthy way of cooking. In addition to being a healthy way, steaming is also widely regarded as providing a unique way of cooking which brings a unique flavor and keeps the fresh taste of produce. Food steaming in the simplest way could be by placing food on a steaming rack inside a pot of boiling water. Dedicated food steamers are also commonly used in kitchens for steaming food and come in various shapes and configurations.

A typical food steamer comprises a perforated base surrounded by a peripheral wall which collectively defines a food steaming compartment. A unique characteristic of food steamers is their ability to expand cooking capacity optionally by vertically stacking a plurality of steamers. In use, food steamers are stacked above a source of steam which is adapted to be fed into the food steaming compartments by forced or natural convection. Some food steamers are optionally provided with a lid to mitigate steam escape and to enhance efficiency. Because a steaming tray is often configured as a basket, food steaming trays are also frequently referred to as food steaming baskets.

Steaming baskets made of thin bamboo sticks are an ancient type of food steamer which is still widely used today because of its lightness and character. On the other hand, steamers made of plastic or other molding are also becoming popular. For example, the inventions of US US2009/0107345A1 by the same inventor disclose steaming trays made of silicone rubber. Silicone rubber molded steaming trays provide a useful alternative due to its improved steam tightness and flexibility. However, both conventional steamers and molded food steamers have shortcomings that food being steamed is easily and unintentionally soaked by condensed steam and becomes wet and soggy.

Summary of the Invention

Accordingly, there is provided a food steaming tray comprising a perforated base defining a food support portion and a peripheral wall surrounding the perforated base to form a food steaming compartment, the perforated base being arranged for allowing steam passage into the tray and for supporting food to be steamed; wherein the perforated base is shaped to direct condensation on the base portion to flow towards the peripheral wall. A food steaming tray comprising a perforated base which is shaped to direct or drain condensation away from the food support section, preferably towards the peripheral wall, has the advantage of mitigating the problem of adverse or unintentional soaking of food during steaming.

The perforated base may comprise an arch-shaped or dome-shaped food support portion, the food support portion comprising draining guides arranged to guide or direct condensation to flow towards the peripheral wall. An arch-shape or

dome-shaped food support portion provides an example of a strong yet relatively simple structure to mitigate adverse soaking problems.

For example, a plurality of drain guides may be formed on the perforated base, the drain guides being arranged to guide or direct condensation to flow towards the peripheral wall, preferably in a radial direction. A set of radial directed drain guides provides a more efficient and direct draining.

The plurality of drain guides may comprise arched ribs. The ribs are useful for elevating food being steamed from a wet floor while the arched ribs offer extra strength or reinforcement to the rib structure to withstand deformation due to food loading. In additions, elevation of food by the ribs mitigates sticking problems.

The arched ribs may be distributed circumferentially on the perforated base and each of the arched ribs extending radially towards the peripheral wall. The circumferential distribution of radial ribs promotes a more balanced weight support or weight bearing surface on the perforated base.

For example, a draining aperture may be formed intermediate two ribs. As a draining groove or channel is formed between two drain guides, the draining aperture is best positioned between two ribs for effective collection and draining of condensation. The ribs may also include sloping sides, preferably circumferentially distributed, so that condensation could be guided to flow into a trough defined by the ribs.

The draining apertures may also serve as distributed steam vents through which steam for food steaming enters the steaming tray.

Preferably, the draining apertures are proximal the peripheral wall, so that collected condensation will exit the base at the downstream end of the drain guide. This proximity arrangement would operate to maximize the non-perforated food supporting region, as steam vents are distributed on the outer region of the food supporting portion..

The perforated base may comprise a food support portion, preferably closed or imperforated, and a sloped skirt surrounding the food support portion, the sloped skirt comprising circumferentially distributed draining means for draining condensation.

The perforated base may comprise an arch-shaped or dome-shaped food support portion, and the food support portion is arranged to drain condensation towards the peripheral wall.

The perforated base may comprise a food support portion and a sloped skirt surrounding the food support portion. The food supporting portion may be dome-shaped or arch-shaped. The sloped skirt may be arranged to drain condensation on the food support portion to flow towards the peripheral wall. Such a combination of the food support portion and the sloped skirt provides a simple and useful design variation to effect the condensation draining arrangement.

In an embodiment, the food support portion is suspended from the peripheral wall by a rib structure, the rib structure defining a steam vent structure for steam to enter the food steaming compartment. Such a steam vent structure defines a large steam channel for through passage of steam into the food

steaming compartment. The ribs also elevate the food articles to be steamed, thereby mitigating surface sticking problems.

For example, the steam vent structure may comprise a plurality of circumferentially distributed steam vents. This would promote even steaming of food inside the steaming compartment. In an embodiment, the steam vent structure and the draining apertures are common.

As an example, the rib structure may comprise a plurality of suspension ribs extending in a radial direction. A structure of suspension ribs is particularly useful because it provides a robust support to the food support portion while minimizing steam blockage.

The suspension ribs may be arched to provide additional structural strength to support the food support portion.

Furthermore, the food supporting portion may comprise a ribbed structure to drain condensation away there-from. Such a ribbed structure also mitigates wetting of the food being steamed by elevating the food being steamed above the condensation being drained.. For example, the rib structure may comprise a plurality of ribs extending in a radial direction. The radial rib structure promotes even support to the food support portion as well as providing a well balanced steam passageway into the food steaming compartment.

The food support section may be surrounded by a second upstanding peripheral wall to define the food steaming region within the steaming compartment.

The perforated base and the peripheral wall may be integrally or singly molded of a soft and resilient material to enhance structural integrity. A food steamer molded of a soft and resilient material promotes enhanced flexibility for both steaming and storage.

For example, the resilient material may be food grade silicone rubber. Food grade silicone rubber is preferred because of its ability to operate in a high temperature with no or minimal toxin release.

The peripheral wall may be arranged for stacking with another steaming tray to increase steaming capacity. For this purpose, the peripheral wall may be structurally reinforced such that the peripheral wall is more rigid and robust in the vertical direction than the radial or horizontal direction.

In an example, the peripheral wall is molded with a reinforcing structure, the reinforcing structure being arranged to strengthen the rigidity of the peripheral wall to permit stacking of a multiple steaming trays for food steaming.

The reinforcing structure may comprise a plurality of vertical ribs and a plurality of circumferentially extending ribs. The vertical and horizontal (or circumferential) ribs collective forms a reinforcing grid to enhance rigidity of the peripheral wall without substantially increasing its thickness. For example, the vertical and horizontal ribs may be formed separately on the inside and outside of the peripheral wall. In an embodiment, the horizontal ribs are formed circumferentially on the outside of the peripheral walls.

In an embodiment, the steamer may further comprise a lid molded of silicone rubber. Optionally, the molded lid may comprise a removable knob

molded of silicone rubber. A removable knob may be used to reconfigure the lid from a steam tight lid to provide a steam vent to release excess pressure where the application so desires.

In another aspect of the present invention, there is provided a lid for use with a food steaming tray, wherein the lid is molded of silicone rubber and comprises a removable knob, and cooperative engagement means are formed on the knob and the lid for detachably attaching the know to the lid. The lid may be arch-shaped or dome-shaped.

Brief description of the drawings

Exemplary embodiments of the present invention will be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a top perspective view of an exemplary food steaming tray illustrating an embodiment of the present invention;

Figure 2 is a top plan view of the steaming tray of Figure 1;

Figure 3 is a cross-sectional view taken along the line A-A' of Figure 1;

Figure 4 is a bottom plan view of the steaming tray of Figure 1;

Figure 5 is a side elevation view of the steaming tray of Figure 1;

Figure 6 is a perspective view of depicting a second exemplary steaming tray of the present invention;

Figure 7 is a top plan view of the steaming tray of Figure 6;

Figure 8 is a cross-sectional view along the lines B-B' in Figure 6;

Figure 9 is a bottom view of the steaming tray of Figure 6;

Figure 10 is a perspective view of a lid for use with a steaming tray of the present invention;

Figure 11 is a top plan view of a lid of Figure 10;

Figure 12 is a cross-section view of the lid of Figure 10 taken along the line C-C';

Figure 13 is a bottom plan view of the lid of Figure 10;

Figure 14 shows the lid of Figure 10 with the knob detached.

Detailed Description of the Preferred Embodiments

A steaming tray **100** integrally molded of silicone rubber as depicted in Figures 1 to 5 illustrates an example of a food steaming apparatus. The steaming tray 100 comprises a base portion **110** as an example of a perforated base which is surrounded by a circular wall **120** as an example of a peripheral wall. The base portion partitions the steaming basket into a food steaming compartment **130** and a base compartment **140,** as shown more particularly in Figure 3. More particularly, the base portion 110 divides the peripheral wall into an upper wall portion **121** which extends upwardly from the base portion 110 and a lower peripheral wall portion **122** which extends downwardly from the base portion. The upper peripheral wall portion and the base portion collectively define the food steaming compartment of the steaming tray, while the lower peripheral wall portion and the base portion collectively define the base compartment.

The uppermost free end of the upper peripheral wall portion includes a circumferential flange **123** as an example of a support base for supporting another steaming tray to be stacked on top, or for receiving a lid to close the steaming tray or a column of stacked steaming trays, as will be explained below. The lowermost free end of the lower peripheral wall portion includes a lower circumferential flange portion **124** and a skirt portion **125** which extends downwardly from the inside edge of the flange. The flange and the skirt collectively forms a stepped portion with the outer side of the skirt retreated from the outer edge of the lower flange. The stepped portion is arranged such that when the steaming tray is stacked on top of another steaming tray, the lower flange of the steaming tray above will rest squarely on the upper flange of the lower steaming tray with the skirt portion of the upper tray protruding into the food steaming compartment and engaging with or pressing the inner surface of the upper peripheral wall to form a steam seal at the junction between adjacently stacked steaming trays.

The base compartment defines a partial steaming compartment which operates as an extension of the food steaming compartment of a steaming basket directly below when steaming baskets are stacked to form a steaming basket column, while the base compartment of the lowest steaming basket in the column or the steam basket most proximal to a bath of boiling water as a source of steam provides an elevated food support surface to mitigate splashing of hard boiling water onto the perforated base directly.

The base portion 110 as an example of a food support portion of the steaming tray comprises moulded perforations distributed on the base portion to

form a perforated base for steam passage and for condensation draining to be explained below. As shown more particularly in cross-sectional view of Figure 3, the base portion is moulded such that it is generally bulged or arched at the centre portion and gradually slopes down towards the peripheral wall. In addition, a plurality of radial ribs **112** is distributed on the upper surface of the arched base portion and extends up to the peripheral wall to further define a food support surface and drain guides. A total of 24 radial ribs are evenly distributed and integrally moulded on the arched base portion. For an exemplary steaming tray having a diameter of 16cm, the maximum separation between distal ends of a pair of adjacent ribs is about 1cm, which would be sufficient for many practical applications. It would be appreciated that the ribs in combination with the sloping skirt portion of the base portion also define drain guides for guiding condensation away from the central portion of the base portion. Specifically, a drain guide **114** is formed by an adjacent pair of ribs which respectively defines the side edges of the drain guide, and the draining channel is formed by the sloping portion of the base portion intermediate the pair of ribs. To better define the flow pattern in the draining change, the edges of the ribs are sloping towards their junction, thereby creating a v-shaped draining channel.

In general, the actual number of radial ribs would depend on the actual dimension of the steaming tray, and the number of radial ribs is selected to provide elevated support to a food article being steamed such that the article could be elevated above a drain guide by at least an adjacent pair of ribs. In addition, each of the ribs also has an arched profile and the arching is sloping downwards towards the peripheral wall so that condensation on the ribs will be

guided to flow towards the peripheral wall, thereby preventing flow of condensation towards the central portion of the steaming compartment.

In order to divert condensation away from the food steaming compartment, a plurality of drain guides and a corresponding plurality of drain apertures **116** are distributed on the base portion 110.

Specifically, drain apertures are disposed intermediate a pair of ribs and at the distal end of the ribs, that is, at the end that is proximal the peripheral wall. Each of the drain apertures comprises an elongate slot which extends in a radial direction between adjacent ribs. In addition, a circumferentially extending groove **118** is also formed at the junction between the peripheral wall and the base portion. This groove is in communication with the drain apertures or slots and provides an open draining channel so that condensation collected at the rim of the peripheral wall could also be drained through the drain apertures. In addition to providing an open draining channel, the circumferential groove also provides a web support to suspend the base portion from the peripheral wall.

As shown in Figures 2 and 4, the central portion of the arched base portion is closed so that condensation will not drip through the central covered portion of the steaming tray which could otherwise result in wetting of food articles immediately below the closed portion. In general, the central portion is shaped like an umbrella with a sloped skirt portion to direct condensation away from the central covered portion. The disposition of draining apertures at distal ends of the ribs makes steam passage possible while mitigating problems of dripping from an upper steaming tray. In general, it is preferred that the covered central portion would extend for at least half the diameter of the base portion.

In order to reinforce the base portion to maintain an arched or bulged configuration for effective draining, a reinforcing structure comprising a star-shaped support rib structure **150** also comprising radially extending ribs is formed on the underside of the base portion. This support rib structure is also arched shaped to provide additional draining guides to divert condensation away from the underside of the covered central portion.

Furthermore, a plurality of concentric ribs **160** is formed circumferentially at regular vertical intervals on the outside of the peripheral wall and a plurality of vertical running ribs are distributedly formed along the inside of the upper peripheral wall to strengthen the vertical robustness of the peripheral so that more steaming trays could be stacked in a steaming tray column. The vertical and circumferential ribs generally forms a grid structure to reinforce the structural strength of the upper peripheral wall, which is required to bear the weight of multiple steaming trays in the case of a steaming tray column.

The steaming tray **200** of Figures 6 to 9 illustrates a second exemplary embodiment of the present invention and comprises parts which are substantially identical to that of the first exemplary embodiment except that there is provided an upstanding wall **290** surrounding the closed region of the base portion **210**. Unless where the context otherwise requires, parts of the second embodiment which are the same to that of first embodiment are indicated by the same numerals plus 100. The upstanding wall of this steaming stray provides a physical boundary to define the closed region of the base portion so that a user could easily locate the covered portion above the steaming tray when covered steaming is preferred. As shown in Figure 6, the upstanding wall and the closed

base portion collectively define a dish shaped steaming carrier. It will be noted that the distributed supporting structure **250** comprises scaffolding or skeleton type framework which is arranged to suspend the dish from the peripheral wall to permit a higher rate of steam passage into the food steaming compartment.

In use, food to be steamed is placed on the base portion inside the food steaming compartment. A plurality of food containing steaming trays is stacked to form a column of steaming baskets which is placed above a steam source. Because the lower skirt, which extends from the lower circumferential flange and also formed of silicone rubber, is adapted for close-fitted engagement with the inside of the peripheral wall of the steaming tray immediately below, steam will be confirmed to within the column of steaming trays after being forced into the steaming tray at the bottom of the column. As steam rises through the column, condensation will occur and the condensation is guided to move towards the peripheral wall by the drain guides and drained through the drain apertures.

A lid **300** as depicted in Figure10 to 15 illustrates a detachable cover for use with the steaming trays 100 and 200 of the present invention. The lid is integrally moulded of silicone rubber and includes a closed top cover **310** surrounded by a peripheral wall **320** on which there is defined a circumferential flange **330** and a circumferential skirt **340** extending downwardly from the flange. The flange is sized to seat squarely on the upper circumferential flange of the steaming tray and the skirt is adapted to fit into the inner side of the peripheral wall of the steaming stray to be covered for close-fitting engagement therewith. The top cover is arch-shaped with a detachable silicone knob **350** attached to the top central portion of the lid. This knob could be used as an insulated handle when

attached to the lid. When the knob is detached from the cover, a steam exit vent is provided.

In use, the lid is placed on top of a steaming tray, with the steaming tray placed on a bath of steam source. Because the steamer trays and the lid collectively form a substantially air-tight steaming column, pressure inside the steaming column would be higher than the atmospheric pressure and steaming efficiency would be substantially enhanced. When there is a need to reduce pressure inside the steaming column, the knob is detached from the lid to release excess steam. Thus, the knob also serves as a pressure adjuster.

While the present invention has been explained with reference to the embodiments illustrated above, it would be appreciated by persons skilled in the art that the embodiments are only for illustration only and are not meant to restrict the scope of the present invention.

For example, while the steaming trays and the lid are integrally moulded of silicone rubber, it would be appreciated that silicone rubber is preferred because it is a food-grade substance which is highly flexible, resilient and heat resistant. Other materials such as rubber, soft plastics, metal, or a combination of materials could be used to form the steaming trays and lids without loss of generality. In the present context, while the term steaming trays is used, it will be appreciated that this term includes food steaming apparatus which is commonly known as 'steaming baskets'.

Also, while radial ribs are included in the steaming tray embodiments, it would be appreciated that the ribs are optional and provides additional benefits of

elevating the articles to be steamed as well as forming drain guides when used in combination with the arched base portion.

While the steaming trays above include an arch- or dome-shaped base portion having a convexly curved sloping skirt, it would be appreciated that the base portion may comprises planar sloping skirts as an alternative.

Also, while draining slots are described, it would be appreciated that the drain apertures may constitute apertures of any appropriate shape, whether regular or irregular without loss of generality.

In addition, while radial extending ribs are formed on the upper side of the base portion of the embodiments, it would be appreciated that the ribs need not be radial extending or continuous. For example, non-continuous ribs arranged in a swirling pattern, or in parallel may be used without loss of generality. Also, additional ribs may be added for steaming trays of a larger size to reduce th separation between adjacent ribs.

Furthermore, while integrally moulded steaming trays and lids have been used as examples, it would be appreciated that the steaming trays or lids need not be integrally moulded. For example, combination of materials could be used where appropriate.

Moreover, while a steaming tray measuring 16 cm by diameter and 7 cm by height has been described, it would be appreciated that the steaming trays could be of any appropriate measures suitable for the purposes without loss of generality.

Likewise, while steaming trays having a circular peripheral wall defining a cylindrical food steaming compartment has been described, it would be appreciated that the peripheral wall could be arranged to define oval, rectangular, polygonal or other appropriate shapes without loss of generality.

Table of Numerals

100	Steaming tray		
	110		Base portion
		112	Rib
		114	Drain guide
		116	Aperture
		118	Groove
	120		Wall
		121	Upper wall portion
		122	Lower wall portion
		123	Flange
		124	Lower flange
		125	Skirt portion
	130		Food steaming compartment
	140		Base compartment
	150		Rib structure
	160		Rib
200	Steaming tray		
	210		Base portion
		216	Aperture
	220		Wall
		221	Upper wall portion
		222	Lower wall portion
		223	Flange
		224	Lower flange
		225	Skirt portion
	230		Food steaming compartment
	240		Base compartment
	250		Rib structure
	290		Wall
300			
	310		Cover
	320		Wall
	330		Flange
	340		Skirt portion
	350		Knob

CLAIMS:

1. A food steaming tray comprising a perforated base defining a food support portion and a peripheral wall surrounding the perforated base to form a food steaming compartment, the perforated base being arranged for allowing steam passage into the tray and for supporting food to be steamed; wherein the perforated base is shaped to guide or direct condensation on the base portion to flow towards the peripheral wall.

2. A food steaming tray according to any of the preceding Claims, wherein the perforated base comprises an arch-shaped or dome-shaped food support portion, the food support portion comprising draining guides arranged to guide or direct condensation to flow towards the peripheral wall.

3. A food steaming tray according to Claims 1 or 2, wherein a plurality of drain guides is formed on the perforated base, the drain guides being arranged to guide or direct condensation to flow towards the peripheral wall.

4. A food steaming tray according to Claim 3, wherein the plurality of drain guides are defined by arched ribs, the arched ribs being distributed circumferentially on the perforated base and each of the arched ribs extending radially towards the peripheral wall.

5. A food steaming tray according to Claims 3 or 4, wherein a draining aperture is formed intermediate two ribs.

6. A food steaming tray according to Claim 5, wherein the draining aperture is proximal the peripheral wall.

7. A food steaming tray according to Claims 5 or 6, wherein the draining apertures are also arranged as distributed steam vents through which steam for food steaming enters the steaming tray.

8. A food steaming tray according to any preceding Claims, wherein the perforated base comprises a food support portion and a sloped skirt surrounding the food support portion, the sloped skirt comprising circumferentially distributed draining means for draining condensation.

9. A food steaming tray according to any of preceding Claims, wherein the food support portion is suspended from the peripheral wall by a rib structure, the rib structure defining a steam vent structure for steam to enter the food steaming compartment.

10. A food steaming tray according to Claim 9, wherein the steam vent structure comprises a plurality of circumferentially distributed steam vents.

11. A food steaming tray according to Claims 9 or 10, wherein the rib structure comprises a plurality of suspension ribs extending in a radial direction.

12. A food steaming tray according to Claims 10 or 11, wherein the suspension ribs are arched.

13. A food steaming tray according to any of the preceding Claims, wherein the food supporting portion comprises a ribbed structure to drain condensation away there-from.

14. A food steaming tray according to Claim 13, wherein the rib structure comprises a plurality of ribs extending in a radial direction.

15. A food steaming tray according to any of the preceding Claims, wherein the food support section is surrounded by a second upstanding peripheral wall.

16. A food steaming tray according to any of the preceding Claims, wherein the perforated base and the peripheral wall are integrally or singly molded of a soft and resilient material.

17. A food steaming tray according to Claim 16, wherein the resilient material is food grade silicone rubber.

18. A food steaming tray according to any of the preceding Claims, wherein the peripheral wall is structurally reinforced such that the peripheral wall is more rigid and robust in the vertical direction than the radial or horizontal direction. .

19. A food steaming tray according to any of the preceding Claims, wherein the peripheral wall is molded with a reinforcing structure, the reinforcing structure being arranged to strengthen the rigidity of the peripheral wall to permit stacking of a multiple steaming trays for food steaming.

20. A food steaming tray according to Claim 19, wherein the reinforcing structure comprises a plurality of vertical ribs and a plurality of circumferentially extending ribs.

21. A column of food steaming trays including a plurality of steaming trays according to any of the preceding Claims, wherein the peripheral walls of the steaming trays collectively define a sealed or closed steam path.

22. A column of food steaming trays according to Claim 21, wherein the peripheral wall comprises a lower skirt portion, wherein the skirt is adapted to engage with the peripheral wall of another tray immediately below upon stacking to formed the sealed steam path.

23. A food steaming tray according to any of the preceding Claims, further comprising a lid molded of silicone rubber.

24. A food steaming tray according to Claim 23, wherein the molded lid comprises a removable knob also molded of silicone rubber.

25. A lid for use with a food steaming tray, wherein the lid is molded of silicone rubber and comprises a removable knob, and cooperative engagement means are formed on the knob and the lid for detachably attaching the knob to the lid.

26. A lid according to Claim 25, wherein the lid is arch-shaped or dome-shaped, and the removable knob is located at the center portion of the dome or arch.

27. A lid according to Claims 25 or 26, wherein the removable knob is molded of silicone rubber and is adapted for press-fit engagement with the lid.

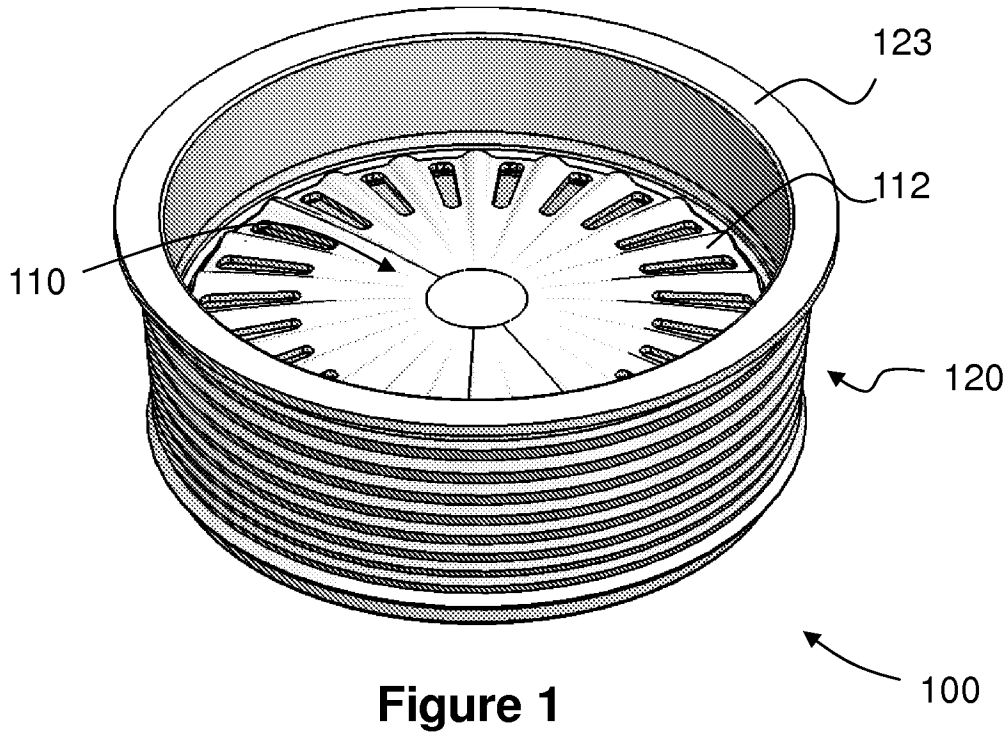

Figure 1

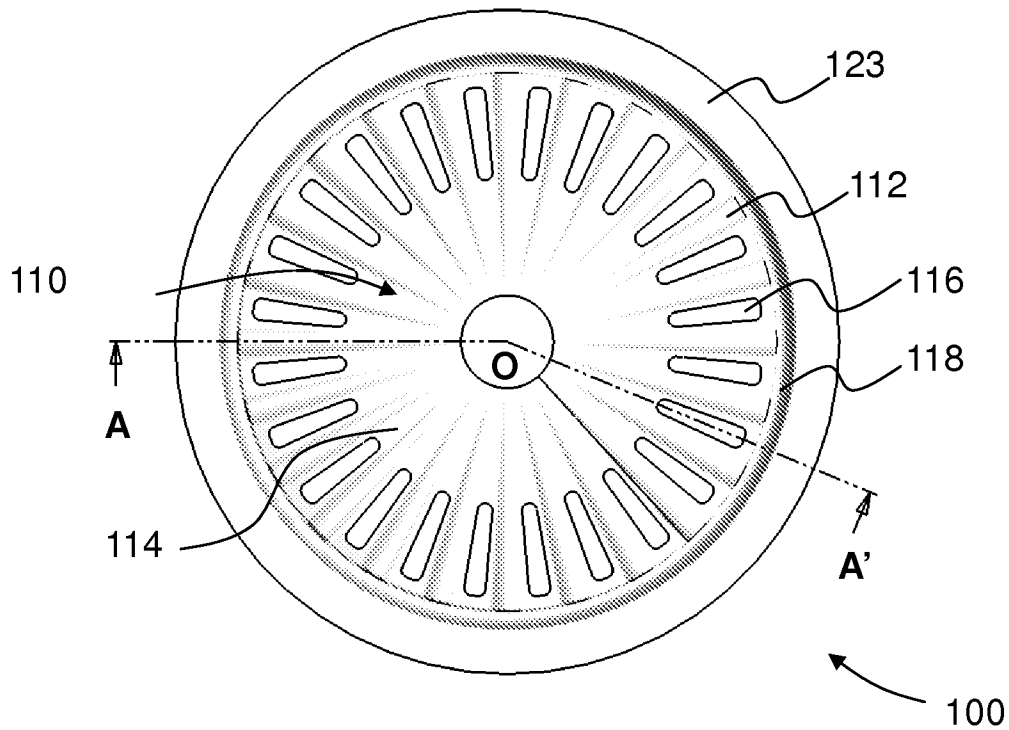

Figure 2

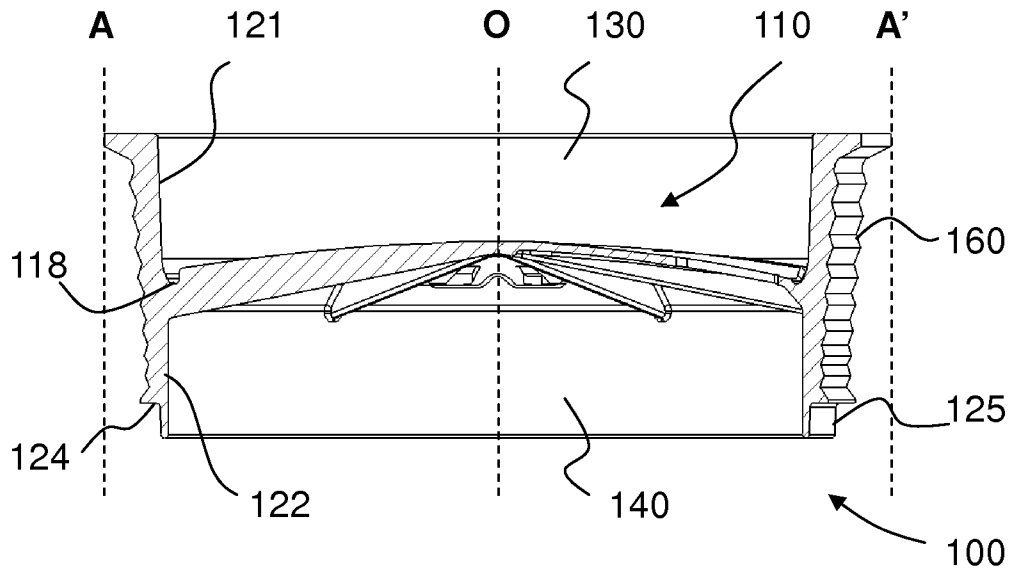

Figure 3

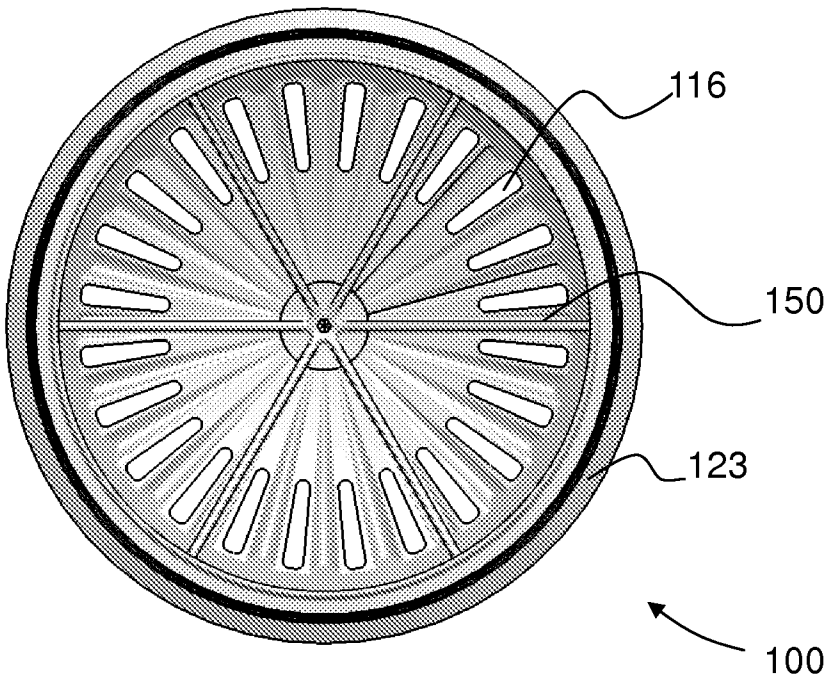

Figure 4

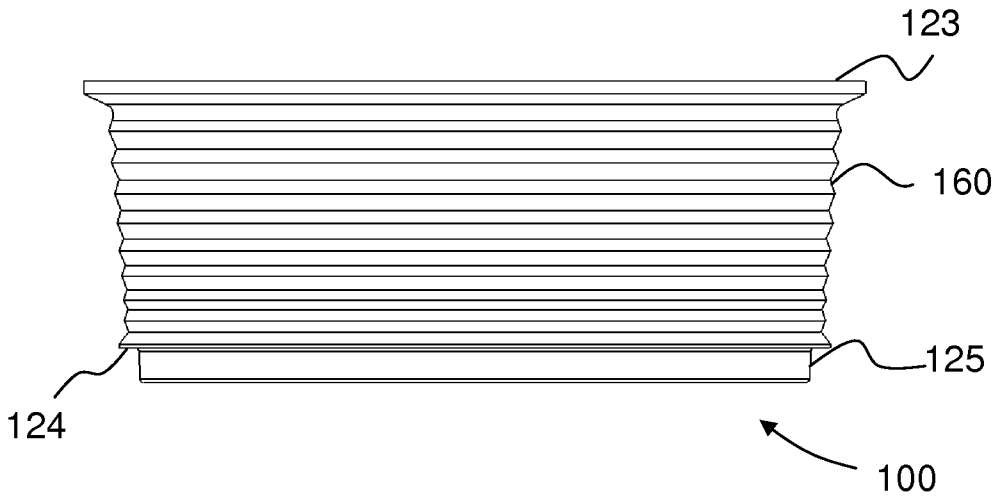

Figure 5

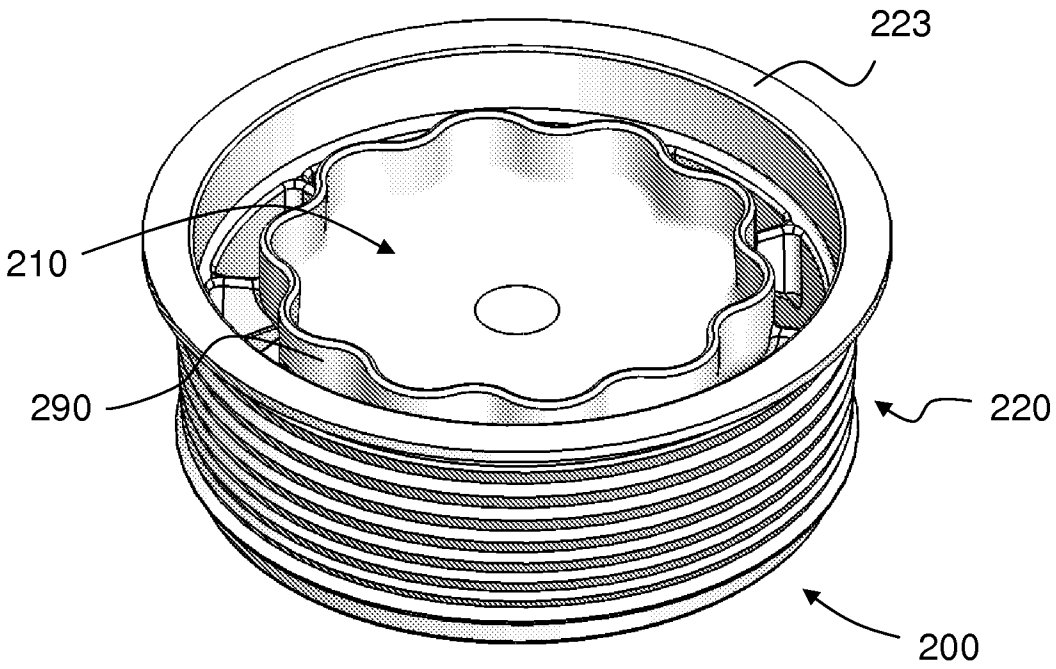

Figure 6

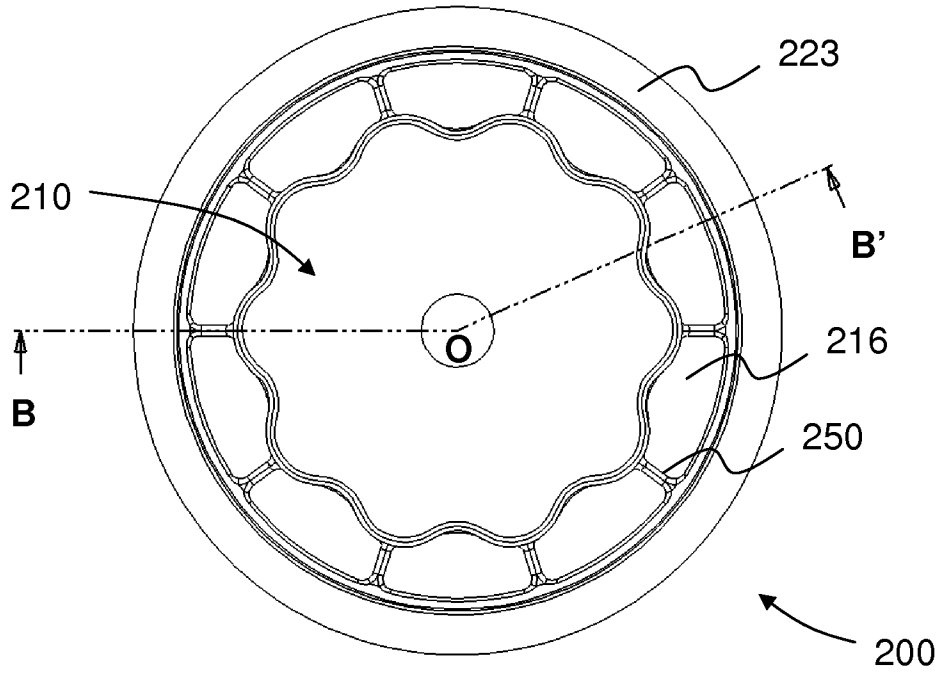

Figure 7

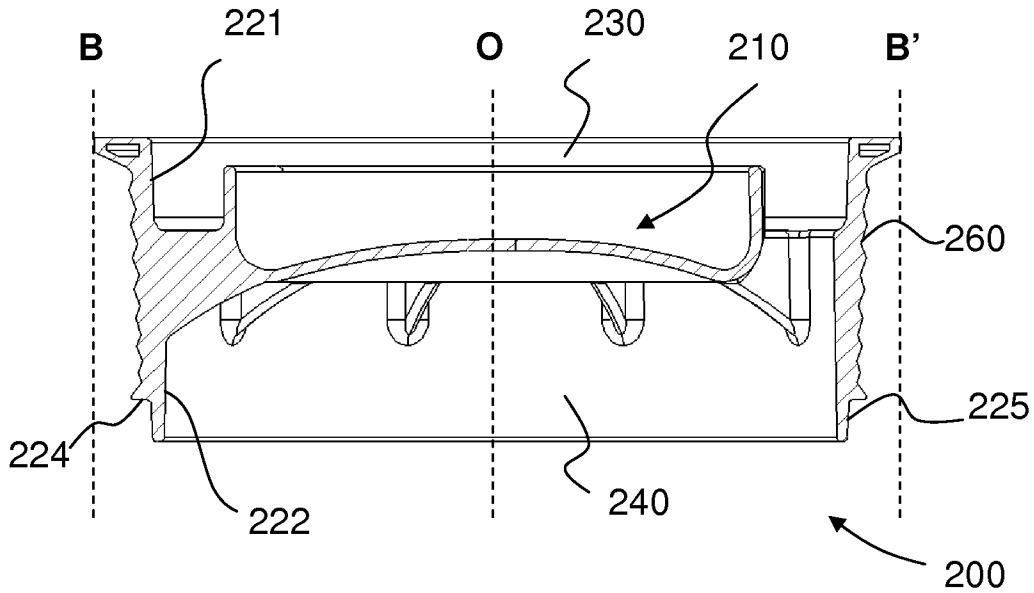

Figure 8

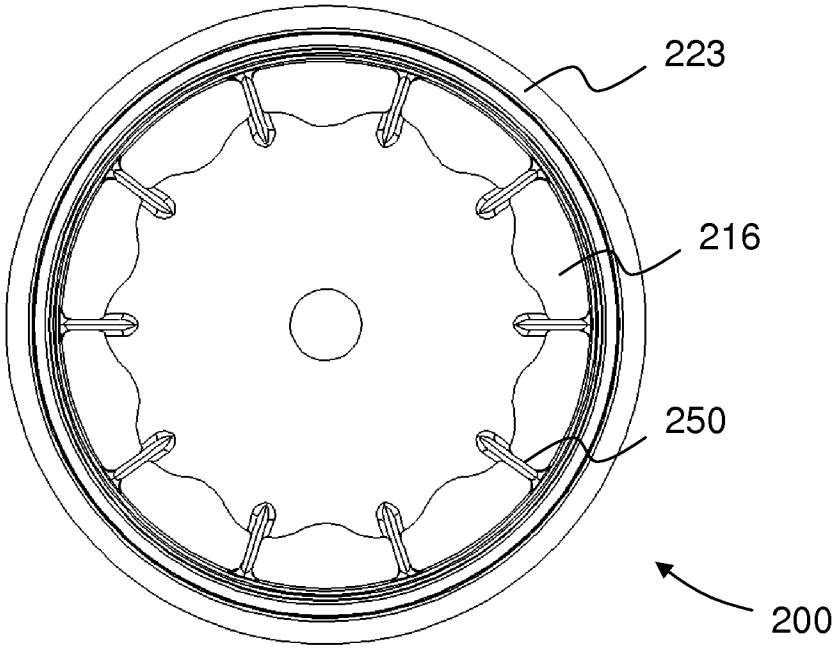

Figure 9

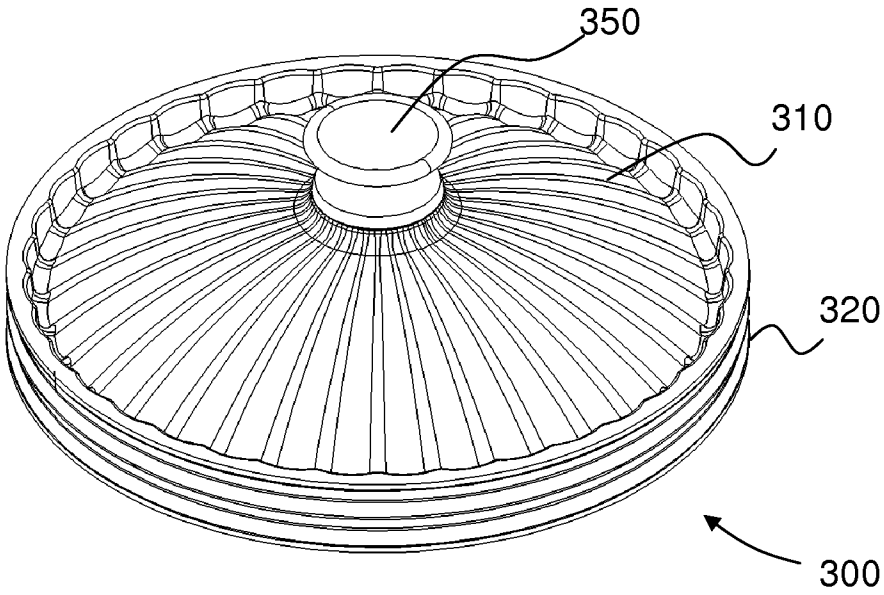

Figure 10

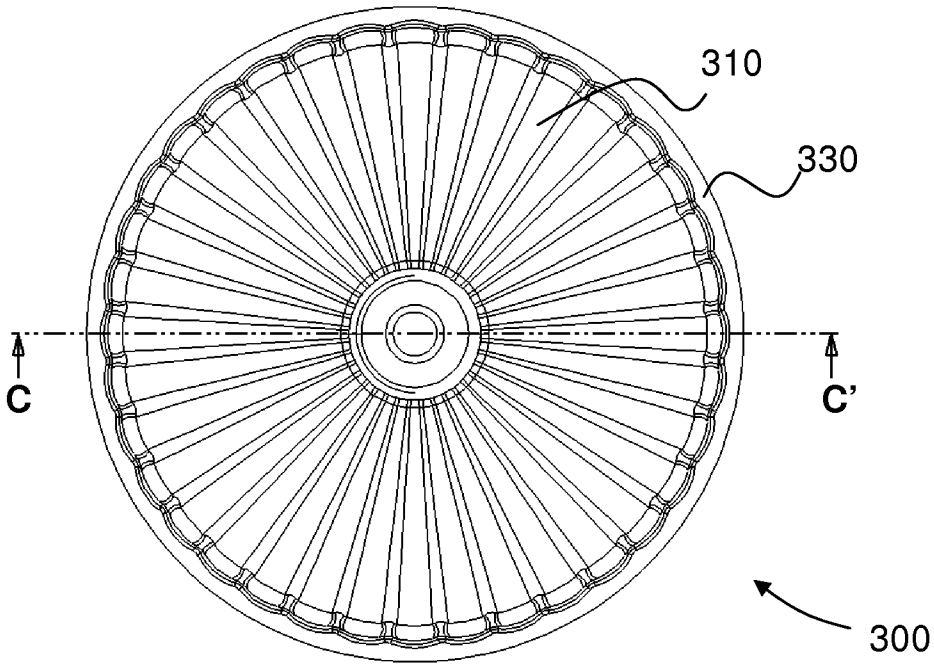

Figure 11

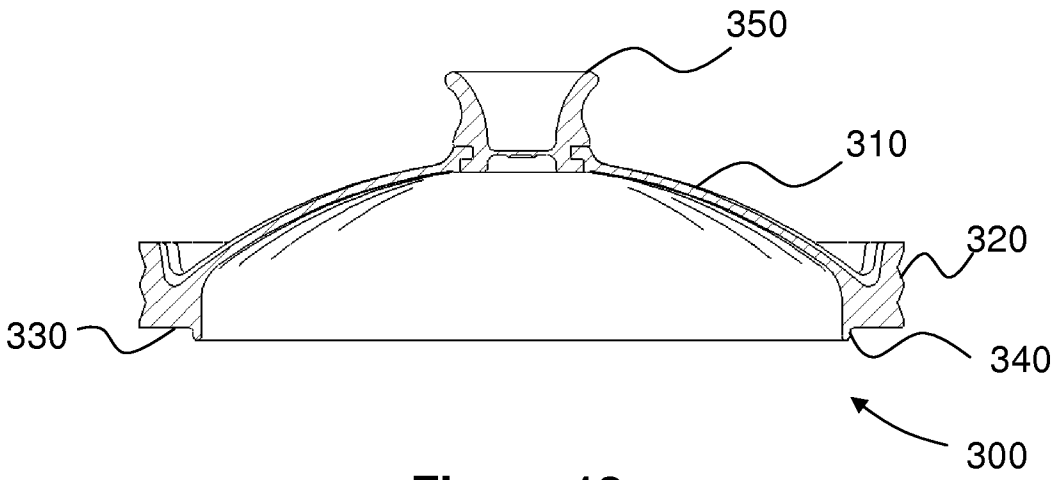

Figure 12

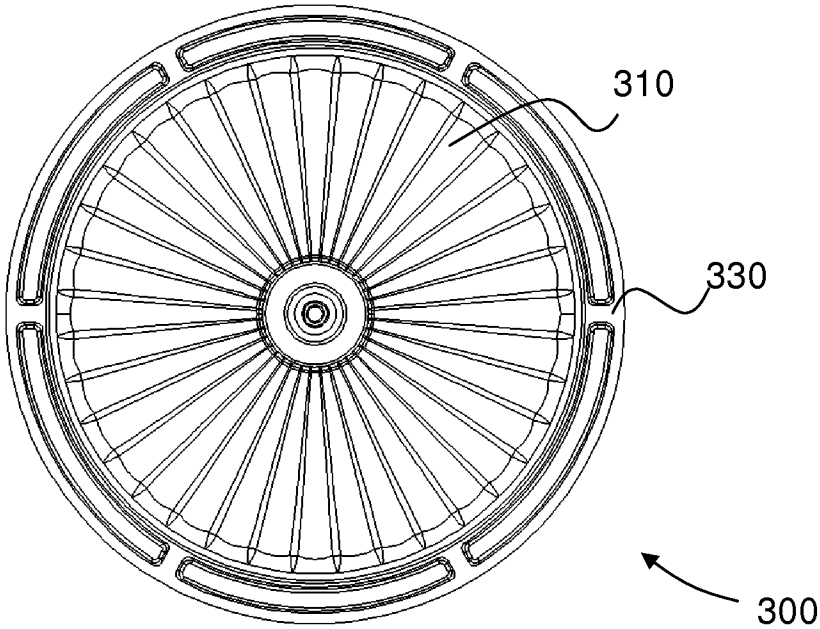

Figure 13

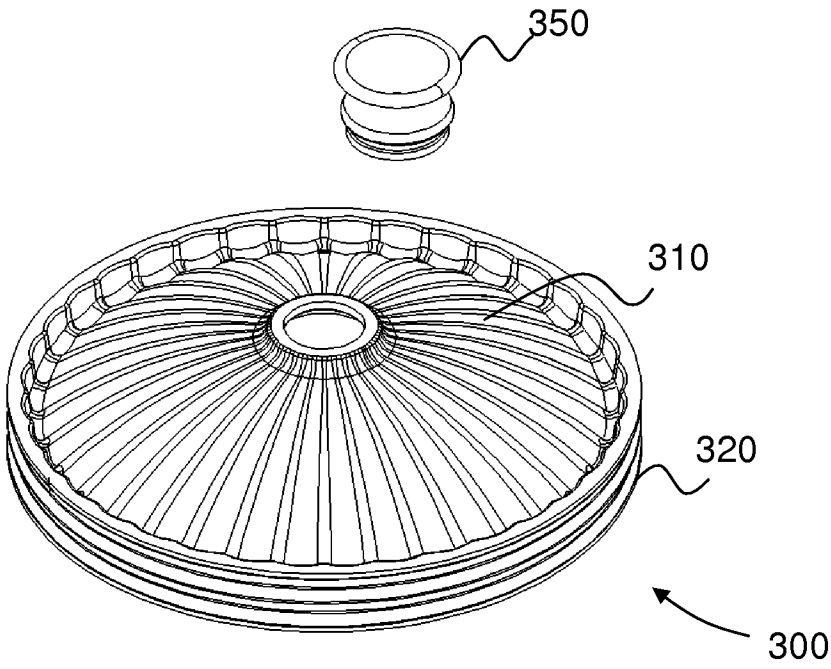

Figure 14

Form PCT/ISA /210 (continuation of first sheet (3)) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/054277

A. CLASSIFICATION OF SUBJECT MATTER

A47J27/05 (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)

IPC: A47J27/-

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

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

WPI;EPODOC;CNKI;CNPAT; and Key words: steam+, tray, perforated, base, peripheral, condensation, drain, guide, direct, soaking.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US4509412 (RIVAL MANUFACTURING COMPANY) 09 Apr. 1985 (09.04.1985) column 3 lines 40-61, figures 4-6	1-3,8
Y		4-24
Y	CN201189084Y (ZHEJIANG ASD ELECTRIC APPLIANCE CO., LTD.)04 Feb. 2009 (04.02.2009) description page 1 lines 5-18	4-24
Y	CN201076348Y (HUANG, Chunchun) 25 Jun. 2008 (25.06.2008) description page 2 line 20-page 3 line 3	9-24
Y	US2009/0107345A1 (SAR HOLDINGS INTERNATIONAL LIMITED)30 Apr. 2009(30.04.2009)	16-24

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 Dec. 2010 (23.12.2010)	**20 Jan. 2011 (20.01.2011)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer TIAN,Jingyi Telephone No. (86-10)82245971

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/054277

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	description page 2 paragraph 35, claims 1,8,15,20,figure 1, CN2610816Y (ZHOU, Yanzeng) 14 Apr. 2004 (14.04.2004) description page 2 line 28-page 3 line 4	21,22
A	CN2850469Y(LAI, Chunbin) 27 Dec. 2006 (27.12.2006) the whole document	1-24

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2010/054277

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US4509412	09.04.1985	CA1199191A1	14.01.1986
		AU3718384A	03.07.1986
CN201189084Y	04.02.2009	None	
CN201076348Y	25.06.2008	None	
US2009/0107345A1	30.04.2009	CN101416837A	29.04.2009
		CN101419888A	29.04.2009
		CN101416795A	29.04.2009
		EP2052711A2	29.04.2009
		EP2052633A1	29.04.2009
		US2009/0108009A1	30.04.2009
		US2009/0106876A1	30.04.2009
		EP2052652A1	29.04.2009
CN2610816Y	14.04.2004	None	
CN2850469Y	27.12.2006	None	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/054277

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The independent claim 21 includes all the features of independent claim 1, and they belong to a single general inventive concept. But the independent claims 1 and 25 do not contain one or more of the same or corresponding special technical features which make the claimed inventions technically interrelated, and the independent claims 21 and 25 also do not contain one or more of the same or corresponding special technical features which make the claimed inventions technically interrelated. So the substantive contents of the technical solution described in the claims do not belong to a single general inventive concept. Thus the independent claims (1, 21) and 25 do not comply with the requirement of unity of invention (Rules 13.1, 13.2 and 13.3).

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:1-24

Remark on protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.