



(11) **EP 2 014 202 B9**

(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**

(15) Correction information:
Corrected version no 1 (W1 B1)
Corrections, see
Description Paragraph(s) 106

(51) Int Cl.:
A47G 23/04 (2006.01) **A23L 3/3409** (2006.01)
B65D 85/34 (2006.01) **B65D 81/24** (2006.01)

(48) Corrigendum issued on:
12.05.2010 Bulletin 2010/19

(45) Date of publication and mention
of the grant of the patent:
18.11.2009 Bulletin 2009/47

(21) Application number: **08166594.5**

(22) Date of filing: **16.08.2004**

(54) **Fruit ripening display**
Obstreifungsaussteller
Affichage du mûrissement de fruits

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR

(30) Priority: **15.08.2003 US 495497 P**

(43) Date of publication of application:
14.01.2009 Bulletin 2009/03

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
04781445.4 / 1 657 998

(73) Proprietors:
• **Chiang, Chia C.**
Los Angeles, CA 90048 (US)
• **Sokol, Brent D.**
Los Angeles, CA 90048 (US)

(72) Inventors:
• **Chiang, Chia C.**
Los Angeles, CA 90048 (US)
• **Sokol, Brent D.**
Los Angeles, CA 90048 (US)

(74) Representative: **Viering, Jentschura & Partner**
Postfach 22 14 43
80504 München (DE)

(56) References cited:
WO-A-99/46175 DE-A- 2 259 561
FR-A- 2 242 872 US-A- 1 126 258
US-A- 3 298 511 US-A- 5 165 947
US-A- 5 345 784 US-B1- 6 527 121

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 014 202 B9

Description

[0001] The invention relates to an apparatus and a method for fruit ripening, and a method for manufacturing an apparatus for fruit ripening

[0002] Supermarkets and other fruit sellers often sell fruit that isn't ripe. There are several reasons for this. For one, fruit sellers are concerned that their fruit inventory will rot on the shelf or in storage before they can sell it. Additionally, fruit transporters are concerned that ripe fruit will bruise or damage during transport. Consequently, supermarkets and other fruit retailers purchase and receive unripe fruit to avoid damage during shipment and to minimize spoilage before the fruit is sold. These practice have become more prevalent in recent years as supermarket consolidation and centralized buying requires fruit to travel farther in order to reach the store. As a result, purchasers are often offered fruit that is not ripe enough for their purposes or ready to eat.

[0003] Yet many fruit purchasers want to eat their fruit soon after they purchase it. And they want their fruit to taste the best that it can taste. To this end, they sometimes place their fruit in paper bags or in a ripening dome to ripen. Or they may ripen the fruit by keeping it in a warm place; exposed to the air.

[0004] Various attempts to address these problems can be found in fruit holders: a Filio Fruit Tray by Mono Tabletop comprises a brushed 18/10 stainless steel sheet that has been bent into a wave profile; a Rosendahl stainless steel fruit dish comprises polished matte 18/08 stainless steel that has been bent into a curve profile with two rectangular legs that form two of its sides; a Lobo fruit bowl/bread basket comprises a square sheet of stainless steel having its sides elevated to form a receptacle having a gradual slope; Stacks and Stacks offers a banana tree/fruit bowl comprising an open chrome wire basket for storing fruit and an integral hook for suspending bananas; Stacks and Stacks also offers a fruit bowl made of natural wood having aluminum legs; and Gumps's of San Francisco offers a bowl made of an unwound coconut palm spathe having four legs.

[0005] Yet these fruit holders ignore an important principle of fruit ripening: exposure to concentrated ripening gas accelerates fruit ripening and improves fruit flavor. Fruit falls into two categories: 1) fruit that can continue the ripening process after harvesting and 2) fruit that cannot continue the ripening process after harvesting. Fruits that can continue ripening after harvesting are called climacteric fruits. They include many of the most popular fruits including apples, banana, pears, plums and peaches. After harvesting, these fruits continue to respire and naturally produce their own fruit ripening gas-ethylene.

[0006] Since at room temperature ripening gas accelerates fruit ripening and improves fruits flavor, it is desirable to retain such gas in a chamber along with fruit that needs to be ripened. If the chamber is appropriately ventilated, the fruit will continue to ripen, which in turn will generate more ripening gas. This creates a positive feedback loop of fruit ripening.

[0007] Yet each of the foregoing fruit holders lacks a chamber for retaining fruit ripening gas. They also only have one fruit-ripening environment. As a result, these fruit holders have at least the following disadvantages: they do not exceptionally accelerate fruit ripening, they only marginally improve the taste of the fruit, they do not accommodate variations in ripening rates of different fruits, and they do not readily allow the user to change the ripening rates for select fruit.

[0008] For over twenty years fruit holders with domed tops and chambers for retaining ripening gas have been described or offered: Hammacher-Schlemmer describes a "ripening bowl" comprising a clear dish with a clear bell-shaped top containing ventilation holes. According to Hammacher-Schlemmer, the "ripening bowl" is "specially designed with a domed lid that provides an ideal climate"; U.S. Des. Pat. No. 247,945, awarded to Saunders in 1978, shows a design for a ripening bowl with ventilation holes. The bowl has a convex bell-shaped top containing ventilation holes; the Koller-Craft division of Koller Enterprises, Inc. has manufactured a fruit holder with a domed top and chamber for retaining ripening gas. According to Koller-Craft, Inc. the design provides "proper" circulation; U.S. Des. Pat. No. 273,652, awarded to Lederman et al. in 1984, shows a design for a fruit ripener having a bottom with several ventilation holes and a dome top with one principal and several smaller ventilation holes; Japanese reference JP1085064 A, published March 30, 1989, and assigned to Matsushita Electric Works Ltd., describes containers with plastic domes, and plastic bags, for ripening fruits in which a ripening gas source is placed "in a case for housing fruits"; The University of California-Davis' March 1995 publication, PostHarvest Horticulture Series No. 8, recommends ripening fruit by placing it into a domed bowl made of clear molded plastic having ventilation holes around the top. Alternately, the publication recommends placing fruits in a paper bag to ripen them.

[0009] Yet these fruit holders featuring a "ripening dome" and a single support surface for ripening fruit have at least the following disadvantages: they do not accommodate variations in ripening rates of different fruits; they do not readily allow the user to change the ripening rates for select fruit; they do not substantially reduce bruising caused by stacking and rolling, and they do not always provide the best fruit flavor and hydration.

[0010] Various other apparatuses and materials have been described, although their inclusion in this Background is not an admission that they are prior art or analogous art with respect to the inventions disclosed herein. U.S. Patent No. 1,985,670, issued June 16, 1934 to Sykes, describes "ripe fruit corrugated packing trays" designed for packaging and shipping ripe fruit; U.S. Patent No. 3,069,274, issued December 18, 1962 to Concannon, describes a protector and

riper for fruit, including a polyethylene foam cushion or wrapper impregnated with ethylene dichloride; European Patent Application No. 85303471.8, published November 27, 1985, assigned to Russo et al., describes an apparatus and process for removing carbon dioxide from ripening rooms and "an ethylene injector," including a "cylinder holder" for holding a pressurized ethylene gas cylinder suitable for discharging into ripening rooms (1,000 cu. Ft. to 20,000 cu. ft i.e. 28,3 m³ to 566 m³); Japanese reference, JP1094871, published March 30, 1989 and assigned to Oishi Sangyo KK, describes ripe kiwi fruit "packaging trays" "consisting of a plurality of fruit receiving bowls." The "packaging trays" may be "stacked" upon insertion of kiwi fruit that is fully ripe; U.S. Patent No. 4,886,377, issued December 1989 to Greengrass et al., and EPO Application 0 282 180 A2, also to Greengrass et al., describe plastic material "containers, bags and encasements" with "micro-perforations," used for produce; Japanese reference JP4210523, published July 31, 1992, assigned to BOC Group PLC, describes a "foldable container" for storing or ripening agricultural products, and having a mechanism for "circulating specified atmosphere around the inside of the container"; U.S. Patent No. 5,254,354, issued October 19, 1993 to Stewart, describes food packages comprised of a polymer having thermally responsive permeability; U.S. Patent No. 5,316,178, issued May 31, 1994 to Garber Jr., describes a fruit ripening system that comprises a fruit ripening ethylene gas storage and dispensing system and container; Perishables Handling Newsletter, Issue No. 80, November 1994, discusses optimum procedures for ripening various types of fruit; U.S. Patent No. 5,661,979, issued September 7, 1997 to DeBoer, describes a domed, self-contained fruit storage apparatus and display device with refrigeration; Likewise, J/K Management Services has displayed an electric appliance comprising a bowl with a clear top. The appliance, marketed as the "Fruit Saver," uses a microchip processor to circulate cool air around the fruit, reportedly to "extend the life of fresh fruit."; U.S. Patent No. 5,667,827, issued September 16, 1997, and U.S. Patent No. 5,711,978, issued January 27, 1998, both to Breen et al., describe methods of packaging using an overwrapped "packing tray" with side holes; Japanese reference, JP11046677, published February 23, 1999, assigned to T K Supply KK; Tatsuno Cork Kogyo KK, describes a "packaging container for vegetables and fruits, that is suitable for containing and transporting vegetables and fruits, particularly full-ripe vegetables and fruits." It comprises "a container made of a synthetic resin foam," a "lid" having an opening closed with "an oxygen permeable sheet material," and an ethylene absorber; U.S. Patent No. 5,916,614, issued June 29, 1999 to Gorlich, describes "dual state" food packaging with a "tray having a peripheral flange adapted to receive a pair of membranes to enclose the tray"; U.S. Patent No. 6,013,293, issued January 11, 2000 to De Moor, describes "packaging of fruit and vegetables" using "an atmosphere-control member comprising a gas-permeable membrane and an apertured cover member over the membrane.; Chinese reference CN1306748 A, published August 8, 2001 and assigned to Yang Lan, describes a gaseous fruit and vegetable ripener that compresses ethylene gas into a seamless bottle having a depression-releasing mouth and a regulator; U.S. Patent No. 6,548,132 B1, issued April 15, 2003 to Clarke et al., describes "gas permeable membranes used in packaging fresh cut fruit and vegetables" and various ripening agents; and U.S. Patent No. 6,376,032 B1, issued April 23, 2003 to Clarke et al., describes "gas permeable membranes used in packaging fresh cut fruit and vegetables." Finally, various publications of the University of California, Davis provide information on fruit ripening for particular types of fruits: Storing Fresh Fruits and Vegetables for Better Taste, Post Harvest Research and Information Center, Department of Pomology at UC Davis, published January 10, 2000; Management of Fruit Ripening, published April 2003 by University of California Davis Post Harvest Research and Information Center; other publications include various Web site printouts: Ethylene Gas, from www.aboutproduce.com, printed August 13, 2004; Mrs. Green's Produce Tips, from www.dennisgreenltd.com, printed August 13, 2004; The Secrets of Fruit Ripening, from www.inra.fr, published June 2002, and printed November 27, 2003; Fresh Tips by Michael Marks, from www.lamasbeauty.com, printed August 13, 2004 and published July 2000; and Fruit Ripening, from www.planthpys.info, printed November 27, 2003.

[0011] Like the other references and fruit holders described above, these references do not solve the need for improved fruit ripening displays.

[0012] Therefore, for all the foregoing reasons, there is a need for an apparatus and method for ripening and displaying fruit that can separately accommodate fruits with different ripening rates or levels of ripeness, permit the user to readily change the ripening rates for select places of fruit, and reduce bruising of the fruit. And there is a need to do all of this while accelerating fruit ripening and greatly Improving fruit flavor and hydration.

[0013] In prior art, storage devices are known. DE 2259561 teaches a storage device keeping vegetables and fruit fresh by cooling inside the storage container, avoiding a ripening or decaying process, extending the time span for distribution.

[0014] From FR 2242872 a stackable, tray-like card board box is known that can be folded up from a flat stencil. The side walls comprise some ventilation openings.

[0015] It is an object of the invention to create an apparatus and method for fruit ripening allowing fruit to be ripened in a more controlled manner without being subject to damage, and to create a method of manufacturing such a fruit ripener.

[0016] This is achieved by the subject-manner in independent claims 1, 14 and 15. Advantageous further embodiments are described in the dependent claims.

[0017] Applicants provide a simple solution to the problem of ripening hard, unripe fruit. In a first aspect, applicants solve each of the foregoing problems through the use of multiple support surfaces for ripening fruit. This aspect allows

fruit purchasers to easily control the ripening process. Moreover, in contrast to prior teachings, such ripening displays may comprise a chamber for retaining ripening gas that is substantially hemispherical, or another non-domed shape, to improve fruit flavor and hydration. After ripening, each support surface may be separately used as part of a traditional fruit bowl. Thus, the applicants provide, in one aspect, multi-support surface apparatuses and methods for ripening and displaying fruit.

[0018] According to this aspect, an apparatus for fruit ripening and display may comprise two or more display parts that, when combined, form at least one chamber for retaining ripening gas. The apparatus also has two or more support surfaces for ripening fruit. At least one of these is located inside a chamber for retaining ripening gas. At least one other support surface for ripening fruit is located outside of the chamber for retaining ripening gas. The support surface located outside the chamber is at least in part concave and at least in part inwardly sloping to reduce fruit rolling and bruising and to increase fruit stability.

[0019] Surprisingly, the apparatus' chamber for retaining ripening gas may take a variety of non-domed shapes and still improve fruit flavor and hydration and accelerate ripening. In a preferred embodiment, at least one chamber for retaining ripening gas is substantially hemispherical.

[0020] In the following, preferred embodiments are described by referring to the drawings. In the drawings:

FIG. 1 is a side elevation view of an apparatus for fruit display.

FIG. 2 is a perspective view of the apparatus for fruit display of FIG. 1.

FIG. 3 is a cross-section view of an apparatus for fruit display, taken through a y-y plane.

FIG. 4 is a cross-section view of an apparatus for fruit display, taken through a y-y plane.

FIG. 5 is a cross-section view of an apparatus for fruit display, taken through a y-y plane.

FIG. 6 is a cross-section view of the apparatus for fruit display of FIG. 1, taken through the y-y plane.

FIG. 7a-d shows a top plan, perspective view front elevation, and side elevation of a vent insert.

FIG. 8a-d shows a top plan, perspective view, front elevation, and side elevation of a vent insert.

FIG. 9a-d shows a top plan, perspective view, front elevation, and side elevation of a vent insert.

FIG. 10a-d shows a top plan, perspective view, front elevation, and side elevation of a platform top.

FIG. 11a-d shows a top plan, perspective view, front elevation, and side elevation of a second display part.

FIG. 12 is a cross-section view of the first display part of FIG. 1, taken through the x-x plane.

FIG. 13 is a cross-section view of the second display part of FIG. 1, taken through the x-x plane.

FIG. 14 is a side elevation view of an apparatus for fruit display.

FIG. 15a is a cross-section view of an apparatus for fruit display comprising a first display part and second display part for a preferred embodiment.

FIG. 15b is a cross-section view of a preferred variant of the apparatus of FIG. 15a wherein the first display part comprises a balancing surface that is an integral ring on the bottom of the part.

FIG. 16a-c shows a perspective view, exploded perspective view, and exploded side elevation view of a ripening display employing the first display part and second display part of FIG. 15 along with a base part.

FIG. 16d-h shows a perspective view, top plan view, cut away view, front elevation view, and side elevation view, of the base part of FIG. 16a-c.

FIG. 17 is a side elevation view of a ripening display with first and second display parts separated.

FIG. 18 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 19 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 20 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 21 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 22 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 23 is a side elevation view of an apparatus for fruit display with first and second display parts separated.

FIG. 24 is a perspective view of an apparatus for fruit display.

FIG. 25 is a perspective view of an apparatus for fruit display.

FIG. 26 is a perspective view of an apparatus for fruit display.

FIG. 27a-b shows a side elevation view and an exploded side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 28a-b shows a side elevation view and an exploded side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 29 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 30 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 31 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 32 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 33 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 34 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 35 is a side elevation view of an apparatus for fruit display comprising a first display part, a second display part, and a base part.

FIG. 36 is a side elevation view of an apparatus for fruit display comprising a first display part and a second display part having a double wall.

FIG. 37 is a side elevation view of an apparatus for fruit display comprising a first display part and a second display part.

FIG. 38a-b shows a perspective view and a side elevation view of an apparatus for fruit display comprising a first display part and a second display part.

FIG. 39a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 40a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 41a-b shows a perspective view and a side elevation view of a closed apparatus for fruit display comprising a first display part and a second display part.

FIG. 42a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 43a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 44a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 45a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configuration.

FIG. 46a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

FIG. 47a-b shows a perspective view of an apparatus for fruit display comprising a first display part and a second display part in closed and open configurations.

Definitions:

[0021]

"Balancing surface" is defined as any surface area that supports the first display part when it is separately balanced.

"Base part" is defined as an apparatus member that rests on a tabletop or other resting surface while supporting another display part.

"Chamber wall" is defined as any surface that partly or fully defines the shape of a chamber.

"Display" means viewing fruit within a chamber for retaining ripening gas or while the fruit is supported on a support surface at room atmosphere.

"Display part" is defined as an apparatus member. Some "display parts" are "base parts."

"Ellipsoidal" describes any geometric shape whose plane sections are all either ellipses or circles.

"Fruit support surface up" means oriented so that the fruit support surface for ripening fruit is oriented to support fruit.

[0022] Platform top means a first display part that does not have walls extending down past the lowest point on the underside of a fruit support surface for ripening fruit.

[0023] Non-domed is defined as not spherical.

[0024] Ripening gas" is defined as ethylene or any other gas that causes fruit to ripen.

[0025] "Support surface for fruit" is defined as any surface that supports fruit. It may support the fruit laterally, from above, from below, or any combination thereof.

[0026] "Ripening" may occur within a chamber for retaining ripening gas or in room atmosphere.

[0027] "Spheroidal" describes an ellipsoid that is generated by revolving an ellipse around of its axes.

First Aspect

[0028] According to the first aspect, an apparatus for fruit display's fruit platform area is uniquely increased thereby

reducing risk of bruising and over ripening of select fruit while maintaining close fruit proximity for ripening other select fruit. This aspect provides a ripening display that has at least two support surfaces for ripening fruit. A preferred embodiment of a ripening display and a method for displaying and ripening fruit according to this aspect is illustrated, by way of example, in FIGS. 1-2. As shown in FIG. 1, the embodiment comprises a first display part 10 and a second display part 20. Together the first display part 10 and the second display part 20 create a fruit ripening chamber with the first display part 10 providing a first support surface for ripening fruit 30 and the second display part 20 providing a second support surface for ripening fruit 40.

[0029] Although the first and second display parts shown herein are top and bottom parts, in each embodiment disclosed in this application they may be side parts (such as parts that combine laterally thereby splitting the chamber in a vertical rather than horizontal plane), a combination of side part, top part and/or bottom part, or some other variation. Unlike prior fruit holders, which employ a dome-shaped top (reportedly for purposes of moisture retention and air circulation) this aspect teaches a first display part having a concave support surface for ripening fruit 30. According to this aspect, ripe fruit, fruit that ripens quickly or fruit that is being kept (such as fruit kept for accelerated ripening in the future) can be stored on the first display part's fruit support surface 30 to selectively regulate fruit ripening rates. FIG. 2 provides a perspective view of the embodiment shown in FIG. 1. The support surface for ripening fruit 30 is preferably at least partly concave, more preferably at least partly concave and at least partly inward sloping (see for example FIGS. 1-6), still more preferably at least partly concave, at least partly inward sloping and at least partly curvilinear (for example FIGS. 1-3, 5-6), still more preferably at least partly concave, at least partly inward sloping, and at least partly upwardly curvilinear (for example FIGS. 1-2, 5-6), or at least partly concave, at least partly inward sloping and predominantly upwardly curvilinear (for example FIGS. 1-2, 5-6) or at least partly concave, at least partly inward sloping, and substantially entirely upwardly curvilinear (FIGS. 1-2, 6). This improves fruit stability, reduces rolling, and reduces bruising on the outside fruit support surface.

[0030] The support surfaces may also be entirely concave. The surfaces and the parts are preferably all or in part rigid, at least when in use.

[0031] As shown in FIGS. 1-2, the first display part 10 and the second display part 20 are preferably entirely or partially transparent for assessing the fruit in the ripening chamber. The display parts and their support surfaces for ripening fruit may, however, be entirely or partly opaque, may be colored and may contain swirls, stripes, or other types of decorative design. The various shapes, positions and/or markings on the display parts, display part vents and/or vent inserts may serve a source identification function. The display parts and the fruit support surface for ripening fruits may also be textured, including coated or stippled, so as to increase surface area and/or surface friction.

[0032] The support surfaces may also comprise fruit guides (such as elevated portions, or recessed portions), vent inserts, or other surface features. The display parts may be separated by hand using a separation surface, such as an extended portion of a display part, a gripping portion, a lifting portion, or even a button to mechanically separate the display parts. The display parts may be partial or completely separated in order to access the chambers for retaining ripening gas.

[0033] The parts and surfaces of the first aspect may further comprise gas impermeable material (such as glass or polymethyl methacrylate), oxygen permeable material, carbon dioxide permeable material, or a combination of the group; and are ventilated by air vents. Embodiments without air vents provided in the support surface do not belong to the present invention as claimed. Fruit support surface for ripening fruit 40 and second display part 20 may be made all or in part of a carbon dioxide permeable material; and are ventilated by air vents. And fruit support surface for ripening fruit 30 and first display part 10 may be made all or in part of oxygen permeable material; they may be additionally or alternatively ventilated. The vents may be integral to the display parts. Alternately or additionally, the vents may be formed by a gap in the display parts when they are joined or by a vent insert that permits gas exchange between the chamber and the exterior of the ripening display.

[0034] A preferred example of a vent insert for a display part is shown in FIG. 7a-d. In this preferred embodiment, the vent insert 700 may be metal, such as steel or aluminium. But polymer materials and other solids, including wood, may be used. Further, the vents of the vent insert may be higher than the surrounding fruit support surface so that fruit will tend to roll off of them, rather than cover them. Thus, in a preferred embodiment, the support surface for ripening fruit is concave and at least partly inward sloping, but comprises a raised area. The raised area may act as a fruit guide to improve fruit stability and reduce rolling on the support surface, and may alternately or additionally comprise a vent insert as shown. It may also comprise integral vents, such that the fruit tends not to cover the vents. The size of each vent is preferably 18 mm by 8 mm for a substantially hemispherical ripening chamber approximately 260 mm in diameter at its widest point by 156 mm high. Another vent insert 800 is shown in FIG. 8a-d. In FIG. 8a-d, the outer radius of each vent 802 is approximately 17 mm from the center of the vent insert, 32 mm wide and 8 mm high. Both are preferably made of stamped sheet metal, such as stainless steel, but also may be made of aluminum or other materials.

[0035] The support surface for ripening fruit may also comprise a lowered area, which may optionally act as fruit guide to improve stability and reduce rolling on the fruit support surface. The lowered area may additionally or alternatively further comprise integral vents, such that the fruit tends not to cover the vents.

[0036] Like the first display part, the second display part may also comprise a vent insert. FIG. 9a-d shows a vent insert 900 for a second display part comprising vents 902. Although one vent may be used, at least two vents are preferred, and at least three are more preferred, for reasons of gas exchange. The vents (here about 8mm in diameter) are preferably spaced apart uniformly, and may be equidistant from the center of the second display part (here about 53mm away). The vent inserts for any display part described herein may be secured by a securing agent, such as glue, sealer, grommet, display part feature, (such as a tab, indent, lock or latch on the display part itself), or one or more securing pieces, such as a securing piece that attaches to the vent insert from the other side of the display part thereby securing the vent insert in place.

[0037] FIG. 10a-d shows a first display part, 1010, with a vent insert receiving area, 1015, for receiving a vent insert. The vent insert may be the vent insert shown in FIGS. 7a-d and FIG. 8a-d, or some other kind of vent insert. The receiving area may be raised relative to the surrounding fruit surface as shown; alternately the receiving area may be lowered relative to the surrounding fruit support surface, or it may comprise an opening level with the surrounding fruit support surface. Preferably, the first display part 1010 has a balancing surface, such as a balancing surface comprising feet 1095 or some other balancing surface. As shown in the preferred embodiment of FIG. 10c-d, the first display part comprises a balancing surface such that it can securely balance on a countertop so that the first display part and second display part may be separated and separately rested on the countertop while their support surfaces still support fruit. In this case, the balancing surfaces comprise feet 1095.

[0038] FIG. 11a-d shows a second display part, 1120, with a receiving area, 1125, for receiving a vent insert (such as for the vent insert of FIG. 9). The receiving area may be raised relative to the surrounding fruit support surface for ripening fruit, as shown; alternatively, the receiving area may be lowered relative to the surrounding fruit support surface for ripening fruit, or it may simply comprise an opening level with the surrounding fruit support surface for ripening fruit. The second display part as shown in FIG. 11a-d, can be elevated with feet (not shown) or by a base part (not shown).

[0039] Alternately or additionally, the first display part and/or second display part of the fruit displays disclosed herein may have vents integral to display part itself. These integral vents may be holes formed in the fruit support surface for ripening fruit. They may be formed in a raised area relative to the surrounding support surface for ripening fruit, a lowered area relative to the surrounding support surface for ripening fruit, or in an area level with the surrounding support surface for ripening fruit. The integral vents may be formed by the intersection of one display part with another surface, such as the surface of another display part, and may contain a partial or total conduit. See FIG. 16c.

[0040] Figs. 12-14 are shown for the combination and separation aspect. It is to be understood that only such embodiments belong to the invention as claimed that include vents provided in the one or more fruit support surfaces located outside the one or more ripening chambers.

[0041] As shown above, ripened fruit may be separated onto two support-surface-up parts, the chamber exposed to air, and the ripening process retarded. FIG. 12 demonstrates this feature. FIG. 12 shows a cross-sectional perspective view of FIG. 1's first display part 10 taken through plane x-x. In this "dog food bowl" configuration, first display part 10 includes a first display part side wall 50 that, along with the underside of fruit support surface 30 forms a hollow space underneath fruit support surface 30. A top part support interface 60 (here formed by recessed portion of first display part wall 50) is designed to rest on and at least in part reciprocates the contour of the weight-bearing rim 70 (shown in FIG. 13). The top part support interface is defined as the first display part surface that supports the first display part while the first display part is combined with the second display part. In this example, the weight-bearing rim 70 is substantially level on parts of its surface. Since, as shown in FIG. 12, the first display part comprises a balancing surface (namely its flat underside) it can balance, fruit support-surface-up, on a flat surface, thereby providing additional fruit support surface area. A display part comprising a fruit support surface may also be reversible. That is, it may have an upward-facing fruit support surface for ripening fruit when in a face-up or face-down position.

[0042] In a preferred embodiment, shown in FIG. 14, the fruit support-surface-up balancing function can also be achieved by having at least one balancing point (shown here as balancing points 80, 90, and 100) on the support interface of the first display part walls. In this version, a balancing surface may comprise the support surface including a balancing point or points that permit the first display part to separately balance on a flat surface. Preferably, the weight-bearing rim of the second display part and the support interface of the first display part have, at least in part, a reciprocal contour.

[0043] A preferred embodiment of the first aspect is shown in FIG. 15a. FIG. 15a shows a cross-section of a first display part 1610 (a platform top) and a second display part, 1620. The fruit support surface of the first display part is concave and inwardly sloped, as is the fruit support surface of the second display part, 1620. The two fruit support surfaces comprise raised areas, 1615 and 1625, respectively. Raised area 1615 of the outside fruit support surface preferably comprises a vent insert receiving area for receiving a vent insert. Thus, as represented by the white portion of raised area 1615, the raised area may have a hole forming part of a vent insert receiving area. As shown in FIG. 15a, the raised area may also be shaped to receive a vent insert, such as, for example, the type of vent inserts shown in FIGS. 7a-d and 8a-d. In this preferred embodiment, the vent insert may also be level with the surrounding fruit support surface or contain a recessed portion relative to the surrounding fruit support surface. Alternately, or in addition, the raised area may also comprise integral vents above, level with, or below the surrounding fruit support surface.

[0044] Likewise, the raised area 1625 of the second display part's fruit support surface may also comprise a vent insert receiving area. It may also be shaped to receive a vent insert, such as, for example, the type of vent insert shown in FIG. 9. The vent insert may also be level with the surrounding fruit support surface, or contained in a recessed portion relative to the surrounding fruit support surface. As described in connection with the most preferred embodiment of the

[0045] FIG. 15b shows a cross-section of the most preferred embodiment, wherein the first display part comprises a balancing surface (in this case an integral ring represented in cross-section by the two dips in the underside of the first display part). The balancing surface can balance the first display part on a tabletop when it is separated from the second display part, 1620. The balancing surface may be attached to the first display part, or be an integral part of the display part, as shown. It may lie within the rim of the second display part, 1620, when the parts are combined. Alternately, the first display part may have a balancing surface that rests outside the rim of the second display part when the parts are combined.

[0046] As shown in FIG. 15b, the fruit support surface of the second display part preferably comprises integral vents instead of a vent insert. These integral vents may be formed on the raised area itself (on its top surface or more preferably on its slopes as represented by the left-most pair of dotted lines on raised area 1625). They may also be formed along the outside perimeter of the raised area or in a lowered area relative to the surrounding support surface for ripening fruit. These characteristics inhibit fruit from covering the vents while resting on the fruit support surface.

[0047] Integral vents for the second display part preferably comprise at least three holes (most preferably precisely three) that are equidistant from the center of the fruit support surface. In the case of the most preferred embodiment, these holes are 8mm in diameter, and spaced 53 mm from the center of the fruit surface platform.

[0048] Consistent with the best mode of practicing the first aspect, the first display part, 1610, is a platform top with a raised area for a vent insert in its center. The vent insert receiving area is located directly above the chamber for retaining ripening gas. Due to the effects of gravity on gas and circulation, vents that overlay the chamber are preferred to chamber side vents such as shown in FIG. 50. Likewise, consistent with the best mode, the chambers of FIGS. 15a and b are substantially hemispherical, although other chamber shapes, including other non-domed shapes, substantially ellipsoidal shapes, substantially spheroidal shapes, and other shapes with rounded inner surfaces (like over-inflated box shape or substantially cylindrical shape) are possible.

[0049] FIG. 15b also shows a cutaway of a preferred feature, base part 1645. The base part 1645 rests on a tabletop or other resting surface while supporting another display part. In this preferred embodiment, the base part 1645 is shaped to receive either display part 1620 or, with 1620 removed, display part 1610. This permits the base to be used in various types of ripening and display formats, and permits the user to separately display fruit on the first display part and base without carrying or using the larger second display part, or forming the chamber. Although the base part 1645 is shown (in dotted line) to receive the first display part 1610 on its outer rim, it may also receive the first display part 1610 on its inner rim, or some other way. A variety of materials may be used for base part 1645. But the preferred material is stainless steel stamped out of sheet using a tool and die process. This is also true of the vent inserts shown herein. The base part may also be made out of enameling steel using the same process, and coated with enamel for color. Alternately, the base may be made out of aluminum, such as anodized aluminum, glass, wood, or other supportive material. The preferred aperture size for the base part is simply the diameter of the vent area on the bottom of the chamber (here about 120 mm).

[0050] Importantly, the display parts of FIG. 15a and b can be used with feet or some other balancing surface rather than base part 1645, as shown. In all cases, it is preferable to have about a 1,27 cm (half-inch) of clearance between any vents and the ground to ensure adequate ventilation of the chamber. With or without feet, both the first display part and second display part may each balance, support surface up, on a flat tabletop.

[0051] FIG. 16a-g show a variety of features of the preferred ripening display of FIG. 15a and b. As shown, the second display part, 1620, may be elevated by a base part, 1645, to permit gas exchange between the ripening chamber and the room's atmosphere. Additionally, or alternately, the second display part 1620 may comprise a balancing surface, such as feet that elevate it from its resting surface. The base part, shown in detail in FIG. 16e-g, may be hollow in its center. Additionally, it may be concave and nestle the second display part. It is preferably a ring shape, as shown. As shown, the outer perimeter of base part 1645 is elevated (preferably about a half inch) off the ground, and the inner perimeter has several cut away surfaces next to balancing surfaces 1647 that permit gas exchange between the ripening chamber and the surrounding atmosphere. Alternately, or in addition, base part 1645 may comprise vents, or vent inserts, to permit gas exchange from the ripening chamber to the outside atmosphere. Vent inserts may be secured by a securing agent, such as the securing piece 1616, which attach to the vent insert and fix it in place on the display part (here first display part 1610). Alternately or additionally the display part may comprise recessed area through which room air may be exchange with the chamber. The base part may also comprise decorative elements, such as the embossed figures, 1649, as shown. The decorative elements may double as vents or vent inserts. However, it is important to note that the preferred embodiment shown in FIG. 16 may be used without a base part, and instead use feet or recessed portions in the second display part to permit air exchange between the ripening chamber and the room's atmosphere.

[0052] According to this preferred embodiment, a base part 1645, such as the base part shown in FIG. 16a-g, may securely receive the first display part after the second display part is removed. In this way, the ripening display may convert to an alternate configuration for fruit display and ripening with the first display part 1610 resting directly on base part 1645. Thus, in this most preferred embodiment, the base part 1645 may be a multi-purpose base part. As with the other embodiments, the first display part may also be reversible, having at least one fruit support surface for ripening fruits on both its sides. As a result, it may rest upside down or right side up on a table top and/or on base 1645. Further, both the first display part and the second display part may have locating features, such as notches, guides, circumferential indents, or a locating ring (such as a locating ring integral to the first display part as shown in FIG. 15b or attached to it) so that the display parts may be readily positioned on one another and/or on the base part. Alternately, or in addition, the base part may have a security surface, such as a rubberized contact surface, or other physical feature, which helps secure the first display part and or second display part to it. The surfaces and the parts described herein are preferably all or in part rigid, at least when in use.

[0053] In this preferred embodiment, the second display part, 1620, when combined with first display part, 1610, comprises a substantially hemispherical inner surface, such as shown in FIGS. 11a-d, 15 and 16a-g and other figures. Although combined parts comprising other types of inner surfaces are functional, it is believed that combined display parts comprising substantially hemispherical contours furthers ripening by forcing the fruit closer together, even when the ripening display is not full. A domed chamber is not needed. A non-domed chamber, such as the substantially hemispherical shaped chamber as shown in FIG. 16, may provide exceptional fruit flavor and hydration while substantially accelerating fruit ripening. See Experimental Results section below.

[0054] In this preferred embodiment, the fruit support surface of the second display part is preferably at least in part concave, more preferably at least in part concave and at least partly inward sloping, still more preferably at least in part concave, at least partly inward sloping and at least partly curvilinear, or at least in part concave, at least partly inward sloping, and at least partly upwardly curvilinear, or at least in part concave, at least partly inward sloping and predominantly upwardly curvilinear. As in FIGS. 15 and 16a, the second display part fruit support surface for ripening fruit is at least in part concave and inwardly sloped. As shown in FIG. 16a and b, it may contain integral vents level with the surrounding support surface, or off-level, such as elevated relative to the surrounding support surface recessed relative to the surrounding fruit support surface (such as shown with the recessed vents on the slopes of the elevated portion 1625 in FIG. 15b).

[0055] Likewise, although the first display part's vents and/or vent inserts may be located in various locations on the first display part, in the most preferred embodiment, shown in FIG. 16a-d, it is preferred to have those vent inserts or integral vents located substantially in the center of the first display part. Further, as shown in FIG. 16a and b, the vents 1602 (shown as part of vent insert 1617) may be elevated relative to the surrounding support surface, or level with the surrounding support surface or recessed relative to the surrounding fruit support surface (such as the integral vents shown in FIG. 15b). In all events, it is preferred that the walls of the first display part are at most only slightly higher than the vents in the first display part. Thus, although higher side walls may be functional, for center vented embodiments, it is believed that side walls at most only slightly higher than the first display part vents result in increased air circulation through the ripening chamber. Further, it is preferred that the first display part support surface be able to hold two full size apples, more preferably three full size apples, still more preferably four full size apples, more preferably five full size apples, and more preferably, six or more full size apples.

[0056] Importantly, for all the apparatuses described herein, the chamber may be split into a plurality of chambers, or be one of a plurality of chambers. Likewise, the display parts, including any base parts, may be split into a plurality of parts, or be one of a plurality of display parts, and the fruit support surfaces likewise may be split into a plurality of fruit support surfaces or be two of two or more fruit support surfaces. Thus, in an alternate embodiment FIG. 15 and 16 contemplates a plurality of chambers, parts, and support surfaces. The underside of the platform top, 1610, may take a variety of shapes, including a downwardly curved surface or level surface, rather than the upwardly curved surface shown. The first display part may be other than a platform top, such as one of the other first display parts described herein. Similarly, the first display's balancing surfaces may lie outside the rim of the second display part, rather than inside, as shown in FIGS. 15a and b.

[0057] In keeping with the desire to have ready separation of the parts, the interface between the display parts may be unrestricted, with only combining force being gravity as shown in FIG. 15. Likewise, the first display part may comprise an extending portion or other lifting surface to permit the user to readily separate two or more display parts. However, in keeping with the space efficiency desired for this apparatus, the extending portion of the first display part preferably has a low profile relative to the other display parts. Most preferably, the outermost diameter of the extending portion of the first display part relative to the display parts with which it is combined is less than 1.3 to 1, and more preferably less than 1.1 to 1, as shown (276 mm to 260 mm). The extending portion may be located close to the interface when the display parts are combined, or located away from the interface, higher up on the first display part, as shown in the gradually broadening extending portion of the first display part of FIG. 38.

[0058] The preferred embodiments described and shown in FIG. 15 and 16 may also be combined with various other

features of the five aspects described herein. Thus, it may employ fruit guides in various forms (including in the form of a vent insert or surface feature) to improve fruit stability or bias fruit position. The surfaces of the display parts, support surfaces, and chambers may be textured or colored. The apparatus may employ a ripening agent unit, including a ripening solid, either with or without a casing. The display parts, chambers, and fruit support surfaces described herein may comprise an anti-fog agent either as a coating or integral to its surface material. The apparatus may comprise a holder for a ripening solid, such as shown in the platform of FIG.42b, or an enclosed holder.

[0059] The best mode of practicing the first aspect may be found in several methods of ripening using the apparatuses described herein. In general, it is best to place the apparatus for ripening and display on a table or countertop away from direct sunlight. The user should separate unripe fruits that can be ripened from those that cannot be ripened. Do not wash the fruit before placing it in the chamber for retaining ripening gas. Fruit that cannot be ripened or that is ripe can be placed on the outside fruit support surface. It is further advisable to stagger ripening by placing some unripe fruit on the fruit support surface located outside the chamber for ripening later on. That way the user has a few ripe, ready-to-eat pieces available each day rather than a large batch of ripe fruit that needs to be consumed immediately.

[0060] Prior to placing fruit on the fruit support surface to be enclosed in the chamber, inspect the fruit for bruises. Do not ripen bruised fruit since it will rot in the apparatus and affect the taste of the other fruit. Then take the following steps: place unripe fruits on the fruit support surface to be enclosed in the chamber. Distribute fruit evenly around the fruit support surface. Preferably do not stack fruit more than two layers high to reduce bruising and instability. Bananas should be placed on top of other fruits since they are softer and bruise easiest. Remaining fruits should be stacked with larger pieces on the bottom and smaller ones on top so as not to bruise the bottom layer. Preferably place one or two ripe fruits, most preferably apples or bananas, on the fruit support surface to be enclosed in the chamber to stimulate the ripening process.

[0061] Then combine a first and second display parts to enclose a fruit support surface in a chamber for retaining an effective amount of ripening gas. Place fruits that cannot be ripened or ready to eat fruits on the fruit support surface located outside the chamber. Visually inspect the fruit in the chamber daily through a transparent portion of the chamber. Market-hard fruit may require anywhere from 1 to 4 days to ripen, although most fruit can be ripened within three day in the apparatus. If some fruit appears to be ripe, separate the display parts thereby opening the chamber and touch and/or smell the fruit for ripeness. Remove ripe fruits from the fruit support surface that becomes enclosed in the chamber when the parts are combined. Recombine first and second display parts to enclose the fruit support surface in a chamber. Place ripened on the fruit support surface located outside of the chamber. Add new fruit to the inside fruit support surface as needed. Its best to keep the chamber at least half full and to mix riper fruit with new, unripe fruit in the chamber. When all the fruit is ripe, the display parts may be separated and used as traditional, non-chambered fruit bowls.

[0062] For example, the embodiment of FIGS. 15 and 16 may further be used in accord with the methods taught herein. Thus, a user may ripen fruit by: a) placing fruit capable of ripening on one or more fruit support surfaces of an apparatus comprised by one or more display parts; b) combining two or more display parts to form one or more chambers for ripening fruit thereby enclosing at least some of the fruit in one or more chambers wherein the size of said two or more display parts permits them to fit entirely on a countertop 61.0 cm (two feet) long by 61.0 cm (two feet) wide when combined; and at least one of said one or more of the chambers at least is in part transparent and ventilated with at least two vents; c) separating two or more of said display parts; d) removing at least some of the fruit capable of ripening from one or more of the open chambers; e) combining two or more display parts to form one or more chambers for ripening fruit f) placing at least some of the removed fruit on one more fruit support surfaces that are located outside of the one or more chambers for retaining ripening gas when one or more of the chambers are formed. The steps may be done in the order recited or in some other order.

[0063] One method for ripening fruit according to this aspect comprises the steps of: a) placing fruit on a display part's fruit support surface for ripening; b) combining that display part with another display part thereby substantially enclosing the fruit support surface within a chamber for retaining ripening gas; c) at least partly separating the two display parts after a period of time; d) removing at least one piece of fruit from the fruit support surface; e) recombining the display parts thereby substantially enclosing the fruit support surface in the chamber for retaining ripening gas f) placing the removed fruit on a display part's support surface that is located outside the chamber.

[0064] Another method for ripening fruit according to this aspect comprises the steps of: a) placing unripe fruit on a support surface located inside a bottom display part; b) placing a top display part over the bottom display part thereby enclosing the unripe fruit in a ventilated chamber; c) arranging fruit that cannot be ripened or ripe fruit on the top part's fruit support surface; d) visually inspecting the fruit located inside the bottom display part through a transparent surfaces of a display part; e) removing the top display part from the bottom display part; e) inspecting the fruit by touch or smell to confirm ripeness; f) removing ripe fruits from the bottom part's fruit support surface and leaving unripe fruit on the same fruit support surface; g) placing a top display part over the bottom display part; and h) placing the removed fruit on the top display part's fruit support surface located outside the bowl. Optionally, the method may include the step of separating the top display part and bottom display part and using them separately like traditional fruit bowls once all the fruit is ripe. In a preferred method, in another step unripe fruit is added to the bottom display part's fruit support surface

while it still supports fruit that has ripened for a time in the ventilated chamber. This helps accelerate ripening and promotes flavor development of the newly introduced fruit in the chamber as compared to wholesale replacement of ripe fruit with the new fruit. The apparatuses and methods herein may thus help fruit purchaser to readily organize their fruit and execute a ripening schedule.

[0065] As for the apparatus, in the best mode, borosilicate glass is preferred over plastic for the display because of its absolute clarity and lack of distortion. This is important for an apparatus that a user will look for to make subtle determination of ripeness. Further, borosilicate glass seems to retain its clarity after washing, unlike many clear plastics. As a result, in the preferred embodiment of FIG. 15 and 16, the interface between the rim of the second display part and the support interface of the first display part is perpendicular. That is because for borosilicate glass parts, as the preferred material for this preferred embodiment, a perpendicular interface reduces the chance of breakage. The preferred materials for a glass apparatus further include Schott Duran 3.3 borosilicate glass of 2.5 mm thickness for the display parts (for its balance of clarity and strength), although soda lime or other glass types may be used. It is preferred to create a mold for machine blowing and machine blow the Duran 3.3 glass parts for consistency. But hand blown techniques may be used and may in fact be required when blowing parts larger than 280 mm in diameter due to manufacturing limitations. Further, when burning integral vents, care must be taken to have the vent area away from the balancing surfaces (usually 2 to 3 mm) to reduce uneven surfaces and ensure proper balancing surfaces of the parts. When creating larger holes in Duran 3.3 glass, its best to core drill them, followed by re-annealing the piece, so as to avoid weakening the display parts or creating cracks. The holes are preferably core-drilled, but may be flame jet cut, laser jet cut, or cut by some other method.

[0066] Particularly for plastic or heat strengthened glass versions of the display parts described in FIG. 15 and 16, the display part interface preferably may be at other angles, such as shown in FIG. 10 and 11. It may also take on irregular contours that do not readily permit the first display part to separately and stably balance. In this case, the support interface of the first display part still rests on the rim when the parts are combined. But when the first display part is removed and balanced, support-surface-up, on a flat surface, the first display part is preferably supported by distinct balancing surfaces rather than by the support interface. By way of illustration, FIG. 17 shows the fruit-support-surface-up balancing function may be achieved by deploying at least one balancing surface (here shown as balancing surfaces 180) that rest inside the perimeter of rim 170 of the second display part walls when the first display part and second display part are combined.

[0067] Figs. 17-26 are shown for the combination and separation aspect and for illustrating various shapes only. It is to be understood that only such embodiments belong to the invention as claimed that include vents provided in the one or more fruit support surfaces located outside the one or more ripening chambers.

[0068] FIG. 17 shows that support interface 160 will rest on the reciprocally contoured weight-bearing rim 170 of the second display part wall when the parts are combined. Yet the second display part and its rim can take on any shape since the balancing surface or surfaces 180 support first display part 110 once the first display part is separated and placed on a flat surface. In FIG. 17, the first display part wall has an inner level 190 and an outer level 192 whose juncture forms at least part of support interface 160. The balancing surfaces are the bottom of the inner level 190 of the first display part. The inner level 190 lies inside the perimeter of the second display part's rim when the parts are joined. (The inner level may be an extended version of the recessed portion of FIG. 1). Alternatively, in the preferred embodiment, the balancing surfaces may be part of an inner sleeve that attaches to the first display part and lies inside the perimeter of the second display part's rim when the parts are joined. The inner level or inner sleeve rests within the rim, efficiently reducing the height of the display, yet having expanded fruit stacking space when the parts are separated.

[0069] Alternatively, in the preferred embodiment of FIG. 15 and 16, the inner and outer level junction may be on the first display part's interior surface. In this case, the support interface formed at their junction is inside the first display part (causing the second display part's rim to lie within the perimeter of the first display part's bottom when the second display parts are joined).

[0070] FIG. 18 shows an alternative preferred embodiment in which the balancing surface may also be one or more feet (here shown as foot 195). The one or more feet are preferably suspended from the underside of fruit support surface for ripening fruit 130. This is also shown in FIG. 10. Alternately, as shown, the fruit support surface for ripening fruit comprises one or more feet that are integral to the underside of fruit support surface for ripening fruit 130 so that they extend to or below the lowest point of the first display part wall. Both configurations may be used in the preferred embodiment of FIGS. 15 and 16.

[0071] As shown in FIG. 19, the balancing surface 180 of the preferred embodiment may also be substantially flat portions of the first display part's bottom, wherein the support surface of the first display part is a lip 140, that, at least in part, reciprocates the contour of and rests on the weight-bearing rim 170 of the second display part walls. This may be done (as with the preferred embodiment of FIGS. 15 and 16 by having the bottom of the first display part comprise an underside ring (not shown) as a balancing surface. The balancing surface comprising the underside ring may double as a locating feature to help position the platform top in the base part. The lip may be outside the first display part side wall, as shown, or alternately inside of the first display part, in which case when the parts are combined the rim of the

second display part rests within the perimeter of the first display part's bottom.

[0072] In a preferred embodiment, as shown in FIGS. 10, 15, 16 and 18, and further shown in FIG. 20, the first display part may be a platform top-defined as a first display part that does not have walls extending down past the lowest point on the underside of fruit support surface for ripening fruit. Preferably these platform tops comprise a fruit support surface for ripening fruit that is at least in part concave, more preferably at least in part concave and at least partly inward sloping, and still more preferably at least in part concave, at least partly inward sloping and at least partly curvilinear, or at least in part concave, at least partly inward sloping, and at least partly upwardly curvilinear, or concave, at least partly inward sloping, and predominantly upwardly curvilinear, or concave, at least partly inward sloping, and substantially entirely upwardly curvilinear. These platform tops may also be substantially or entirely concave. These configurations improve fruit stability, reduce fruit rolling, and reduce fruit bruising on the platform top.

[0073] In a preferred embodiment as shown in FIGS. 10, 15, and 16, the support surface for ripening fruit of the platform top is concave and at least partly inward sloping, but comprises a raised area. The raised area may comprise a fruit guide (e.g. slope 1635 and/or 1637) to improve stability and reduce rolling on the support surface for ripening fruit. Further, the raised area may comprise a first display part vent insert, such as shown in FIG. 7a-d, or comprise integral vents, such that the fruit tends not to cover the vents. In a preferred embodiment, the size of each vent is preferably 18 x 8 mm for a ripening chamber approximately 260 mm in top diameter by 156 mm high. Alternately, or additionally (Figs. 15b, 16a) the platform top's support surface may comprise a lowered area, which may further comprise a fruit guide (e.g. slope 1619) to improve stability and reduce rolling on the fruit support surface. The lowered area may additionally or alternatively further comprise integral vents, so that the fruit tends not to cover the vents. See Aspect 5 below.

[0074] The platform top of the preferred embodiment shown in FIGS. 15 and 16 is preferably substantially rigid, may vary in its thickness and may be any thickness. More preferably, if in glass, the platform top is substantially rigid and between a sixteenth of an inch (2mm) and three inches thick (approximately 76mm), more preferably between a sixteenth of an inch (2mm) and two inches (51 mm) thick, and most preferably 2.5 mm thick. If made in plastic, tempered glass, or some other less breakable material, the platform top may easily be thinner. As with the first display parts shown in FIG. 15 and 16, the first display part may be multilevel, thereby permitting the first display part to drop into the second display part. Second display part rim 170 may alternately or additionally have at least one recessed portion 172 that permits the user to access and lift the platform top out of the second display part. Alternately, the platform top may have a recessed portion (like that shown in FIG. 12, 15 and 16) that forms a support surface thereby leaving a liftable side surface exposed when the parts are joined. As shown in FIG. 15 and 16, when the parts are combined, this liftable exposed side surface permits the user to readily remove the first display part with fruit on it. In an alternate embodiment of FIG. 15 and 16, the first display part may include a gripping portion, such as a hook or handle, so that the user may lift and separate the first display part from the second display part. In another alternate version of FIG. 15 and 16's embodiment, the first display part may comprise a vent insert that further comprises a gripping portion, so that the first display part may be lifted from the vent insert. For all embodiments herein, the gripping portion may be integral to the first display part or attached to it. The gripping portion may further comprise a hook for suspending a banana.

[0075] In the preferred embodiment discussed above, the platform top may comprise a balancing surface (such that the platform top balances on a tabletop when separated from the second display part) that comprises a support interface 160 (for resting on the second display part rim, as shown, for example, in FIG. 20). The platform top may alternately or additionally comprise one or more balancing surfaces that may further comprise one or more feet 195 (as shown, for example, in FIGS. 18, 21). The platform top may alternately or additionally comprise any other balancing surface that rests within the perimeter of the second display part's rim when the first display part and second display part are combined, such as the underside ring described in connection with FIG. 16. By way of further example, FIG. 22 shows the first display part may comprise an integral inner level 190 whose junction with an outer level forms support surface 160, and balancing surface 180 comprises at least part of the first display part's underside. Alternatively, the first display part may comprise an inner sleeve (not shown). Or as shown in FIGS. 16 and 23, comprise a support surface that is a lip 182, which rests on the weight-bearing rim of the second display part, and the underside of the platform top comprises a balancing surface. FIG. 16 also shows this configuration.

[0076] In separate, alternative embodiments, a ripener may be a variety of overall structures, including in the form of an oval "collapsed cake" FIG. 24, a "curved rectangle" FIG. 25, and a "leaf" FIG. 26.

[0077] Certain variations on the preferred embodiment of FIGS. 15 and 16 are possible. FIG. 27a-b shows one ripening display embodiment, 2700, with first display part 2710, second display part 2720, base part 2745 and vent insert receiving area 2715. FIG. 27a-b also shows a vent insert, such as described in FIGS. 7 and 8. For the second display part, integral vents are used. Alternately, or in addition, second display part 2720 may have a vent insert receiving area and a vent insert as shown in FIG. 9. FIGS. 28a-b shows another variation, 2800, with a convex base part, 2845, that nestles the second display part 2820. The base part, 2845, comprises feet (not shown) or other balancing surfaces such that gas may be exchanged between the ripening chamber and the outside atmosphere. This embodiment has vent insert receiving areas, 2815 and 2825, that receive vent inserts, such as described in FIGS. 7-9. Alternately, or in addition, integral vents may be used in both a first display part and second display part. The base part may alternately or additionally have

integral vents.

[0078] Features from less preferred variations may be used in the preferred embodiments described herein, including those shown in connection with FIGS. 15 and 16. FIG. 29 shows a fruit ripening display, 2900, comprising a first display part, 2910, second display part, 2920, and base part 2945. Base part 2945, like all base parts disclosed herein, may have integral vents, such as 2949. The vent size need not vary, but their number may vary with the size of the ripening display to gain an evenly distributed gas exchange.

[0079] FIG. 30 shows a fruit ripening display, 3000, comprising a first display part, 3010, a second display part, 3020, and a base part, 3045. As shown, base part 3045 has recessed areas, 3049, through which gas from the ripening chamber may pass to the outside atmosphere. In this embodiment, the base, 3045, is taller and wider than the second display part, 3020, and thus can substantially contain the entire second display part. In this embodiment, first display part, 3010, comprises a vent insert receiving area, 3015. The vent insert receiving area may receive a vent insert, such as shown in FIGS. 7-9, or some other kind of vent insert. In this embodiment, the second display part comprises integral vents, though vent inserts and a vent insert receiving area may be used.

[0080] FIG. 31 shows a fruit ripening display, 3100, comprising a first display part, 3110, second display part, 3120, and base part 3145. Base part 3145, like all base parts disclosed herein, may have integral vents, it may have recessed areas, and may be additionally, or alternately, elevated by balancing surfaces, such as feet, to promote gas exchange from the ripening chamber to the outside atmosphere. In this embodiment, first display part, 3120, comprises a vent insert (shown in dotted lines) and a vent insert receiving area that is level with the surrounding support surface for ripening fruit. In this variation, the second display part comprises integral vents, although vent inserts and a vent insert receiving area may be used.

[0081] FIG. 32 shows a fruit ripening display, 3200, comprising a first display part, 3210, second display part, 3220, and base part 3245. Base part 3245, like all base parts disclosed herein, may have integral vents, such as shown 3249. The base part vent size is proportional to the size of the ripening display. Generally, the smaller the vents are, the more that are needed. The base part may be additionally, or alternately, elevated by balancing surfaces, such as feet, to promote gas exchange from the ripening chamber to the outside. In this embodiment, first display part, 3210, comprises a vent insert receiving area, 3215. The vent insert receiving area may receive a vent insert, such as shown in FIGS. 7-9, or some other kind of vent insert. In this embodiment, the second display part comprises integral vents, though vent inserts and a vent insert receiving area may be used.

[0082] FIG. 33 shows a fruit ripening display, 3300, comprising a first display part, 3310, a second display part, 3320, and a base part, 3345. As shown, base part 3345 has substantially recessed areas through which gas from the ripening chamber may pass to the outside atmosphere. In this embodiment, first display part, 3310, comprises a vent insert receiving area. The vent insert receiving area may receive a vent insert, such as shown in FIGS. 7-9, or some other kind of vent insert. In this embodiment, the second display part comprises integral vents, although vent inserts and a vent insert receiving area may be used.

[0083] FIG. 34 shows a fruit ripening display, 3400, comprising a first display part, 3410, second display part, 3420, and base part 3445. Base part 3445, like all base parts disclosed herein, may have integral vents, it may have recessed areas, and may be additionally, or alternately, elevated by balancing surfaces, such as feet, to promote gas exchange from the ripening chamber to the outside. In this embodiment, first display part, 3410, comprises a vent insert receiving area that is elevated relative to the surrounding support surface for ripening fruit, and a flat vent insert, both shown in dotted lines. In this embodiment, the second display part comprises integral vents, although vent inserts and a vent insert receiving area may be used.

[0084] FIG. 35 shows a fruit ripening display, 3500, comprising a first display part, 3510, second display part, 3520, and base part 3545. Base part 3545 is concave and nestles the second display part 3520. Base part 3545 also has integral vents, 3549. Like the other base parts disclosed herein, it may have recessed areas, and may be additionally, or alternately, elevated by balancing surfaces, such as feet, to promote gas exchange from the ripening chamber to the outside. In this embodiment, first display part, 3510, comprises a vent insert receiving area that is level with the elevated relative to the surrounding support surface for ripening fruit, and a flat vent insert, both shown in dotted lines. In this embodiment, the second display part comprises integral vents, although vent inserts and a vent insert receiving area may be used.

[0085] FIG. 36 shows an embodiment, 3600, tested as Unit 3 as described in the Experimental Results section, comprising a first display part that is a platform top 3610 and a second display part 3620. Second display part 3620 comprises a double wall, that is preferably transparent to permit examination of the fruit. When combined, the first display part and the second display part form a substantially hemispherical fruit ripening chamber. As tested, the platform top 3620 comprises a central vent insert receiving area, and a vent insert like the one in FIG. 7a-c, but with a flattened top, rather than a domed top. Likewise, the second display part 3620 comprises a central vent insert receiving area and a vent insert, similar to the one in FIG. 9a-c. In this embodiment, the second display part is elevated by a thin base part 3645 (not shown) that is open through its middle and comprises balancing surfaces in the form of feet (three of which are visible in the drawing). In this embodiment, the chamber is substantially hemispherical. As tested, the vent insert

vents at the bottom of the chamber were about 6 mm in diameter and located about 53 mm from the center of the vent; the four vent insert vents at the top of the chamber were about 32 mm from the center, and, when half covered with tape (as was done with the working examples), measured about 18 mm by 8 mm. The substantially hemispherical chamber had an internal height of about 155 mm, a diameter of about 270 mm at its top and the internal fruit support surface which comprises the vent insert, had a diameter of about 140 mm. The first display part, a platter top, had a diameter of about 370 mm. As shown, for both vent inserts the vents were raised relative to the surrounding fruit support surface in order to inhibit fruit from blocking the vents. The vent insert of the second display part creates a convex area at the bottom of the substantially hemispherical chamber.

[0086] FIG. 37 shows an embodiment 3700 that was tested as Unit 8 as described in the Experimental Results section. It comprises a platform top 3710, having a support surface for ripening fruit 3730, and second display part, 3720, with a second display part vent insert receiving area, 3725, and a vent insert as shown. As shown, vent insert's vents were raised relative to the surrounding surface for ripening fruit to inhibit fruit from blocking the holes. The vent insert of the second display part creates a convex area at the bottom of the over-inflated box shaped chamber. On the inside, the over-inflated box formed a chamber about 260 mm wide, 260 mm long, and 110 mm high. During testing half of every third slot-shaped vent was left open, and the rest were taped over. The slots were about 2.5 mm wide and 35 mm long before being covered with tape. For this embodiment, the second display part comprises a first display part receiving area, 3715, which in turn comprises a notched bezel, 3717, which receives first display part 3710. The notches of the bezel approximated half circles with radii of about 8mm. Gas is exchanged between the chamber and room atmosphere through the gap between the notched bezel and the underside of the platform top 3710, rather than through a vent insert. Alternately, instead of a notched bezel this gas exchange may occur directly through a gap existing between the first display part and the second display part when they are combined. First display part fruit platform 3730 may be ridged or have other fruit guides to prevent fruit rolling and bruising and promote fruit stability. In this embodiment, the chamber is the shape of an over-inflated box, which is defined as a box-like chamber whose internal edges have been rounded.

[0087] FIG. 38a-b shows an embodiment, 3800, tested as Unit 4 as described in the Experimental Results section. It comprises a first display part that is a platform top 3810 but with high side walls relative to the vent insert receiving area 3815 and the vent insert. It further comprises a second display part 3820. When combined with the first display part, the second display part 3820 comprises a substantially cylindrical fruit ripening chamber, which along with the high side walls of the first display part creates less consistent in its fruit flavor. See Experimental Results below.

[0088] As tested, the support surface inside the chamber had a diameter of 235 mm, an internal height of 140 mm, and a top opening 270 mm in diameter. The platform top 3820 had an internal height of about 55 mm, a diameter on its fruit support surface of 210 mm, and a diameter at its top opening of 240 mm. It comprises a central vent insert receiving area, 3815, and a vent insert, with a single central hole surrounded by a plurality of smaller holes as shown. Likewise, the second display part 3820 comprises a central vent insert receiving area 3825 and a vent insert similar to the one shown in FIG. 9a-c, with vents about 5 mm in diameter. In this embodiment, the second display part is elevated with balancing surfaces in the form of feet (not shown). Further, the chamber is substantially cylindrical, with the cylinder getting wider at the top, but with substantially flat top and bottom surfaces. As shown, for both vent inserts the vents are raised relative to the surrounding surface for ripening fruit so as inhibit fruit from blocking the vents. Further, the vent insert of the second display part creates a convex area at the bottom of the substantially cylindrical chamber.

[0089] FIGS. 39-47 show various alternate ripening displays that have unique features or illustrate additional concepts that may be combined with the other embodiments. FIG. 39a-b shows a ripening display 3900 with a first display part 3910, second display part, 3920, and vent insert receiving areas, 3915, and 3925. The second display part, 3920, may rest on a balancing surface comprising feet 3947. The vent insert receiving area is elevated such that when it receives the vent insert 3917, the vents are higher than the rim of the first display part 3910. This elevated vent feature may be beneficially employed in the other embodiments disclosed herein, including that of FIGS. 15 and 16.

[0090] FIG. 40a-b shows an alternate ripening display, 4000, in which the receiving area, 4015, comprises a vent insert that further comprises a lifting surface for the first display part, 4010. The lifting surface may be on the side of the first display part, as shown. A second vent insert receiving area and a vent insert comprising a lifting surface may be included on the opposite side of the first display part. Although the lifting surface functions as a side handle as shown, in a preferred embodiment, the lifting surface may be located on fruit support surface 4030 itself, and may be comprised by a vent insert. It is to be understood that only such embodiments belong to the invention as claimed that include vents provided in the one or more fruit support surfaces located outside the one or more ripening chambers. These features may be beneficially employed in the other embodiments disclosed herein, including that of FIGS. 15 and 16.

[0091] FIG. 41a-b shows an alternate ripening display where the first display part, 4110, and the second display part, 4120, are near identical parts that combine together like a shell. (One or both parts may have balancing surfaces such as feet 4147 to elevate the ripening display off the table or other surface and permit gas exchange between the ripening chamber and the outside environment.) The vents in the first and/or second display parts can be created through lettering that is cut, punched or otherwise formed through the parts. This is shown for fruit platform 4130. Alternately, the fruit support surface for ripening fruit may comprise a vent insert receiving area 4145 and a vent insert, whose vents are

formed by lettering cut, punch or otherwise formed through the vent insert. These features may be beneficially employed in the other embodiments disclosed herein.

[0092] FIG. 42a-b shows an alternate ripening display where the vent insert receiving area, 4215, comprises a lifting surface. In this case, the vent insert 4217 may function as a knob for lifting. Moreover, alternately or additionally, the vent insert receiving area may comprise additional integral vents (not shown). In another alternate aspect, the second display part may comprise an elevated area for holding a piece of fruit. It may be desirable to place a piece of already ripened fruit in the center of the ripening chamber to facilitate ripening. But the ripened fruit is beneficially kept from significant direct contact from the fruit to be ripened. Thus, the ripening display may comprise a ripe fruit holding area within the ripening chamber. As shown, the second display part's vent insert receiving area 4225 comprises a vent insert that contains an elevated portion upon which a ripe piece of fruit may rest. These features may be beneficially employed in the other embodiments disclosed herein.

[0093] FIG. 43a-b shows a variation on the alternative ripening display of FIG. 42a-b. In this variation, the first display part comprises a lifting surface, in this case, a handle. As shown, the vent insert receiving area, 4315, comprises the lifting surface. The vent insert, 4317, comprises a ring. However, the lifting surface may be integral or attached to the first display part, without a vent insert receiving area or a vent insert. Alternately, the first display part may comprise a vent insert that itself comprises the lifting surface. These features may be beneficially employed in the other embodiments disclosed herein.

[0094] FIG. 44a-b shows a less preferred ripening display 4400, having a rectangular, flat bottom fruit chamber. (A rectangular flat bottom is less desired at least because the fruit spreads out and the ripening gas exposure is uneven).

The first display part 4410 comprises a vent insert 4417 and second display part 4420 comprises a vent insert 4427. FIG. 45a-b shows a less preferred ripening display 4500, with squared shape fruit ripening chamber, having rounded internal surfaces. The first display part comprises a vent insert receiving area, 4515, and a vent insert, 4517. Likewise the second display part comprises a vent insert receiving area, 4525, and a vent insert. Alternately, in both FIGS. 44 and 45 the top and second display parts may comprise integral vents. FIG. 46 likewise shows a less preferred ripening display with a rounded square-like fruit chamber. In this case, however, the first display part vent is formed by a gap in the intersection of the first display part 4610 and the second display part 4620. Although the vents are shown as formed on the sides, more preferably the vents are located on the first display part for reasons of gas exchange. Thus, the first display part may have the sloped edge that creates a gap with a straight edged side surface. Further, this display, demonstrates a first display part 4610 that may slide off the second display part in a horizontal direction. These features may be beneficially used with other the first display parts and second display parts disclosed herein.

[0095] FIG. 47a-b shows a distinct, alternate embodiment, 4700 where the second fruit platform is separable from the ripening chamber without opening the chamber to air. In the particular version shown here, the fruit platform 4730 comprises a ring that receives both a first display part 4710 and a second display part 4720. The first display part may have a vent insert receiving area, 4715, and a vent insert, 4717, as shown. Likewise, the second display part may comprise a vent insert receiving area, 4725, and a vent insert, 4727, in this case, a disc, such that air is passed between the vent insert and the vent insert receiving area. Alternately or additionally, the first display part and second display parts may comprise integral vents. Feet may be used to elevate the base part 4720 and the fruit platform 4730 to permit gas exchange from the fruit- ripening chamber to the outside atmosphere. Although the separable support surface for ripening fruit is shown as a ring, it may take a variety of shapes and locations. Preferably it may be separated without opening the ripening chamber to air. These features may be beneficially used with other embodiments disclosed herein.

Experimental Results for the First Aspect:

[0096] Applicants made over a dozen tests of specific features discussed herein. Three designs, FIGS. 36, 37, and 38, were prototyped in SLA (stereolithography) plastic models and tested against a Koller-Craft (division of Koller-Enterprises, Inc.) "Ripen Rite" fruit ripening dome (whose shape is shown in the Koller-Craft product insert described in the Background section above) and, for comparison, an open bowl with three vents in its bottom (the bottom half of the "Ripen Rite.") In one test applicants also tested the prototypes against a paper bag. Gas, temperature, and humidity readings were taken, and blind taste tests performed.

[0097] Consistent with applicants' understanding of the best mode of using the inventions herein, applicants picked fruit that, although unripe, did not appear to be bruised or damaged in any way. Applicants selected various types of fruit to test, including apples, pears, and bananas (three of the most widely consumed fruits that produce ripening gas). For experimental purposes, in certain experiments applicants changed the source of fruit (such as switching from farmer's market fruit to grocery store bought fruit) and/or fruit variety. Within each experiment, the applicants used the same fruit mix and fruit amount, and placed the fruit in the same relative positions within the units. As is best for practicing the methods of ripening herein, the fruit was not washed before hand and care was taken to avoid bumping or pressing the fruit when placing it in the apparatuses so as to avoid bruising. Although for any particular experiment applicants used the same amount of fruit in each unit, applicants made a consistent effort to pick an amount that substantially filled all

the units. Applicants believe that ripening gas concentration is effected by the amount of unused volume in the chamber, and thus the best mode of use is to substantially fill the chambers for use.

[0098] The applicants performed the ripening experiments at room temperature, as is generally best for post-store purchase ripening. Both temperature and humidity levels varied with room atmosphere. In each experiment, the fruit was monitored for ripeness, and generally removed on the third or fourth day when the fruit was ripe. Consistent with the best mode of practicing the invention, fruit was examined for color, softness and bruising in order to determine its state of ripeness. In Experiments Five through Ten, the chamber was opened to air daily or every other day and certain of the fruit briefly examined by hand in order to simulate consumer behavior. Upon final removal of the fruit from the units, the fruit was then promptly washed, peeled, cut and eaten in a blind taste test.

[0099] Applicants took ethylene and carbon dioxide readings once a day inside the chambers with a Kitagawa gas detector tube system, Model No. 8014-400A, and Kitagawa No. 8014-108SA (ethylene 20-1200ppm), No. 108B (ethylene .1 to 100ppm) and No. 8014-126SA (carbon dioxide .1 to 2.6 %) gas detector tubes, distributed by Matheson-Tri-Gas of Montgomeryville, Pennsylvania. Applicants also continuously tracked chamber humidity and temperature with Barnstead/ERTCO RHTEMP101 data loggers from Barnstead International of West Paterson, New Jersey. The data loggers were secured with tape inside the chambers throughout the experiments.

[0100] Applicants note that they found a simple, effective, best way to make an apparatus for fruit display with one or more chambers such that the one or more chambers retained an effective amount of ripening gas for substantially accelerated fruit ripening a day or more after one or more of the chambers was filled substantially full of fruit: for each apparatus applicants prototyped, applicants formed a plurality of vents in the chamber, both at its top and at its bottom, by using vent inserts. Applicants then covered some of the vent insert's vents after a test if the ripening gas levels in the chamber seemed low throughout that particular experiment. Bottom vents seemed to have the greatest effect on ethylene concentration in the chamber (too many or too large of vents created low ethylene concentrations). Applicants also increased the chamber's ethylene gas retention in certain cases by covering all or part of a subset of vents in the vent inserts located at the top of the chamber. In one case, for Unit 4, applicants switched to a vent insert with less vent area.

After three experiments, Units 3 and 4 were performing suitably. After four experiments, we arrived at vent sizes for all three of the prototype units such that substantially greater than 4 parts per million of ethylene was retained in each chamber on each day. This proved true even at the lowest ethylene concentration average, between 4 and 5ppm of ethylene for Unit 3, as shown in Table 3C, occurred at average temperature and humidity of 70 degrees. 4ppm is an effective amount of ripening gas to accelerate fruit ripening. However, ethylene concentrations of 8ppm and higher are more preferred, and 10ppm and higher even more preferred.

[0101] For example, in Experiment 1 all vents were open. For Unit 3 that meant the four vents in the first display part's vent insert shown in FIG. 36 were open. In Experiment 2, we covered half of each of those vents with tape, giving them a preferred size of about 18 mm by 8 mm, with each vent's center about 32 mm from the center of the vent insert. The ethylene readings were still very faint (approximately 2ppm of ethylene gas or less in the chambers) despite never opening the chambers to inspect the fruit during the experiment. So for Experiment 3, applicants covered three of the vents at the chamber's bottom with tape, which resulted in three 6 mm vents like that shown in FIG. 36. The vents were each located on a radius 53 mm from the center of the vent insert. In the case of Unit 8, (FIG. 37), we started experiments with all the vents in the chamber bottom's vent insert open. After two experiments, we covered two of every three of these vents entirely, and half covered the third vent. We also fine tuned ethylene retention by switching to a bezel with notches in twos rather than threes. As a result, the Unit 8 apparatus had a chamber that retained ripening gas for substantially accelerated fruit ripening a day or more after being filled substantially full of fruit: as Tables 3-10 show, its daily ethylene readings were generally above 10 parts per million. We made similar adjustments for Unit 4 (FIG. 38.), turning over the bottom of the second display part and vent 3825 to reverse it to its proper orientation. By Experiment 2, we had also elevated the apparatuses consistently a half inch off the table to allow uniform clearance and gas exchange through the bottom vents for all units.

[0102] In Experiment 3, Unit 3 was tested as a working unit with the configuration described above (vents half covered) and it delivered exemplary results. Unit 4 tested satisfactory using the vent insert shown in FIG. 38 but its fruit taste test performance was weaker compared to the other units. Unit 8 was tested with two of every three vents and half of the third vent in the second display part's vent insert covered with tape. This led to better ethylene retention in the chamber, and better taste test results. Experiment 3 was performed three times for consistency. The results are shown in Tables 3a-c below. All three units accelerated ripening adequately, averaging greater than 4ppm of ethylene each day, yet results suggest Unit 3 was the best for consistency of flavor and texture, and had fewer off-flavor fruits relative to the other units, including the open unit.

[0103] In Experiment 4 Unit 3 had an "enclosing ring," essentially a large washershaped disc that was placed between the slotted base part shown in Fig. 36 and the chamber. The washer's outer diameter was the same as the base part and its inner diameter was about the diameter of the vent insert. Both the washer's outer and inner diameters had an upturned edge, giving it a slight outer and inner rim. Its purpose was to keep dirt from collecting between the outside of the chamber and the inside of the double wall. It was intended be formed integral to the bottom part of the apparatus.

Although Unit 3 performed well in this test, it appeared difficult to make an integral enclosing ring (designed to keep the unit clean) out of glass. So applicants did not test it further. Applicants have, however, developed the concept of using a separate ring with a center hole the size of the chamber vent region as shown, for example, in FIGS. 15b, 16a-h, and 35. Unit 8 was tested as shown in FIG. 37 with a series of two notch vents on the bezel 3717 and the vent insert vents taped as in Experiment 3. Unit 4 had three of the vents in its second display part's vent insert covered leaving three as shown in FIG. 38. Experiment 4 was repeated for consistency, and although all units adequately accelerated ripening, Unit 3 again seemed the best for flavor and consistent taste relative to all other units tested. See Table 4a-b.

[0104] By Experiments 5 through 10, the vent sizes had been already corrected and the chambers adequately accelerated ripening with an effective amount of ripening gas. Thus, only minor modifications were made. We tested Unit 3 the same way as in Experiment 3 (removing the enclosing ring). For Unit 4 we drilled out four vents approximately 3-5mm in diameter at the outer edges of the bottom of the chamber to more widely distribute its vents. And for Unit 8 applicants used a bezel with a three-notch pattern instead of two as shown. In Experiment 6 (and for the rest of the testing) we used the same structural configuration for all the units but exclusively used pears and bananas to get more data points on specific types of fruit. In Experiment 7, applicants switched fruit sources to see if the source of fruit made a difference for taste testing. (It did.) Consistent with the best mode of using the invention, from a taste standpoint, it's best to select and purchase quality fruit for ripening.

[0105] In Experiment 8 we added solar powered fans inside the ripening chambers. Wires ran from the solar powered fan to a small solar panel taped to the apparatus or table and connected to a constant light source. Relative to the other experiments, the fan's motion apparently reduced ethylene retention by the chambers (perhaps because it blew ethylene out of the chamber) without improving fruit flavor. Experiment 9 was the same as Experiments 6-7 but two "Ripen Rites" were used, one with a fan and one without, to confirm Experiment 8's results. Finally, Experiment 10 reprised Experiments 6-7 but changed the variety of pears to one that exhibited more color change upon ripening.

[0106] Overall, once the vent configurations were set, chamber ripening gas retention was of an effective amount to substantially accelerate fruit ripening in each of the prototypes at all atmospheres tested, including for temperatures around 70 degrees and 70 % humidity (See Table 3c). The prototypes also consistently provided better tasting fruit than "Ripen Rite" and the "open" unit, but not in every case. (In Experiment 5 the various units provided very similar tastes. And in Experiment 7 applicants left the fruit in the chambers too long so that it was overripe before the taste test). Although the results were often close, Unit 3 seemed to consistently perform better than the other prototypes as far as taste was concerned. The tasters-applicants-tasted the fruit as indicated but were not aware of which units the fruit samples came from. In general, applicants tasted several pieces of each type of fruit from each unit, and several slices from each piece of fruit they tasted. The experimental results are set out at Tables 1-10 below.

55 50 45 40 35 30 25 20 15 10 5

TABLE 10

Experiment.10 Temperature and Humidity Readings													
	Unit 3	Unit 4	Unit 8	RR	Open			Unit 3	Unit 4	Unit 8	RR	Open	
Temp ° C							Humidity %						
Min	19.80	19.40	19.50	19.30	19.40		Min	44.50	43.00	39.50	44.50	43.00	
Max	26.10	25.80	26.10	26.00	26.30		Max	99.50	100.00	100.00	100.00	68.00	
Ave Temp	23.12	22.94	22.95	22.80	22.72		Ave Hum.	90.96	94.08	93.00	94.99	57.00	
Mean Temp	23.19	23.01	23.03	22.92	22.80		S.D.	11.01	11.94	12.58	10.81	5.50	
S.D.	1.18	1.20	1.21	1.24	1.25								
Experiment 10 Average Ethylene and Carbon Dioxide Levels over 4 Days													
C ₂ H ₄ In ppm parts per			Ave.reading		CO ₂ In %		Ave, reading						
		#3	8.25				#3						0.36
		#4	7.5				#4						0.36
		#8	11.25				#8						0.41
		RR	14.25				RR	.55					
Experiment 10 Taste Test Results													
Day3--Tester 1							Day 3--Tester 2						
2 new Bartlett, 2 Packhams from Exp. 9 (indicated by "P")							2 new Bartlett, 2 Packhams from Exp. 9 (indicated by "P")						
		Flavor	Texture	Average					Flavor	Texture	Average		
	#3- P	3.5	2.75	3.125	too soft			#3	3	4	3.5		
		2.75	2.75	2.75					2.5	4	3.25		

(continued)

Experiment 10 Taste Test Results												
Day3--Tester 1						Day 3--Tester 2						
2 new Bartlett, 2 Packhams from Exp. 9 (indicated by "P")						2 new Bartlett, 2 Packhams from Exp. 9 (indicated by "P")						
		Flavor	Texture	Average				Flavor	Texture	Average		
	P	3.5	2.75	3.125	too soft		P	3	2.5	2.75		
		2.26	3	2.625	no flavor		P	2.5	3	2.75		
	#4	2	2.5	2.25			#4	3	4	3.5		
		2	2.5	2.26				3	4	3.5		
	P	3	2.5	2.75			P	3.5	2.5	3		
	P	3	2.5	2.75	too soft		P	3	2.5	2.75		
	#8	2.5	3	2.75			#8	3	4	3.5		
		3	3	3				3	4	3.5	slightly tart	
		3	3	3				2	2.5	2.25	crunchy, not ready	
	P	3	3	3	too soft			2	2	2	mushy	
	Open-- P	3.5	2.5	3	too soft		Open	2	4	3	tart	
		2.5	3	2.75				3	4	3.5		
		3	3	3			P	3	2	2.5		
		2	3	2.5	bad, bitter		P	3	2	2.5		
	RR	3.5	2.5	3	too soft		RR	3.5	4	3.75		
		3	3	3				3.5	4	3.75		
		2	3	2.5			P	3	3	3		
		3	3	3			P	2.5	2.5	2.5	tart	

55 50 45 40 35 30 25 20 15 10 5

(continued)

Day 5--Tester 1							Day 5--Tester 2					
1 new Bartlett (indicated by "B"), 2 new Packham							1 new Bartlett (indicated by "B"), 2 new Packham					
		Flavor	Texture	Average					Flavor	Texture	Average	
	#3	2.75	3	2.875	little off, less flavorful			#3	2	3	2.5	
		3.75	3	3.375					3	2.5	2.75	sweet,juicy, little soft post-test flavor upgrade to 3.5
		3.75	3	3.375					2.5	3	2.75	little tart
	#4 B	3.25	3	3.125				#4	3	3	3	
		3.25	3	3.125	little plain				3	3	3	
		2.75	3	2.875	little sour				3.5	3	3.25	
	#8 B	2.5	3	2.75				#8	3	2.5	2.75	juicy, little soft
		3.5	3	3.25	good				3	3	3	sweat, juicy, little soft
		3.25	3	3.125					2	2	2	not ripe, dry
	Open	2.5	3	2.75	little off, less flavorful			Open	2	2.5	2.25	tart
		3	3	3	little flavorless				3	3	3	sweet juicy
		3.25	3	3.125					2.5	2.5	2.5	little tart, soft
	RR	2.75	3	2.875				RR	2.5	2.5	2.5	little tart, little soft
		3.25	2.5	2.875	little soft				2	2	2	too hard, dry
		3	3	3	little unripe				3	3	3	sweet, juicy, little soft

Second Aspect

[0107] According to the fifth separate aspect, the ripener comprises one or more fruit support surfaces having fruit guides. Thus, according to this separate aspect, the fruit support surfaces, including ones that are all or partly flat, may beneficially comprise one or more fruit guides to reduce fruit rolling and increase stability. The fruit guides may comprise surface tabs, ridges, pits, dips or any other surface feature that provides lateral support for the fruit (inhibits lateral motion). This aspect may be combined with any of the other aspects, and may be used in connection with non-gas permeable ripener materials, such as glass or polymethyl methacrylate, or gas permeable ripener materials.

Claims

1. An apparatus for fruit ripening comprising

a) two or more display parts (1610, 1620) wherein

the size of said two or more display parts permits them to fit entirely on a countertop 61.0 cm long by 61.0 cm wide (two feet long by two feet wide) when the display parts are combined;

b) one or more chambers for retaining ripening gas wherein

i) one or more of the chambers are formed at least in part by the combination of two or more of the display parts (1610, 1620)

ii) at least one of said one or more of the chambers has one or more walls comprising gas impermeable material and at least one rounded inner surface;

c) two or more support surfaces for ripening fruit wherein

i) one or more of said two or more display parts comprise at least part of one of the two or more support surfaces for ripening fruit;

ii) at least one support surface for ripening fruit is enclosed inside one or more chambers for retaining fruit ripening gas when the one or more of the chambers are formed at least in part by combination of two or more of the display parts;

iii) one or more fruit support surfaces for ripening fruit are located outside of the one or more chambers for retaining ripening gas when one or more of the chambers are formed by the combination of two or more of the display parts;

iv) the one or more of the fruit support surfaces located outside the one or more ripening chambers are at least in part concave; and

v) one or more air vents (1602) are provided in the one or more of the fruit support surfaces located outside the one or more ripening chambers, said air vents being in a raised or lowered area relative to the surrounding support surface for ripening fruit, or in an area level with the surrounding support surface for ripening fruit.

2. The apparatus for ripening of Claim 1 wherein the one or more air vents (1602) are not on the same level as the surrounding support surface.

3. The apparatus for ripening of Claim 1 wherein at least one chamber is substantially hemispherical.

4. The apparatus for ripening of Claim 1 wherein at least one chamber is substantially ellipsoidal.

5. The apparatus for ripening of Claim 1 wherein the one or more air vents are located on the same level as their surrounding support surface area and the one or more of the fruit support surfaces located outside the one or more ripening chambers comprise a fruit guide.

6. The apparatus for ripening of Claim 2 wherein the one or more of the fruit support surfaces located outside the one or more ripening chambers comprises a fruit guide (e.g., 1619 and/or 1635).

7. The apparatus for ripening of Claim 1 wherein one or more of said two or more display parts comprises feet (3645).

8. The apparatus for ripening of Claim 1 wherein the at least two display parts comprise one bottom display part and one top display part, said top display part is stacked on the bottom display part, and is of different shape than the bottom display part.

9. The apparatus for ripening of Claim 8 wherein the support surface of the top display part that is located outside the one or more ripening chambers is shallower than the support surface of the bottom display part that is enclosed inside the one or more chambers.

10. The apparatus for ripening of Claim 1 wherein the one or more chambers is ventilated for substantially accelerated fruit ripening.

11. The apparatus for ripening of Claim 10 wherein the one or more air vents (1602) provided in the one or more of the fruit support surfaces located outside the one or more ripening chambers are higher than their surrounding support surface such that fruit tends not to cover the vents.

12. The apparatus for ripening of Claim 10 wherein the at least two display parts comprise one bottom display part and one top display part, said top display part is stacked on the bottom display part, and is of different shape than the bottom display part.

13. The apparatus for ripening of Claim 10 wherein the display parts can be separated.

14. A method for ripening fruit comprising the following steps:

a) a step of placing fruit capable of ripening on one or more fruit support surfaces comprised by one or more display parts;

b) a step for combining two or more display parts to form one or more chambers for ripening fruit whereby

i) the size of said two or more display parts permits them to fit entirely on a countertop 61.0 cm long by 61.0 cm wide (two feet long by two feet wide) when combined;

ii) at least some of the fruit placed on one or more fruit support surfaces is enclosed in one or more of the chambers when two or more of the display parts are combined; and

iii) at least one of said one or more of the chambers comprises at least one rounded inner surface and is ventilated by one or more air vents provided in a support surface located outside the one or more chambers;

c) a step for ripening fruit enclosed on one or more fruit support surfaces at an accelerated rate;

d) a step of separating two or more of said display parts and removing some of said fruit capable of ripening from one or more of the open chambers; and

e) a step of placing and selectively regulating fruit ripening at room atmosphere of at least one piece of the fruit that is ripe, that ripens quickly or that is being kept on one or more fruit support surfaces that are comprised by one or more display parts and located outside of the one or more chambers for retaining ripening gas when one or more of the chambers are formed by two or more display parts.

15. A method of manufacturing an apparatus for fruit ripening and display comprising the acts of

a) injecting a mold for one or more display parts with plastic resin creating a plurality of display parts wherein the size and shape of the molding surface

i) permits the display parts to fit entirely on a countertop 61.0 cm long by 61.0 cm wide (two feet long by two feet wide) when combined;

ii) permits the display parts to combine to form at least in part one or more chambers;

iii) permits one or more of said two or more display parts to comprise at least part of one of two or more support surfaces for ripening fruit;

iv) permits at least one support surface for ripening fruit to be enclosed within one or more chambers for retaining fruit ripening gas when the chambers are formed at least in part by the first and second display parts;

v) permits one or more support surfaces for ripening fruit to be located outside of the one or more chambers for retaining ripening gas when one or more of the chambers are formed by at least the first and second display parts,

vi) wherein the one or more support surfaces for ripening fruit that are located outside of the one or more

chambers for retaining ripening gas when the chambers are formed by at least the first and second parts are at least in part concave and at least in part inwardly sloped; and

b) creating holes in two or more display parts such that at least one of the one or more chambers formed at least in part by two or more display parts has one or more air vents provided in the fruit support surface located outside the one or more chambers.

Patentansprüche

1. Eine Vorrichtung zum Reifen von Früchten, aufweisend:

a) zwei oder mehrere Auslageteile (1610, 1620), wobei die Größe der zwei oder mehreren Auslageteile erlaubt, dass sie vollständig auf eine Thekenoberfläche passen, die 61,0 cm lang mal 61,0 cm breit ist (zwei Fuß lang mal zwei Fuß breit), wenn die Auslageteile kombiniert werden;

b) eine oder mehrere Kammern zum Stauen von Reifeprozess-Gas, wobei

i) eine oder mehrere der Kammern zumindest teilweise durch die Kombination von zwei oder mehreren der Auslageteile (1610, 1620) gebildet sind,

ii) mindestens eine der einen oder mehreren Kammern eine oder mehrere Wände aufweist, die gasundurchlässiges Material aufweisen, und wenigstens eine gerundete Innenfläche aufweisen;

c) zwei oder mehrere Halteflächen zum Reifen von Früchten, wobei

i) einer oder mehreren der zwei oder mehreren Auslageteile zumindest einen Teil von einer der zwei oder mehreren Halteflächen zum Reifen von Früchten aufweisen,

ii) mindestens eine Haltefläche zum Reifen von Früchten im Inneren von einer oder mehreren Kammern zum Stauen von Früchte-Reifungs-Gas eingeschlossen ist, wenn die eine oder mehrere der Kammern zumindest teilweise durch die Kombination von zwei oder mehreren der Auslageteile gebildet sind;

iii) eine oder mehrere Früchte-Halteflächen zum Reifen von Früchten außerhalb von der einen oder den mehreren Kammern zum Stauen von Reifeprozess-Gas angeordnet sind, wenn eine oder mehrere der Kammern durch die Kombination von zwei oder mehreren der Auslageteile gebildet sind;

iv) die eine oder mehrere der Früchte-Halteflächen, die außerhalb der einen oder mehreren Reifungskammern angeordnet sind, zumindest teilweise konkav sind; und

v) eine oder mehrere Belüftungsöffnungen (1602) in der einen oder mehreren der Früchte-Halteflächen vorgesehen sind, die außerhalb der einen oder mehreren Reifungskammern angeordnet sind, wobei die Belüftungsöffnungen sich in einem erhöhten oder abgesenkten Bereich relativ zu der umgebenden Haltefläche zum Reifen von Früchten befinden oder auf gleicher Höhe mit einem Bereich der umgebenden Haltefläche zum Reifen von Früchten befinden.

2. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei die eine oder mehreren Belüftungsöffnungen (1602) sich nicht auf der selben Höhe wie die umgebende Haltefläche befinden.

3. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei wenigstens eine der Kammern im Wesentlichen halbkugelförmig ausgebildet ist.

4. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei wenigstens eine der Kammern im Wesentlichen ellipsoidförmig ausgebildet ist.

5. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei die eine oder mehreren Belüftungsöffnungen auf der gleichen Höhe wie der diese umgebende Halteflächenbereich angeordnet sind, und wobei die einen oder mehreren der Früchte-Halteflächen, die außerhalb der einen oder mehreren Reifungskammern angeordnet sind, eine Früchte-Führung aufweisen.

6. Die Vorrichtung zum Reifen gemäß Anspruch 2, wobei die eine oder mehreren der Früchte-Halteflächen, die außerhalb der einen oder mehreren Reifungskammern angeordnet sind, eine Früchte-Führung (zum Beispiel 1619 und/oder 1635) aufweisen.

7. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei einer oder mehrere der zwei oder mehreren Auslageteile Füße (3645) aufweisen.

8. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei die mindestens zwei Auslageteile einen unteren Auslageteil und einen oberen Auslageteil aufweisen, wobei der obere Auslageteil auf den unteren Auslageteil gestapelt ist und eine andere Form als der untere Auslageteil aufweist.

9. Die Vorrichtung zum Reifen gemäß Anspruch 8, wobei die Haltefläche des oberen Auslageteils, die außerhalb der einen oder mehreren Reifungskammern angeordnet ist, flacher als die Haltefläche des unteren Auslageteils ist, die im Inneren der einen oder mehreren Kammern eingeschlossen ist.

10. Die Vorrichtung zum Reifen gemäß Anspruch 1, wobei die eine oder mehrere Kammern für einen wesentlich beschleunigten Früchte-Reifeprozess belüftet sind.

11. Die Vorrichtung zum Reifen gemäß Anspruch 10, wobei die eine oder mehreren Belüftungsöffnungen (1602), die in der einen oder mehreren der außerhalb der einen oder mehreren Reifungskammern angeordneten Früchte-Halteflächen vorgesehen sind, höher als ihre umgebende Haltefläche sind, so dass die Früchte nicht zum Abdecken der Belüftungsöffnungen neigen.

12. Die Vorrichtung zum Reifen gemäß Anspruch 10, wobei die mindestens zwei Auslageteile einen unteren Auslageteil und einen oberen Auslageteil aufweisen, wobei der obere Auslageteil auf den unteren Auslageteil gestapelt ist und eine andere Form als der untere Auslageteil aufweist.

13. Die Vorrichtung zum Reifen gemäß Anspruch 10, wobei die Auslageteile voneinander trennbar sind.

14. Ein Verfahren zum Reifen von Früchten, die folgenden Schritte aufweisend:

a) einen Schritt zum Platzieren von Früchten, die zum Reifen geeignet sind, auf einer oder mehreren Früchte-Halteflächen von einem oder mehreren Auslageteilen;

b) einen Schritt zum Kombinieren von zwei oder mehreren Auslageteilen zum Ausbilden von einer oder mehreren Kammern zum Reifen von Früchten, wobei

i) die Abmessungen von zwei oder mehreren Auslageteilen erlaubt, dass diese vollständig auf eine Thekenoberfläche passen, die 61,0 cm lang mal 61,0 cm breit ist (zwei Fuß lang mal zwei Fuß breit), wenn diese kombiniert sind,

ii) mindestens einige von den Früchten, die auf einer oder mehreren Früchte-Halteflächen platziert sind, in einer oder mehreren der Kammern eingeschlossen sind, wenn zwei oder mehrere der Auslageteile kombiniert werden, und

iii) mindestens eine der einen oder mehreren der Kammern durch eine oder mehrere Belüftungsöffnungen belüftet wird, die in einer Haltefläche vorgesehen sind, die außerhalb der einen oder mehreren Kammern angeordnet ist;

c) einen Schritt zum beschleunigten Reifen von Früchten, die auf einer oder mehreren Früchte-Halteflächen eingeschlossen sind;

d) einen Schritt zum Trennen von zwei oder mehreren der Auslageteile und zum Entfernen von einigen der Früchte, die zum Reifen geeignet sind, aus einer oder mehreren der offenen Kammern; und

e) einen Schritt zum Platzieren und selektiven Regulieren der Früchte-Reifung bei Raumatmosphäre von mindestens einer der Früchte, welche reif ist, schnell reift oder auf einer oder mehreren Früchte-Halteflächen gehalten wird, die Bestandteil von einem oder mehreren Auslageteilen sind und außerhalb der einen oder mehreren Kammern zum Stauen von Reifeprozess-Gas angeordnet sind, wenn eine oder mehrere der Kammern aus zwei oder mehreren Auslageteilen gebildet sind.

15. Ein Verfahren zur Herstellung einer Vorrichtung zum Reifen und Auslegen von Früchten, die folgenden Vorgänge aufweisend:

a) Spritzgießen von Kunststoffharz in einer Gussform für ein oder mehreren Auslageteilen, um eine Mehrzahl von Auslageteilen herzustellen, wobei durch die Größe und die Form der Gussform ermöglicht wird,

- i) dass die Auslageteile vollständig auf eine Thekenoberfläche passen, die 61,0 cm lang mal 61,0 cm breit ist (zwei Fuß lang mal zwei Fuß breit), wenn sie kombiniert werden,
- ii) dass die Auslageteile zum zumindest teilweisen Ausbilden von einer oder mehreren Kammern kombiniert werden,
- iii) dass einer oder mehrere der zwei oder mehreren Auslageteile zumindest einen Teil von einer von zwei oder mehreren Halteflächen zum Reifen von Früchten aufweisen;
- iv) dass zumindest eine Haltefläche zum Reifen von Früchten in einer oder mehreren Kammern zum Stauen von Früchte-Reifeprozess-Gas eingeschlossen ist, wenn die Kammern zumindest teilweise durch den ersten und zweiten Auslageteil ausgebildet sind,
- v) dass eine oder mehrere Halteflächen zum Reifen von Früchten außerhalb der einen oder mehreren Kammern zum Stauen von Reifeprozess-Gas angeordnet sind, wenn eine oder mehrere der Kammern durch mindestens den ersten und zweiten Auslageteil ausgebildet sind,
- vi) wobei die eine oder mehreren Halteflächen zum Reifen von Früchten, die außerhalb der einen oder mehreren Kammern zum Stauen von Reifeprozess-Gas angeordnet sind, wenn die Kammern durch mindestens den ersten und zweiten Teil ausgebildet sind, zumindest teilweise konkav und zumindest teilweise nach innen geneigt sind, und

b) Erzeugen von Löchern in zwei oder mehreren Auslageteilen, so dass mindestens eine der einen oder mehreren Kammern, die zumindest teilweise aus zwei oder mehr Auslageteilen gebildet sind, eine oder mehrere Belüftungsöffnungen aufweist, die in der Früchte-Haltefläche vorgesehen sind, die außerhalb der einen oder mehreren Kammern angeordnet ist.

Revendications

1. Appareil conçu pour le mûrissement de fruits comprenant

- a) deux ou plusieurs parties présentoir (1610, 1620), dans lesquelles la taille desdites deux ou plusieurs parties présentoir permet de les monter entièrement sur un plan de travail d'une longueur de 61, 0 cm et d'une largeur de 61, 0 cm (deux pieds de long sur deux pieds de large), lorsque les parties présentoir sont combinées ;
- b) une ou plusieurs chambres de rétention du gaz de mûrissement, dans la ou lesquelles

- i) l'une ou plusieurs des chambres est (sont) formée(s) au moins en partie en combinant deux ou plusieurs des parties présentoir (1610, 1620),
- ii) au moins une chambre sélectionnée parmi une ou plusieurs des chambres comporte une ou plusieurs paroi(s) constituée(s) d'un matériau étanche au gaz et au moins une surface interne arrondie ;

c) deux ou plusieurs surfaces de support destinées au mûrissement des fruits, dans lesquelles

- i) une ou plusieurs parties présentoir sélectionnée(s) parmi lesdites deux ou plusieurs parties présentoir constitue(nt) au moins une partie de l'une des deux ou plusieurs surfaces de support destinées au mûrissement des fruits ;
- ii) au moins une surface de support destinée au mûrissement des fruits est contenue dans une ou plusieurs chambres de rétention du gaz de mûrissement des fruits, lorsque l'une ou plusieurs des chambres est (sont) formée(s) au moins en partie en combinant deux ou plusieurs des parties présentoir ;
- iii) une ou plusieurs surfaces de support de fruits destinée(s) au mûrissement des fruits est (sont) située(s) à l'extérieur d'une ou plusieurs chambres de rétention du gaz de mûrissement, lorsque l'une ou plusieurs des chambres est (sont) formée(s) en combinant deux ou plusieurs des parties présentoir ;
- iv) l'une ou plusieurs des surfaces de support de fruits située(s) à l'extérieur d'une ou plusieurs chambres de mûrissement est (sont) au moins en partie concave(s) ; et
- v) un ou plusieurs évent(s) (1602) est (sont) ménagé(s) dans l'une ou plusieurs des surfaces de support de fruits située(s) à l'extérieur d'une ou de plusieurs chambres de mûrissement, lesdits événements se trouvant dans une zone rehaussée ou abaissée par rapport à la surface de support environnante destinée au mûrissement des fruits ou dans une zone qui se trouve au même niveau que la surface de support environnante destinée au mûrissement des fruits.

2. Appareil de mûrissement selon la revendication 1, dans lequel un ou plusieurs évent(s) (1602) ne se trouve(nt) pas au même niveau que la surface de support environnante.

3. Appareil de mûrissement selon la revendication 1, dans lequel au moins une chambre est de forme sensiblement hémisphérique.
- 5 4. Appareil de mûrissement selon la revendication 1, dans lequel au moins une chambre est de forme sensiblement ellipsoïdale.
5. Appareil de mûrissement selon la revendication 1, dans lequel un ou plusieurs événement(s) est (sont) situé(s) au même niveau que la surface de support environnante et l'une ou plusieurs des surfaces de support de fruits située(s) à l'extérieur d'une ou de plusieurs chambres de mûrissement comprend (nent) un élément de guidage des fruits.
- 10 6. Appareil de mûrissement selon la revendication 2, dans lequel l'une ou plusieurs des surfaces de support de fruits située(s) à l'extérieur d'une ou de plusieurs chambres de mûrissement comprend (nent) un élément de guidage des fruits (par exemple, 1619 et/ou 1635).
- 15 7. Appareil de mûrissement selon la revendication 1, dans lequel l'une ou plusieurs desdites deux ou plusieurs parties présentoir comprend (nent) des pieds (3645).
8. Appareil de mûrissement selon la revendication 1, dans lequel les au moins deux parties présentoir comprennent une partie présentoir inférieure et une partie présentoir supérieure, ladite partie présentoir supérieure étant empilée sur la partie présentoir inférieure et ayant une forme différente de la partie présentoir inférieure.
- 20 9. Appareil de mûrissement selon la revendication 8, dans lequel la surface de support de la partie présentoir supérieure qui est située à l'extérieur d'une ou de plusieurs chambre(s) de mûrissement est moins profonde que la surface de support de la partie présentoir inférieure contenue dans une ou plusieurs chambre(s).
- 25 10. Appareil de mûrissement selon la revendication 1, dans lequel une ou plusieurs chambre(s) est (sont) ventilée(s) pour sensiblement accélérer le mûrissement des fruits.
- 30 11. Appareil de mûrissement selon la revendication 10, dans lequel un ou plusieurs événement(s) (1602) ménagé(s) dans l'une ou plusieurs des surfaces de support de fruits située(s) à l'extérieur d'une ou de plusieurs chambre(s) de mûrissement est (sont) plus haut(s) que leur surface de support environnante, de sorte que le fruit ne bouche généralement pas les événements.
- 35 12. Appareil de mûrissement selon la revendication 10, dans lequel les au moins deux parties présentoir comprennent une partie présentoir inférieure et une partie présentoir supérieure, ladite partie présentoir supérieure étant empilée sur la partie présentoir inférieure et ayant une forme différente de la partie présentoir inférieure.
- 40 13. Appareil de mûrissement selon la revendication 10, dans lequel les parties présentoir peuvent être séparées.
- 45 14. Procédé de mûrissement de fruits comprenant les étapes suivantes :
 - a) une étape de placement des fruits aptes à mûrir sur une ou plusieurs surface(s) de support de fruits constituée(s) d'une ou de plusieurs partie(s) présentoir ;
 - b) une étape de combinaison de deux ou plusieurs parties présentoir pour former une ou plusieurs chambre(s) de mûrissement de fruits, par laquelle
 - i) la taille desdites deux ou plusieurs parties présentoir permet de les monter entièrement sur un plan de travail d'une longueur de 61, 0 cm et d'une largeur de 61, 0 cm (deux pieds de long sur deux pieds de large), lorsqu'elles sont combinées ;
 - 50 ii) au moins certains des fruits placés sur une ou plusieurs surface(s) de support de fruits sont contenus dans une ou plusieurs des chambres, lorsque deux ou plusieurs des parties présentoir sont combinées ; et
 - iii) au moins une chambre sélectionnée parmi ladite ou lesdites chambre(s) comprend au moins une surface interne arrondie et est ventilée par un ou plusieurs événement(s) ménagé(s) dans une surface de support située à l'extérieur d'une ou de plusieurs chambre(s) ;
 - 55
 - c) une étape de mûrissement à vitesse accélérée des fruits contenus sur une ou plusieurs surface(s) de support de fruits ;
 - d) une étape de séparation de deux ou plusieurs desdites parties présentoir et de retrait de certains desdits

fruits aptes à mûrir d'une ou de plusieurs des chambres ouvertes ; et

e) une étape de placement et de régulation sélective du mûrissement des fruits sous atmosphère ambiante d'au moins une partie des fruits mûrs, qui mûrissent rapidement ou qui sont conservés sur une ou plusieurs surface(s) de support de fruits constituée(s) d'une ou de plusieurs partie(s) présentoir et située(s) à l'extérieur d'une ou de plusieurs chambre(s) de rétention du gaz de mûrissement, lorsque l'une ou plusieurs des chambres est (sont) formée(s) de deux ou plusieurs parties présentoir.

15. Procédé de fabrication d'un appareil de mûrissement et de présentation de fruits, ledit procédé comprenant les actions suivantes :

a) injecter de la résine plastique dans un moule conçu pour une ou plusieurs partie(s) présentoir, ce qui permet de créer une pluralité de parties présentoir, dans lequel la taille et la forme de la surface de moulage

i) permet de monter entièrement les parties présentoir sur un plan de travail d'une longueur de 61, 0 cm et

d'une largeur de 61, 0 cm (deux pieds de long sur deux pieds de large), lorsqu'elles sont combinées ;

ii) permet de combiner les parties présentoir pour former au moins en partie une ou plusieurs chambre(s) ;

iii) permet qu'une ou plusieurs desdites deux ou plusieurs parties présentoir constitue(nt) au moins une partie de l'une des deux ou plusieurs surfaces de support destinées au mûrissement des fruits ;

iv) permet qu'au moins une surface de support destinée au mûrissement des fruits soit contenue dans une ou plusieurs chambre(s) de rétention du gaz de mûrissement des fruits, lorsque les chambres sont formées au moins en partie par les première et seconde parties présentoir ;

v) permet qu'une ou plusieurs surface(s) de support destinée(s) au mûrissement des fruits soit(en)t située(s) à l'extérieur d'une ou de plusieurs chambre(s) de rétention du gaz de mûrissement, lorsque l'une ou plusieurs des chambres est (sont) formée(s) par au moins les première et seconde parties présentoir,

vi) dans lequel la ou les surface(s) de support destinée(s) au mûrissement des fruits située(s) à l'extérieur d'une ou plusieurs chambre(s) de rétention du gaz de mûrissement, lorsque les chambres sont formées par au moins les première et seconde parties, sont au moins en partie concaves et au moins en partie inclinées vers l'intérieur ; et

b) créer des trous dans deux ou plusieurs parties présentoir, de sorte qu'au moins une chambre sélectionnée parmi la ou les chambres formée(s) au moins en partie par deux ou plusieurs parties présentoir comporte un ou plusieurs événement(s) ménagé(s) dans la surface de support de fruits située à l'extérieur de la ou des chambre(s).

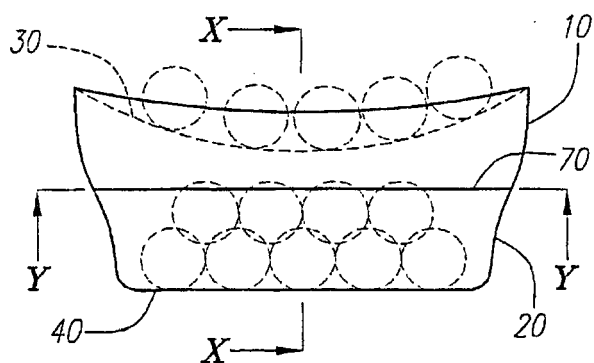


FIG. 1

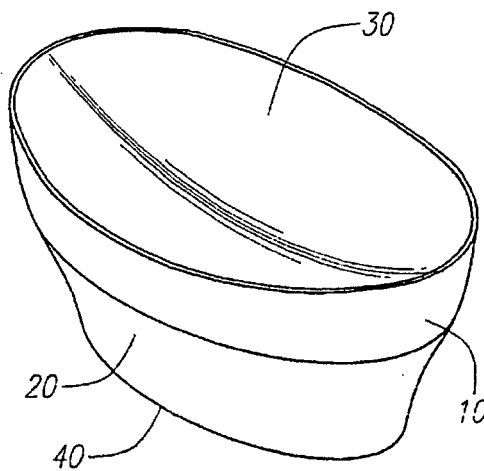


FIG. 2

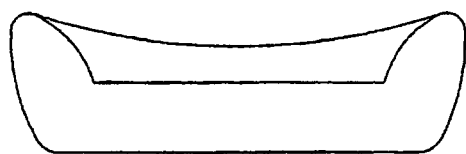


FIG. 3

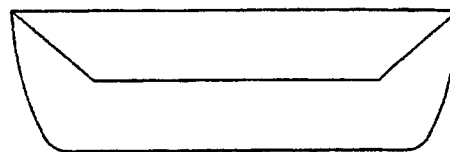


FIG. 4

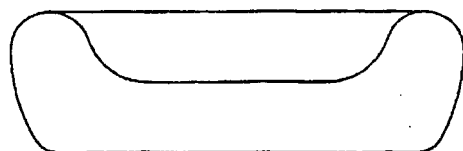


FIG. 5

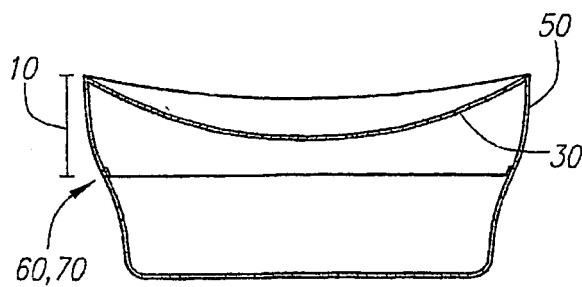


FIG. 6

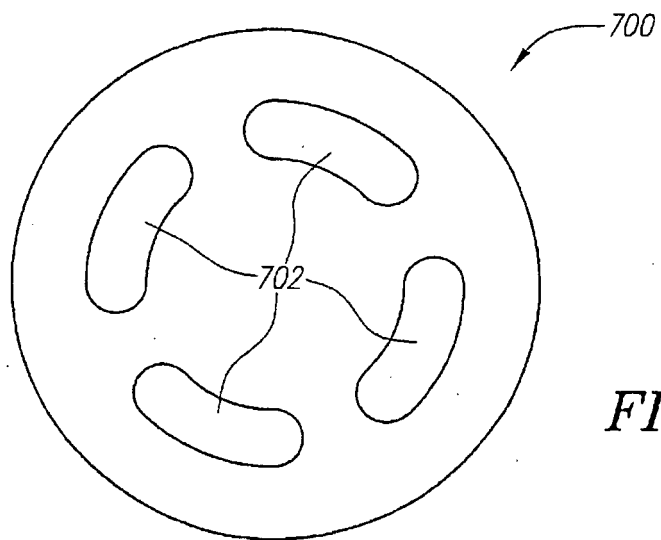


FIG. 7a

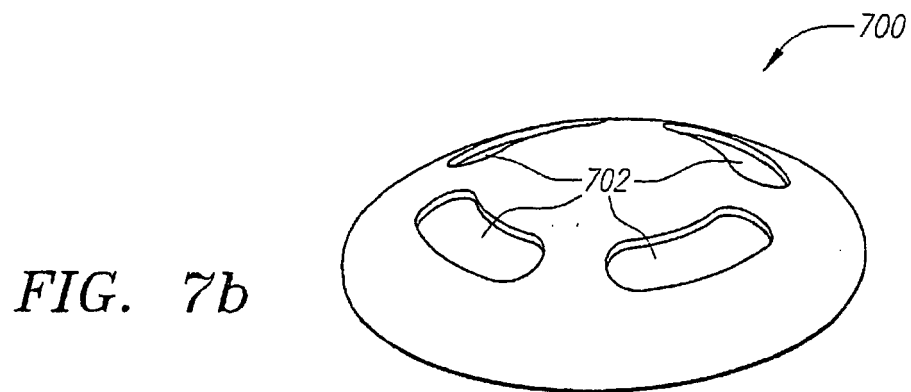


FIG. 7b

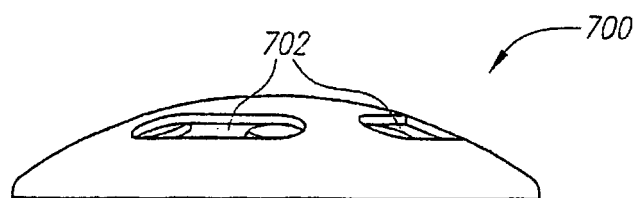


FIG. 7c

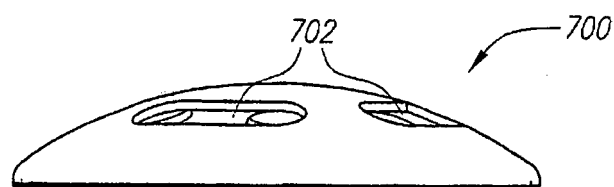


FIG. 7d

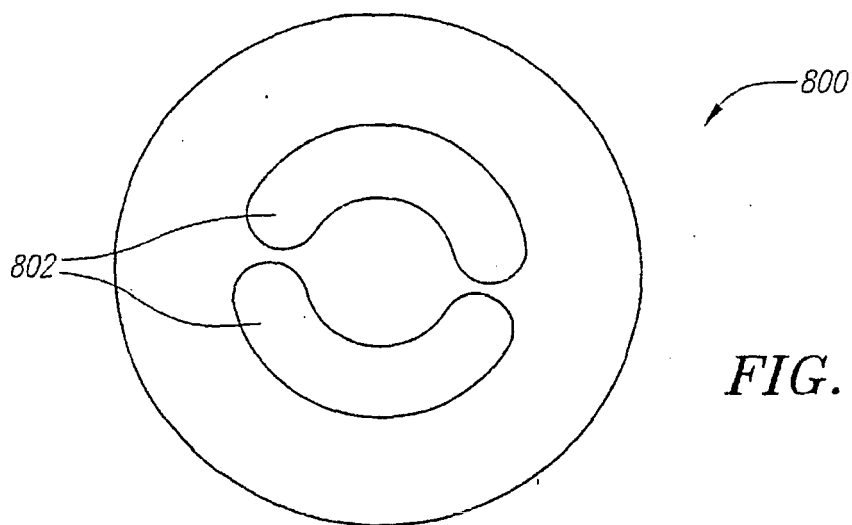


FIG. 8a

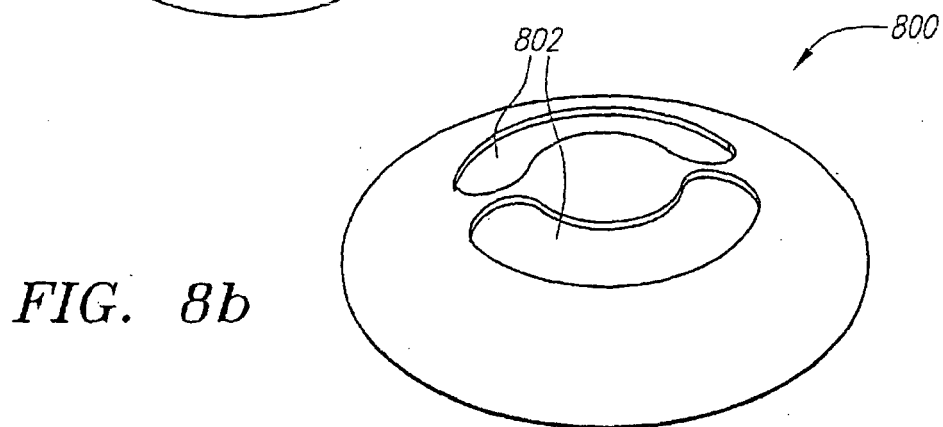


FIG. 8b

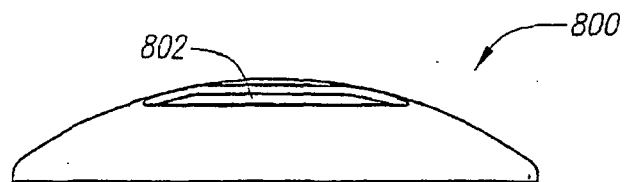


FIG. 8c

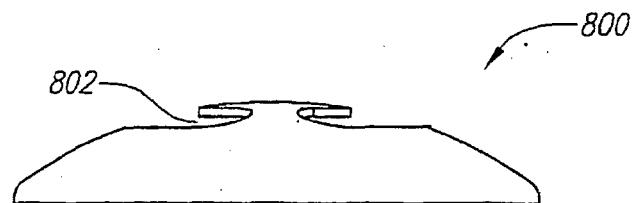


FIG. 8d

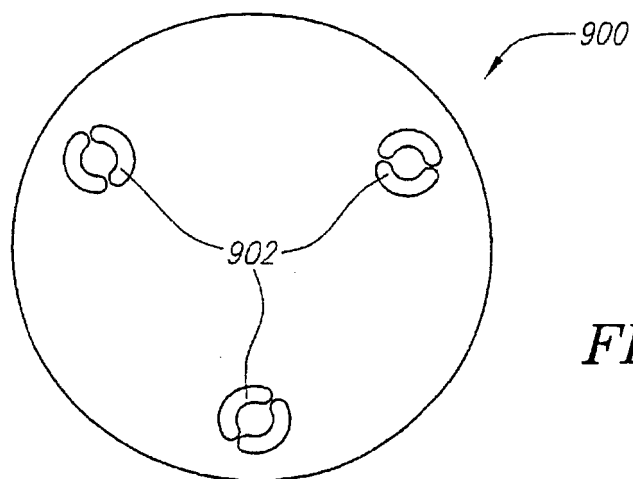


FIG. 9a

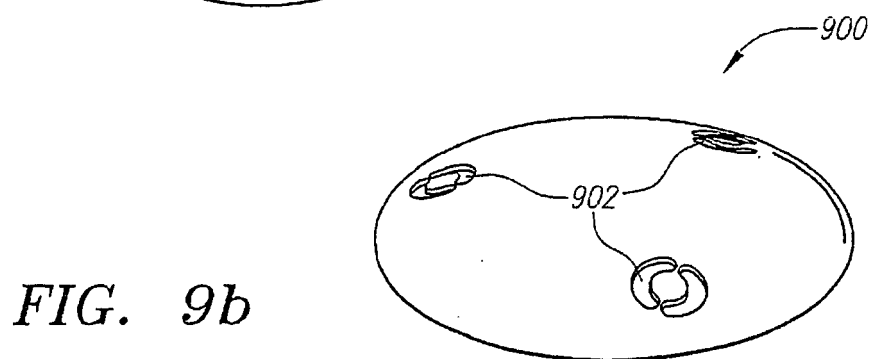


FIG. 9b

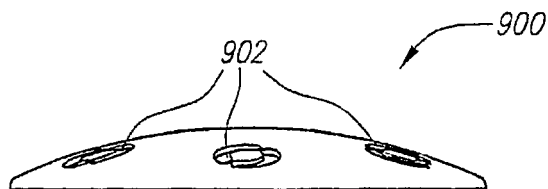


FIG. 9c

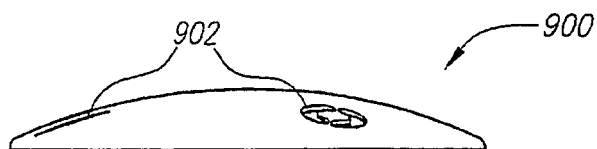


FIG. 9d

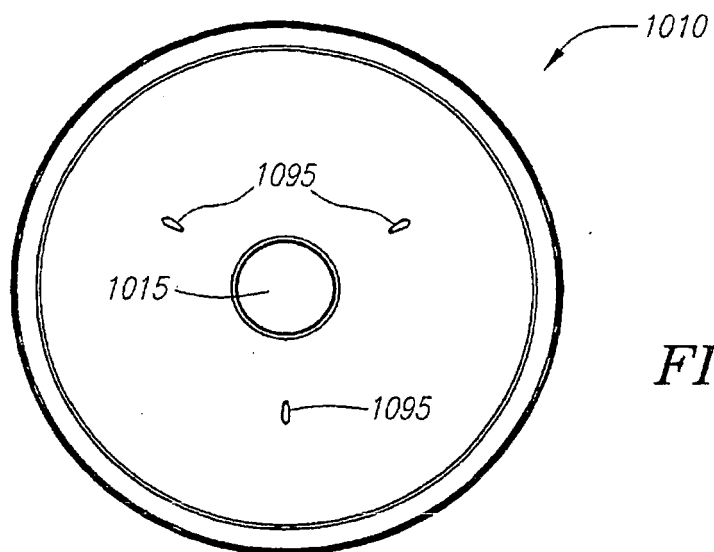


FIG. 10a

FIG. 10b

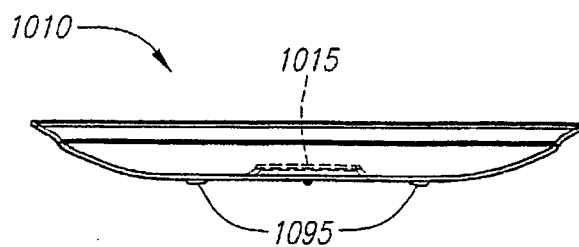
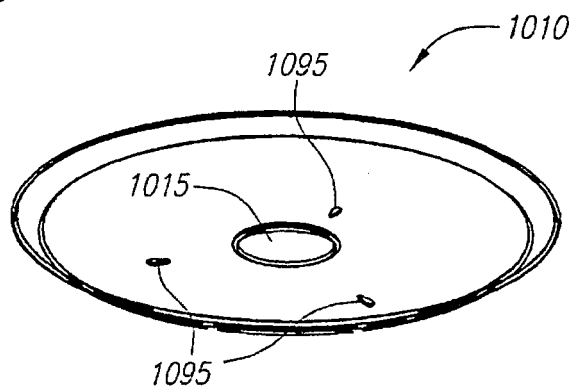


FIG. 10c

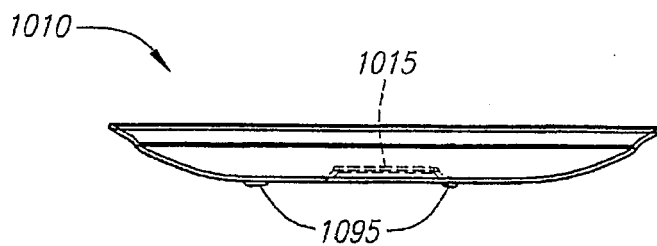


FIG. 10d

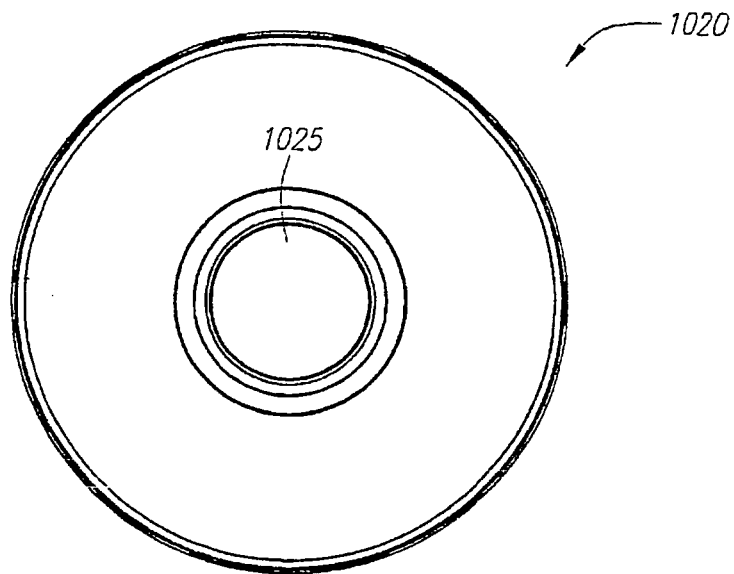


FIG. 11a

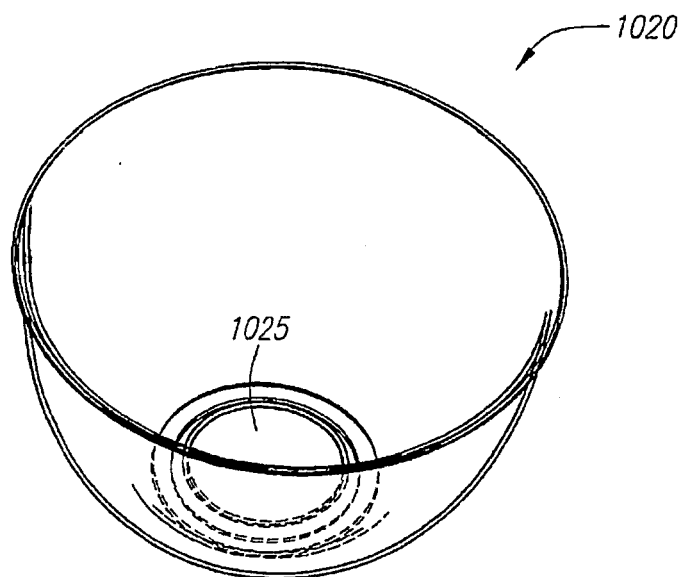


FIG. 11b

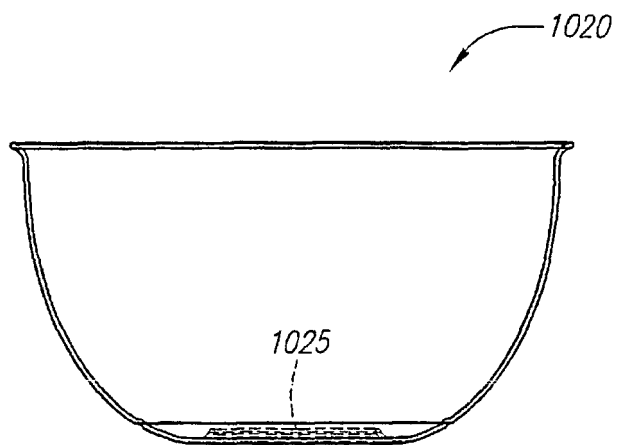


FIG. 11c

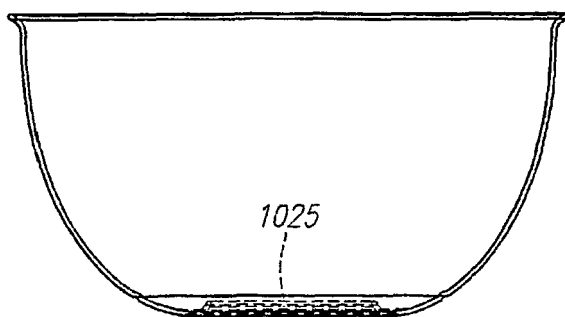


FIG. 11d

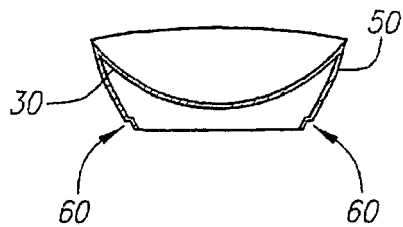


FIG. 12

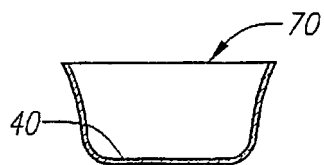


FIG. 13

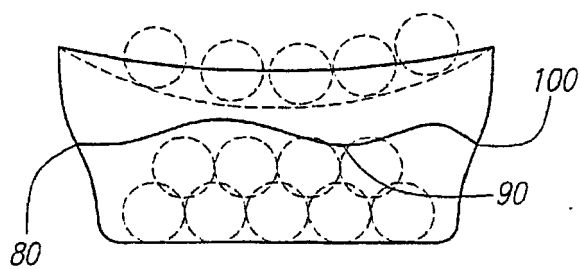


FIG. 14

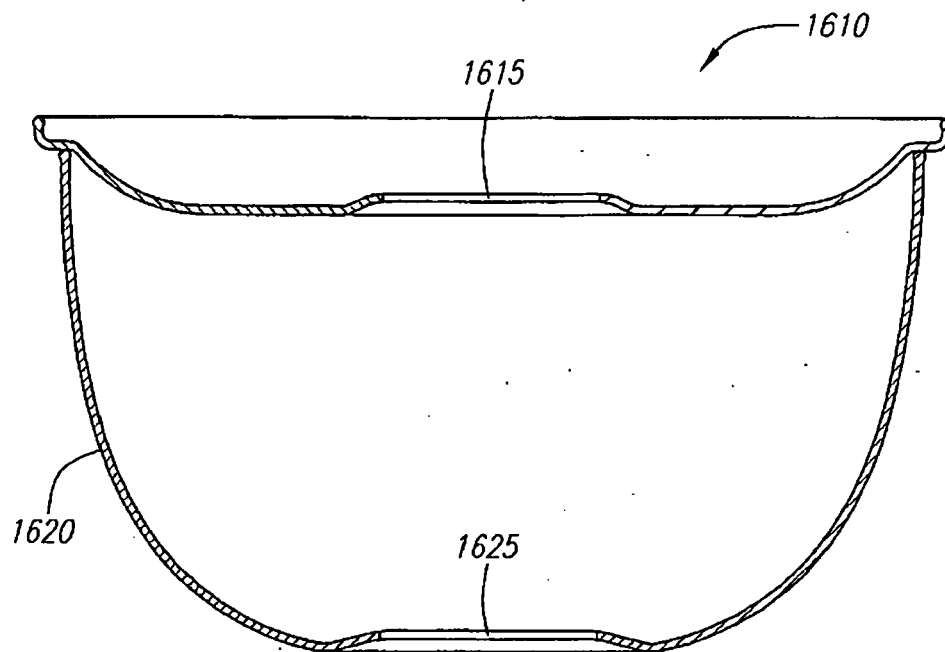


FIG. 15A

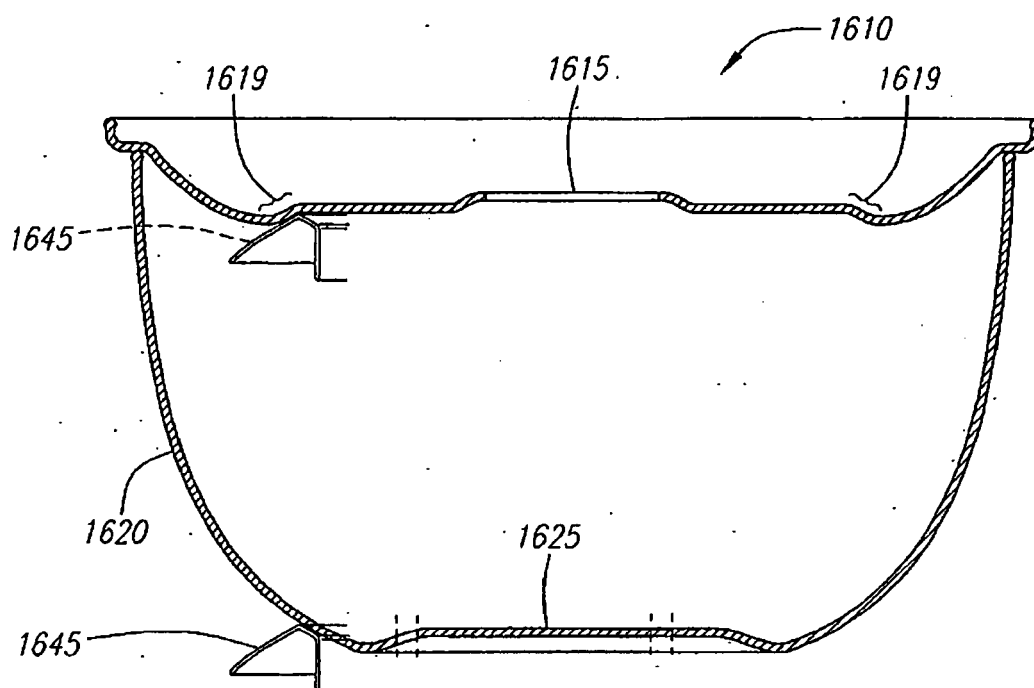


FIG. 15B

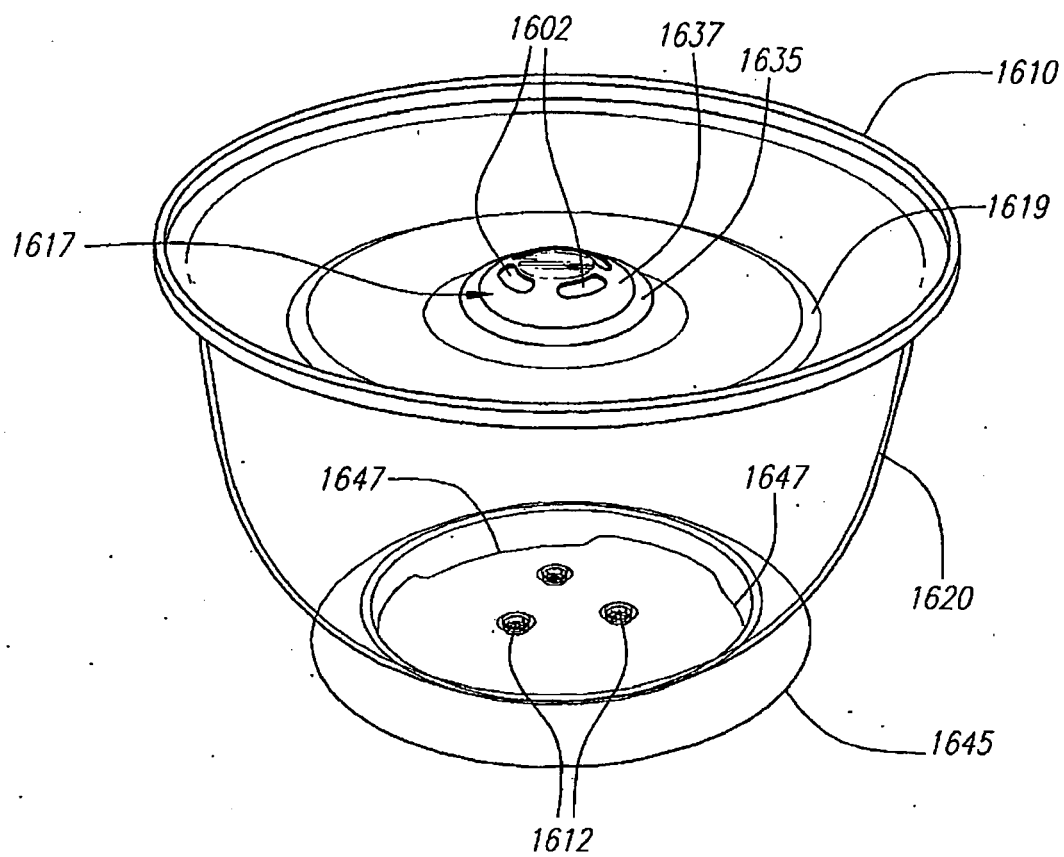


FIG. 16a

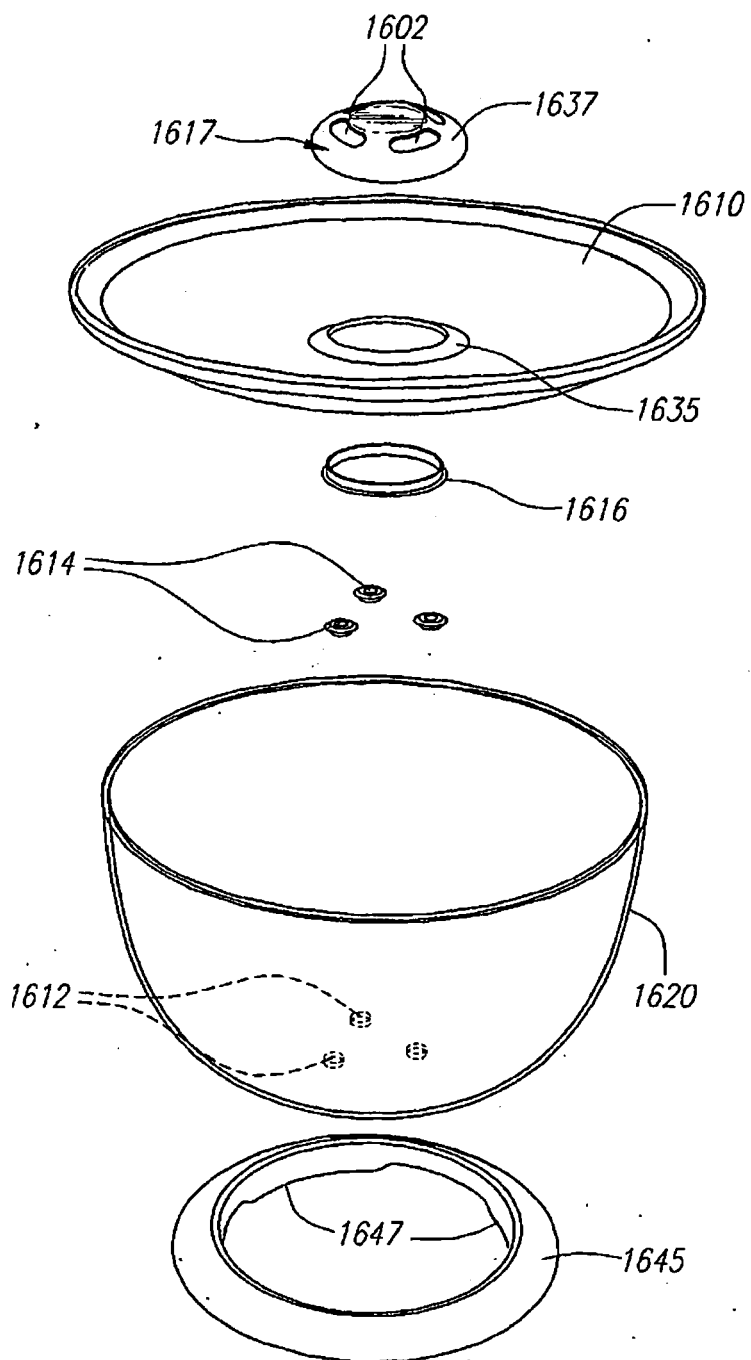


FIG. 16b

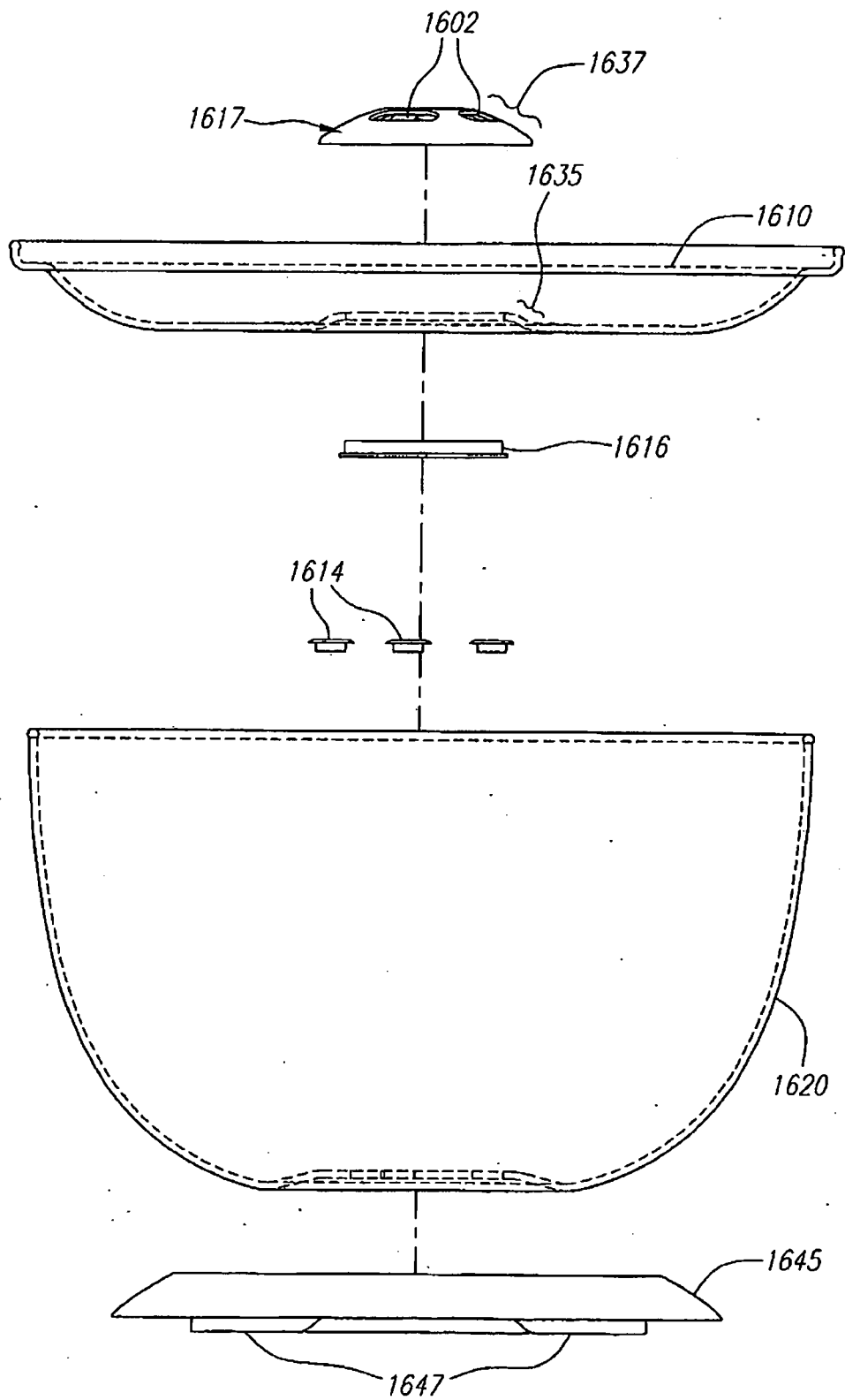


FIG. 16c

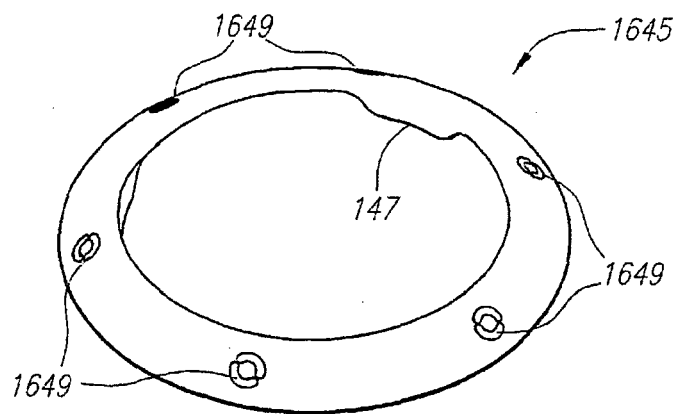


FIG. 16d

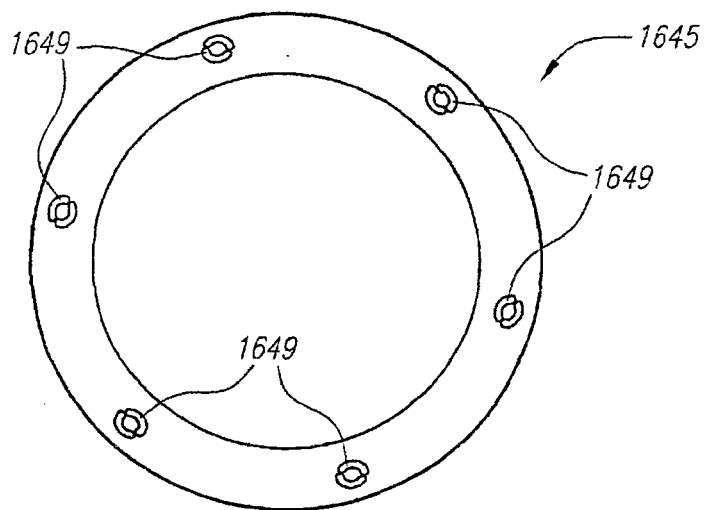


FIG. 16e

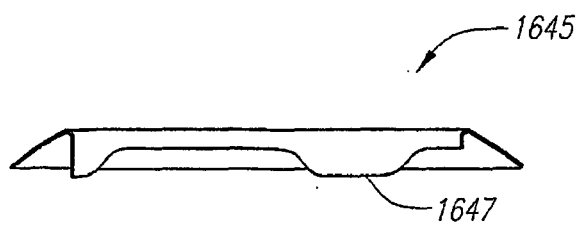


FIG. 16f

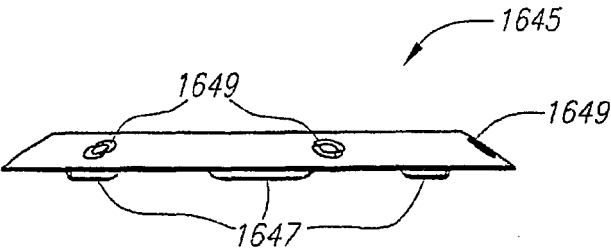


FIG. 16g

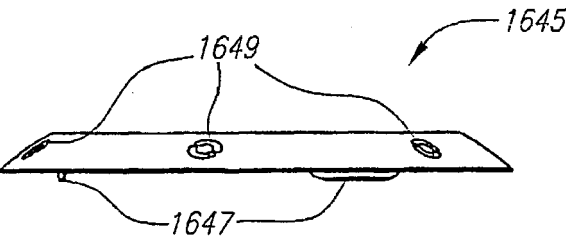


FIG. 16h

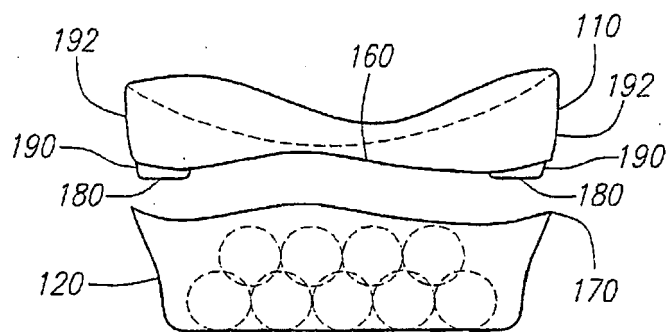


FIG. 17

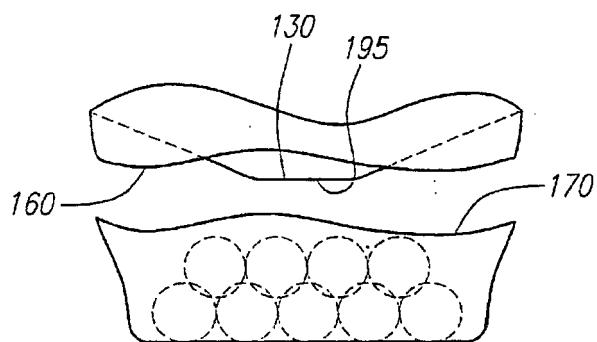


FIG. 18

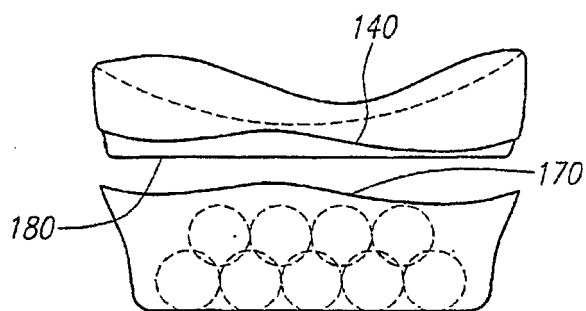


FIG. 19

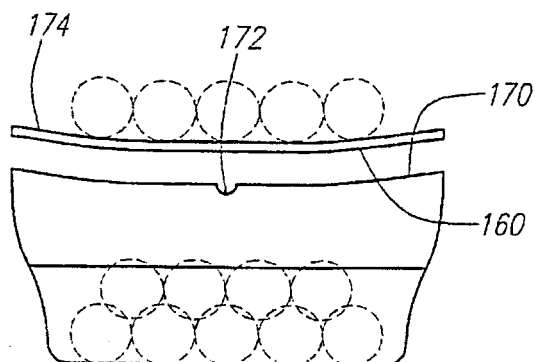


FIG. 20

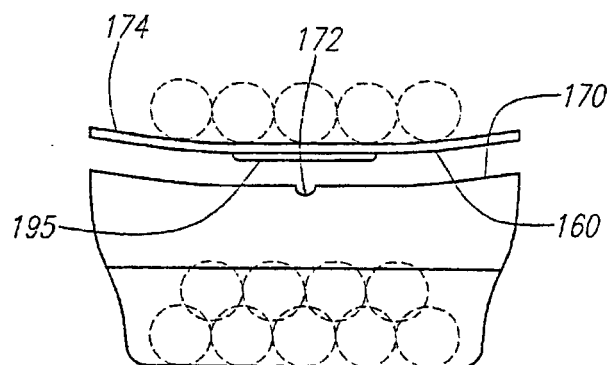


FIG. 21

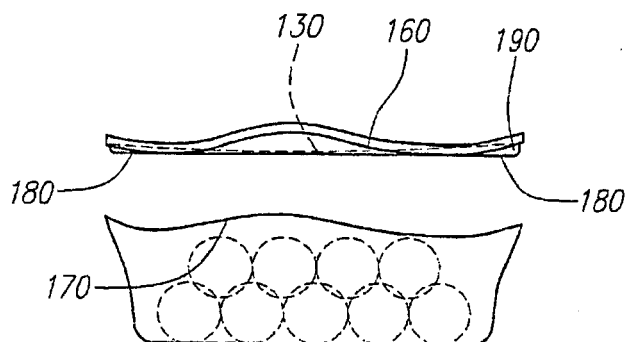


FIG. 22

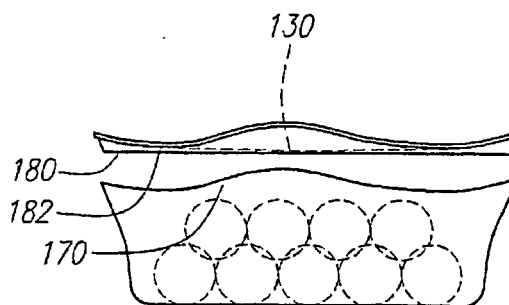


FIG. 23

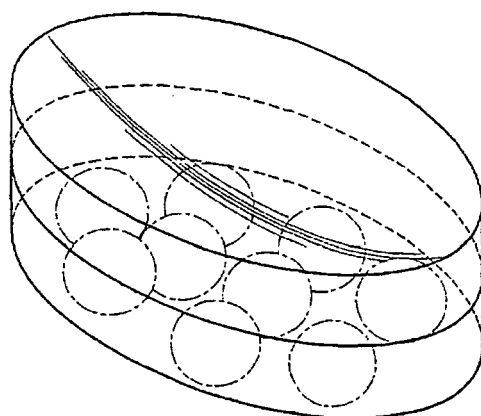


FIG. 24

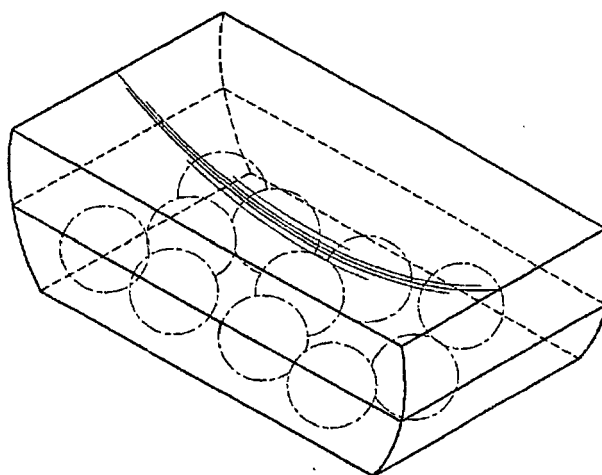


FIG. 25

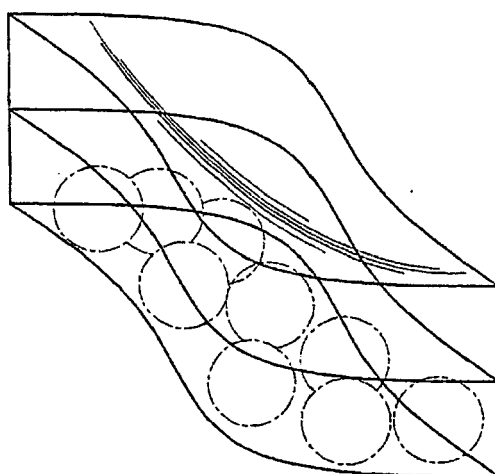


FIG. 26

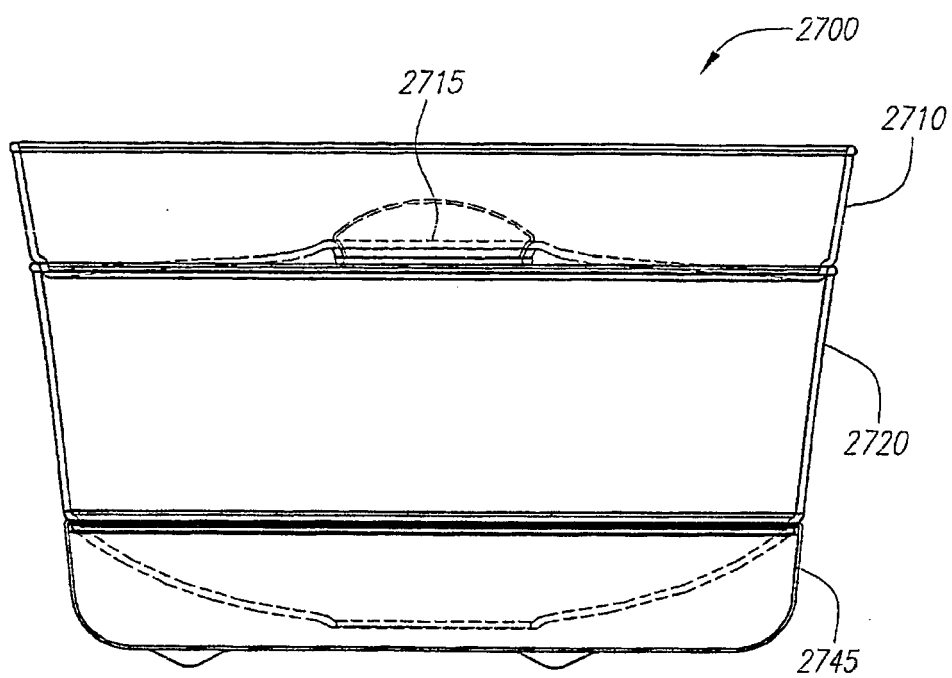


FIG. 27a

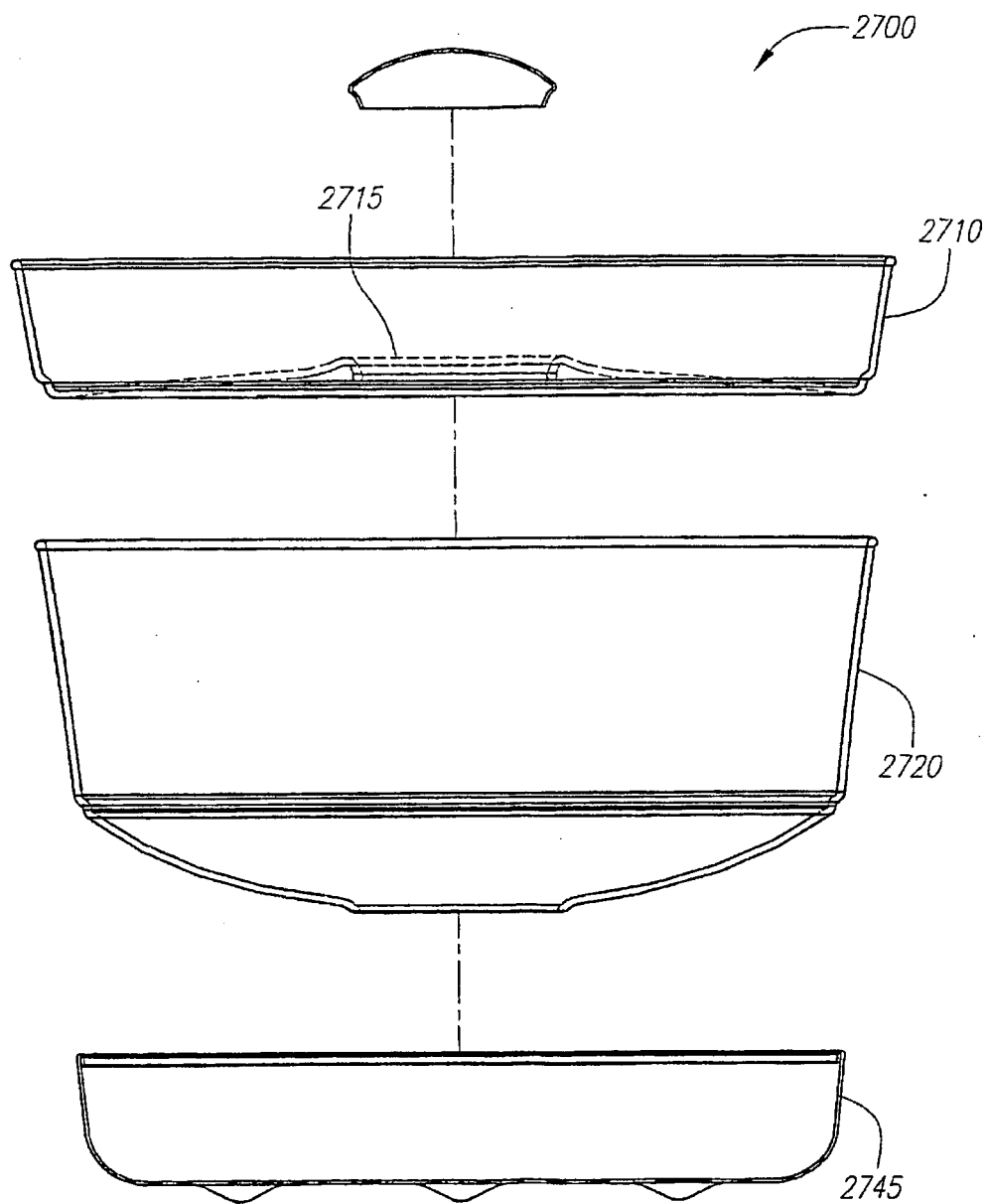


FIG. 27b

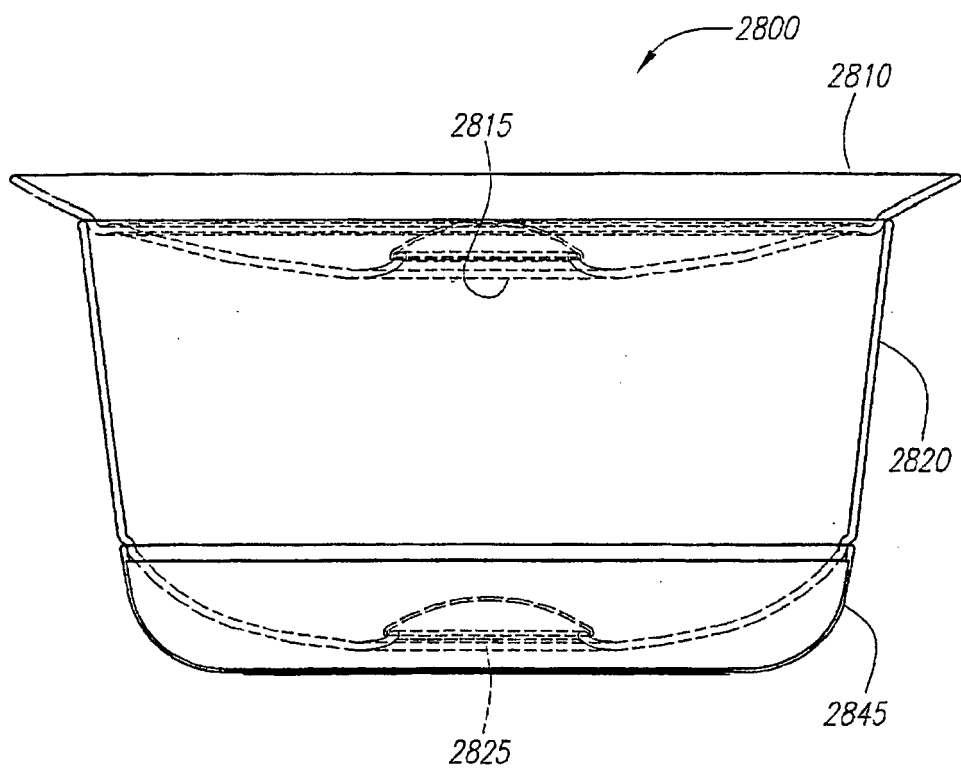


FIG. 28a

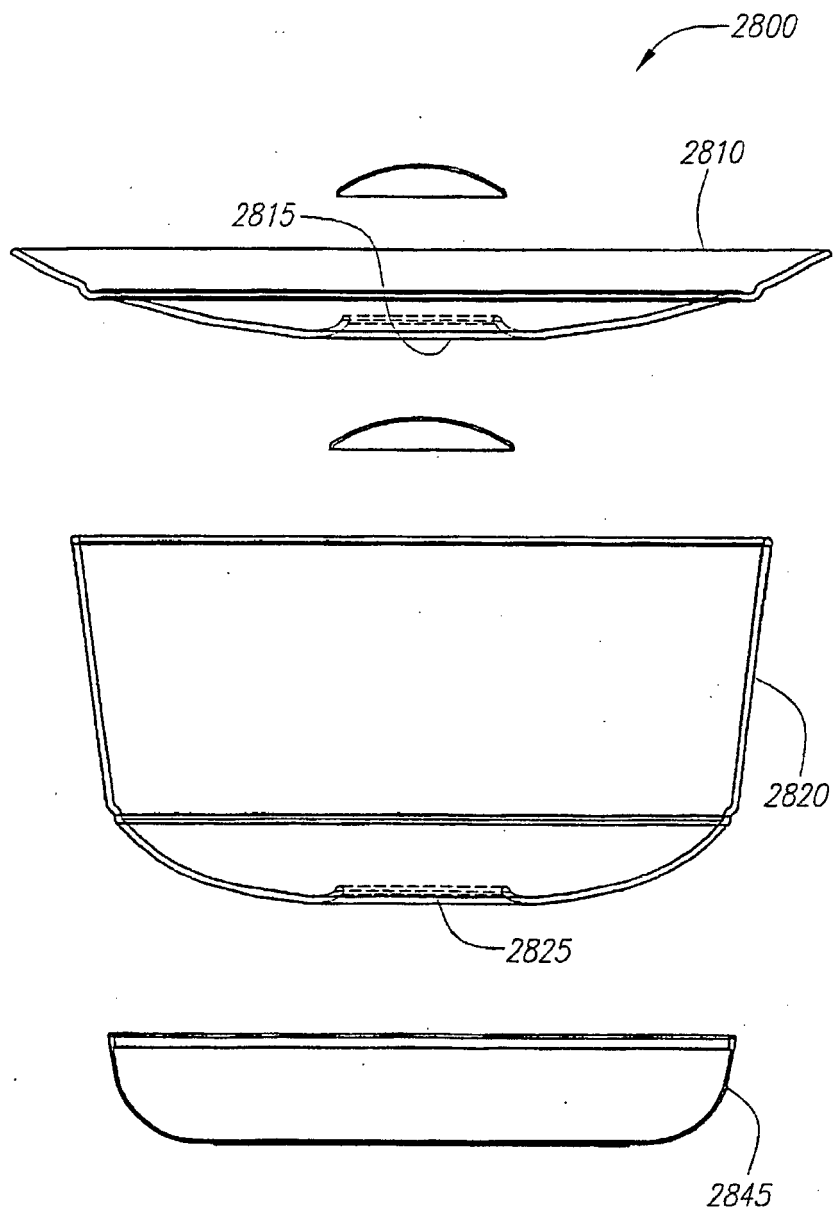


FIG. 28b

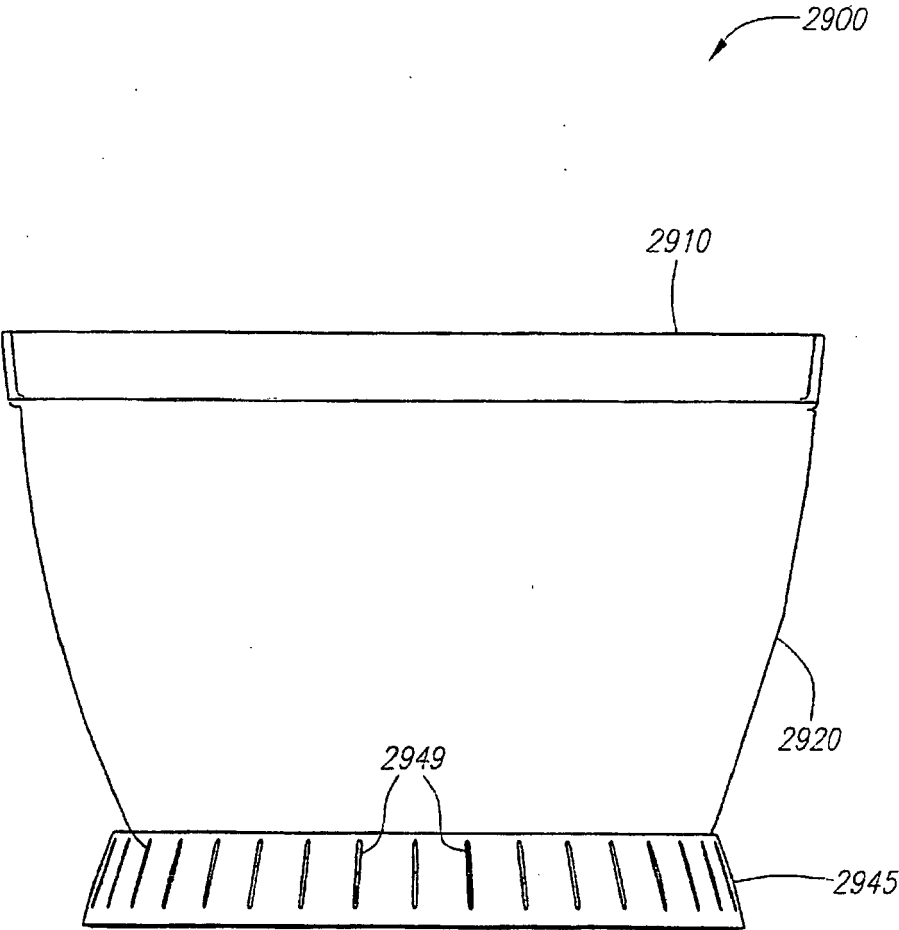


FIG. 29

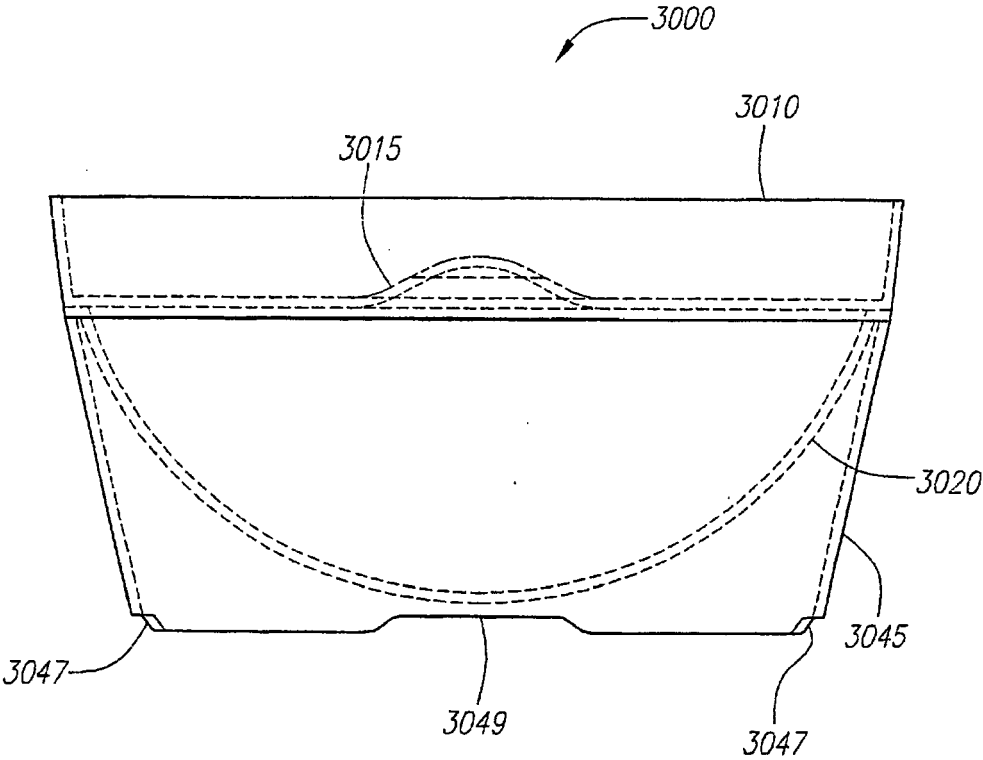


FIG. 30

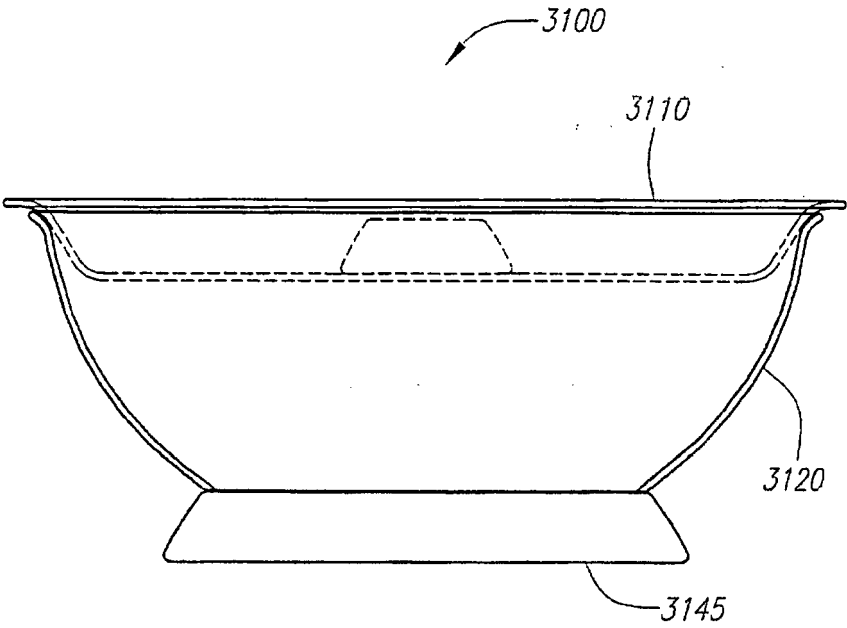


FIG. 31

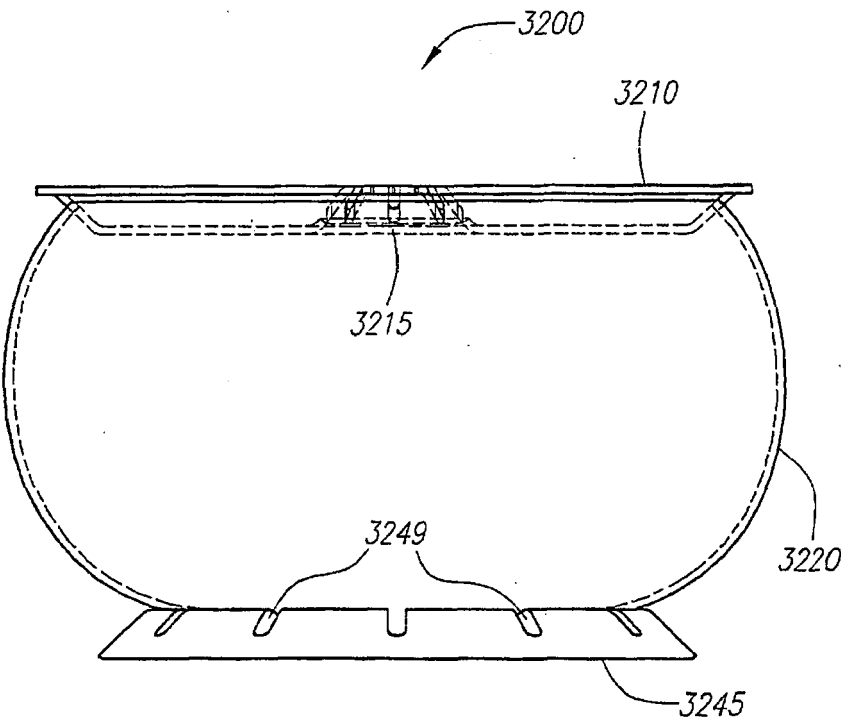


FIG. 32

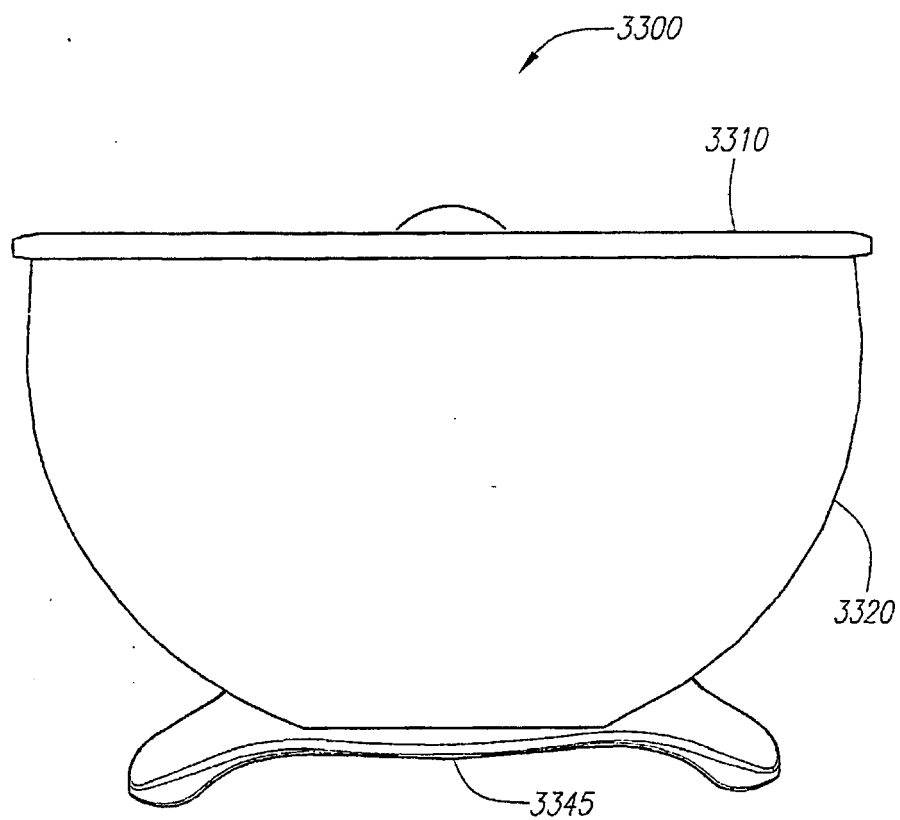


FIG. 33

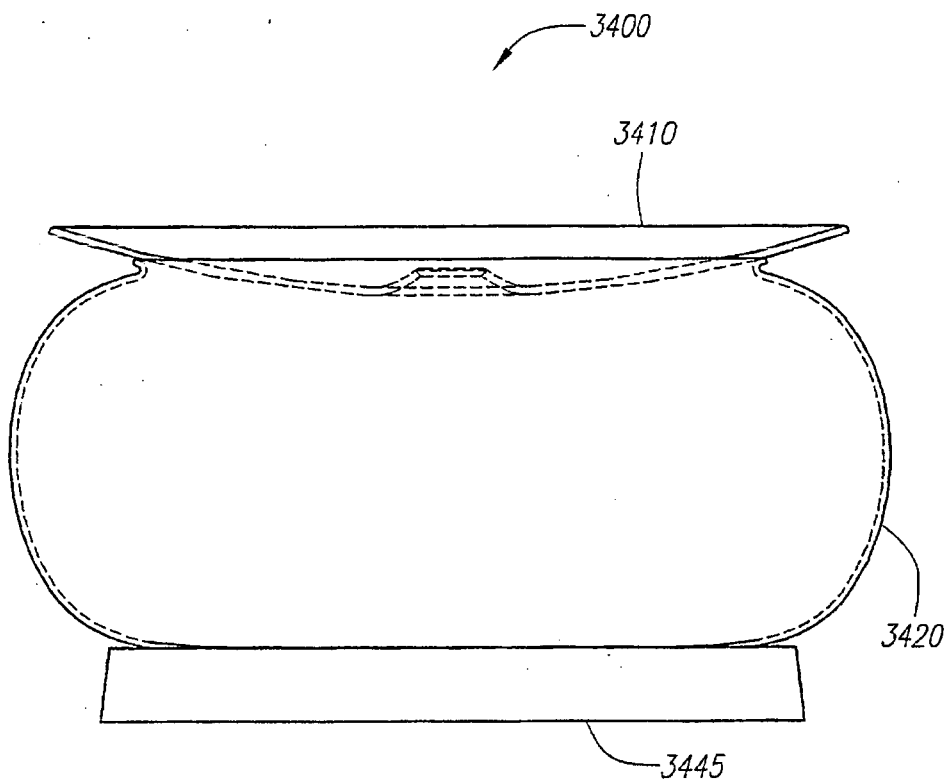


FIG. 34

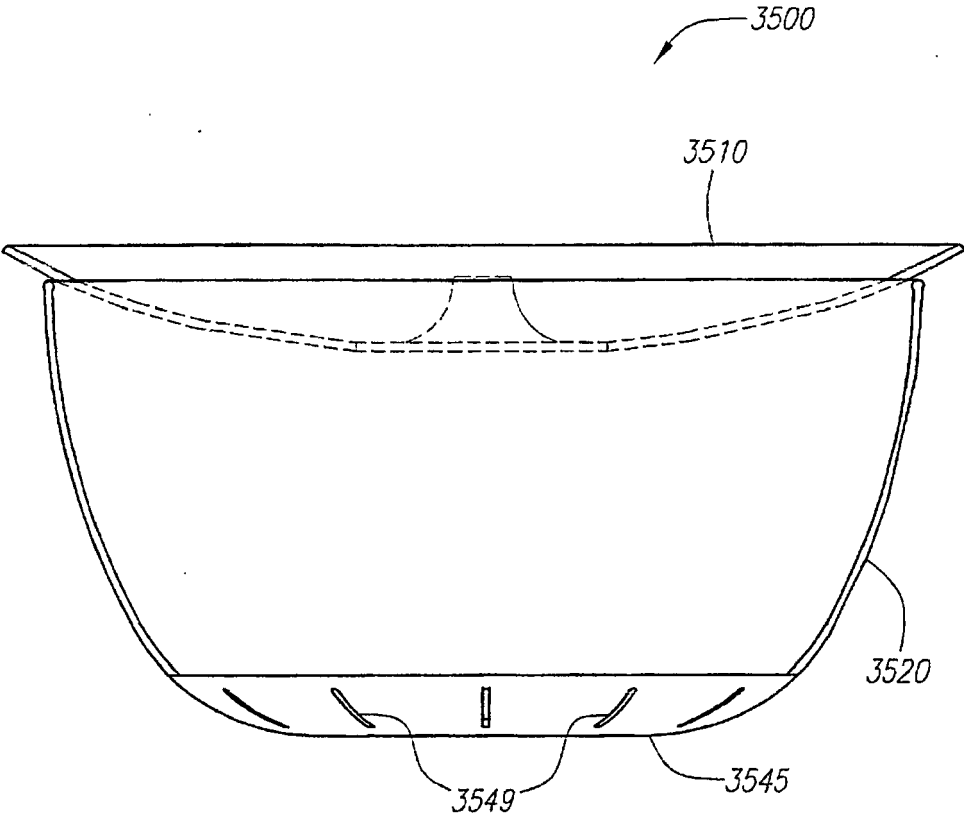


FIG. 35

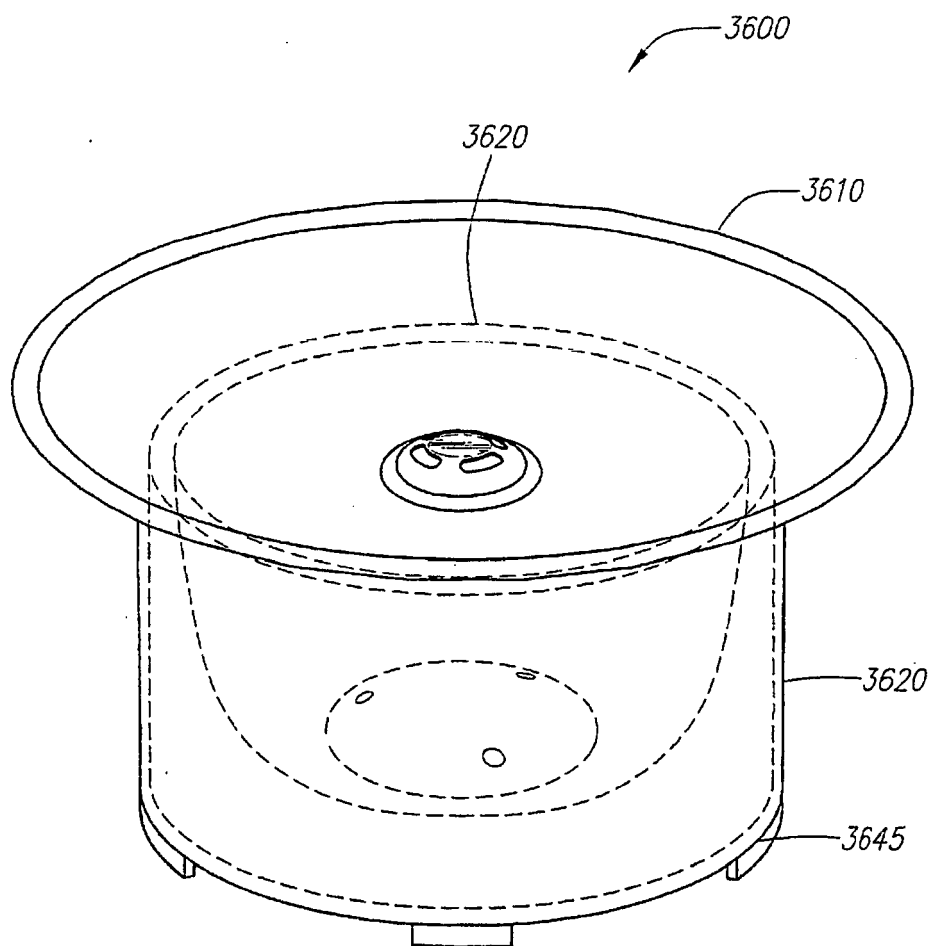


FIG. 36

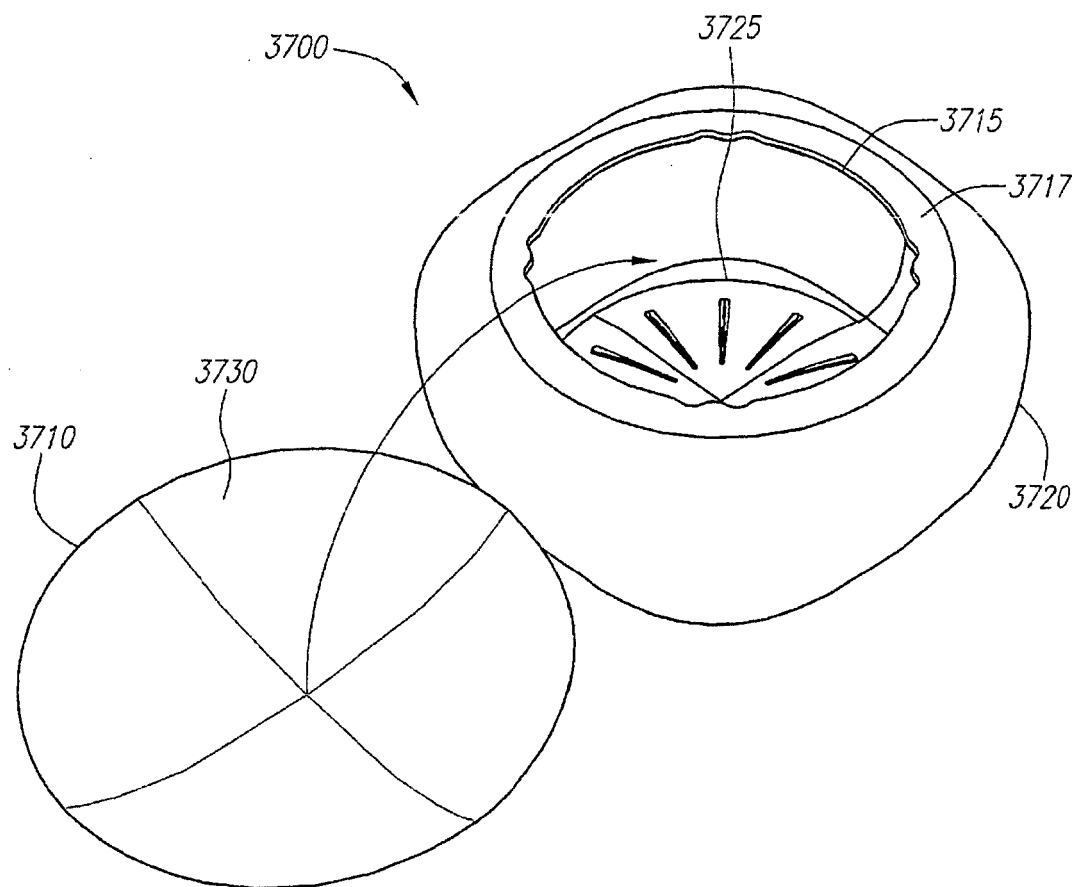


FIG. 37

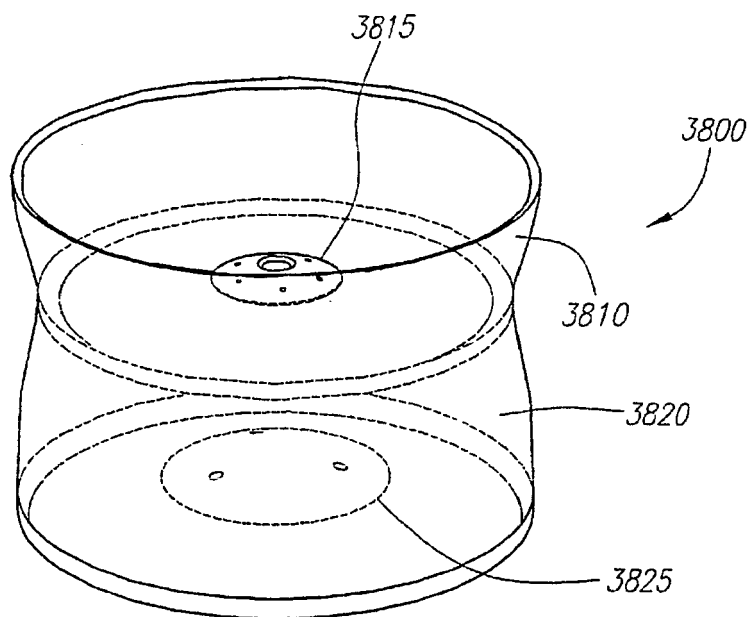


FIG. 38a

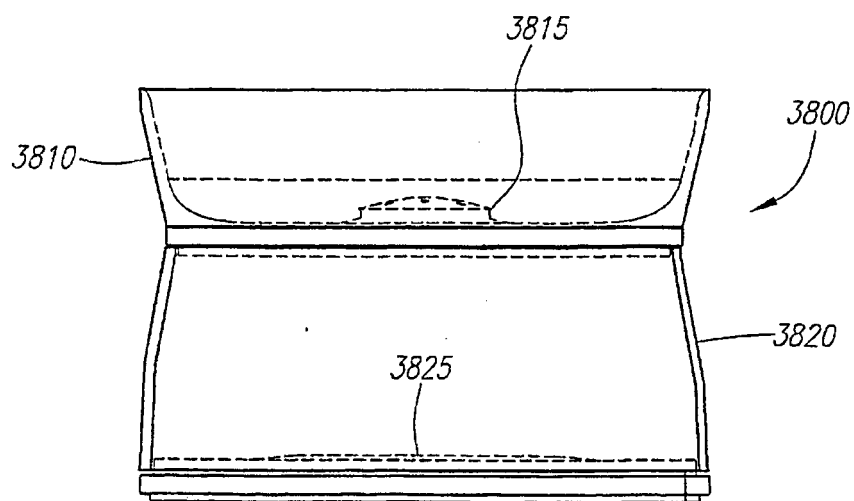


FIG. 38b

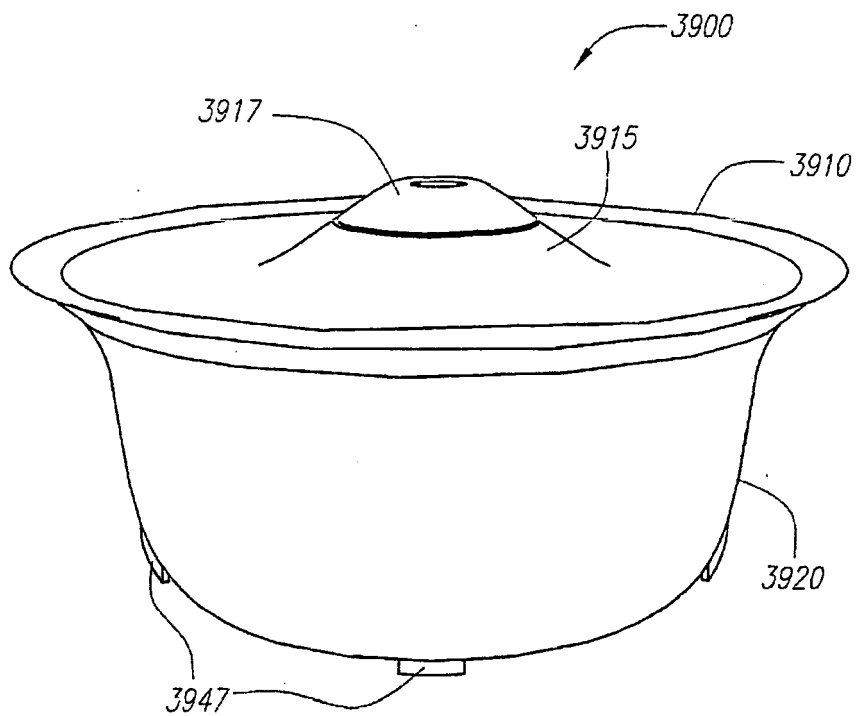


FIG. 39a

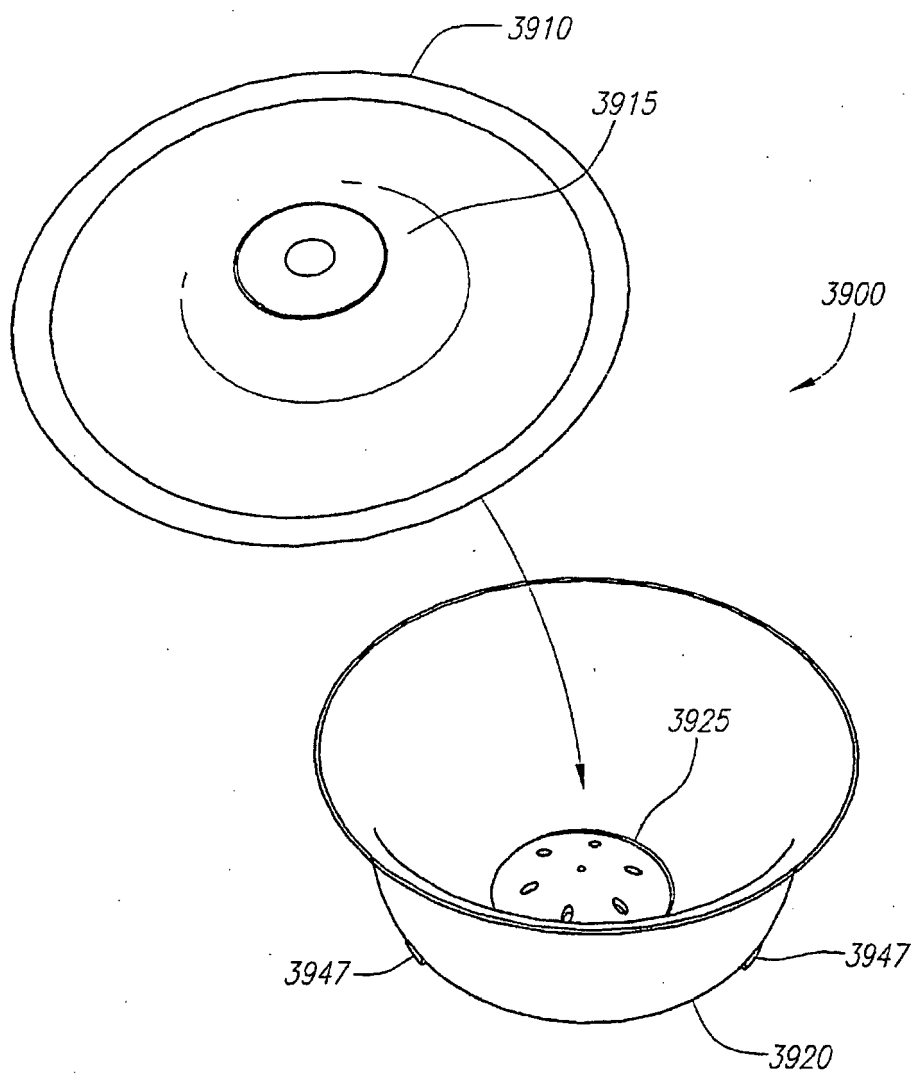


FIG. 39b

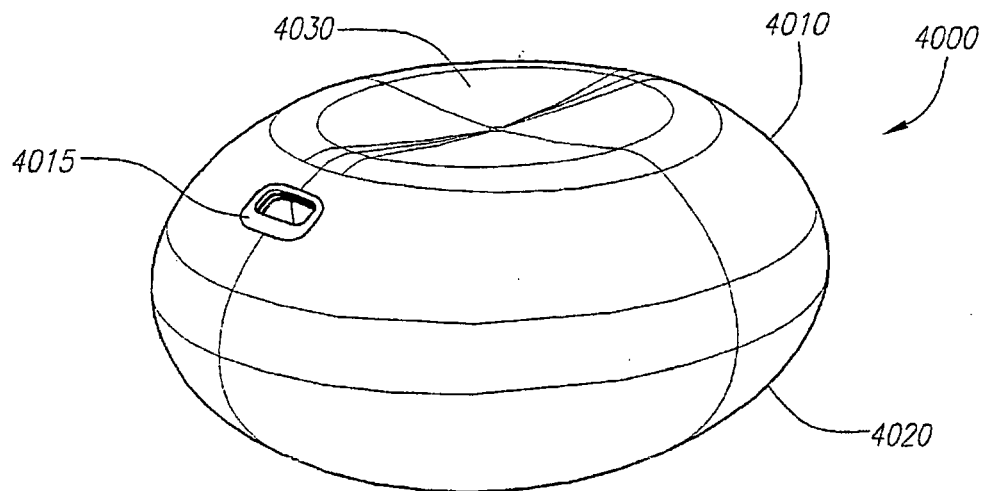


FIG. 40a

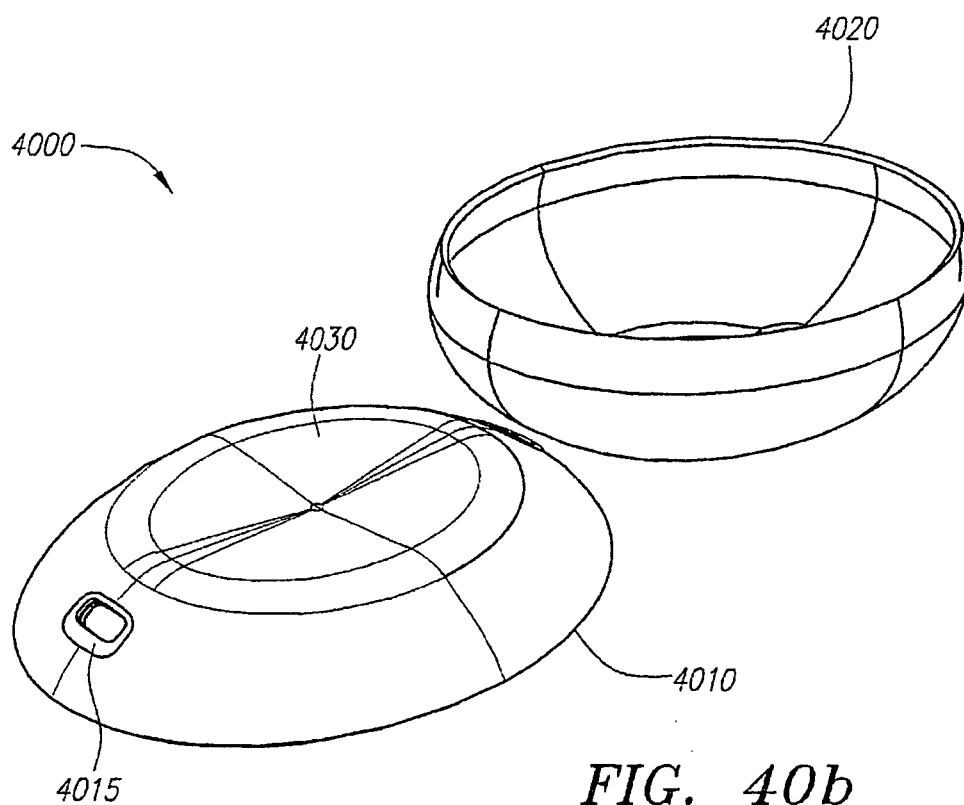


FIG. 40b

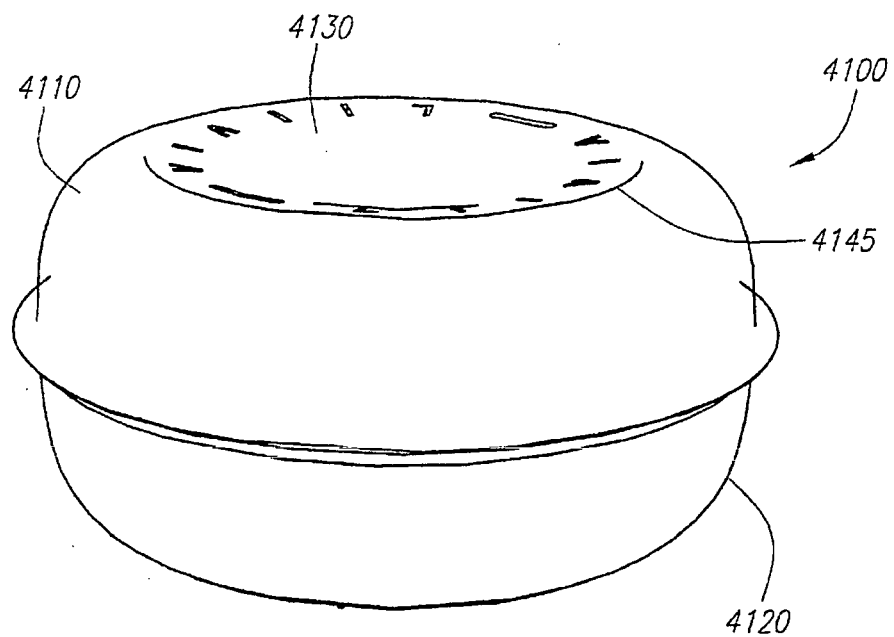


FIG. 41a

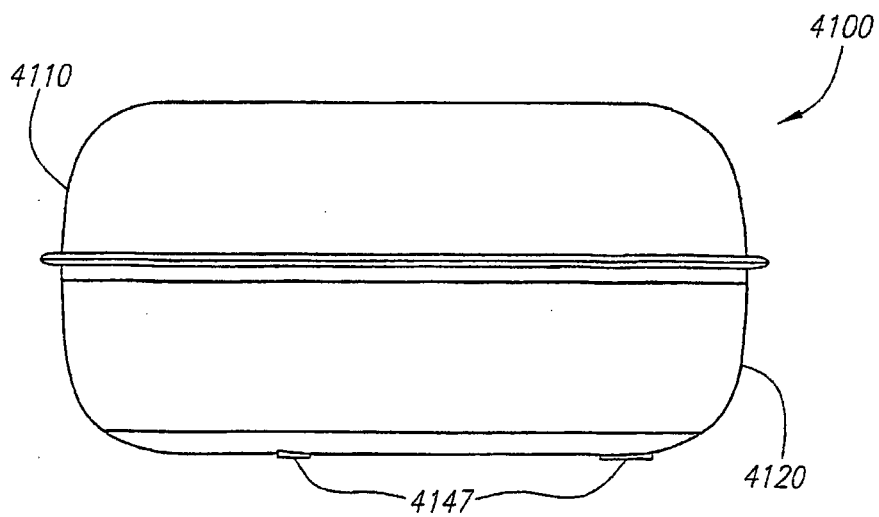
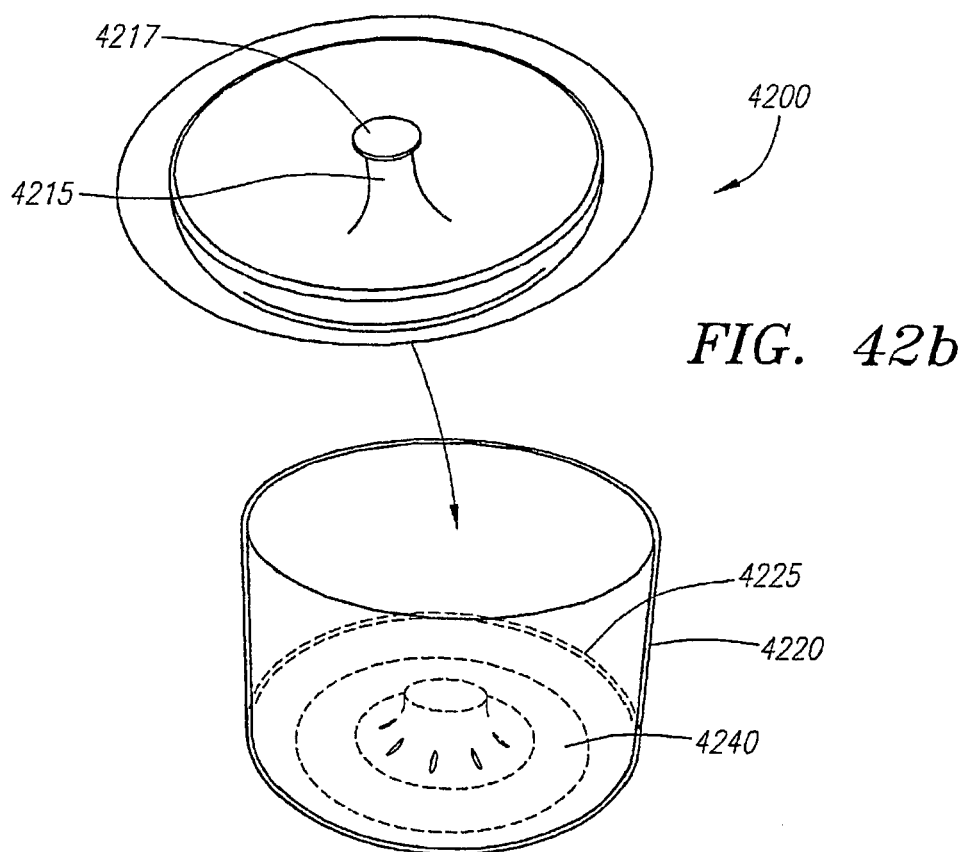
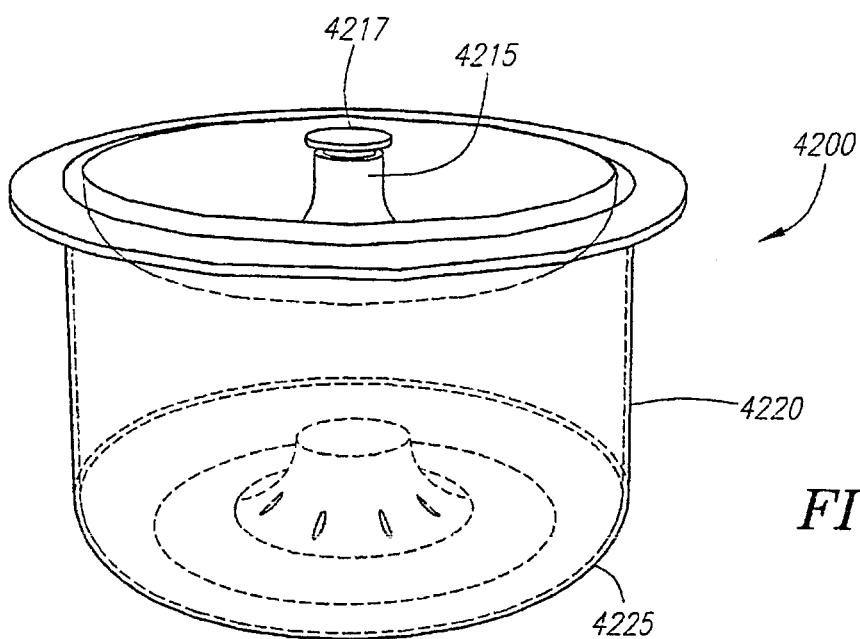


FIG. 41b



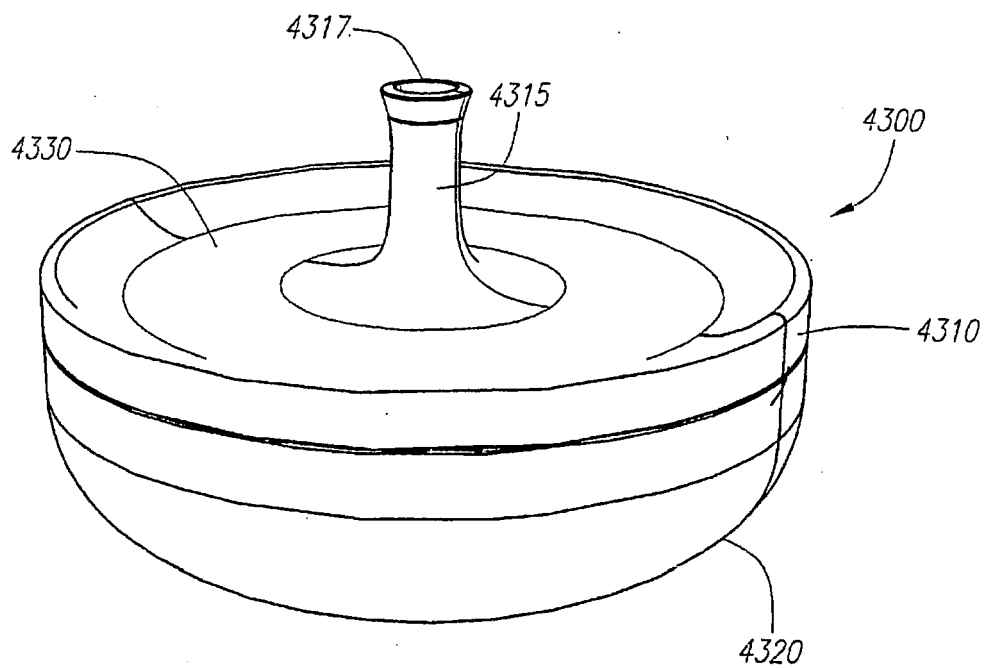


FIG. 43a

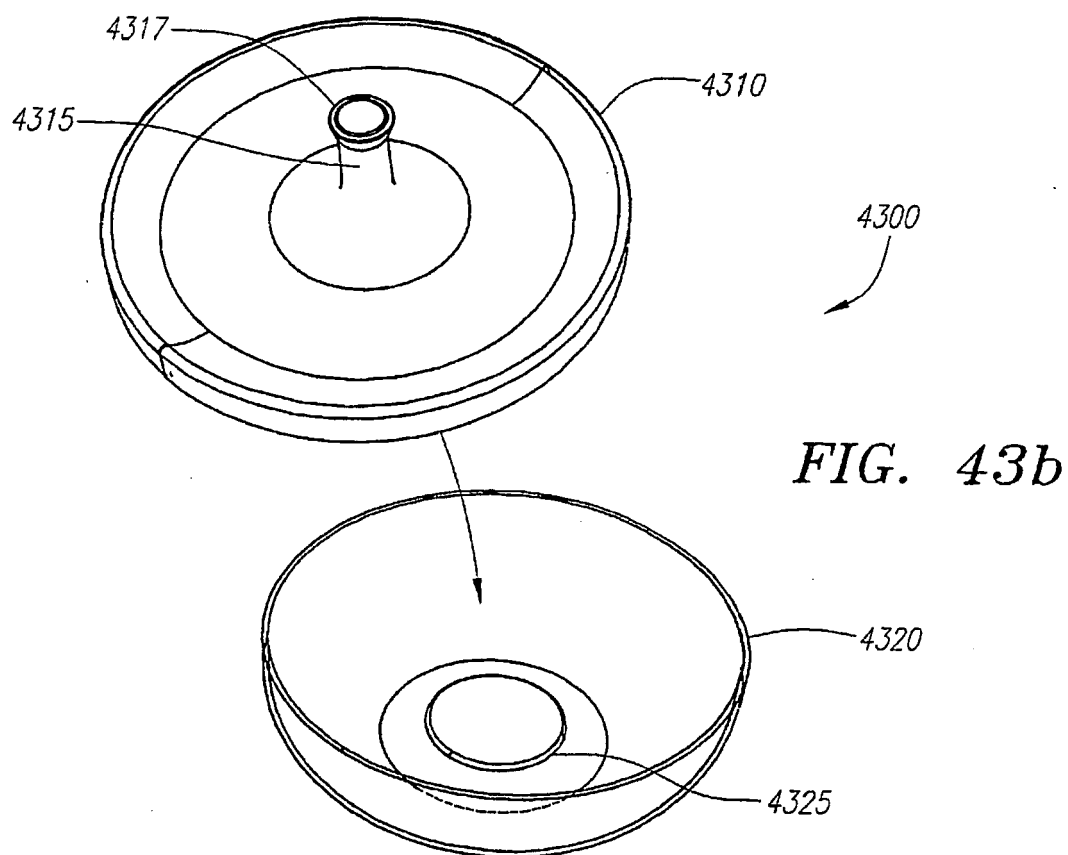


FIG. 43b

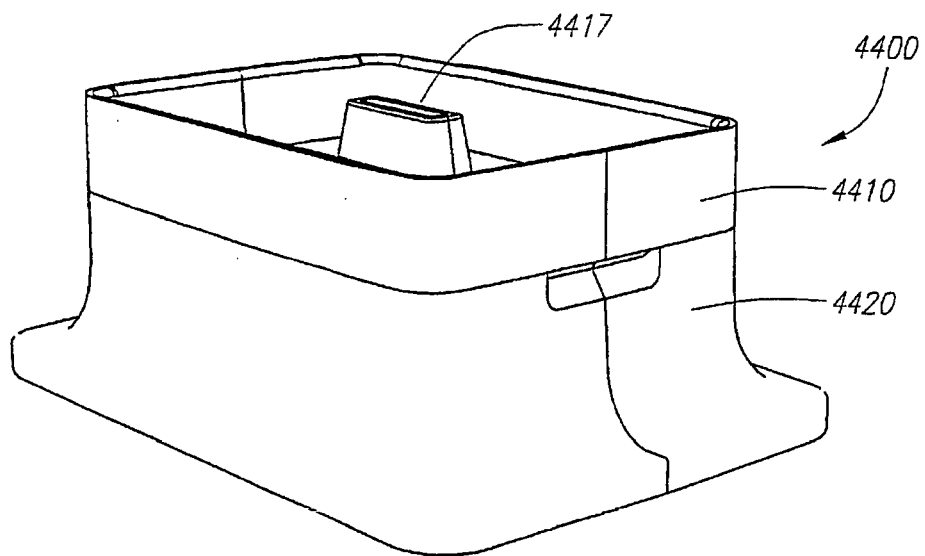


FIG. 44a

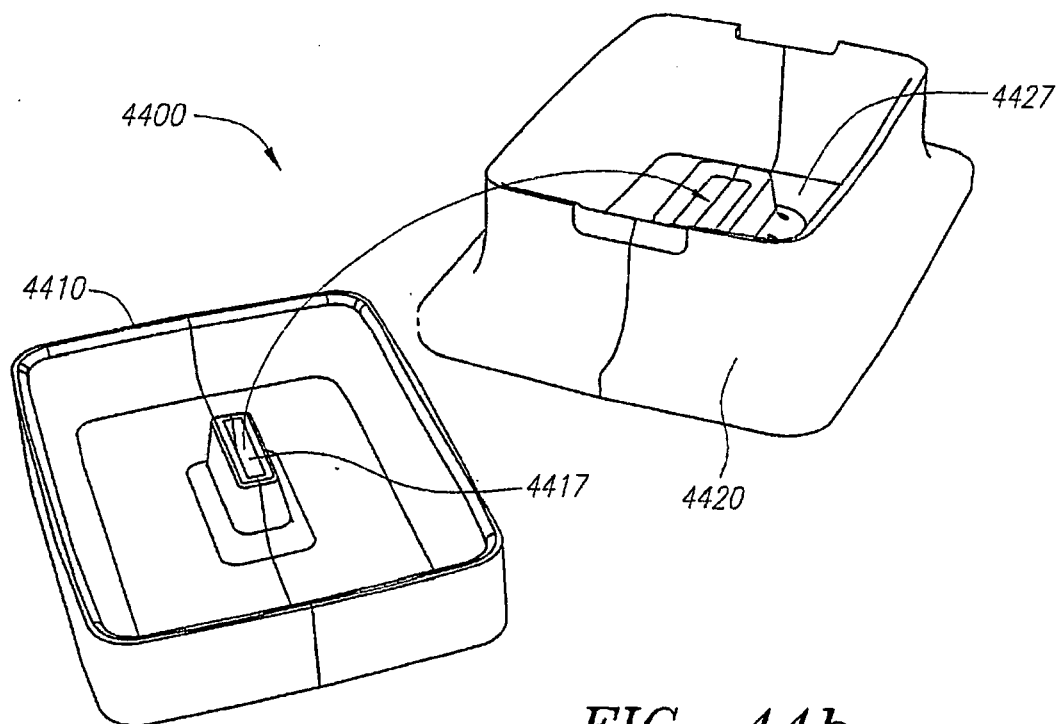


FIG. 44b

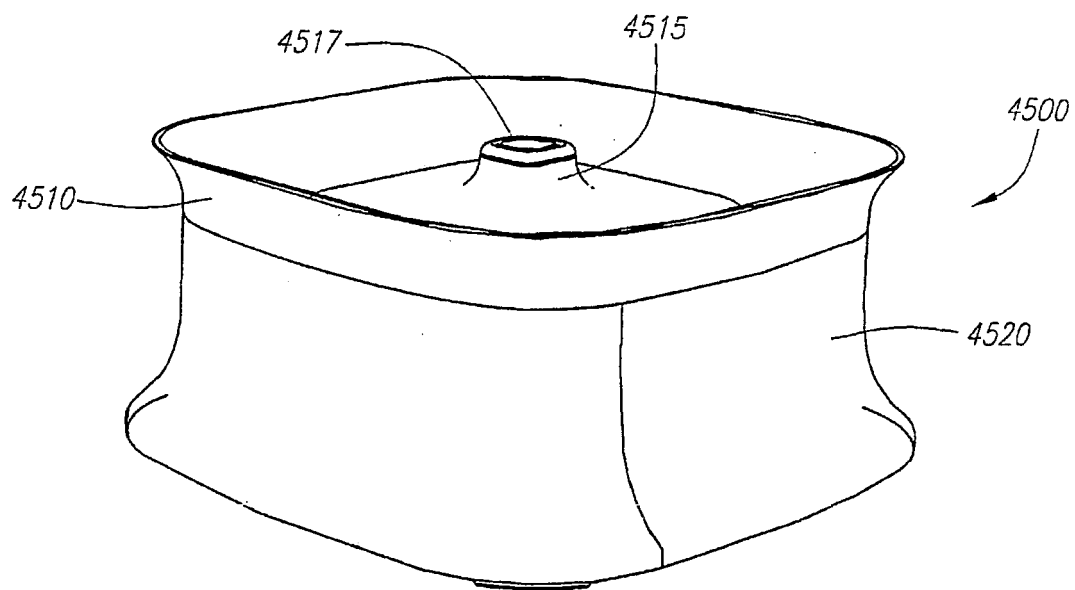


FIG. 45a

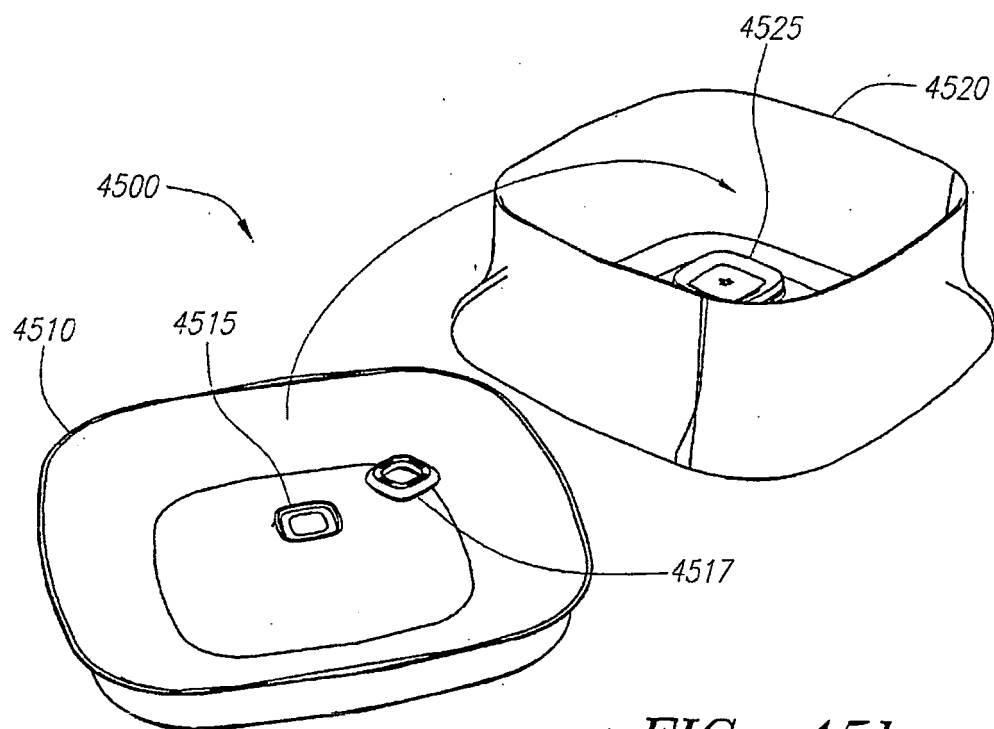


FIG. 45b

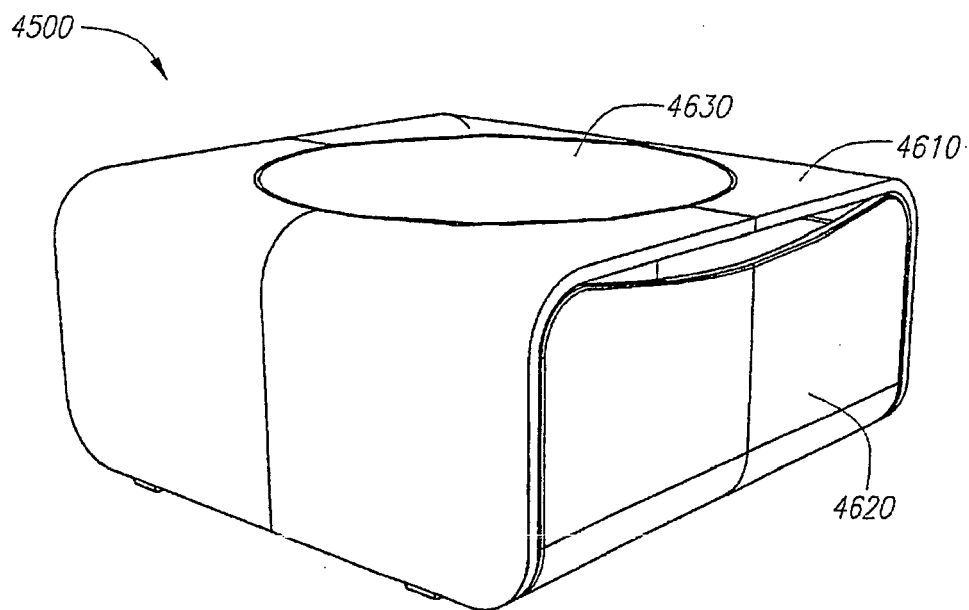


FIG. 46a

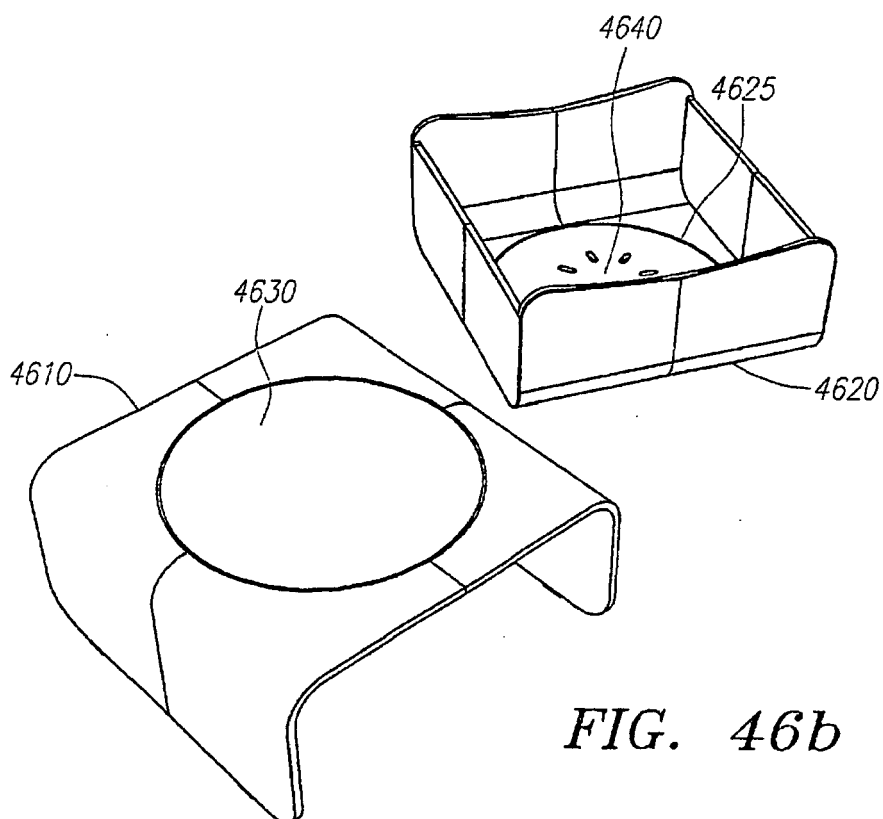


FIG. 46b

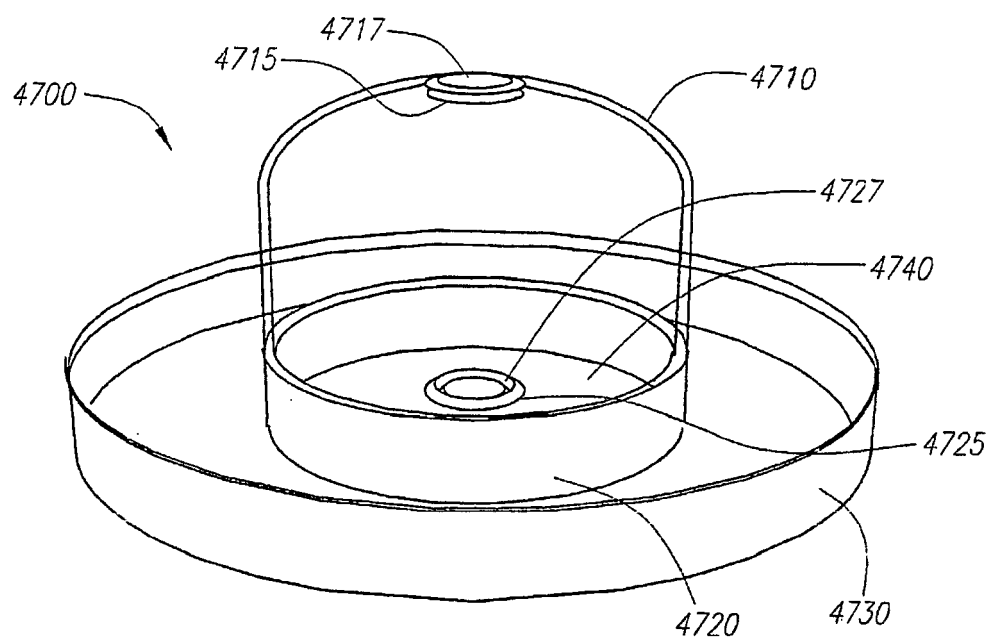


FIG. 47a

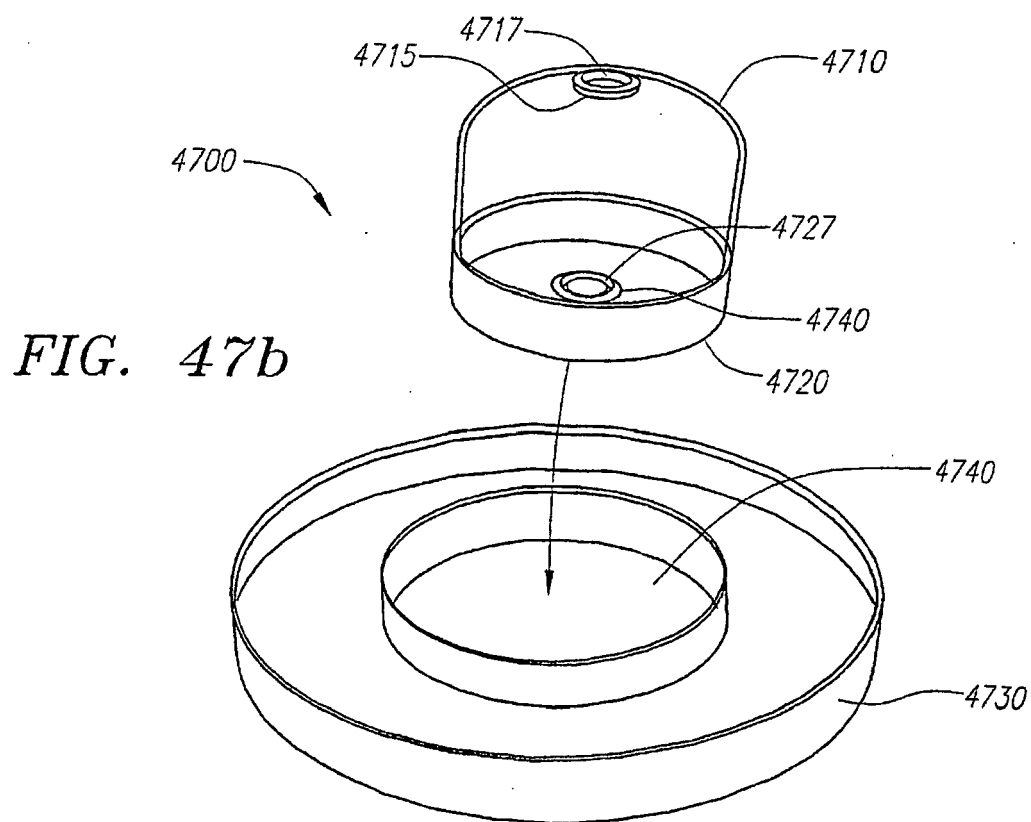


FIG. 47b

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 247945 A [0008]
- US 273652 A [0008]
- JP 1085064 A [0008]
- US 1985670 A, Sykes [0010]
- US 3069274 A, Concannon [0010]
- EP 85303471 A [0010]
- JP 1094871 A [0010]
- US 48863772 B [0010]
- EP 0282180 A2 [0010]
- JP 4210523 B [0010]
- US 5254354 A, Stewart [0010]
- US 5316178 A, Garber Jr. [0010]
- US 5661979 A, DeBoer [0010]
- US 5667827 A [0010]
- US 5711978 A, Breen [0010]
- JP 11046677 B [0010]
- US 5916614 A, Gorlich [0010]
- US 6013293 A, De Moor [0010]
- CN 1306748 A [0010]
- US 6548132 B1, Clarke [0010]
- US 6376032 B1, Clarke [0010]
- DE 2259561 [0013]
- FR 2242872 A [0014]
- WO 8014400 A [0099]
- WO 8014108 A [0099]

Non-patent literature cited in the description

- Storing Fresh Fruits and Vegetables for Better Taste. Post Harvest Research and Information Center, 10 January 2000 [0010]
- Management of Fruit Ripening. University of California Davis Post Harvest Research and Information Center, April 2003 [0010]
- *Ethylene Gas*, 13 August 2004 [0010]
- *Mrs. Green's Produce Tips*, 13 August 2004, www.dennisgreenltd.com [0010]
- *The Secrets of Fruit Ripening*, June 2002 [0010]