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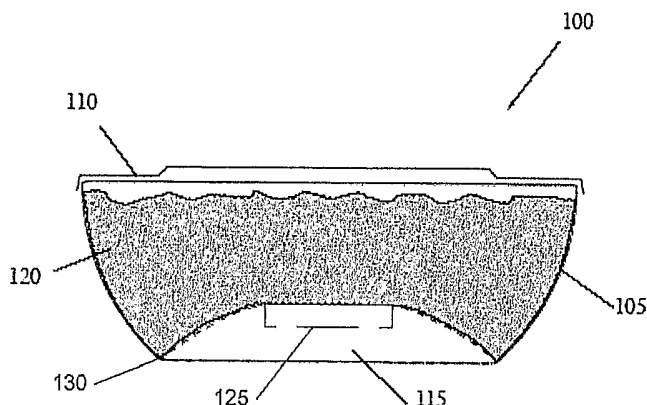
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(54) Title: MULTIMODE DISTRIBUTION CONTAINER



(57) **Abstract:** Disclosed are an apparatus, a distribution system, and methods of distribution and post-distribution processing. The apparatus includes a first surface defining a container including a first non-zero volume having an opening; a second surface defining a cover for the opening; and a volume-modifying portion coupled to at least one of the surfaces, the volume-modifying portion including a first mode and a second mode, the first mode producing the first volume and the second mode producing a second volume different from the first volume.

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CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of and incorporates by reference for all purposes, the entire disclosure of U.S. Provisional Patent Application No. 60/594,204, filed on 18 March 2005 and entitled "Expandable Food Container."

BACKGROUND OF THE INVENTION

[0002] The present invention relates generally to packaging systems and methods as well as item distribution systems and methods, and more specifically it relates to a container having two non-zero volumes and a mechanism to transition the container from one mode having one of the volumes to a second mode having the other volume.

[0003] Currently, most salads from food service establishments (primarily quick-service restaurants) are sold in plastic containers (many times they look like salad bowls) with a lid. Often times the salad and its toppings are packed to the top of the container in order to use all available container space, with the lid possibly stabilizing the entire salad contents. However, there are problems with this existing arrangement: 1) since it is difficult and time consuming to achieve a uniform dispersion of salad dressing on the entire salad within that same container, when a customer pours on the salad dressing, they have no choice but to put it on only the top of the salad, thereby getting too much on some parts and not enough on others; 2) often times customers use more salad dressing than they need because of this problem; 3) when the customer does attempt to toss the salad, they must either empty the contents into a larger bowl and use utensils to toss, or attempt tossing it in the existing container, thereby losing product and creating a mess; and 4) when the salad is not tossed, customers often time eat the salad toppings because that is what is most accessible and leave the lettuce at the bottom of the bowl. This can significantly defeat the intended texture and experience of the salad, especially when the salads were intended to be tossed (for example, a Caesar salad and the like).

[0004] Often times customers may justify paying two to three times the amount of money for a similar tossed salad, primarily due to the ease of consuming and an intended experience of consuming the pre-tossed salad is greater. Many quick service restaurants often therefore price similar but un-tossed salads lower than the pre-tossed counterparts, because of the real or imagined

compromise in their product and not giving the customer the anticipated perceived salad consuming experience and value. Further, when a salad is tossed, different people desire different amounts of salad dressing, dictated by many factors including taste, diet, and the like.

[0005] A need exists for a cost-effective container that allows a provider to efficiently prepare, prepackage and distribute an item while permitting customers to receive the item and to perform a post-distribution processing on the item in an easy, efficient and time friendly manner under conditions controlled by the consumer.

BRIEF SUMMARY OF THE INVENTION

[0006] Disclosed are an apparatus, a distribution system, and methods of distribution and post-distribution processing. The apparatus includes a first surface defining a container including a first non-zero volume having an opening; a second surface defining a cover for the opening; and a volume-modifying portion coupled to at least one of the surfaces, the volume-modifying portion including a first mode and a second mode, the first mode producing the first volume and the second mode producing a second volume different from the first volume.

[0007] The distribution system includes a plurality of containers, each container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for the opening; and a volume-modifying portion coupled to at least one of the surfaces, the volume-modifying portion including a first mode and a second mode, the first mode producing the first volume and the second mode producing a second volume greater than the first mode; and wherein the first mode defines a distribution mode having one or more items disposed in the first volume and wherein the second mode defines a processing mode for a post-distribution processing of the one or more items within the second volume and wherein the distribution mode produces a first packing density for the plurality of containers greater than a second packing density of the plurality of containers in the second mode.

[0008] A method for distributing an item includes a) dispensing the item into a container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for the opening; and a volume-modifying portion coupled to at least one of the surfaces, the volume-modifying portion including a distribution mode and a processing mode, the distribution mode producing the first volume and the processing mode producing a second volume

greater than the first mode; b) covering the opening using the second surface; and c) providing the container to a user in the distribution mode.

[0009] An item processing method includes a) receiving the item in a container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for the opening; and a volume-modifying portion coupled to at least one of the surfaces, the volume-modifying portion including a distribution mode and a processing mode, the first mode producing the first volume and the second mode producing a second volume greater than the first mode wherein the distribution mode includes the item disposed in the first volume; and thereafter b) transitioning the container to the processing mode from the distribution mode; and thereafter c) processing the item in the second volume.

[0010] A preferred embodiment includes a container, a container distribution system, a container distribution method, and post-distribution processing method of a distributed item distributed. The container of this embodiment is adapted for a salad and includes a distribution mode for delivering the salad (in a first volume) to a customer and a processing mode (having a greater volume) for adding dressing and other items and tossing them together right before consumption. The distribution system and method includes pre-filling containers in the distribution mode with basic salad contents, the containers in the distribution mode having a greater packing density than the containers in the processing mode (though other embodiments may not include this feature), and stacking them until requested. Upon request, the container is provided to the requester, who thereafter transitions the container to the processing mode for adding dressing and tossing the dressing with the salad contents. The post-distribution processing includes receiving the container in the distribution mode, transitioning the container to the processing mode, and then processing (e.g., adding dressing and tossing) the salad and dressing together.

[0011] There are advantages to both the retailer and the consumer in the preparation, storage, dispensation, receipt, setup, and consumption of the product. The preferred embodiment includes a cost-effective container that allows the retailer to efficiently prepare, prepackage and distribute its product (e.g., a salad) while permitting customers to receive the salad and to uniformly disperse the salad dressing on the salad in an easy, sanitary and time friendly manner under conditions controlled by the consumer.

[0012] Fig. 1 is a side view of a system in a distribution mode;

[0013] Fig. 2 is a side view of the system of FIG. 1 in a processing mode;

[0014] Fig. 3 is a side view of two stacks of systems, one stack with the systems in the processing mode and one stack with the systems in the distribution mode;

[0015] Fig. 4 is a side view of a second embodiment for a system in a distribution mode;

[0016] Fig. 5 is a side view of the system of Fig. 4 in a processing mode;

[0017] Fig. 6 is a side view of a third embodiment for a system in a distribution mode;

[0018] Fig. 7 is a side view of the system of Fig. 6 in a processing mode;

[0019] Fig. 8 is a flowchart for a distribution process; and

[0020] Fig. 9 is a flowchart for a post-distribution process.

DETAILED DESCRIPTION OF THE INVENTION

[0021] The following description is presented to enable one of ordinary skill in the art to make and use the invention and is provided in the context of a patent application and its requirements. Various modifications to the preferred embodiment and the generic principles and features described herein will be readily apparent to those skilled in the art. Thus, the present invention is not intended to be limited to the embodiment shown but is to be accorded the widest scope consistent with the principles and features described herein.

[0022] Fig. 1 is a side view of a system 100 in a distribution mode. System 100 includes a container 105 having a lid 110 and a volume-modifying portion 115 (e.g., a moveable wall in a bottom of container 105). System 100 receives, holds, and dispenses contents 120, for example components of a food item such as a salad and the like. A tab 125 permits a user to transition system 100 from the distribution mode to a processing mode as shown in Fig. 2 below. In this example, system 100 transitions between these two modes by changing a concavity of portion 115 along a transition point 130 on a wall of container 105.

[0023] Fig. 2 is a side view of system 100 of Fig. 1 in the processing mode. System 100 includes an expanded container 205 with a transitioned bottom 210 for holding shifted contents 215, covered by lid 110.

[0024] For purposes of ease of explanation, a preferred embodiment for system 100 is described in the context of a fast food restaurant providing pre-made and undressed salads to its customers. Of course, other embodiments, contexts, configurations, implementations and uses of the present invention are contemplated and within the scope of the present disclosure and invention. This preferred embodiment includes system 100 having container 105 formed of a plastic (i.e., capable of undergoing appropriate (in this context) deformation without rupture or relaxation) material created by allowing a portion of a bottom 115 of container 105 to be concave, thus pushed upwards into container 105. In operation, when the fast food restaurant is making its food item (e.g., the pre-made salad) it adds appropriate ingredients in container 105 as contents 120, exactly as they do currently, and cover contents 120 with removably attached lid 110 in a substantially liquid leak-proof manner. Lid 110 may be a snap-on lid, a screw-on lid, a clamp-on lid or some other type of removable and attachable lid. Lid 110 may also be pre-attached to container 105 by way of some type of hinge or other coupler. System 100 defines two volumes based upon the intended uses in the distribution mode and in the processing mode. For example, in this preferred embodiment, the distribution volume is determined to nearly exactly match a volume of the pre-made salad contents and the processing volume is determined to provide sufficient space for the post-distribution processing of contents 120. In this way, the customer receives the salad in a full container yet is able to expand the container volume further for adequate tossing and other pre-consumption processing of the salad. Some conventional systems distribute contents in a container having a volume greater than the contents volume exactly to permit some post-distribution processing. However in this context, the customer receives the material in a less-than-fully filled condition and perceived value is thereby diminished. Additionally, in some cases it is desirable to secure the contents in the “right-sized” container for distribution (e.g., to avoid damage from content shifting) while providing for post-distribution processing within the container.

[0025] When a customer receives the salad dispensed in system 100 and is ready to consume it, the customer transitions system 100 from the distribution mode to the processing mode, such as by, for example, pulling tab 125 (tab 125 may include a trigger, handle or the like based on design considerations and transition modality including that tab 125 may be located in another or

other locations) that is attached to the bottom of the concave bowl downwards towards the bottom in order to increase the volume of container 105 and convert it to expanded container 205. (When one or more optional tab 125 are included in an embodiment, tab 125 itself may be made of one or more components and tab 125 may be attached post-manufacture of container 105 or integrated into container 105 during manufacturing.) Expanded container 205 in processing mode produces a profile that is more of a bowl shape while container 105 in dispensation mode produces a profile that is more planar (advantageous for stacking multiple units of system 100). In addition, expanded container 205 preferably is designed so that after transition from container 105 to expanded container 205, container 205 includes a stable base and transitioned bottom 210 is not easily transitioned to moveable bottom 110 unless and until the customer wants to transition from the consumption mode to the dispensation mode. In the preferred embodiment it is satisfactory that the transition of system 100 from container 105 to expanded container 205 is one-way without repetitive transitions, however other embodiments may provide for two-way multiple transitions.

[0026] It is one purpose of this preferred embodiment of the present invention that system 100 provides for an expandable container to allow the salad and its toppings to settle into the new larger sized bowl with more air space. It is advantageous to distributors because they are permitted to prepare a collection of pre-made salads in advance and store them efficiently in dispensation mode because of the planar profile. Also, because of the dispensation profile the salads are attractive to prospective consumers because they are filled to the top. The customer receiving one of these containers in dispensation mode is then able to transition the system to consumption mode, remove the lid, pour on the desired amount of salad dressing, reattach the lid, and shake the entire container (or simply pour on the salad dressing as desired without shaking). The end result will be a premium freshly tossed salad, much like customers are accustomed to receiving at higher priced restaurants.

[0027] Fig. 3 is a side view of two stacks of systems, one stack 305 with the systems in the processing mode and one stack 310 with the systems in the distribution mode. As shown, four systems of stack 305 have a lesser packing density than five systems in stack 310. The systems in stack 305 and 310 include respective contents and are covered, such as for example using a lid. Additionally, systems 100 in the distribution mode are also further stackable having an even greater packing density with lids and contents removed. System 100 nests within another in a pre-distribution mode.

[0028] Fig. 4 is a side view of a second embodiment for a system 400 in a distribution mode. System 400 includes a container 405 having a lid 410 and a volume-modifying portion 415 (e.g., an accordion-pleated portion of a lateral surface of container 405). System 400 receives, holds, and dispenses contents 420, for example components of a food item such as a salad and the like or other object. A tab may or may not be provided to assist a user to transition system 400 from the distribution mode to a processing mode as shown in Fig. 5 below. In this example, system 400 transitions between these two modes by expanding/contracting portion 415.

[0029] Fig. 5 is a side view of system 400 of Fig. 4 in the processing mode. System 400 includes an expanded container 505 with an expanded volume-modifying portion 510 for holding shifted contents 515, covered by lid 410.

[0030] Fig. 6 is a side view of a third embodiment for a system 600 in a distribution mode. System 600 includes a container 605 having a lid 610 and a volume-modifying portion 615 (e.g., a telescoping portion of a lateral surface of container 605). System 600 receives, holds, and dispenses contents 620, for example components of a food item such as a salad and the like or other object. A tab may or may not be provided to assist a user to transition system 600 from the distribution mode to a processing mode as shown in Fig. 7 below. In this example, system 600 transitions between these two modes by expanding/contracting portion 615.

[0031] Fig. 7 is a side view of system 600 of Fig. 6 in the processing mode. System 600 includes an expanded container 705 with an expanded volume-modifying portion 710 for holding shifted contents 715, covered by lid 610.

[0032] Fig. 8 is a flowchart for a distribution process 800. Process 800 includes a sequence of three blocks: block 805, block 810, and block 815. Block 805 dispenses an item included inside a multimode container, such as described herein, having a distribution mode, a second mode (e.g., a second mode as described herein), and mode-changing system to transition from one mode to another. Then, block 810 closes the container, such as for example by covering an opening of the multimode container with a lid. Thereafter, block 815 distributes the closed multi-mode container including the desired contents (such as for example to a customer purchasing a pre-made salad or the like).

[0033] Fig. 9 is a flowchart for a post-distribution process 900. Process 900 includes a sequence of three blocks: block 905, block 910, and block 915. Block 905 receives an item in a

multimode container with the container initially in a mode having one of two volumes (the lesser volume which may also be the distribution mode described herein). Block 910 transitions the container to a second of the two volumes (e.g., the greater volume which may also be the processing mode described herein). Block 915 then processes the item in the second volume. For example, block 915 could include opening the expanded container to reveal a pre-made salad, applying a salad dressing, and any other ingredients such as for example salad toppings including croutons and the like, to the salad inside the container, closing the lid/opening, and tossing the salad and dressing together. Of course, other embodiments, applications, uses, and implementations are possible for process 900.

[0034] The described systems feature, for sake of illustration, various bowl configurations for the container. It is important that the present invention not be so limited as many alternative shapes, arrangements and configurations for the components of the systems are within the scope of the present invention. Also, the various described embodiments of the present invention were often described in the context of delivering a pre-made salad to a customer for post-distribution dressing and consumption. The present invention contemplates additional uses and configurations, both for the nature and type of container contents as well as for post-distribution processing specifics.

[0035] In other embodiments, the bottom of the expanded container preferably would also include a small flat space in order to stabilize the container while eating or storing. In other embodiments, the area in the bottom of the container in either mode (most preferably in the dispensation mode) would match with a similar sized concave or convex area in the lid in order to enable stacking of multiple salads by customers or food service establishments.

[0036] Another advantage of the preferred embodiment of the present invention is the total space consumed by the product for foodservice use. The expandable container in the dispensation mode has less wasted space for packaging and storage.

[0037] Another advantage of the preferred embodiment of the present invention is the potential for less clean up by both customers and food service operators that will be necessary since customers won't have to fling salad and its toppings all over the table and floor while attempting to find salad toppings or get dressing on the entire salad. The invention further creates a more sanitary atmosphere for both the customer and food service operator.

[0038] Another advantage of the preferred embodiment of the present invention is the potential for cost savings for food service establishments. The concave container allows the food service operators to include less salad dressing (and possibly lettuce and toppings) than currently is given to customers. Currently, often times excess salad dressing is given to customers because it is generally known that customers may run out of salad dressing since they are forced to continually pour or squeeze on more salad dressing throughout the consumption process. A fresh tossed salad enables even distribution throughout the salad with considerably less salad dressing. In addition, less salad dressing may equate to a healthier meal, which is a primary goal of many individuals.

[0039] Additionally, the size of the container should not be limited to individual sized containers. Salads or other food items or meal components for large groups, often times in a catering setting, have similar problems as those discussed above and would benefit from embodiments of this invention as well.

[0040] It is a goal in some embodiments (such as in the fast-food context) to provide the functional features of the present invention as inexpensively as possible. To this end, it is desirable in these embodiments to create a system design that may be manufactured relatively inexpensively – such as limited steps of vacuum or injection molding, or other forming processes including stamping and the like.

[0041] Additionally, many embodiments are described as including a “plastic” component or element or material. Plastic in this sense is a functional definition appropriate to the construction and intended use as noted above and is not intended to be limited to any particular material composition. Thus plastic may include many different materials, like deformable materials including polyvinylchloride (PVCs and the like), polyethylene (and the like), polystyrene (and the like), aluminum and the like. Not all embodiments require a plastic material component, and not all implementations of useful embodiments including a plastic material component require the plastic material component in all implementations. For example, the “accordion” and the “telescoping” embodiments may in some cases include rigid non-plastic material components for the volume-modifying portions.

[0042] Further, in some embodiments (such as for example implementations having a sealed opening for enhancing freshness or other content attribute) it may be necessary or desirable to provide for one or more vents or other venting structure to not interfere with (or to promote)

transition of a particular system from a distribution mode to a second mode having a greater volume.

The vents or venting structures may include integrated valves or valve-like structures that permit air-influx (or air-outflux for transitions from a greater volume to a lesser volume for example) when transitioning the system. In some cases, a sticker, label or other component may be placed over the vent/valve to further enhance the desired content attribute. A user may remove or modify the sticker, label or other component prior to transitioning the system. In some cases, deploying or operating the tab may actuate the venting structure.

[0043] Additionally, in many of the described embodiments, it was a feature (sometimes expressly set forth and in some cases implicitly described) to provide a multimode system that expanded from a distribution mode to a post-distribution processing/consumption mode. The present invention is not limited to this configuration and contemplates that other embodiments and implementations will include contractions or other volume-modification from one mode to another. The present invention is not constrained to be just two modes, but three or more modes are also possible with varying volumetric and other modal transitions.

[0044] In the description herein, numerous specific details are provided, such as examples of components and/or methods, to provide a thorough understanding of embodiments of the present invention. One skilled in the relevant art will recognize, however, that an embodiment of the invention can be practiced without one or more of the specific details, or with other apparatus, systems, assemblies, methods, components, materials, parts, and/or the like. In other instances, well-known structures, materials, or operations are not specifically shown or described in detail to avoid obscuring aspects of embodiments of the present invention.

[0045] Reference throughout this specification to “one embodiment”, “an embodiment”, or “a specific embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention and not necessarily in all embodiments. Thus, respective appearances of the phrases “in one embodiment”, “in an embodiment”, or “in a specific embodiment” in various places throughout this specification are not necessarily referring to the same embodiment. Furthermore, the particular features, structures, or characteristics of any specific embodiment of the present invention may be combined in any suitable manner with one or more other embodiments. It is to be understood that other variations and modifications of the embodiments of the present invention described and

illustrated herein are possible in light of the teachings herein and are to be considered as part of the spirit and scope of the present invention.

[0046] As used in the description herein and throughout the claims that follow, “a”, “an”, and “the” includes plural references unless the context clearly dictates otherwise. Also, as used in the description herein and throughout the claims that follow, the meaning of “in” includes “in” and “on” unless the context clearly dictates otherwise.

[0047] The foregoing description of illustrated embodiments of the present invention, including what is described in the Abstract, is not intended to be exhaustive or to limit the invention to the precise forms disclosed herein. While specific embodiments of, and examples for, the invention are described herein for illustrative purposes only, various equivalent modifications are possible within the spirit and scope of the present invention, as those skilled in the relevant art will recognize and appreciate. As indicated, these modifications may be made to the present invention in light of the foregoing description of illustrated embodiments of the present invention and are to be included within the spirit and scope of the present invention.

[0048] Thus, while the present invention has been described herein with reference to particular embodiments thereof, a latitude of modification, various changes and substitutions are intended in the foregoing disclosures, and it will be appreciated that in some instances some features of embodiments of the invention will be employed without a corresponding use of other features without departing from the scope and spirit of the invention as set forth. Therefore, many modifications may be made to adapt a particular situation or material to the essential scope and spirit of the present invention. It is intended that the invention not be limited to the particular terms used in following claims and/or to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include any and all embodiments and equivalents falling within the scope of the appended claims. Thus, the scope of the invention is to be determined solely by the appended claims.

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. An apparatus, comprising:
 - a first surface defining a container including a first non-zero volume having an opening;
 - a second surface defining a cover for said opening; and
 - a volume-modifying portion coupled to at least one of said surfaces, said volume-modifying portion including a first mode and a second mode, said first mode producing said first volume and said second mode producing a second volume different from said first volume.
2. The apparatus of claim 1 wherein said second volume is larger than said first volume.
3. The apparatus of claim 1 wherein said first volume includes a corresponding first shape and said second volume has a corresponding second shape.
4. The apparatus of claim 3 wherein said second volume is larger than said first volume and wherein said volume-modifying portion is disposed in said first surface.
5. The apparatus of claim 4 wherein a plurality of said containers in said first mode have an increased packing density as compared to said plurality of said containers in said second mode.
6. The apparatus of claim 1 wherein said second surface forms a sanitary seal with said first surface.
7. The apparatus of claim 1 wherein said second surface forms a vacuum seal to said first surface.
8. The apparatus of claim 1 wherein human consumable quality food is stored in said first volume.
9. The apparatus of claim 8 wherein said second surface forms a sanitary seal with said first surface.

10. The apparatus of claim 8 wherein said second surface forms a vacuum seal to said first surface.
11. The apparatus of claim 1 wherein said volume-modifying portion includes a plastic material.
12. The apparatus of claim 11 wherein said plastic material is a deformable, non-rupturable, shape-retaining material.
13. The apparatus of claim 1 wherein a transition of said volume-modifying portion from said first mode to said second mode produces an indication.
14. The apparatus of claim 13 wherein said indication is an audible sound.
15. A distribution system, comprising:
a plurality of containers, each said container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for said opening; and a volume-modifying portion coupled to at least one of said surfaces, said volume-modifying portion including a first mode and a second mode, said first mode producing said first volume and said second mode producing a second volume greater than said first mode; and
wherein said first mode defines a distribution mode having one or more items disposed in said first volume and wherein said second mode defines a processing mode for a post-distribution processing of said one or more items within said second volume and wherein said distribution mode produces a first packing density for said plurality of containers greater than a second packing density of said plurality of containers in said second mode.
16. A method for distributing an item; the method comprising:
a) dispensing the item into a container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for said opening; and a volume-modifying portion coupled to at least one of said surfaces, said volume-modifying portion including a distribution mode and a processing mode, said distribution mode producing said first volume and said processing mode producing a second volume greater than said first mode;

- b) covering said opening using said second surface; and
- c) distributing the container in said distribution mode.

17. An item processing method, the method comprising:

- a) receiving the item in a container including a first surface defining a first non-zero volume having an opening, a second surface defining a cover for said opening; and a volume-modifying portion coupled to at least one of said surfaces, said volume-modifying portion including a distribution mode and a processing mode, said first mode producing said first volume and said second mode producing a second volume greater than said first mode wherein said distribution mode includes the item disposed in said first volume; and thereafter
- b) transitioning said container to said processing mode from said distribution mode; and thereafter
- c) processing the item in said second volume.

18. The item processing method of claim 17 wherein said item processing c) includes:

- c1) adding a second item into said second volume; and
- c2) tossing said first item and said second item together.

19. The item processing method of claim 18 wherein said first item includes a salad and said second item includes a salad dressing wherein said tossing c2) dresses said salad with said salad dressing.

20. An item processing method, the method comprising:

- a) receiving the item in a container including a surface defining a first non-zero volume having an opening and a volume-modifying portion coupled to said surface, said volume-modifying portion including a distribution mode and a processing mode, said first mode producing said first volume and said second mode producing a second volume greater than said first mode wherein said distribution mode includes the item disposed in said first volume; and thereafter
- b) transitioning said container to said processing mode from said distribution mode; and thereafter
- c) processing the item in said second volume.

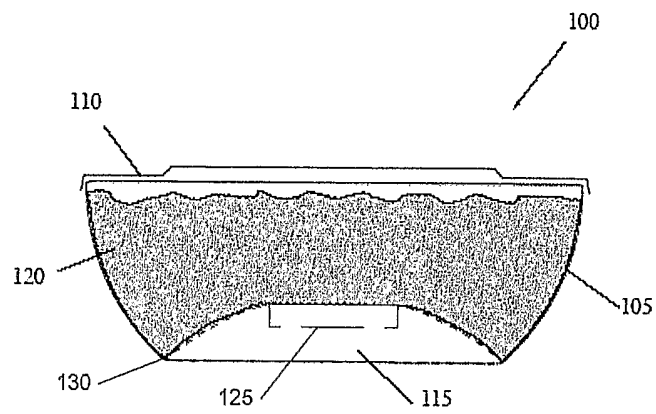


Fig. 1

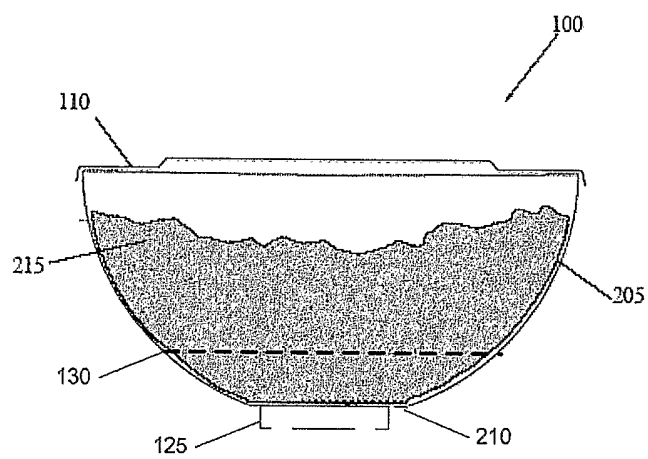


Fig. 2

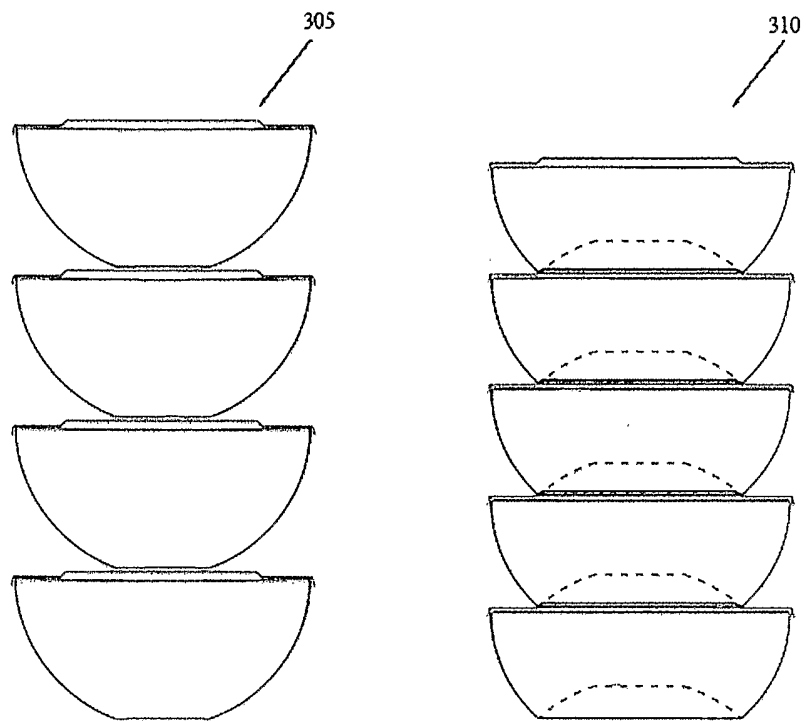


Fig. 3

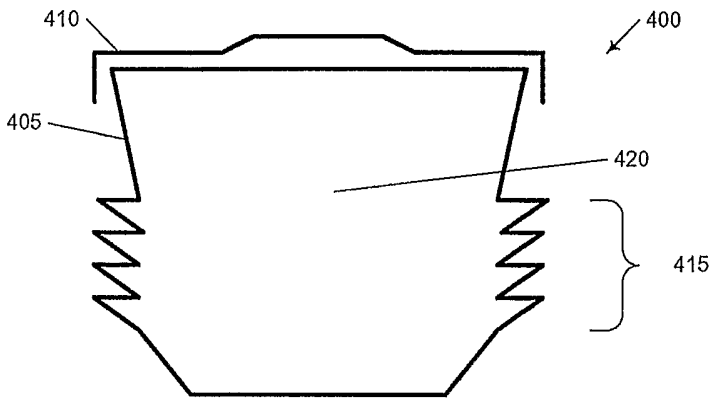


Fig. 4

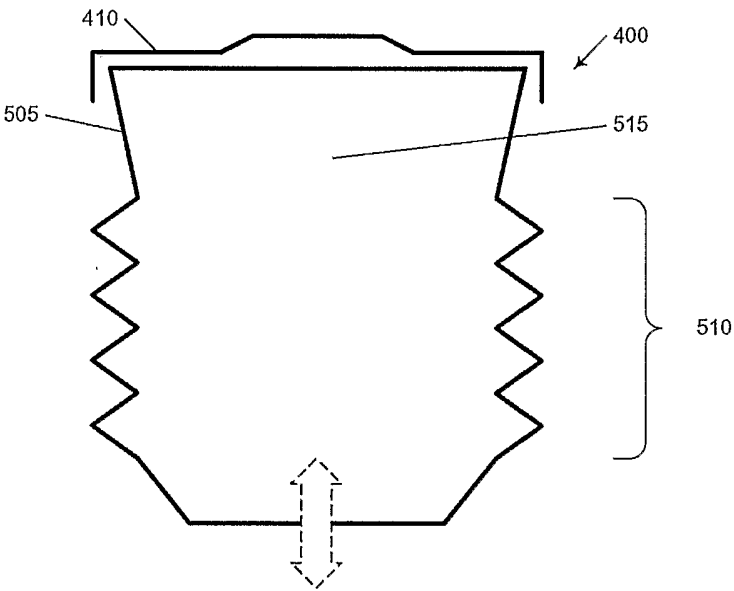


Fig. 5

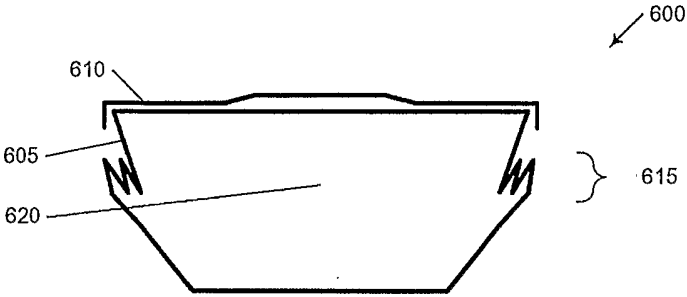


Fig. 6

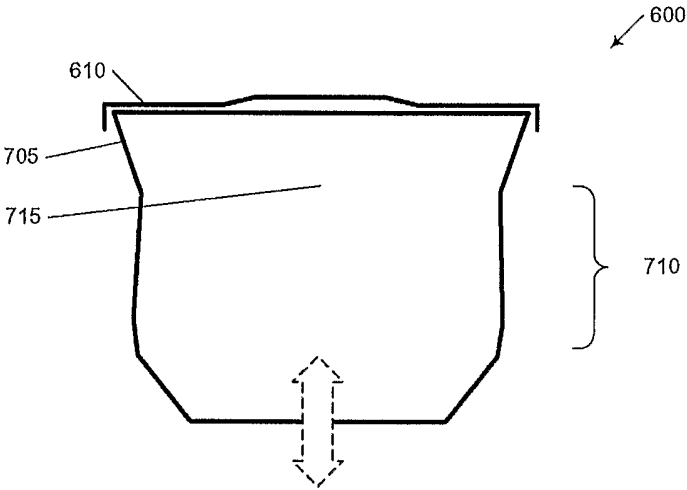


Fig. 7

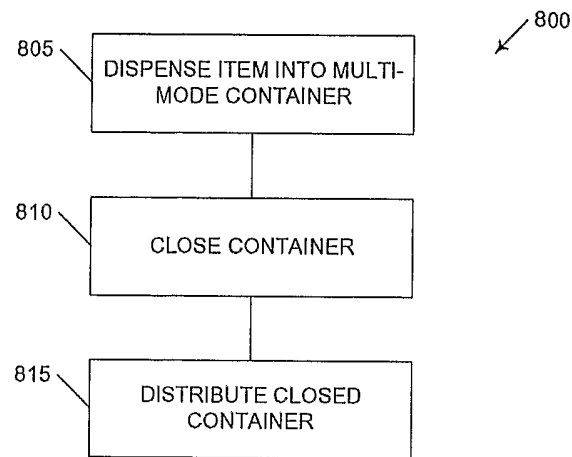


Fig. 8

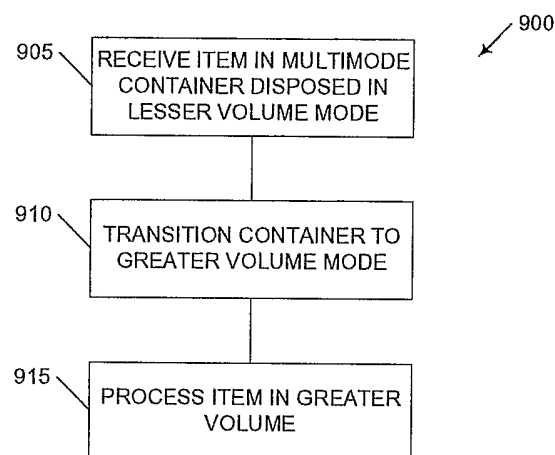


Fig. 9