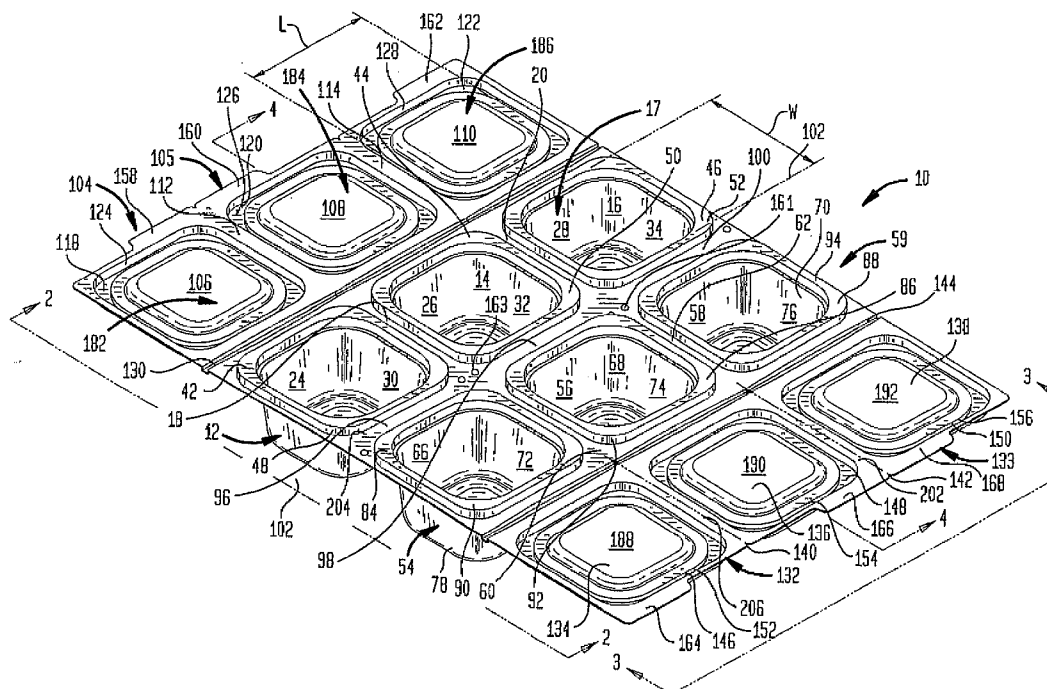




US 20070246469A1

(19) **United States**(12) **Patent Application Publication**
Whitmore et al.(10) **Pub. No.: US 2007/0246469 A1**(43) **Pub. Date: Oct. 25, 2007**(54) **SEPARABLE CONTAINERS ARRANGED IN
ARRAYS WITH INTEGRALLY FORMED
LIDS**(60) Provisional application No. 60/389,533, filed on Jun.
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(US); **Gerald J. Van Handel**, Neenah,
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(52) **U.S. Cl.** **220/507**Correspondence Address:
PATENT GROUP GA030-43
GEORGIA-PACIFIC LLC
133 PEACHTREE STREET, N.E.
ATLANTA, GA 30303-1847 (US)(57) **ABSTRACT**

An integrally formed ensemble of interconnected, separable containers and associated lids is adapted for use as disposable containers for condiments, sauces, and the like. The interconnected assembly typically includes a first plurality of containers arranged in a first linear array and a second plurality of containers arranged in a second linear array wherein the first linear array and the second linear array are secured to each other by way of a plurality of tear portions. First and second pluralities of lids are hinged to the containers and outwardly disposed with respect thereto such that the lids and containers are balanced during a fill operation.

(73) Assignee: **Dixie Consumer Products LLC**(21) Appl. No.: **11/751,103**(22) Filed: **May 21, 2007****Related U.S. Application Data**(63) Continuation of application No. 10/456,207, filed on
Jun. 6, 2003, now abandoned.

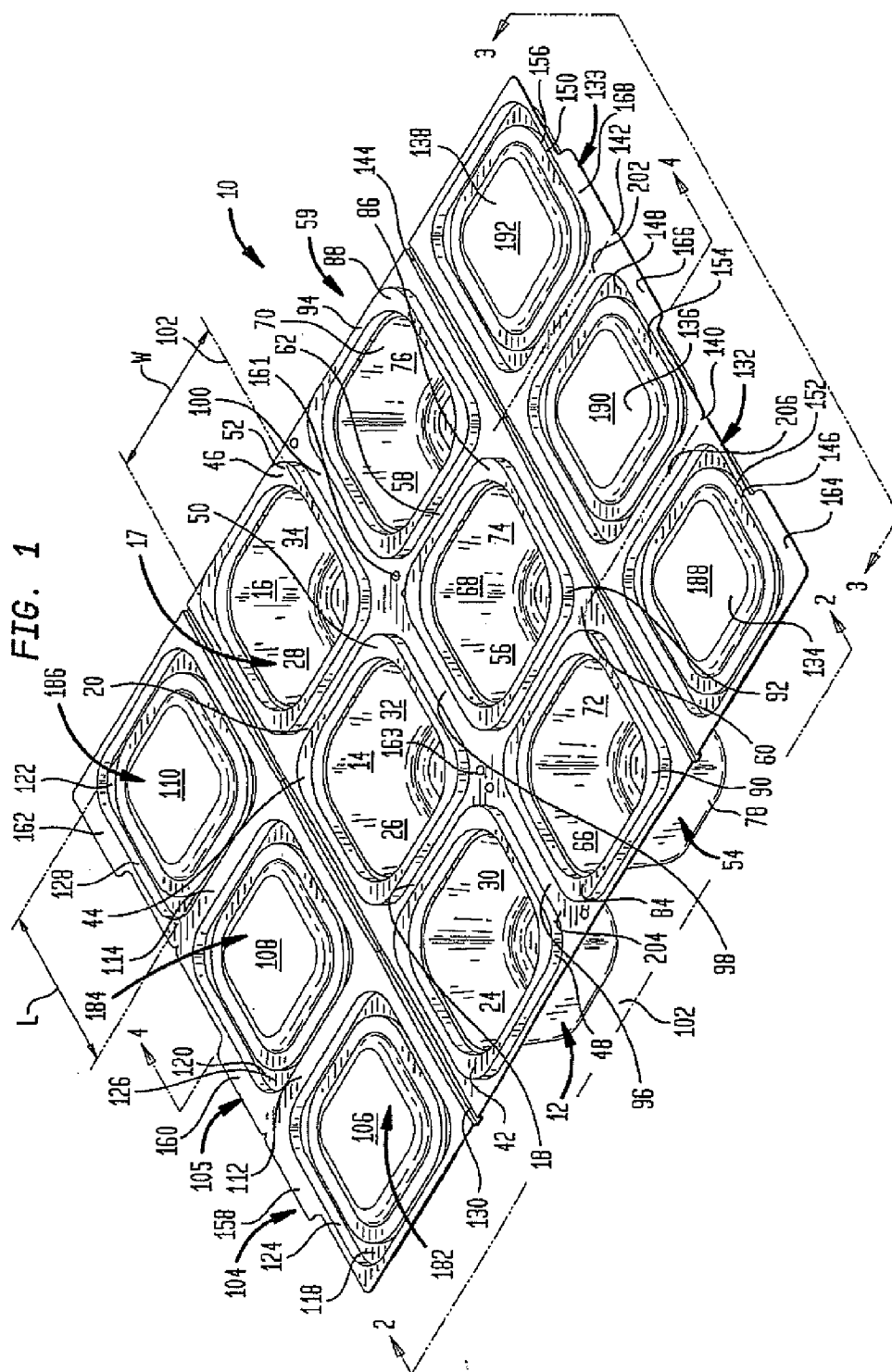


FIG. 2

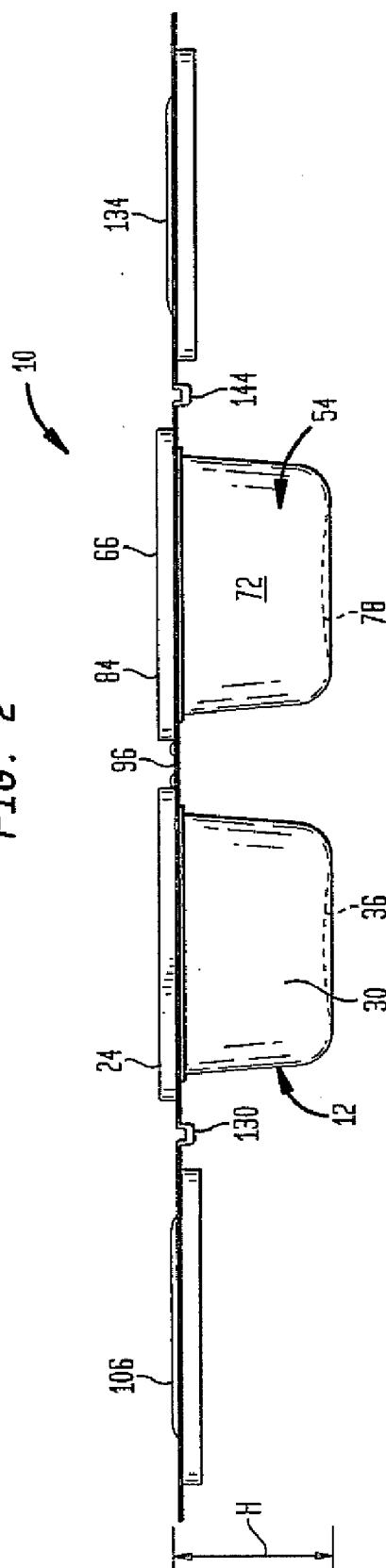


FIG. 3

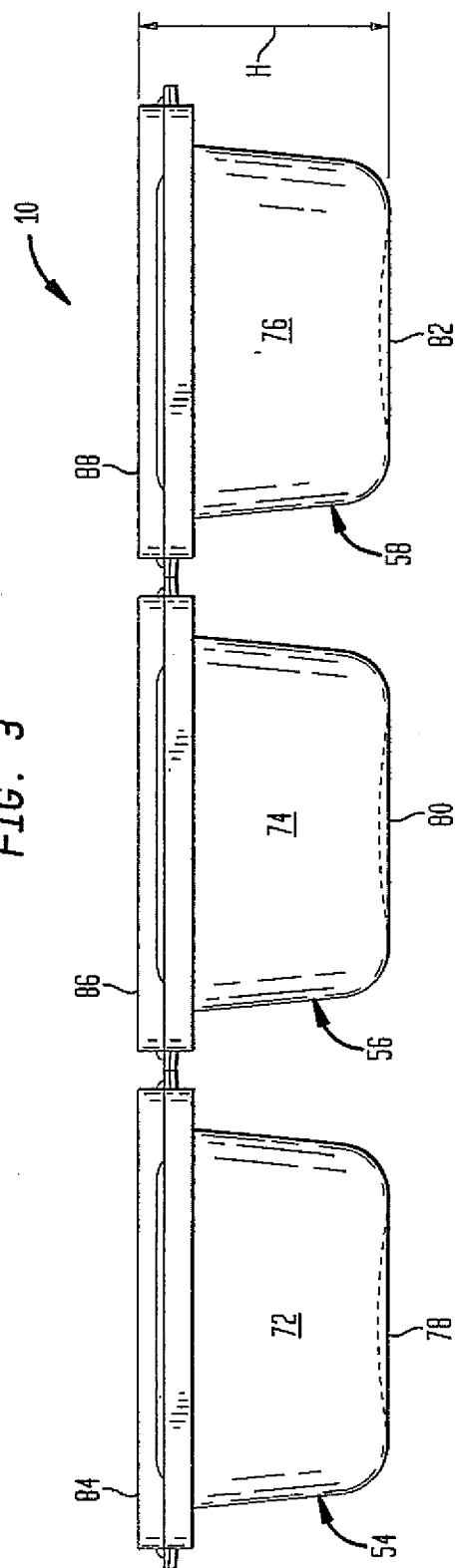


FIG. 5

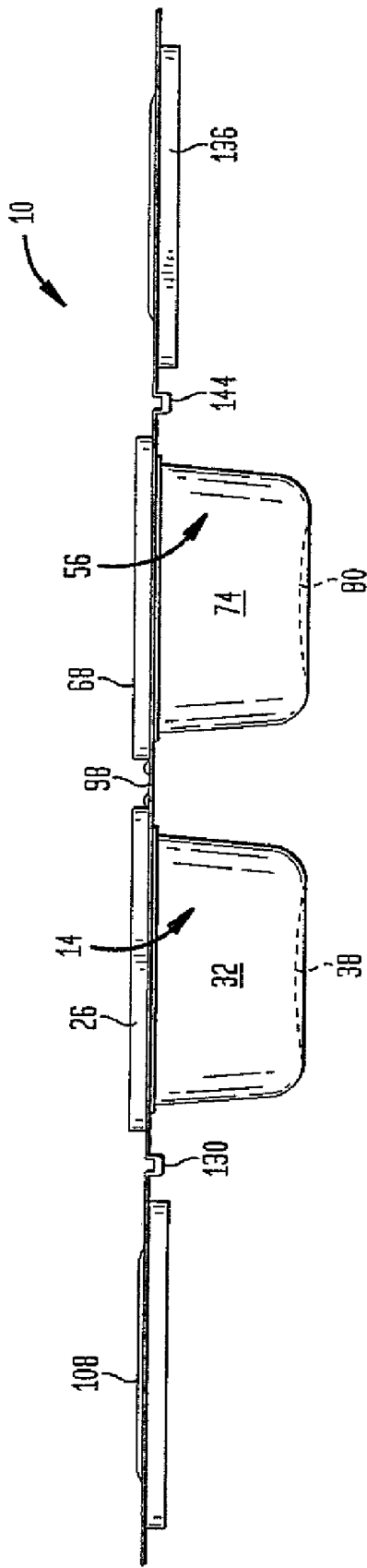


FIG. 6

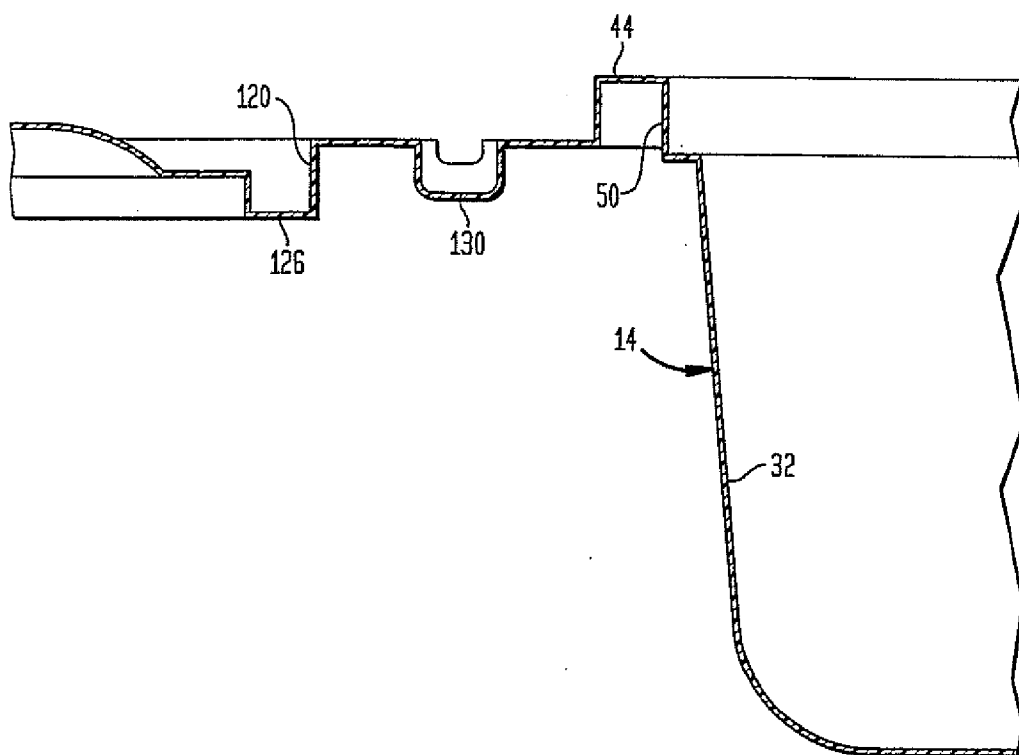


FIG. 7

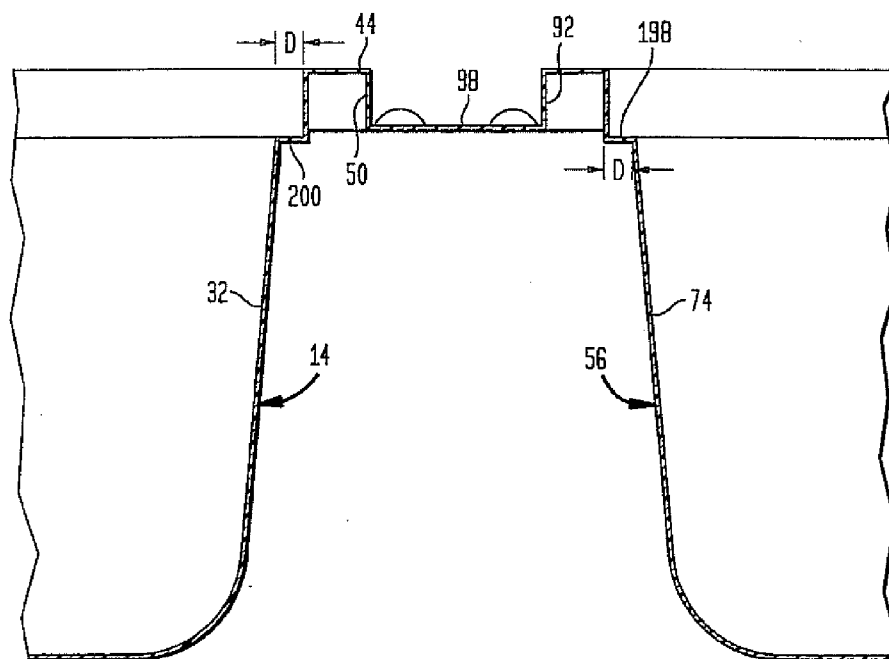


FIG. 8

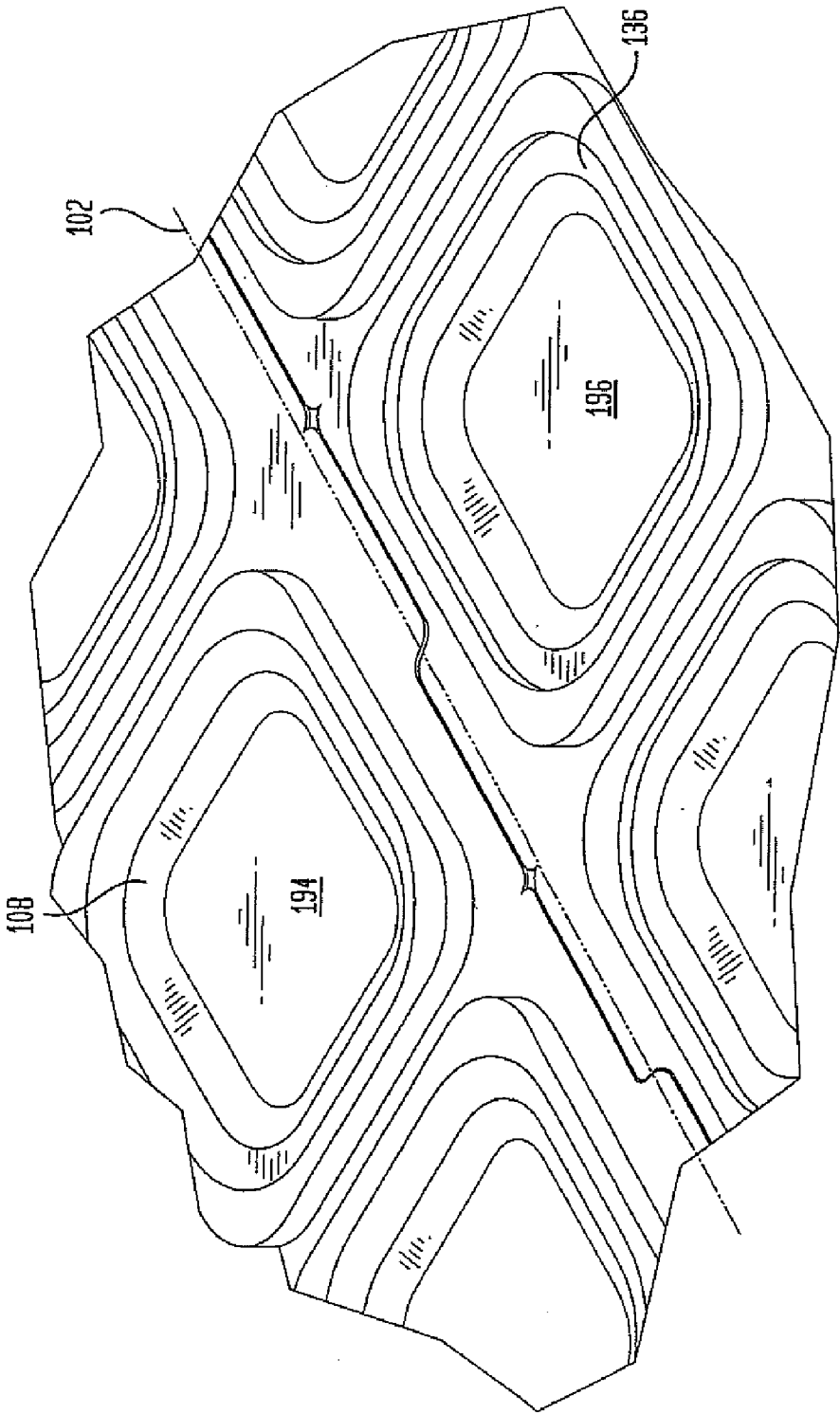


FIG. 9

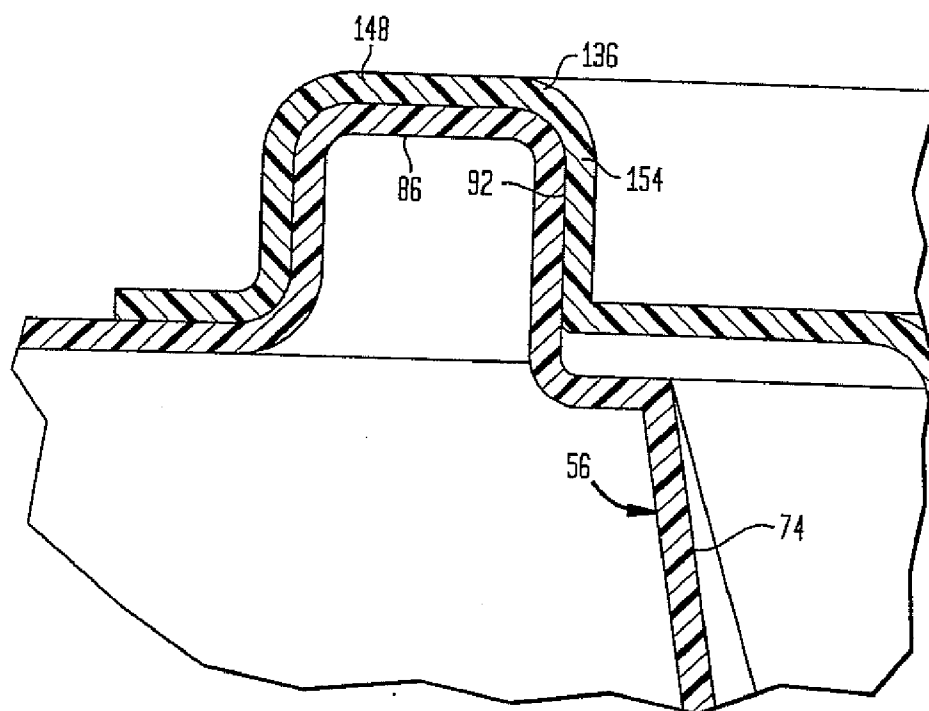
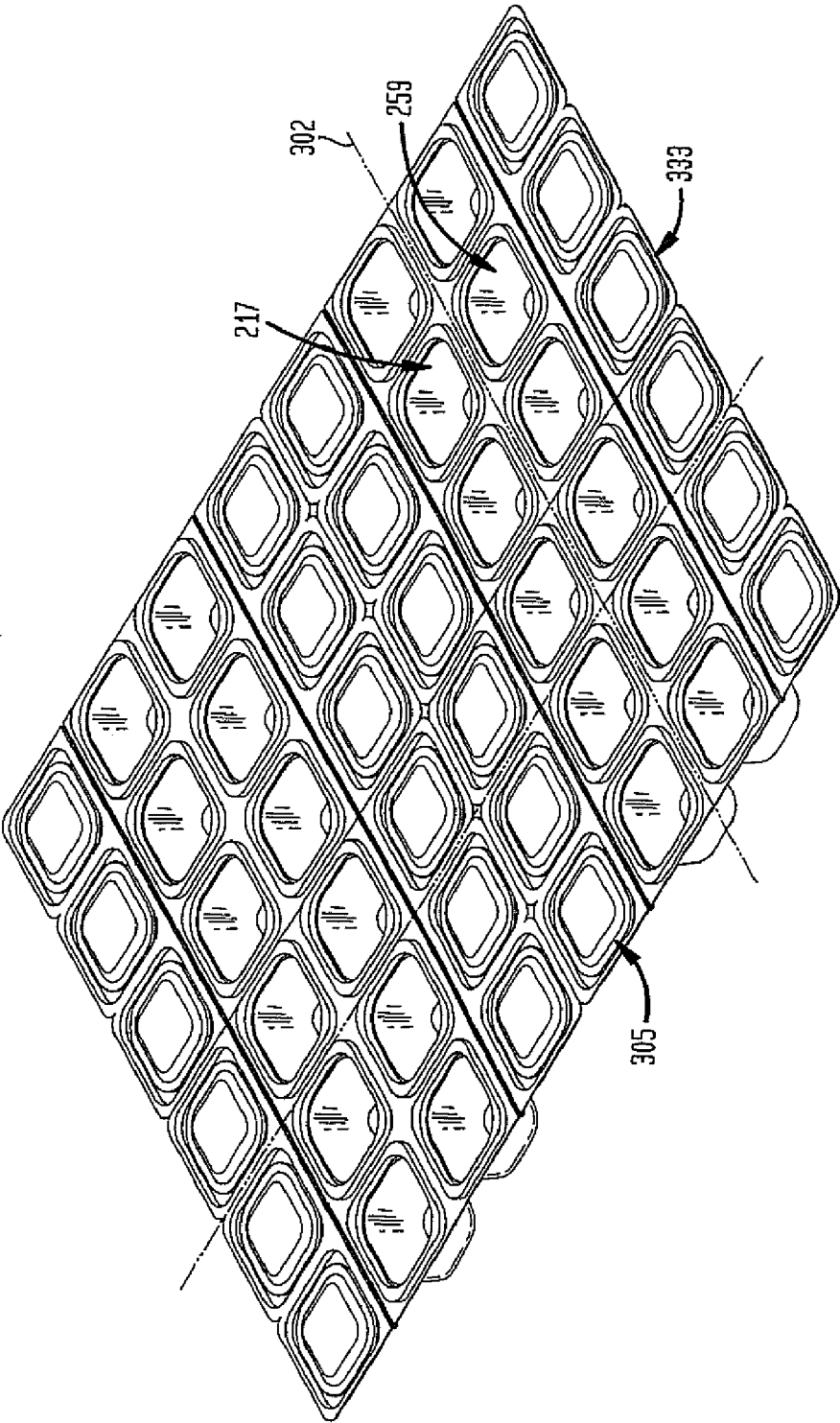


FIG. 10



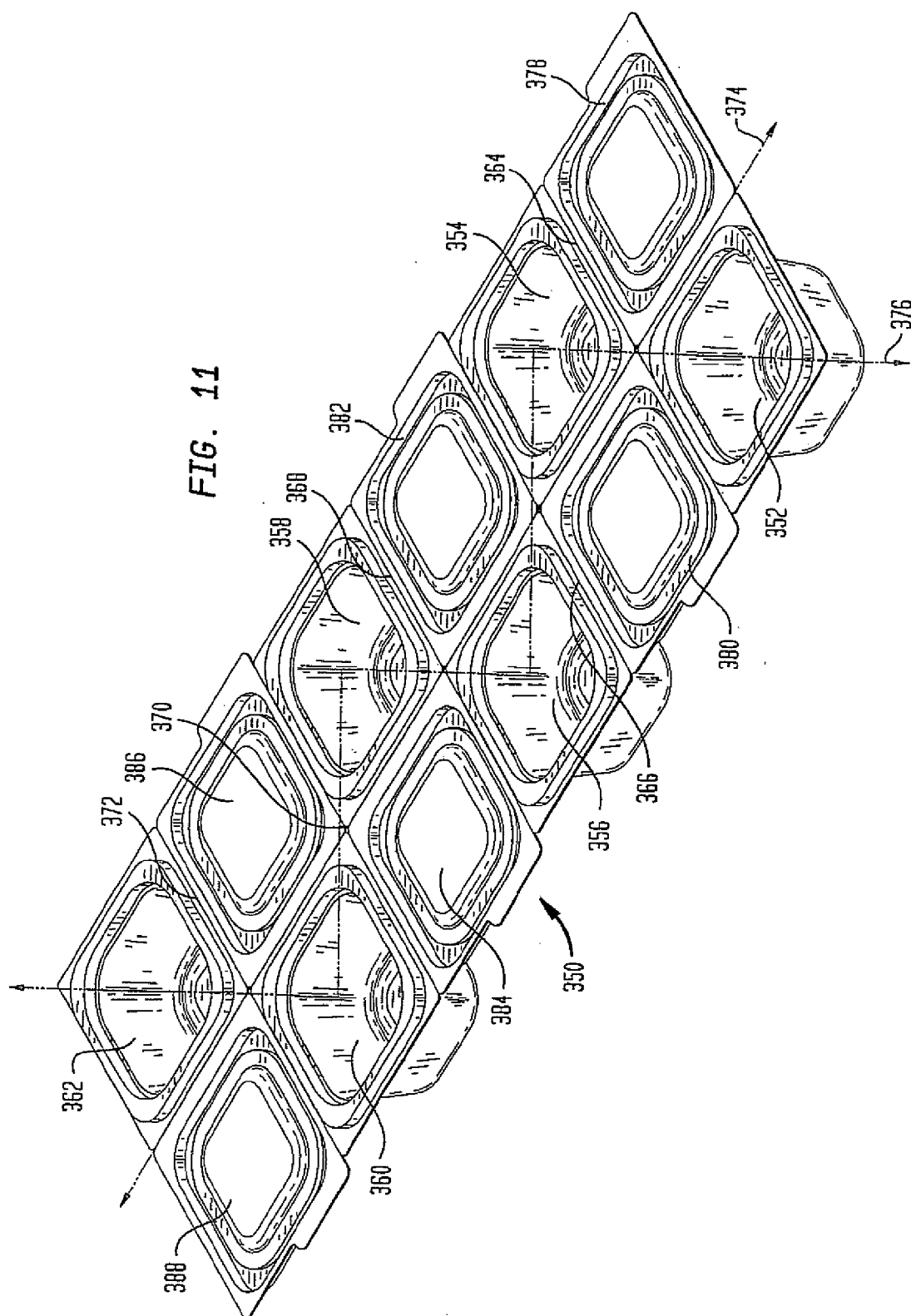


FIG. 12

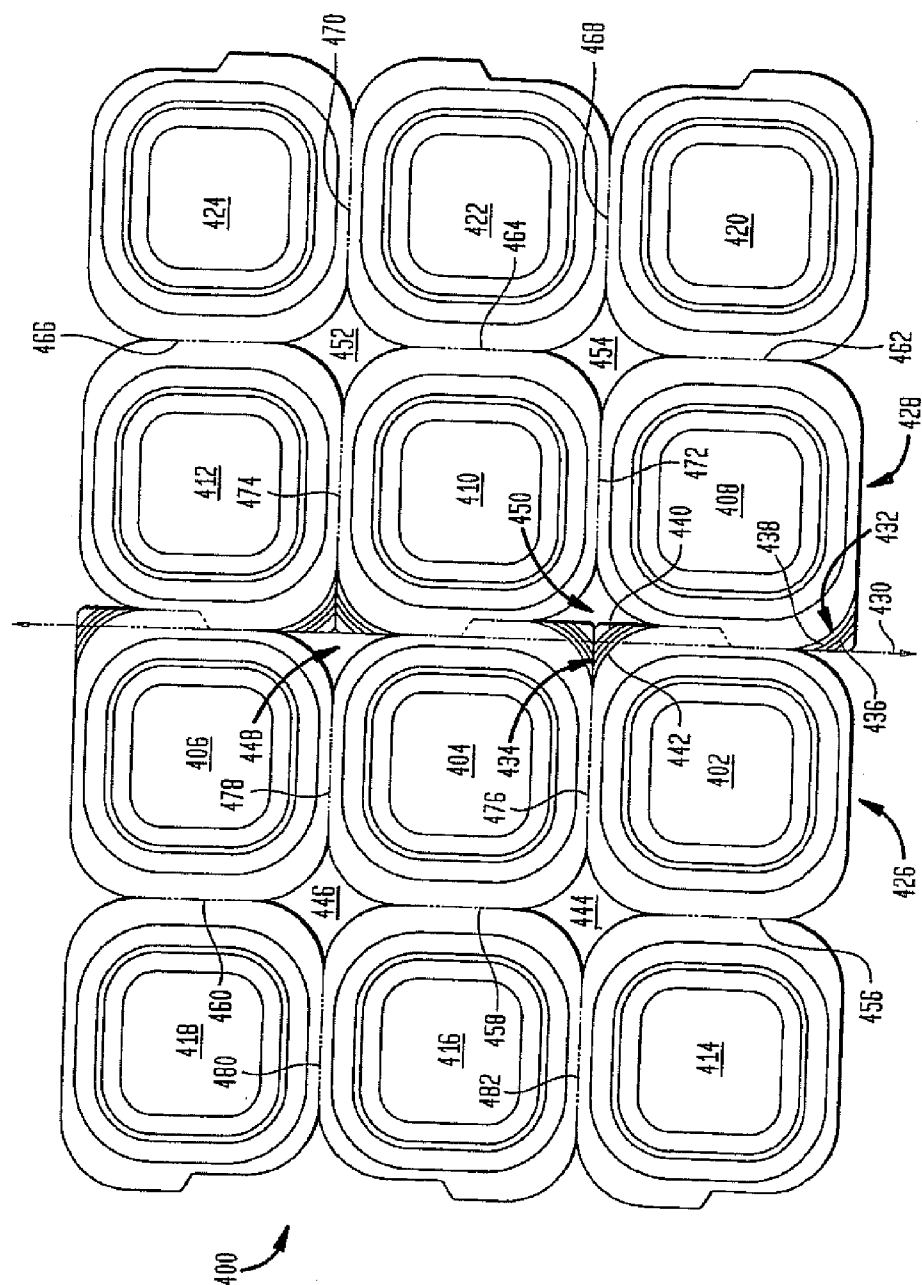
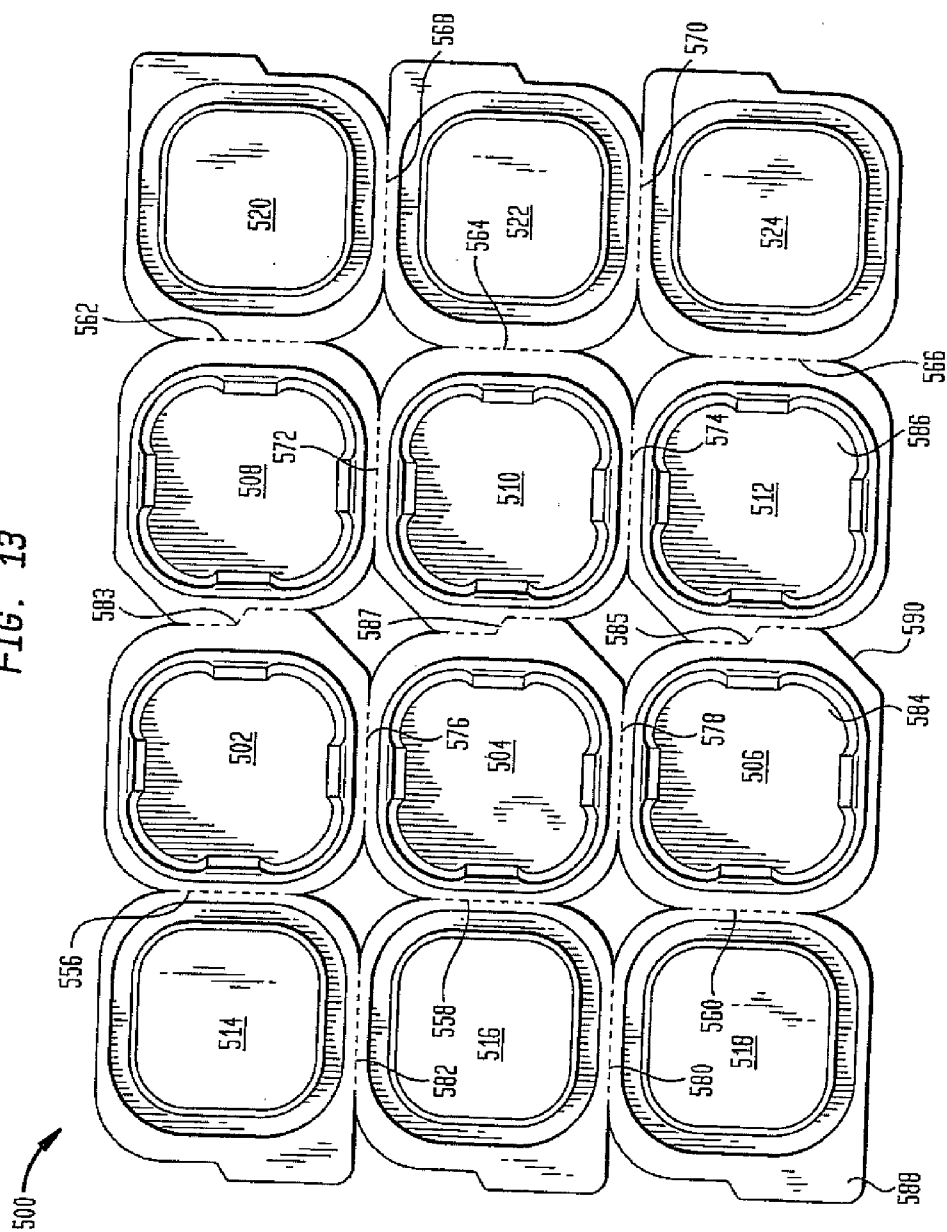


FIG. 13



SEPARABLE CONTAINERS ARRANGED IN ARRAYS WITH INTEGRALLY FORMED LIDS

CLAIM FOR PRIORITY

[0001] This Continuation application claims the benefit of U.S. Non-provisional application Ser. No. 10/456,207, of the same title, filed Jun. 6, 2003, and U.S. Provisional Patent Application Ser. No. 60/389,533, filed Jun. 18, 2002, the disclosures of which are each incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates generally to disposable food containers, and more particularly to an ensemble of sealable containers having lids attached thereto. The containers are connected to each other by way of tear portions.

BACKGROUND

[0003] Plastic containers such as disposable plastic containers are well known. There is disclosed in U.S. Pat. No. 5,702,017 to Goncalves a combination of a row of containers and a strip of caps, each of the containers and caps being respectively joined by breakable links allowing the joined strip of caps to be placed on necks of the joined row of containers by a translation movement parallel to the axes of the containers. See also U.S. Pat. No. 5,531,349 to Wojcik et al.

[0004] Disposable articles are used as food containers as is seen, for example, in U.S. Pat. No. 5,012,971 to Cozzi et al. In the '971 patent there is disclosed a compartmented container of the "clam shell" class suitable for containing food. The container or package in one embodiment includes a first or bottom compartment and a second or top compartment that is hinged to the first compartment. There is disclosed in U.S. Pat. No. 4,798,133 to Johnson a package and container for eggs. The container defines a plurality of compartments each of a configuration to hold an egg captive, each portion of the container defining a respective single compartment being connected with the remainder along lines of weakening, perforation or the like.

[0005] Containers arranged in arrays with breakable or tearable portions between them are seen in a number of references.

[0006] There is disclosed in U.S. Pat. No. 6,000,535 to Berk et al. disposable mixing wells. Wells are formed as a unitary sheet of individual mixing wells arranged in rows and columns. The boundary between each mixing well is scored, perforated or otherwise made to allow individual pieces to be removed from the sheet. Preferably, the mixing wells may be pressure formed rather than being vacuum formed.

[0007] There is disclosed in U.S. Pat. No. 5,904,263 to St. Pierre et al. a multi-container package with individually removable containers. The package includes several individually sealed containers which are easily separable from one another by weakened zones between adjacent containers. Each container includes a tab portion over which the peel tab of the lid extends. Dimples in either the peel tab or tab portion facilitate their separation. Several multi-container packages are manufactured as a unit using a die and

conventional heat sealing process and then are separated from one another by transverse cuts.

[0008] U.S. Pat. No. 5,409,127 to Stratford et al. is directed to a multi-pack container assembly. The multi-pack assembly includes a plurality of containers and webs joining the containers, each web configured to include an area of reduced structural integrity for tearing a plurality of frangible ribs interconnecting adjacent containers and traversing the tearing area.

[0009] U.S. Pat. No. 4,875,620 to Lane, Sr. discloses a fluted product cup. The cup, suitable for food packaging is formed from a resilient material and has an integral body having a product reservoir and a lip. The product reservoir includes a flat bottom wall and a continuous sidewall integrally joined together about a smooth curve. The sidewall extends upwardly from the bottom wall to join the lip. The joint between the lip and the sidewall continuously surrounds and defines an opening through the lip to the interior of the reservoir. The lip extends in a plane outwardly from this opening completely around the periphery of this opening. The bottom wall is essentially circular in shape and the opening is essentially a square shape. First, second, third and fourth fluted areas are located in the sidewall at the corners of the squarish shaped opening at the top of the containers. Each of the fluted areas are shaped essentially as a conical surface generated from a cone which is truncated by a plane about a parabolic intersection of the plane with the cone. These containers may be formed in an array as can be seen in the patent.

[0010] With respect to containers which may be separated, the following references are also of interest: French Patent No. 1,392,947 to Skandinavisk; German Patent No. DE 26 53 906 to Gizeh-Werk and British Provisional Specification No. 649,541 to Stephenson.

[0011] It is seen in U.S. Pat. No. 5,722,553 to Hovatter an integral assembly of microcentrifuge strip tubes having independently tethered caps and angularly related seal caps.

[0012] While the container art is plentiful, there remain largely unresolved issues in the food service industry particularly with respect to problems involved with tipping of small containers during filling, problems associated with the loss of lids, and problems associated with easily fitting lids onto large numbers of containers in a short period of time as is required, for example, in a catering operation. Small dishes (1-4 fluid ounce) are typically used for condiments, dressing, sauces and dips in the food service industry. By way of conventional containers when it is desired to fill a large number of relatively small dishes, it is necessary to lay out a large number of the individual dishes currently used, fill each separately with the desired product while avoiding spills between the dishes and then match up the lids with each individual dish. Such undertaking is both tedious and difficult with conventional containers, made all the more difficult by small individual containers which tend to be unstable on a flat surface and tip over and lids which may be misplaced or lost. Moreover, large amounts of product may be lost due to difficulty in accurately locating and aligning individual containers with the product source. There is thus a need for an efficient disposable food packaging system, particularly with respect to containers, each having a cup which may conveniently and rapidly be filled and closed with a minimum of associated equipment. Ideally, the

ensemble of containers will be configured such that, when placed on a flat horizontal surface, the ensemble will maintain the cup portions thereof in an upright position both before and after filling.

SUMMARY OF INVENTION

[0013] There is provided in accordance with the present invention an ensemble of connected containers in a separable array, each container comprising a cup and a lid. Generally, in preferred embodiments, the individual containers are arrayed as integrally formed pairs which are separably connected to other pairs to make up a separable array having an even number of containers. Each container in the array is separably connected to at least one other container along a medial axis and has an integrally formed lid extending outwardly with respect to the medial axis, that is, distally with respect to the medial axis between containers. In an array of six containers, for example, the center most pair of containers is joined along the medial axis and has a lid joined to a portion of the container spaced away from the medial axis. Both to the left and right of the centermost pair of containers are also disposed other pairs of containers in a preferred embodiment as will be described in detail hereinafter.

[0014] There is thus provided in accordance with the present invention an integrally formed ensemble of interconnected separable containers each comprising a cup and an associated lid including a first plurality of containers arranged in a first linear array each container in said first linear array connected to another container in the linear array by a tearable portion of a first plurality of tearable portions, each of said first plurality of containers having an upper cup aperture, a cup sidewall and a cup bottom and further including means for securing its associated lid about its upper aperture. A second plurality of containers is disposed in a second linear array of containers, each container in said second linear array being connected to another by one of a second plurality of tearable portions, each of the second plurality of containers having an upper cup aperture, a cup sidewall and a cup bottom and further including means for securing its associated lid about its upper cup aperture. The first linear array of the first plurality of containers is separably adjoined to the second linear array of the second plurality of containers by way of a third plurality of tearable portions arranged along a medial axis between first linear array of the first plurality of containers and the second linear array of the second plurality of containers. Preferably the containers in each said array are disposed such that the cup portions thereof are adjacent a cup portion of a container in the other array. A first plurality of lids is hinged to the cup portions of containers in said first plurality of containers, the first plurality of lids being arranged in a third linear array generally parallel to the medial axis between the container arrays wherein the third linear array of the first plurality of lids is generally disposed and hinged along the sides of the cup portions of the first plurality of containers opposite to the sides adjacent the medial axis between the first linear array of the first plurality of containers and the second linear array of the second plurality of containers. Each of the first plurality of lids is adapted to cooperate with the means for securing it to its associated cup portion of the first plurality of containers to provide sealed cup/lid assemblies upon pivotal motion of the lid about its hinge to the upper cup aperture of the associated container of the first plurality of

containers. A second plurality of lids is hinged to cup portions of the second plurality of containers, the second plurality of lids being arranged in a fourth linear array generally parallel to the medial axis between the container arrays wherein the fourth linear array of the second plurality of lids is generally disposed along the sides of the cup portions of said second plurality of containers opposite to the sides adjacent the medial axis between the first linear array of the first plurality of containers and the second linear array of the second plurality of containers. Here also, each of the second plurality of lids is adapted to cooperate with the means for securing it to its associated cup portion of the second plurality of containers to provide sealed cup/lid assemblies upon pivotal motion of the lid about its hinge to the upper cup aperture of its associated container of the second plurality of containers. The third linear array of the first plurality of lids and the fourth linear array of the second plurality of lids are thus generally distally and symmetrically disposed with respect to the medial axis between the first linear array of the first plurality of containers and the second linear array of the second plurality of containers.

[0015] In this manner, the integrally formed cup/lid ensemble of the invention provides for a balanced structure which is relatively stable on a flat surface during a filling operation. Moreover, the associated lids are conveniently secured to their associated cups and are readily located and secured to their associated cup portions. Thus, the integral assembly of the present invention solves the problems involved with tipping of small containers during filling; problems associated with the loss of lids and problems associated with easily fitting lids onto large numbers of containers in a short period of time. Alternatively, a staggered linear array of containers as shown in FIG. 11 may be employed to provide a narrower ensemble of containers which is still balanced for stable placement on a flat surface.

[0016] In a preferred embodiment, the lids are hinged to their associated cups by way of a hinge that is weakened for removal. The hinge region may be perforate scored such that the lid can be readily removed from its associated cup. This feature is particularly useful when it is desired to use the cup to hold a dip, for example, wherein it is undesirable to have the lid present during use.

[0017] Thus, in one aspect of the invention there is provided an integrally formed ensemble of interconnected separable containers and associated lids including: (a) a plurality of containers arranged in an array, each container comprising a cup and a lid adjoined thereto, the containers being separably joined to each other and each of the containers having an upper cup aperture, a cup sidewall, and a cup bottom and further including means for securing its associated lid about its upper cup aperture; (b) the containers thus including a plurality of lids, each of which is hinged to its associated cup, wherein the cups and lids are arranged about a medial axis such that the area of the ensemble, is generally equally divided by the medial axis whereby the ensemble is generally balanced thereabout; and (c) each of the plurality of lids being adapted to cooperate with the means for securing it to its associated cup upon pivotal motion of the lid about its hinge to the upper aperture of its associated cup. Typically, the cups are arranged in a staggered linear array about the medial axis of the ensemble and the lids are generally coplanar with the upper cup aperture of their associated cups.

[0018] A particularly preferred embodiment is an ensemble of containers where two container arrays each having three cups and two arrays of lids each having three lids. The tearable portions between containers are typically thermoformed from the same sheet material as the cups and lids and may form continuous strips therebetween which intersect other continuous strips between containers as shown in the drawings. Other means for connecting the containers to each other may be employed, such as discrete projections or “tabs” of material between containers if so desired. Typically the tearable portions between containers will be perforated or scored to make it easier to separate single containers from other containers in the array or ensemble of containers.

BRIEF DESCRIPTION OF DRAWINGS

[0019] The invention is described in detail below with reference to the various figures in which like numbers designate similar parts and wherein:

[0020] FIG. 1 is a schematic view in perspective of a 2×3 configuration of a container and lid ensemble of the present invention;

[0021] FIG. 2 is an end view in elevation of the ensemble of the container/lid ensemble of FIG. 1 generally along line 2-2 of FIG. 1;

[0022] FIG. 3 is a side view in elevation of the container/lid ensemble of FIG. 1 generally along line 3-3 of FIG. 1;

[0023] FIG. 4 is a perspective view in partial section of the container/lid ensemble of FIG. 1 along line 4-4 of FIG. 1 showing the various features;

[0024] FIG. 5 is a view in elevation and section along line 4-4 of FIG. 1;

[0025] FIG. 6 is an enlarged schematic view showing a lid joined with its associated container;

[0026] FIG. 7 is an enlarged schematic view showing two containers separably joined about the medial axis of the ensemble;

[0027] FIG. 8 is an enlarged partial top perspective view of the container ensemble of FIG. 1 along its medial axis showing the lids secured to their associated containers;

[0028] FIG. 9 is an enlarged schematic view of a container/lid combination wherein the lid has been pivoted to the medial axis to seal the container; and

[0029] FIG. 10 is a schematic view in perspective showing a container/lid ensemble of the present invention wherein 24 container/lid combinations are shown in one embodiment of the present invention integrally formed in a sheet;

[0030] FIG. 11 is a schematic view in perspective showing a container/lid ensemble of the present invention wherein 6 container/lid combinations are shown in one embodiment of the present invention integrally formed in a sheet wherein the containers are arranged in a staggered configuration;

[0031] FIG. 12 is a plan view of another 2×3 configuration of a container and lid ensemble of the present invention; and

[0032] FIG. 13 is a plan view of still yet another 2×3 configuration of a container and lid ensemble of the present invention

DETAILED DESCRIPTION

[0033] The invention is described in detail below in connection with various embodiments of the present invention. Such description and exemplification is for purposes of illustration only. Modifications to those embodiments within the spirit and scope of the present invention, set forth in the appended claims, will be readily apparent to those of skill in the art.

[0034] The integrally formed, container/lid arrays of the present invention may be conveniently formed by way of any conventional molding technique from a plastic material such as by a thermoforming process from a suitable thermoplastic sheet. “Thermoforming”, “Thermoformed” and like terminology is given its ordinary meaning. In the simplest form, thermoforming is the draping of a softened sheet over a shaped mold. In the more advanced form, thermoforming is the automatic high speed positioning of a sheet having an accurately controlled temperature into a pneumatically actuated forming station whereby the article’s shape is defined by the mold, followed by trimming and regrind collection as is well known in the art. Still other alternative arrangements include the use of drape, vacuum, pressure, free blowing, matched die, billow drape, vacuum snap-back, billow vacuum, plug assist vacuum, reverse draw with plug assist, pressure bubble immersion, trapped sheet, slip, diaphragm, twin-sheet cut sheet twin-sheet roll-fed forming or any suitable combinations of the above. Details are provided in J. L. Throne’s book, *Thermoforming*, published in 1987 by Coulthard. Pages 21 through 29 of that book are incorporated herein by reference. Suitable alternate arrangements also include a pillow forming technique which creates a positive air pressure between two heat softened sheets to inflate them against a clamped male/female mold system to produce a hollow product. Metal molds are etched with patterns ranging from fine to coarse in order to simulate a natural or grain like texturized look. Suitable formed articles are trimmed in line with a cutting die and regrind is optionally reused since the material is thermoplastic in nature. Other arrangements for productivity enhancements include the simultaneous forming of multiple articles with multiple dies in order to maximize throughput and minimize scrap. In some preferred embodiments, the melt-compounded composition from which the articles are made may include polypropylene and optionally further includes a polyethylene component and titanium dioxide. Suitable materials and techniques for fabricating the disposable containers of the present invention from thermoplastic materials appear in U.S. Pat. No. 6,211,501 to McCarthy et al. as well as U.S. Pat. No. 6,211,500 to Cochran II et al. the disclosures of which are incorporated herein by reference.

[0035] Alternatively, the lid/container ensemble may be injection molded; however, thermoforming is generally preferred.

[0036] When a container in the ensemble is joined to another container in the array, the interconnecting joining portion is formed to incorporate a line of weakness, whether by scoring, perforating, or merely forming the array in such a fashion that the polymer is considerably thinner along the joining portion so that after containers in the array are filled and lidded, a single container in the array may be easily separated by a simple tearing motion. It is preferred that the mouth or upper apertures of the containers substantially fill

the plane containing the medial axis between the container arrays so that problems of spills between containers are substantially obviated. It is also preferred that the integrally formed lids are attached to each other and are separably joined to adjacent lids in a similar fashion so that the array may be easily filled, lidded and then separated after the lid has been engaged with the mouth of the container. For purposes of balance, it is preferred that the lids in essence balance each other by being arrayed on opposite sides of the medial axis between the linear arrays of containers.

[0037] A preferred shape for the mouth of each separable container is generally rectangular, and it is likewise preferred that the lower portion of the container is generally rectangular. A typical container will have a flat or slightly upwardly convex bottom so that the container will remain in a stable position when placed on a flat surface such as a table. Extending peripherally around the generally rectangular mouth of the container is a land area adjoining a downwardly extending rim or ridge connected to a generally planar surround portion extending between each container. A joining portion between the surrounds of the containers preferably has a line of weakness whether formed by scoring, perforations, thinning or other known technique of forming a line of weakness in polymer materials. Surrounds of the containers in the array have at least two regions, a medial region along the medial axis between the arrays of containers and a distal region on the side of the containers opposite their medial regions. The distal region adjoins a hinge region by way of which lids are extending outwardly with respect to the containers. The lids have a groove with any convenient profile dimensioned to cooperate with a ridge having a mating profile about the upper cup apertures of the containers as will be described in more detail below with reference to the various figures. Preferably the lids include a molded-in area defining a recess facilitating stacking and handling of numerous arrays of container/lid ensembles as will be appreciated from the discussion which follows.

[0038] The hinges are preferably joined to their associated containers by a hinge area which is likewise formed to incorporate a line of weakness, whether by scoring, perforating or merely forming the array in such a fashion that the polymer is considerably thinner in selected areas so that the lid may be separated if so desired. As noted above, this feature is desirable when the cup is used as a serving container for a dip, for example.

[0039] Referring generally, to FIGS. 1 through 9, there is shown an integrally formed, container/lid ensemble 10 in a 2x3 configuration. The ensemble 10 includes a plurality of first containers 12, 14 and 16 arranged in a first linear array 17 and joined to one another by a plurality of tear portions 18 and 20. Each container includes an upper aperture 24, 26 and 28 as shown in the figures as well as sidewalls 30, 32 and 34. The containers also have bottoms 36, 38 and 40 as well as ridges 42, 44, and 46 about their upper apertures. Ridges 42, 44 and 46 generally have a rectangular profile as shown at 48, 50 and 52 for ease of thermoforming. Tear portions 18, 20 as well as those tear portions referred to below may be formed in a continuous surround about the peripheries of the containers and lids as can be seen in the Figures.

[0040] There is further provided a second linear array 59 of containers 54, 56 and 58 which are connected to each

other by tear portions 60 and 62. The containers likewise have upper apertures or mouths 66, 68 and 70 as well as sidewalls 72, 74, and 76; bottoms 78, 80 and 82; and upper ridges 84, 86 and 88 about their apertures. The ridges about the second linear array of containers also have rectangular profiles as indicated at 90, 92 and 94.

[0041] A plurality of tear portions 96, 98 and 100 connect first linear array of containers 17 to second linear array of containers 59 along a medial or interior axis 102 as is shown in FIG. 1.

[0042] There is disposed on the side of container array 17 distal to medial axis 102 a set of lids 104 also arranged in a linear array 105. Array 105 includes lid 106, lid 108 and lid 110 which are respectively connected by way of tear portions 112 and 114. Each lid further includes a groove 118, 120 and 122. Each groove respectively defines a rectangular profile 124, 126 and 128 which will be further appreciated by way of reference to FIG. 9 discussed below. Array 105 is hinged to the container array 17 by way of a hinge 130.

[0043] There is further provided another set of lids 132 along the side of container array 59 distal to medial axis 102 on the other side of the ensemble that is the side opposite lid array 105. An array of lids 133 includes a lid 134, a lid 136, as well as a lid 138. The lids are joined by tearable portions 140 and 142. Here again the lids are provided with grooves 146, 148 and 150 each of which have a rectangular profile 152, 154 and 156 as shown in the various Figures. These lids are also attached by way of another hinge 144.

[0044] The container/lid ensemble of the present invention is conveniently fabricated by thermoforming as noted above. In preferred methods of thermoforming a plug assist may be employed as is well known in the art. The ensemble when formed has a generally planar upper surface as can be seen particularly in FIGS. 1 and 2 and typically includes a plurality of tab portions associated with the lids as is best seen in FIGS. 1, 4 and 12 (discussed hereinafter). Each lid 106, 108, 110, 134, 136 and 138 has at its periphery a tab 158, 160, 162, 164, 166 and 168. As will be appreciated from FIG. 1 and FIG. 8 the tabs are axial or linearly offset with the tab on the lid directly opposed across medial axis 102. That is to say tab 158 of lid 106 is at the outer most corner of the lid near its adjacent lid 108 whereas tab 164 of lid 134 is at the corner of lid 134 away from lid 136. When the lids are folded over inwardly to their closed position as is shown in FIG. 8 the tabs lie adjacent each other generally along axis 102, and do not overlap so that the containers can be sealed and provided with a tab to facilitate opening. It is further noted that the tab projects outwardly or past the medial axis 102 which is generally coincident with the various tear portions between the containers.

[0045] There may optionally be provided a plurality of raised dots, such as raised dots 161, 163 located to underlie the lids in the sealing position as is known in the art to facilitate opening of the containers.

[0046] Containers of the invention may be made of any suitable polymer. A class of polymers frequently employed for this type of container includes polystyrene polymers which consist predominantly of styrenic monomer units and may include, for example, butadiene co-monomers. Particularly preferred polymeric materials for making the inventive containers include high impact polystyrene (HIPS) and

rubberized polystyrene. Oriented polystyrene sheet may also be employed. Another class of polymers from which the inventive container/lid ensemble may be made include polyolefin polymers such as polypropylene and polyethylene. Likewise polyesters are suitable, particularly polyethylene terephthalate polymers often referred to in the art as "bottle resin".

[0047] It will be appreciated from the various Figures that the upper apertures of the containers such as apertures **24, 26** and bottoms **36, 38** are generally rectangular. Preferably, the rectangular portions of the sidewalls are interconnected by arcuate portions to facilitate removal of the contents of the containers.

[0048] The lids have a plurality of molded-in regions, **182, 184, 186, 188, 190** and **192** formed therein which have on their opposite side recesses corresponding to the generally rectangular bottoms of the containers for enhancing stacking. That is to say the molded-in regions **184, 190** shown in FIG. **1** form recesses such as recesses **194** and **196** shown on FIG. **8** for receiving the bottoms of another stack of containers and lids as will be appreciated from the diagram. The lids are provided with grooves having a convenient profile such as profile **154** shown schematically and enlarged in FIG. **9** where the profile **154** cooperates with the mating profile **92** of ridge **86** in order to provide for a liquid resistant seal. That is to say in FIG. **9** the lids have been folded over as shown in FIG. **8** and the grooves engaged to the ridges around the periphery of the containers to provide for a seal. In preferred embodiments, the ridge and groove will have undercut mating portions to further facilitate a secure leak resistant seal when the lid is secured over the cup portion of each container. Provided in the interior of the containers is a stacking ledge such as stacking ledges **198** and **200** shown in FIG. **7** which are provided with a uniform width (D) around the entire periphery of the interior of the container. The apertures of the containers generally have a width (W) of about one to three inches and a length (L) of about one to three inches. So also, the depth or height of the container (H) FIG. **2**, is typically from about 1 to about 3 inches such that the fill volume of the container is preferably from about 1 to about 8 fluid ounces. A fill volume of about 2 fluid ounces is typical. As noted above, to make the containers easily separable from each other container in the ensemble, the weakened zones between containers and lids may be perforated or scored to make them easily tearable as shown schematically at **202, 204** and **206** in the various diagrams.

[0049] Typically the container/lid assembly of the present invention is thermoformed from a thermoplastic sheet having a thickness or caliper of from about 10 to about 30 mils (thousandths of an inch). A thermoplastic sheet having a caliper of about 20 mils is typical.

[0050] There is further shown in FIG. **10** an embodiment of the present invention wherein multiple sets of containers and lids have been thermoformed in a single mold. In the embodiment of FIG. **10** shows 24 containers and their associated lids generally having the structure shown in FIGS. **1** through **9**. For purposes of convenience, the various features are labeled **200** numerals higher for purposes of brevity. It can be seen in FIG. **10** that the various arrays of containers **217, 259** are separated by a medial axis **302** and hinged to arrays of lids **305** and **333**. The substructure or unit structure illustrated is repeated throughout the sheet such

that multiple arrays may be formed in a single operation as will be appreciated by one of skill in the art.

[0051] In FIG. **11**, yet another embodiment is shown wherein a container ensemble **350** includes a plurality of cups **352, 354, 356, 358, 360** and **362** adjoined to the ensemble by scored or perforated tearable portions indicated generally at **364, 366, 368, 370** and **372**. The cups are arranged about a medial axis **374** in a staggered array **376**. Here, it is seen that the projected surface area of the ensemble is generally symmetrical about axis **374** so that the ensemble is generally balanced; that is, lids **378, 380, 382, 384, 386** and **388** have generally the same area as their corresponding cup on the opposite side of medial axis **374**.

[0052] Still yet another embodiment of the present invention is shown in FIG. **12** which is a plan view of a 2x3 container/lid ensemble **400** including cups **402, 404, 406, 408, 410** and **412** as well as their associated lids **414, 416, 418, 420, 422** and **424**. Cups **402, 404** and **406** form a first linear array **426** while cups **408, 410** and **412** form a second linear array **428** of cups as shown. The cups are arranged along opposite sides medial axis **430** which generally divides the ensemble.

[0053] The upper aperture of each cup includes a surround portion such as portions **432, 434** and so forth that are provided with a plurality of arcuate ridges such as ridges **436, 438, 440** and **442** which project upwardly from surround portions **432, 434**. The ridges are arranged generally along the medial axis and are configured to project outwardly with respect to a cup's associated lid when the container is closed. The ridges are also positioned away from adjacent cups so that they can operate to provide a grip when needed, such as when separating a container from the rest of the ensemble as well as to aid in opening a sealed container. If so desired, the ridges can also be configured to provide raised areas to that the lid will overlap them when closed to provide some separation between the surrounds of the lids and cups.

[0054] In the embodiment of FIG. **12**, there are provided open areas **444, 446, 448, 450, 452** and **454** in the upper surface of the ensemble. Lids **414-424** are hinged to their associated containers **402-412** by way of perforate hinge portions **456, 458, 460, 462, 464** and **466** of the integrally formed ensemble **400** so that the lids may be readily separated if so desired. Likewise, the lids and cups are separably joined to others by way of perforate portions **468, 470, 472, 474, 476, 478, 480** and **482**.

[0055] In the embodiment of FIG. **13**, lids **514-524** are hinged to their associated containers **502-512** by way of perforate hinge portions **556, 558, 560, 562, 564** and **566** of the integrally formed ensemble **500** so that the lids may be readily separated if so desired. Likewise, the lids and cups are separably joined to others by way of perforate portions **568, 570, 572, 574, 576, 578, 580** and **582**, as well as perforate portions **585** and **587**. Note that the containers have outwardly protruding corner sections as are seen at **584, 586**, and the lids have tabs such as tab **588** which will project beyond angled rim **590** when the lids are folded over.

[0056] While the invention has been described in detail in connection with several embodiments, modifications within the spirit and scope of the invention, set forth in the appended claims, will be readily apparent to those of skill in the art.

What is claimed is:

1. An integrally formed ensemble of interconnected separable containers and associated lids comprising:

- (a) a first plurality of containers arranged in a first linear array each container comprising a cup and a lid adjoined thereto, said containers being separably adjoined to each other by a first plurality of tear portions, each of said first plurality of containers having an upper cup aperture, a cup sidewall and a cup bottom and further including means for securing its associated lid about its upper cup aperture;
- (b) a second plurality of containers arranged in a second linear array, each container comprising a cup and a lid adjoined thereto, said containers being separably adjoined to each other by a second plurality of tear portions, each of said second plurality of containers having an upper cup aperture, a cup sidewall and a cup bottom and including means for securing its associated lid about its upper cup aperture;

wherein said first linear array of said first plurality of containers is secured to said second linear array of said second plurality of containers by way of a third plurality of tear portions arranged along a medial axis between said first linear array of said first plurality of containers and said second linear array of said second plurality of containers;

- (c) there being thus provided a first plurality of lids hinged to said first plurality of cups, said first plurality of lids being arranged in a third linear array, generally parallel to the medial axis between the container arrays, said third linear array of said first plurality of lids being generally disposed and hinged along the sides of the first plurality of containers opposite to the sides adjacent the medial axis between said first linear array of said first plurality of containers and said second linear array of said second plurality of containers;

each of said first plurality of lids being adapted to cooperate with the means for securing it to its associated cups of the first plurality of containers to provide sealed cup, lid assemblies upon pivotal motion of the lid about its hinge to the upper cup aperture of its associated cup of the first plurality of containers;

- (d) and there being thus further provided a second plurality of lids hinged to said second plurality of containers, said second plurality of lids being arranged in a fourth linear array generally parallel to the medial axis between the container arrays, said fourth linear array of said second plurality of lids being generally disposed along the sides of the second plurality of containers opposite to the sides adjacent the medial axis between said first linear array of said first plurality of containers and said second linear array of said second plurality of containers;

each of said second plurality of lids being adapted to cooperate with the means for securing it to its associated cup of the second plurality of containers to provide sealed cup, lid assemblies upon pivotal motion of the lid about its hinge to the upper cup aperture of its associated cup of the second plurality of containers, the third linear array of said first

plurality of lids and the fourth linear array of said second plurality of lids being thus generally distally and symmetrically disposed with respect to the medial axis between the first linear array of the first plurality of containers and the second linear array of the second plurality of containers.

2. The integrally formed ensemble according to claim 1, further comprising a fourth plurality of tearable portions connecting said first plurality of lids to each other and a fifth plurality of tearable portions connecting said second plurality of lids to each other.

3. The integrally formed ensemble according to claim 2, wherein each of said first and second plurality of lids has a tab portion projecting outwardly with respect to said medial axis of the ensemble and wherein the tabs of said first plurality of lids are linearly offset with respect to the tabs of said second plurality of lids and configured such that the tabs of said first and second plurality of lids will lie along the medial axis adjacent each other when the first and second plurality of lids are pivoted to the medial axis.

4. The integrally formed ensemble according to claim 1, made from a thermoplastic composition comprising a polystyrene polymer composition.

5. The integrally formed ensemble according to claim 4, wherein said polystyrene polymer composition comprises high impact polystyrene.

6. The integrally formed ensemble according to claim 4, wherein said polystyrene polymer composition comprises rubberized polystyrene.

7. The integrally formed ensemble according to claim 4, wherein said polystyrene polymer composition is oriented polystyrene.

8. The integrally formed ensemble according to claim 1, made from a thermoplastic composition comprising a polyolefin polymer.

9. The integrally formed ensemble according to claim 8, wherein said polyolefin polymer is polypropylene.

10. The integrally formed ensemble according to claim 8, wherein said polyolefin polymer is polyethylene.

11. The integrally formed ensemble according to claim 1, made from a thermoplastic composition comprising polyethylene terephthalate.

12. The integrally formed ensemble according to claim 1, wherein the upper cup apertures of said first and second plurality of containers is substantially rectangular in shape.

13. The integrally formed ensemble according to claim 12, wherein the bottom portion of each of said first and second plurality containers are substantially rectangular in shape.

14. The integrally formed ensemble according to claim 1, wherein said first and second plurality of containers have upwardly convex cup bottom portions.

15. The integrally formed ensemble according to claim 1, wherein said first and second plurality of lids are provided with recesses configured to engage the cup bottoms of said first and second plurality of containers.

16. The integrally formed ensemble according to claim 1, wherein the means for securing associated lids about their corresponding cups comprises a plurality of ridges disposed about the upper cup apertures of said first and second plurality of containers.

17. The integrally formed ensemble according to claim 16, wherein each of said first and second pluralities of lids are provided with grooves configured to engage the ridges disposed about the upper cup apertures of said first and second pluralities of containers.

18. The integrally formed ensemble according to claim 17, wherein said grooves and said ridges have mating profiles.

19. The integrally formed ensemble according to claim 1, wherein said first and second pluralities of containers include a stacking ledge of uniform width at an upper portion of their interiors.

20. The integrally formed ensemble according to claim 1, wherein the upper cup apertures of said first and second plurality of containers substantially define a planar region about said medial axis.

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