United States Patent

Alroy

[15] **3,701,456**

[45] **Oct. 31, 1972**

[54] **STACKABLE MEMBERS**

[72] Inventor: **John D. Alroy,** 380 Mountain Road Ste:1713, Union City, N.J. 07087

[22] Filed: **April 2, 1970**

[21] Appl. No.: **25,051**

[52] **U.S. Cl.**.....**220/97 C,** 150/0.5, 220/66

[51] **Int. Cl.**.....**B65d 21/02,** B65d 1/34

[58] **Field of Search**.....220/23.6, 97 C, 97 D, 97 F, 220/66; 206/65 K, 56 K; 229/15 B; 150/0.5

[56] **References Cited**

UNITED STATES PATENTS

3,405,858	10/1968	Collie	220/66 X
3,288,340	11/1966	Shapiro	229/1.5 B
3,776,772	1/1957	Itoda	206/65 K X
3,192,770	7/1965	Robertson	220/23.6
3,483,908	12/1969	Donovan	220/23.8
3,351,229	11/1967	Bridenstine	220/97 E

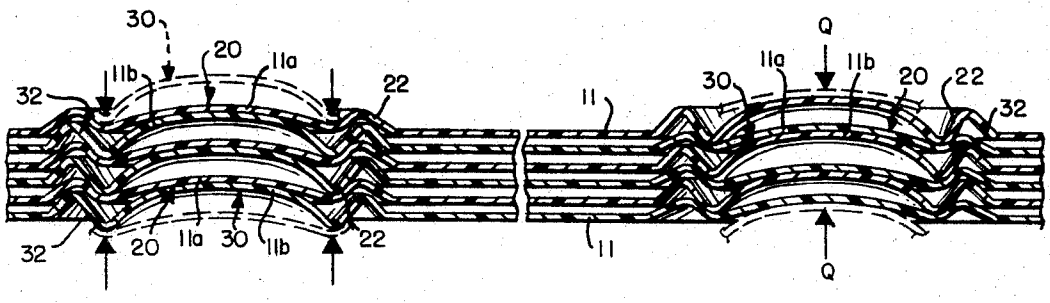
Primary Examiner—George E. Lowrance

Attorney—Darby & Darby

[57] **ABSTRACT**

Articles of deformable material which are formed with means on a wall thereof which permit a number of articles nested one within the other to be compressed into a smaller volume when force is applied thereto and which also cause the articles to move apart when the force is removed.

23 Claims, 13 Drawing Figures



PATENTED OCT 31 1972

3,701,456

SHEET 1 OF 4

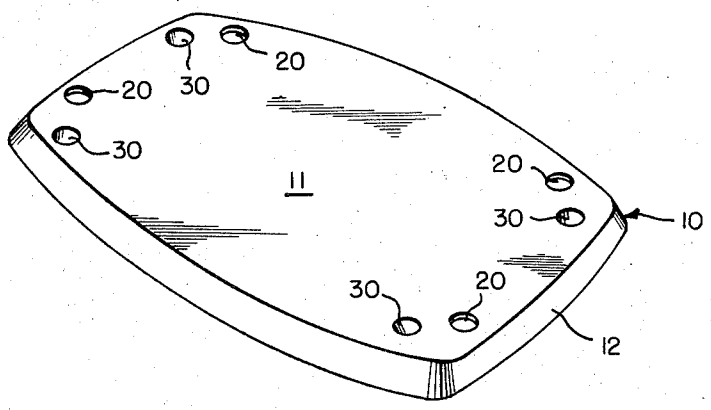


FIG. 1

FIG. 2

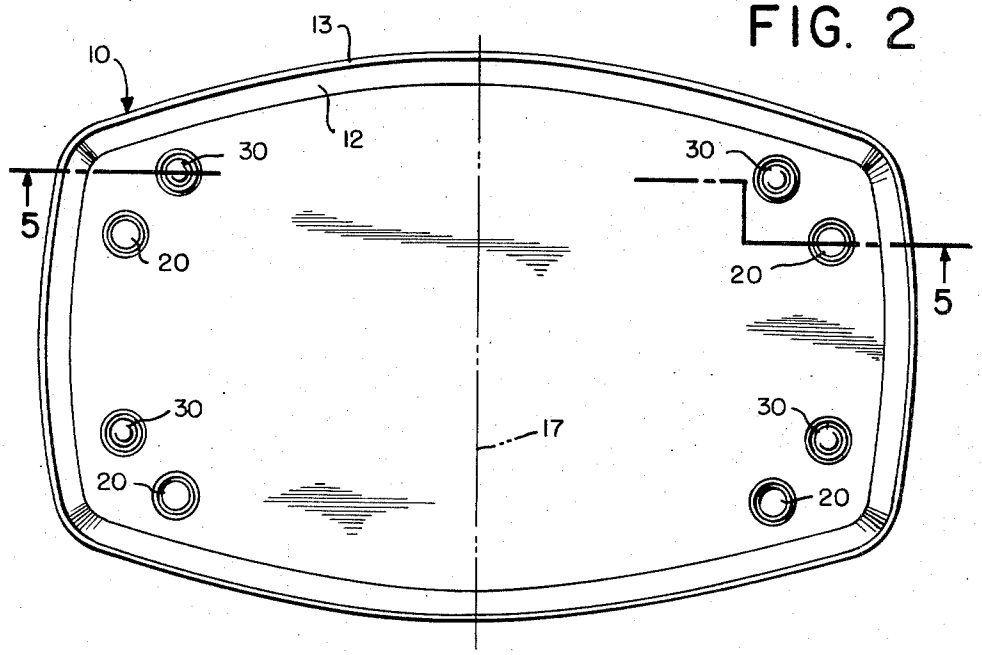


FIG. 3A

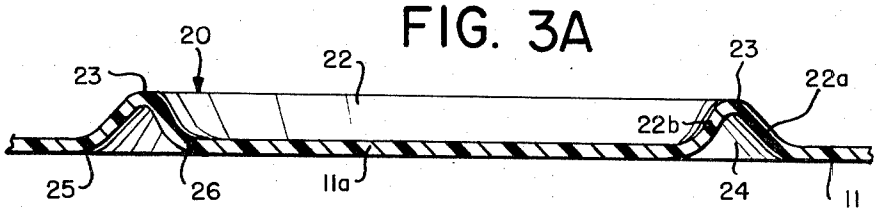
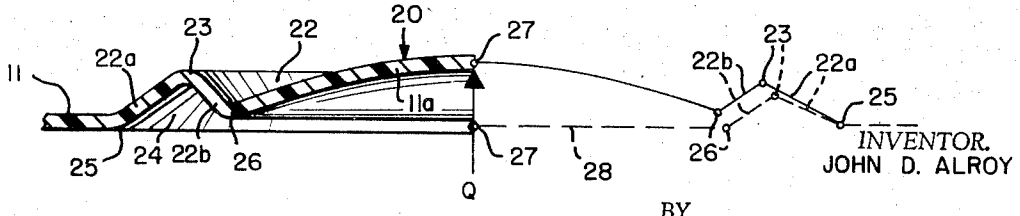


FIG. 3B



INVENTOR.
JOHN D. ALROY

BY

Darby & Darby

ATTORNEYS

FIG. 4A

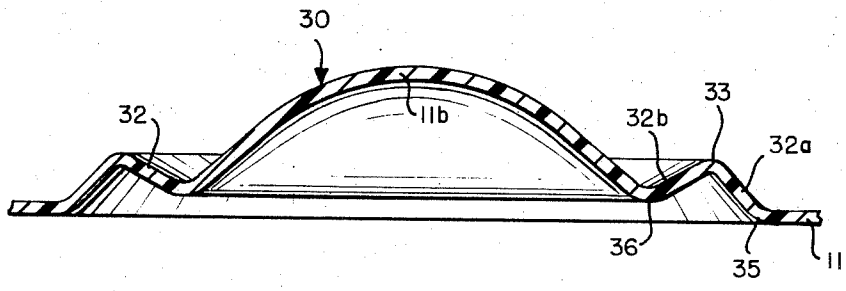


FIG. 4B

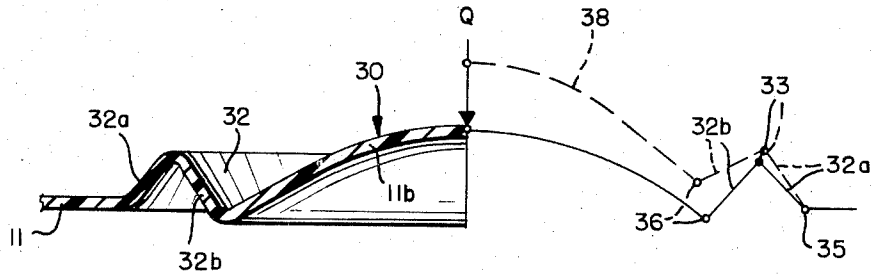
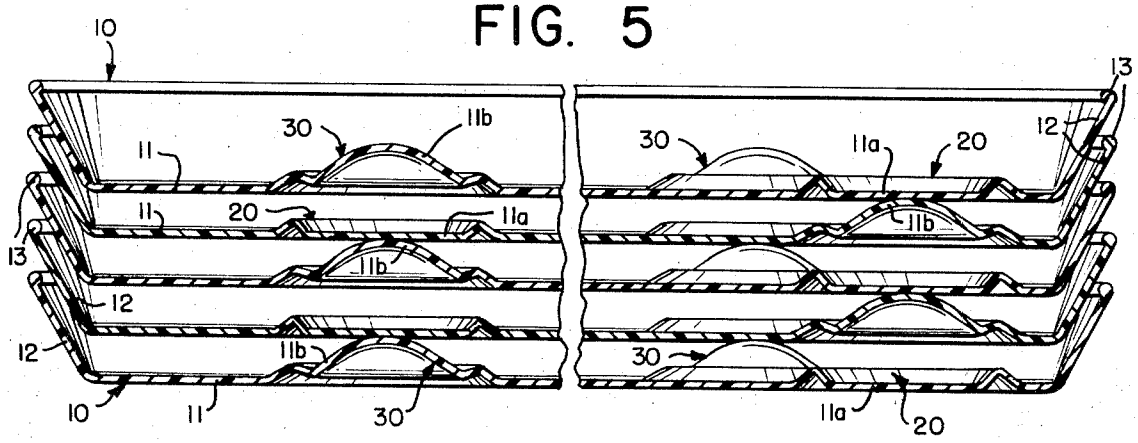


FIG. 5



INVENTOR.
JOHN D. ALROY

BY

Darby & Darby

ATTORNEYS

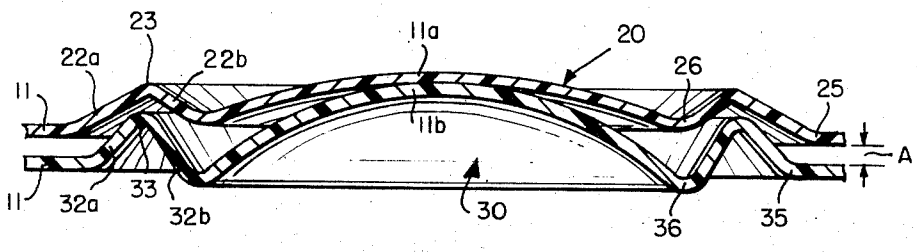


FIG. 6A

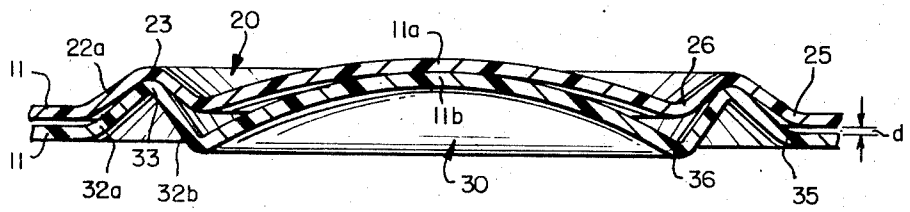


FIG. 6B

FIG. 8

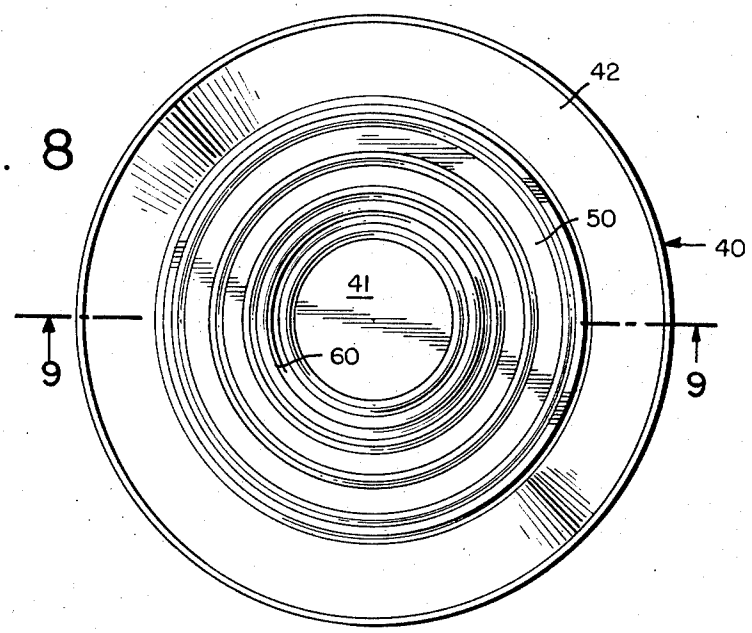
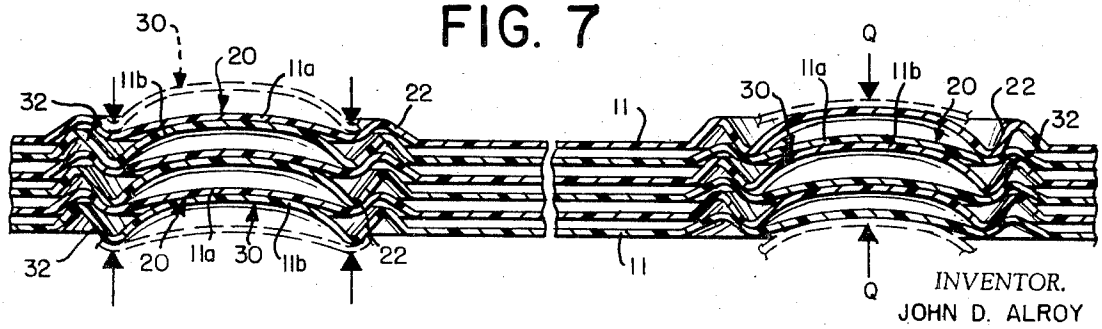


FIG. 7



INVENTOR.
JOHN D. ALROY

BY

Darby & Darby

ATTORNEYS

FIG. 10

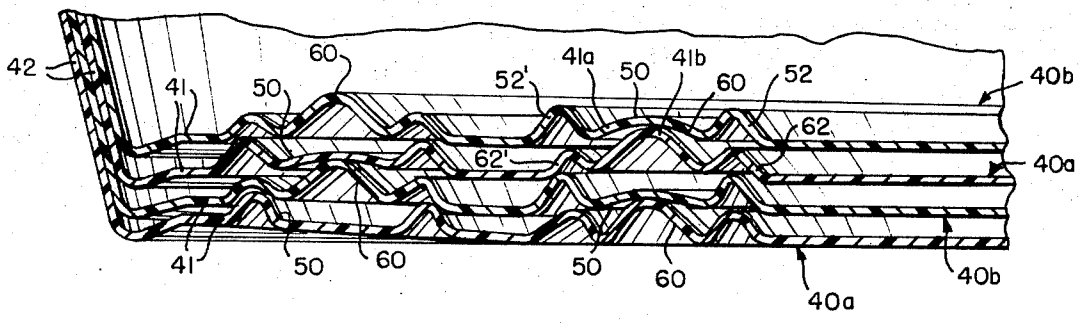
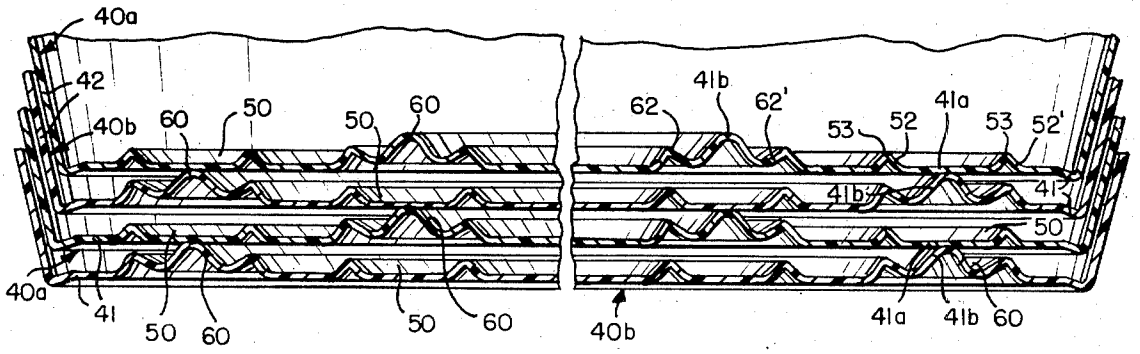


FIG. 9



INVENTOR.
JOHN D. ALROY

BY

Darby & Darby

ATTORNEYS

STACKABLE MEMBERS

STATE OF THE ART

Thin-walled plastic articles, such as containers, cups and lids for comestibles and beverages are made in a wide variety of shapes and sizes. Typical of such articles are cups of plastic materials for soft drinks, trays, or cups in which liquid or semi-liquid material such as cottage cheese or oleomargarine are placed, and lids for either trays or cups. These articles are manufactured by a variety of suitable processes such as injection molding, thermoforming, or blow-molding.

To reduce the bulk of a large number of a given type of these articles when they are empty and in storage or are being shipped, a construction is utilized so that the articles can be stacked or nested one within the other. One typical construction is to have the side walls of the article tapered upward and outward so as to permit stacking. When stacking is employed, the overall height of a given number of the same type of articles can be reduced considerably when compared to the same number of these articles arranged end-to-end without nesting or stacking.

At the point of end use, such as a place where a tray or a container has to be filled, or in a vending machine where a liquid is to be automatically poured into a cup, the articles must be "de-nested" from the stack, that is, removed individually from the stack. This de-nesting can be done either manually or by automatic or semi-automatic machinery. As should be apparent, it is essential for the ease and speed of smooth de-nesting that the stacked articles come apart quite easily, one at a time.

Stacked articles can be de-nested either manually or by machine with relative ease if they are kept apart by a sufficient and uniform distance to permit removal of individual articles from the stack. One way of accomplishing this is to provide some arrangement on the articles so that there will be uniform spacing, or uniform pitch, between the same point (for example the top rim of a cup) of adjacent articles in the stack. It is quite important that the pitch of the stack be kept uniform to prevent two articles from being removed from the stack at the same time.

As should be apparent, the economics of packaging, shipping and warehousing of empty stacked articles is somewhat at cross-purposes with the ease of de-nesting such stacked articles at the point of each use. The higher the density of stacking, the less space a given number of stacked articles will occupy. However, the more densely the articles are stacked into each other, the more difficult it becomes to de-nest them since there is less free space between adjacent articles in the stack.

To facilitate de-nesting of stacked articles and to provide uniform pitch for a stack, a device commonly referred to as "stacking lugs" is often used. Stacking lugs are formations on the bottom and/or side wall of each article which prevent the article nested within it from going past the upper extremity of the stacking lug. The height of the stacking lugs is selected to keep the articles from wedging far enough down into one another to a point which would render de-nesting difficult or impossible.

One stacking lug arrangement which is known in the art, for example, see Edwards U.S. Pat. No. 3,091,360,

uses several relatively rigid lugs formed on the bottom of the article side wall. The lugs are formed on diametrically opposite points of the article side wall and have a slope of generally opposite inclination to the slope of the side wall itself. Each lug has an upper ledge which is generally transverse to the article side wall. In the portion of the article below the upper ledges of the lugs, the lugs form an aperture that is slightly smaller than the cross-section of the bottom of the article. Thus, when another article of the same construction is to be nested within the first, its bottom can go down only to the upper ledges of the stacking lugs. The height of the lugs determine the pitch of stacking and since the lugs are not flexible the pitch of the stack can be kept quite uniform.

Another type of stacking lug commonly used in the art is in the form of a round dimple of generally convex shape on the bottom wall of an article. The location of the dimples on the bottom wall of each article is such that they are offset on adjacent articles in the stack. Thus, when in the stack, the lower surface of the bottom wall of one article rests on the raised dimple, or dimples, on the upper surface of the bottom wall of the article immediately below in the stack. In this case, the pitch of the stacking is determined by the height of the dimples and also can be kept relatively constant.

SUBJECT INVENTION

As should be apparent, it would be desirable to produce thin-wall plastic articles and other articles of deformable material, for example, such as tinplate, and paper or paper pulp, which not only have higher stacking density than prior art plastic articles but which also can be more readily de-nested. Accordingly, the subject invention provides such articles having deformable members, on a wall thereof which engage a corresponding wall of the adjacent article in the stack. The members are of such a shape so that when force is applied to the stack of articles, they will deform and change their respective shapes to one which permits the height of the stack of articles to be substantially reduced. Since plastic and the other materials mentioned above can be made in a resilient or semi-resilient material form with somewhat of a "memory", when the force is removed from the stack the deformable members will return to their original undeformed states thereby aiding in the separation of the articles by moving them apart.

The subject invention provides two advantages. First of all, by flattening out the members from the original undeformed condition, the stacking density of a stack of articles can be greatly increased over that where fixed, rigid members such as stacking lugs are used. In addition, due to the fact that the shape of the members is such that they will return to their undeformed state when the force applied to the stack is released, the articles of the stack will tend to move apart greatly facilitating the removal of individual articles from the stack either manually or by automatic or semi-automatic machinery.

In a preferred embodiment of the invention, deformable members of two different shapes are used. One member includes a flat wall which is connected by what is effectively a hinge to a wall of the article. When force is applied to the flat wall of the member, it as-

sumes a somewhat domed shape. The other member includes a domed wall also connected by a hinge to the article wall. When force is applied to this second member, the domed wall assumes a flatter shape. The articles are stacked within each other so that a deformable member with a flat wall is in vertical alignment with a deformable member with a domed wall. When force is applied to the two articles, they move closer together, as both types of members change their shape in the manner previously described, to decrease the space between the adjacent walls of the articles having the deformable members thereon to increase the stacking density.

In one form of the invention, the deformable members are in the shape of small closed segments or "dimples" and several of these are located on the same wall of each article in a predetermined pattern. This arrangement is quite suitable with non-circular articles wherein the articles can be turned and held in a fixed position with respect to each other so that the dimples of the two different shapes will be in vertical alignment. Where circular shaped articles are to utilize the invention, the two different shaped members can take the form of concentric rings, one of each on a wall of the article. The location of the rings of two different shaped deformable members is alternated on successive articles so that there will still be vertical alignment when the articles are stacked in proper sequence.

It is therefore an object of the present invention to provide articles of a deformable material which can be stacked with a high density.

A further object is to provide articles which can be stacked with a relatively high density and which have means thereon to facilitate the de-nesting of the articles.

An additional object is to provide articles which can be nested, each article having at least one deformable member in a wall thereof which changes its shape when force is applied to the stack of articles to increase the stacking density.

Yet another object is to provide nestable articles each of which has two different types of deformable members in a wall thereof, the members being located and/or the articles being aligned so that there is vertical alignment between the two different shapes of members on two adjacent articles, the members deforming when force is applied to the stack to thereby increase the stacking density.

A further object is to provide stackable articles with deformable dimples of two different shapes on a wall thereof, the articles being stacked with respect to each other so that the two dimples of different shape of two adjacent articles are in vertical alignment.

An additional object is to provide stackable articles with deformable members in the shape of rings on a wall thereof, the members being located so that when the articles are stacked in the proper sequence deformable members of different shapes will be vertically aligned.

Still another object is to provide stackable articles having deformable members on a wall thereof which change their shape when force is applied to a stack of articles to increase stacking density and which resume their normal shape when the force is removed to move the articles apart to aid in de-nesting of the articles.

Other objects and advantages of the present invention will become more apparent upon reference to the following specification and annexed drawings, in which:

FIG. **1** is a bottom view in perspective of an article made in accordance with the subject invention;

FIG. **2** is a top view of the article of FIG. **1**;

FIGS. **3A** and **3B** show in cross-section one type of deformable member in its normal and deformed states, respectively;

FIGS. **4A** and **4B** show in cross-section another type of deformable member in its normal and deformed states;

FIG. **5** is an elevational view taken in cross-section along lines **5—5** of FIG. **2** showing a number of the articles of FIG. **1** in a stacked configuration with no force applied thereto;

FIGS. **6A** and **6B** are cross-sectional views showing two articles in the stack which have a force applied thereto to increase the stacking density;

FIG. **7** shows the stack of articles of FIG. **5** in a compressed condition;

FIG. **8** is a top view of a stackable cup made according to the present invention;

FIG. **9** is a fragmentary view, taken in cross-section of a number of cups of the type shown in FIG. **8** which are stacked; and

FIG. **10** is a partial cross-sectional view of the cups of FIG. **9** shown with force applied to increase the stacking density.

Referring to FIGS. **1–7**, a preferred embodiment of the subject invention is described with respect to plastic articles which are shown in the form of a lid **10** for a container (not shown), such as an oleomargarine container. Of course, as should be understood, the subject invention will apply to any plastic article which can be stacked and includes lids, containers, cups, trays, and other similar articles and also to other materials which can be deformed such as tinplate, plastic coated paper, paper with other coatings, thin paper pulp, cellular plastic (i.e. foam) etc. All of these materials can be formed into the desired shapes described below by suitable techniques well known in the art.

The lid **10** of the preferred embodiment is formed of a thin-wall plastic material, for example, polystyrene, polyethylene, polypropylene, or any other suitable plastic or combination thereof. This material can be made in a variety of desired shapes, for example, by thermoforming. The lid **10** has a bottom wall **11** and a continuous side wall **12** therearound which tapers outwardly slightly from the bottom wall and permits a number of the articles to be stacked, or nested, one within the other. The upper edge of the side wall **12** is shown as having a lip **13** thereon which is used to hold the lid **10** to a suitable container (not shown). The lip forms no portion of the subject invention.

As seen in FIGS. **1** and **2**, a number of deformable members, in the shape of dimples, are formed on the lid's bottom wall **11**. The number of these dimples is not critical. However, in a preferred embodiment of the invention it is desirable that there be a sufficient number of dimples and that they be of a suitable configuration and size so that when the force used to compress the articles is released, the force produced by the dimples in returning to their normal undeformed condi-

tion will tend to move the articles apart. This aids in the de-nesting. For reasons to be described below, there are two types of dimples respectively designated a flat dimple **20** and a domed dimple **30**.

The dimples are arranged in pairs in the pattern shown with a flat dimple **20** located adjacent a domed dimple **30**, there illustratively being four pairs of flat and domed dimples shown. The lid **10** is shown as being non-circular, but is symmetrical about a center line, shown as **17** in FIG. **2**. The pattern of dimples is such that they exhibit mirror symmetry about this line. Thus, if the lid **10** of FIG. **2** is rotated by 180°, the two flat deformable dimple members **20**, shown at the top of FIG. **2**, will be at the bottom and the two domed deformable dimple members **30**, shown at the bottom of FIG. **2**, will be at the top. When two articles **10** are stacked, or nested one within the other, with one of the articles turned by 180° with respect to the next adjacent article in the stack, each flat dimple **20** will lie above a domed dimple **30**, and vice versa.

FIG. **3A** shows a flat dimple **20** with no load or force applied, in the undeformed condition. The dimple **20** is formed as part of the bottom wall **11** of the article and has an annular inverted V-shaped wall **22** with an apex **23** between the two side walls **22***a* and **22***b*. The wall **22** forms a hinge and surrounds the periphery of a flat bottom wall which is designated **11a** since it is a portion of the bottom wall **11**. As also seen in FIG. **3A**, there is a circular V-shaped groove **24** in the bottom wall which is produced when the V-shaped wall **22** is formed.

FIG. **3B** shows a flat dimple **20** under a loaded condition. In actual use, the load is applied as a force to a stack of the articles to compress them. The stack is then sealed in a carton or otherwise held. The load is shown as a force Q acting at point **27** at the center of the bottom wall **11a** of the dimple. Since the plastic material of the article **10** is relatively thin, it is elastically deformed when the force is applied. The force Q moves the flat wall portion **11***a* upwardly from the normal undeflected position, which is shown schematically by the dotted lines **28**, to the dome shaped configuration shown in the solid lines. The V-shaped inverted wall **22** permits this by acting as a hinge, in much the same manner as a bellows, which pivots at the point of attachment **25** of side wall **22***a* to the bottom wall **11**, at the point of attachment **26** of side wall **22***b* to the wall portion **11***a*, and also at the apex **23**.

FIGS. **4A** and **4B** show the domed dimple **30** and in FIG. **4A** it is shown in an undeformed condition. Dimple **30** also has an inverted V-shaped, annular wall **32** formed by side walls **32***a* and **32***b* which have an apex **33**, a point of attachment **35** of the side wall **32***a* to the bottom wall **11** of the article and a point of attachment **36** of the side wall **32***b* to a dome shaped wall portion **11b** which is part of the bottom wall **11**.

As shown in FIG. **4B**, when the stacking force Q is applied downwardly to the domed portion **11b** of the dimple, it is also elastically deformed. The dome moves downwardly, from its undeformed position shown in FIG. **4A** and shown in dotted lines **38** in FIG. **4B**, to a deformed position, which is shown in solid cross-section lines in the left-hand side of FIG. **4B**. This is permitted by the hinge, or bellows type, action of V-shaped wall **32**, which pivots around the various pivot points **33**, **35** and **36**.

FIG. **5** shows a number of articles **10** in a stacked condition with no stacking force applied. Alternate articles **10** are reversed by 180° with respect to each other so that each flat dimple **20** has a domed dimple **30** below it. As also seen, the top of an undeformed domed wall **11b** touches the bottom of the crater wall **11a** of a flat dimple **20**.

FIGS. **6A** and **6B** show the deformation of a pair of vertically aligned dimples, one flat and one domed, of two stacked articles with a vertical loading force applied. Consider, for example, that the bottom article is held stationary and the force is downward on the top article. As the top article moves down, the top-most portion of the dome **11***b* of the bottom article contacts the bottom of the flat wall **11a** and starts to deform it into a domed shape in the manner described with respect to the FIG. **3B**. As the force is continued to be applied, there is a further deformation of the dome wall **11***b* of the domed dimple **30** to flatten it and reduce its height in the manner described with respect to FIG. **4B**. This produces a greater area of contact between the top of the domed wall **11***b* and the bottom of the flat wall **11***a*. Further, the inverted V-shaped wall **32** of the lower article assumes a better fit within the inverted V-shaped wall **22** of the upper article as the legs of these articles spread apart.

As seen from a comparison of FIGS. **6A** and **6B**, the overall height of the two stacked articles is reduced by an amount corresponding to the difference between the spacing of their bottom walls with deformable members **20** and **30** in an undeflected condition (shown as "A" in FIG. **6A**) and the spaces in the fully deformed condition (shown as *d* in FIG. **6B**). The reduction in spacing from "A" to *d* occurs for all articles in the stack, only two being shown in FIG. **6** for purpose of clarity.

FIG. **7** shows the stack of articles of FIG. **5** under load. Each flat wall **11***a* of a deformable member **20** assumes a more domed shape as the membrane elastically strains. The exact shape of the dome is determined by the shape of the inverted V-shaped bellows hinge **22** around its periphery. At the same time the domed wall **11***b* of the deformable member **30** below it, which engages the underside of the flat wall **11***a*, flattens out an amount determined by the shape of the bellows- type hinge **32** around its periphery. As this occurs, the curvature of the originally flat wall **11a** fits into the place made available by the flattening out of the originally domed wall **11***b* and vice versa. This action occurs throughout the complete stack.

In accordance with the principles of the present invention, it has been found that a stacking pitch α (distance between the bottom walls **11** of two articles in the stack under load) can be achieved upon application of the proper force and proper design of the deformable members **20** and **30**, which is less than one-quarter of the natural pitch *d* under no load conditions. This can be accomplished without exceeding the condition of extreme elastic deformation of the plastic material, that is, there will be no crushing or buckling of the deformable wall portions **11a** and **11b** or of the hinges **22** and **32**.

Once the force Q is removed from the stack of articles of FIG. **7**, due to the elasticity of the plastic material and its memory, each deformable member **20**, whose flat wall **11***a* has assumed a domed shape, will return to

its undeformed flat shape. The dome shaped wall **11***b* of a member **30**, which has been flattened, will return to its full domed condition. The energy released by the members **20** and **30** in returning to their original undeformed shapes, will cause the articles **10** to be pushed apart, at least by a distance of the origianl separation *d* between walls **11**. As explained previously, there are a sufficient number of the deformable members of a suitable size so that the force released by the members when the stacking force is removed, moves the articles apart.

The embodiment of FIGS. **1** to **7** illustratively showed an article of a non-circular shape which permitted keying of the articles in the stack so that a domed wall **11***b* of a deformable member **30** would be aligned vertically with a flat wall **11***a* of a member **20** of the article directly above and below it. Although the dimple-shaped deformable members **20** and **30** can be utilized for fully circular articles, it should be apparent that this embodiment would not be as satisfactory as with non-circular articles, since the possibility exists that the circular articles can rotate in the stack relative to one another and throw off the required vertical alignment of the deformable members. Assuming that proper vertical alignment of the deformable members can be achieved when circular articles are stacked in the original packing operation, it is possible to use the dimple arrangement shown in FIGS. **1–7** if some other means are provided, such as by placing the articles in a suitable form or taping or tying them, to insure that the articles will not rotate.

Referring to FIGS. **8–10**, another embodiment of the invention is shown for circular articles, illustratively shown as cups **40**, having a bottom wall **41** and a generally cylindrical outwardly slanting side wall **42**.

As seen best in FIGS. **9** and **10**, there are two different types of cups **40**, which are respectively labeled **40***a* and **40***b*. These are stacked alternately.

As shown in FIG. **8**, the bottom wall of each type of cup **40***a* and **40***b* has two concentric rings **50** and **60** which are the deformable members. Rings **50** and **60** have respective flat and dome shaped central walls between bellows-type hinges to provide deformable members similar to the flat and dome shaped dimples **20** and **30** previously described. Cups of the type designated **40***a* have the ring **50**, with the flat central wall as the outside ring and the ring **60**, with the domed central wall as the inside ring. Cups **40***b* have the reverse arrangement with ring **60** having the greater diameter and ring **50** the lesser. The diameters of the rings **50** and **60** are such so that when cups **40***a* and **40***b* are stacked, each of the two rings **50** and **60** of any given cup in the stack (with the exception of the ones of the top and bottom of the stack) is in vertical alignment both above and below with respective rings of the other type. For example, as shown in FIGS. **9** and **10**, the outer ring **60** with domed shaped central wall of the second cup **40***b* from the top is in vertical alignment with the flat central walls of the rings **50** of two cups **40***a* directly above and below it. The ring **50** of the same cup **40***b* is vertically aligned with the two rings **60** of the same two cups **50***a* above and below it.

The deformable rings **50** and **60** are quite similar to the respective flat and domed dimples **20** and **30** of FIGS. **1–7**, except that the dimple configuration has been extended for a complete revolution of 360°. If desired, however, the rings can be segmented leaving breaks between segments, as long as the cups are properly stacked to ensure alignment of the segments.

The deformable rings **50** and **60**, of each type of cup are the same. It is only their respective locations on a given type of cup that is different.

As shown in FIG. **9**, the deformable ring **50** has a flat central wall portion **41a** which is bounded by two inverted V-shaped walls **52** and **52'** which form a bellows-type hinge. Each of the walls **52** and **52'** has a vertex **53**. The outer hinge wall **52'**, the one closest to the cup side wall **42**, has its inner edge joined to the flat bottom wall **41***a* of the deformable member and its outer edge joined to the main portion of the cup bottom wall **41**. The inner hinge wall **52**, the one of minimum diameter closest to the center of the cup, has its outer edge joined to the central wall **41***a* and its inner edge joined to the main portion **41** of the cup bottom wall.

In a similar manner, a dome shaped deformable ring member **60** is formed as part of the bottom wall **41**. This ring **60** also has two inverted V-shaped walls **62** and **62'**, forming bellows-type hinges, which are connected to a domed central wall section **41***b* to permit it to deform under load. The outer edge of the greater diameter hinge wall **62'** is connected to the main part of the cup bottom wall **41** while the inner edge is connected to the domed central wall portion **41***b*. The inner edge of the lesser diameter hinge wall **62** is connected to the main portion of the cup bottom wall **41** and the outer edge connected to the center wall **41***b*.

As seen in FIGS. **9** and **10**, when the cups **40***a* and **40***b* are stacked alternately, the top of a dome shaped central wall **41***b* of a deformable member **60** engages the undersurface of the flat central wall **41***a* of a deformable member **50**. The point of engagement alternates between adjacent cups, that is, in one cup the point of engagement is at the larger (outer) diameter ring **50** and in the next cup above or below the one under consideration at the smaller (inner) diameter rings **50**.

Referring to FIG. **10**, when a compressive force is applied to the nested cups **40**, the deformable rings which are in contact elastically deform in a manner similar to that described with respect to the dimples of FIGS. **1–7**. The flat central wall **41***a* of a ring **50** becomes domed shaped while the domed central wall **41***b* of a ring **60** flattens out. In each case, the inverted V-shaped walls **52** and **62** spread to fit one within the other. This considerably reduces the overall height of the nested containers and thereby greatly increases the packing density.

When the compressive force applied to the stack is removed, the deformable rings return to their original undeformed conditions. In doing this, the individual articles in the stack are moved apart to facilitate de-nesting.

The inverted V-shaped wall hinges are merely illustrative of the type of hinge that can be used for the deformable members, although it is believed that it is the simplest and easiest to form. For example, a double inverted V can be used with the two V's lying side-by-side. Also, a generally S-shaped wall hinge can be used. Further, it should be understood that the dimple

shaped deformable members 20 and 30 of FIGS. 1–7 need not be round, but that some other shape can be used, e.g., oval, elliptical, diamond-shaped, etc.

What is claimed is:

1. In combination first and second articles of an elastically deformable material each having a first wall and an opening, said articles being of the same general overall shape so that they are nestable one within the other when one article is placed in the opening of the other with the first walls thereof lying adjacent each other, first and second deformable means on the first walls of said first and second articles respectively for engaging a portion of the first wall of the article lying next adjacent thereto, each of said first and second deformable means having a respective portion which deforms in a substantially opposite direction to the deformable portion of the deformable means on the first wall of the article next adjacent thereto when a force is applied substantially transverse to the deformable portions of the deformable means of said articles, said deformable portion of said first deformable means including first means which causes it to assume a shape of lesser height than when undeformed in response to the force and said deformable portion of said second deformable means including first means which causes it to assume a shape of greater height than when undeformed in response to the force, said deformable portions upon resuming their undeformed shapes when the force is released tending to move the articles apart.

2. A stackable article as in claim 1, wherein each said deformable means is a unitary part of said first wall and said first means of each said deformable means includes a hinge which permits said portion of each said deformable means to change its shape when force is applied thereto.

3. A stackable article as in claim 2, wherein said hinge means for each said deformable means is attached to the portion of said deformable means which changes its shape at two opposed sides thereof.

4. A stackable article as in claim 3, wherein there is a single hinge means for each said deformable means which surrounds the respective portion of each said deformable means which changes its shape.

5. A stackable article as in claim 3, wherein each said deformable means is in the shape of a ring.

6. A stackable article as in claim 1, wherein said deformable portion of the first said deformable means is generally flat in the absence of the force and said deformable portion of the second deformable means is generally dome shaped in the absence of the force.

7. The combination of claim 1, wherein said deformable means of each said article are aligned when the articles are stacked and the deformable portions thereof engage each other when the articles are nested and force is applied generally transverse to said deformable portions.

8. A stackable article as in claim 7, wherein each said deformable means is a unitary part of said one wall and includes a hinge which permits said portion of each said deformable means to change its shape when force is applied thereto.

9. A stackable article as in claim 7 wherein said deformable portion of the first said deformable means is generally flat in the absence of the force and said deformable portion of the second deformable means is generally dome shaped in the absence of the force.

10. A stackable article of an elastically deformable material having a first wall and a second wall defining an open portion to accept another article of the same general shape to be nested therein with the first walls of the respective articles lying adjacent each other, first and second deformable means formed on the first wall of a said article to achieve substantial alignment with a second and a first deformable means respectively on the first wall of another stackable article when nested therein, each of said first and second deformable means of the article having a respective deformable portion thereon which deforms in a substantially opposite direction to the deformable portion of the other deformable means when force is applied substantially transverse to said deformable portions, said deformable portion of the said first deformable means being generally flat in the absence of the force and said deformable portion of the second deformable means being generally dome shaped in the absence of the force, each of said first and second deformable means being a unitary part of said one wall and each including a respective first means which permits said flat deformable portion of said first deformable means to deform to a more dome shape when force is applied thereto and which permits domed portion of said second deformable means to deform to a more flat shape when force is applied thereto.

11. An article as in claim 10, wherein said first means of each deformable means including a hinge.

12. A stackable article as in claim 10, wherein said first and second deformable means are located on said one wall of one article to achieve respective substantial vertical alignment with a respective second and a first deformable means of another stackable article when nested.

13. A stackable article as in claim 10, said article being non-circular and having the first and second deformable members located thereon to achieve the stated vertical alignment when a part of one stackable article is oriented by a predetermined amount with respect to the same part of another stackable article when the two are nested.

14. A stackable article as in claim 13, wherein said article has a plurality of pairs of first and second deformable means, said pairs of first and second deformable means arranged to provide mirror image symmetry.

15. A stackable article as in claim 10, said article being substantially circular and said first and second deformable means being bounded by a generally closed perimeter.

16. A stackable article as in claim 15, wherein said perimeter is in the shape of a circle.

17. A stackable article as in claim 11, wherein said hinge is in the general shape of an inverted V, the legs of the V being capable of spreading as force is applied to a respective deformable member.

18. A stackable article as in claim 11, wherein there is a single hinge means for each of said first and second deformable means, said single hinge means substantially surrounding the respective deformable portion of each said deformable means.

19. A stackable article as in claim 10, wherein each of said first and second deformable means has the general shape of a ring, said rings being concentric with respect to each other.

20. A stackable article as in claim 19, wherein each ring shaped deformable means has first and second hinge means attached to opposite sides of the respective deformable portion of a said deformable means.

21. A stackable article as in claim 20, wherein said first deformable means lies within said second deformable means.

22. A stackable article as in claim 20, wherein said second deformable means lies within said first deformable means.

23. The article of claim 10, wherein first and second deformable members are generally ring shaped with the rings being concentric, the positions of said rings being reversed on alternate articles to be stacked together.

* * * * *