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P. DAVIS

3,353,708

DISPOSABLE PLASTIC ARTICLE

Filed March 15, 1965

2 Sheets-Sheet 1

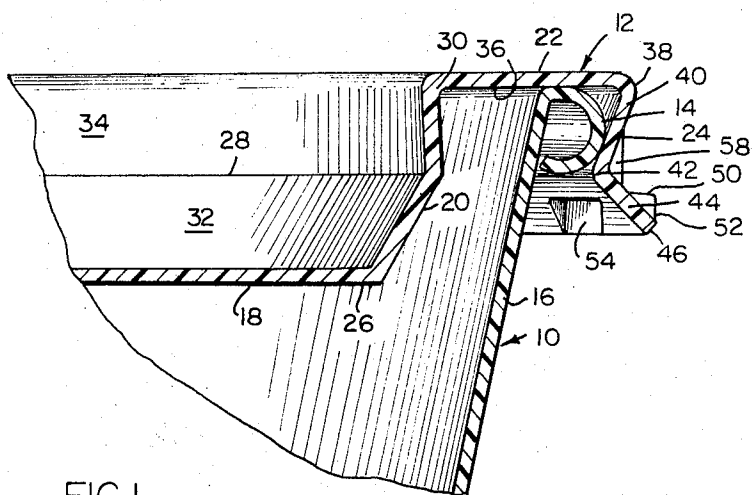


FIG. 1

FIG. 2

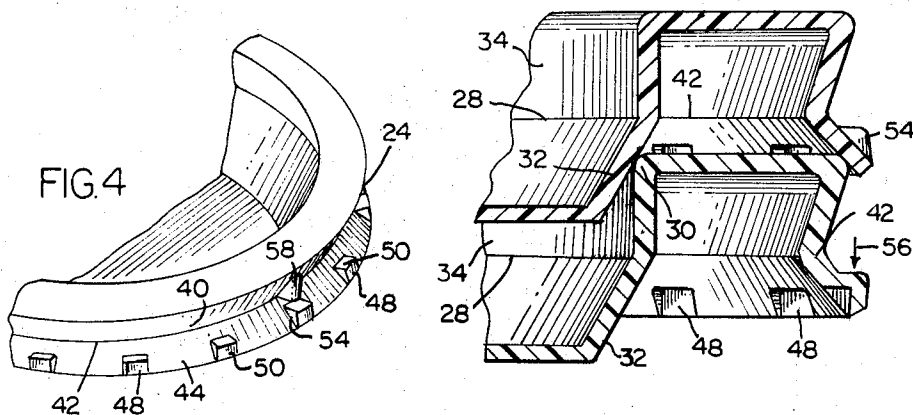


FIG. 4

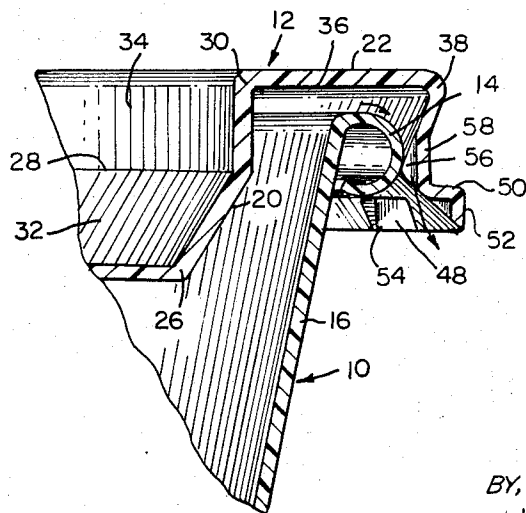


FIG. 3

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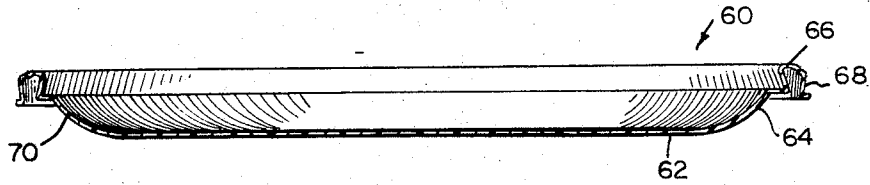


FIG. 5

FIG. 6

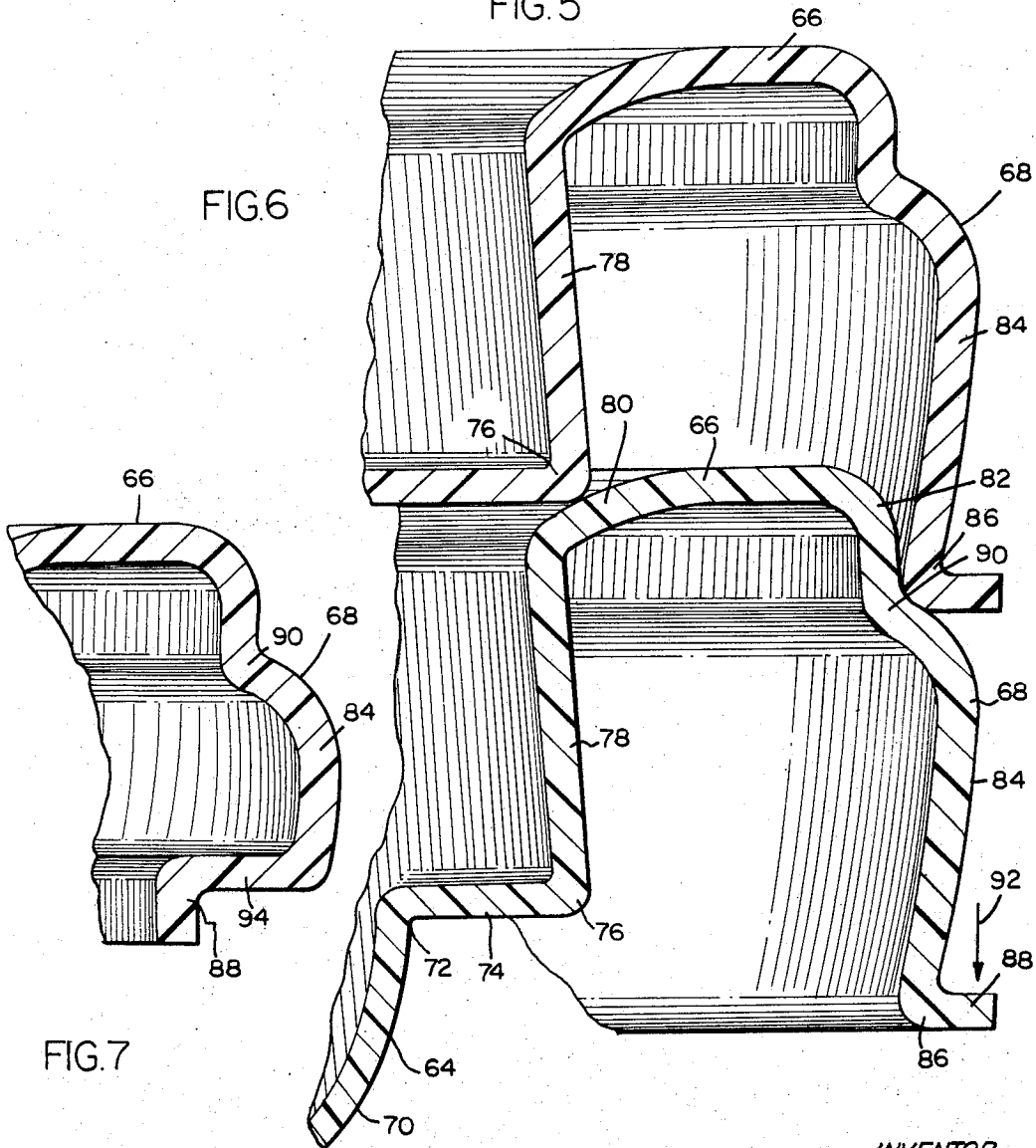


FIG. 7

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DISPOSABLE PLASTIC ARTICLE

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ABSTRACT OF THE DISCLOSURE

Nesting of articles made of thin sheet material is carried out by a new and improved nesting configuration for thin sheet plastic lids, dishes, containers and other related articles. Among the features of a disposable plastic article in accordance with the invention are a bottom wall, a side wall, an outwardly extending top wall and a downwardly extending skirt. The side wall and skirt are so formed that each nests in contact with the side wall and skirt of an identical article when the two are stacked one upon another.

The nesting characteristic of disposable plastic articles is a very important consideration in evaluating the quality of such goods. The nesting characteristic of such articles is important for it relates to the storage capacity of establishments using the articles, the shipping costs of the articles and the ability to use the articles in automatic feeding and vending equipment. A high quality article must be capable of stacking in a low nest with other identical articles, of creating a stable stack so that the articles don't tilt or slip with respect to one another, of preventing jamming of one article with another (i.e., binding of the rim of one article with the next lower article in a stack), and of being fed by automatic conveying equipment from one station to another.

One important object of this invention is to provide a disposable plastic article made of thin sheet material which forms a low nest and stable stack with other identical articles when they are placed one on top of the other.

Another important object of this invention is to provide a disposable plastic article made of thin sheet material which will nest with other identical articles without binding or locking on them.

Another important object of this invention is to provide a disposable plastic article made of thin sheet material which may be automatically dispensed by conveying equipment when nested with other identical articles.

To accomplish these and other objects in accordance with this invention, the disposable plastic article made of thin sheet material includes among its features a bottom wall, a side wall, an outwardly extending top wall and a downwardly extending skirt. The side wall and skirt are so formed that each nests in contact with the side wall and skirt of an identical article when the two are stacked one upon the other. Each article is provided with an outwardly extending flange at the bottom of the skirt possessing sufficient stiffness so that it may be pushed by a mechanism in dispensing or conveying apparatus to separate each article from the other articles in the stack.

These and other objects and features of this invention along with its incident advantages will be better understood and appreciated from the following detailed description of several embodiments thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

FIG. 1 is an enlarged fragmentary cross-sectional view of a disposable thin sheet plastic lid embodying this invention, shown seated on the lip of a cup;

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FIG. 2 is an enlarged fragmentary cross-sectional view of a pair of lids identical to that in FIG. 1 and showing the manner in which the lids nest with one another when stacked;

FIG. 3 is an enlarged cross-sectional fragmentary view similar to that of FIG. 1 illustrating another characteristic of the lid;

FIG. 4 is a fragmentary perspective view of the lid shown in FIGS. 1-3;

FIG. 5 is a cross-sectional view of a disposable thin sheet plastic dish constructed in accordance with this invention;

FIG. 6 is an enlarged fragmentary cross-sectional view of a pair of dishes identical to that in FIG. 5 and showing the manner in which the dishes nest with one another when stacked in a column; and

FIG. 7 is an enlarged fragmentary cross-sectional view of the rim of the dish shown in FIG. 5 and illustrating the manner in which its skirt may be rolled.

In FIG. 1 a container 10 used as a dish, cup, or other article, is shown closed by a lid 12 embodying the present invention. The container 10 is provided with a rolled rim 14 at the top of the side wall 16. The lid 12 cooperates with the rim 14 to form a seal about the mouth of the container 10.

The lid 12 includes a bottom wall 18, an upwardly extending side wall 20, a top wall 22 that extends outwardly from the top of the side wall 20 and a skirt 24 that extends downwardly from the outer edge of the top wall 22. The side wall 20 of the lid as shown in FIG. 1 does not engage the inner surface of the side wall 16 of the container, but rather is spaced a substantial distance from it. The side wall 20 and the bottom wall 18 of the lid may form a seat for the bottom of a second container stacked on top of it. The side wall 20 extends upwardly and outwardly from its bottom edge 26 at the periphery of the bottom wall 18 to a bend 28 intermediate the bottom edge 26 and its top edge 30. From the bend 28 the upper portion 34 of the side wall 20 extends upwardly and inwardly to the top edge 30. Thus, the lower portion 32 and the upper portion 34 of the side wall 20 converge outwardly toward one another in the direction of the bend 28.

The top wall 22 in the embodiment shown is substantially flat and is adapted to seat on the container 10 with its lower surface 36 in contact with the top of the side wall 16 and the top of the rolled rim 14. The outer edge 38 of the top wall 22 extends radially beyond the point of maximum radius on the rim 14.

The skirt 24 has an upper portion 40 which extends inwardly and downwardly from the edge 38 to a bend 42, and from the bend, the lower portion 44 of the skirt extends outwardly and downwardly to the lower edge 46. When the lid 12 is seated on the rim 14 of the container 10, the upper portion 40 of the skirt a short distance above the bend 42 bears against the outer face of the rim 14 below its point of maximum diameter so as to retain the lid in place on the rim. Thus, the top wall 22 forms a seal with the rim 14 while the upper portion of the skirt 24 retains the lid in place on the rim. In the absence of other structure, the upper portion 40 may form a second seal with the rim.

The lower portion 44 of the skirt 24 is shown to be provided with a number of protrusions 48 spaced equally about the skirt. Each protrusion includes a generally horizontal outwardly extending top face 50 and a generally vertical side face 52 which extends downwardly from the outer edge of the top face 50. The protrusions 48 also include side faces 54. The protrusions 48 spaced about the lower portion 44 of the skirt increase the rigidity of the skirt and particularly provide a surface against which a

dispensing mechanism may push to separate lids when stacked one upon the other in the manner shown in FIG. 2. It is evident in FIG. 2 that a thread or other form of cam of a conveying mechanism can push downwardly on the protrusions 48 as suggested by the arrow 56 to separate the lower lid of the two shown from the other lid when they are being fed, for example, to a container capping machine.

The nesting characteristics of the lid are clearly shown in FIG. 2. It will be noted that when the lids are stacked one upon the other, the inner surface of the lower portion 44 of the skirt 24 rests upon the corner 38 at the junction of the top wall 22 and the skirt, while the outer surface of the lower portion 32 of the side wall 20 rests upon the corner 30 at the junction of the top wall 22 and the side wall. The width of the top wall 22 is substantially greater than the space between the outer surface of the side wall 20 and the inner surface of the skirt 24 measured at the plane of the bends 28 and 42 so that the top wall 22 of the lower lid cannot jam within the space between the skirt and the side wall above the bends. Therefore, there is substantially no possibility that one lid will lock upon another to interfere with the ready separation of the lids. Further, the two lines of contact (at the skirt and side wall) of the lids produce a particularly stable stack. Thus, it is seen that the lid in accordance with this invention can readily be separated from other lids in a nest, forms a stable stack when nested with other identical lids and provides a relatively low nest so that many lids may be stacked within a given height.

The lid shown in FIGS. 1-4 includes yet another feature which enhances its performance. Venting protrusions 58 bridge the bend 42 in the skirt 24 at spaced locations about the periphery of the lid in order to allow the lid to seat on the rim 14 without trapping substantial air beneath the lower wall 18 to prevent any substantial increase in pressure in the container as the lid is applied. In FIG. 3, a lid is shown in an intermediate position before it is fully seated on the rim 14 of the container. In the position shown the protrusions 58 which bridge the bend 42 provide passages 60 between the inner surface of the skirt 24 and the outer surface of the rim 14 so that the air in the container may be vented without difficulty. Only when the bend 42 slips beneath the rim 14 of the container so as to snap the lid from the position shown in FIG. 3 to that shown in FIG. 4, is the venting passage closed by the contact between the top wall 22 of the lid and the top of the rim 14. It will also be appreciated that when the lid is seated as in FIG. 1 and pressure builds up within the container for any reason, the flexible nature of the lid material will allow it to bow upwardly to unseat the lid on the rim and vent the pressure through the passages 56. If the rim 14 is somewhat shorter in a vertical direction than the rim shown, the passage 56 itself will close when the lid is seated as shown in FIG. 1 so as to form two seals between the lid and the container rim. It is only necessary to provide just a few of the bridging protrusions 58 about the lid to allow adequate venting when the containers are being capped.

In the article of FIGS. 5-7 the invention is embodied in a shallow dish 60. The dish includes a bottom wall 62, a side wall 64 extending upwardly from the periphery of the bottom wall 62, a top wall 66 extending outwardly from the upper edge of the side wall 64 and a skirt 68 extending downwardly from the outer edge of the top wall.

The side wall 64 includes a lower portion 70 that is upwardly and outwardly flared and emerges in a smooth curve from the bottom wall 62. The lower portion 70 terminates at its upper end in a corner 72 that forms the inner edge of a horizontal shoulder 74. The outer edge of the shoulder forms a bend 76. The upper portion 78 of the side wall extends upwardly and inwardly from the bend 76 and terminates at the top wall 66. The top and side walls are joined together at the corner region 80. The

top wall 66 is bent downwardly adjacent its outer edge 82 and merges smoothly into the skirt 68. The skirt 68 and particularly its lower portion 84 extends downwardly and inwardly to the lower edge 86, and a very short horizontal flange 88 extends outwardly from the lower edge 86 of the skirt.

In FIG. 6 the manner in which the plates nest with one another at their edges is clearly shown. The lower edge 86 of the lower portion 84 of the skirt 68 rests upon a seat 90 provided at the top of the portion 84, and simultaneously the lower edge 76 of the upper portion 78 of the side wall rests upon the corner region 80 where the portion 78 and the top wall 66 join one another. The double seating of the side wall and skirt provides a very stable stack when identical dishes are placed in a column one above the other. Further, a relatively low nest is created between the dishes so that a stack of dishes of a given number consumes relatively little space. Further, the top wall 66 including its outer downturned region 82 is substantially wider than the space between the lower corner 76 of the portion 78 of the side wall and the lower end 86 of the portion 84 of the skirt. Consequently, it is substantially impossible for the upper wall 66 of the rim portion of one dish to force its way upwardly within the region between the side wall portion 78 and the skirt of another so as to lock or bind the two together. The outer flange 88 provides a relatively stiff protrusion against which a feeding screw or cam of a dispensing machine may push as suggested by arrow 92 to separate the lowermost lid in a stack from the other lids nested above it.

The dish shown in FIG. 5 may be subjected to a rim rolling operation. In fact, the nestability of the dishes as depicted in FIG. 6 is particularly important before the rim is rolled so that they may be conveyed to a rim rolling machine by a conveying mechanism. That is, the machine which exerts the force represented by the arrow 92 on the flange 88 may be the machine which conveys the dishes one at a time to the machine for rolling the dish rims.

In FIG. 7 the manner in which the dish rim may be rolled is shown. In that figure the downwardly and inwardly extending portion 84 of the skirt 68 is shown to be turned under at its lower section 94 so that the flange 88 is in a vertical plane as opposed to the horizontal plane shown in FIGS. 5 and 6. The rolled rim enhances the beauty of the dish without sacrificing the resistivity of the dish to binding upon other like dishes when stacked one on top of the other. It will be noted in FIG. 7 that the lower section 94 which extends inwardly reduces the space between the side wall portion 78 and the skirt 68 so that the top wall 66 of a dish cannot squeeze into that space.

There are several similarities between the lid shown in FIGS. 1-4 and the dish shown in FIGS. 5-7. Each of the articles has a side wall substantially greater in axial height than the height of the skirt 68, and each is designed to prevent the top wall of the rim of the article from binding within the space between the upper portion of the side wall and the skirt. Thus, in the embodiment of FIG. 1 the top wall 22 of the lid will not bind or lock within the space between the skirt and side wall above the bend 28 and the lower end of the downwardly and inwardly extending portion 40 of the skirt. Similarly, the top wall 66 of the dish 60 cannot fit within the space between the upper portion 78 of the side wall and the skirt portion 84, above the bend 76 and the lower end 86 of the skirt. Further, when each is stacked with an identical article, the nesting relationship of the two is such that contact is made both at the skirt and the side wall so that a particularly firm and stable seat is provided. In addition, each is provided with means to enable a conveying mechanism to peel off or separate the bottommost article in a stack from the other identical articles nested above it so that the articles may be conveyed one

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at a time to some station or equipment where that condition is necessary.

From the foregoing description those skilled in the art will appreciate that numerous modifications may be made of this invention without departing from its spirit. Therefore, it is not intended that the breadth of this invention be determined by the specific embodiments illustrated and described. Rather, it is intended that the scope of this invention be determined by the appended claims and their equivalents.

What is claimed is:

1. A disposable plastic article made of thin sheet material comprising,
 - a bottom wall lying substantially in a plane,
 - a side wall extending upwardly from the bottom wall,
 - a bend intermediate the top and bottom of the side wall, said side wall having an upper portion that extends upwardly and inwardly from the bend and a lower portion that extends continuously inwardly to said bottom wall,
 - a top wall extending outwardly from the top of the side wall,
 - a skirt extending downwardly from the outer edge of the top wall but terminating above said plane passing through said bottom wall,
 - said skirt comprising a downwardly and inwardly inclined portion extending from the top wall of the skirt with the inside of the skirt below the minimum diameter of the inclined portion being adapted to engage a point on the outside above the inclined portion of the skirt of an identical article nested beneath it and a downward and outwardly inclined portion depending from said inwardly inclined portion,
 - said side wall having an outer diameter at a first point below the upper portion substantially equal to the inner diameter of the upper portion of the side wall at a second point above the first point a distance

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equal to the distance between the points on the skirt whereby the side walls of identical articles nest at the first and second points when the points on the skirt nest.

2. A disposable plastic article as defined in claim 1 further characterized by
 - said top wall having a radial width substantially greater than the radial width measured between the bottoms of the portions of the side wall and skirt where said top wall nests whereby the top wall cannot jam between the skirt and side wall above the bottoms of said portions.
3. A disposable plastic article as defined in claim 2 further characterized by
 - spaced relatively stiff protrusions provided about the skirt below the bottom of the inwardly inclined portion against which an axially directed force may be applied to separate nested articles.
4. A disposable plastic article as defined in claim 1 and further comprising a plurality of venting passages provided in the skirt bridging the top of the downward and outwardly inclined portion and the bottom of the first-named portion of the skirt.

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