

June 16, 1964

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3,137,409

CONTAINER COVER

Filed Jan. 23, 1963

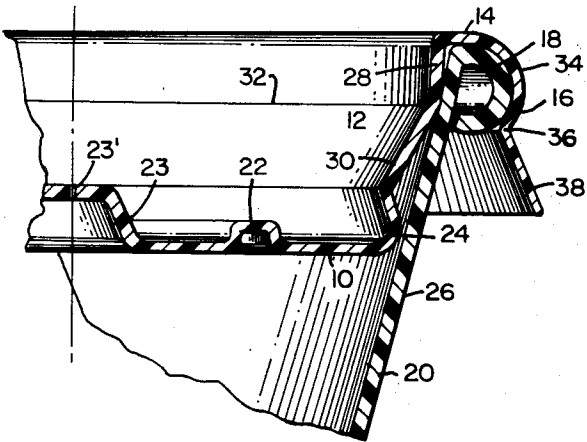
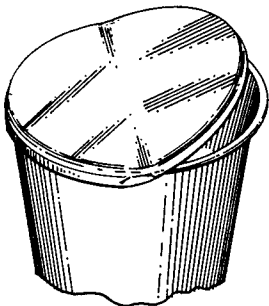


FIG. 1



PRIOR ART

FIG. 3

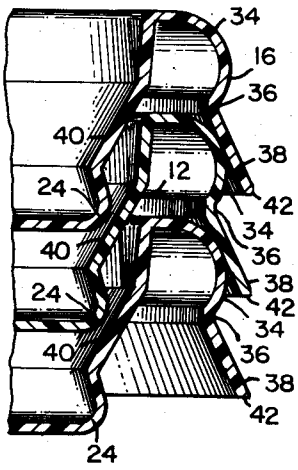
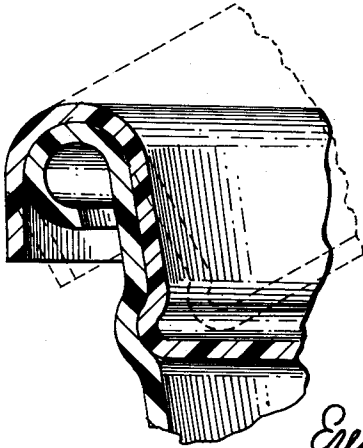


FIG. 2



PRIOR ART

FIG. 4

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## CONTAINER COVER

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Filed Jan. 23, 1963, Ser. No. 253,491  
8 Claims. (Cl. 220-97)

This invention relates to container covers and more particularly comprises a new and improved disposable plastic lid for drinking cups and the like, which nests with identical lids when stacked one above the other.

The quality of disposable lids made of plastic or paper commonly used as covers for drinking cups and the like is measured in terms of the effectiveness of the seal which they form about the mouth of the container, how easily they may be mounted on and removed from the containers with which they are used, how well they nest one upon the other when stacked in a column and how many lids may be stacked in a given stack height. A high quality product provides a very effective seal, is easy to manipulate on the containers, forms a stable stack when nested with other lids and easily separates from other lids in the stack, and nests very close to other lids to form a very dense stack. It is an object of this invention to provide a lid which is inexpensive and relatively easy to fabricate and which possesses the high quality characteristics herein noted.

While it is not particularly difficult to design a lid which forms an effective seal with a container, such lids which provide the necessary seal are very often extremely difficult to remove. Very often lids which form a tight seal on the container mouth tend to peel off the mouth rather than snap off when a lifting pressure is exerted upon them. When such a lid is removed from the container mouth by an upward and outward pull applied to the downturned skirt of the lid outside the container rim, a substantial part of the remaining portion of the skirt is pulled more tightly against the container wall and binds against it beneath the container rim. This action particularly prevalent with lids made of thin stock increases the difficulty of removing lids from the containers and often jars the containers and spills the contents because of the considerable force required to finally remove them.

It is essential that the lids be designed to cooperate with one another so that they form a stack without one lid binding upon an adjacent lid in a manner which would make it difficult to separate them. Moreover, the lids when stacked should provide some means which enables any lid to be engaged at its periphery. The lids should so loosely fit together that when one lid is supported at its periphery the lid or lids disposed beneath it will drop freely from the stack. This feature enables the lids to be used in vending machines and the like where automatic dispensing of them is essential.

It should be apparent that considerable savings may be realized if in a selected stack height a great number of lids may be nested together. The smaller the package required for a given number of lids, the less costly is packing and shipping of the lids in quantity. Moreover, lids which stack or nest very close together place lesser storage demands not only upon the user of such lids but on the manufacturer as well.

In accordance with the present invention the lid includes a side wall extending upwardly and outwardly from the periphery of the bottom wall, which walls are joined together by an outwardly convex bead. An outwardly extending flange is secured to the top of the side wall, and depending from the outer edge of the flange is an inwardly concave arcuate wall which forms the upper portion of the lid skirt. A downwardly and outwardly flared lower skirt portion extends from the lower edge of the arcuate

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portion of the skirt, and the lower portion is designed to rest upon the arcuate portion of the next lower lid in a stack when the lid is nested with like lids. The inwardly concave portion of the arcuate wall is designed to form a seal about the mouth of the container with which it is used by engagement with the rolled rim of that container over a substantial area.

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 one embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

FIG. 1 is a fragmentary cross sectional view of a lid and container constructed in accordance with this invention;

FIG. 2 is a cross sectional fragmentary view of a number of identical lids constructed in accordance with this invention and illustrating the manner in which they nest together;

FIGS. 3 and 4 illustrate different characteristics of the prior art.

The lid of this invention includes a bottom wall 10, a side wall 12, an outwardly extending flange 14, and a skirt 16. As shown in FIG. 1, the lid is designed to fit within the rim 18 of a container 20 and form a seal about the container mouth so as to prevent the container contents from spilling. The manner in which the lid forms the seal at the mouth of the container and nests with like lids formed in a stack are described in detail below.

The bottom wall 10 of the lid is shown in FIG. 1 to be provided with a rib 22 on its upper surface which may cooperate with the bottom of a container standing on its upper surface to prevent that container from tipping. The rib 22 may bear against the inner or outer edge of the bottom of the container side wall to achieve this purpose. The inverted well 23 disposed inwardly of the rib 22 has a central perforation 23' which permits air or steam within the container to escape without spilling the liquid contents.

The side wall 12 of the lid is connected to the bottom wall 10 by an outwardly convex bead 24, and the side wall is flared upwardly and outwardly at an angle to the vertical which is somewhat greater than the angle with the vertical formed by the side wall 26 of the container 20. Intermediate its ends the side wall 12 turns upwardly in a more acute angle with the vertical to provide an upper side wall portion 28 joined to the lower portion 30 at the bend 32. While the lower portion 30 of the side wall 12 forms a greater angle with the vertical than the side wall 26 of the container, the upper portion 28 of the side wall forms an angle with the vertical which is less than that formed by the side wall 26, and therefore, the side wall 12 of the lid bears against the side wall 26 of the container at the region of the fold 32. The lid is dimensioned so that when the skirt 16 extends about the rolled rim 18 of the container, the fold 32 bears heavily against the inner surface of the side wall 26 and forms a seal at that region about the mouth of the container. The pressure of the lid against the container may cause either or both of the side walls 12 and 20 to deform somewhat and form a most effective seal.

The flange 14 which is relatively narrow and may lie in a plane parallel to the bottom wall 10 merges with the inwardly concave arcuate portion 34 of the skirt 16. The arcuate portion 34 which forms the upper part of the lid skirt extends through an arc of more than 90° so that the lower end 36 of the arcuate portion lies somewhat under the rolled rim 18 of the container. Preferably the arc is approximately 120°. Because the arcuate portion 34 extends over an appreciable arc beneath the rim 18,

it serves to bind the lid on the mouth of the container and prevents it from loosening on the mouth and impair the effectiveness of the seal formed by the inner wall 12 of the lid with the inner surface of the container wall 20. Moreover, the arcuate portion 34 of the skirt is in contact with the rolled rim 18 of the lid over a very appreciable area because their radii are matched for this purpose, and the very appreciable contact between the rolled rim 18 and the skirt 16 forms an additional seal about the mouth of the container which will prevent the contents of the container from spilling even should the seal be less than 100% effective between the side wall 12 of the lid and the wall 26 of the container.

Flared downwardly and outwardly from the edge 36 of the arcuate wall 34 is the lower skirt portion 38 which serves two important functions. First, the lower portion 38 forms a finger grip which facilitates the removal of the lid from the container and second, as is shown in FIG. 2 the lower portion serves as a support for the lid by engaging the upper arcuate wall of the skirt of the lid beneath it when the lids are stacked.

In FIG. 2 it will be noted that when the lids are nested, the bead 24 at the junction of the walls 10 and 12 does not engage the inner surface 40 of the side wall 12 of the next lower lid but rather stands away from that wall a very short distance. It would be difficult to machine the mold on which the lids are formed so precisely that when the lids are stacked one upon the other the bead 24 contacts the inner surface 40 of the wall 12 of the next lower lid just as the lower portion 38 of the skirt of the upper lid engages the arcuate wall 34 of the next lower lid. Because it would be so difficult to achieve this match of contacts at the bead 24 and skirt 16, the lid is designed so that contact is made at the skirt alone, and the bead 24 is formed so as not to engage the wall 12. Thus, while the skirt 16 serves to support the lid upon the next lower lid in the stack, the bead 24 prevents any appreciable shifting of the lid upon the next lower lid by limiting the amount of lateral displacement permitted. While the skirt portion 38 of each lid rests upon the upper portion 34 of the skirt of the next lower lid, the bottom edge 42 of each skirt extends beyond and is free of contact with the skirt of the next lower lid so as to enable a stack of lids to be supported by mechanical fingers or some other device which engages the lower edge 42 of one lid without interfering with the lids beneath it. Thus, the lids of this invention are particularly suitable for use in automatic vending machines which discharge the lids one at a time. It is apparent that when the stack of lids is supported by engaging the lower edge 42 of the bottom most lid in a stack, that lid may readily be discharged by withdrawing support of that lid and engaging the lower edge 42 of the next upper lid in the stack. With this action the lower most lid is permitted to fall away from the stack and will do so readily as it is free of any binding contact with the next upper lid.

It will be noted in FIGS. 1 and 2 that the gap between the outer surface of the wall 12 and the lower end of the arcuate wall 34 is substantially less than the overall width of the upper portion of the lid from the inner surface 40 of the wall 12 to the outer surface of the arcuate wall 34. These dimensions are such that it is impossible, without permanently deforming or mutilating one lid to drive the upper portion of one lid into the inwardly concave portion of the next upper lid in the manner of the rim of the container shown in FIG. 1. As a result, it is not possible without a very appreciable force being appreciable force being applied to the stack of lids to cause one lid to bind upon the next lid and make it thereafter difficult to separate lids in the stack.

In the preferred embodiment of this invention the plastic sheet material from which the lid is made is between .015 and .017 inches in thickness, which is significantly heavier than the material from which ordinary disposable plastic lids are made. Customarily such lids are made of

stock in the range of .010 to .012 inches. The heavier stock has several advantages. First, the lid does not so readily bend and therefore does not have a tendency to peel from the container mouth when being removed. Rather, the lid tends to remain flat and snaps off and on the container rim when being opened and closed. Furthermore, with the heavier material, when an upwardly and outwardly directed pull is applied to one area on the lower portion 38 of the skirt, the remainder of the periphery of the skirt does not have a tendency to bend or draw inwardly toward the wall of the container on which it is mounted to form a more positive grip upon the rolled rim of the container. Lids made of lighter stock have a very definite tendency to bend in this manner so that the pelling action of the lid is accentuated and the lid is even more difficult to remove. This is suggested in FIG. 3 wherein the lid is shown to be partially removed from the cup and the skirt is binding tightly against and under the rim of the container wherever it is not free of it.

The location of the seal at the bend 32 between the wall 12 of the lid and the wall 26 of the container also contributes to the ease with which the lid may be removed. Because the seal is adjacent the top of the container rather than at the region of the bead 24, the lid need be tilted through a relatively slight angle to break the seal. Furthermore, the configuration of the side wall 12 of the lid does not require that a cavity be formed on the inner surface of the lid to receive the bead to effect the seal. Therefore, it is not necessary to spread the container wall to break the seal as would be the case with a cavity which receives the bead 24. In FIG. 4 the prior art lid is shown to form a seal primarily at the bead of the lid, and in broken lines the considerable angle through which that lid must be pivoted to free the bead from the inner surface is suggested.

From the foregoing it will be appreciated that the numerous advantages referred to in the introduction are derived from the present invention. An effective seal is formed between the lid and the container without employing a lid which is difficult to remove and mount on the container. Moreover, the lid nests readily with like lids in a stack without binding one upon the other, and the lids nest relatively close together so that a large number of stacked lids may be packaged in a limited volume. The fact that the preferred lids are made of somewhat heavier stock is not a significant factor in the price of the lids as material cost is not a major manufacturing cost.

While the foregoing description has been limited to container lids, it will be appreciated that many of the features of this invention may be used advantageously in other nestable articles. Moreover, it will be appreciated from the foregoing description 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 embodiment illustrated and described. Rather, the breadth of this invention is to be determined by the appended claims and their equivalents.

What is claimed is:

1. A lid for a container having a flared side wall and a beaded rim comprising
  - a bottom wall,
  - a side wall extending upwardly and outwardly from the periphery of the bottom wall and joined thereto by an outwardly convex bead,
  - said side wall of the lid having upper and lower portions which diverge inwardly in an upwardly and downwardly direction, respectively, from the inner surface of the container side wall and adapted to form a seal at the junction of said upper and lower portions of the side wall of the lid with the inner surface of the container side wall when the lid is mounted on the container,

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an outwardly extending flange secured to the top of the side wall,

a downwardly extending skirt secured to the outer edge of the flange and spaced from the side wall, said skirt having an inwardly concave upper portion adapted to wrap around a substantial portion of the beaded rim of the container and be in surface-to-surface contact therewith over a substantial area, said skirt also having a downwardly and outwardly flared lower portion immediately beneath the upper portion and spaced and diverging downwardly from the outer surface of the container side wall,

the lower portion of said skirt being adapted to rest upon and support the lid on the upper portion of the skirt of an identical lid disposed beneath it and with the bead of the lid spaced from the inner surface of the side wall of the lid beneath it.

2. A container lid as defined in claim 1 further characterized by

said lid being made of plastic sheet material between .015 and .017 inches in thickness.

3. A lid and container combination comprising a container having an upwardly flared side wall terminating in a rolled rim,

a lid having a bottom wall connected by an outwardly convex bead to a side wall,

said side wall having a lower portion flaring upwardly from the bead at an angle with the vertical greater than the angle of flare of the side wall of the container and having an upper portion forming a continuation of the lower portion and flaring outwardly at a lesser angle than the side wall of the container whereby said lower and upper portions of the side wall of the lid diverge respectively in a downwardly and upwardly direction from the inner surface of the container side wall,

the region of the junction of the upper and lower portions of the side wall bearing against the inner surface of the side wall of the container and with the bead of the lid disposed away from the inner surface of said side wall,

an outwardly extending flange secured to the top of the side wall of the lid and extending over and in contact with the top of the rolled rim of the container,

an inwardly concave downwardly extending skirt secured to the outer end of the flange and engaging a substantial area of the rolled rim outwardly and downwardly from the rim top,

and a downwardly extending extension of the skirt flared outwardly from the concave portion and diverging from the side wall of the container.

4. A lid and container combination as defined in claim 3 further characterized by

said downward extension of the skirt of the lid adapted to rest upon the outer surface of the concave portion of the skirt of an identical lid stacked beneath it.

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5. A lid and container combination as defined in claim 3 further characterized by

the bead of the lid being spaced inwardly from the inner surface of the lower flared portion of the side wall of a like lid nested with it in a stack.

6. A lid and container combination as defined in claim 3 further characterized by

the space between the concave portion of the skirt and the upper portion of the side wall of the lid being less than the horizontal distance across the container from the outermost point of the curled rim to the inner surface of the side wall thereof whereby the region of the junction of the upper and lower sections of the side wall compresses and forms a seal with the inner surface of the side wall of the container.

7. A lid for a container having a flared side wall and a beaded rim comprising

a bottom wall, a side wall extending upwardly and outwardly from and joined to the periphery of the bottom wall, said side wall of the lid having upper and lower portions which diverge inwardly in an upwardly and downwardly direction respectively from the inner surface of the container side wall with said upper and lower portions being joined at a bend in the side wall of the lid, said bend being adapted to abut against and form a seal with the inner surface of the container side wall,

means including a downwardly extending skirt secured to the upper edge of the side wall of the lid and having an inwardly concave portion adapted to wrap around a substantial portion of the beaded rim of the container for retaining the lid on the container, said skirt having an outwardly and downwardly flared lower portion secured to the bottom of the concave portion with said flared portion diverging downwardly from the outer surface of the container side wall when the lid is mounted on the container.

8. A lid as defined in claim 7 further characterized by the side wall of the lid extending downwardly below the bottom of the inwardly concave portion of the skirt and with the horizontal distance between the bottom edge of the inwardly concave portion of the skirt and the outer surface of the side wall of the lid being less than the maximum horizontal distance between the outer surface of the inwardly concave portion of the skirt and the inner surface of the side wall of the lid.

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