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Rathbun

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[54] **LID AND CONTAINER**

[75] Inventor: **Willard J. Rathbun,** Castalia, Ohio

[73] Assignee: **Foster Grant Co. Inc.,** Leominster, Mass.

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Related U.S. Application Data

[63] Continuation of Ser. No. 875,157, Nov. 10, 1969.

[52] **U.S. Cl.**..... **220/60 R,** 220/97 R, 220/97 F

[51] **Int. Cl.**..... **B65d 43/10,** B65d 21/00

[58] **Field of Search**..... 220/60 R, 97 R, 97 F, 220/97 C; 229/43

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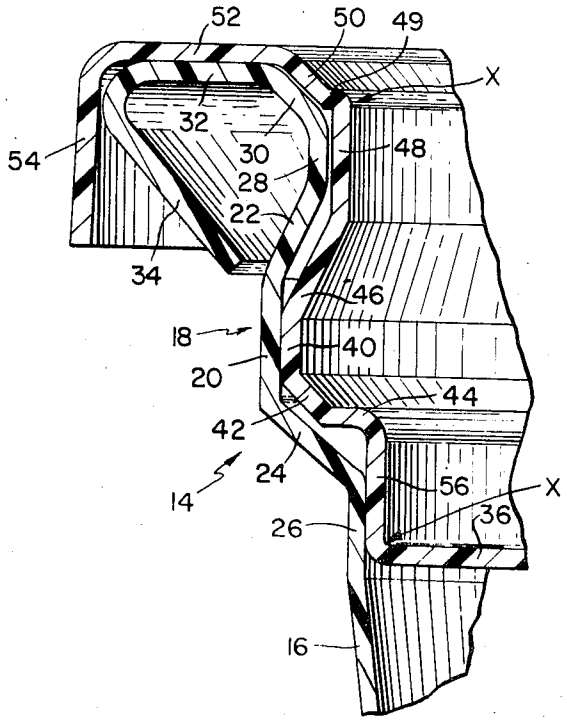
Primary Examiner—George E. Lowrance

Attorney—Leroy G. Sinn, Leonard S. Selman et al.

[57] **ABSTRACT**

A lid and container to which the lid is removably attached; the lid and container each having a configuration which insures a tight seal between them for protecting perishables, the lid configuration also providing a stacking means for maintaining each lid in a stack in its properly aligned position for strip-feeding and a centering means for locating and guiding the lid over the rim portion of the container during a strip-feeding and capping operation.

5 Claims, 6 Drawing Figures



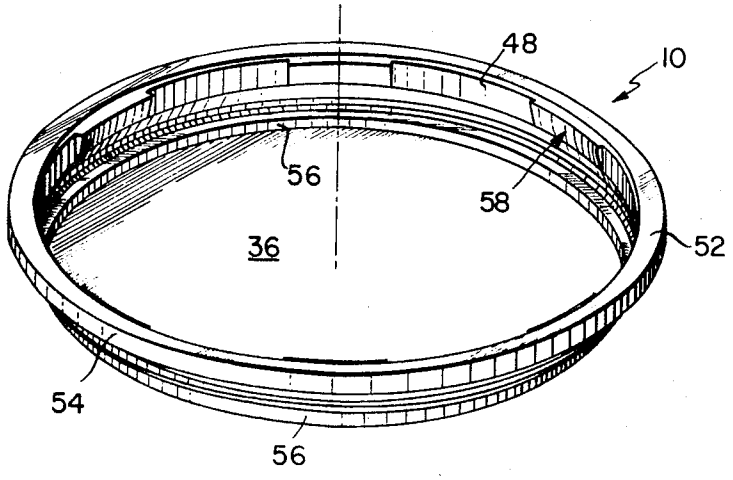


FIG. 1

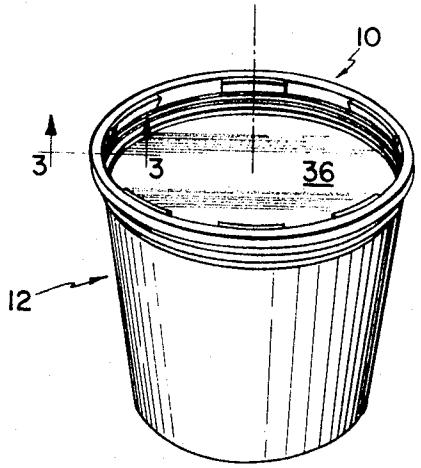


FIG. 2

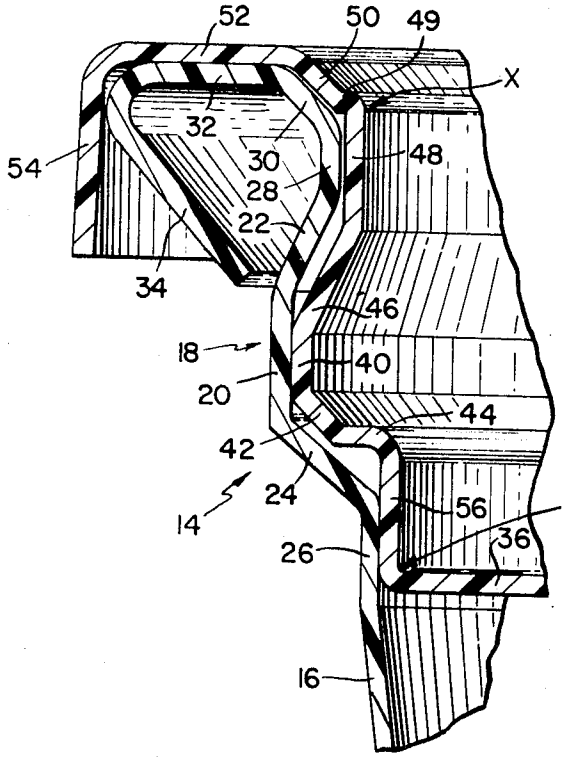


FIG. 3

INVENTOR
WILLARD J. RATHBUN
BY
Leonard S. Selman
ATTORNEY

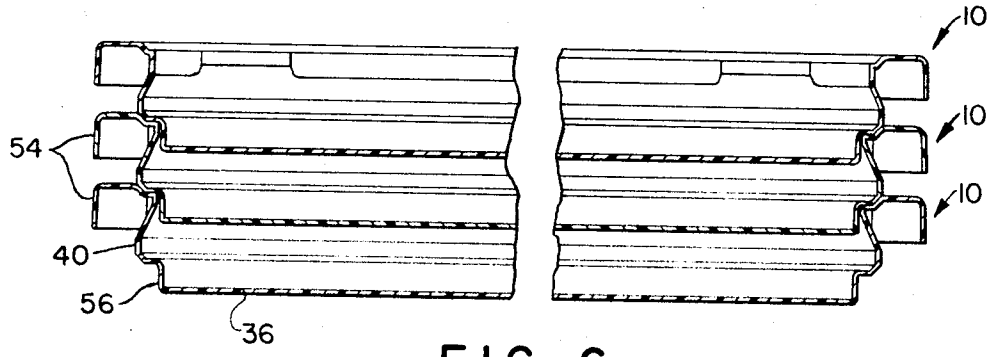


FIG. 6

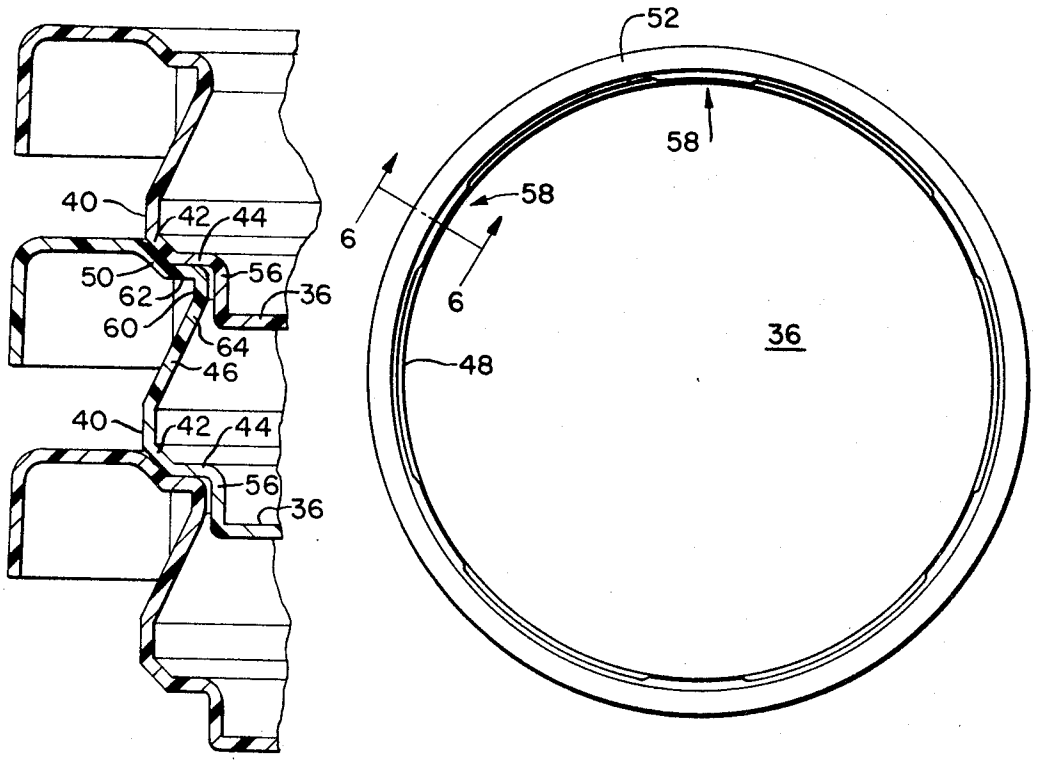


FIG. 4

FIG. 5

INVENTOR
WILLARD J. RATHBUN
BY
Leonard D. Lehman
ATTORNEY

LID AND CONTAINER

This is a continuation of application, Ser. No. 875,157, filed Nov. 10, 1969.

This invention relates generally to improvements in a closure or lid and in the container to which the lid is removably attached, the container being the kind commonly used to contain cold or hot, liquid or solid food products.

One most important function of the lids and containers disclosed herein is to seal the lid tightly on the container to prevent spoilage of perishable items such as food. Because of the nature of the forming operations of the container and lid packages in common use today, it has been often found that each lid does not always perfectly fit its container, resulting in leakage both of food product out of the container and air and foreign particles into the container. Thus, instead of providing only a single sealing area between the lids and containers, the present invention provides two separate sealing areas which consistently provide a tightly sealed package.

An additional requirement for the lid is imposed where automatic feeding or dispensing of the lid is contemplated. Automatic dispensing apparatus may be used in dispensing machines to discharge the lids, and likewise, the lids may be dispensed by equipment used to cap food containers, or the like. With use in such equipment it is customary, due to space requirements, to arrange the lids in a vertical stack from which they are removed for capping the open mouth containers. Individual lids may then be removed from the bottom of the stack in synchronous relationship with the container-filling apparatus for movement to a container lid assembly station where the capping operation takes place. The term strip-feeding is generally used to describe the feeding operation utilized with the present lids where there is a substantially vertical separating movement between the lowermost lid and the next adjacent lid. To facilitate this operation, the lids must be maintained in a straight stack and any substantial lateral movement of one lid relative to another must be prevented. The lids, according to the present invention, are thus provided with a configuration which at all times aids in maintaining each lid in a stack in its properly aligned position.

After the containers are filled with the food product, for example, they are automatically capped by machinery which locates the containers with respect to the lids and press fits the lids on the containers. The lid configuration disclosed herein is such that provides a centering portion to aid in locating and guiding the lids over the rim portions of the containers during this operation and whenever replacing the lids on the containers.

Accordingly it is an object of the present invention to provide a lid and container to which it is removably attached, which incorporate several advantageous features in a simple structure.

Another object of the invention is to provide a lid and container package having portions thereon for forming a tight seal therebetween for the protection of perishables.

A further object of the invention is to provide a container lid having a stacking means which will maintain each lid in a stack in its properly aligned position.

A still further object of the invention is to provide a container lid including a centering means to aid in locating and guiding the lid over the rim portion of the container.

Another object of the invention is to provide a lid and container to which it is removably attached, which can both be economically made by known molding or manufacturing techniques.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

To accomplish these and other objects, the lid of the present invention includes a bottom wall adapted to cover the mouth of the container, a bead joined to the periphery of the bottom wall which is adapted to be received in a channel or groove provided in a complementary container, the bead including a first sealing portion, and a second sealing portion formed below the bead at the junction of the bead and the bottom wall. A side wall of the lid extends upwardly from the bead and a rim portion is joined to the periphery of the sidewall. The first and second sealing portions on the lid are of the expansion type being formed with a slightly larger diameter than the portions of the container they are meant to engage in sealed relationship therewith. Thus, the reactive forces in the container sidewalls resisting expansion assure that there is a tight sealing contact between the lid and container in those engaged portions. A feature of the present invention resides in the sealing portion formed in the container wall beneath the bead receiving groove to provide one of the two expansion seals in cooperation with the lid sealing portions. The other expansion seal is provided between the container and lid in the area of the bead receiving groove in the container sidewall.

The structure on the lid forming one of the sealing portions located below the bead also serves at least two other important functions. Specically, it provides a stacking means which is received within the space between the sidewalls of a like lid disposed below the lid in a vertical stack of such lids. The sidewalls of the lids have an inner diameter to receive and closely surround the stacking means of the lid above in nesting relationship to prevent substantial lateral movement of any lid in a vertical stack of such lids. The other function of the lid sealing portion located below the bead is to serve as a centering means for the lid to aid in locating and guiding the lid over the rim portion of a container to which it is to be attached. This is especially advantageous when the lid is utilized with containers lacking such centering structure such as certain so-called rim stacking containers.

Thus, a single integral structure on the lid below the bead serves as an integral combination expansion sealing portion, stacking means, and centering means when the lid is attached to a complementary container or when stacked when awaiting capping.

The features of this invention along with its incidental advantages will be better understood and appreciated from the following detailed description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing in which:

FIG. 1 is a perspective view of the novel container lid or closure member of the present invention;

FIG. 2 is a perspective view of the lid and container of the present invention in attached relationship;

FIG. 3 is an enlarged fragmentary side elevational view, in section, of the container and lid substantially as taken along line 3—3 in FIG. 2;

FIG. 4 is a top plan view of the lid of the present invention;

FIG. 5 is an enlarged fragmentary sectional view substantially as taken along line 5—5 in FIG. 4 of a plurality of stacked lids; and

FIG. 6 is a reduced sectional view of a plurality of stacked lids as shown in FIG. 5.

Referring to the drawing and first to FIGS. 1 and 2, there is shown a lid or closure member 10 which forms a package in conjunction with container 12, which for purposes of illustration may be considered as especially designed for a food product, for example, cottage cheese. Both the lid 10 and container 12 are preferably made from thermoplastic materials such as polystyrene, polyethylene, and other similar plastic materials. The configurations of the lid and container are such that they may be easily and economically formed by conventional thermoforming techniques, as one-piece seamless articles of a thin-wall nature. It should be understood that other materials may also be employed either separately or combined in some manner with thermoplastic materials to form the lids described herein.

The lid 10 is adapted to be positioned over the open mouth of the container 12 having a substantially complementary rim portion 14 as shown in FIG. 3. Located in the vicinity of rim portion 14 above the sidewall 16 of the container is an inwardly facing groove 18. The groove 18 includes a substantially vertical annular expansion sealing portion 20, an upper inwardly inclined portion 22, and a bottom inwardly inclined portion 24. Located below the portion 24 is another substantially vertical annular sealing portion 26 which merges into the container sidewall 16. Above the groove 18 on the container and merging with inclined portion 22 there is an upwardly extending cylindrical portion 28 merging into an outwardly inclined portion 30. A substantially flat flange portion 32 extends outwardly from the upper extremity of inclined portion 30 and a depending annular skirt portion 34 is secured to the outer edge of the flange 32 which may be turned inwardly as shown in FIG. 3.

For covering the container the lid 10 is provided with a horizontally extending generally planer bottom wall 36 which overlies the open mouth of the container 12. Joined to the periphery of the bottom wall is a bead 38. The bead 38 includes a substantially vertical annular expansion sealing portion 40, a lower inwardly inclined portion 42 merging into a short horizontal portion 44 and an upper inwardly inclined portion 46. Portion 46 merges into a substantially vertical lid sidewall portion 48. The rim portion of the lid includes a small horizontal portion 49, a small inclined portion 50, a substantially flat flange portion 52, which extends outwardly from the upper extremity of portion 50, and a depending annular skirt portion 54 which is secured to the outer edge of flange portion 50. The vertical expansion sealing portion 40 on the lid bead 38 engages the expansion sealing portion 20 on the container 12 to establish a seal between the container and lid so as to protect the contents of the container from the entry of air and foreign particles, or the like. The expansion sealing portion 40 on the lid is made with a slightly larger diameter than the expansion sealing portion 20 on the container, so that the resistance to expansion of the container portion 20 insures a tight seal.

Below the bead 38 on the lid at the junction of the bead and the bottom wall 36 is located a second substantially vertical annular expansion sealing portion 56. This sealing portion 56 as shown in FIG. 3 engages the expansion sealing portion 26 on the container to establish a second seal between container and lid. Once again the sealing portion 56 on the lid is made with a slightly larger diameter than the sealing portion 26 on the container, so that the resistance to expansion of the container insures a tight seal.

It can be seen that the two separate expansion sealing areas between the container and lid will still provide a tight seal even if, due to some difficulty in forming either the container or lid, one of the seals was not complete. The substantially vertical orientation of the sealing portions 20 and 26 on the container and mating portions 40 and 56, respectively, on the lid have additional advantages in that they are relatively easy to form in a vacuum molding process commonly used to manufacture the container and lid, and they form a tight seal and yet do not require much force to slide them together. An additional advantage of the lid structure is apparent during the capping operation. As the lid is urged downwardly into the rim portion of the container, the bead 38 engages the cylindrical portion 28 of the container with a resulting hinge action at points X in FIG. 3 representing hinge lines located above and below the bead at the junction of the sidewall portion 48 and horizontal portion 49, and at the junction of bottom wall 36 and portion 56 respectively. This inward hinging of a portion of the lid including the bead 38 allows the expansion sealing portion 40 of the lid to slip easily into engagement with its mating expansions sealing portion 20 on the container with much less force than would be required without such hinging action. Further, a lid which, either purposely or inadvertently, is made with a diameter that is larger than ordinary at sealing portion 40 relative to sealing portion 20 on the container will still fit on, due to this hinging action, without resulting in a great increase in capping resistance.

FIGS. 4, 5, and 6 of the drawing illustrate the stacking function of the lid expansion sealing portion 56 and especially how portion 56 serves as a stacking means within a vertical stack of lids 10. To receive the portion 56 which extends below the lid bead 38 a plurality of stacking lugs 58 are provided spaced around and forming an integral part of the lid sidewall portion 48 as shown in FIG. 4. Each of these lugs shown in cross-section in FIG. 5 includes a substantially vertical arc-shaped portion 60 and a small horizontal portion 62 extending outwardly from the top extremity of portion 58 which merges with inclined portion 50. A small inclined portion 64 extends from the bottom extremity of portion 60 and merges with the upper inclined portion 46 of lid bead 38. The inner diameter of lid sidewall 48 as outlined by the substantially vertical arc-shaped portions 60 of each lug 58 is of a size so that it closely surrounds the substantially vertical annular portion 56 of the lid above, as shown in FIG. 5, thus positively preventing any substantial lateral movement of any one of the lids forming the vertical stack of such lids. It can be seen in FIGS. 5 and 6 that the lids nest within one another in the stack with a space between the outer skirt 54 of each lid and the lid below, so that a so-called stripper plate or any type of arm member may easily slip into this space and vertically remove the lower lid from the stack. The inclined portions 50 on the upper portion of the lid is made to incline at the same angle

to the lid axis as portion **42** on the lower portion of the lid bead **38**, so that in nested relationship portions **50** conform to and make a seat for portions **42**. The small horizontal portions **62** on each lug **58** also form a seat for the horizontal portions **44** on the lower portion of each lid bead **38**.

Still another function of portion **56** on the lid below bead **38**, as stated previously, is to serve as a centering means, especially during the initial capping operation, to aid in locating and guiding the lid over the rim of the container. Even if the container is slightly out of register when moved into capping position beneath the lid, it can be seen that the portion **56**, because it is slightly smaller in diameter than that of the bead, will still enter the mouth of the container. As the lid is urged downwardly into the container with portion **56** leading the rest of the lid structure, the interaction between the lid, especially the leading end of portion **56**, the container im portion will move the container into its exactly aligned position while guiding the lid over the rim thereof. Since the inclined portion **30** at the rim of container **12** is inclined to the lid axis at the same angle as that of the inclined portion **42** on the lower portion of the lid bead **38**, these two portions will tend to slide easily over one another during capping, contributing to a lessening of capping resistance.

It should be understood that in certain instances the present lid can be used as a closure for a container having only one sealing portion in the bead receiving groove thereof which is engaged by a single expansion sealing portion on the lid, and in such instances the portion **56** on the lid formed below the bead serves primarily as an integral combination stacking and centering means for performing the stacking and centering functions as described above.

I claim:

1. A stackable lid for attaching to a container, said container including a sidewall having an inwardly facing groove near a rim portion thereof and a sealing portion beneath said groove, said lid comprising:

a bottom wall lying substantially in a plane;

a bead joined to the periphery of said bottom wall, said bead including a first substantially vertical expansion sealing portion, a lower inwardly inclined portion and a horizontal portion for engaging, in a sealing contact, said groove on said container;

an integral combination second expansion sealing portion, stacking and centering means comprising a continuous annular portion having a vertical peripheral wall portion formed below and spaced inwardly from the outer periphery, of said bead and joining said horizontal portion of said bead and said bottom wall for, respectively, engaging, in sealing contact, said sealing portion beneath said groove on said container, for preventing substantial lateral movement between the lid and a like lid disposed beneath it in a vertical stack of such lids and for aiding in locating and guiding the lid over the rim portion of the container to which it is to be attached;

a sidewall extending upwardly from said bead on said lid and including a plurality of spaced inwardly extending stacking lugs,

said stacking lugs each including a substantially horizontal seat portion positioned to support the bead of a like lid in a stack of such lids and an upwardly and inwardly extending portion merging into a vertical arc-shaped portion immediately below said substantially horizontal seat portion which closely surrounds at a constant minimum distance a length of the vertical peripheral wall portion of said continuous annular portion formed below said bead of a like lid in a stack of such lids to prevent lateral displacement thereof in a stack of such lids;

said sidewall extending upwardly from said bead on said lid also includes an upwardly and outwardly extending seating portion immediately above said substantially horizontal seat portions on said stacking lugs which seating portion is dimensioned and positioned to engage said lower inwardly inclined portion of the bead of a like lid disposed above said lid in a stack of such lids to further prevent lateral displacement of any lid in a stack of such lid; and

a rim portion on said lid joined to said sidewall.

2. A tight sealing package comprising:

a container having an open end defined by a circumferential rim portion;

an inwardly facing groove near said rim portion of said container and a sealing portion beneath said groove;

a lid adapted to be retained on said container, said lid comprising;

a bottom wall for closing off said open end of said container;

a bead joined to the periphery of said bottom wall, said bead including a first substantially vertical expansion sealing portion, a lower inwardly inclinded portion and a horizontal portion for engaging, in a sealing contact, said groove on said container;

an integral combination second expansion sealing portion, stacking and centering means comprising a continuous annular portion having a vertical peripheral wall portion formed below and spaced inwardly from the outer periphery of said bead and joining said horizontal portion of said bead and said bottom wall for, respectively, engaging, in sealing contact, said sealing portion beneath said groove on said container, for preventing substantial lateral movement between the lid and a like lid disposed beneath it in a vertical stack of such lids and for aiding in locating and guiding the lid over the rim portion of the container to which it is to be attached;

a sidewall extending upwardly from said bead on said lid and including a plurality of spaced inwardly extending stacking lugs,

said stacking lugs each including a substantially horizontal seat portion positioned to support the bead of a like lid in a stack of such lids and an upwardly and inwardly extending portion merging into a vertical arc-shaped portion immediately below said substantially horizontal seat portion which closely surrounds at a constant minimum distance a length of the vertical peripheral wall portion of said continuous annular portion formed below said bead of a like lid in a stack of such lids to prevent lateral displacement thereof in a stack of such lids;

said sidewall extending upwardly from said bead on said lid also includes an upwardly and outwardly extending seating portion immediately above said substantially horizontal seat portions on said stacking lugs which seating portion is dimensioned and positioned to engage said lower inwardly inclined portion of the bead of a like lid disposed above said

lid in a stack of such lids to further prevent lateral displacement of any lid in a stack of such lid; and

a rim portion on said lid joined to said sidewall.

3. The package as described in claim **2** wherein said groove near said rim portion of said container includes a substantially vertical annular expansion sealing portion for engaging said first substantially vertical expansion sealing portion on said lid.

4. The package as described in claim **2** wherein said sealing portion beneath said groove on said container comprises a vertical annular expansion sealing portion for engaging said second vertical expansion sealing portion, stacking and centering means on said lid.

5. A stackable lid for attaching to a container, said container including a sidewall having an inwardly facing groove near a rim portion thereof, said lid comprising:

a bottom wall lying substantially in a plane;

a bead joined to the periphery of said bottom wall, said bead including a first substantially vertical expansion sealing portion, a lower inwardly inclinded portion and a horizontal portion for engaging, in a sealing contact, said groove on said container;

an integral combination stacking means and centering means comprising a continuous annular portion having a vertical peripheral wall portion formed below said bead and joining said horizontal portion of said bead and said bottom wall for, respectively, preventing substantial lateral movement between the lid and a like lid disposed beneath it in a vertical stack of such lids and for aiding in locating and guiding the lid over the rim portion of the container to which it is to be attached;

a sidewall extending upwardly from said bead on said lid and including a plurality of spaced inwardly extending stacking lugs,

said stacking lugs each including a substantially horizontal seat portion positioned to support the bead of a like lid in a stack of such lids and an upwardly and inwardly extending portion merging into a vertical arc-shaped portion immediately below said substantially horizontal seat portion which closely surrounds at a constant minimum distance a length of the vertical peripheral wall portion of said continuous annular portion formed below said bead of a like lid in a stack of such lids to prevent lateral displacement thereof in a stack of such lids;

said sidewall extending upwardly from said bead on said lid also includes an upwardly and outwardly extending seating portion immediately above said substantially horizontal seat portions on said stacking lugs which seating portion is dimensioned and positioned to engage said lower inwardly inclined portion of the bead of a like lid disposed above said lid in a stack of such lids to further prevent lateral displacement of any lid in a stack of such lid; and

a rim portion on said lid joined to said sidewall.

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