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(54) Container lid and gasket combination

(57) A plastic lid for closing a container neck opening according to one embodiment of the present invention comprises a lid body (20) surrounded by an annular rim (23), the annular rim defining a gasket channel (22) having an open portion at one end opening toward the container neck opening and including a closed base (26) at an opposite end. The annular rim defines a pair of raised

annular beads (30, 31) positioned adjacent the open portion of the channel for capturing a gasket (21) received within the gasket channel. The corresponding gasket may be either a preformed gasket that is inserted into the channel or a foamed-in-place gasket that is formed in the gasket channel. No pretreatment of the lid is required for the installed gasket to be retained in the gasket channel.

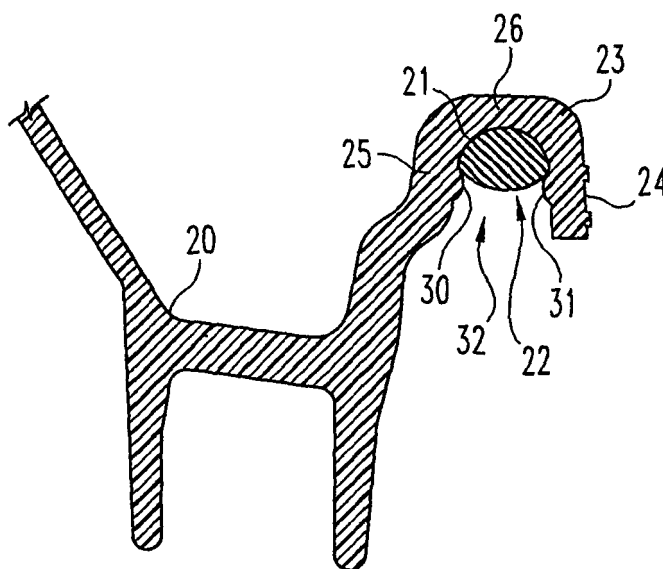


Fig. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates in general to the design of a container lid such as a drum or paid lid and the manner of placing and retaining a sealing gasket in a lid channel. More specifically, the present invention relates to a structural configuration as part of the drum (or other container) lid that facilitates the retention of the sealing gasket without requiring any adhesive for retaining the gasket and without requiring any pretreatment process for the channel of the lid that receives the gasket. The present invention is applicable to both plastic lids and steel (or other metal) lids. However, since the issues that the present invention addresses are more significant for plastic lids, that will be the principal focus of this description. The application of the present invention to a steel or other metal lid is addressed later in the specification.

[0002] When adding a sealing gasket to a drum lid, the two most widely used prior art approaches are to (1) use a flexible, preformed gasket and glue it into a receiving area of the lid, such as a peripheral, annular channel adjacent the outer edge of the lid, and (2) foam the gasket in place by injecting a liquid foam into the channel or receiving area. With the first approach, the adhesive that should be used to glue the gasket in place does not typically adhere to the plastic material of the lid without some type of heat treat pretreatment, such as subjecting the plastic to a flame or to a "corona" gun spark. With the foamed-in-place approach, the same problem exists. In order for the foamed gasket material and resultant foamed gasket to adhere to the lid channel or the intended gasket-receiving area, the described heat treat pretreatment or a similar pretreatment is necessary. The present invention is applicable to any container lid, such as an industrial drum. For the description of the preferred embodiment, a drum lid is used.

[0003] The problem that occurs as a result of this heat treat pretreatment is that the gasket sticks so well to the lid that the gasket cannot be removed cleanly for subsequent reconditioning or recycling. This problem occurs whether the gasket that is installed in the lid is a preformed gasket or a gasket that is foamed in place. One consequence of this problem is that only the center section of these drum lids can be recycled. If one would try to recycle the entire lid, noting the gasket portions or residue and/or the adhesive residue that cannot be removed cleanly, there will be contamination with regard to the remainder of the plastic lid material. If the drum lid is to be reconditioned as contrasted to recycling of the drum lid material, it is difficult to cleanly remove the entire gasket and/or adhesive without damaging the plastic lid in such a way as to effectively destroy or eliminate the reconditioning option.

[0004] As an improvement to the aforementioned practices of installing a sealing gasket into a container lid, the

present invention configures the lid with a unique retention bead that keeps the gasket in position without the need to perform any type of pretreatment to the lid in order to hold the gasket in position. The present invention works equally well with either a flexible, preformed gasket or with a foamed-in-place gasket. The redesign to the lid is independent of the gasket style, material, or fabrication method.

[0005] In the case of a steel (or other metal) lid, the preferred method of securely retaining the sealing gasket is to apply adhesive in the case of a pre-formed gasket. As a result, the same removal problems exist for any reconditioning or recycling. If the gasket is foamed-in-place, there can be retention questions if the lid is not pretreated in some fashion to help the foam material adhere. By use of the retention bead(s) of the present invention, the retention concerns or questions are addressed without any extra steps or processes.

SUMMARY OF THE INVENTION

[0006] A lid for closing a container neck opening according to one embodiment of the present invention comprises a lid body surrounded by an annular rim, the annular rim defining a gasket channel having an open portion at one end opening toward the container neck opening and including a closed base at an opposite end. The annular rim defines gasket-retention means positioned adjacent the open portion for capturing a gasket received within the gasket channel. The corresponding gasket may be either a preformed gasket that is inserted into the channel or a foamed-in-place gasket that is formed in the gasket channel.

[0007] One object of the present invention is to provide an improved container lid and gasket combination without lid pretreatment or gasket adhesive being required.

[0008] Related objects and advantages of the present invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a partial, side elevational view of a plastic lid and gasket combination according to one embodiment of the present invention.

FIG. 1A is a partial, enlarged view, in full section, of an alternative retention bead geometry according to the present invention.

FIG. 2 is a partial, side elevational view showing one alternative embodiment to the FIG. 1 combination, according to the present invention.

FIG. 3 is a partial, side elevational view showing another alternative embodiment to the FIG. 1 combination, according to the present invention.

FIG. 4 is a partial, side elevational view of a metal lid and gasket combination according to another embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

[0011] Referring to FIG. 1, there is illustrated in partial form a plastic drum lid 20 arranged in combination with a sealing gasket 21 that is fabricated of an elastomeric material. The annular lid 20 has an orientation in FIG. 1 as it would be applied in the downward direction onto an open, annular end of a drum or similar container. For example, a container of the type contemplated as part of the subject invention would have a neck portion and a neck opening (not illustrated) constructed and arranged to receive drum lid 20 wherein sealing gasket 21 establishes a sealed interface between channel 22 and the upper edge of the drum or container neck opening. The upper edge of the container neck opening is constructed and arranged to push upwardly into channel 22 of lid 20.

[0012] Channel 22 of lid 20 is defined by outer peripheral rim 23. Annular rim 23 includes an annular outer wall 24, an annular inner wall 25, and an annular upper wall 26 that defines a closed base for channel 22. In terms of an axial direction, the area of channel 22 that is opposite and actually below upper wall 26 is the channel opening that is facing or directed toward the upper edge of the container neck opening (not illustrated). The three walls 24, 25, and 26 define the overall position and shape of channel 22. Sealing gasket 21 is positioned and retained in channel 22 without the need for any bonding adhesive and without the need for any pretreatment of the plastic material that creates the surfaces of channel 22. While there are two embodiments for the style of gasket 21 (preformed and foamed-in-place), the structure of lid 20, including channel 22, does not change with these different gasket styles.

[0013] The focus of the present invention is directed to the fact that gasket 21 can be used and retained without requiring any pretreatment. Related to this aspect of the present invention is the addition of a retention bead on an inner surface of channel 22. In the FIG. 1 illustration, one raised annular bead 30, appearing as a radially outwardly projecting, rounded rib, is unitarily molded as part of inner wall 25. A second raised annular bead 31, appearing as a radially inwardly projecting, rounded rib, is unitarily molded as part of outer wall 24. In terms of vertical or axial positioning, bead 30 is generally aligned with bead 31, as if generally coplanar. In FIG. 1A, an alternative annular bead 31a shape is disclosed that is more square than rounded. It is to be understood that either

bead shape is suitable for the present invention so long as it is constructed and arranged to properly function to retain the gasket 21 in channel 22.

[0014] While beads 30 and 31 have been described as "annular", it is to be understood that one embodiment of the present invention configures either or both beads 30 and 31 in a partial or segmented form. For example, in lieu of a complete 360 degrees extent for beads 30 and 31, one embodiment of the present invention envisions creating each bead into four sections, equally spaced, with a clearance space or gap between adjacent bead sections. For example, one contemplated possibility is to provide four bead sections for each bead with a 60 degree circumferential extent separated from one another by a space or gap of 30 degrees. Another option for four bead sections would be to include each section with a 45 degree circumferential extent with a spacing or separation between adjacent beads of 45 degrees. These same alternatives apply to the alternative shape represented by bead 31a.

[0015] As would be understood, the radial width of opening 32 of channel 22 is closed slightly by or due to the raised heights of beads 30 and 31, whether as annular beads or as segmented beads with the individual segments spaced apart from one another. When gasket 21 is constructed and arranged as a preformed gasket, it is not adhesively bonded (glued in) to the inner surface(s) of channel 22. As such, there is nothing to hold or retain gasket 21 in position in channel 22. This is where the beads 30 and 31 come into use. The reduction in the radial width of channel 22 by the addition of beads 30 and 31 prevents gasket 21 from falling out of channel 22. However, gasket 21 can be readily and easily extracted from channel 22 by manually pulling on the gasket, such as with a pair of pliers. This is due to the width of channel 22 and the elastomeric material used for gasket 21. Importantly, gasket 21 can be cleanly removed without leaving behind any gasket portions or pieces or any gasket residue and without leaving behind any adhesive residue. This in turn permits the lid 20 to be reconditioned without damaging the lid to the point that it is effectively destroyed in terms of reconditioning. Alternatively, the absence of any pretreatment and the use of beads 30 and 31 permit lid 20 to be recycled without the risk that any gasket pieces or portions or any gasket residue or any adhesive residue will be left behind and will contaminate the recycled plastic material of lid 20.

[0016] When gasket 21 is constructed and arranged as a foamed-in-place gasket, there is no pretreatment required for the surfaces of channel 22 in order for this style of gasket to be captured and retained in channel 22. The typical pretreatment for plastics of this type and for this application is a heat treating technique such as the use of a flame or a corona gun spark. However, nothing in terms of a surface treatment or any other pretreatment is required with respect to channel 22 in order for that channel to accept and retain a foamed-in-place style for gasket 21. The beads 30 and 31, whether annular in

form or segmented form, provide a sufficient "closing" of channel opening 32 in order to prevent any fall out of gasket 21 from within channel 22.

[0017] The preferred design for the present invention is depicted by the FIG. 1 structure, including a pair of beads 30 and 31. However, in terms of closing a portion of opening 32, so as to reduce the opening width a sufficient degree to capture gasket 21, the combined radial "height" of these two beads can be introduced into a single bead that would either be annular in form or segmented. In FIG. 2, this style of single bead 36 is illustrated as part of lid 37. Bead 36 has a raised height (in a radial width direction) that is substantially equal to the combined raised height of beads 30 and 31 in FIG. 1. Further, single bead 36 is positioned as part of inner wall 25a. Alternatively, a single bead 38 that is unitarily formed as part of lid 39, can be positioned as part of outer wall 24a, see FIG. 3.

[0018] Since gasket 21 can be readily and easily installed or formed into channel 22 and then removed without leaving behind any gasket portions or pieces or gasket residue, and without leaving behind any adhesive residue, the entire lid can be recycled without contamination or reconditioned without damage.

[0019] In terms of the method steps to fabricate the combination of lid 20 and gasket 21, the lid 20 is injection molded into the form illustrated, in partial form, in FIG. 1, including beads 30 and 31. The next step is to either install a preformed gasket into channel 22 or create a foamed-in-place gasket into channel 22, using a foamable gasket material. Regardless of the style of gasket created/installed, that step is performed without any prior pretreatment to the lid. When recycling the lid and gasket combination, the gasket is pulled out of the channel and the lid is recycled. No prior clean up step is needed to remove any gasket material, any gasket residue, or any adhesive residue.

[0020] With reference to FIG. 4, a metal (steel) lid 50 is illustrated in partial form with an elastomeric sealing gasket 51 installed into gasket channel 52. The gasket channel 52 includes a radially inwardly extending bead 53 and a radially outwardly extending bead 54. Beads 53 and 54 are constructed and arranged relative to channel 52 and gasket 51 in a manner virtually identical to how beads 30 and 31 cooperate with channel 22 and sealing gasket 21. Except for the fact that lid 50 is fabricated out of steel, rather than plastic (i.e., lid 20), the FIG. 4 structural combination is virtually identical to the FIG. 1 structural combination. By the use of beads 53 and 54, adhesive is not required in order to retain gasket 51 in channel 52. It is also envisioned that a larger single bead could replace the pair of beads 53 and 54. It is further contemplated that the shape of beads 53 and 54 can be more rounded in form and less square.

[0021] While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the

preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

Claims

1. A lid for closing a container neck opening, said lid comprising:

a lid body surrounded by an annular rim, said annular rim defining a gasket channel having an open portion at one end opening toward said container neck opening and including a closed base at an opposite end, said annular rim further defining gasket-retention means positioned adjacent said open portion for capturing a gasket received within said gasket channel; and a gasket that is foamed-in-place in said gasket channel between said closed base and said gasket-retention means.

2. A lid for closing a container neck opening, said lid comprising:

a lid body surrounded by an annular rim, said annular rim defining a gasket channel having an open portion at one end opening toward said container neck opening and including a closed base at an opposite end, said annular rim further defining gasket-retention means positioned adjacent said open portion for capturing a gasket received within said gasket channel; and a pre-formed gasket inserted into said gasket channel between said closed base and said gasket-retention means.

3. A lid as claimed in claim 1 or 2, in which the lid is a plastic lid.

4. The lid of claim 1, 2 or 3 wherein said gasket channel is free of any surface pretreatment for facilitating the securing of the gasket to said gasket channel.

5. The lid of any preceding claim wherein said gasket channel is free of any adhesive.

6. The lid of any preceding claim wherein said gasket-retention means includes at least one bead formed as part of said rim and extending across part of said open portion of said gasket channel.

7. The lid of claim 6 wherein said bead is an uninterrupted annular member.

8. The lid of claim 6 wherein said bead is formed into a plurality of spaced-apart sections.

9. A method of fabricating a plastic closing lid for a container, said plastic closing lid defining an annular rim that includes a gasket channel, said method comprising the following steps:

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injection molding a plastic closing lid with an annular rim that defines a gasket channel and includes gasket retention means positioned across part of said gasket channel;

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injecting a foamable gasket material into said gasket channel wherein the gasket material foams up, in place; and

performing the injecting step free of any prior pre-treatment step to said gasket channel, such that said foamed-in-place gasket is removable from said gasket channel, intact.

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10. A method of recycling a plastic lid and gasket assembly that is used for closing a neck opening of a container, the gasket being retained in a gasket channel, said method comprising the following steps:

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removing the plastic lid from the container;

pulling the gasket out of the gasket channel;

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recycling the lid material once the gasket is removed; and

performing the recycling step without the need to perform any prior cleaning step to remove gasket residual material left in the gasket channel after the pulling step.

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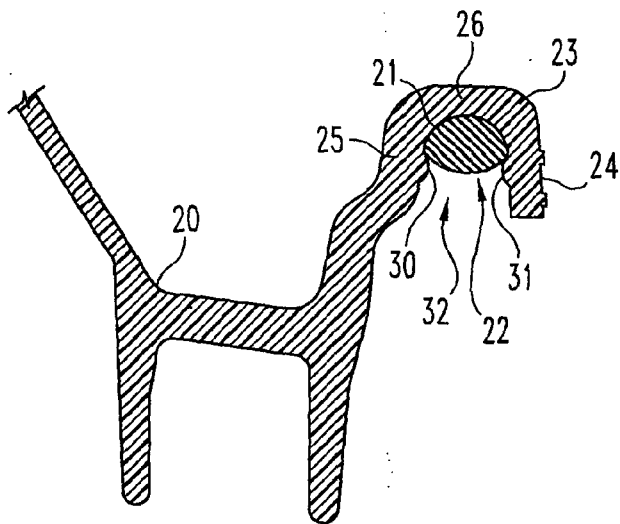


Fig. 1

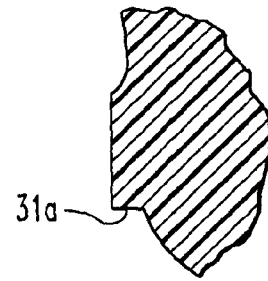


Fig. 1A

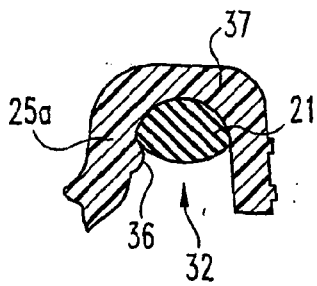


Fig. 2

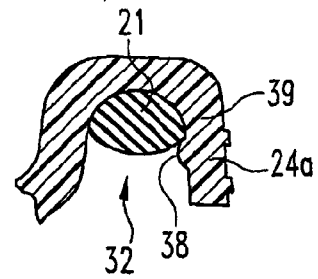


Fig. 3

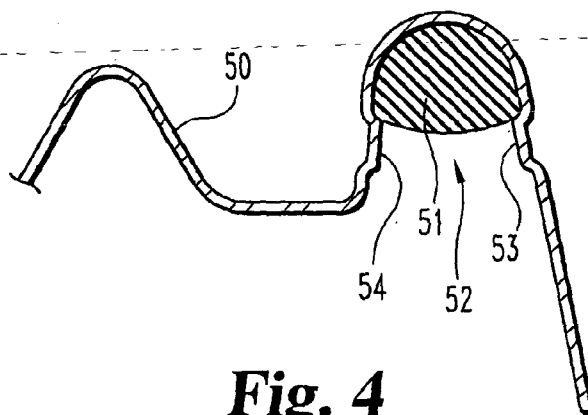


Fig. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 361 928 A (STOLZMAN ET AL) 8 November 1994 (1994-11-08)	2-7,10	INV. B65D43/06 B65D53/02
Y	* column 3, line 11 - line 42 * * figures 1-5 *	1,3-7	

X	US 3 688 942 A (ROBERT M. MITCHELL ET AL) 5 September 1972 (1972-09-05)	2-8,10	
Y	* column 2, line 26 - column 4, line 24 * * figures 1-4 *	1,3-9	

X	GB 1 275 949 A (FARBWERKE HOECHST AKTIENGESELLSCHAFT, VORMALS MEISTER LUCIUS & BRUNING) 1 June 1972 (1972-06-01)	2-7,10	
Y	* claim 2; figure 3 *	1,3-7	

X	DE 92 00 259 U1 (JOH. VAILLANT GMBH U. CO, 5630 REMSCHEID, DE) 27 February 1992 (1992-02-27)	2,4-7,10	
Y	* page 2 - page 4; figures 1-7 *	1,4-7	

X	US 5 641 065 A (OWENS ET AL) 24 June 1997 (1997-06-24)	2-7,10	TECHNICAL FIELDS SEARCHED (IPC)
Y	* column 2, line 25 - line 37 * * figures 1-4 *	1,3-7	B65D F16J

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Y	* column 1, line 11 * * column 2, line 49 - column 3, line 21 * * figures 1-3 *	1,3-7,9	

Y	US 2002/148847 A1 (LUBURIC FRANO) 17 October 2002 (2002-10-17) * paragraph [0034]; figures 5,6 *	1,3-9	

The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 May 2006	Examiner Fitterer, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 25 6985

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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