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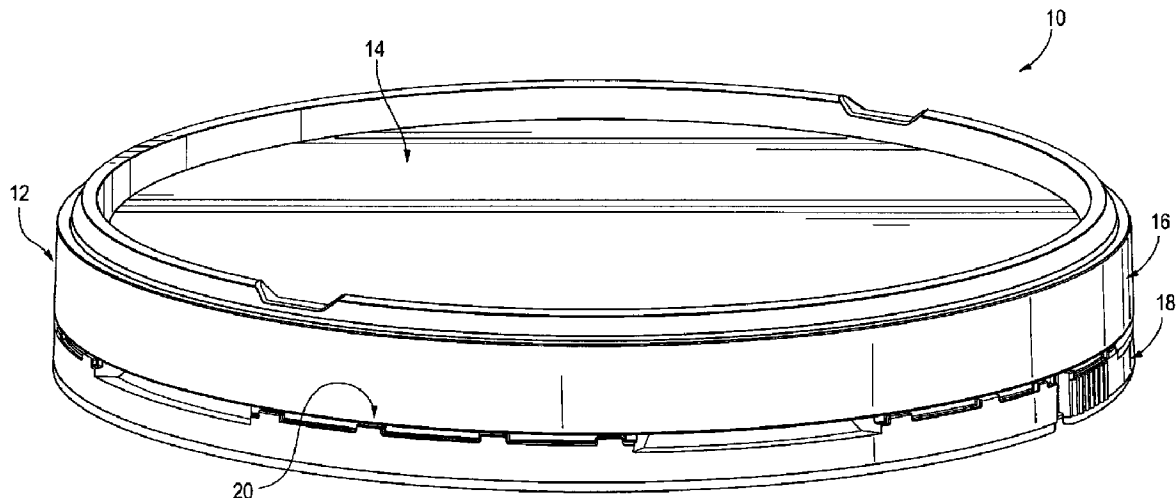
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(54) Title: IMPROVED TAMPER EVIDENT LID



(57) **Abrégé/Abstract:**

An improved tamper evident lid for a container is provided. The lid includes an annular sidewall with an upper section and a lower section connected together by a weakened portion. The lid includes one or more tamper evident locking components for securing the lid to the container. Each locking component extends inward from an interior surface of the lower sidewall section with a top wall that connects the locking component to the upper sidewall section. The lid includes a void space defined into the exterior of the annular sidewall and corresponding to each locking component. Each locking component forms a continuous enclosure separating the void spaces from the interior of the lid and preventing leakage of contents through void spaces. The void spaces and the weakened portion create a line of weakness that can provide visual evidence of tampering once the lid has been secured to a container.

ABSTRACT

An improved tamper evident lid for a container is provided. The lid includes an annular sidewall with an upper section and a lower section connected together by a weakened portion. The lid includes one or more tamper evident locking components for securing the lid to the container. Each locking component extends inward from an interior surface of the lower sidewall section with a top wall that connects the locking component to the upper sidewall section. The lid includes a void space defined into the exterior of the annular sidewall and corresponding to each locking component. Each locking component forms a continuous enclosure separating the void spaces from the interior of the lid and preventing leakage of contents through void spaces. The void spaces and the weakened portion create a line of weakness that can provide visual evidence of tampering once the lid has been secured to a container.

IMPROVED TAMPER EVIDENT LID

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Application claims priority to U.S. Provisional Patent Application Serial No. 62/804,871, filed on February 13, 2019, to Michael Liming et al., entitled “Improved Tamper Evident Lid,” currently pending, the entire disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The invention relates generally to lids for containers and particularly to an improved tamper evident lid, which in addition to providing evidence of tampering, also prevents spillage or leakage of contents.

BACKGROUND

[0003] Tamper evident lids are often used to enclose and secure containers for food items and other contents. These lids incorporate locking features that restrict the ability to remove the lid from the container without deforming the lid or providing evidence of tampering. One problem with current tamper evident lids is that they do not provide an effective seal around the perimeter of the container opening and thereby allow excess contents within the container to leak out or otherwise exit the container through the lid. This is in part due to the fact that the tamper evident locking features in current tamper evident lids form gaps and spaces extending from the interior of the lid and through the outer sidewall. FIG. 1 provides an illustration of the leaking problem for the tamper evident lids existing in the prior art. As shown, the contents within the container (such as ice cream) can easily leak or ooze out of the locking features in the tamper evident lid due to the gaps and spaces extending from the interior of the lid and through the outer sidewall.

[0004] Another problem with current tamper evident lids is that they present several manufacturing difficulties. In particular, the construction of the locking features in current tamper evident lids require the forming tool parts to contact and slide across one another during the molding of the lid, which causes excessive wear on the forming components of the manufacturing process. This is in part because current tamper evident lids utilize several projections and ribs within the locking features to support the locking features and provide visual representations of possible tamper evidence, which requires additional molding operations that require the forming tool parts to contact and slide across one another.

[0005] Accordingly, a need exists for a tamper evident lid that can effectively secure a container and restrict leakage of contents from the container. In addition, a need exists for a tamper evident container and manufacturing method thereof that can prevent excessive forming tool wear due to sliding contacts between forming tool parts during the molding of the tamper evident lid.

SUMMARY OF THE INVENTION

[0006] The present invention is directed generally to an improved tamper evident lid for containers, including without limitation, containers for holding ice creams, dairy products and other food products and consumables. The improved tamper evident lid may provide a solution for securely covering a top end of a container with tamper evident indicators that indicate whether the lid has been previously removed from the container. The tamper evident lid may include an annular sidewall and cover portion connected to the annular sidewall to create an enclosed upper end of the lid. The annular sidewall may include an upper sidewall section and a lower sidewall section connected together along a weakened portion extending circumferentially around the annular sidewall. The weakened portion may be constructed as an indentation or gap defined partially through the sidewall to create a line of weakness between the upper and lower sidewall sections.

[0007] The lid may include one or more locking components that are provided on the interior of the annular sidewall and circumferentially spaced around the lid. The locking components can operate in connection with the weakened portion of the lid to indicate whether the lid has been removed or attempted to be removed from the container or otherwise tampered with after being secured thereon. The locking components may include an inward projecting wall that extends radially inward from the interior surface of the lower sidewall section and a top wall that extends from the projecting wall back toward the interior surface of the sidewall. The projecting wall and top wall can operate as a continuous structure that extends the entire length of the locking component and encloses the locking component to separate the interior of the lid.

[0008] The lid may include a void space opposite each locking component, where each void space may be configured as a gap or partial opening extending through the annular sidewall and defined by the projecting wall and top wall of the locking component. The top wall of the locking component may extend to and connect to the interior surface of the upper sidewall section bottom edge to completely enclose the void space along the interior of the sidewall, which may restrict contents within the container from exiting, oozing or leaking through the locking components when the lid is secured on the container. According to one embodiment, the void space may be configured as a continuously uninterrupted open space extending into annular sidewall and enclosed along the interior by the projecting wall and the top wall of the locking component.

[0009] The void spaces may be generally aligned with and integral with the weakened portion extending circumferentially around the annular sidewall to provide a continuous line of weakness around the lid. The connecting edge that connects the upper wall of the locking component to the upper sidewall section may further function as a line of weakness coextensive with the weakened portion extending around the sidewall.

[0010] The lid may include a pair of ribs provided on the interior surface of the sidewall adjacent to each locking components. Each rib may be configured as a vertically oriented protrusion located near each end of the locking components. The ribs may be configured to facilitate aligning and stacking the lid with additional lids.

[0011] The lid can be placed on a container so that the locking components engage the upper rim of the container and be secured underneath upper rim. Once engaged, the lid is restricted from being removed from the container without deforming the annular sidewall and providing evidence of tampering. Each locking component may be configured to restrict the lid from being removed from the container without pulling or bending the lower sidewall section. The weakened portion provides a line of weakness around the circumference of the annular sidewall such that if the sidewall is pulled away from the container to allow the locking components to be lifted over the container upper rim, the annular sidewall may deform or tear along the weakened portion to provide a visual indication of tampering.

[0012] Other aspects and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the accompanying drawing figures.

DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0013] In the accompanying drawing, which forms a part of the specification and is to be read in conjunction therewith in which like reference numerals are used to indicate like or similar parts in the various views:

[0014] FIG. 1 is a partial perspective view of a container with a tamper evident lid as known in the prior art illustrating the leaking problem common with such tamper evidence lids;

[0015] FIG. 2 is a top perspective view of a tamper evident lid for a container in accordance with one embodiment of the present invention;

- [0016] FIG. 3 is a bottom perspective view of the tamper evident lid of FIG. 2;
- [0017] FIG. 4 is a side elevation view of the tamper evident lid of FIG. 2;
- [0018] FIG. 5 is a bottom plan view of the tamper evident lid of FIG. 2;
- [0019] FIG. 6 is a top perspective sectional view of the tamper evident lid of FIG. 2 taken along line 6'-6' in FIG. 4, illustrating the interior of the lid and the locking components provided on the interior of the lid in accordance with one embodiment of the present invention;
- [0020] FIG. 7 is a partial cross-sectional view of the tamper evident lid of FIG. 2, illustrating the construction of the annular sidewall of the lid at line 7'-7' in FIG. 4 in accordance with one embodiment of the present invention;
- [0021] FIG. 8 is a partial cross-sectional view of the tamper evident lid of FIG. 2, illustrating the construction of the annular sidewall and corresponding locking component of the lid at line 8'-8' in FIG. 4 in accordance with one embodiment of the present invention;
- [0022] FIG. 9 is a schematic cross-sectional view of the tamper evident lid of FIG. 2 illustrating the lid placed onto a container and the locking component engaging the container rim in accordance with one embodiment of the present invention;
- [0023] FIG. 10 is a partial interior perspective view of a locking component for a tamper evident lid in accordance with one embodiment of the present invention;
- [0024] FIG. 11 is a partial exterior perspective view of the locking component of FIG. 10;
- [0025] FIG. 12 is a partial interior cross-sectional perspective view of the locking component of FIG. 10; and
- [0026] FIG. 13 is a partial exterior cross-sectional perspective view of the locking component of FIG. 10.

DETAILED DESCRIPTION OF THE INVENTION

[0027] The invention will now be described with reference to the drawing figures, in which like reference numerals refer to like parts throughout. For purposes of clarity in illustrating the characteristics of the present invention, proportional relationships of the elements have not necessarily been maintained in the drawing figures.

[0028] The following detailed description of the invention references specific embodiments in which the invention can be practiced. The embodiments are intended to describe aspects of the invention in sufficient detail to enable those skilled in the art to practice the invention. Other embodiments can be utilized and changes can be made without departing from the scope of the present invention. The present invention is defined by the appended claims and the description is, therefore, not to be taken in a limiting sense and shall not limit the scope of equivalents to which such claims are entitled.

[0029] Referring to the figures, the present invention is directed to a tamper evident lid 10 for use with containers, including without limitation, containers for holding ice creams, dairy products and other food products and consumables. Lid 10 may be configured for placement over the open end of a container and secured around the container's top rim so as to cover the container opening and prevent the removal of lid 10 without evidence of tampering. As described herein, lid 10 may be secured over the upper rim of a container and include a tamper-evident feature that snaps underneath the rim in accordance with conventional tamper-evident lids to restrict the removal of lid 10 without permanent deformation of lid 10, which may indicate evidence of tampering. As described in greater detail below, lid 10 of the present invention can include a construction with an improved seal design that can limit excess contents within the container from leaking out or exiting through the lid.

[0030] Turning to FIGS. 2-6, tamper-evident lid 10 according to one embodiment may include an annular sidewall 12 and a cover portion 14. Annular sidewall 12 may be configured as a generally vertically oriented circumferential wall defining the outer perimeter of lid 10. Annular sidewall 12 may further be configured to generally conform to the round, oval, rectangular, or other shape of the upper end of the container to which lid 10 is used. As best shown in FIGS. 2-4, annular sidewall 12 may include an upper sidewall section 16 and a lower sidewall section 18. Annular sidewall 12 may also include weakened portion or residual line 20 extending generally horizontally around the circumference of annular sidewall 12 that may segment, break, or otherwise provide a distinction of annular sidewall 12 into its upper and lower sidewall sections 16 and 18. Weakened portion 20 may be positioned between the top end of lower sidewall section 18 and the bottom end of upper sidewall section 16 and connect lower sidewall section 18 to upper sidewall section 16. Depending on the particular embodiment of the present invention, weakened portion 20 may be configured as a reduced thickness region of annular sidewall 12 (as shown in the figures) or as any other suitable means for creating a circumferential line of weakness having a reduced strength relative to the remainder of annular sidewall 12. According to certain embodiments, weakened portion 20 may further comprise a visual tamper evident indication, to provide visual proof if lid 10 has been, or has been attempted to be, removed. The tamper evident indication may be without limitation discoloration, disfigurement, bending, breaks, or other visual indicators known in the art.

[0031] As shown in FIGS. 2-6, cover portion 14 may be configured with a disc-type shape that spans across the interior of lid 10 and may be secured to upper sidewall section 16 using any suitable means. It will be appreciated that cover portion 14 may be configured with alternate shapes to conform to alternate shapes of a container including without limitation oval, triangular, rectangular, or other desired shapes. Cover portion 14 may be constructed from paperboard, lined

paperboard, plastic or any other suitable material depending on the particular embodiment of the present invention and application of lid 10. Cover portion 14 may be configured to enclose the top end opening of the container when lid 10 is secured onto the container and restrict the spillage, leakage, or otherwise removal of contents from the container.

[0032] As best shown in FIGS. 3-6 and described in greater detail below, lid 10 may include one or more locking components 22 provided on annular sidewall 12 and circumferentially spaced around lid 10. Locking components 22 can operate in connection with weakened portion 20 to indicate whether lid 10 has been removed or attempted to be removed from the container after being secured thereon as described in greater detail below. FIG. 6 illustrates lid 10 according to one embodiment with five circumferentially spaced locking components 22; however, it is recognized that any number of desired locking components 22 may be utilized in various embodiments of the present invention. The one or more locking components 22 may be configured to snap under or otherwise lock beneath the upper rim of a container and restrict the removal of lid 10 from the container (see FIG. 9). It will be appreciated that lid 10 may utilize a snapping method of securing to container; however, any other suitable method of securing or attaching lid 10 may also be used, including a twisting, or screwing method of attachment.

[0033] FIGS. 7 and 8 provide schematic sectional views of lid 10 illustrating the configuration and arrangement of annular sidewall 12 and cover portion 14 in accordance with one embodiment of the present invention. As best shown in FIG. 7, upper sidewall section 16 may include an annular ridge or projection 24 that extends circumferentially around the upper end of annular sidewall 12 and projects slightly inward toward the interior of lid 10. As shown in FIG. 7, the inward projection of annular projection 24 can create a ledge or engaging surface 26 to which cover portion 14 may be secured. Beneath annular projection 24, upper sidewall section 16 may extend downward and

include one or more protrusions or ridges 28 extending circumferentially around the inner surface of upper sidewall section 16. Ridges 28 may be configured to engage the upper rim of a container when lid 10 is secured onto the container. Upper sidewall section 16 may then terminate at a bottom edge 30 defined by weakened portion 20 extending around the circumference of annular sidewall 12.

[0034] As shown in FIG. 7, weakened portion 20 may not extend completely through the thickness or width of annular sidewall 12 and as a result, bottom edge 30 of upper sidewall section 16 may be partially connected to an upper edge 34 of lower sidewall section 18 toward the interior portion of annular sidewall 12. As best shown in FIG. 7, according to certain embodiments, weakened portion may be configured as an indentation or gap defined into and partially through annular sidewall 12 to create a line of weakness circumferentially around annular sidewall 12 and between upper sidewall section 16 and lower sidewall section 18. In other embodiments, the weakened portion 20 may be perforated or be of various thicknesses and/or widths. Slightly above bottom edge 30, upper sidewall section 16 may further include an inwardly projecting lip 32 that may be configured to engage the lower portion of a container upper rim 102 (see also FIG. 9). As further illustrated in FIG. 7, inwardly projecting lip 32 may be spaced slightly above bottom edge 30 and project inward from annular sidewall 12 toward the interior of lid 10. In addition, as shown in FIG. 7 (as well as FIG. 8) upper and lower sidewall sections 16 and 18 may be integrally connected to one another by a portion of annular sidewall 12 located laterally adjacent to weakened portion 20 on the interior of annular sidewall 12, but can otherwise remain spatially separated from one another by means of weakened portion 20.

[0035] As further shown in FIG. 7, lower sidewall section 18 may include an upper edge 34 that connects to bottom edge 30 of upper sidewall section 16 along the interior of annular sidewall 12

via weakened portion 20. Weakened portion 20 may further spatially separate upper edge 34 (of lower sidewall section 18) and bottom edge 30 (of upper sidewall section 16) toward the outer portion of annular sidewall 12 and function to separate annular sidewall 12 into upper and lower sidewall sections 16 and 18 as shown in FIG. 7. Beneath upper edge 34 (and weakened portion 20), lower sidewall section 18 may extend downward toward to a bottom terminal edge 36. As further shown in FIG. 7, lower sidewall section 18 may include an inner surface 38 that extends from bottom terminal edge 36 to upper edge 34 of lower sidewall section 18 and bottom edge 30 of upper sidewall section 16.

[0036] FIG. 8 provides a schematic sectional view of annular sidewall 12 of lid 10 illustrating the configuration and arrangement of one of the locking components 22 provided on the interior of annular sidewall 12. As described above, lid 10 may have one or more locking components 22 depending on the particular embodiment, and it will be appreciated that lid 10 may include a plurality of locking components 22 (see FIG. 6). As best shown in FIG. 8, locking components 22 may be positioned on inner surface 38 of lower sidewall section 18 in a circumferentially-spaced arrangement (see also FIG. 6). As best shown in FIG. 8, each locking component 22 can project inwardly and angularly away from inner surface 38 of lower sidewall section 18 and into the interior of lid 10. Additionally, according to certain embodiments, each locking component 22 may further include visual indicators of tampering. The tamper evident indication may be without limitation discoloration, disfigurement, deformation, bending, breaks, cracks, or other visual indicators known in the art.

[0037] As further shown in FIG. 8, each locking component 22 can include a projecting surface wall 40 extending inward from inner surface 38 of lower sidewall section 18 and an upper or top wall 42 connected to projecting wall 40 and extending outward back toward annular sidewall 12.

According to one embodiment as illustrated in FIG. 8, projecting wall 40 may have an angled/sloped surface that extends from inner surface 38 at an upward angle and top wall 42 may extend generally horizontally outward from the terminal edge of projecting wall 40 back toward inner surface 38 and annular sidewall 12. It will also be appreciated that projecting surface wall 40 may alternatively extend generally horizontally away from inner surface 38 and then upward in a general vertical arrangement in certain embodiments. Locking component 22 and projecting wall 40 and top wall 42 may also have any other suitable configuration, including without limitation, a rounded, rectangular or other suitable shape depending on the particular embodiment of the present invention. In addition, according to certain embodiments top wall or membrane 42 may alternatively have a slightly angled configuration while extending from projecting surface wall 40 back toward sidewall 12.

[0038] Both projecting surface wall 40 and top wall 42 may comprise a solid structure lacking gaps, holes, or other spacing which may prevent the leaking, oozing or spillage of contents from the container. In particular, both projecting surface wall 40 and top wall 42 may form a continuous enclosure that encloses the interior of annular sidewall 12 around the space or gap formed between upper sidewall section 16 and lower sidewall section 18 and the weakened portion 20 formed therebetween. As best shown in FIG. 8, top wall 42 may extend away from projecting wall 40 back toward the inner surface of annular sidewall 12 to define an enclosed upper boundary of locking component 22. Top wall 42 may further be configured as a continuous top wall that extends the entire length of locking component 22 to separate the interior space within lid 10 from the exterior environment around lid 10.

[0039] As further shown in FIG. 8, locking component 22 may connect to both lower sidewall section 18 and upper sidewall section 16. Projecting wall 40 may extend away from inner surface

38 of lower sidewall section 18 in a radially inward orientation and top wall 42 may extend away from projecting wall toward the inner surface of upper sidewall section 16 adjacent bottom edge 30. As best shown in FIG. 8, at the position of each locking component 22, upper sidewall section 16 may have an increased thickness at its lower end (between bottom edge 30 and lip 32) that extends into the interior of lid 10. This increased thickness can form an inward projection 44 along the interior of upper sidewall section 16 immediately above locking component 22. As best shown in FIG. 8, top wall 42 may connect to inward projection 44 at a connecting edge 45 between the lateral ends of locking component 22 (top wall 42 may also connect to lower sidewall section 18 along its upper edge 34 at the ends of locking component 22). Connecting edge 45 may extend along the entire length of locking component 22 (and top wall 42) in order to separate the interior of lid 10 from its exterior. Connecting edge 45 may also be generally aligned with weakened portion 20 extending circumferentially around annular sidewall 12 and may operate as a continued line of weakness around annular sidewall 12 along with weakened portion 20.

[0040] As further shown in FIGS. 7 and 8, annular sidewall 12 may include at least one rib or bar 46 located on the interior surface of the annular sidewall 12 and adjacent to an end portion of each locking component 22. As illustrated in in FIGS. 7 and 8, according to one embodiment, annular sidewall 12 may include a pair of ribs or bars 46 provided adjacent to each lateral end of each locking component 22. Ribs 46 may be utilized to assist in aligning lid 10 when stacked or nested with a second or lower lid 10 by engaging with annular upper ridge 24 of a second or lower lid 10. As such, the ribs 46 are configured to facilitate the stacking of the lid 10 with another second lid 10 by engaging an annular projection of said second lid 10. This stacking may be utilized during transport or storage of lids 10. As shown, ribs 46 may be vertically orientated and provided on the inner surface 38 of lower sidewall section 18. Ribs 46 may also be slightly spaced away from

locking components 22 and not directly connected to locking components 22. In one embodiment, ribs 46 and annular upper ridge 24 are shaped and positioned such that the ribs 46 of a first or upper lid 10 engage the chamfered, angled or sloped surface 50 of the annular upper ridge 24 of a second or lower lid 10.

[0041] As further shown in FIG. 8, lid 10 may include a void space 48 extending into an exterior surface of annular sidewall 12 that corresponds to each locking component 22. As shown, each void space 48 may be defined into the outer surface of lower sidewall section 18 that is aligned with and corresponds to a locking component 22. As shown in FIG. 8, void space 48 may also be generally aligned and be integral with the circumferential, weakened portion 20 extending circumferentially around annular sidewall 12. Void space 48 may extend through lower sidewall section 18 and into locking component 22 and may form a larger gap or spacing into sidewall 12 relative to the height/width of weakened portion 20. According to one embodiment, void space 48 may have a width greater than the width of the adjacent weakened portion 20.

[0042] As best shown in FIG. 8, the upper and interior boundary of void space 48 may be defined by bottom edge 30 of upper sidewall section 16 (toward the exterior of annular sidewall 12) and by projecting surface wall 40 and top wall 42 of locking component 22 (toward the interior of annular sidewall 12) so that void space 48 is isolated from the interior of lid 10. Top wall 42 of locking component 22 may extend to and connect to bottom edge 30 (via inward projection 44 and connecting edge 45) to completely enclose void space 48 or seal an inner portion thereof along locking component 22 and separate void space 48 from the interior of lid 10. Void space 48 may further be constructed as a continuously uninterrupted space defined into or through the exterior surface of lower sidewall section 18 (and annular sidewall 12) and enclosed along its interior by projecting wall 40 and top wall 42 of locking component 22. In such an embodiment, voice space

48 may be without any obstructions within the open space formed into annular sidewall 12 along the entire length of void space 48. Accordingly, void space 48 may be without any braces or supports (or other obstructions) extending vertically at intermediate positions along the length of void space 48 and its corresponding locking component 22.

[0043] As best shown in FIG. 8, according to one embodiment, void space 48 may correspond in location to a locking component 22 located along the annular sidewall 12. The surface wall 40 and top wall 42 of locking component 22 may act as an enclosed upper boundary of void space 48 along the interior of sidewall 12. In particular, as best shown in FIG. 8, top wall 42 of locking component 22 can be configured as a continuous wall or thin membrane that seals or encloses or otherwise prevents direct exposure of the void space 48 from the interior of lid 10 and can prevent any contents within the container from spilling, oozing, or leaking out through locking components 22, thereby separating the void space 48 from the interior of the lid 10. As shown, connecting edge 45 that connects top wall 42 of locking component 22 to upper sidewall section 16 can function to provide a continuous connection along the upper boundary of void space 48.

[0044] Void space 48 may be configured to provide flexibility to lid 10 during the attachment and removal process. The gap or space in the annular sidewall 12 as defined by void space 48 may provide flexibility to the annular sidewall 12 to prevent complete breaking or loss of functionality of lid 10 during removal or attachment. Void space 48 may further provide flexibility to the corresponding locking component 22 and support to the locking component 22 during attachment and removal process.

[0045] FIG. 9 provides a schematic sectional illustration of lid 10 after being secured onto a container 100 with an upper rim 102. As shown, upper sidewall section 16 of lid 10 can engage rim 102 of container 100 and locking component 22 can be secured underneath rim 102. As a

result, lid 10 is restricted from being removed from container 100 without deforming annular sidewall 12 by tearing away lower sidewall section 18 of annular sidewall 12. Each locking component 22 may be configured to restrict lid 10 from being removed from container 100 after being secured to container 100 by preventing the removal of lid 10 without pulling or bending lower sidewall section 18. Weakened portion 20 (along with connecting edges 45 connecting each locking component 22) may provide a line of weakness around the circumference of sidewall 12 such that if sidewall 12 is pulled away from container 100 to allow locking components 22 to be lifted over container upper rim 102, annular sidewall 12 may deform or tear along weakened portion 20 to provide a visual indication of tampering. Other visual indications of tampering may also be utilized and provided by the configuration of locking components 22 and weakened portion 20.

[0046] FIGS. 10-13 provide partial views of lid 10 to illustrate the configuration of locking components 22 according to one embodiment of the present invention. As best shown in FIGS. 10 and 12, from the interior of lid 10, angled projecting wall 40 and top wall 42 may project inward from inner surface 38 of lower sidewall section 18 and connect together to form a fully enclosed and continuous projection (along with extension portion 44 of upper sidewall section 16 that connects to top wall 42 along connecting edge 45) within the interior of lid 10. Additionally, as best shown in FIG. 10, two ribs 46 can be positioned next to the ends of locking component 22, while remaining separated and not in contact with angled projecting wall 40.

[0047] As best shown in FIGS. 11 and 13, from the exterior surface of lid 10, void space 48 can extend into annular sidewall 12 along the same height and position of the one or more locking component 22 along inner surface 38. As best shown in FIG. 13, void space 48 can extend into annular sidewall 12 with a similar shape as locking component 22 and be defined along its interior

by angled projecting wall 40 and top wall 42 (and bottom edge 30 of upper sidewall section 16). Further, void space 48 may be defined into an exterior surface of a corresponding locking component 22, wherein the void space 48 extends through the annular sidewall 12 and into the locking component 22. As further shown in FIG. 13, both projecting wall 40 and top wall 42 can provide a continuous barrier between the interior of lid 10 and the exterior of lid 10 and separate void space 48 from the interior of lid 10. As further shown in FIGS. 10-13, the solid structures of both projecting wall 40 and top wall 42 can provide a continuous barrier, devoid of any gaps or spacing, between the interior of lid 10 and the exterior of lid 10 and separate void space 48 from the interior of lid 10. This continuous barrier may prevent contents from the container from spilling, leaking, or otherwise coming in contact with the void space 48, and prevent spillage, leaking, oozing, or other exiting from the lid 10, while lid 10 is secured to container.

[0048] The configuration of lid 10 of the present invention also provides advantages over previously designed tamper evident lid constructions in the manufacturing process. The continuous top wall 42 of locking component 22 (which seals void space 48 from the interior of lid 10) enables more efficient manufacturing of lid 10 by eliminating or reducing the metal-on-metal slide action within the manufacturing mold. The metal-on-metal slide action is eliminated or reduced by allowing a gap between the moving tool components. Contrary to previous tamper evident lid designs that rely on a plurality of teeth vertically oriented along the length of the voice space, the continuous opening along the length of the voice space 48 allows for increased spacing, thereby reducing tool wear during the manufacturing process of lid 10. This increased spacing allows the manufacturing tools to be spaced further apart, and prevents any sliding, cross cutting, or other contact between tools while manufacturing the lid 10. This can be achieved in manufacturing methods requiring molds as well as manufacturing methods that do not require molds. The

manufacturing advantages of the present invention are in addition to the other advantages as described above. In addition to the manufacturing advantages, the present invention can prevent the contents of container 100 (such as ice cream or other food products) from leaking out through the locking components 22 of lid 10 from the continuous top wall 42 and sealing of void space 48 from the interior of lid 10.

[0049] From the foregoing, it will be seen that this invention is one well adapted to attain all the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure. It will be understood that certain features and sub combinations are of utility and may be employed without reference to other features and sub combinations. This is contemplated by and is within the scope of the claims. Since many possible embodiments of the invention may be made without departing from the scope thereof, it is also to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not limiting.

[0050] The constructions described above and illustrated in the drawings are presented by way of example only and are not intended to limit the concepts and principles of the present invention. Thus, there has been shown and described several embodiments of a novel invention. As is evident from the foregoing description, certain aspects of the present invention are not limited by the particular details of the examples illustrated herein, and it is therefore contemplated that other modifications and applications, or equivalents thereof, will occur to those skilled in the art. The terms "having" and "including" and similar terms as used in the foregoing specification are used in the sense of "optional" or "may include" and not as "required". Many changes, modifications, variations and other uses and applications of the present construction will, however, become apparent to those skilled in the art after considering the specification and the accompanying

drawings. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

CLAIMS

What is claimed is:

1. A tamper-evident lid for a container, the lid comprising:
an annular sidewall defining a perimeter of the lid, the annular sidewall including an upper sidewall section and a lower sidewall section connected together along a weakened portion extending circumferentially around the annular sidewall;
a cover portion connected to the upper sidewall section; and
a locking component provided on an interior surface of the lower sidewall section, wherein the locking component comprises a projecting wall extending inward from the interior surface and a top wall connected to the projecting wall and extending back toward the annular sidewall and defining an enclosed upper boundary of the locking component.
2. The lid of claim 1, further comprising a void space extending into an exterior surface of the annular sidewall and corresponding to the locking component, wherein the void space extends through the annular sidewall and into the locking component and is defined by the projecting wall and the top wall of the locking component.
3. The lid of claim 2, wherein the projecting wall and the top wall seal an inner portion the void space and separate the void space from an interior of the lid.
4. The lid of claim 3, wherein the top wall of the locking component comprises a continuous top wall extending from the projecting wall to an interior surface of the upper sidewall section along an entire length of the locking component to separate the void space from the interior of the lid.
5. The lid of claim 4, wherein the continuous top wall of the locking component restricts contents in the container from exiting the lid through the locking component and void space.
6. The lid of claim 2, wherein the void space comprises a continuously uninterrupted open space formed into the annular sidewall and defined along an interior of the lid by the locking component, wherein the open space is without obstructions along an entire length of the void space.

7. The lid of claim 1, wherein the weakened portion connecting the upper sidewall section and the lower sidewall section extends circumferentially around the perimeter of the lid.
8. The lid of claim 7, wherein the weakened portion comprises a gap defined partially through the annular sidewall between the lower sidewall section and the upper sidewall section.
9. The lid of claim 8, further comprising a void space extending into an exterior surface of the annular sidewall and corresponding to the locking component, wherein the void space extends through the annular sidewall and into the locking component and is defined by the projecting wall and top wall of the locking component, wherein the void space is generally aligned with and is integral with the weakened portion extending circumferentially around the annular sidewall of the lid.
10. The lid of claim 9, wherein the void space has a width greater than a width of the weakened portion.
11. The lid of claim 1, further comprising an inward projection defined on an interior surface of the upper sidewall section adjacent a lower edge of the upper sidewall section, wherein the continuous top wall of the locking component extends from the projecting wall toward the inward projection and connects to the inward projection along a connecting edge defined along a length of the locking component.
12. The lid of claim 11, wherein the connecting edge of the locking component creates a line of weakness around the circumference along with the weakened portion.
13. The lid of claim 1, wherein the locking component is configured to be positioned under an upper rim of the container when the lid is secured onto the container.

14. The lid of claim 13, wherein locking component restricts the lid from being removed from the container after being secured to the container without deforming the annular sidewall along the weakened portion of the lid.

15. The lid of claim 13, wherein the locking component restricts the lid from being removed from the container after being secured to the container without providing a visual indication of tampering.

16. The lid of claim 1, further comprising a pair of ribs provided on the interior surface of the lower sidewall section adjacent to the locking component, wherein each rib is positioned next to an end portion of the locking component.

17. The lid of claim 16, wherein the pair of ribs are configured to facilitate stacking of the lid with another second lid by engaging an annular projection of the second lid.

18. The lid of claim 1, wherein the lid comprises five locking components circumferentially spaced around the annular sidewall.

19. The lid of claim 18, further comprising a void space corresponding to each locking component, wherein each void space extends through the annular sidewall and into the locking component and is defined by the projecting wall and the top wall of the locking component.

20. A tamper-evident lid for a container, the lid comprising:
an annular sidewall defining a perimeter of the lid, the annular sidewall including an upper sidewall section and a lower sidewall section;
a weakened portion extending circumferentially around the annular sidewall and partially through the annular sidewall, the weakened portion connecting the upper sidewall section and the lower sidewall section together;
a cover portion connected to the upper sidewall section;
one or more locking components provided on an interior surface of the lower sidewall section, wherein each locking component comprises:

a projecting wall extending radially inward from the interior surface of the lower sidewall at an upward angle; and

a top wall extending from the projecting wall toward a lower edge of the upper sidewall section;

wherein the top wall connects to an interior surface of the upper sidewall section along the lower edge to form an enclosed upper boundary of the locking component; and

a void space corresponding to each locking component of the one or more locking components, wherein each void space extends into and through the annular wall at a location corresponding to the locking component and is defined along an interior of the lid by the projecting wall and the top wall of the locking component;

wherein the void space is generally aligned with and integral with the weakened portion to form a continuous line of weakness for tamper evidence around the circumference of the lid;

wherein the projecting wall and top wall form a continuous enclosure separating each void space from the interior of the lid.

FIG. 1
PRIOR ART

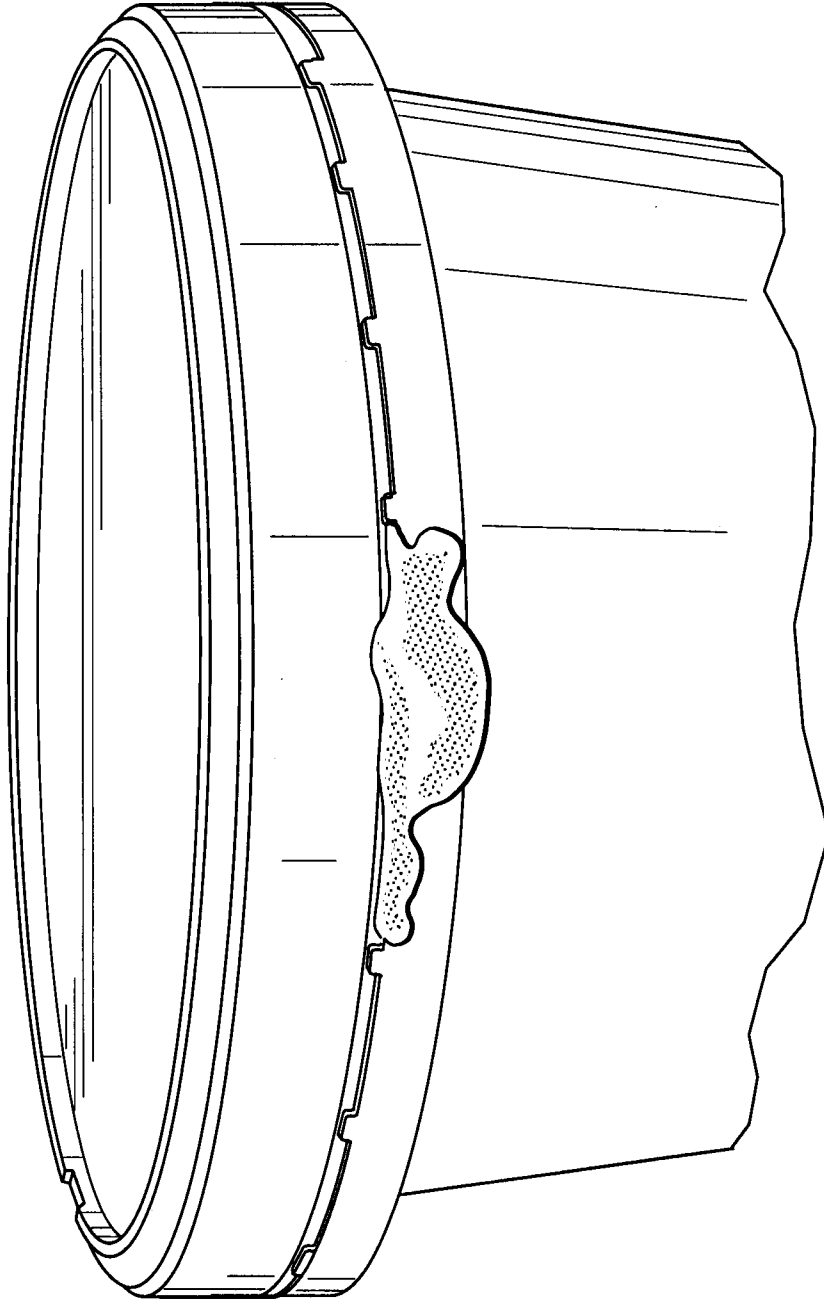
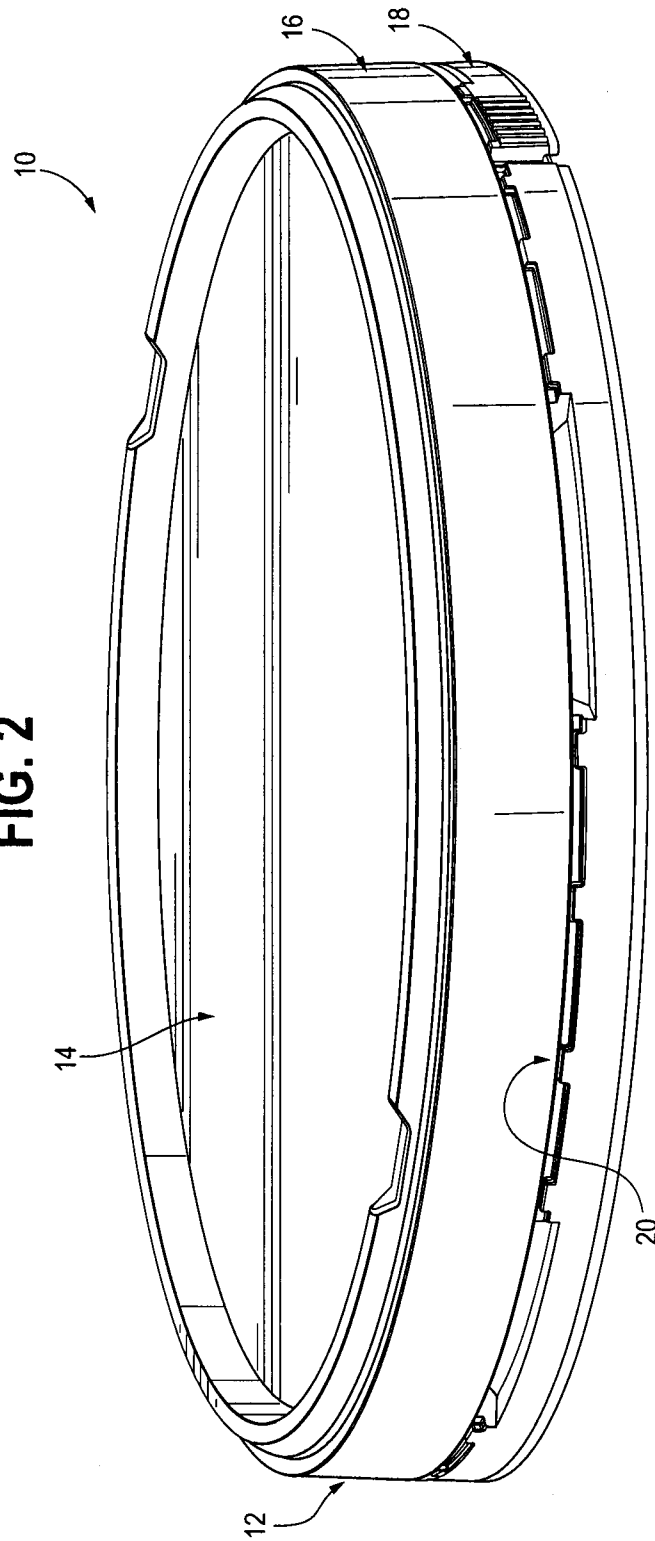


FIG. 2

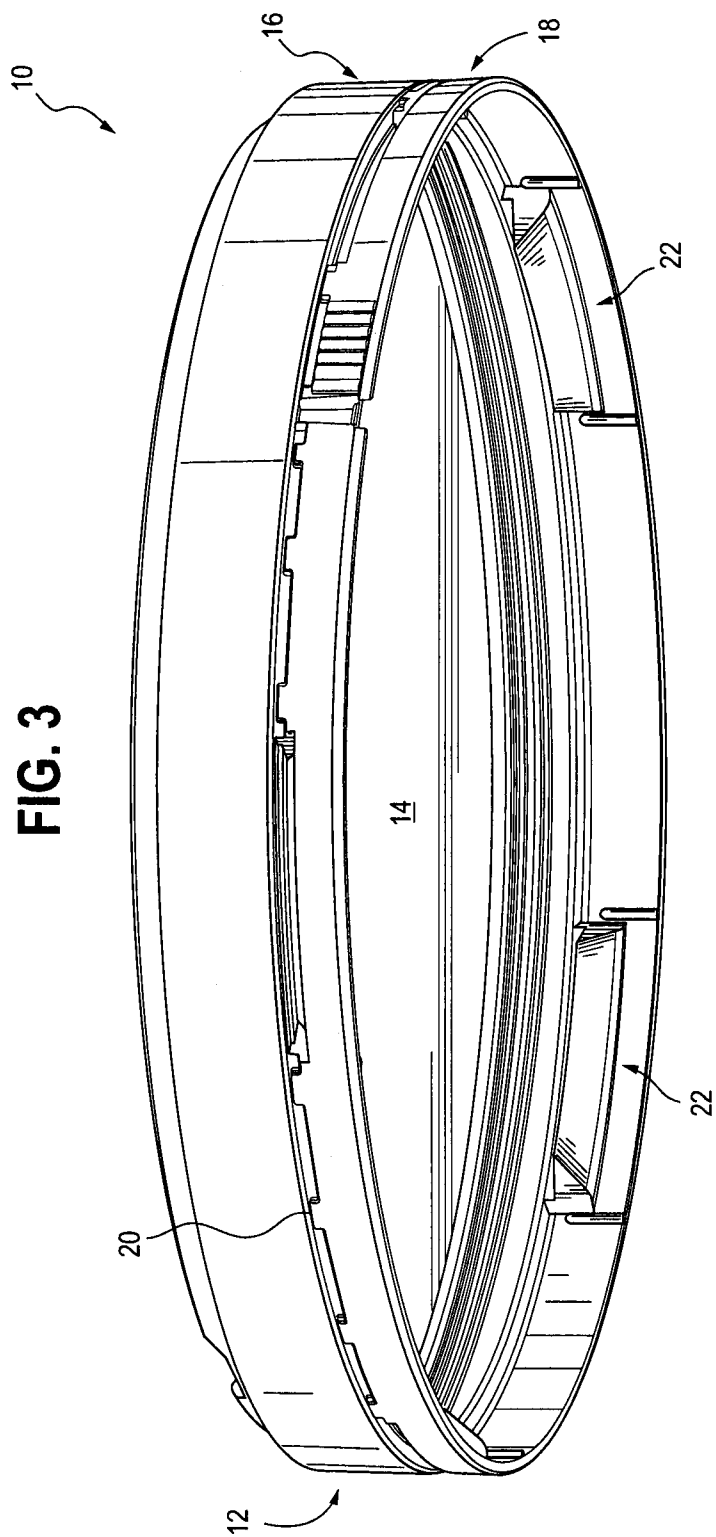


FIG. 4

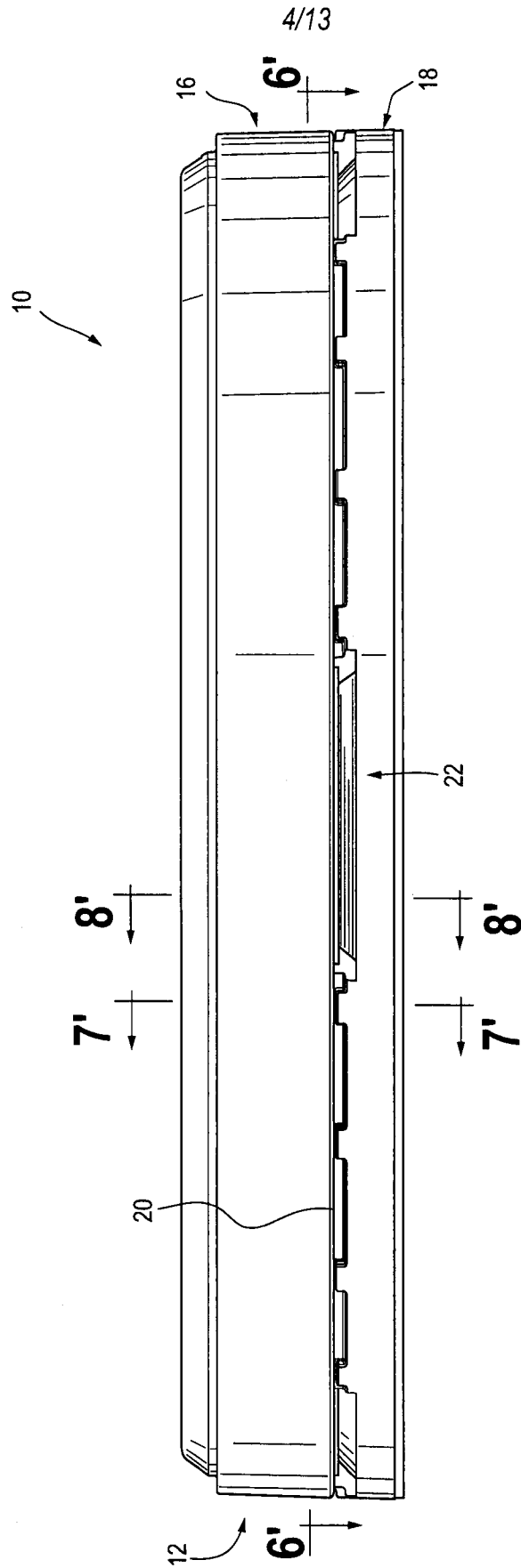


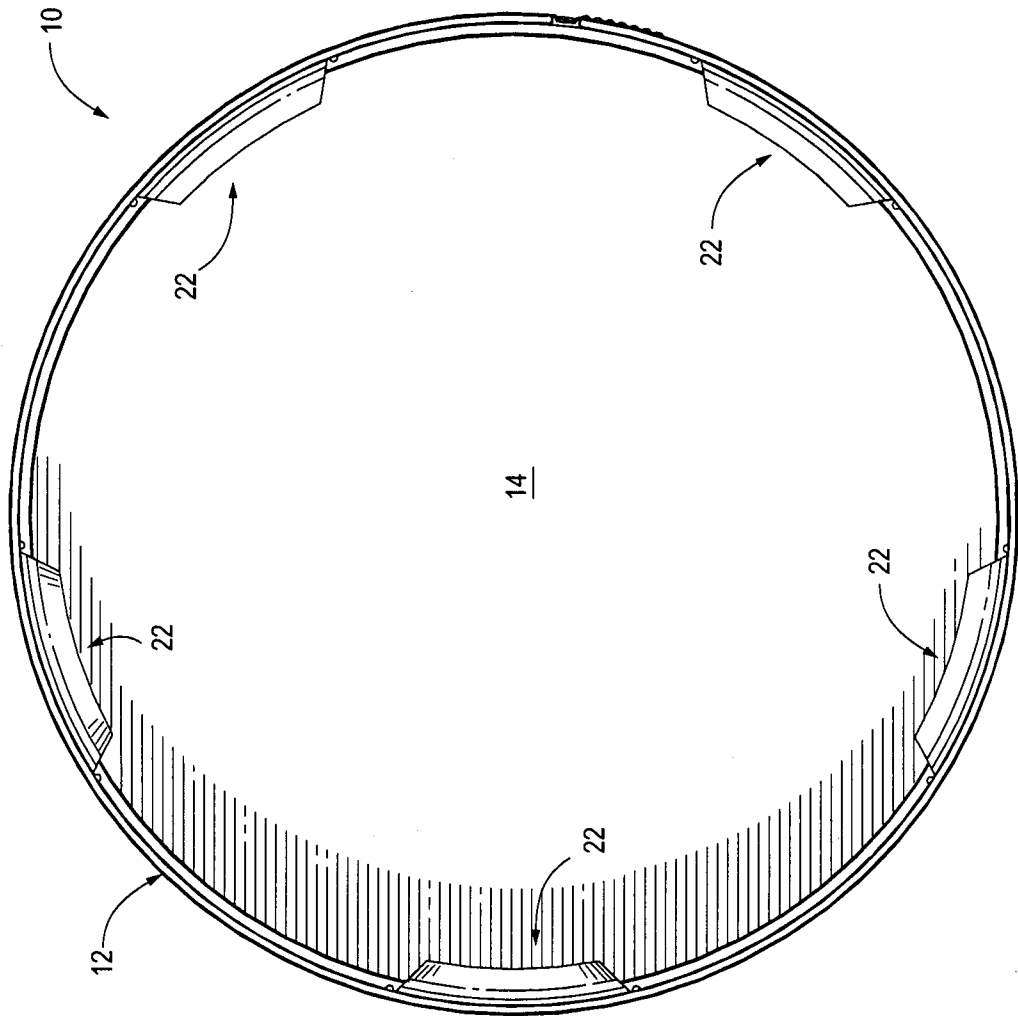
FIG. 5

FIG. 6

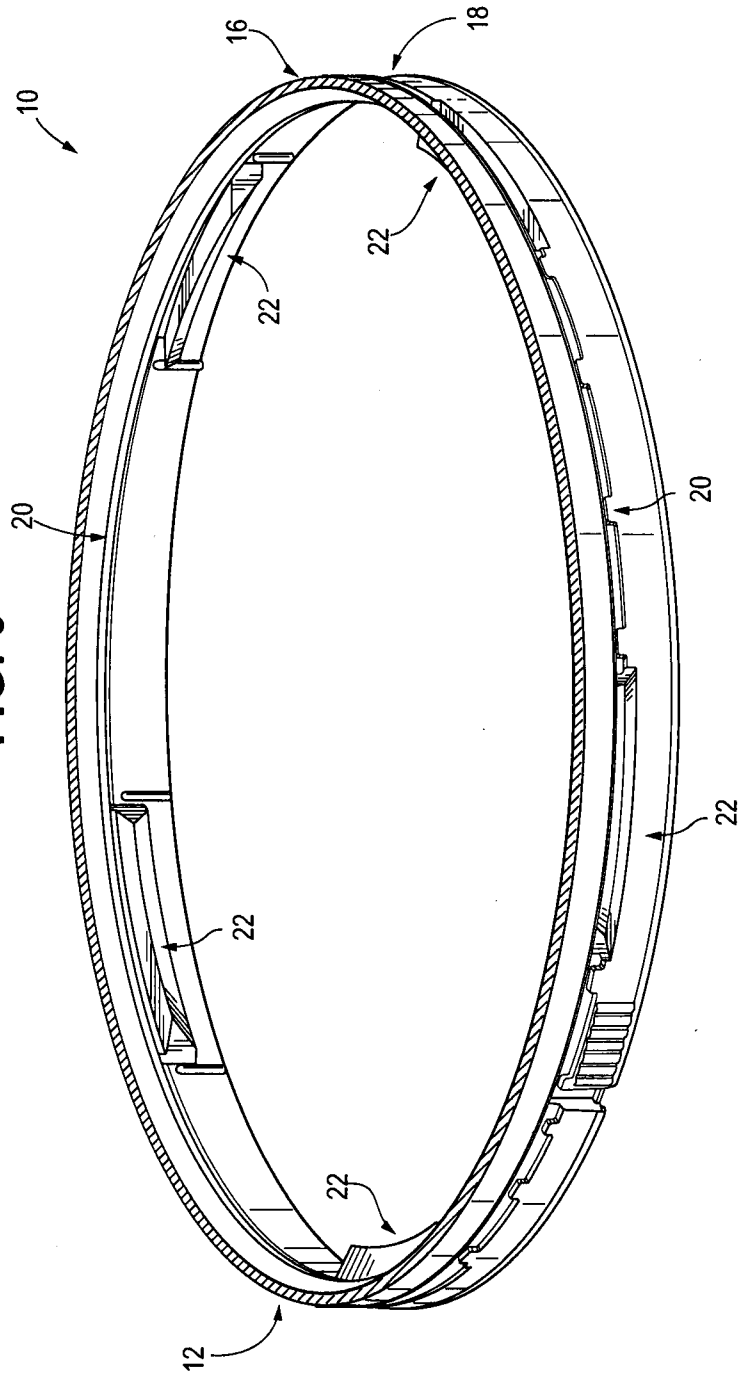


FIG. 7

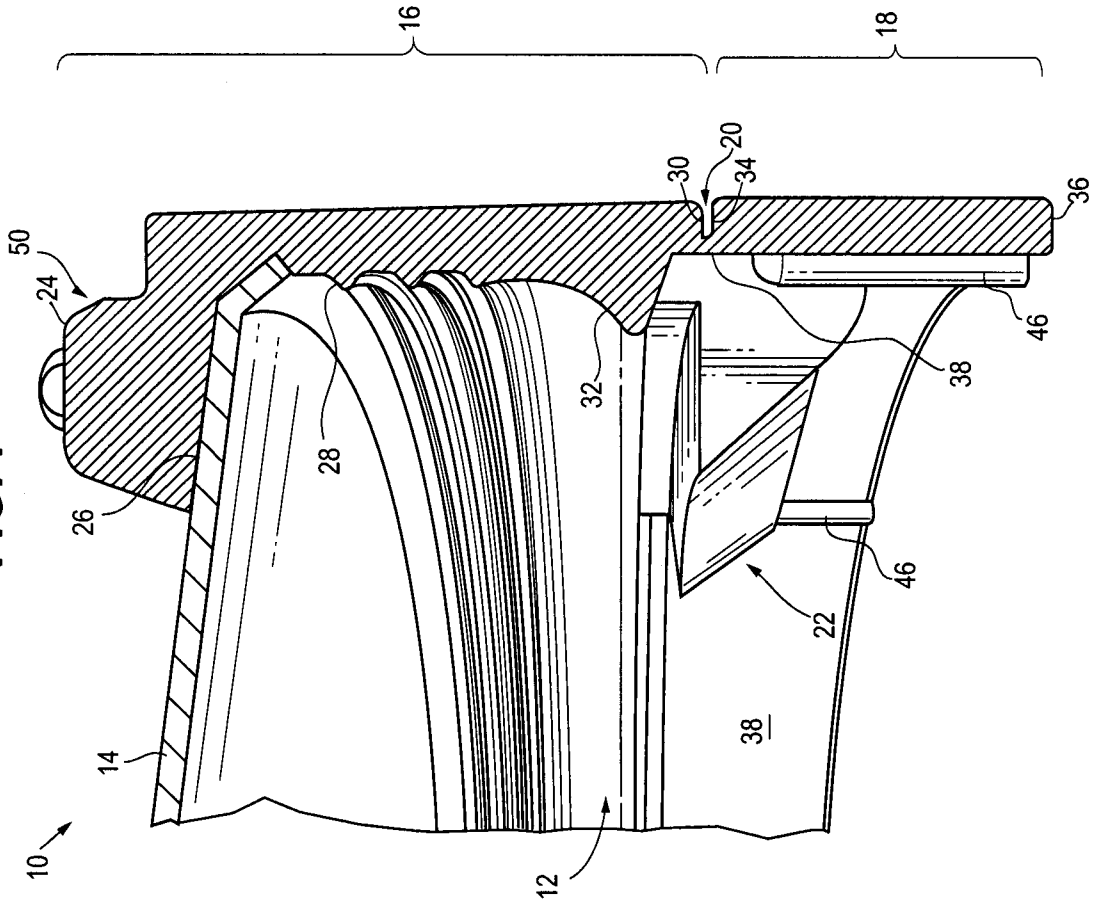


FIG. 8

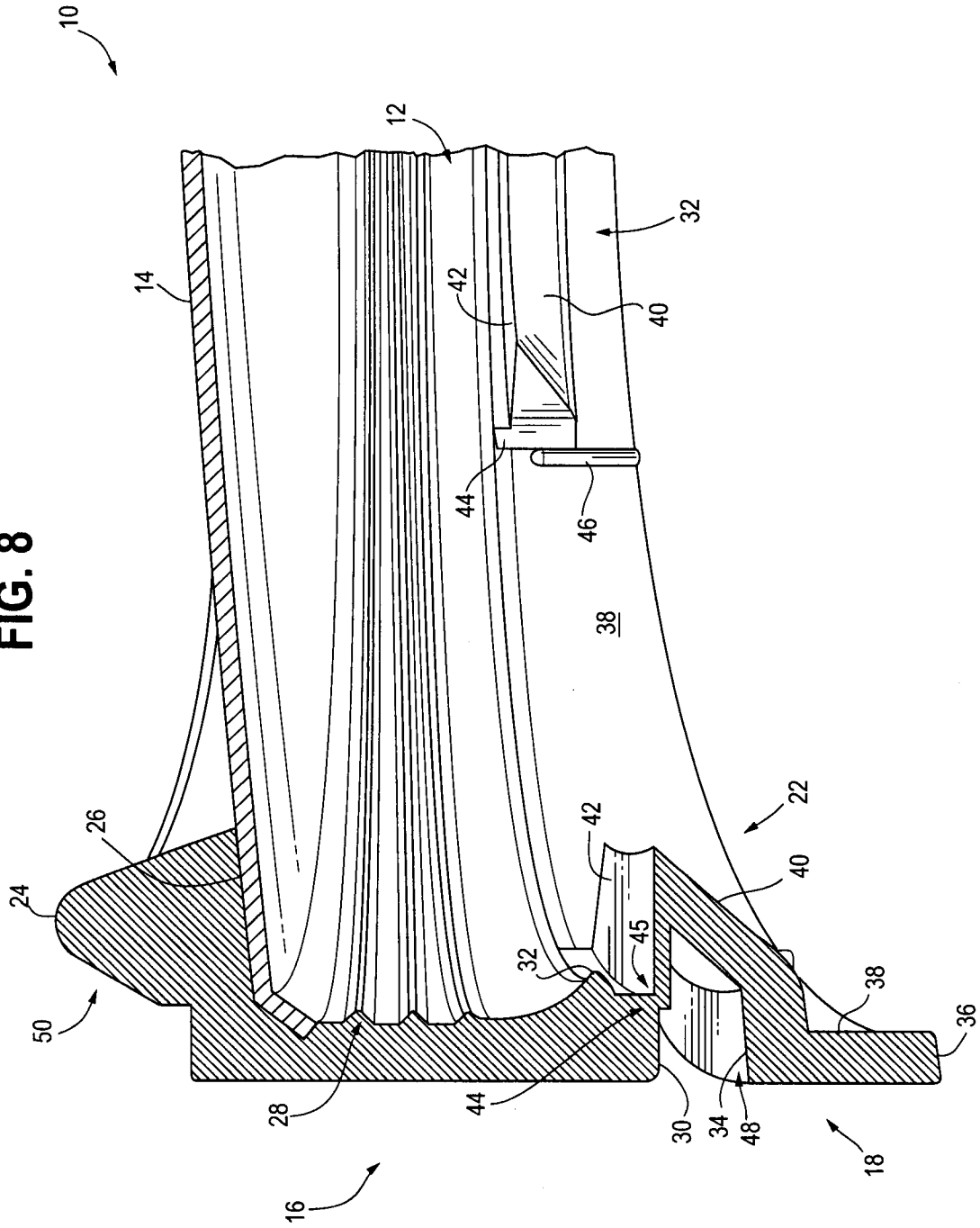


FIG. 9

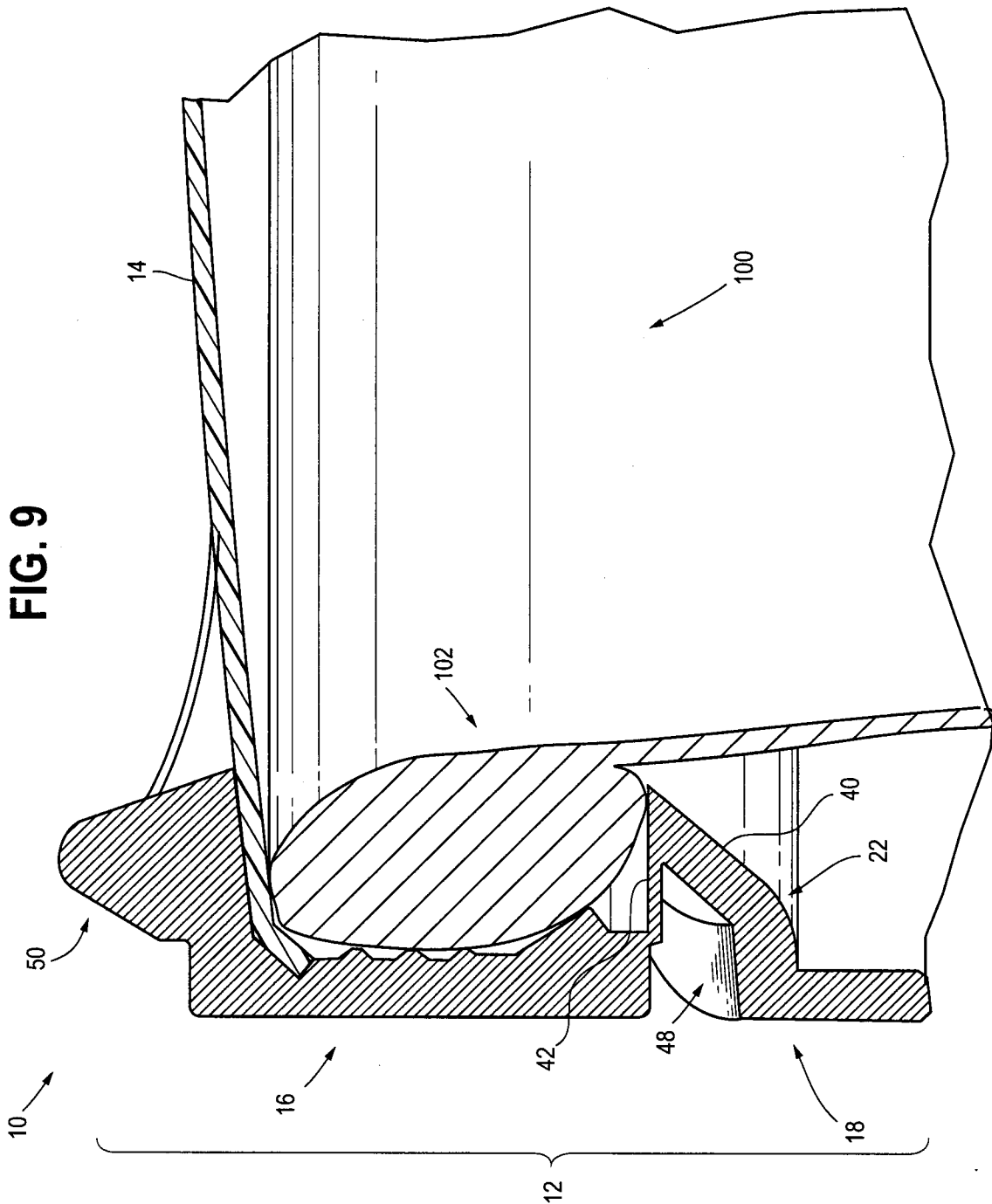


FIG. 10

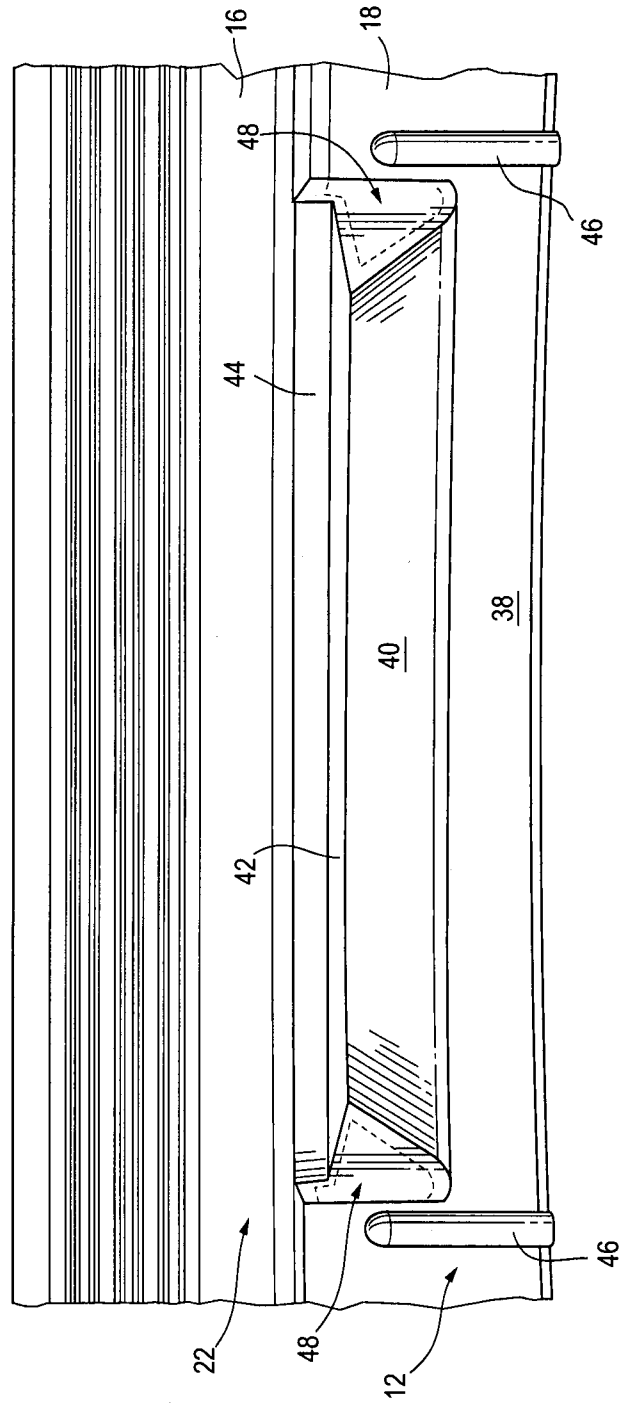


FIG. 11

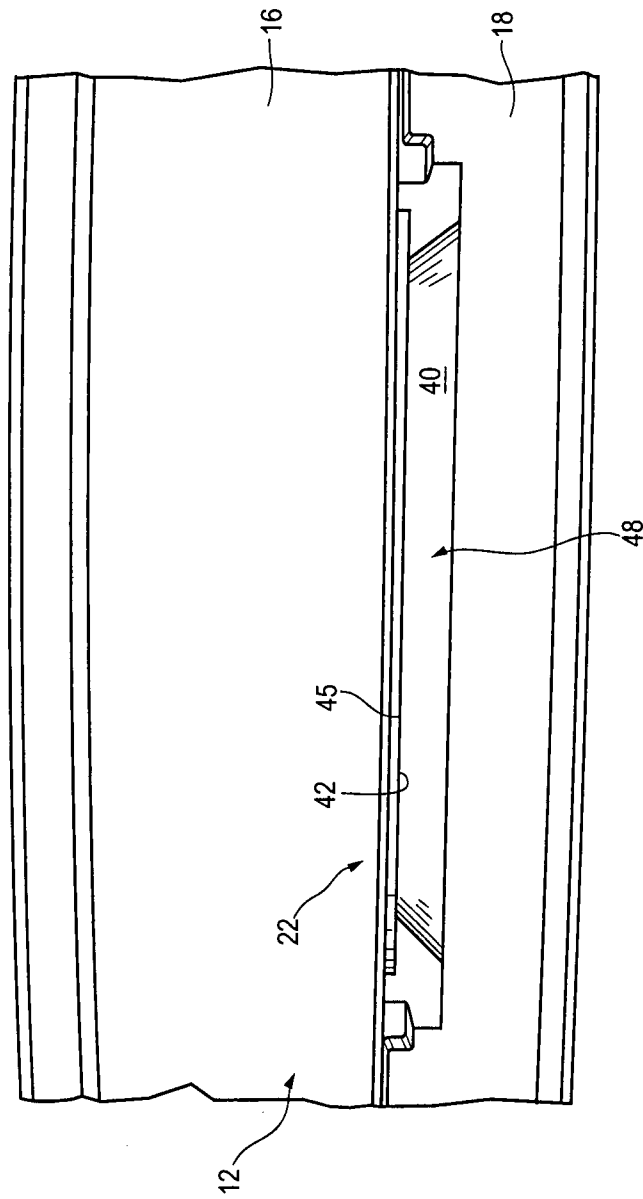


FIG. 12

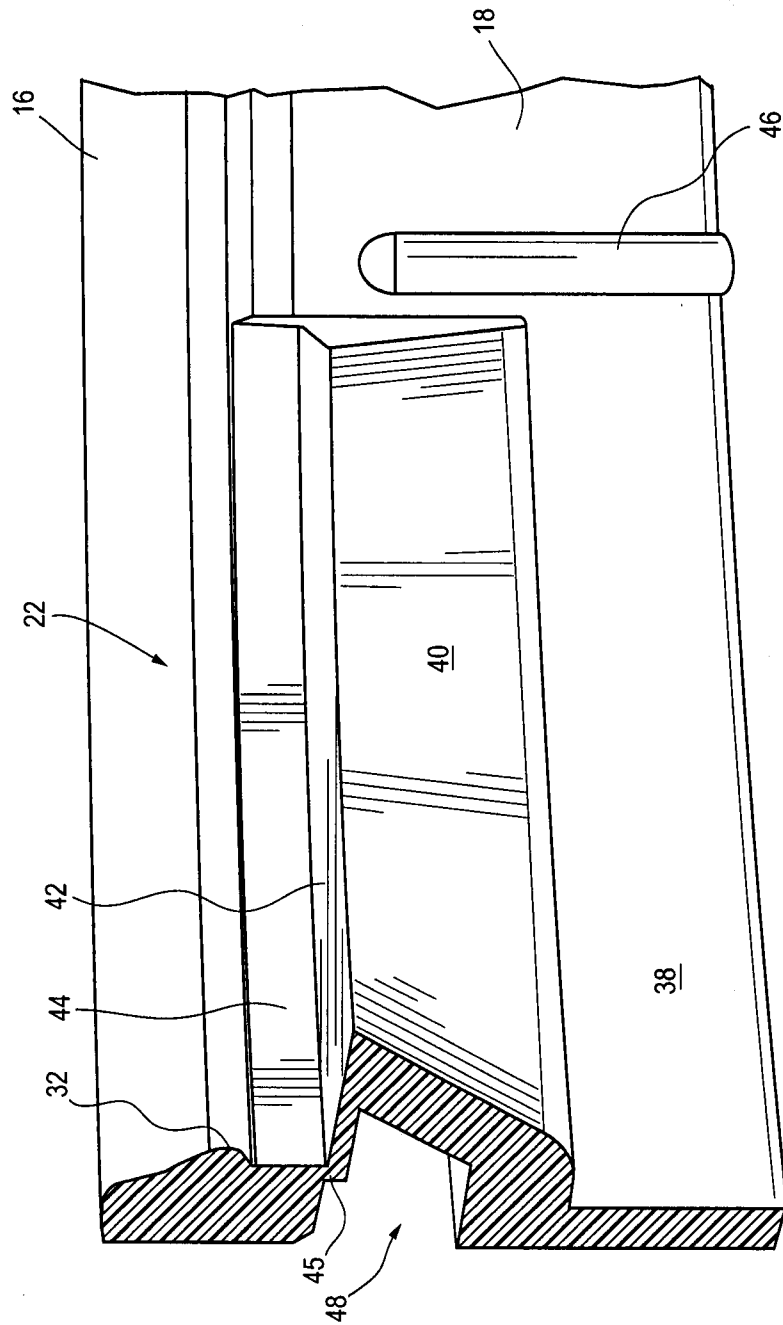


FIG. 13

