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(54) **Audible closing feature for a threaded container and lid**

(57) An audible closing feature for threaded containers (14) with a threaded lid (12), the container and lid including a lug (22) and notch (20) arrangement that provides an audible indication that the lid (12) is sufficiently closing the container (14) as well as providing for minimal resistance when removing the lid (12) from the container (14). The audible closing feature further reduces or eliminates backoff between the lid (12) and container (14) during transport and/or storage. The lid (12) and container (14) contain at least one of either the lugs (22) and notches (20), such that a lug (22) is received by a notch (20) to provide the audible indication that the lid (12) is sufficiently closing the container (14).

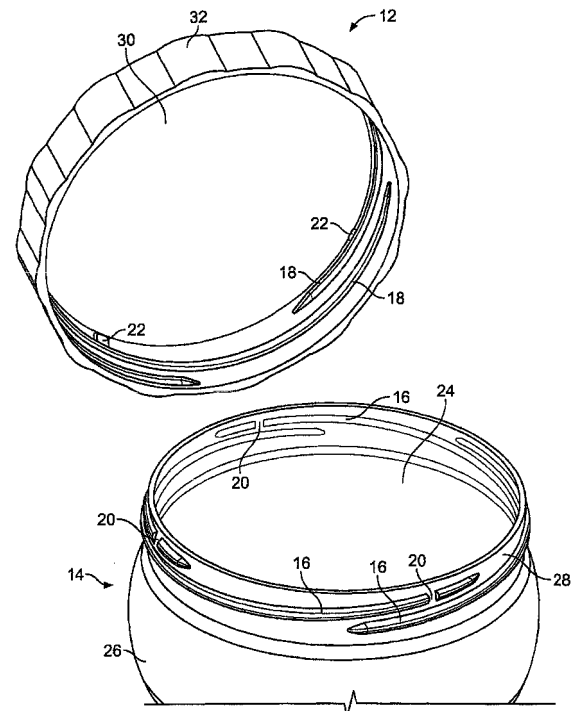


FIG. 4

Description

FIELD

[0001] This disclosure relates generally to an audible closing feature for threaded containers and lids, and more specifically to a lug and notch arrangement that provides an audible indication that the lid is sufficiently closing the container.

BACKGROUND

[0002] Threaded containers and lid closures may contain various mating arrangements therebetween. Typical arrangements may provide notches, or protrusions, in or adjacent to the threads of one or both of the lid and container to perform various functions.

[0003] One such function is to provide a venting path to allow pressure within the container to escape. Pressure venting systems can include notches in the threads of the lid and/or the threads of the container. Containers with pressure venting systems can be used in packaging beverages under pressure, such as carbonated beverages. U.S. Patent No. 6,736,280 provides notches in the threads of the lid for venting. U.S. Patent No. 5,533,633 provides notches in the threads of the container for venting. U.S. Patent No. 6,006,930 provides notches in the threads of both the lid and container for venting. However, none of the above-mentioned patents discloses providing an audible indication when the lid is sufficiently closing the container.

[0004] Another function of lid and container mating arrangements is to provide a locking feature between the lid and container. One purpose of this locking feature is to provide a child-proof safety lock, such that the lid is not easily removed from the container. U.S. Patent No. 6,848,590 discloses a lug and pocket device where the lid contains lugs in the threads of the lid that fit into pockets that are in the threads of the container. It is further disclosed that when it is attempted to remove the closure from the container, a lug abutment face will cooperate with a pocket abutment face to prevent unscrewing of the closure in the absence of a sufficient axial force on the closure to compress a spring that permits the lugs to clear the pockets. U.S. Patent No. 4,084,717 discloses a series of ratchet portions at the end of the thread of the container which engage with a series of ratchet teeth in the lid. To open the container after closing, disengagement of the teeth from the ratchet portion must first be achieved before the lid can be rotated in an opening direction. This is done by applying an axial downward force to the closure/lid in order to disengage the teeth from the ratchet portion. U.S. Patent No. 3,741,421 discloses a lug and detent system in either the lid or container that provides resistance to cap rotation in an opening direction of rotation. The lug and detent are both formed on the thread of its respective part (i.e., lid or container). The lugs are downwardly projecting lugs in the form of a right

triangle with a sloping side such that rotation in the opposite direction (i.e., unlocking direction) is significantly impeded due to the vertical side of the lug becoming lodged against the wall of the detent. U.S. Patent No. 5,197,616 discloses a child safety lock feature where a lid includes an inner cap, a middle cap, and an outer cap. The inner cap has threaded portions for engagement with threaded portions of a container. The middle cap, which is next to the inner cap, rotates with the inner cap and locks in place as the inner cap is in a fully closed position. To close the lid, the outer cap is rotated, and as it rotates the middle and inner caps are rotated until fully closed. Once fully closed, the inner and middle caps will no longer rotate when the outer cap is rotated. As the outer cap continues to be turned, it rotates past the middle cap while the middle cap remains stationary and provides an audible click sound as it slides past part of the middle cap. The audible click occurs when a protrusion on the outer cap contacts the trailing edge of a cam surface of the middle cap, providing a click when the middle cap is in the fully closed position. In order to remove the cap, and thus to open the container, the user must provide both a rotative and an axial force to disengage the threaded portion of the inner cap from the threaded portion of the container. Such child-proof safety locks are specifically designed to impede removal of the lids from the containers.

[0005] Another function of lid and container mating arrangements is to provide an anti-backoff system so the lid does not loosen or backoff from the closed position during transport and/or storage. U.S. Patent No. 5,969,033 discloses locking the lid in place for the purpose of preventing backoff of the lid from the container by providing wedge-shaped teeth along the bottom thread on the lid. The teeth then abut against the underside of the thread along the container for the purpose of preventing backoff of the lid during transport. It is further disclosed that this type of arrangement is useful only for applications where ready removal of the closure is not desired. U.S. Patent No. 4,461,394 discloses providing a series of alternate ridges and indentations as part of the threads on both the lid and container rim where a ridge on one engages an indentation of the other. U.S. Patent No. 5,803,287 discloses providing downward extending lugs on the lid and abutments and projections on the container rim below the threads. The lugs on the lid engage the abutments to provide an audible click when the lugs on the interior of the lid rotate past the abutments on the container. The projections on the container interfere with the threads on the lid to reduce backoff during transport and/or storage. However, none of the above-mentioned patents discloses providing an audible indication when the lid is sufficiently closing the container.

SUMMARY

[0006] A lug and notch closing feature is disclosed that provides an audible indication when the lid is sufficiently

closing the container, provides for minimal resistance when removing the lid from the container, and reduces or eliminates backoff between the lid and the container during transport and/or storage.

[0007] A container having a body with a neck surrounding an opening and a lid with a top wall and a skirt depending therefrom are provided. The neck of the container has external threading located thereon having at least one notch, and preferably, though not necessarily, at least three notches generally equidistantly spaced. The skirt of the lid has internal threading for engagement with the external threading on the neck and it further has at least one radially inward extending lug, and preferably, though not necessarily, at least one lug for each notch with the lugs being generally equidistantly spaced. The lugs are positioned between the internal threading and the top wall. To generate an audible indication that the lid is sufficiently closing the container, the lugs snap into the notches on the external threading.

[0008] As the lid is rotated about the neck of the container, the lug contacts a ramp end of the external threading. The lug then rides up on the ramp end and onto the external threading, uniformly deforming one or both of the lid and container. The lug then snaps into the notch providing an audible indication that the lid is sufficiently rotated into a closed position, and thus returning one or both of the lid and container to an undeformed, or relaxed, state.

[0009] In another aspect, the audible closing feature comprises a similar container and lid, however, the external threading of the neck has at least one radially outward extending lug, and preferably, though not necessarily, at least three generally equidistantly spaced lugs, and the internal threading on the skirt of the lid has at least one notch, and preferably, though not necessarily, at least three generally equidistantly spaced notches. The lugs on the neck of the container are positioned between the external threading and the opening. The audible indication is generated by the lugs on the neck snapping into the notches on the lid.

[0010] A method of providing an audible indication of the position of the lid on the container comprises providing at least three lugs generally equidistantly spaced between the internal threading and a top wall of the lid and providing at least three notches generally equidistantly spaced on the external threading of the neck of the container body. At least one of the neck of the container and the skirt of the lid is uniformly deformed by engaging the lugs with the external neck threads and aligning the lug with the notch to return at least one of the neck and the skirt to an undeformed, or relaxed, state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1A is a cross-sectional view of a lug on a lid positioned adjacent the beginning of an external thread on a container neck;

[0012] FIG. 1B is a cross-sectional view of the lug on

the lid positioned on the external thread of the container neck;

[0013] FIG. 1C is a cross-sectional view of the lug on the lid positioned in a notch in the external thread of the container neck;

[0014] FIG. 2 is a top plan view of the container;

[0015] FIG. 3 is a bottom plan view of the lid;

[0016] FIG. 4 is a perspective view of the container with the lid spaced above the neck of the container; and

[0017] FIG. 5 is a perspective view of the container neck showing the external threads and the notch.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0018] An audible closing feature for containers with a threaded lid, and in particular a lug and notch arrangement is disclosed herein and illustrated in FIGS. 1-5. The container may have at least one lug in the closure and at least one notch along the thread of the container for receiving the lug to provide an audible indication when the lid is sufficiently closing the container, to provide for minimal resistance when removing the lid from the container, and to prevent backoff between the lid and container during transport and/or storage.

[0019] A container and lid both contain threads which engage one another to secure the lid to the container. The lid may contain at least one lug, and preferably at least three, positioned between the top surface of the lid and the topmost portion of the thread. The lugs may each align with a corresponding notch, or gap, in the external thread of the container neck when the lid is sufficiently closing the container or, alternatively, only some of the lugs may have a corresponding notch with which to align and not all of the lugs. As the lid is rotated about the container neck, the lugs that have a corresponding notch to align, with will come into contact with a ramp end of the external thread. As the lug rides up on the ramp end of the external thread and onto the thread, one or both of the lid skirt and container neck may be deformed. The deformation may be uniform if three or more lugs are utilized. The lug slides along the thread until it snaps into place within the notch on the external thread. As the lug snaps into the notch, an audible indication is made to indicate that the lid is sufficiently rotated into a closed position and that the container is properly closed, thus providing the consumer an assurance that the container is adequately closed.

[0020] Additionally, engagement of the lug with the thread of the container can prevent backoff of the lid from the container during transport and/or during storage of the container when a tamper evident film is covering the opening. The film can provide increased resistance to rotation between the lid and the container, which can be enhanced when the lugs also contact the film or when the lugs are in the notches and the film is causing additional pressure between the threads.

[0021] The container 14 comprises a body 26 with an

opening 24 at one end, and a neck 28 surrounding the opening 24 of the container 14, as is illustrated in FIG. 4. The neck 28 of the container 14 contains external threading 16 for engagement with internal threading 18 of the lid 12. Additionally, the external threading 16 of the container 14 contains at least one notch 20 in the threading 16 and preferably, though not necessarily, at least three generally equidistantly spaced notches 20. Alternatively, the container 14 may contain a ring, or continuous thread-type protrusion, around the neck 28 of the container 14 below the threads 16 that may contain the notches 20.

[0022] The notches 20 in the thread 16 separate the thread into different segments. As a result, a multi-segment thread is formed. The external threads 16 on the neck 28 of the container 14 may be discontinuous and positioned at an angle around the neck 28 of the container 14, such that the end of one overlaps with the beginning of another. Where the external threading has at least three discontinuous external threads, and more preferably, though not necessarily, at least four discontinuous external threads, and is at an angle such that an uppermost end of a first external thread overlaps at a position above a lowermost end of a second external thread, the uppermost end of the first external thread contains the notch, as shown in FIGS. 4 and 5. Alternatively, the opposite overlapping configuration may be possible. Still alternatively, the thread may be continuous.

[0023] The notch 20 may be positioned in the uppermost thread 16, i.e., the thread that is closest to the top or opening 24 of the container 14. Furthermore, the notch 20 may be placed near an endpoint of the uppermost thread of the discontinuous external thread, thus separating the adjacent portion of the thread 16 into two segments; a long segment and a short segment separated by the notch 20.

[0024] The lid 12 is provided with internal threading 18, where the internal threading may be discontinuous. The lid 12 has a top wall 30 and a skirt 32 depending therefrom, with the threading 18 positioned on the interior side of the skirt 32. The internal threading 18 on the lid 12 is configured to engage with the external threading 16 on the container neck 28 to provide a closure for the container 14. The threads 18 of the lid 12 may also be positioned at an angle such that the end of one overlaps with the beginning of another, depending upon the configuration of the thread 16 on the neck 28 of the container 14. For example, an uppermost end of a first internal thread may overlap a lowermost end of a second internal thread.

[0025] The lid 12 includes at least one lug member 22 positioned between an uppermost portion of the thread 18 and an interior surface of the top wall 30 of the lid 12, and preferably, though not necessarily, at least three generally equidistantly spaced lugs 22 along an interior surface of the skirt 32 where the lid has at least three discontinuous internal threads. The lug 22 may contact the upper side of the thread 18, or may be spaced there-

from; similarly, the lug 22 may contact the intersection of the top wall 30 and skirt 32, or may be spaced therefrom. One embodiment may have the lug 22 positioned at an upper side of an uppermost thread 18, where the threads 18 overlap, as illustrated in FIG. 4, and positioned near the beginning point of the uppermost thread 18 at the overlapping section. Another embodiment may have the lug 22 positioned on an upper side of a thread 18 in a non-overlapping section, such that the lug 22 is only in contact with the thread 18, being spaced a distance away from the intersection of the top wall 30 with the skirt 32.

[0026] The lug 22 is sized to fit in the notch 20 located on the threads 16 of the container 14, and may have various shapes and sizes that are smaller, complementary to, or larger than the notch 20. Typically, the lug 22 may have a leading edge and a trailing edge, and further comprising an exposed surface that contacts the notch 20 once the lug 22 is inserted. Opposite the exposed surface may be a straight edge that is attached to the skirt 32 of the lid 12. The leading edge of the lug 22 is the first edge to contact the notch 20, and the trailing edge is the last part of the lug 22 to contact the notch 20. An example of a lug shape is generally trapezoidal, with four straight edges having a leading edge at a 90° angle and a trailing edge at a different angle, where one of the other straight edges is attached to the skirt. Another shape may be a lug having rounded edges and a straight edge top and bottom. The leading and trailing edge may be similar in shape, i.e., both may be rounded, and the exposed surface of the lug may be a straight edge, with the side opposite the exposed surface attached to the skirt and may also be a straight edge. Another possible shape may be a half-circle lug where there are only two sides, a half circle side and a straight edge that is attached to the skirt. Still another possible shape may be a quarter circle lug, having three sides. The leading edge may be a straight edge with the remainder of the exposed lug surface being rounded, and the side that is attached to the skirt of the lid may be a straight edge. Still other shapes may be provided for the lug member 22, and the shapes are not limited to those just described above.

[0027] The notch 20 may be shaped to receive a lug 22 positioned in the lid 12 and may have any number of shapes. The notch 20 may be sized slightly larger than the lug 22, or may be sized to compliment the lug 22 size, or may be sized slightly smaller than the lug 22. The notch 20 preferably may be sized smaller than the lug 22, such that the lug 22 is longer than the notch 20 and has a circumferential length larger than the circumferential length of the notch 20, to achieve a tighter fit between the lug 22 and the notch 20. Beginning with such a configuration can be advantageous if there is expected to be wear on one or both of the lugs 22 and notches 20 due to repeated use. The notch 20 preferably extends at least substantially all the way through the thread 16, separating it into two segments.

[0028] The audible closing feature 10 may have at least one lug 22 and one corresponding notch 20 that

provide an audible sound that indicates when the lid 12 is sufficiently closing the container. When it is desired to close the container 14, the lid 12 may be placed over the opening 24 and rotated such that the threads 18 on the lid 12 engage with the threads 16 on the container neck 28, as is typical of threaded closure systems. The lugs 22 on the lid 12 may initially pass between the threads 16 on the container 14 as the lid is first rotated. However, the audible closing feature 10 may also have an unequal number of lugs 22 and notches 20, such that, for example, there may be a greater number of lugs 22 than notches 20. One example of an audible closing feature 10 with unequal lugs 22 and notches 20 may have four lugs 22 and only two notches 20, such that only two lugs 22 are aligned with the two notches 20.

[0029] As the lid 12 nears its final point of rotation, the lugs 22 may begin to engage with a ramp portion of the threads 16 of the container 14, as shown in FIG. 1A. (FIGS. 1A-1C depict cross-sectional views of the lid 12 placed on top of the container 14 and viewed from an interior of the container 14 looking outwards.) The ramp position may be located on the short segment of the discontinuous external thread 16 of the container 14 and ending at a notch 20 or it may be located along a ring around the neck 28 of the container and also ending at a notch 20. As the lugs 22 engage with the ramp portion and slide up along the ramp on the external thread 16, as seen in FIG. 1B, the neck 28 of the container 14 may be inwardly deformed in a uniform manner and/or the skirt 32 of the lid 12 may be outwardly deformed in a uniform manner as the lug 22 slides along the ramp. Tension may build up between the lid 12 and container 14 when pressure is exerted by the lug 22 on the thread 16 of the container 14, and may cause the uniform deformation of the container 14 and/or the lid 12. Once a lug 22 is aligned with its corresponding notch 20, such that it has snapped into position within the notch 20, the neck 28 and/or the skirt 32 of the lid 12 may be returned to its undeformed, or relaxed state. FIG. 1C shows a lug 22 and notch 20 fully aligned and the lid 12 in the fully closed position. As the lug 22 snaps into place within the notch 20, an audible sound may be created, which indicates that the lid 12 is sufficiently closing the container 14. This is preferably at the position of maximum rotation between the lid 12 and the container 14.

[0030] Engagement of the lugs 22 with the thread 16 can prevent backoff of the lid 12 from the container 14 during transport and movement of the container 14. The lugs 22 on the lid 12 can be prevented from aligning with the notch 20 by the placement of a tamper evident film over the lid and between the neck 28 of the container 14 and the lid 12 prior to initial use and during transport and/or storage. The film between the lid 12 and container 14 can interfere with the alignment of the lugs 22 and notches 20 and prevents the lugs 22 from falling into the notches 20 by blocking access to the notch 20 and preventing further rotation of the lid 12 towards the notch 20. Thus, tension of the lug 22 on the thread 16 of the

container 14, which is covered by the film, can prevent backoff. Alternatively, such as for a tamper evident film that does not extend into the threading, the film may provide increased resistance to rotation between the lid 12 and the container 14, which can be enhanced when the lugs 22 also contact the film or when the lugs 22 are in the notches 20 and the film is causing additional pressure between the threads. Additionally, the lug 22 and notch 20 are preferably configured such that simple rotation of the lid 12, without axial force, will back the lid 12 off the container 14 to facilitate easy opening of the container 14.

[0031] In an alternative arrangement, the lug 22 may be provided on the neck 28 of the container 14 and the notch 20 may be provided on the threads 18 of the lid 12, while still providing an audible sound upon aligning the lugs 22 with the notches 20.

[0032] The number of lugs 22 on the lid 12 does not necessarily equal the number of notches 20 in the container threads 16. It may be possible to have a greater number of lugs 22 than notches 20, or vice versa. For example, the lid 12 may contain four lugs 22 and the container 14 may have only two notches 20, such that two lugs 22 on the lid 12 are left without a notch 20 to snap into. Alternatively, there may be at least one lug 22 and at least one corresponding notch 20 for each lug 22; still it may be preferable to have at least three lugs 22 and a corresponding notch 20 for each lug, i.e., at least three notches 20, and still more preferable to have four lugs 22 and four notches 20, as shown in FIGS. 2-3, all generally equidistantly spaced apart. Having at least three lugs 22 and three notches 20 helps maintain a uniform deformation of the neck 28 of the container 14 and/or the skirt 32 of the lid 12. This further facilitates the lugs 22 and notches 20 snapping into place once the container 14 returns to its original, undeformed shape, thus providing the audible indication.

[0033] From the foregoing it will be appreciated that an audible reclose feature for containers with a threaded finish is provided that allows for the engagement of a lug and notch closing system located on the lid and the container neck and for providing an audible sound upon full closure. However, the disclosure is not limited to the aspects and embodiments described hereinabove, or to any particular embodiments. Various modifications to the audible reclose feature can result in substantially the same feature.

Claims

1. A container with an audible closing feature, the container comprising:
 - a body with a neck surrounding an opening;
 - external threading on the neck having at least one notch;
 - a lid having a top wall and a depending skirt therefrom; and

- internal threading on the skirt for engagement with the external threading on the neck, at least one radially inward extending lug on the skirt and positioned between the Internal threading and the top wall for Insertion into the notches on the external threading with an audible indication.
2. The container according to claim 1, wherein the external threading on the neck has at least three notches generally equidistantly spaced and at least three radially inward extending lugs generally equidistantly spaced.
 3. The container according to claim 2, wherein: the external threading has at least three discontinuous external threads along an exterior surface of the neck, the external threading being angled such that an uppermost end of a first external thread overlaps a lowermost end of a second external thread and the uppermost end of the first external thread contains the notch; and the internal threading has at least three discontinuous internal threads along an interior surface of the skirt, the internal threading being angled such that an uppermost end of a first internal thread overlaps a lowermost end of a second internal thread and each of the lugs being positioned between the uppermost end of the adjacent internal threading and an interior surface of the top wall, along the interior surface of the skirt.
 4. The container according to claim 3, wherein the at least three notches are positioned adjacent an end point of the respective at least three discontinuous external threads such that each of the discontinuous external threads comprises a long segment and a short segment separated by the notch.
 5. The container according to claim 4, wherein the at least three lugs are positioned adjacent an end point of the respective at least three discontinuous internal threads.
 6. The container according to any one of Claims 1 to 5, wherein the number of notches is different than the number of lugs.
 7. The container according to any one of Claims 1 to 4, wherein the number of notches and the number of lugs is four.
 8. The container according to any one of Claims 1 to 7, wherein the lug engages with the discontinuous external thread to uniformly deform at least one of the neck of the container and the skirt of the lid until the lug is aligned with the notch in the neck.
 9. The container according to claim 8, wherein the lug engages with a ramp portion of the discontinuous external thread, the ramp portion being positioned on the short segment of the discontinuous external thread.
 10. The container according to any one of Claims 1 to 9, wherein the audible indication is created when the lug snaps into place within the notch, indicating that the lid is sufficiently rotated to a closed position.
 11. The container according to any one of Claims 1 to 10, wherein the lug has a circumferential length larger than the circumferential length of the notch.
 12. The container according to any one of Claims 1 to 11, wherein the engagement of the lug with the threads of the container prevents back-off between the lid and the container during transporting and movement of the container.
 13. The container according to any one of Claims 1 to 12, wherein each of the lugs has a leading edge and a trailing edge, the leading edge is the first edge of the lug to contact the notch and is curved.
 14. The container according to any one of Claims 1 to 12, wherein each of the lugs has a leading edge and a trailing edge, the leading edge is the first edge of the lug to contact the notch and is linear.
 15. The container according to claim 1, wherein: the external threading has four discontinuous external threads along an exterior surface of the neck and each having a notch; the internal threading has four discontinuous internal threads along an interior surface of the skirt, and four lugs positioned between the uppermost end of the internal threading and an interior surface of the top wall, along the interior surface of the skirt.
 16. The container according to claim 15, wherein the lug has a circumferential length larger than the circumferential length of the notch.
 17. The container according to claim 15 or 16, wherein the audible indication is created when the lug snaps into place within the notch, indicating that the lid is sufficiently rotated into a closed position.
 18. A method of providing an audible indication of the position of a lid on a container comprising:
 - providing at least three lugs generally equidistantly spaced between internal threading and a top wall of a lid;
 - providing at least three notches generally equidistantly spaced on external threading of a neck on a container body;
 - deforming at least one of the neck of the con-

tainer and the skirt of the lid by engaging the lugs with the external threading; and returning at least one of the neck of the container and the skirt of the lid to an undeformed state by aligning the lug with the notch in the external threading. 5

19. The method according to claim 18, wherein the external threading has at least three discontinuous external threads along an exterior surface of the neck, the external threading angled such that an uppermost end of a first external thread overlaps a lowermost end of a second external thread and the uppermost end of the first external thread contains the notch, and the internal threading has at least three discontinuous internal threads along an interior surface of the skirt, the internal threading angled such that an uppermost end of a first internal thread overlaps a lowermost end of a second internal thread and each of the lugs positioned between the uppermost end of the adjacent internal threading and an interior surface of the top wall, along the interior surface of the skirt. 10 15 20

20. A container with an audible closing feature, the container comprising: 25

a lid having a top wall and a depending skirt therefrom; internal threading on the skirt having at least one notch; a body with a neck surrounding an opening; external threading on the neck for engagement with the internal threading on the skirt, at least one radially outward extending lug on the neck positioned between the external threading and the opening for insertion into the at least one notch on the internal threading with an audible indication. 30 35 40

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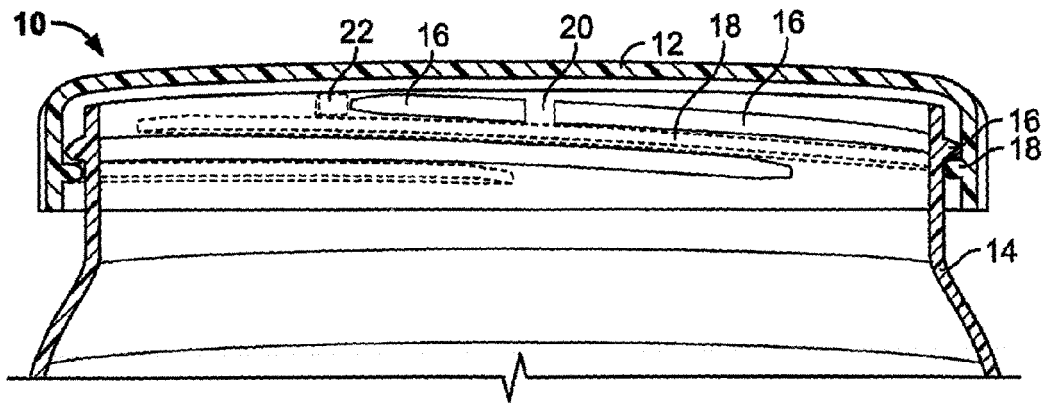


FIG. 1A

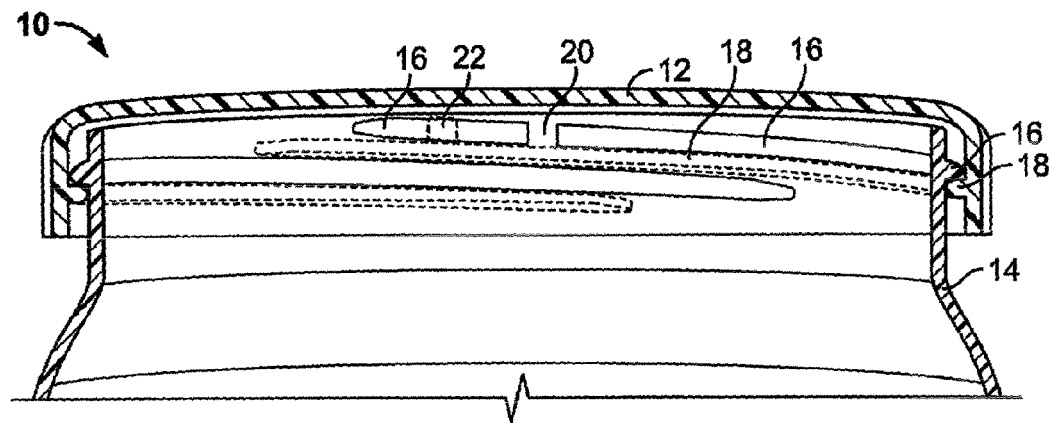


FIG. 1B

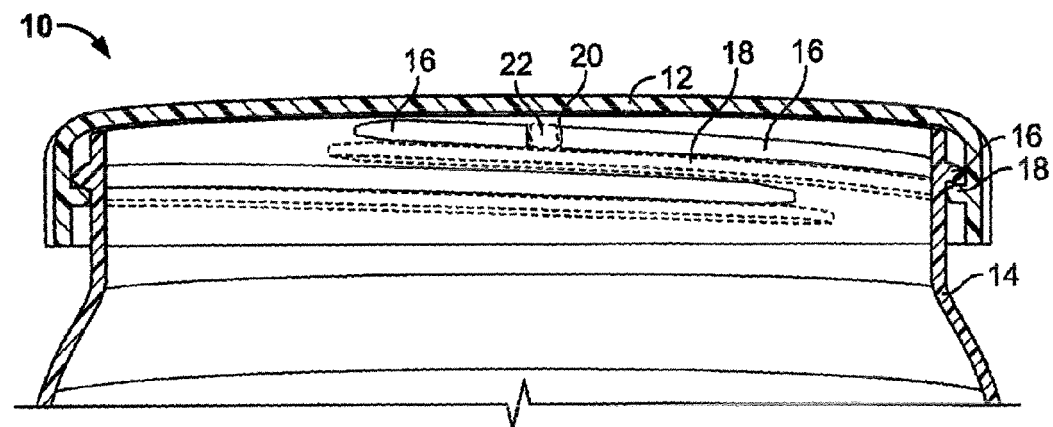


FIG. 1C

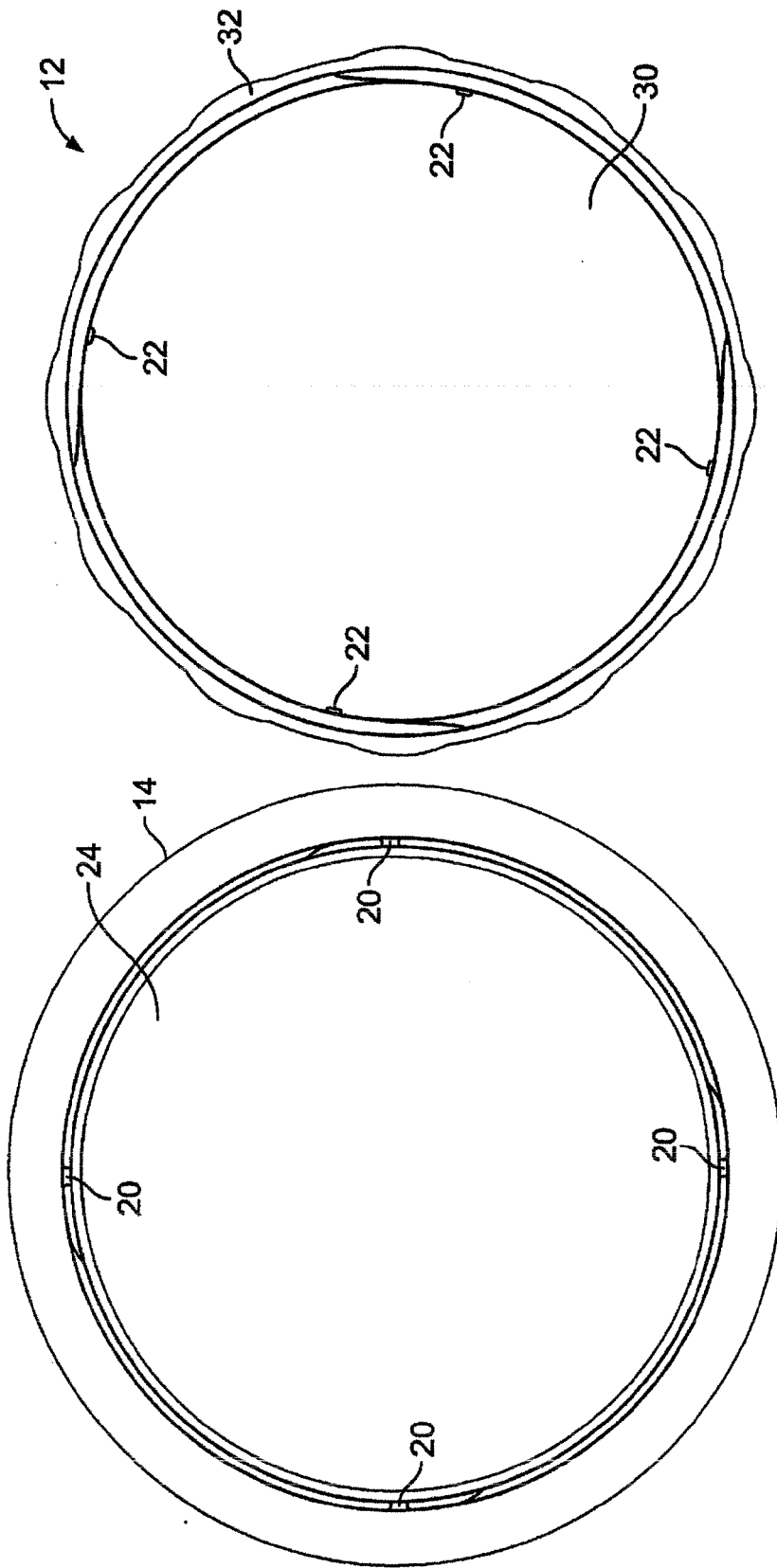


FIG. 3

FIG. 2

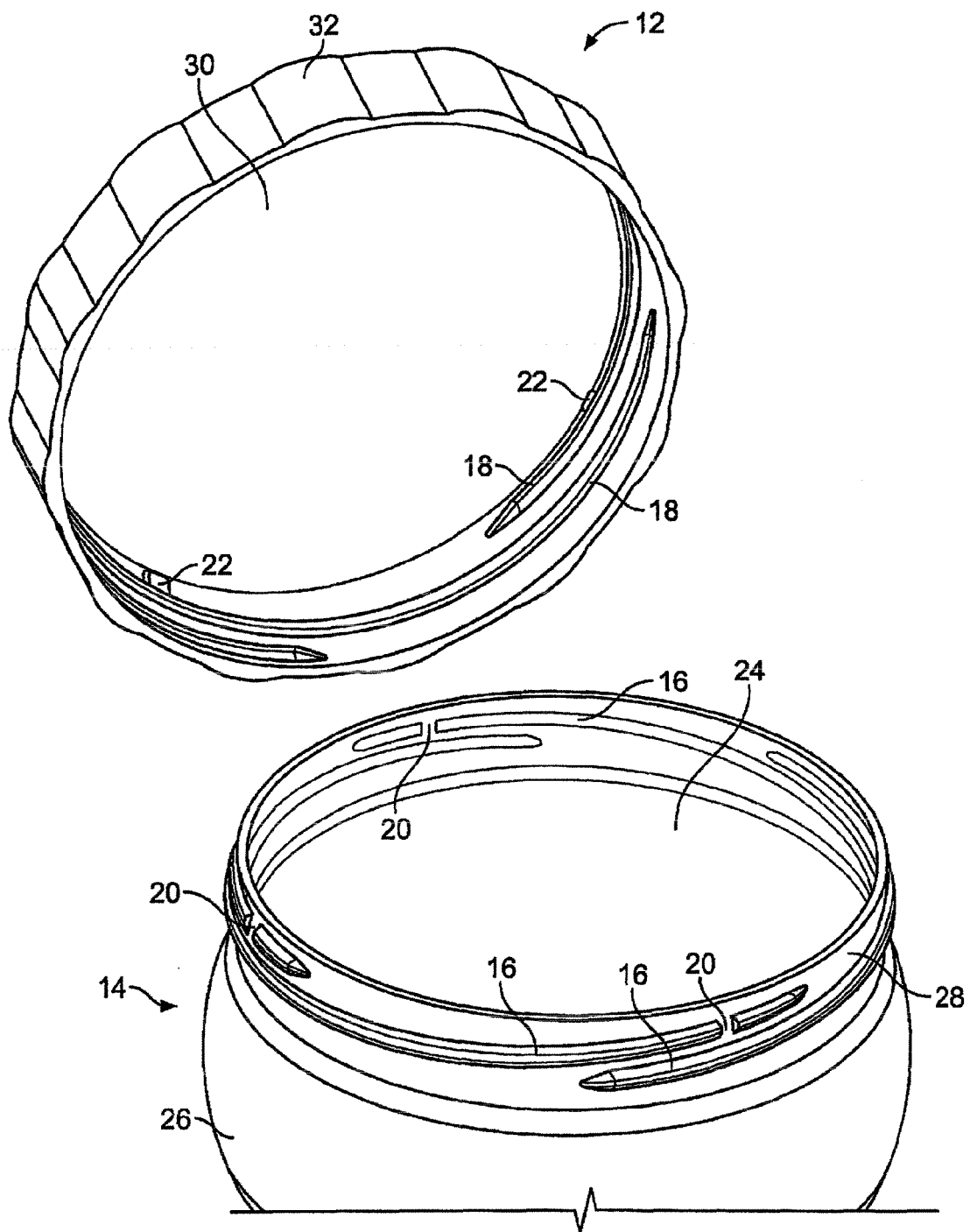


FIG. 4

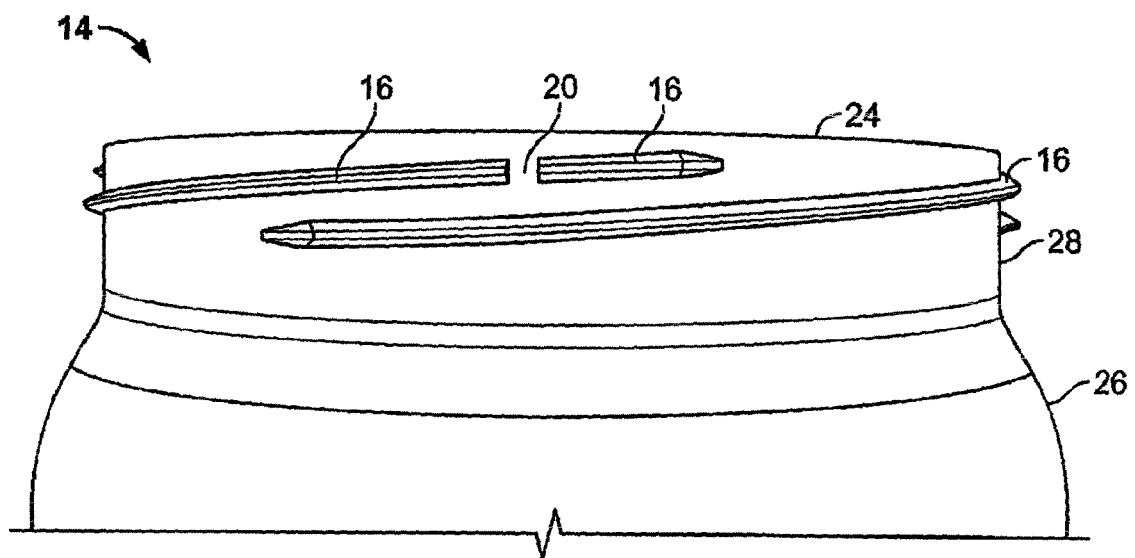


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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