

CONTAINER

Cross-Reference to Related Application

[001] This application claims the benefit of and priority to United States Provisional Patent Application Serial No. 61/639,857, entitled PRODUCT CONTAINMENT SYSTEM and filed April 27, 2012, the entire disclosure of which is incorporated herein by reference, to the extent that it is not conflicting with the present application.

Background

[002] Many consumer products are packaged in granular or powdered form, such as for example, infant formula, flour, coffee, and sugar. Stock keeping units of granular or powdered form which are sold in volumes larger than one-time use amounts require specific packaging. Such packaging must be suitable for storage until first time use and must provide adequate storage at the consumer site between subsequent uses. Adequately storing the product throughout the consumption cycle requires packaging which prohibits waste and contamination, is strong and durable, and is convenient to the user.

[003] Multiple-use containers for power products are typically constructed of polymers. Such materials are subject to many variables that adversely result in product components being produced that can vary beyond acceptable dimensional tolerance limits. Also, polymeric materials can render mis-shaped component profiles due to unexpected shrinkage and warping. These types of manufacturing problems are especially pronounced in containers formed from assemblies that incorporate more than one component, such as where a top or lid and a collar

assembly are fastened to a bottom part or base of a container.

[004] Still other users experience problems with prior art containers that are inadequate for use in circumstances where the ambient air pressure external to the container changes drastically so as to create a significant pressure differential between the sealed interior space of the container and the external, ambient atmosphere. For example, when a container is packaged at a facility at sea-level pressure, and then shipped to consumers located at higher altitudes, the container will have a higher internal pressure, which creates a pressure differential that can be significant. If the pressure differential is large enough, the container may become distended, making it difficult to stack and store, and may even experience a breach, leading to contaminated and wasted product. The opposite situation can occur when containers that are filled and sealed at a higher altitude are shipped to lower altitude users. Upon opening, ambient air can rush into the interior space of the container and contaminate the contents.

[005] When a container having a pressure differential is opened, the contents may again spill due to the very rapid pressure equalization ejecting a cloud of powdered or other type of product contents. Attempts to overcome these disadvantages have included thicker walled containers, which increases weight and material costs, as well as round and cylindrical containers that may have higher hoop stress strength, but which are less efficient and convenient to stack and store on a shelf.

[006] A container is needed that addresses the many issues surrounding prior art containers, and which most importantly offers new and innovative ways to prevent and/or minimize contamination, spillage, and waste of product contained in such containers. A more durable container is needed that incorporates improved rigidity and strength characteristics that can expand the range of acceptable dimensional tolerances and that can adapt to and more readily accommodate unexpected mis-shaped container component profiles.

Summary

[007] Embodiments of the present application provide a container for use in packaging, such as for example, a container suitable for use in holding powder infant formula.

[008] According to a first aspect of the present invention, there is provided a container comprising: walls defining an interior space and an upper portion, the upper portion defining a sealing flange having an internal edge which defines an opening to the interior space; a collar attached to the upper portion; a lid attached to the collar for positioning between an open position and a closed position, and adapted to cover the opening while in the closed position; a latch attached to an outer surface of the lid, the latch having an actuator rotatable in two directions relative to the lid and detachably engaged to a catch, the catch protruding from an outside surface of the collar; and an engagement block cooperatively shaped relative to the actuator to limit a rotation of a top portion of the actuator in a direction toward the lid; wherein the collar further comprises an upwardly protruding flag, the flag positioned to nest behind the engagement block with the lid in the closed position.

[008a] There is also disclosed a container comprising: walls defining an interior space and an upper portion, the upper portion defining a sealing flange having an internal edge which defines an opening to the interior space; a collar attached to the upper portion; a lid attached to the collar for positioning between an open position and a closed position, and adapted to cover the opening while in the closed position; a first protrusion attached to an outer surface of the lid, the first protrusion having an actuator detachably engaged to a second protrusion from an outside surface of the lid; a flexible gasket positioned to extend from an interior surface of the collar to removably rest against the sealing flange and arranged to remain biased against the sealing flange when the lid is in an open position, the flexible gasket having a vertical portion separated from an inwardly protruding portion by a trough.

[008b] There is also disclosed a container comprising: walls defining an interior space and an upper portion, the upper portion defining a sealing flange having an internal edge which defines an opening to the interior space; a collar attached to the upper portion; a lid attached to the collar for positioning between an open position and a closed position, and adapted to cover the opening while in the closed position; and a latch attached to an outer surface of the lid, the latch having an actuator rotatable in two directions relative to the lid and detachably engaged to a catch, the catch protruding from an outside surface of the collar.

[009] Further features and advantages of the invention will become apparent from the following detailed description made with reference to the accompanying drawings.

Brief Description of the Drawings

[010] Features and advantages of the general inventive concepts will become apparent from the following detailed description made with reference to the accompanying drawings.

[011] Figure 1 is a front perspective view of a container;

[012] Figure 2 is a front perspective view of the container of Figure 1, shown with a lid of the container in an open position;

[013] Figure 3 is a rear perspective view of the container of Figure 1, shown with a lid of the container in an open position;

[014] Figure 4 is an assembly view of the container of Figure 1, shown with a lid of the container in an open position;

[015] Figure 5 is a bottom perspective view of the lid and collar of Figure 1, shown with the lid of the container in a closed position and a scoop installed;

[016] Figure 6 is a bottom perspective view of the lid of Figure 1;

[017] Figure 7 is a top view of the lid and collar of Figure 1, shown with a lid of the container in an open position;

[018] Figure 8 is a bottom view of the lid and collar of Figure 1, shown with a lid of the container in an open position;

[019] Figure 9 is an enlarged perspective view of the designated circular area of Figure 1;

[020] Figure 10 is an enlarged perspective view of the designated circular area of Figure 2;

- [021] Figure 11 is an enlarged perspective view of the designated circular area of Figure 2;
- [022] Figure 12 is a sectional view of the container of Figure 1;
- [023] Figure 13 is an enlarged perspective view of the designated circular area of Figure 12, shown with an actuator in a secured position;
- [024] Figure 14 is an enlarged perspective view of the designated circular area of Figure 12, shown with a top portion of the actuator rotated away from the lid;
- [025] Figure 15 is an enlarged perspective view of the designated circular area of Figure 12, shown with a top portion of the actuator in an unsecured position;
- [026] Figure 16 is an enlarged sectional view of a portion of the container of Figure 1, showing a tab and recess connection;
- [027] Figure 17 is a perspective view of the receptacle of Figure 1;
- [028] Figure 18 is a top perspective view of the container of Figure 1, shown with the lid and the collar of the container removed;
- [029] Figure 19 is an enlarged view of a portion of the container of Figure 1, shown with the lid and the collar of the container removed;
- [030] Figure 20 is a bottom view of the container of Figure 1;
- [031] Figure 21 is a top view of the seal of Figure 18;
- [032] Figure 22 is a top view of an exemplary seal of the prior art;
- [033] Figure 23 is an enlarged top view of the designated circular area of Figure 21;
- [034] Figure 24 is an enlarged sectional view of a portion of the container of Figure 1, shown with a lid of the container in an open position and the seal removed; and
- [035] Figure 25 is a front perspective view of the container of Figure 1, shown with a lid of the container in an open position and the seal removed.

Detailed Description

[036] This Detailed Description merely describes exemplary embodiments in accordance with the general inventive concepts and is not intended to limit the scope of the invention or the claims in any way. Indeed, the invention as described by the claims is broader

than and unlimited by the exemplary embodiments set forth herein, and the terms used in the claims have their full ordinary meaning.

[037] The general inventive concepts will now be described with occasional reference to the exemplary embodiments of the invention. This general inventive concept may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the general inventive concepts to those skilled in the art.

[038] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art encompassing the general inventive concepts. The terminology set forth in this detailed description is for describing particular embodiments only and is not intended to be limiting of the general inventive concepts. As used in this detailed description and the appended claims, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[039] Unless otherwise indicated, all numbers expressing quantities of ingredients, properties such as molecular weight, reaction conditions, percentages and so forth as used in the specification and claims are to be understood as being modified in all instances by the term “about.” Accordingly, unless otherwise indicated, the numerical properties set forth in the specification and claims are approximations that may vary depending on the suitable properties sought to be obtained in embodiments of the present invention. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of the general inventive concepts are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical values, however, inherently contain certain errors necessarily resulting from error found in their respective measurements.

[040] The present application describes a container for use in packaging, such as for example, a container suitable for use in holding powder infant formula. The container provides an advantageous storage method for a granular or powdered product. The container offers improved durability, strength, sealing and convenience features.

[041] One embodiment of the invention features a container having walls defining an

interior space, a collar, a lid, and a latch. The interior space is suitable for storage of a powder. The walls include an upper portion which defines a sealing flange having an internal edge. The internal edge defines an opening to the interior space. The collar is attached to the upper portion. The lid is attached to the collar for positioning between an open position and a closed position. The lid is adapted to cover the opening while in the closed position. The latch is attached to an outer surface of the lid. In offering increased ease of operation, the latch may have an actuator rotatable in two directions relative to the lid and detachably engaging to a catch. The catch protrudes from an outside surface of the container. The latch may be comprised of a protrusion on the lid and the catch may be comprised of a protrusion on the collar or container.

[042] Another embodiment of the invention features a container having two first walls and two second walls, a collar, a lid, a latch, and a seal. The two first walls are each wider than the two second walls to generally form an opening having a rectangular shape. The upper portion defines a sealing flange having an internal edge which defines an opening to the interior space. The collar is attached to an upper portion of the walls. The lid is attached to the collar for positioning between an open position and a closed position. The lid is adapted to cover the opening while in the closed position. The latch is attached to an outer surface of the lid and is detachably engaged to a catch. The seal protects the contents of the container after packaging, during shipment and during storage prior to sale. The seal is removably attached to the sealing flange and covering the opening to the interior space. The seal includes a tab and defines a gripping surface for a consumer to grasp. In offering increased ease of operation, the tab is positioned along a first wall for prohibiting tearing during removal.

[043] Another embodiment of the invention features a container having walls, a collar, a lid, a latch, and a flexible gasket. The upper portion defines a sealing flange having an internal edge which defines an opening to the interior space. The collar is attached to an upper portion of the walls. The lid is attached to the collar for positioning between an open position and a closed position. The lid is adapted to cover the opening while in the closed position. The latch is attached to an outer surface of the lid and is detachably engaged to a catch. The flexible gasket is positioned to extend from an interior surface of the collar to removably rest against the sealing flange. The flexible gasket is arranged to remain biased against the sealing flange when the lid is in an open position. The flexible gasket has a vertical portion separated from an inwardly

protruding portion by a trough.

[044] Referring now to the drawings, a container 10 for holding a granular or powdered product is shown in Figures 1-4. The container is suitable for packaging of product at a manufacturing facility which is sold in volumes larger than one-time use amounts. The exemplary container discussed herein is suitable for use in packaging infant powder formula which is sold in multiple-use amounts. However, it should be understood that the invention can be practiced with any type of granular or powdered product, such as for example, flour, coffee, and sugar, and any packaged volume of granular or powdered product.

[045] Now referring to Figure 1, a container 10 having a receptacle 12, collar 14 and lid 16 is shown. The lid is hinged to the collar on the back side of the container. A user may rotate the lid between a closed position and an open position to access an interior space within the receptacle. In assembly, the interior space of the receptacle is filled with a powder. After a sealing layer is applied to the top of the receptacle to close an opening to the receptacle, the collar is secured to an upper portion of the receptacle by snapping protruding tabs of the collar into recesses in the exterior surface of the upper portion. An inside surface of the lid includes tabs for removably securing a scoop. A container having this general type of structure is discussed in US 8,308,008, issued November 13, 2012, which is incorporated herein by reference.

[046] The receptacle 12 is shaped to define an interior space 26 for storing powder. The receptacle 12 has a bottom wall and four side walls to generally form a cuboid with an open top. The opening 24 provides access to the interior space 26 suitable for storing a powder product. During a packaging operation, the interior space is filled with powder and then sealed with a removable sealing layer. The exemplary receptacle 12 shown has at least two opposing and generally rectangular sides and a rectangular bottom side, i.e., is generally in the shape of a rectangular hexahedron. Figure 17 is a perspective view of the top half of the receptacle 12 prior to assembly to other components of the container. It should be understood that the receptacle illustrated in the figures is for example only, and that walls of the container may be of alternative size, shape and structure in the practice of this invention.

[047] The exemplary receptacle 12 is formed in part by four vertical walls and a bottom wall. Referring to Figures 1-3, the receptacle 12 generally includes two first walls, or front and

rear walls, and two second walls, or side walls. A top view of the bottom wall 28 is illustrated in Figure 20. Specifically, the first walls are a front wall 20a and a rear wall 20b, and the two second walls are a right side wall 22a and a left side wall 22b. In regard to a horizontal measurement along the exterior surface of the container, the front wall 20a and rear wall 20b are generally the same width, as are the right wall 22a and the left wall 22b generally the same width. As shown in the figures, each of the front wall 20a and rear wall 20b are of a greater width than each of the right side wall 22a and a left side wall 22b. As such, the walls of the exemplary receptacle 12 generally form the shape of a rectangular hexahedron.

[048] The walls are constructed to permit a firm grip by the user during removal of the sealing layer. The front wall 20a has a recess 31a positioned to facilitate gripping of the container 10 by one or more digits of the user. The rear wall 20b also has a recess 31b positioned to facilitate gripping of the container 10 by one or more digits of the user. The recess 31a can further have an additional recess 32a to indicate the precise location within the recess 31a for the placement of a single digit of the user, such as for example, a thumb. The recess 32a is smaller in area than the recess 31a. The recess 31b can further have an additional recess 32b to indicate the precise location in the recess 31b for the placement of the desired digit of the user. The recess 32b is smaller in area than the recess 31b. The recesses 32a and 32b are preferably circular in shape, but other shapes may be used in the practice of the invention.

[049] The walls of the container also form an upper portion which is advantageously shaped for strength, durability and strength. The upper portion defines a sealing flange having an internal edge which defines an opening to the interior space. The upper portion includes structural features allowing a secure connection of the collar and lid after application of the sealing layer.

[050] The container 10 is also adapted for stacking a plurality of units to maximize containers per cubic feet, by increasing the number of containers per stack height, and thus, the number of containers per shipping pallet. As shown in Figure 1, a dove-shaped protrusion 404 is located on the top of the lid 16. The protrusion 404 is cooperatively shaped to insert into a recess 406 on the bottom wall 28 of the receptacle 12, as seen in Figure 20. The recess is formed by two opposing, convex and short walls 406c, 406d and two opposing, concave and long walls 406a, 406b. It is believed that the dove-shaped protrusion 404 and dove-shaped recess 406 also

promotes locking between contiguously stacked containers, i.e., a stack formed by a plurality of containers is more resistant to twisting along the height of the stack.

[051] Referring now to Figures 4, 17 and 18, the upper portion 40 of the receptacle 12 is adapted for secure attachment by the collar. One or more engagement recesses or indentations 50 are spaced around the circumference of the upper portion of the receptacle. The recesses 50 are laterally separated by strengthening bridges 52. The spaced apart bridge 52 arrangement imparts improved strength and rigidity capabilities to the upper portion 40 of the receptacle 12, which, in turn, improves the crippling strength of the container and the rigidity of the upper portion 40 when the collar 14 is fitted together with the receptacle 12.

[052] The upper portion of the receptacle includes additional stabilizing features. Discussed herein, the upper portion 40 of the receptacle provides stability to protruding tabs of the collar. As shown in Figure 17, the upper portion 40 includes a planar surface 42 located above the recesses 50 and bridges 52. The planar surface 42 is of a length to provide a backing surface to prohibit movement of the tab. For example, Figure 16 shows an exemplary tab 54 having an inside surface 56. Movement of the tab 54 is prohibited in a direction toward the interior space 26. As best seen in Figure 5, a spine 60 runs the length of the tab 54 between the tab and an inside wall 150 of the collar 12. This construction adds reinforcement and stability to the collar attachment to the lid by prohibiting movement of the tab 54 in a direction away from the interior space 26. This configuration is improved over known bridge and recess connections.

[053] As shown in the assembly view of Figure 4, the collar 14 and the lid 16 attach to an upper portion 40 of the receptacle 12 to complete the assembly of the container 10. A bottom perspective view of the collar 14 and lid 16 in a closed position is shown in Figure 5, and the collar and lid are shown in an open position in Figures 8 and 9. In the illustrated example and as best shown in Figures 7 and 8, the lid 16 and collar 14 are a uniform piece joined by two folding hinges 400, 402. About the hinges 400, 402, the lid is positionable relative the collar between an open position and a closed position.

[054] Referring now to the collar 14 and Figure 11, an upwardly protruding flag 250 is positioned on a top surface 252 of the collar 14. The flag 250 is centered on the collar to engage the lid in a position between the interior wall 412 and exterior wall 410 of the lid 16, as shown in Figure 14, for example. Specifically, the exemplary flag 250 nests into two receiving brackets

450, 452 (see Figures 8 and 10) which extend outward from the inner wall 412 of the lid 16. The configuration of the brackets 450, 452 and the flag 250 add reinforcement to the engagement of the lid and the collar, and allow the fingertip operation of the latch mechanism.

[055] Still referring to the collar 14, a downwardly extending flag 600 can best be seen in Figure 13. The flag 600 is positioned behind the inside surface 602 of the collar and essentially under the upwardly protruding flag 250. With the collar 16 attached to the receptacle 12, the flag 600 contacts a hemispherical-shaped protrusion 604 on an outer surface of the front side of the receptacle 12 (see Figure 4). A similarly shaped protrusion 606 is shown on the back side of the receptacle in Figures 17 and 18. The contact of the flag 600 with the protrusion 604 adds to the reinforcement of the collar 14 and the receptacle 12, as well the reinforcement of the collar 14 and the lid 16.

[056] The structure of the lid 16 adds to the overall stability and strength of the container 10. To emphasize certain structural features, a bottom perspective view of the lid 16 is shown in Figure 6 without the collar 14. The lid has an exterior wall 410 and an interior wall 412. Each wall 410, 412 vertically descends in a direction toward the collar 14 when in the closed position, such as for example, as shown in Figure 16. In the exemplary lid 16, the walls 410, 412 are parallel, and the exterior wall 410 extends downward to a position below the interior wall 412. As seen in Figures 6, 8, and 10, for example, a plurality of bridges 414 extend between the walls 410, 412 to add stability to the lid during engagement with and disengagement from the collar.

[057] The lid 16 offers storage for a scoop 420 when not in use. The scoop 420 is stored in between clips 422, 424, 426, 428 extending from the bottom side of the lid 16. A scoop 420 is shown in Figure 5 for example, but for clarity the scoop is not included in other figures. The clips 422, 424, 426, 428 are positioned to secure the handle 430 of the scoop only, allowing for a scoop having a bowl 432 of varying shape, size and volume. The clips 422, 424, 426, 428 are for example only, and the invention may be practiced with clips of other location, size, shape and quantity.

[058] The container includes a latch for manipulation of the lid from an engaged position relative the collar to an unengaged position relative the collar. The actuator provides a user with precise fingertip control of the latch, without requiring the user to engage or contact the

surface of the lid or collar. Many conventional collar and lid latch mechanism require a user to brace one or more fingers against the lid or the collar when opening the lid. However, the stability and strength afforded by the assembly of the inventive receptacle, collar, and lid, allows for ease of operation of the latch.

[059] Relying upon fingertip movement of a single part of the latch, a user can move the lid between engaged and unengaged positions relative the collar. The latch includes an actuator rotatable in two directions relative to the lid and detachably engaged to a catch. In the exemplary embodiment on Figures 9-11 and 13-15, for example, the actuator is located on a front face of the lid and the catch protrudes from an outside surface of the collar.

[060] An enlarged front perspective view of the latch 200 is shown in Figure 9, showing the enlarged perspective view of the designated circular area of Figure 1. The actuator 202 is rotatable relative to a horizontal axis of the container 10. The actuator is generally coin shaped, i.e., has a circle-shaped face and a thickness which offers an easily gripped top portion 204 and bottom portion 206. Of course, a user may make contact with the actuator 202 at any point or points in the manipulation of the actuator, such as for example, by using one or more fingers within a concave front face 208. It should be understood that the illustrated actuator 202 is for example only, and that actuators of other shape and size may be used is the practice of this invention.

[061] The actuator is adapted to attach to a catch on the outside surface of the container. The adapter includes a tooth 218 which protrudes from an inside surface of the actuator 202, as best shown in Figure 10. The tooth 218 is braced on a bottom surface by two supports 222. When the actuator engages the bottom surface of the catch 220, as shown in Figure 13, the supports prohibit downward movement on the tooth 218. Similarly, the catch is supported on a top surface with a support 223, as shown in Figure 11. When the actuator 202 engages the bottom surface of the catch 220, as shown in Figure 13, the support 223 prohibits upward movement of the catch 220. It is believed the movement of the tooth 218 in a downward direction beyond the catch 220 produces an audible engagement, giving notice to the user that the lid 16 is secure in a closed position.

[062] The actuator offers precise finger tip control for the user. For example, the actuator can be rotated in two directions relative the container. As discussed herein, a top

portion of the latch can be rotated away toward the lid. When the lid is moved to an open position and released, the actuator is biased to passively return to an at rest position, as shown on Figure 13. If a user does not move the lid to an open position after rotated the actuator toward the lid, and merely releases the actuator, the actuator is biased to passively return to an at rest position, as shown on Figure 13. The lid can be opened with the user only operating the actuator with his fingertips.

[063] The actuator 202 includes several structural features which promote rotation by a user. Two bridges 210 extend from the front face 214 of the lid 16 to support the actuator 202. As such, the inside surface 212 of the actuator 202 in the closed position, as shown in Figure 13, is remotely disposed from each of an outside surface 214 of the lid 16 and an outside surface 216 of the collar 14. This configuration permits the top portion 204 of the actuator to be rotated in two directions relative to the container. For example, the top portion 204 of the actuator 202 has been rotated a direction D_1 from the lid 16 in Figure 14. In this position, the tooth 218 is still engaged with the catch 220. However in Figure 15, the top portion 204 has been rotated a direction D_2 toward the lid. As such, the bottom portion 206 of the actuator has disengaged from the catch 220. Further movement of the actuator in an upward direction D_3 will move the lid to an open position. Alternatively, a user may rotate a bottom portion of the actuator in a direction away from the lid to disengage the actuator from the catch.

[064] Referring again to Figure 9, other structural benefits of the latch assembly are shown. Mounted in an extended position away from the outside surface of the container, the actuator is susceptible to damage. For example, the actuator could be inadvertently hit on the production line, in shipping, or in the kitchen or bathroom during use by the consumer. A lateral force may damage the actuator and otherwise compromise the precise operation of the latch mechanism. To prohibit such damage, the actuator is protected on either side by a bumper.

[065] As seen in Figure 9, the lid 16 includes a bumper 230 located on either side of the actuator 202. Each bumper 230 protrudes outward from an outer surface of the lid 16. The T-shaped bumper includes a horizontal brace 234 supporting a vertical wall 232 adjacent the actuator 202. Each horizontal brace 234 has an outer surface 236 ramping away from the lid in a direction toward the actuator 202 (also see Figure 5, for example). The outer surface 236 is configured to deflect lateral moving objects, relative to the position of the container, out and

away from the actuator. The shape of the horizontal brace 234, and the general positioning of the bumper, prohibits damage to the actuator. It should be understood that the illustrated bumpers 320 are for example only, and that bumpers of other shape, size and quantity may be used is the practice of this invention.

[066] The lid 16 also includes structure to limit movement of the actuator. Referring again to Figure 9, an engagement block 240 is positioned on the lid. The inside concave surface 242 of the engagement block is illustrated in Figure 10. The engagement block is cooperatively shaped relative to the actuator and positioned to limit a rotation of a top portion 204 of the actuator in a direction toward the lid. For example, Figure 15 illustrates the actuator in a position just prior to contact between the top portion 204 of the actuator 202 and the engagement block 240. In this configuration, rotation of the actuator is limited in one direction, and when contact is made with the engagement block, a user is clued that further rotation is not required and the lid may be moved to the open position. It should be understood that the illustrated engagement block 240 is for example only, and that blocks of other shape, size and quantity may be used is the practice of this invention.

[067] In one embodiment of the invention, the container includes a flexible gasket. The flexible gasket is affixed to an inside wall of the collar and is dimensioned to project inwardly to removably rest against the sealing flange 30 of the receptacle 12, as depicted in Figures 13-16, for example, with the lid in the closed position. The flexible gasket 300 projects slightly downwardly to be biased against the sealing flange 30 for an improved sealing configuration. The flexible gasket 300 remains biased against the sealing flange 30 with the lid in the opened position, as shown in Figure 24. As shown in Figure 13 with the seal in place and in Figure 24 with the seal removed, the flexible gasket 300 extends interiorly to project beyond the internal edge 24 of the sealing flange 30. With the lid 16 closed, as in Figure 13, the flexible gasket 300 is removably positioned between the inner wall 412 of the lid 16 and the sealing flange 30.

[068] The flexible gasket 300 has several inventive features beneficial to the sealing performance of the container. As best seen in Figure 13, the flexible gasket includes a vertical portion 310 separated from an inwardly protruding portion 312 by a trough 314. The vertical portion extends upward to an upper seat surface 252 around a circumference of the collar. The trough extends around the circumference of the flexible gasket 300. The trough reduces the

resistance of the gasket during removal of the seal by providing a void into which the inward end of inwardly protruding portion 312 may bend. Further, the trough 314 is believed to provide a gathering location for relatively small amounts of moisture to gather in a location remote from the seal before it is removed, and a gather location remote from the powder after the seal is removed.

[069] As discussed herein, a seal is used to protect the contents of the container after packaging, during shipment and during storage prior to sale. The sealing layer may help to preserve freshness or indicate tampering. Any suitable seal material may be selected, such as for example, a material suitable to protect the contents from moisture, oxygen and light. The sealing layer may include a tab that facilitates removal of the sealing layer by the end user. Any gasket used in the container is adhered directly to the collar during manufacturing, such that the gasket will not subsequently interfere during a seal removal process by the consumer. In the removal process, the lid will in the open position and the gasket will flex up and out of the way of the seal.

[070] Referring now to Figure 18, a receptacle is shown prior to assembly to the collar. In this illustrated stage of packaging, the receptacle contains a powdered product and a sealing layer has been attached to the top surface of the receptacle. The seal is constructed from a substantially moisture-impervious, oxygen-impervious material, such as for example, aluminum foil, or a foil made of some other metallic material, or a combination of a layer of materials that can include a metallic, a polymeric, and other material layers.

[071] In the packaging process, the seal is attached to the outside surface of the receptacle. The seal is adhered to the receptacle by a pressing operation. As shown in Figure 19, the seal extends downward the outer surface of the upper portion to a tapered surface 44. In the exemplary seal shown, an impression pattern has been left upon a top surface of the seal. Specifically, an inner depression pattern 73a compliments the shape of an outer depression 73b which borders the sealing flange of the receptacle. In the practice of this invention, alternative impression patterns may be left upon a top surface of the seal, or no impression pattern may be left upon a top surface of the seal.

[072] An exemplary seal 70 is illustrated in a top view in Figure 21. The seal includes a tab 72 which extends from the container for grasping by the user. The shape of the seal is

defined by two opposing and longer sides 74a, 74b and two opposing and shorter sides 76a, 76b. The tab 72 is disposed along a short side. In the exemplary seal illustrated, the tab 72 is disposed along the short side 76a.

[073] When the seal 70 is attached to the receptacle 12, as shown in Figure 18, the tab is disposed along the right side wall 22a. This seal location is for example only, and when practicing this embodiment of the invention, the seal could be located at other locations along the right side wall 22a, or at other locations along the left side wall 22b.

[074] The seal 70 has other inventive features beneficial to tear resistance during removal from the receptacle by a user. An enlarged top view of the designated circular area of Figure 21 is shown in Figure 23. The seal generally includes a covering portion 90, a tab portion 94, and a transition portion 92. The covering portion 90 extends over the sealing flange of the receptacle to seal the inner space. The transition portion 92 is disposed between the covering portion and the gripping portion and includes several inventive features which reduce tearing during removal of the seal. The transition portion 92 illustrated in Figure 23 generally extends from the covering portion, i.e., about from the end line 100 of the seal which contacts the receptacle, to the boundary line 102 of the tab having a constant radius R_1 . As shown, the constant radius R_1 of the distal end 98 of the tab 72 is an angle α_1 , which as illustrated, is greater than 180 degrees. An angle of over 180 degrees allows certain features, such as for example, the tab 72 has no planar edge surfaces. This illustrative angle is for example only, and in the practice of this embodiment of the invention, other angles of over 180 degrees may be used.

[075] The tab 72 illustrated in Figures 21 and 23 have other inventive features which reduce tearing of the seal during removal from the receptacle by the user. The width of the tab 72 reduces between the transition portion 92 and gripping portion 94. The sinusoidal shape of the outside edge of the tab 72 is exaggerated by the width changes of the tab from the covering portion 90 to the distal end 98 of the tab. Specifically, the width changes from the two opposing points 100a, 100b at a maximum width W_1 of the transition portion, to a minimum width W_2 , then expanding again to a width W_3 , equal to the diameter of the gripping portion 94. The width in fact constantly changes from one end of the tab to another, such that the tab 72 has no planar edge surfaces.

[076] For reference, a prior art seal is shown in Figure 22. The seal 80 includes a tab 82

located at a corner between a short side 84 and a long side 86. A seal of this shape and location is susceptible to inadvertent and undesirable tearing by the user during removal of the seal. Tearing of the seal may delay access to the powder by the end user, and may result in spilling of the powder if and when the end user seeks other methods for accessing the powder. The illustrated tab 82 is defined by two straight and parallel sides 82a, 82b, each side having the same length L_5 . A distal end 82c of the tab 82 has a constant radius over an angle α_5 , which as illustrated, is not more than 180 degrees.

[077] The inventive shape of the tab 72 offers dramatic improvement in tearing resistance over conventional tabs. In fact, testing of the inventive tab shape resulted in unexpected performance. In tear resistance testing, the tab shape of Figures 21 and 23 significantly outperformed the tab shape of Figure 22. In testing, a positive tearing test results from a user tearing any portion of the foil seal during a removal attempt. For reference, the tab shape 80 exhibited tearing at some point during removal at a rate of 90%. In other words, only 10% of seals having the tab shape 80 could be entirely removed from the receptacle without some tearing. Testing of the inventive tab resulting in tearing at a rate of only 10%. Specifically, at least 70% of seals having the tab 72 with the inventive shape were removed or peeled 50% of the way of the receptacle without tearing. At least 30% of the seals having the tab 72 with the inventive shape were removed or peeled 100% of the way of the receptacle without tearing. One reason believed for the dramatic increase of tear resistance is the shape of the invention tab is believed to not promote any tear propagation point along the outside edge of the tab, as compared to known tab shapes in the art. Another reason believed for the dramatic increase of tear resistance is the reduction of force required to remove the seal in the inventive container as compared to known containers, in part due to the inventive gasket shape, such as for example, the trough in the gasket.

[078] While various inventive aspects, concepts and features of the general inventive concepts are described and illustrated herein in the context of various exemplary embodiments, these various aspects, concepts and features may be used in many alternative embodiments, either individually or in various combinations and sub-combinations thereof. Unless expressly excluded herein all such combinations and sub-combinations are intended to be within the scope of the general inventive concepts. Still further, while various alternative embodiments as to the

various aspects, concepts and features of the inventions (such as alternative materials, structures, configurations, methods, circuits, devices and components, alternatives as to form, fit and function, and so on) may be described herein, such descriptions are not intended to be a complete or exhaustive list of available alternative embodiments, whether presently known or later developed. Those skilled in the art may readily adopt one or more of the inventive aspects, concepts or features into additional embodiments and uses within the scope of the general inventive concepts even if such embodiments are not expressly disclosed herein. Additionally, even though some features, concepts or aspects of the inventions may be described herein as being a preferred arrangement or method, such description is not intended to suggest that such feature is required or necessary unless expressly so stated. Still further, exemplary or representative values and ranges may be included to assist in understanding the present disclosure; however, such values and ranges are not to be construed in a limiting sense and are intended to be critical values or ranges only if so expressly stated. Moreover, while various aspects, features and concepts may be expressly identified herein as being inventive or forming part of an invention, such identification is not intended to be exclusive, but rather there may be inventive aspects, concepts and features that are fully described herein without being expressly identified as such or as part of a specific invention. Descriptions of exemplary methods or processes are not limited to inclusion of all steps as being required in all cases, nor is the order that the steps are presented to be construed as required or necessary unless expressly so stated.

What is claimed is:

1. A container comprising:
walls defining an interior space and an upper portion, the upper portion defining a sealing flange having an internal edge which defines an opening to the interior space;
a collar attached to the upper portion;
a lid attached to the collar for positioning between an open position and a closed position, and adapted to cover the opening while in the closed position;
a latch attached to an outer surface of the lid, the latch having an actuator rotatable in two directions relative to the lid and detachably engaged to a catch, the catch protruding from an outside surface of the collar; and
an engagement block cooperatively shaped relative to the actuator to limit a rotation of a top portion of the actuator in a direction toward the lid;
wherein the collar further comprises an upwardly protruding flag, the flag positioned to nest behind the engagement block with the lid in the closed position.
2. The container of claim 1, wherein a top portion of the actuator is rotatable in either direction about a horizontal axis.
3. The container of claim 1, wherein a tooth protrudes from an inside surface of the actuator.
4. The container of claim 3, wherein movement of the tooth in a downward direction beyond the catch produces an audible engagement.
5. The container of claim 1, wherein a rotation of a top portion of the actuator in a direction toward the lid combined with upward lifting of a bottom portion of the actuator disengages the actuator from the catch.
6. The container of claim 1, wherein a rotation of a bottom portion of the actuator in a direction away from the lid disengages the actuator from the catch.

7. The container of claim 1, wherein an inside surface of the actuator in the closed position is remotely disposed from each of an outside surface of the lid and an outside surface of the collar.

8. The container of claim 7, wherein a top portion of the actuator in the closed position is rotatable in either direction relative the lid.

9. The container of claim 1, wherein the lid further comprises a bumper on either side of the actuator, each bumper protruding outward from an outer surface of the lid.

10. The container of claim 1, wherein a top portion of the actuator is biased away from the lid when the lid is in the closed position.

11. The container of claim 1, wherein a top portion of the actuator is biased away from the lid when the lid is in the open position.