Storage canisters that are specially adapted for use in the packaging process are disclosed. Such canisters can include latching mechanisms for latching the lid onto the base of the canister in a locked position, an easy-pour mechanism, an evacuation chamber, and either a process indicator or a vacuum indicator. Some embodiments include an adjustable baffle.
EASY-POUR CANISTER WITH VACUUM OR PROCESS INDICATOR AND KINEMATIC LATCHES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/624,751, filed on Nov. 2, 2004.

FIELD OF THE INVENTION

[0002] The present invention generally relates to vacuum packaging appliances. More particularly, the invention is directed to an easy-pour canister with either a vacuum indicator or a process indicator and kinematic latches for use with vacuum packaging appliances.

BACKGROUND

[0003] Vacuum packaging is a process for removing oxygen and other gases from containers holding food and other products that deteriorate in the presence gases. For example, food spoilage can occur due to oxidation. Thus, vacuum packaging can extend the life of products that deteriorate in the presence of gases by removing nearly all of the gases in a sealed container in which such products are stored.

[0004] Storage canisters may be used for the vacuum packaging process. However, such canisters need to be specially adapted for use in the packaging process. For example, such canisters would ideally 1) allow for convenient evacuation of gases, 2) maintain a vacuum seal, 3) allow for easy venting of the interior of the canister to ambient atmosphere, and 4) allow for easy access to the contents of the canister.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The present invention is illustrated by way of example, and not by way of limitation.

[0006] FIG. 1A is a cross sectional view of a canister with a specialized lid adapted for use in vacuum packaging processes, according to certain embodiments;

[0007] FIG. 1B is a cross sectional view of a canister with a specialized lid adapted for use in vacuum packaging processes, according to certain other embodiments;

[0008] FIG. 2A illustrates an exploded cross sectional view of an evacuation chamber, and vacuum indicator of a canister lid;

[0009] FIG. 2B illustrates an exploded cross sectional view of an evacuation chamber, and vacuum chamber of a canister lid;

[0010] FIG. 3 illustrates an exploded cross sectional view of an easy-pour mechanism in a canister lid;

[0011] FIG. 4 is an exploded cross sectional view of a left-hand side latching mechanism;

[0012] FIG. 5A is an exploded cross sectional view of a right-hand side latching mechanism; and

[0013] FIG. 5B is an exploded cross sectional view of a right-hand side latching mechanism used in conjunction with a vacuum chamber.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] An easy-pour canister with either a vacuum indicator or a process indicator and kinematic latches for use with vacuum packaging appliances is described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the present invention.

[0015] FIG. 1A is a cross sectional view of a canister 100 with a specialized lid adapted for use in vacuum packaging processes, according to certain embodiments. Canister 100 includes a base 102 and a lid 106. Base 102 has substantially rigid walls. Base 102 may be made of any material suitable for use in a vacuum packaging process for food storage. Typically, such materials are machine or hand washable and may have anti-bacterial properties.

[0016] Lid 106 includes latching mechanisms 112a and 112b, an easy-pour mechanism 105, an evacuation chamber 110 with evacuation port 128, and a vacuum indicator 119. The latching mechanisms 112a and 112b are for latching lid 106 onto base 102 in a locked position. The latching mechanisms 112a and 112b are described in greater detail infra with reference to FIG. 4, FIG. 5A and FIG. 5B. Easy-pour mechanism 105 allows for easy access to the contents of the canister. For example, rather than uncovering the canister first by unlatching latching mechanisms 112a and 112b and then lifting lid 106 away from base 102, the easy pour-mechanism can be peeled open in order to pour out the contents of the canister. The easy-pour mechanism 105 is described in greater detail infra with reference to FIG. 3.

[0017] During an evacuation operation, lid 106 is fastened to base 102 by the latching mechanisms 112a and 112b. The lid may include a gasket around the perimeter of the lid 106 so as to create a static seal when lid 106 is latched to base 102. A vacuum hose from a vacuum packaging appliance (not shown) is inserted in vacuum port 128 over evacuation chamber 110 to remove gases from interior 104. The evacuation chamber 110 is described in greater detail infra with reference to FIGS. 2A and 2B. The vacuum indicator 119 is described in greater detail with reference to FIG. 2B. The evacuation operation is described in greater detail with reference to FIG. 2A.

[0018] FIG. 2A illustrates an exploded cross sectional view of an evacuation chamber, and vacuum indicator of a canister lid. The evacuation operation is described with reference to the inter-operation of various components of lid 206 as shown in FIG. 2A. Lid 206 is assumed to be in a closed position over base 202 prior to the commencement of the evacuation operation. Latch mechanisms, such as latch mechanism 212a, includes a gasket 231. Gasket 231 operates to seal vent-hole 214 when the latch is in the locked position. During the evacuation operation, a vacuum hose (not shown) from a vacuum packaging appliance is inserted in vacuum port 228 over evacuation chamber 210.

[0019] Gases from interior 204 of the canister are pulled from interior 204 up through a valve 224 into evacuation
chamber 210, and into the vacuum hose (not shown). Specifically, the gases are pulled from interior 204 through the vent-holes 226. Valve 224 is such that gases from outside the canister are prevented from entering interior 204, either at all times, or at least post evacuation. The evacuation of gases from interior 204 causes a differential pressure to develop between interior 204 and the ambient conditions outside the canister. The differential pressure operates to maintain valve 224 in a closed position to seal vent-holes 226.

[0020] The vacuum indicator 219 may be made of a flexible membrane that deforms into a concave surface relative to the surface of lid 206 when the gases are substantially evacuated from interior 204. If at a later time, it is desired to open the canister, either or both latch mechanisms on lid 206 may be lifted. For example, in FIG. 2A, when latch mechanism 212a is lifted, gasket 231 is pulled away from vent-hole 214. Thus, interior 204 is brought in contact with the ambient atmosphere and the pressure in the canister becomes substantially the same as the ambient pressure. When the interior 204 is brought in contact with the ambient atmosphere, vacuum indicator 219 substantially returns to its original undeformed state, absent any plastic deformation.

[0021] It is to be noted that, over a period of time, the contents that were vacuum packaged in the canister may emit gasses. For example, food products often release gasses in the natural process of biological degradation. As a result, the gasses that are released within the canister destroy the vacuum state in the canister. Such released gasses will cause the vacuum indicator 219 to substantially return to its original undeformed state. Further, the amount of released gasses may be considerable so as to cause the flexible membrane of vacuum indicator to deform into a convex surface relative to the surface of the lid. The convex surface would indicate that the pressure in the canister is greater than the ambient pressure outside the canister. However, the latching mechanism allows the lid to remain locked onto the base of the canister despite the higher pressure within the canister. Further, the latching mechanism may be lifted so as to allow the gasses in the canister to escape through the vent-hole, such as vent-hole 214.

[0022] FIG. 1B is a cross sectional view, according to another embodiment, of a canister 150 with a specialized lid adapted for use in vacuum packaging processes. In FIG. 1B, lid 106 includes latching mechanisms 112c and 112c', an easy-pour mechanism 105, an evacuation chamber 110 with evacuation port 128, a process indicator 118, and a vacuum chamber 108.

[0023] Latching mechanism 112c of FIG. 1B differs from the latching mechanism 112a of FIG. 1A due to the presence of the vacuum chamber 108. In brief, latching mechanism 112c is adapted for venting both the interior 104 and vacuum chamber 108 to the ambient atmosphere. The differences between latching mechanism 112c and latching mechanism 112c are further described with reference to FIG. 5A and FIG. 5B. The process indicator is described in greater detail with reference to FIG. 2B.

[0024] FIG. 2B illustrates an exploded cross sectional view of an evacuation chamber, and a vacuum chamber of a canister lid. The evacuation operation is described with reference to the inter-operation of various components of lid 209 as shown in FIG. 2B. Lid 209 is assumed to be in a closed position over base 202 prior to the commencement of the evacuation operation. Latch mechanisms, such as latch mechanism 212a includes a gasket 230. Gasket 230 operates to seal vent-holes 214 and 216 when the latch is in the locked position. Vent-hole 214 is for contacting the atmosphere in the interior of vacuum chamber 208 with the ambient atmosphere that is extant in the environment exterior to the canister. Vent-hole 216 is for contacting the atmosphere in the interior 204, which is the main cavity of the canister, with the ambient atmosphere that is extant outside the canister. Thus, the vacuum state within the vacuum chamber and the main cavity of the canister can be destroyed by simply lifting latch 213 away from base 202.

[0025] During the evacuation operation, a vacuum hose (not shown) from a vacuum packaging appliance is inserted in vacuum port 228 over evacuation chamber 210. Gases from the vacuum chamber 208 as well as from interior 204 of the main cavity of canister are pulled up through the valve 224 into evacuation chamber 210, and into the vacuum hose (not shown). Specifically, gases from vacuum chamber 208 are pulled down into the main cavity 204 through the valve 220 through the vent-holes 222. The gasses in the main cavity are in turn pulled up through the valve 224 into evacuation chamber 210, and into the vacuum hose.

[0026] When a vacuum is created in vacuum chamber 208, the process indicator 218, which may be made of a flexible membrane, deforms into a concave surface relative to the surface of lid 209. The purpose of the process indicator is to indicate whether the canister has been opened since the last evacuation operation that was performed on the canister.

[0027] To explain, assume that the some food products are vacuum packaged in a canister with a specialized lid as illustrated in 2B. Upon completion of the vacuum packaging process, a vacuum is created in vacuum chamber 208 and main cavity 204. The vacuum in vacuum chamber 208 causes the process indicator 218 to deform into a concave surface relative to the surface of lid 209. Assume that the canister remains unopened for a period of time after evacuation. Further assume that during that period of time, the food products in the canister have emitted gasses into the main cavity of the canister. The emitted gasses are prevented from entering the vacuum chamber 208 due to the valve 220. The emitted gasses in the main cavity causes the pressure in the main cavity to be higher than the pressure in the vacuum chamber. The differential pressure causes the valve 220 to seal the vent-holes 222, thus preventing the emitted gasses from penetrating the vacuum chamber. Thus, despite the gas emissions from the food products in the canister, the process indicator can indicate whether the canister has been opened since the last evacuation operation that was performed on the canister.

[0028] In certain other embodiments, the vacuum chamber extends from the right-hand side latch mechanism to the left-hand side latch mechanism, while bypassing and separated from the evacuation chamber. In such embodiments, there is pair of vent-holes such as vent-holes 214 and 216 on associated with the right-hand side latch mechanism and the left-hand side latch mechanism.

[0029] FIG. 3 illustrates an exploded cross sectional view of an easy-pour mechanism in a canister lid. The easy-pour mechanism includes a flap 356 fixed to the lid 306 at point
An anterior flap portion 356a of flap 356 has a gasket 362 for sealing vent-hole 360 when flap 356 is in the closed position. Further, flap 356 includes a posterior flap portion 356b that is disposed over an opening 358 in lid 306, when flap 356 is in the closed position. A gasket 364 around the perimeter of opening 358 maintains a static seal when flap 356 is in the closed position. The opening 358 is the pour-hole and opens into main cavity 304 of the canister.

Such an easy-pour mechanism allows for quick easy access to previously vacuum packaged contents in the canister. To illustrate the operation of the easy-pour mechanism, assume that the canister was previously vacuum packaged to create a vacuum in the main cavity 304. The differential pressure between the inner surface 356a and outer surface 356b of flap 356 makes the flap difficult to peel open but for the anterior flap portion 356a and hinge 354. Hinge 354 allows for the anterior flap portion 356a can be peeled back with relative ease to lift gasket 362 away from vent-hole 360. When gasket 362 is lifted away from vent-hole 360, the vacuum within main cavity 304 is destroyed and thus eliminates the differential pressure between the inner surface 356a and outer surface 356b of flap 356. Flap 356 can then be easily peeled back to uncover opening 358 for easy-pour access.

FIG. 4 is an exploded cross sectional view of left-hand side latching mechanism 400. Latching mechanism 400 includes a latch piece 412 that is hinged to lid 406 at location 411. Latch piece 412 is designed to catch on to a lip portion 403 of base 402 of the canister. Latch piece 412 includes a gasket 430 for sealing vent-hole 417. Vent-hole 417 exposes the interior portion 404 of the canister to ambient conditions that are extant outside the canister.

FIG. 5A is an exploded cross sectional view of right-hand side latching mechanism. Latching mechanism 500 includes a latch piece 512 that is hinged to lid 506 at location 511. Latch piece 512 is designed to catch on to a lip portion 503 of base 502 of the canister. Latch piece 512 includes a gasket 530 for sealing vent-hole 514. Vent-hole 514 exposes the interior portion 504 of the canister to ambient conditions that are extant outside the canister.

Some embodiments include only a left-hand side latching mechanism, while other embodiments include only a right-hand side latching mechanism. Still other embodiments include both a left-hand side and a right-hand side latching mechanisms.

FIG. 5B is an exploded cross sectional view of right-hand side latching mechanism used in conjunction with a vacuum chamber. The latching mechanism of FIG. 5B includes a latch piece 512 that is hinged to lid 506 at location 511. Latch piece 512 is designed to catch on to a lip portion 503 of base 502 of the canister. Latch piece 512 includes a gasket 530 for sealing vent-hole 514 and vent-hole 516. Vent-hole 514 exposes the interior portion of vacuum chamber 508 to ambient conditions that are extant outside the canister. On the other hand, vent-hole 516 exposes the interior portion 504 of the canister to ambient conditions that are extant outside the canister. Such a latching mechanism is used in embodiments that include a vacuum chamber as described herein.

According to certain embodiments, a storage canister, such as an easy-pour canister, can include a baffle such that the baffle can be positioned to be in contact with the surface of the product stored in the container. For purposes of explanation, assume that the canister is used for storing a product such as ice cream. Further assume that the amount of ice product stored in the canister is such that the product fills only a fraction of the interior storage volume of the canister. The baffle can be lowered to be in contact with substantially the entire top surface of the product in the canister in order to reduce freezer burn, for example.

FIG. 6A is a simplified longitudinal cross-sectional view of a storage canister that includes a baffle. View 600 of the storage canister shows a base 602, an inner container 606, a lid 604, and a baffle 614. Base 602 includes a supporting rim-like appurtenance 622 on which baffle 614 can be supported. Lid 604 includes a latching mechanism 610 for latching lid 604 to base 602. Latching mechanism 610 (610a and 610b) includes gasket 612 for sealing vent hole 620. FIG. 6A shows only one vent hole at latch 610a. However, there may exist a similar vent hole at latch 610b. Vent hole 620 is for venting the interior volume of the canister when it is desired to lift lid 604 from base 602 in order to uncover base 604. Lid 604 also includes a vacuum port 616 that works in conjunction with valve 618, which valve 618 is a component of baffle 614. A vacuum hose (not shown) may be inserted in vacuum port 616 for pulling gases from the interior up through a valve 618 when evacuating the interior of the canister. Baffle 614 can be stretched such that baffle portion 614a is in close contact with the surface of product 608 in inner container 606. Baffle portion 614a as shown in FIG. 6A is not completely stretched out. In contrast, the baffle portion 614b is in a stretched configuration such that the baffle extends downward to meet the surface of product 608. The baffle is adapted for various configurations and may vary from implementation to implementation. Inner container 606 is detachably removable from base 602 for ease of cleaning or replacement. The canister of FIG. 6A may also include an easy pour mechanism (not shown), and a vacuum indicator (not shown).

FIG. 6B illustrates view 650 that is similar to view 600 of FIG. 6A. However, in FIG. 6B, baffle 614 is in a configuration whereby baffle portion 614b is substantially stretched out so as to lie flat against the top surface of product 608. Baffle portion 614b is as shown in FIG. 6B may be stretched further in order to meet the surface of product 608 in the event that the amount of product in the canister is decreased.

FIG. 7A is a cross-sectional view of a base of a canister that illustrates one configuration of a ratchet mechanism that is adapted for use with a baffle. In FIG. 7A, view 700 shows a canister base 704. Side walls 712 and 714 of canister base 704 are configured to include notches 706 that make up the ratchet mechanism. FIG. 7A also shows a plate-like baffle 702 that is supported in position by notches 706. Notches 706 are shown to be saw-shaped. Plate-like baffle 702 may be of a flexible material such that baffle 702 can be flexed either to move baffle 702 from notch to notch or to remove baffle 702 from base 704. The configuration of plate-like baffle 702 may vary from implementation to implementation.

FIG. 7B is a cross-sectional view of a base of a canister that illustrates another configuration of a ratchet mechanism. In FIG. 7B, view 725 shows notches 708 to be crenellation-shaped.
What is claimed is:

1. A storage canister for use with a vacuum packaging appliance, said storage canister comprising:
   a base that encompasses a main cavity of said canister;
   a lid for covering said base and removably detached therefrom, wherein said lid includes any one of:
   a vacuum indicator; and
   a process indicator.

2. The storage canister of claim 1, further including a vacuum chamber that is associated with said process indicator.

3. The storage canister of claim 1, wherein said vacuum indicator is adapted for indicating whether a vacuum exists in said main cavity.

4. The storage canister of claim 3, wherein said vacuum indicator comprises a flexible membrane.

5. The storage canister of claim 4, wherein said flexible membrane of said vacuum indicator:
   deforms into a concave surface relative to a surface of said lid when an interior pressure in said main cavity is lower than an ambient pressure that is existent outside of said storage canister;
   deforms into a convex surface relative to said surface of said lid when said interior pressure is higher than said ambient pressure; and
   remains undeformed when said interior pressure is substantially equal to said ambient pressure.

6. The storage canister of claim 2, wherein said process indicator is adapted for indicating whether a vacuum exists in said vacuum chamber.

7. The storage canister of claim 2, wherein said vacuum chamber is separated from said main cavity and said vacuum chamber includes a valve for allowing gases to pass from said vacuum chamber into said main cavity.

8. The storage canister of claim 1, wherein said process indicator comprises a flexible membrane.

9. The storage canister of claim 8, wherein said flexible membrane of said process indicator:
   deforms into a concave surface relative to a surface of said lid when an interior pressure in said vacuum chamber is lower than an ambient pressure that is existent outside of said storage canister;
   remains undeformed when said interior pressure is substantially equal to said ambient pressure.

10. The storage canister of claim 1, wherein said lid further includes a vacuum port.

11. The storage canister of claim 1, wherein said lid further includes kinematic latches for securing said lid to said base, wherein said kinematic latches are associated with a first venting mechanism.

12. The storage canister of claim 11, wherein said lid further includes:
   an easy-pour mechanism, wherein said easy-pour mechanism includes a second venting mechanism for venting said main cavity, a pour-hole, and a hinged flap that pivots between an open and closed position over said pour-hole.

13. The storage canister of claim 11, wherein said first venting mechanism includes a right-hand side vent-hole and a left-hand side for venting said main cavity when said lid includes said process indicator.

14. The storage canister of claim 13, wherein said kinematic latches include gaskets adapted for sealing said right-hand side vent-hole and said left-hand side for venting said main cavity.

15. The storage canister of claim 11, wherein said first venting mechanism includes:
   a right-hand side vent-hole and a left-hand side vent-hole for venting said main cavity; and
   a right-hand side vacuum chamber vent-hole and left-hand side vacuum chamber vent-hole for venting said vacuum chamber, when said lid includes said vacuum indicator.

16. The storage canister of claim 15, wherein said kinematic latches include gaskets adapted for sealing:
   said right-hand side vent-hole and said left-hand side vent-hole for venting said main cavity; and
   said right-hand side vacuum chamber vent-hole and left-hand side vacuum chamber vent-hole for venting said vacuum chamber.

17. The storage canister of claim 11, wherein said venting mechanism includes:
   a right-hand side vent-hole and a left-hand side vent-hole for venting said main cavity; and a right-hand side vacuum chamber vent-hole for venting said vacuum chamber.

18. The storage canister of claim 17, wherein said kinematic latches include gaskets adapted for sealing:
   said right-hand side vent-hole and said left-hand side vent-hole for venting said main cavity; and
said right-hand side vacuum chamber vent-hole for venting said vacuum chamber when said lid includes said vacuum indicator.

19. The storage canister of claim 1, further includes a baffle adapted for varying an interior storage volume of said storage canister.

20. The storage canister of claim 19, wherein said baffle can be pulled in a downwardly direction towards a bottom portion of said storage canister when reducing said interior storage volume of said storage canister.

21. The storage canister of claim 19, wherein said baffle can be pulled in an upwardly direction towards a top portion of said storage canister when increasing said interior storage volume from a previously reduced interior storage volume of said storage canister.

22. The storage canister of claim 19, wherein said baffle includes a valve for evacuating said interior storage volume of said storage canister.

23. The storage canister of claim 19, wherein said baffle is adapted for being stretched into an extended position for reducing said interior storage volume of said storage canister.

24. The storage canister of claim 19, wherein said baffle is adapted for being shrunk from a previously extended position for increasing said interior storage volume from a previously reduced interior storage volume of said storage canister.

25. The storage canister of claim 19, further includes a ratchet mechanism adapted for use with said baffle for varying said interior storage volume, wherein said baffle can be held in a selected position using notches of said ratchet mechanism.

26. The storage canister of claim 25, wherein said baffle is structurally flexible for moving between said notches of said ratchet mechanism.

27. The storage canister of claim 25, wherein said baffle has two halves that are connected together by a hinged portion and such that said baffle can be folded along said hinged portion.

28. The storage canister of claim 25, wherein said ratchet mechanism is along two opposite walls that partly define said interior storage volume.

29. The storage canister of claim 25, wherein said ratchet mechanism occupies a circumferential surface area of walls that define said interior storage volume.

30. An ice-cream canister for use with a vacuum packaging appliance, said ice-cream canister comprising:

an inner storage container that is removable from said ice-cream canister for cleaning; and

a baffle adapted for reducing an internal volume of said inner storage container, wherein said baffle includes a valve for use with said vacuum packaging appliance in evacuating gases from said internal volume.

31. A canister for use with a vacuum packaging appliance, said canister comprising:

a baffle adapted for reducing an internal volume of said canister, wherein said baffle includes a valve for use with said vacuum packaging appliance in evacuating gases from said canister.

a lid, wherein said lid includes any one of:

a vacuum indicator; and

a process indicator.

32. A canister for use with a vacuum packaging appliance, said canister comprising:

a lid that includes kinematic latches for securing said lid to a base of said canister, wherein said kinematic latches are associated with a first venting mechanism for venting said canister; and

an easy-pour mechanism, wherein said easy-pour mechanism includes a second venting mechanism for venting said canister.

33. A canister for use with a vacuum packaging appliance, said canister comprising:

a kinematic latch means for securing a lid to a base of said canister;

a first venting means associated with said kinematic latch means for venting said canister;

an easy-pour means; and

a second venting means associated with said easy-pour means for venting said canister.

34. A canister for use with a vacuum packaging appliance, said canister comprising:

a kinematic latch means for securing a lid to a base of said canister;

a venting means associated with said kinematic latch means; and

a vacuum indicator means for indicating whether a vacuum exists in said canister.

35. A canister for use with a vacuum packaging appliance, said canister comprising:

a kinematic latch means for securing a lid to a base of said canister;

a venting means associated with said kinematic latch means;

a vacuum chamber means; and

a process indicator means for indicating whether a vacuum exists in said vacuum chamber means.