RESEALABLE AND EVACUABLE HANGING BAG WITH REMOVABLE HANGING DEVICE

Inventors: Linh Pham, Chula Vista, CA (US); Martin Calvo, Chula Vista, CA (US)

Correspondence Address:
OSTRAGER CHONG FLAHERTY & BROITMAN PC
570 LEXINGTON AVENUE, FLOOR 17
NEW YORK, NY 10022-6894 (US)

Appl. No.: 12/229,381
Filed: Aug. 22, 2008

Related U.S. Application Data
Provisional application No. 60/966,025, filed on Aug. 24, 2007.

Publication Classification
Int. Cl. B65D 33/14 (2006.01)
U.S. Cl. 383/23

ABSTRACT
A hanging storage system comprising a resealable evacuable bag and a hanging device attached to the bag. The hanging device is designed to attach to a portion of the bag in a manner such that a vacuum inside the evacuated bag can be maintained while the bag is hanging, e.g., in a closet. More specifically, the hanging device comprises first and second parts that couple together, the first part being disposed inside the bag and the second part being disposed outside the bag, with a portion of a thin flexible bag wall being disposed between the coupled first and second parts.
FIG. 1
RESEALABLE AND EVACUABLE HANGING BAG WITH REMOVABLE HANGING DEVICE

RELATED PATENT APPLICATION

[0001] This application claims the benefit, under Title 35, United States Code, §119(c), of U.S. Provisional Application No. 60/966,025 filed on Aug. 24, 2007.

BACKGROUND OF THE INVENTION

[0002] This invention generally relates to resealable and evacuable storage bags. In particular, the invention relates to resealable evacuable storage bags that can be hung in a storage area, such as a closet.

[0003] Collapsible, evacuable storage containers typically include a flexible, airtight bag, a mouth through which an article can be inserted inside the bag, a zipper for closing the bag mouth and hermetically sealing the bag, and a fixture (e.g., a one-way vacuum valve) through which the interior volume of the bag can be evacuated. A user places an article into the bag through the opening, seals the opening, and then evacuates the air in the bag through the fixture. With the bag thus evacuated, a compressible article contained therein may be significantly compressed so that it is easier to transport and requires substantially less storage space.

[0004] Collapsible evacuable storage containers are beneficial for reasons in addition to those associated with compression of the stored article. For example, removal of the air from the storage container inhibits the growth of destructive organisms, such as moths, silverfish, and bacteria, which require oxygen to survive and propagate. Moreover, such containers, being impervious to moisture, inhibit the growth of mildew.

[0005] There is a need for inexpensive collapsible evacuable storage containers that can be hung (e.g., on a horizontal rod or pole) in the manner of an ordinary garment bag.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a drawing showing an isometric view of one conventional type of collapsible, evacuable storage container having a zipper and a slider for closing the zipper.

[0013] FIG. 2 is a drawing showing an isometric view of an evacuable and resealable hanging storage bag in accordance with one embodiment of the present invention.

[0014] FIG. 3 is a drawing showing a cross-sectional view of a known zipper suitable for use with a bag of the type depicted in FIG. 2.

[0015] FIG. 4 is a drawing showing a removable hanging device attached to a storage bag in accordance with a further embodiment of the invention.

[0016] FIG. 5 is a drawing showing an elevational view of the assembled hanging device in accordance with the embodiment depicted in FIG. 4.

[0017] FIGS. 6 and 7 are drawings showing side and front elevational views respectively of an outer hanger support that is a component of the assembled hanging device depicted in FIG. 5.

[0018] FIG. 8 is a drawing showing a side elevational view of a hook that is a component of the assembled hanging device depicted in FIG. 5, the hook being pivotably coupled to the outer hanger support depicted in FIGS. 6 and 7.

[0019] FIG. 9 is a drawing showing an isometric view of a retainer ring that is a component of the assembled hanging device depicted in FIG. 5, the retainer ring being used to retain the hook depicted in FIG. 8 in the outer hanger support depicted in FIGS. 6 and 7.

[0020] FIGS. 10 and 11 are drawings showing bottom plan and front elevational views of an inner hanger support that is a component of the assembled hanging device depicted in FIG. 5, the inner hanger support being coupled to the outer hanger support depicted in FIGS. 6 and 7 when the hanging device is fully assembled.

[0021] FIG. 12 is a drawing showing a side elevational view of a pivotable clip that is a component of the assembled
hanging device depicted in FIG. 5, the pivotable clip being pivotably coupled to the inner hanger support depicted in FIGS. 10 and 11.

FIG. 13 is a drawing showing a front elevational view of a hanging ring that is a component of the assembled hanging device depicted in FIG. 5, the hanging hook being snapped into the pivotable clip depicted in FIG. 10.

Reference will now be made to the drawings in which similar elements in different drawings bear the same reference numerals.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows a conventional collapsible, evacuable storage container 2 comprising a bag 4, a valve assembly 6, and a zipper 8 comprising a pair of mutually interlockable extruded zipper strips that are joined to each other at opposing ends thereof. The bag 4 typically comprises front and rear walls or panels (made of thermoplastic film material) that are joined together at the bottom and two sides by conduction heat sealing to form a receptacle having an interior volume and a mouth in which the zipper 8 is installed. One wall of bag 4 has a hole (not shown in FIG. 1) in which to install the valve assembly 6. Alternatively, the bag 4 may be made from a web of film that is folded, the fold forming the bottom of the bag. To maintain a vacuum inside the storage bag, the zipper in a closed state must provide a hermetic seal at the mouth (i.e., fourth side of) the bag. Many different types of zippers can be used.

During use, one or more discrete articles or a bulk material (not shown) may be placed inside the bag 4 while the zipper 8 is open, i.e., while the closure profile of the interlockable zipper strips are disengaged from each other. After the article or material to be stored has been placed inside the bag, the mouth of the bag 4 can be sealed by pressing the zipper strips together to cause their respective closure profiles to interlock with each other. Although the zipper closure profiles may have many different designs, the design must be one that ensures that an airtight seal can be formed at the mouth of the bag. The zipper strips can be pressed together using a device 10 commonly referred to as a "slider" or "clip", which straddles the zipper. The ends of the zipper strips are joined together at the sides of the bag, e.g., by the application of heat and pressure. The zipper is opened by pulling apart the zipper upper flanges.

The present invention is directed to a hanging storage system comprising a resealable evacuable flexible bag and a hanging device attached to the bag. The hanging device is designed to attach to a portion of the bag in a manner such that a vacuum inside the evacuated bag can be maintained while the bag is hanging, e.g., in a closet.

FIG. 2 shows a hanging storage system in accordance with one embodiment of the present invention. This hanging storage system comprises a collapsible, evacuable receptacle 12, a valve assembly 6, a zipper 8 comprising a pair of mutually interlockable extruded zipper strips that are disposed along one side of the receptacle 12 and joined to each other at opposing ends thereof, a slider or clip 10 slidably mounted on the zipper 8, and a hanging device 15 attached to a top portion of the receptacle 12. The receptacle 12 has a gusset 14 on the side opposite the zipper 8. Alternatively, the zipper 8 may be opened into the bottom of the receptacle and both sides of the receptacle could be gusseted. The zipper 8, when closed by operation of the slider 10, forms an airtight seal across the mouth of the receptacle 12.

In accordance with the embodiment shown in FIG. 2, the hanging device 15 is attached to a top portion of the receptacle 12. The hanging device 15 comprises first and second subassemblies that couple together. The first subassembly of the hanging device 15 comprises an inner hanger support 16 and a ring 22 pivotally coupled to the inner hanger support 16. The second part of the hanging device 15 comprises an outer hanger support 18 and a hook 20 pivotally coupled to the outer hanger support 18. During assembly of the hanging storage bag, the first subassembly is disposed inside the receptacle while the second subassembly is disposed outside the receptacle. These two subassemblies are then coupled to each other with a portion of the receptacle wall (made of thin flexible web material) being disposed between the coupled first and second subassemblies. The hanging device 15 does not penetrate the receptacle wall, thereby maintaining a vacuum inside the storage bag after it has been evacuated. When the hanging device 15 is fully assembled and attached to the receptacle 12, multiple hooked hangers can be hung on the ring 22, allowing multiple articles to be stored in the bag. The hook 20 is configured to fit over and be supported by a horizontal rod or pole. Preferably, the components of the hanging device are made of rigid or semi-rigid plastic material.

Still referring to FIG. 2, the valve assembly 6 is preferably a one-way vacuum valve. One suitable one-way vacuum valve assembly is disclosed in U.S. Pat. No. 7,350,541. Although not shown in FIG. 2, the valve assembly 6 may comprise a cap that can be snapped onto a portion of the valve assembly that is disposed on the exterior of the receptacle 12. The cap must be removed before the bag can be evacuated, and then is replaced after the bag has been evacuated. The cap is intended to seal the valve assembly to prevent air from entering the evacuated bag.

The receptacle 12 is made from a web of thermoplastic film material that is folded to form the gusset 14. The overlapping top edges and overlapping bottom edges of the folded web are joined together by conduction heat sealing to form a receptacle having an interior volume and a mouth in which the zipper 8 is installed. One wall of the receptacle 12 has a hole (not shown in FIG. 2) in which to install the valve assembly 6. The receptacle 12 may be formed of various types of gas-impermeable thermoplastic film material. The bag material may be either transparent or opaque. The preferred gas-impermeable thermoplastics are some nylons, polyester, polyvinylchloride and ethylene vinyl acetate. For example, the receptacle may be constructed of a blended extrusion layer of polyethylene sandwiched between a nylon layer and a layer of polyethylene sheeting.

The zipper 8 is designed to form a hermetic seal at the mouth of the side of the receptacle 12 when the zipper 8 is closed. After the zipper has been closed, the interior volume of the receptacle can be evacuated by sucking air out via the one-way valve assembly 6. Air can be drawn out of receptacle 12 through valve assembly 6 using a conventional vacuum source, such as a household or industrial vacuum cleaner. The valve assembly 6 and the zipper 8 maintain the vacuum inside the receptacle 12 after the vacuum source is removed.

To maintain a vacuum inside the storage bag, the zipper 8 in a closed state must provide a hermetic seal at the side (or bottom) of the bag. Many different types of zippers can be used. The present invention is not directed to any particular zipper construction. For the sake of illustration,
however, a suitable zipper for use with the present invention will now be described with reference to FIG. 3.

FIG. 3 shows a conventional zipper that comprises a pair of mutually interlockable extruded zipper strips 34 and 36. The zipper strip 34 comprises a pair of projections 38 and 40 having ball-shaped closure profiles, an upper flange 48, and a lower flange 50. The zipper strip 36 comprises a trio of projections 42, 44 and 46 having ball-shaped closure profiles, a upper flange 52, and a lower flange 54. For each zipper strip, the portions exclusive of the projections will be referred to herein as a “body”. The bag walls may be joined to the respective bodies of the zipper strips by conductive heat sealing across their entire height or across only portions thereof. For example, the bag walls could be joined to the zipper lower flanges and to the upper flanges by means of conductive heat sealing, as shown in FIG. 3. The projections 38 and 40 interlock with projections 42, 44 and 46 by fitting inside the respective spaces therebetween. The upper flanges 48 and 52 can be gripped by the user and pulled apart to open the closed zipper. The opened zipper can be resealed by pressing the zipper strips together along the entire length of the zipper with sufficient force to cause the projections 38 and 40 to enter the respective spaces between the projections 42, 44 and 46. The opposing ends of the zipper strips 34 and 36 are typically fused together.

[0034] The zipper strips of zipper 8 can be pressed together using a device 10 commonly referred to as a “slider” or “clip”, which straddles the zipper. The typical slider has a generally U-shaped profile, with respective legs disposed on opposing sides of the zipper. The U-shaped slider fits over the zipper with clearance for the upper flanges of the zipper, while the legs of the slider cam the zipper profiles of the incoming zipper section into engagement when the slider is moved along the zipper in either direction. The gap between the slider legs is small enough that the zipper can pass through the slider gap only if the zipper is in a closed state. The slider can be made using any desired method, such as injection molding. The slider can be molded from any suitable plastic, such as nylon, propylene, polystyrene, acetal, polyketone, polybutylene terephthalate, high-density polyethylene, polycarbonate, or ABS. One suitable slider for use in the hanging storage bag of the present invention is disclosed in U.S. Patent Appln. Publ. No. 2006/0056743.

[0035] FIG. 4 shows a hanging device attached to a storage bag in accordance with a further embodiment of the invention. Again the hanging device 15 comprises first and second subassemblies coupled to each other with an air tight top portion of the receptacle 12 disposed therebetween. Again the first subassembly of the hanging device 15 comprises an inner hanger support 16 and a ring 22 pivotally coupled to the inner hanger support 16; the second subassembly of the hanging device 15 comprises an outer hanger support 18 and a hook 20 pivotably coupled to the outer hanger support 18. The first subassembly is disposed inside the receptacle 12, while the second subassembly is disposed outside the receptacle. FIG. 4 shows a side view of the assembled hanging device, with the hook 20 and ring 22 disposed almost in the same plane.

[0036] FIG. 5 shows an end view of the same hanging device, with the hook 20 disposed in a plane normal to the plane of the ring 22. In accordance with this embodiment, the inner and outer hanger supports are coupled to each other by means of two pairs of retaining tabs on the outer hanger support 18 that latch onto respective ledges 78 and 80 of the inner hanger support 16. One pair of retaining tabs 72 and 74 are visible in FIGS. 5 and 7. The other pair of retaining tabs are directly behind tabs 72 and 74 in FIGS. 5 and 7, and therefore are not visible in those views. However, they have the same L-shaped profile as that seen in FIGS. 5 and 7. The spacing between the respective pairs of retaining tabs can be seen in FIG. 6. The only relative movement of the inner and outer hanger supports allowed by the interaction of the retaining tabs and the ledges 78 and 80 is sliding displacement along an axis normal to the plane of the paper in FIG. 5. As will be described in more detail hereafter, when the inner and outer hanger supports are fully coupled, resistance to further relative movement is provided by the interaction of the retaining tabs on the outer hanger support 18 with indentations formed on the inner hanger support 16.

[0037] Referring to FIGS. 6 and 7, the outer hanger support 18 comprises a hollow shell having a boss 60 that defines a circular cylindrical hole 64 (indicated by dashed lines in FIGS. 6 and 7). A pair of stiffening ribs 66 and 68 (indicated by dashed lines in FIG 7) extend in parallel inside the hollow shell on opposite sides of the circular hole 64. The stiffening ribs 66, 68 have mutually parallel straight edges that guide the leading lip of the inner hanger support during slidable coupling with the outer hanger support, preventing tilting of the inner hanger support relative to the outer hanger support during coupling. Other stiffening ribs may be provided which extend from the stiffening ribs 66 and 68 to respective sidewalls of the hollow shell. The outer hanger support also has four L-shaped retaining tabs, three of which are visible in FIGS. 6 and 7 and are labeled with numerals 70, 72 and 74. The four retaining tabs are rigid or semi-rigid, which allows the ledges 78 and 80 of the inner hanger support (see FIG. 5) to be slid into the outer hanger support with little resistance until the ends of the retaining tabs snap or lock into a corresponding set of indentations (items 96 and 98 in FIG. 10) formed on the undersides of ledges 78 and 80, thereby latching the inner and outer hanger supports together.

[0038] The circular hole of the outer hanger support receives an axle of the hanger hook 20 shown in FIG. 8 during assembly. An annular flange 24, shown in FIG. 8, protrudes from the hook axle and sits atop the upper edge of the boss 60, shown in FIG. 6, preventing the axle of the hanging hook from being inserted into the hollow shell any further. In this position, an annular recess 26 formed at the end of the axle of the hanger hook 20 is disposed slightly below the lower edge of the boss 60. In this position, a retainer ring 25 (shown in FIG. 9) can be used to couple the hanger hook and the outer hanger support while allowing the hanger hook to pivot freely about its axle relative to the outer hanger support. As seen in FIG. 9, the retainer ring 25 has a pair of protrusions 28, 30 that can be slided into the annular recess 26, thereby retaining the hanger hook 20 in pivotable coupling relationship with the outer hanger support 18, i.e., preventing the hanger hook from being pulled out during use.

[0039] FIGS. 10 and 11 are bottom plane and front elevational views of the inner hanger support 16. The inner hanger support 16 comprises a hollow shell having a boss 82 that defines a circular cylindrical hole 76 (indicated by dashed lines in FIGS. 10 and 11). Although not indicated in the drawings, the inner hanger support may also have internal stiffening ribs. The circular hole of the inner hanger support receives a ring support 90 (shown in FIG. 12) during assembly. The ring support 90 may be made of a rigid or semi-rigid plastic material. In contrast to the hanger hook, which is inserted through the circular hole in the outer hanger support
from the exterior until it projects into the interior of the hollow shell of the outer hanger, the ring support 90 is inserted through the circular hole in the inner hanger support from the interior until it projects outward on the exterior of the hollow shell of the inner hanger support. An annular flange 92, shown in FIG. 12, protrudes from the ring support 90 and sits atop the upper edge of the boss 82, shown in FIG. 11, preventing the ring support from projecting outside the inner hanger support any further. In this position, a recess 94 formed in the ring support 90 is disposed below the lower edge of the boss 82. In this position, an axle portion 88 of ring 22 (shown in FIG. 13), bounded by flanges 84 and 86, can be snapped into the recess 94 of ring support 90. When snapped in place, the ring 22 depends downward from the inner hanger support 16 (see FIG. 4) and can pivot about the axis of axle portion 88.

[0040] The hanging device disclosed herein can be attached to a resealable and evacuable storage bag, e.g., a garment bag, with the hanging hook on the outside and the ring on the inside of the storage bag, as seen in FIG. 2. The storage bag can be hung on a rod or pole using the hanger hook 20. Before the storage bag is hung on a rod or pole, the zipper 8 can be opened and then various compressible articles of clothing on individual clothing hangers (not shown in FIG. 2) can be hung inside the bag, the hook of each clothing hanger being hung on the ring 22. After the zipper has been closed, the interior volume of the bag can then be evacuated via the one-way vacuum valve 6. Such evacuation causes compression of the articles of clothing inside the bag. The evacuated storage bag can then be hung on a rod or pole, as previously described, using the hanger hook 20. As seen in FIG. 2, the storage bag has a gusset 14 on the side opposite to the zipper, which increases the storage capacity of the bag. Alternatively, the zipper could be installed along the bottom of the bag and both sides could be gusseted. Because the hanging device of the present invention is movable, a resealable evacuable storage bag could be used with the hanging device for hanging storage or without the hanging device for stacking storage.

[0041] Resealable evacuable bags of the type described herein can be manufactured on an automated production line. In accordance with one automated method of manufacture, a web of film is paid off a roll and folded to form a gusset connecting opposing walls having marginal portions in overlying relationship. Downstream respective sets of pull rollers are provided for pulling the webs through the bag making machine. A continuous length of interlocked zipper strips is paid off a spool and fed between the marginal portions of the opposing walls of the advancing film web. Typically the web and the zipper are advanced intermittently, while certain operations are performed during the dwell times. At a first sealing station, the marginal portions of the opposing web walls are sealed to the backs of intervening sections of the respective zipper strips by a first pair of horizontal heated sealing bars. At a crush welding station, the zipper is stomped to form a slider end stop, while a respective slider is inserted onto an unstomped section of the zipper by a conventional slider insertion device. At a second sealing station, the opposing web walls are heat sealed together to form a cross seal at package-length intervals. At a cutting station, the individual bags are severed from one another by cutting along a line that bisects each cross seal, thereby forming respective side seals on the separated bags, which side seals will become the top and bottom seals respectively when the storage bag is turned 90 degrees so that the zipper is vertical, as seen in FIG. 2. The hanging device can then be manually attached to the web in the area of the top seal, as previously described.

[0042] While the invention has been described with reference to various embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation to the teachings of the invention without departing from the essential scope thereof. Therefore it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

1. A hanging device comprising first and second bodies that can be alternately coupled to and uncoupled from each other, a ring coupled to said first body, and a hook coupled to said second body.

2. The hanging device as recited in claim 1, wherein said ring is pivotably coupled to said first body.

3. The hanging device as recited in claim 1, wherein said hook is pivotably coupled to said second body.

4. The hanging device as recited in claim 1, wherein said first and second bodies slide relative to each other during coupling and uncoupling thereof.

5. The hanging device as recited in claim 4, wherein one of said first and second bodies comprises first and second ledges disposed on opposite sides thereof, said first ledge having a first indentation and said second ledge having a second indentation, and wherein the other of said first and second bodies comprises first and second retaining projections that snap into said first and second indentations respectively during coupling of said first and second bodies.

6. The hanging device as recited in claim 1, wherein said first and second retaining projections are made of rigid or semi-rigid material.

7. The hanging device as recited in claim 1, wherein said first and second bodies are in the shape of shells.

8. The hanging device as recited in claim 1, wherein said hook is made of rigid or semi-rigid material.

9. A hanging storage system comprising a resealable bag and a hanging device, said resealable bag comprising a receptacle made of thin flexible web material; said hanging device comprising first and second bodies that can be alternately coupled to and uncoupled from each other, a ring coupled to said first body, and a hook coupled to said second body; and a portion of said thin flexible web material being disposed between said first and second bodies.

10. The hanging storage system as recited in claim 9, wherein said first body is disposed within an interior volume of said receptacle and said second body is disposed outside of said receptacle.

11. The hanging storage system as recited in claim 9, wherein said first and second bodies slide relative to each other during coupling and uncoupling thereof.

12. The hanging storage system as recited in claim 11, wherein one of said first and second bodies comprises first and second ledges disposed on opposite sides thereof, said first ledge having a first indentation and said second ledge having a second indentation, and wherein the other of said first and second bodies comprises first and second retaining projections that snap or lock into said first and second indentations respectively during coupling of said first and second bodies.
13. The hanging storage system as recited in claim 9, further comprising an airtight zipper installed in a mouth located along one side or a bottom of said receptacle, said zipper comprising first and second plastic zipper strips having mutually interlockable closure profiles.

14. The hanging storage system as recited in claim 9, further comprising a one-way vacuum valve attached to said receptacle, said one-way vacuum valve being operable to allow evacuation of an interior volume of said receptacle.

15. The hanging storage system as recited in claim 9, wherein said receptacle comprises a gusset located along one side of said receptacle.

16. The hanging storage system as recited in claim 9, wherein said hanging device is located at a top of said receptacle.

17. A hanging storage system comprising an evacuable bag having a mouth, a resealable zipper disposed in said mouth, and a hanging device comprising a hook disposed outside said bag and a ring disposed inside said bag, wherein said bag is airtight when said zipper is fully resealed.

18. A method of hanging a storage bag comprising the following steps:
   placing a first part of a hanging device inside a receptacle made of thin flexible web material, said first part comprising a first body and a ring, said first body being positioned such that it contacts a portion of said web material;
   placing a second part of the hanging device in a position outside said receptacle and adjacent said first part, said second part comprising a second body and a hook; and
   coupling said first and second bodies together with said portion of said web material disposed therebetween.

19. The method as recited in claim 18, wherein said coupling step comprises sliding said first body relative to said second body.

20. The method as recited in claim 18, further comprising the steps of placing an article inside said receptacle; hanging said article from said ring; resealing said receptacle with said article inside; and evacuating an interior volume of said resealed receptacle.

* * * * *