(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
2 April 2009 (02.04.2009)

PCT

(10) International Publication Number
WO 2009/042133 A1

(51) International Patent Classification:
B65D 33/01 (2006.01)

(21) International Application Number:
PCT/US2008/011046

(22) International Filing Date:
24 September 2008 (24.09.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/995,215 24 September 2007 (24.09.2007) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

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(54) Title: TOTE BAG WITH INNER RESEALABLE EVACUABLE FLEXIBLE BAG

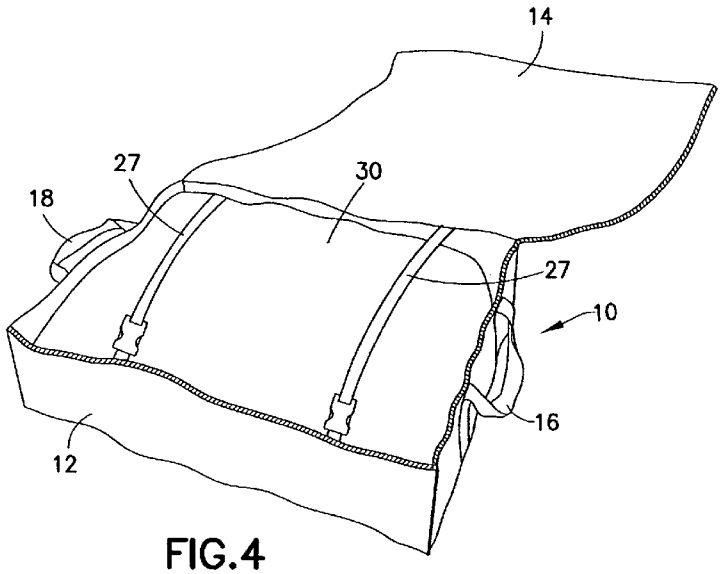


FIG.4

(57) Abstract: A system comprising: a tote bag (10) comprising a container having an opening and means (14) for closing the opening, wherein the container comprises first and second rigid or semi-rigid side walls (22, 24) and a connecting wall (6, 8, 12) made of flexible fabric material; and a resealable evacuable bag (30) placed inside and freely removable from the tote bag via the opening. The resealable evacuable bag comprises: a receptacle having an interior volume and a mouth that allows communication between an exterior and the interior volume, the receptacle comprising flexible front and rear walls (32, 34) and a flexible gusseted bottom (56, 58); a resealable closure (60) installed in the mouth; a one-way valve (64) mounted to a hole in the front wall; and a rigid or semi-rigid board (40) loosely disposed inside and freely removable from the receptacle and in contact with the gusseted bottom.

WO 2009/042133 A1

NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

TOTE BAG WITH INNER RESEALABLE EVACUABLE FLEXIBLE BAG

BACKGROUND

This invention generally relates to evacuable storage containers, and in particular, to evacuable reclosable and flexible storage bags.

Collapsible, evacuable storage containers typically include a flexible, airtight bag, an opening through which an article is inserted inside the bag, and a fixture through which excess air is evacuated. A user places one or more compressible articles 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, the compressible articles contained therein may be significantly compressed so that it is easier to transport and requires substantially less storage space. For example, compressible items such as clothing may be stored in collapsible, evacuable storage bags.

The storage bag containing the compressed items is deformable and may, in turn, be placed inside a rigid or semi-rigid container for transport and/or storage, as disclosed in U.S. Patent Application Serial No. 11/000,000. Because the contents of the bag have been compressed, the number of items that can be stored in a fixed volume is increased.

There is a need for tote bags that can be packed with compressible items to reduce bulk, thereby facilitating bag transport, especially for travelers.

SUMMARY

The invention is directed to systems for carrying and transporting compressible articles.

One aspect of the invention is a system comprising: a resealable flexible bag comprising a receptacle having a mouth at a top and an interior volume, a resealable zipper installed in the mouth, and a one-way vacuum

valve for use in evacuating the interior volume of the receptacle, wherein the receptacle in a flattened state comprises front and rear walls joined by first and second side seals and a gusseted bottom joined to the front and rear walls by first and second bottom seals respectively, the gusseted bottom and the front and rear walls being made of a flexible web material, and the one-way vacuum valve being attached to and penetrating the front wall; and a board made of a rigid or semi-rigid material, the board being loosely disposed inside and freely removable from the receptacle.

Another aspect of the invention is a system comprising: a resealable flexible bag comprising a receptacle having a mouth at a top and an interior volume, a resealable zipper installed in the mouth, and a one-way vacuum valve for use in evacuating the interior volume of the receptacle, wherein the receptacle in a flattened state comprises front and rear walls joined by first and second side seals and a gusseted bottom joined to the front and rear walls by first and second bottom seals respectively, the gusseted bottom and the front and rear walls being made of a flexible web material, and the one-way vacuum valve being attached to and penetrating the front wall; and a tote bag for receiving the resealable flexible bag after the resealable flexible bag has been filled with compressible articles and evacuated, the tote bag comprising a container having an opening and means for closing the opening, wherein the resealable flexible bag is freely removable from the tote bag

A further aspect of the invention is a system comprising: a tote bag comprising a container having an opening and means for closing the opening, wherein the container comprises first and second rigid or semi-rigid side walls and a connecting wall made of flexible fabric material; and a resealable evacuable bag placed inside and freely removable from the tote bag via the opening, the resealable evacuable bag comprising: a receptacle having an interior volume and a mouth that allows communication between an exterior and the interior volume, the receptacle comprising flexible front and rear walls and a flexible gusseted bottom; a resealable closure installed in the mouth; a

one-way valve mounted to a hole in the front wall; and a rigid or semi-rigid board loosely disposed inside and freely removable from the receptacle and in contact with the gusseted bottom.

Other aspects of the invention are disclosed and claimed below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a drawing showing an isometric view of a tote bag in accordance with one embodiment of the invention.

FIG. 2 is a drawing showing an isometric view of a gusseted resealable evacuable bag that fits inside the tote bag depicted in FIG. 1 in accordance with one embodiment of the invention.

FIG. 3 is a drawing showing an isometric view of a folding board that fits inside the gusseted resealable evacuable bag depicted in FIG. 2.

FIG. 4 is a drawing showing a resealable evacuated bag filled with compressed articles and placed inside an open tote bag in accordance with one embodiment of the invention.

FIG. 5 is a drawing showing the packed tote bag of FIG. 4 when closed.

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

DETAILED DESCRIPTION

The present invention is a storage and/or transport system comprising an outer tote bag and an inner resealable evacuable bag that, when filed with compressed items, fits inside the outer tote bag and can be carried therein. The inner bag is removable from the tote bag, allowing for bag replacement while retaining the same tote. Preferably the inner bag is gusseted, has a mouth closed by an airtight plastic extruded zipper having

interlocking profiles and has an interior volume that can be evacuated via a one-way vacuum valve when filled with compressible items, such as articles of clothing. In one embodiment, a support board made of rigid or semi-rigid material is placed inside the inner bag atop the gusseted bottom. The support board is sized and shaped to fit inside the tote bag.

In accordance with one embodiment, the tote bag is made of flexible fabric and has a zippered entry from the top side of the bag. In this case, the zipper is of the type typically used on luggage and clothing. Such a zipper typically consists of two rows of tiny interlocking tabs which are brought into engagement or separated by a sliding part. Preferably two opposing vertical side walls of the tote bag have rigid or semi-rigid boards inserted within or permanently attached to the fabric of those side walls to help support the tote bag during loading and storage. A pair of security belts are provided inside the tote bag (sewn to the fabric) with buckles to secure the gusseted bag with compressed contents after the latter has been filled with compressible items and evacuated. The tote bag may be provided with a clear window for visibility of the stored contents.

The inner resealable evacuable bag has a gusseted bottom that greatly increases the storage capacity of the bag. A rigid or semi-rigid support board (which is not attached to the bag) is placed inside the bag and on the gusseted bottom to flatten the gusset and provide additional support to the packed contents of the inner bag. By providing a support board that is detachable from the inner bag, the end user can replace the bag as many times as he/she wishes while retaining the tote bag and support board. The inner resealable evacuable bag may be constructed of a blended extrusion layer of polyethylene sandwiched between a nylon layer and a layer of polyethylene sheeting. Other suitable gas-impermeable web material may be used.

FIG. 1 shows an outer tote bag 10 in accordance with one embodiment of the invention. The outer tote bag 10 has a bottom wall 6, a rear wall 8, a front wall 12, side walls 22 and 24 and a top flap 14. Although the

outer tote bag is represented by straight lines, it should be understood that only the side walls 22 and 24 are rigid or semi-rigid, while the other walls 6, 8, 12 and 14 are made of flexible fabric. The preferred fabric is nonwoven polypropylene, but other fabrics can be used. Each of the side walls 22 and 24 comprises a kraft backer (e.g., 2 mm thick) that is completely covered by fabric. A pair of handles 16 and 18 are respectively attached to side walls 24 and 22 for lifting the tote bag.

The walls 8, 12, 22 and 24 form an opening as seen in FIG. 1. When flap 14 is moved into position covering the opening, a slider 20 can be operated to close a zipper, thereby closing the tote bag. The zipper comprises a first zipper strip 19 that extends along the tops of walls 22, 12 and 24 and a second zipper strip 21 that extends along three sides of the rectangular flap 14. Although only one slider 20 is shown, it is well known that two sliders could be used. In the latter case, the sliders move in opposite directions to close respective lengths of the zipper. As previously mentioned, the zipper may be of the type which is typically used on luggage or clothing.

Still referring to FIG. 1, a pair of security belts 27 are provided inside the tote bag (sewn to the fabric) with respective buckles to secure a packed bag (not shown) when the latter is placed inside the tote bag. Each buckle comprises a buckle insert 26 and a buckle slot 28 for receiving and interlocking with a buckle insert inserted therein.

In accordance with one embodiment, a resealable evacuable bag having a gusseted bottom is packed with compressible items, evacuated and then placed inside the tote bag. The gusseted bottom greatly increases the storage capacity of this inner bag. The inner bag comprises a receptacle made of flexible web material, such as thermoplastic film. It can be constructed from three rectangular pieces of web material having equal widths in a well-known manner. The first two rectangular pieces have the same dimensions and form the front and rear walls of the receptacle. The third rectangular piece is folded, inverted and placed between the lowermost portions of the overlapping front

and rear walls to serve as a gusseted bottom. The receptacle is then formed by heat sealing the marginal portions of the three rectangular pieces of web material as follows: (1) a marginal portion at the bottom of the front wall is heat sealed to a marginal portion at the bottom of one half of the folded piece that serves as the gusseted bottom; (2) a marginal portion at the bottom of the rear wall is heat sealed to a marginal portion at the bottom of the other half of the folded piece that serves as the gusseted bottom; (3) a marginal portion at one side of the rear wall is heat sealed to a marginal portion at one side of the front wall in a region above the gusseted bottom during formation of a first side seal; (4) during formation of the first side seal, marginal portions on one side of the gusseted bottom are heat sealed to each other and to corresponding marginal portions on the one side of the front and rear walls respectively; (5) a marginal portion at the other side of the rear wall is heat sealed to a marginal portion at the other side of the front wall in a region above the gusseted bottom during formation of a second side seal; and (6) during formation of the second side seal, marginal portions on the other side of the gusseted bottom are heat sealed to each other and to corresponding marginal portions on the other side of the front and rear walls respectively. The result, when the receptacle is placed flat on a table, is a rectangular bag having two side seals and a bottom gusset, the ends of the gusset being captured in the side seals and the panels of the gusset being joined to the bottom marginal portions of the front and rear walls by a pair of longitudinal seals.

FIG. 2 shows the bag 30 with gusseted bottom after it has been expanded to increase its storage capacity by expanding the gusset and then placing a rigid or semi-rigid support board 40 (which is not attached to the inner bag) inside the inner bag 30 atop the gusseted bottom to flatten a major portion of the gusset. In this disclosed embodiment, the support board 40 is rectangular. The support board 40 has a folding line 42, indicated by a dashed line in FIG. 2. The folding of the support board is shown in FIG. 3. The board 40 preferably comprises a kraft backer covered by fabric, e.g., nonwoven polypropylene.

When the major portion of the gusseted bottom is flattened, it has a rectangular shape, as seen in FIG. 2. FIG. 2 depicts the inner bag in a state wherein the zipper 60 is being held up. In the absence of any force holding up the zipper, the bag would collapse because, in this example, the front and rear walls are made of thin flexible thermoplastic web material. The zipper 60 consists of a first zipper strip heat sealed to a top marginal portion of front wall 32 and a second zipper strip heat sealed to a top marginal portion of rear wall 34. Although not shown in FIG. 2, the zipper strips may be provided with flanges that allow a user to pull open the zipper. A slider 62 can be moved in either direction along the length of the zipper 60 to close the zipper.

The front (32) and rear (34) walls of the bag may fold along lines 48, 50, 52 and 54 when the zipper 60 is lifted to the position shown in FIG. 2. More specifically, as shown in FIG. 2, the front wall 32 (including front panel 32a and side panels 32b and 32c) folds along lines 48 and 52 which extend from the ends of the zipper 60 to two corners of the support board 40, whereas the rear wall 34 (including rear panel 34a and side panels 34b and 34c) folds along lines 50 and 54 which extend from the ends of the zipper 60 to the other two corners of the support board 40. In the bag configuration shown in FIG. 2, the portions of the gusseted bottom that are not contacted by the support board 40 form respective triangular pockets 56 and 58 when the major portion of the gusset is expanded and flattened.

The side seals of the inner bag are indicated by reference numerals 44 and 46 in FIG. 2. The portion of side seal 44 that extends from the peak of triangular pocket 56 to one end of the zipper 60 joins marginal portions of the front and rear walls to each; the portion of side seal 46 that extends from the peak of triangular pocket 58 to the other end of the zipper 60 also joins marginal portions of the front and rear walls to each. The portion of side seal 44 that includes marginal portions of the gusseted bottom is indicated by numeral 44a, while the portion of side seal 46 that includes marginal portions of the gusseted bottom is indicated by numeral 46a.

In accordance with the specific embodiment of the inner bag 30 depicted in FIG. 2, the sum of the length and width of the rectangular support board 40 is slightly less than the length of either bottom seal. In FIG. 2, item 66 indicates the bottom seal along which a bottom marginal portion of the front wall 32 (extending from side seal 44a to side seal 46a) is heat sealed to a marginal portion of the bottom gusset. In the bag configuration depicted in FIG. 2, the bottom seal 66 is bent in two places to follow the shape of the rectangular support board 40. Similarly, the other bottom seal along which a bottom marginal portion of the rear wall 34 (again extending from side seal 44a to side seal 46a) is heat sealed to another marginal portion of the bottom gusset also follows the shape of the support board.

FIG. 2 shows the bottom gusset with a major portion lying directly below the support board 40. It should be understood that at the sides of the bag 30, the bottom gusset bends around the edges of the support board and extends upward to form one side of each of the triangular pockets 56 and 58. The dashed lines disposed at acute angles relative to the base of each triangle indicate where the bottom gusset is again folded. Thus, it should be appreciated that in the areas of the triangular pockets 56 and 58, there are three layers of web material: one layer being either the front or rear wall and the other two layers being a folded portion of the bottom gusset.

The collapsible, evacuable storage bag 30 depicted in FIG. 2 further comprises a one-way valve assembly 64 installed in an opening formed in the front wall 32. Although not shown in FIG. 2, the conventional valve assembly 64 may also comprise a cap that can be snapped onto a portion of the valve assembly that is disposed on the exterior of the bag. 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 supplement the air pressure on the diaphragm and help to seal the valve assembly to prevent air from entering the evacuated bag.

During use, one or more discrete compressible articles (not shown in FIG. 2) may be placed inside the inner bag 30 while the zipper 60 is open, e.g., while the closure profiles of two interlockable zipper strips are disengaged from each other. After the articles to be stored have been placed inside the bag, the mouth of the receptacle can be resealed, e.g., 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.

With the zipper 60 closed, the interior volume of the bag 30 is hermetically sealed. The interior volume can now be evacuated by sucking air out of the bag via the one-way valve assembly 64. Air can be drawn out of the receptacle through valve assembly 64 using a conventional vacuum source, such as a household or industrial vacuum cleaner. The valve assembly 64 and the zipper 60 maintain the vacuum inside the receptacle of bag 30 after the vacuum source has been removed.

The zipper 60 may be of the type disclosed in U.S. Patent Application Serial No. 12/229,381, filed on August 22, 2008, and entitled "Resealable and Evacuable Hanging Bag with Removable Hanging Device." The zipper 60 is closed by means of a plastic inverted U-shaped slider or clip 62 mounted thereto. The slider may be of the type disclosed in U.S. Patent Application Serial No. 10/940,213, filed on September 13, 2004 and entitled "Improved Slider for Use with Evacuable Storage Bags." The slider 62 is capable of closing an open zipper, i.e., by camming the opposing zipper strips into engagement during slider travel in either direction, but cannot be used to open a closed zipper. The slider 62 does not have means for opening the zipper because typically such means (e.g., a separating plow or finger) would leave a gap in the zipper, thereby preventing formation of a hermetic seal. The reclosable bag must be hermetically sealed in order to maintain a vacuum inside after the compressible articles have been compressed by evacuating air

out of the bag. Alternative reclosable means, such as opposing strips of cohesive material or a strip of low-tack pressure-sensitive adhesive material, may be used.

The inner bag depicted in FIG. 2 is designed to fit inside the tote bag depicted in FIG. 1. For example, the board 40 seen in FIG. 2 may be a rectangular board having a length and a width on slightly less than the length and width respectively of the bottom wall 6 of the tote bag shown in FIG. 1, so that the inner bag can be placed inside the tote bag with the support board lying flat on the bottom wall of the tote bag. The support board 40 inside bag 30 (see FIG. 2) and the side walls 22 and 24 of the tote bag 10 (see FIG. 1) are rigid or semi-rigid, thereby providing support and shape to a fully packed tote bag.

The invention disclosed herein is particularly useful for travelers. The number of articles of clothing that can be packed inside the tote bag is increased due to compression of the clothing. The packing procedure is as follows. A user first opens the bag 30 by pulling apart the upper flanges (not shown) of the respective zipper strips of zipper 60. Then the user expands the bottom gusset and places the support board 40 inside the bag 30, as seen in FIG. 2, atop the flattened gusset. A plurality of compressible articles can then be placed inside the bag, stacked on top of the support board. Then the slider 62 can be used to close the zipper 60. Air is then evacuated out through the one-way valve using a vacuum cleaner or similar device in conventional manner, thereby compressing the compressible contents of the bag. The inner bag 30 with compressed contents can then be placed inside the tote bag 10, as seen in FIG. 4, with the support board 40 (inside the inner bag) lying atop the bottom wall of the tote bag. The packed inner bag 30 is secured using security belts 27. Then the flap 14 is placed over the opening of the tote bag 10 and the zipper 25 is closed as shown in FIG. 5. The fully packed bag can then be lifted using the handles 16 and 18.

While the invention has been described with reference to preferred embodiments, it will be understood by those skilled in the art that

various changes may be made and equivalents may be substituted for members 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.

CLAIMS

1. A system comprising:

a resealable flexible bag (30) comprising a receptacle having a mouth at a top and an interior volume, a resealable zipper (60) installed in said mouth, and a one-way vacuum valve (64) for use in evacuating said interior volume of said receptacle, wherein said receptacle in a flattened state comprises front and rear walls (32, 34) joined by first and second side seals (44, 46) and a gusseted bottom (56, 58) joined to said front and rear walls by first and second bottom seals (66) respectively, said gusseted bottom and said front and rear walls being made of a flexible web material, and said one-way vacuum valve being attached to and penetrating said front wall; and

a board (40) made of a rigid or semi-rigid material, said board being loosely disposed inside and freely removable from said receptacle.

2. The system as recited in claim 1, wherein said board can be folded along a line (42).

3. The system as recited in claim 1, wherein said gusseted bottom comprises a first folded marginal portion (44a) that is captured in said first side seal and a second folded marginal portion (46a) that is captured in said first side seal.

4. The system as recited in claim 1, wherein said gusseted bottom is formed by a rectangular piece of said flexible web material that is folded when said receptacle lies flat.

5. The system as recited in claim 1, wherein when said gusseted bottom is expanded and partly flattened and when said board is placed on top of said flattened portion of said gusseted bottom, the length of said mouth is greater than the length of said flattened portion of said gusseted bottom.

6. The system as recited in claim 5, wherein said board and said flattened portion of said gusseted bottom are both rectangular.

7. The system as recited in claim 1, further comprising a tote bag (10) for receiving said resealable flexible bag after said resealable flexible bag has been filled with compressible articles and evacuated, said tote bag comprising a container having an opening and means (14) for closing said opening.

8. The system as recited in claim 8, wherein said container comprises first and second side walls (22, 24), each of said first and second side walls comprising a respective board made of rigid or semi-rigid material.

9. The system as recited in claim 9, wherein said container further comprises a wall (6, 8, 12) made of flexible fabric that connects said first and second side walls.

10. The system as recited in claim 8, wherein said board fits through said opening of said container.

11. A system comprising:

a resealable flexible bag (30) comprising a receptacle having a mouth at a top and an interior volume, a resealable zipper (60) installed in said mouth, and a one-way vacuum valve (64) for use in evacuating said interior volume of said receptacle, wherein said receptacle in a flattened state comprises front and rear walls (32, 34) joined by first and second side seals (44, 46) and a gusseted bottom (56, 58) joined to said front and rear walls by first and second bottom seals (66) respectively, said gusseted bottom and said front and rear walls being made of a flexible web material, and said one-way vacuum valve being attached to and penetrating said front wall; and

a tote bag (10) for receiving said resealable flexible bag after said resealable flexible bag has been filled with compressible articles and evacuated, said tote bag comprising a container having an opening and means

(14) for closing said opening,

wherein said resealable flexible bag is freely removable from said tote bag.

12. The system as recited in claim 11, further comprising a belt (27) attached to said container, said belt being arranged to secure said resealable flexible bag inside said container when said resealable bag is filled with compressed articles.

13. The system as recited in claim 11, wherein said container comprises first and second side walls (22, 24), each of said first and second side walls comprising a respective board made of rigid or semi-rigid material.

14. The system as recited in claim 13, further comprising first and second handles (16, 18) respectively attached to said first and second side walls

15. The system as recited in claim 13, wherein said container further comprises a wall (6, 8, 12) made of flexible fabric that connects said first and second side walls.

16. The system as recited in claim 11, further comprising a board (40) made of a rigid or semi-rigid material, said board being loosely disposed inside and freely removable from said receptacle and in contact with said gusseted bottom of said receptacle.

17. The system as recited in claim 15, wherein said board can be folded along a line (42).

18. A system comprising:

a tote bag (10) comprising a container having an opening and means (14) for closing said opening, wherein said container comprises first and second rigid or semi-rigid side walls (22, 24) and a connecting wall (6, 8, 12)

made of flexible fabric material; and

a resealable evacuable bag (30) placed inside and freely removable from said tote bag via said opening, said resealable evacuable bag comprising:

a receptacle having an interior volume and a mouth that allows communication between an exterior and said interior volume, said receptacle comprising flexible front and rear walls (32, 34) and a flexible gusseted bottom (56, 58);

a resealable closure (60) installed in said mouth;

a one-way valve (64) mounted to a hole in said front wall; and

a rigid or semi-rigid board (40) loosely disposed inside and freely removable from said receptacle and in contact with said gusseted bottom.

19. The system as recited in claim 18, wherein said board can be folded along a line (42).

20. The system as recited in claim 18, wherein said resealable closure comprises first and second zipper strips having mutually interlockable profiles.

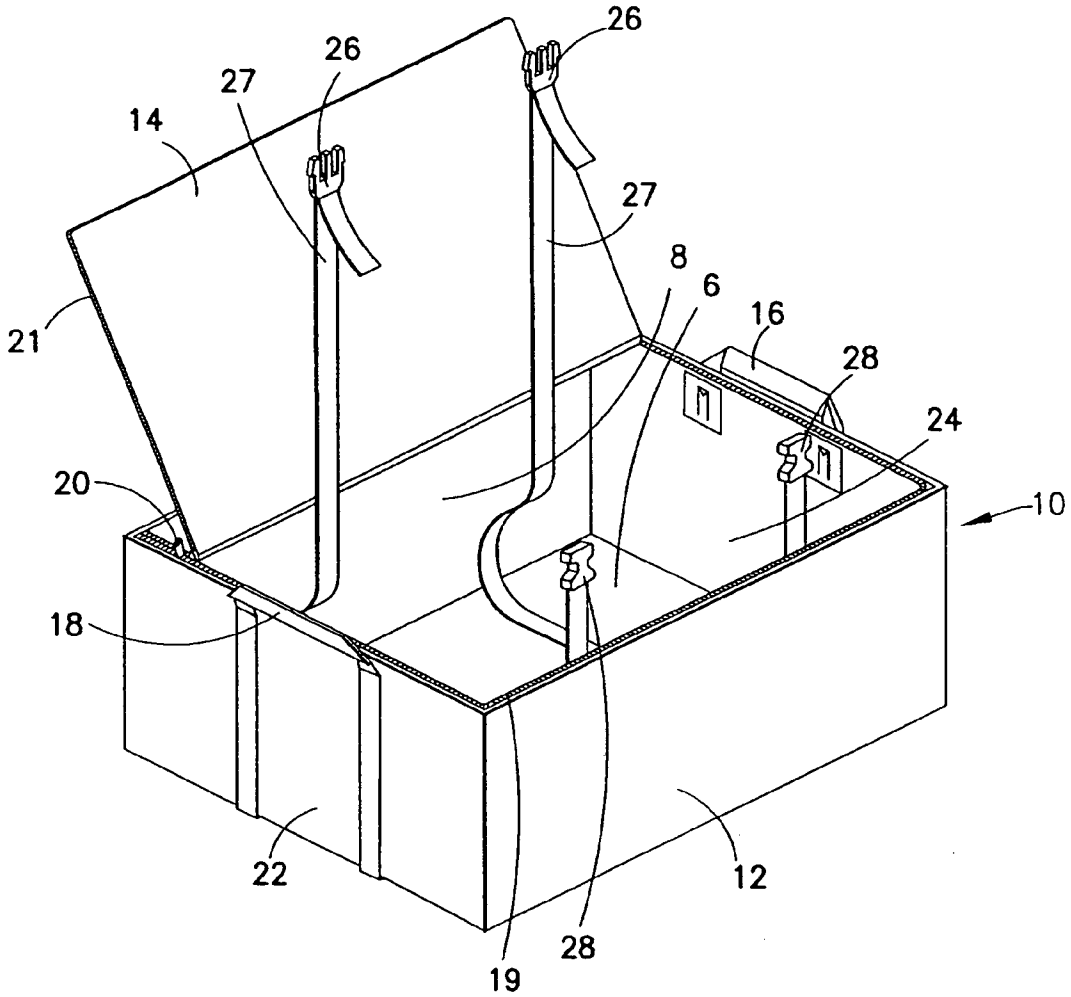


FIG.1

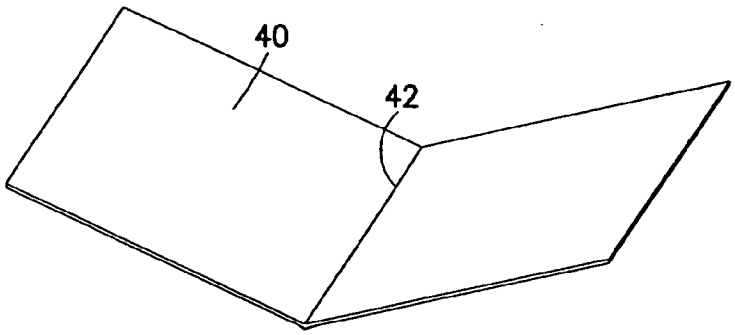
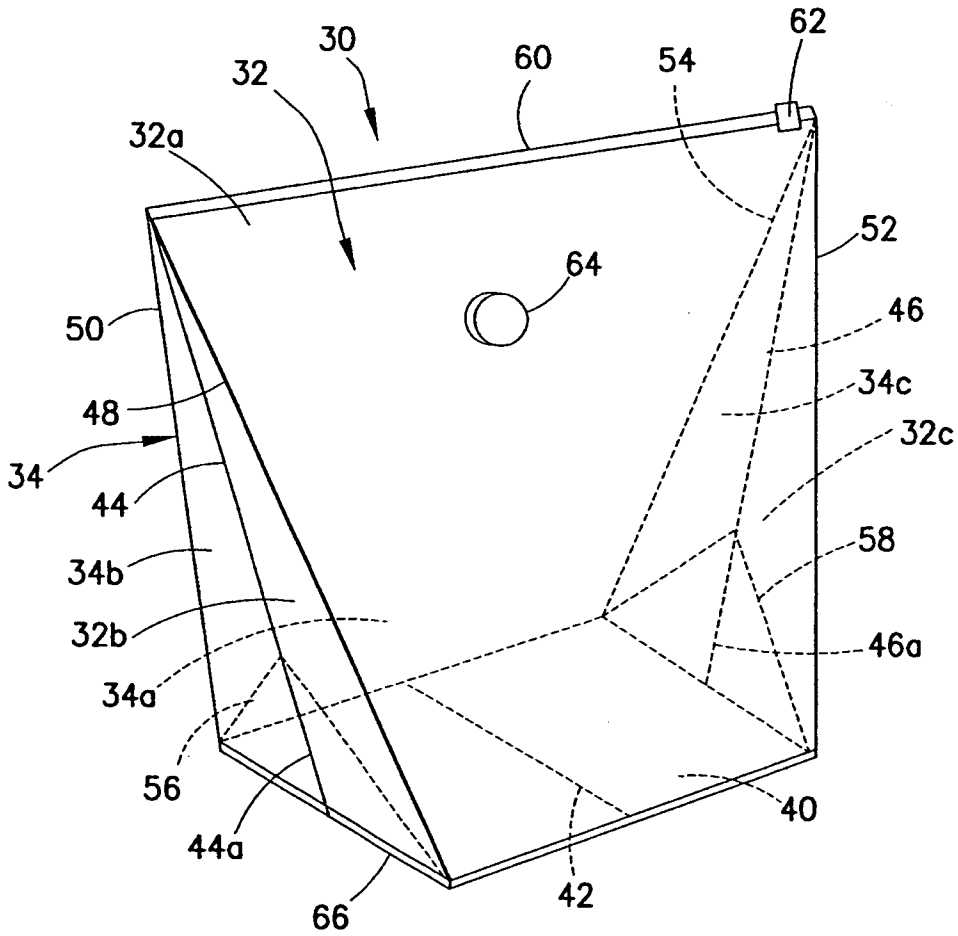


FIG.3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44a
42
66

FIG.2

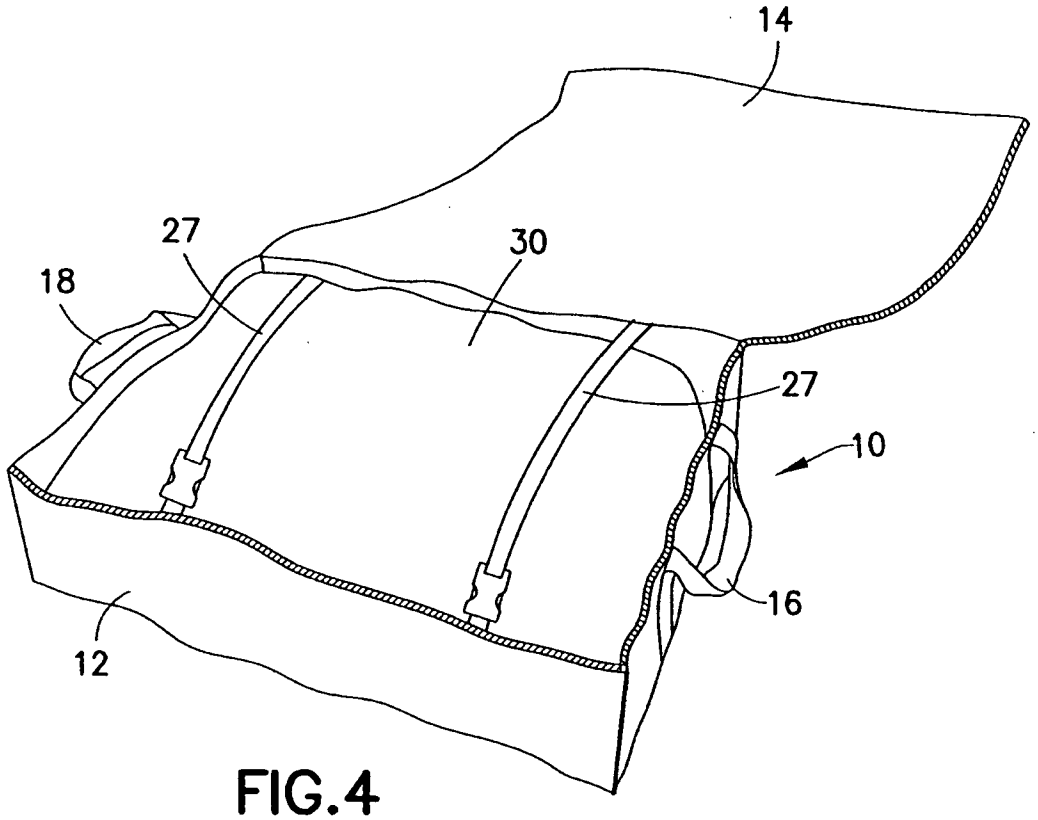

FIG.4

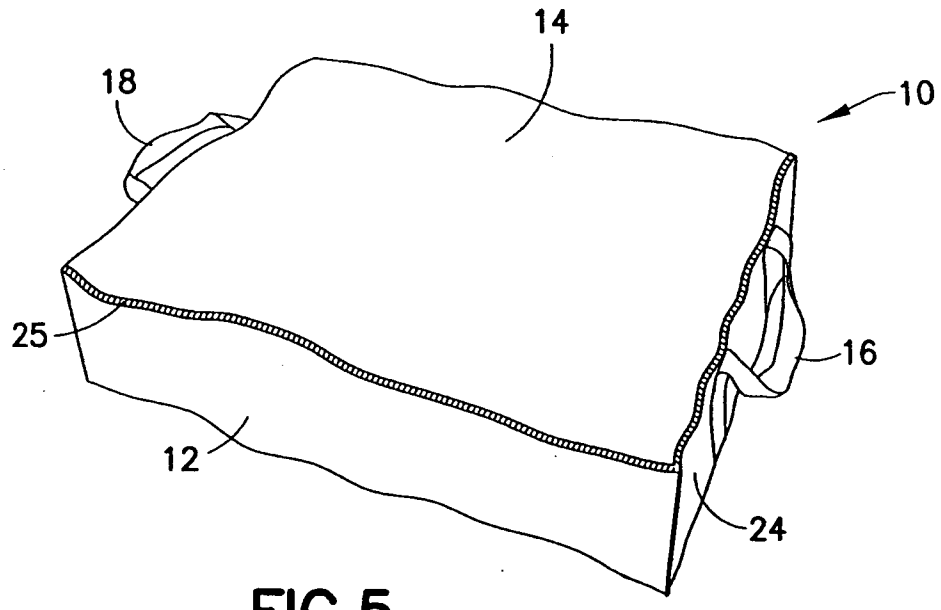

FIG.5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/011046

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B65D 33/01 (2008.04)
USPC - 206/524.8
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - B65D 30/18, 24; 33/01, 02 (2008.04)
USPC - 206/524.8

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/0162767 A1 (OHTSUBO) 07 November 2002 (07.11.2002) entire document	1-4, 7-10 16-20
Y	US 2005/0173439 A1 (CHEN) 11 August 2005 (11.08.2005) entire document	1-4, 7-20
Y	US 6,953,069 B2 (GALOMB) 11 October 2005 (11.10.2005) entire document	1-4, 7-17

☐ Further documents are listed in the continuation of Box C. ☐

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Date of the actual completion of the international search	Date of mailing of the international search report
13 November 2008	02 DEC 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2005)