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(71) Applicant *(for all designated States except US)*: **THE COCA-COLA COMPANY** [US/US]; Patents, One Coca-Cola Plaza, NW, Atlanta, GA 30313 (US).

(72) Inventors: **LEE, Jung-min**; 1208 A, Miseong Apt., 37 Yeouido-dong, Yeongdeungpo-gu, Seoul (KR). **LEE, Sung-jae**; 1208 A, Miseong Apt., 37 Yeouido-dong, Yeongdeungpo-gu, Seoul (KR).

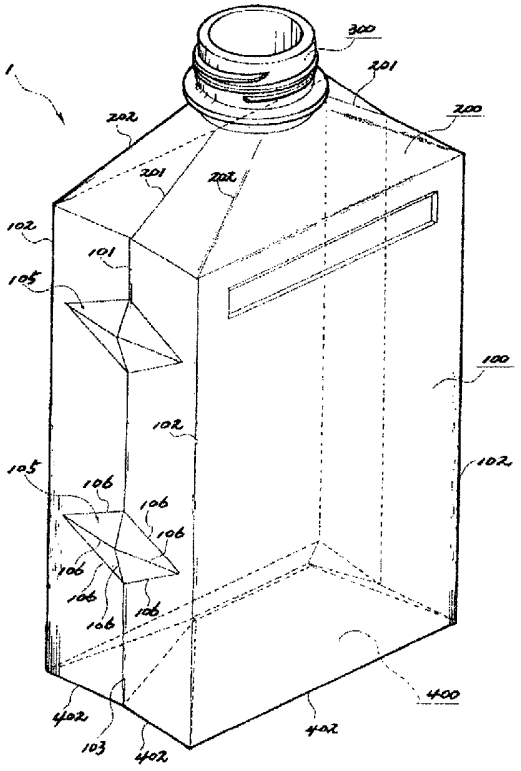
(74) Agents: **WARREN, Daniel, J.** et al.; Sutherland Asbill & Brennan LLP, 999 Peachtree Street, NE, Atlanta, GA 30309-3996 (US).

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[Continued on next page]

(54) Title: A STRUCTURE OF COLLAPSIBLE BLOW MOLDED CONTAINER



(57) Abstract: A container having a neck with a mouth [300], a shoulder [200] , a body [100], a pair of side panels, and a bottom [400]. The shoulder and the side panels are provided with fold lines to facilitate folding of the body. The bottom includes a base that is substantially partitioned by fold lines into gable-like planes. The container also includes fastening members that retain a collapsed state when the shoulder, the body, and the bottom are collapsed along the fold lines.

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A Structure of Collapsible Blow Molded Container

Technical Field

The present application provides a collapsible blow molded container.

Background of the Invention

The present invention relates to easily collapsible blow molded containers as provided by previous inventions including U.S. Pat. No. 5,511,686; U.S. Pat. No. 5,080260; Japan Utility Model Publication No. 6-6214; PCT WO98/31592; Japan Patent Publication No. 2002-80021; Japan Patent Publication No. 2002-160719; Japan Utility Model Publication No. 5-46717; Japan Patent Publication No. 8-324533; Japan Patent Publication No. 8-324534; U.S. Pat. No. 5,174,458; U.S. Pat. No. 6,170,712; and U.S. Pat. No. 3,559,847. Further to this, Japan Patent Application No. 2002-539215 was invented by the inventors of the present invention.

Of the prior arts, the structure of the bottom of the container implemented by U.S. Pat. No. 5,511,686 is difficult to fold and U.S. Pat. No. 5,080,260 employs a technology that collapses the container while unfolding it, thereby being liable to the force of restitution while in a collapsed state.

Regarding the Japan Utility Model Publication No. 6-6214, the bottom has a Z-shape that is folded flat when the container is filled with liquid. However, because the Z-shaped part is of a thicker mold than a single layer bottom, it is unsuitable for collapsing, and even when collapsed, the force of restitution exerts itself on the folded form.

Regarding the PCT WO98/31592, due to the concertinaed fold lines, it takes up relatively more space than the collapsible containers in accordance with other inventions when collapsed for disposal and the liquid in the container could overflow should the folding structure be flattened when liquid is in the container. Regarding Japan Patent Publication No. 2002-80021, characterized by a scheme similar to that of

the U.S. Pat. No. 5,080,260 apart from a slight difference in the folding structure, it takes up more space when collapsed, and could possibly unfold during use.

Regarding Japan Patent Publication No. 2002-160719, its bottom foldability is poor. Regarding the Japan Utility Model Publication No. 5-46717, wherein the container is collapsed by unfolding its walls, of which its collapsed body does not form a smooth plane which would cause the force of restitution, as well as the possibility of overflow during use because the container is easily collapsed without significant urging force.

Regarding the Japan Patent Publication No. 8-324533, its bottom foldability is poor and it exerts the force of restitution when collapsed. Japan Patent Publication No. 8-324534 has similar problems to those of Japan Patent Publication No. 8-324533. Regarding U.S. Pat. No. 5,174,458, its bottom folds towards the side exerting the force of restitution when collapsed.

U.S. Pat. No. 6,170,712 has problems similar to those of PCT WO98/31592, while the structure of the container implemented by U.S. Pat. No. 3,559,847 is suitable as a general refill container but is unsuitable as a container for use in logistic networks.

Regarding Japan Patent Application No. 2002-539215, which was invented by the present inventor, it substitutes a spout pouch by spouting the liquid in the container in accordance with the contraction of the container as the liquid is emptied. Therefore, its criteria of intellectual rights is different from the collapsible containers relating to the collapsible container in accordance with the present invention.

For referential purposes, U.S. Pat. No. 5,310,068 has a problem in that water remains in the container when washed in preparation for filling a liquid. Additionally, its design lacks marketability.

As described hereinabove, a number of inventors have developed and implemented collapsible containers following consideration of such factors as marketability, design, easy usability, stability, and production cost. However, the effectiveness of all the inventions has still not been satisfactorily achieved.

Summary of the Invention

A container having a neck with a mouth, a shoulder, a body, a pair of side panels, and a bottom. The shoulder and the side panels are provided with fold lines to facilitate folding of the body. The bottom includes a base that is substantially partitioned by fold lines into gable-like planes. The container also includes fastening members that retain a collapsed state when the shoulder, the body, and the bottom are collapsed along the fold lines. In addition, the fold lines formed in the bottom of the gable-like planes are formed with depressed grooves that facilitate folding.

As described above, a container that is constituted by the present invention is formed with the fold line structures and the fastening members to retain the collapsed state thereby preventing outward bulging once collapsed. Therefore, the container can be easily flattened to occupy considerably less space and retain its flat condition when placed in waste disposal facilities.

Deliberating the abovementioned points, the present invention has the following aims: firstly, to facilitate the folding in of the side walls in order to achieve side wall collapsing; secondly, to provide resistance against a certain degree of urging force in order to prevent unwanted collapsing; thirdly, to shape the bottom with edged perimeters on the same elevation, suitable for a display stand preventing fall, while being constituted of gables in order to facilitate folding by an intentional force and, at the same time, to minimize restitution when collapsed. Finally, the container provided by the present invention accommodates diversity of design while maintaining the basic shape of existing containers, without affecting productivity in the common production processes and facilities. The bottom fold line in accordance with the present invention is grooved to facilitate folding for convenient disposal.

The desirable shape requires that the transverse section of the container body in accordance with the present invention is rectangular or an exact square rather than circular. A container in accordance with the present invention whose collapse is facilitated by fold lines incorporating a diversity of patterns of inscriptions, whether in engraved relief or depressed, desirable for improving the rigidity of the container, and if

also desired and so formed, reducing the overall weight.

The containers, including the container in accordance with the present invention, are folded in such a manner that the front wall and the rear wall are in contact together, are formed with fold lines in a diversity of lengths at appropriate positions, wherein the center fold lines are given a certain degree of angle to facilitate the inward of the walls when required to collapse. The bottom wall includes gables that fold inwardly, incorporating fold lines appropriately arranged in order to facilitate the collapse, with appropriate stiffening grooves as necessary to resist ordinary external or bulging force, maintaining the original shape of the container until collapsed. In addition, the fold line formed at the bottom of the gable roof-like structure is formed with a depressed groove that facilitates folding.

Brief Description of the Drawings

Fig. 1 to Fig. 4 show a collapsible container, that is an exemplary embodiment in accordance with the present invention, wherein the Fig. 1 is a perspective view.

Fig. 2 is a perspective view of a portion of the bottom of the container shown in Fig. 1.

Fig. 3 shows the bottom of the container shown in Fig. 1 in a collapsed state.

Fig. 4 shows that the bottom center fold line facilitates the folding.

Detailed Description of the Invention

A direct blow or injection blow molded plastic container (1) in accordance with the present invention, that is manufactured by a blow molding process, has a shoulder (200) and a neck with mouth (300) on top of the container body (100), and a bottom wall (400) below the body (100).

On each side wall of the container body (100) a center fold line is formed (101) as well as edge fold lines (102), wherein the center fold line is formed slightly further inwards to the inside of the container than the edge fold lines so that the side wall fractions on both sides of the center fold line (101) are folded inwards when the edge

fold lines (102) are urged toward each other.

On each side of the shoulder (200) of the container, a shoulder fold line (201) is formed from the side wall up to the edge of the neck (300), and at the center of the shoulder side; and on both sides of the shoulder fold line are formed additional shoulder folder lines (202) that are the edges for folding, and preferably formed with supplementary fold lines (203) that converge at the edge of the neck (300).

The bottom wall (400) may include triangular gables that are partitioned at the bottom center fold line (401) and bottom side fold lines (402). The side fold lines (402) are connected at each corner of the bottom wall.

On both ends of the center bottom fold line 401), inclined bottom fold lines (403) are formed. Supplementary fold lines (404) are formed connecting the joint point of the center fold lines 401 and 403 with the corner of the bottom side fold lines (402). The inclined bottom fold lines (403) are connected with the inclined body fold lines (103) that are extensions of the body center fold lines (101). Bottom side fold lines (104) are also formed extending from the beginning point of the inclined body fold lines (103) to the corners of the bottom edges.

In order to provide the body center fold lines (101) with a certain degree of rigidity to prevent collapse without any intentional force, stiffening grooves (105) are formed to retain the rigidity of the container form during normal use, including, but not restricted to, grasping or holding the container in hand, and that are subject to collapse when an urging force is exerted to flatten the container. The stiffening grooves (105) also may be collapsed by pushing, for example with the fingers, inwardly into the container prior to collapsing the whole container (1). The stiffening grooves (105) in accordance with the present invention can be formed on the container body (100) sides, shoulder (200), and bottom, in a diversity of shapes and dimensions suitable to the shape, size, material, or purpose of the use of the container.

The stiffening grooves (105) are so structured that when pressed to collapse the container body (1), the grooves shall draw back inwardly facilitating the folding of the side walls of the container body (1), by virtue of the fold guide lines (106) which are

formed to facilitate the folding of the stiffening grooves.

As shown in the Fig. 2, fastening members (410) are formed on the bottom (400) of the container, as well as on the side walls and the shoulder of the container body (100) as proper, to prevent the container body (1) from restitution when in the state of collapse, and in a diversity of shapes including but not restricted to a concave and convex pairing, which can serve to couple the two opposite walls and hold them together.

Regarding the bottom (400) of the container in accordance with the present invention, at least two kinds of structure can be implemented - of which one exemplary case is illustrated in Fig. 2 where, in the case that the inclined center bottom fold lines (403) are protruding more than the supplementary bottom fold lines (404) then the bottom will fold when pressed to flatten, with both the inclined center bottom fold lines facing each other; or in the case that the inclined center bottom fold lines (403) are on a lower plane than the supplementary bottom fold lines (404) then the bottom will fold when pressed to flatten, with both the inclined center bottom fold lines (403) extruding outwardly.

It is desirable that, in the case of protruding inclined bottom fold lines (403) then the inclined body fold lines (103) are formed so as to be depressed, and in the case that the inclined bottom fold lines (403) are depressed then the inclined body fold lines (103) are formed to protrude.

The functions and their effects of the members set forth and described hereinabove are described herein below.

A container in accordance with the present invention will be manufactured, delivered, reserved, and served in such a state that, as illustrated in the Fig. 1, the container (1) is filled with liquid and the mouth on the neck (300) is capped. When pouring the liquid out from the container (1), uncap the mouth on the neck (300) while holding the container (1) and incline it so that the liquid in the container flows out through the mouth on the neck (300). The container (1) does not collapse by the force exerted in order to pick up or hold the container body (100) for pouring, due to the

rigidity provided by the stiffening grooves (105).

In order to discard the container (1) when empty, depress the stiffening grooves (105) inwardly until they are collapsed, then urge the front and rear walls of the container body (100) to collapse and flatten into the state illustrated in Fig. 4.

Additionally, in the collapsing process described in the above passage, the folding structure of the bottom (400) of the container may differ by, and in accordance with, the protrusion or depression of the inclined body fold lines (103) and/or the inclined bottom fold lines (403).

In order to prevent the restitution of the container (1) when collapsed, it is desirable to provide one or more fastening member (410), as shown in the Fig. 4, with proper shape and position suitable for the size and/or shape of the container (1) on the bottom wall (400), body walls (100), and/or on the sides of the shoulder (200).

In addition, the fold lines utilized in this invention are grooved or protruded, whichever is appropriate.

As was shown and described hereinabove, the container provided in accordance with the present invention can be collapsed reducing volume considerably: Therefore, the cost and space of disposal facilities can be saved, with less environmental impact. In addition, collapsing this container is easier than with the containers provided by prior arts due to the configuration of a bottom wall consisting of triangular gables - one of the major characteristics of the present invention.

Claims

What is claimed is:

1. A collapsible blow molded plastic container, comprising: a body having a shoulder, a neck with an opening, and a bottom; wherein the body, the shoulder, and the bottom comprise a plurality of fold lines that facilitate the folding of the body, the shoulder, and the bottom; and wherein the bottom is folded when the body is collapsed due to the plurality of fold lines.

2. The collapsible blow molded container in accordance with claim 1, wherein the plurality of fold lines formed along the bottom comprise depressed grooves so as to facilitate the folding of the body.

3. The blow molded container in accordance with claim 1, wherein the bottom is formed in a gable shape such that a center fold line is relatively protruded so that the bottom does not extrude outwards from the body.

4. The collapsible blow molded container in accordance with claim 1, wherein the bottom is folded when collapsed for disposal, whereby the body comprises a plurality of center fold lines formed on a pair of side walls that are drawn inwardly into the body.

5. The collapsible blow molded container in accordance with claim 1, wherein the bottom is folded when collapsed for disposal, whereby the body comprises a plurality of center fold lines formed on a pair of side walls that are drawn inwardly into the body, and wherein a pair of side walls comprise inclined body fold lines that extrude outwardly when folded.

6. A collapsible blow molded plastic container, comprising: a body having a shoulder, a neck with an opening, and a bottom; wherein the body, the shoulder, and the bottom comprises a plurality of fold lines to facilitate the folding of the body, the shoulder, and the bottom wall; wherein the bottom comprises a plurality of bottom fold lines to facilitate the folding of the bottom in multiple layers; wherein the plurality of bottom fold lines comprise grooves to facilitate folding of the bottom inwardly; and wherein the bottom comprises a pair of side center fold lines so as to extrude outwardly or inwardly when folded.

7. The collapsible blow molded plastic container in accordance with claim 6, wherein the bottom comprises a fastening pair so as to prevent the bottom from bulging when the body is collapsed and fastened with the fastening pair.

8. The collapsible blow molded plastic container in accordance with claim 6, wherein the body or the shoulder comprise stiffening grooves that retain the shape of the body against unwanted collapse.

Fig. 1

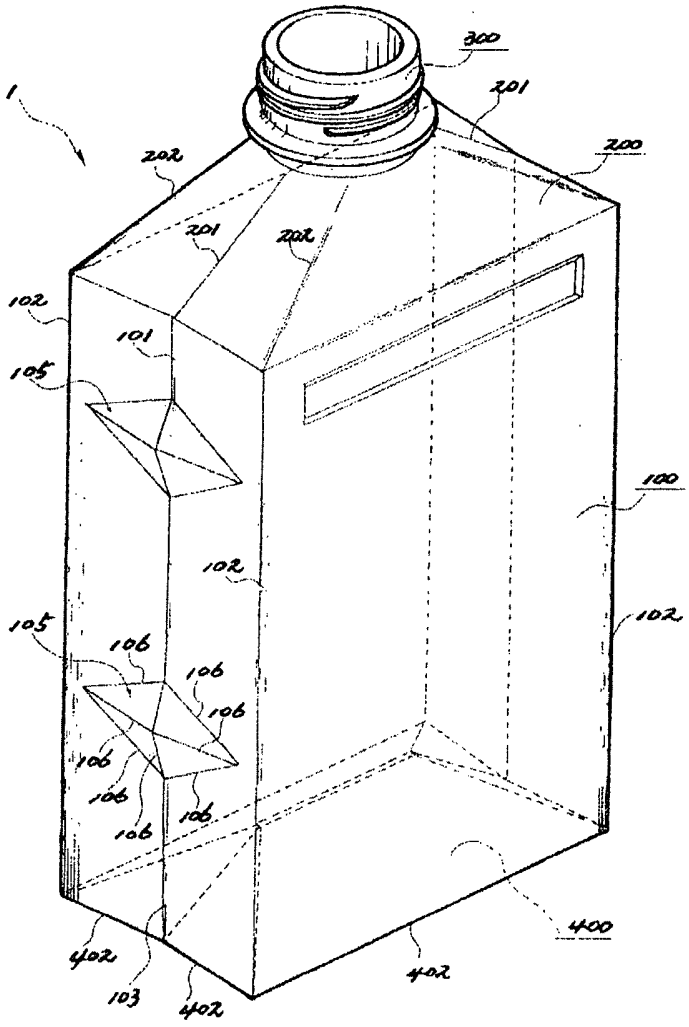

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Fig. 2

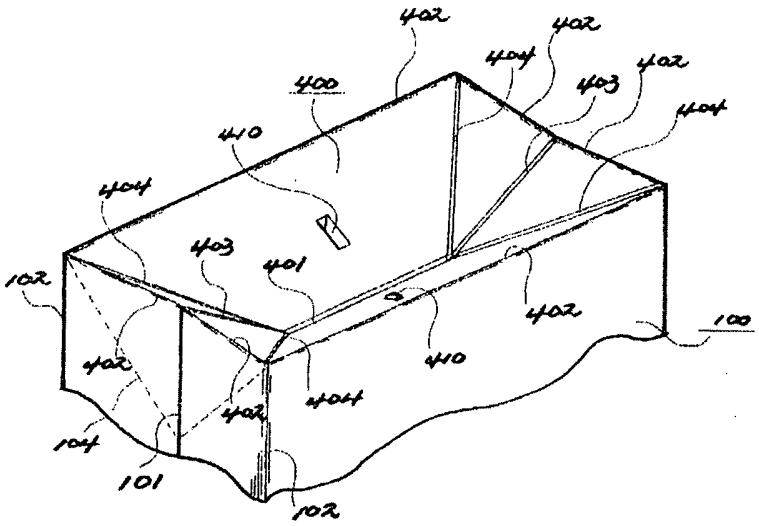


Fig. 3

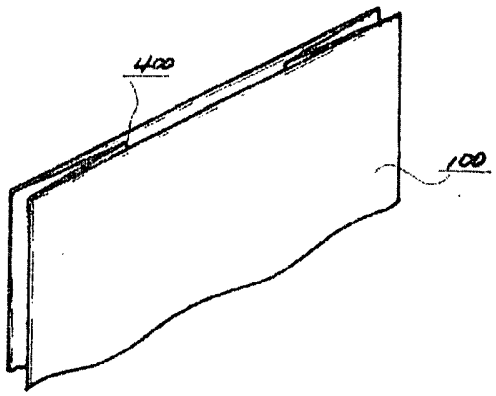


Fig. 4



INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B32B 1/00, 1/02, 1/04
US CL : 428/34.1, 35.7, 35.9; 222/92

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)
U.S. : 428/34.1, 35.7, 35.9; 222/92, 93, 94, 95

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,223,932 B1 (USUI) 1 May 2001, column 2, lines 14-62.	1-8
Y	US 5,174,458 A (SEGATI) 29 December 1992, column 3, lines 20-60; column 4, lines 1-14.	1-8
Y	US 6,170,712 B1 (KASBOSKE) 09 January 2001, column 5, lines 1-52.	1-8
Y	JP 07052934 A (YOSHIKAWA) 28 February 1995, Abstract	1-8
Y	JP 06219434 A (YAMADA) 09 August 1994, Abstract.	1-8
Y	CH 598088 (ETAB L GOIFFON) 18 June 1976, Abstract.	1-8

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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