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(54) **COMPRESSIBLE PAPERBOARD CONTAINER**

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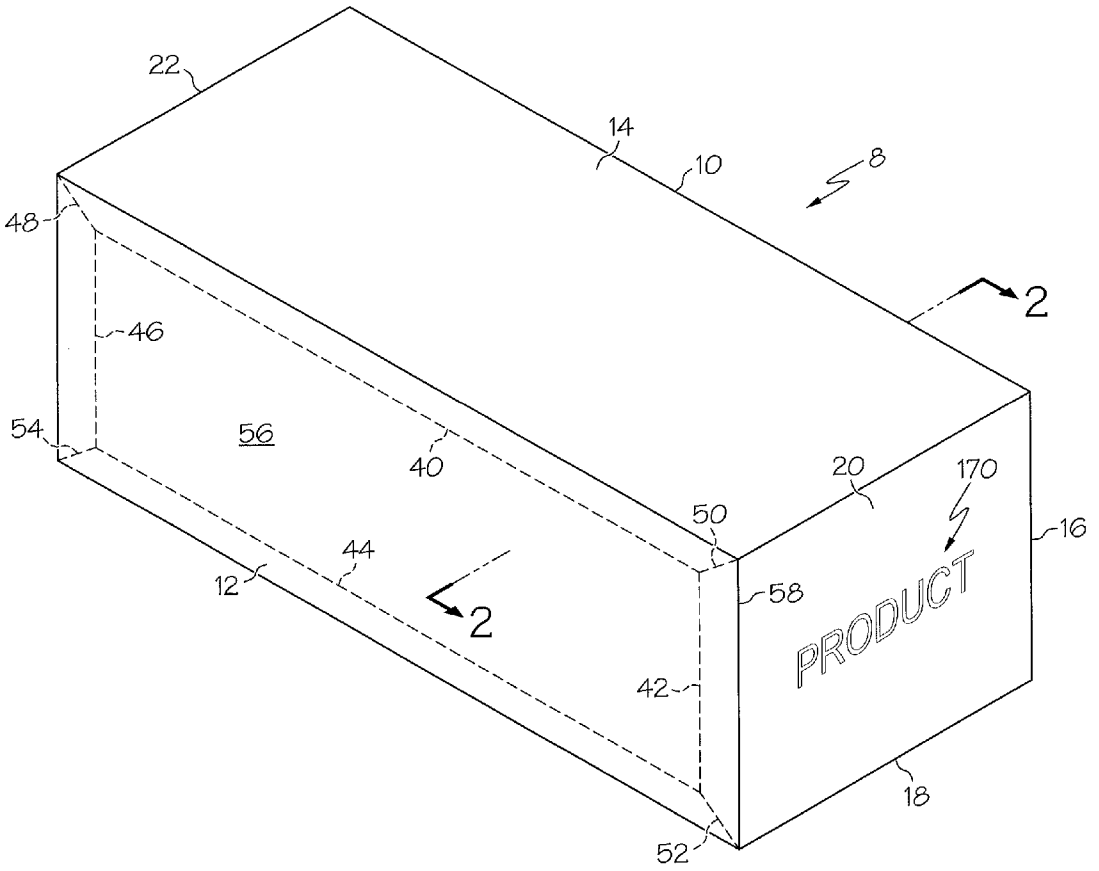
(57) **ABSTRACT**

A container including a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein at least one of the walls includes a plurality of pre-formed fold lines that facilitate controlled deformation of the wall when the container is under compression.



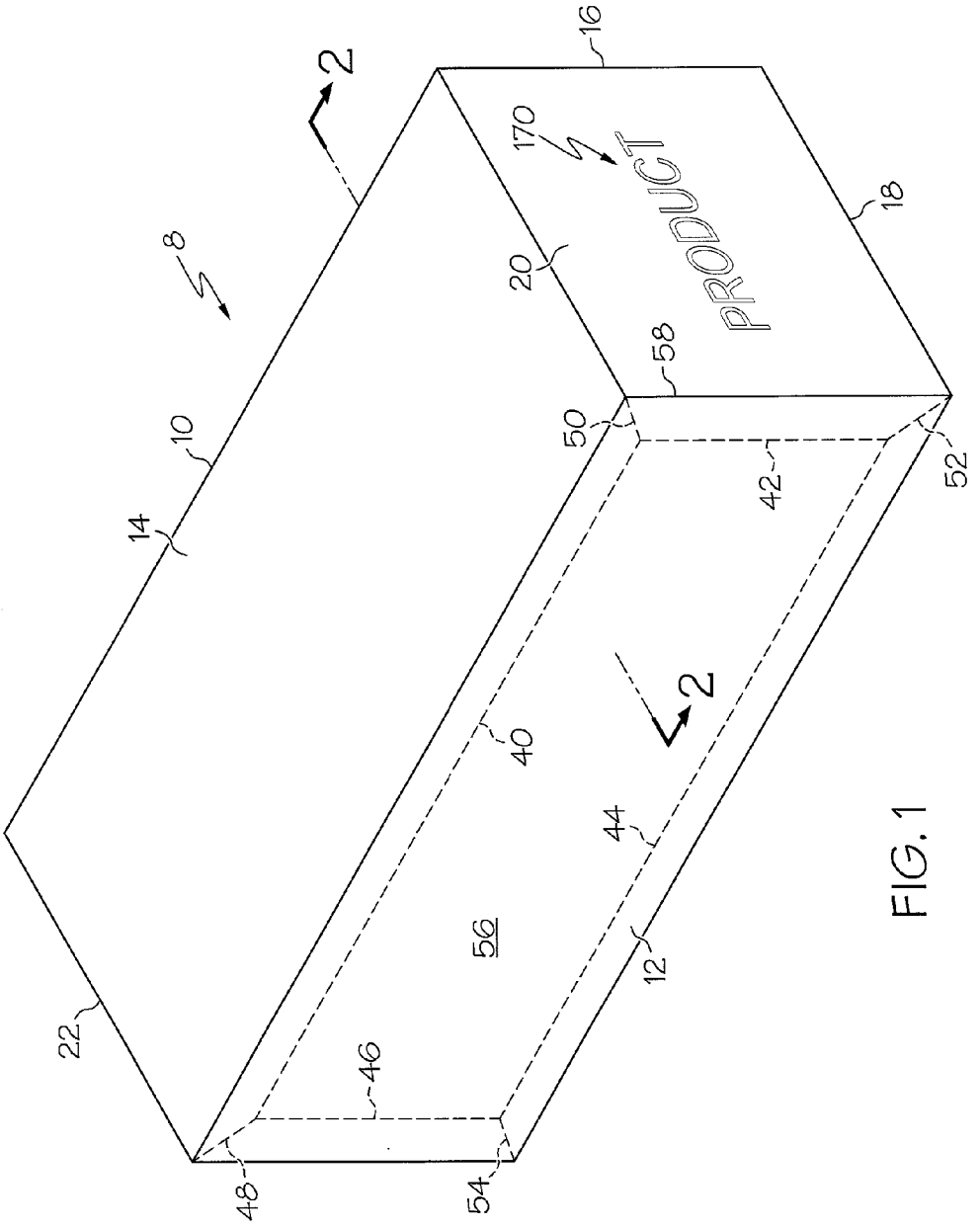


FIG. 1

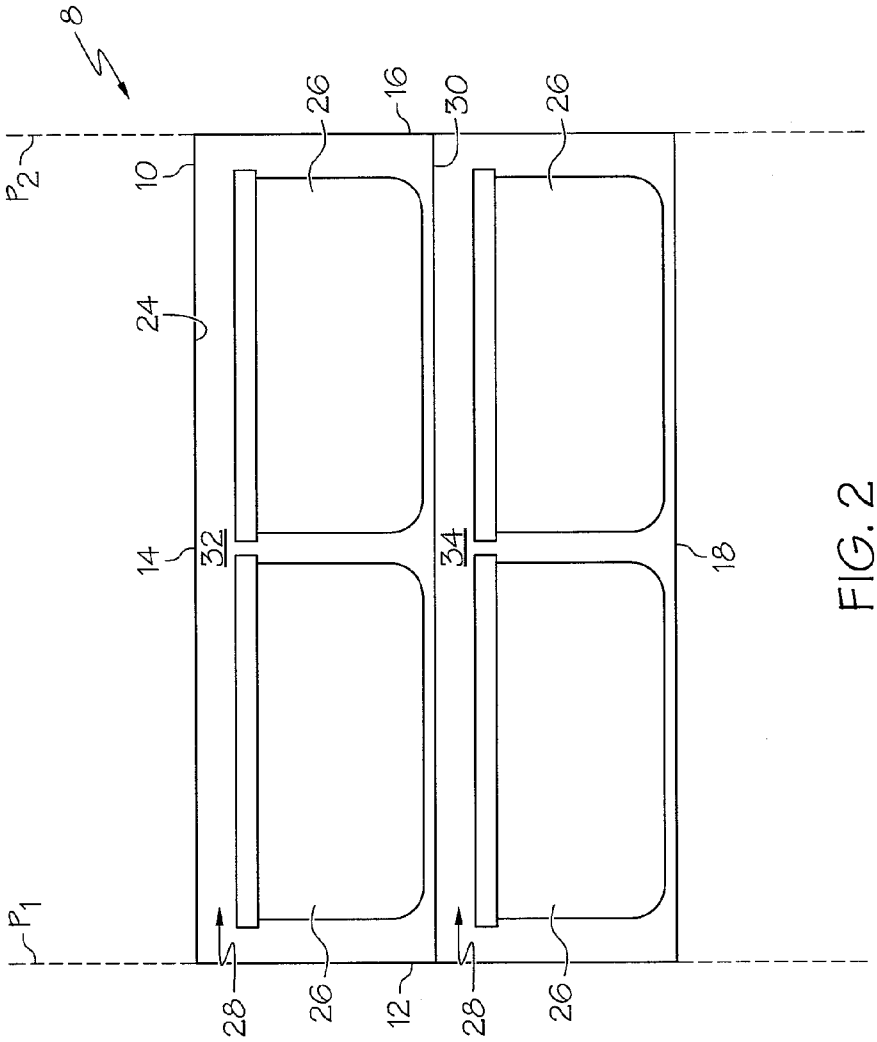


FIG. 2

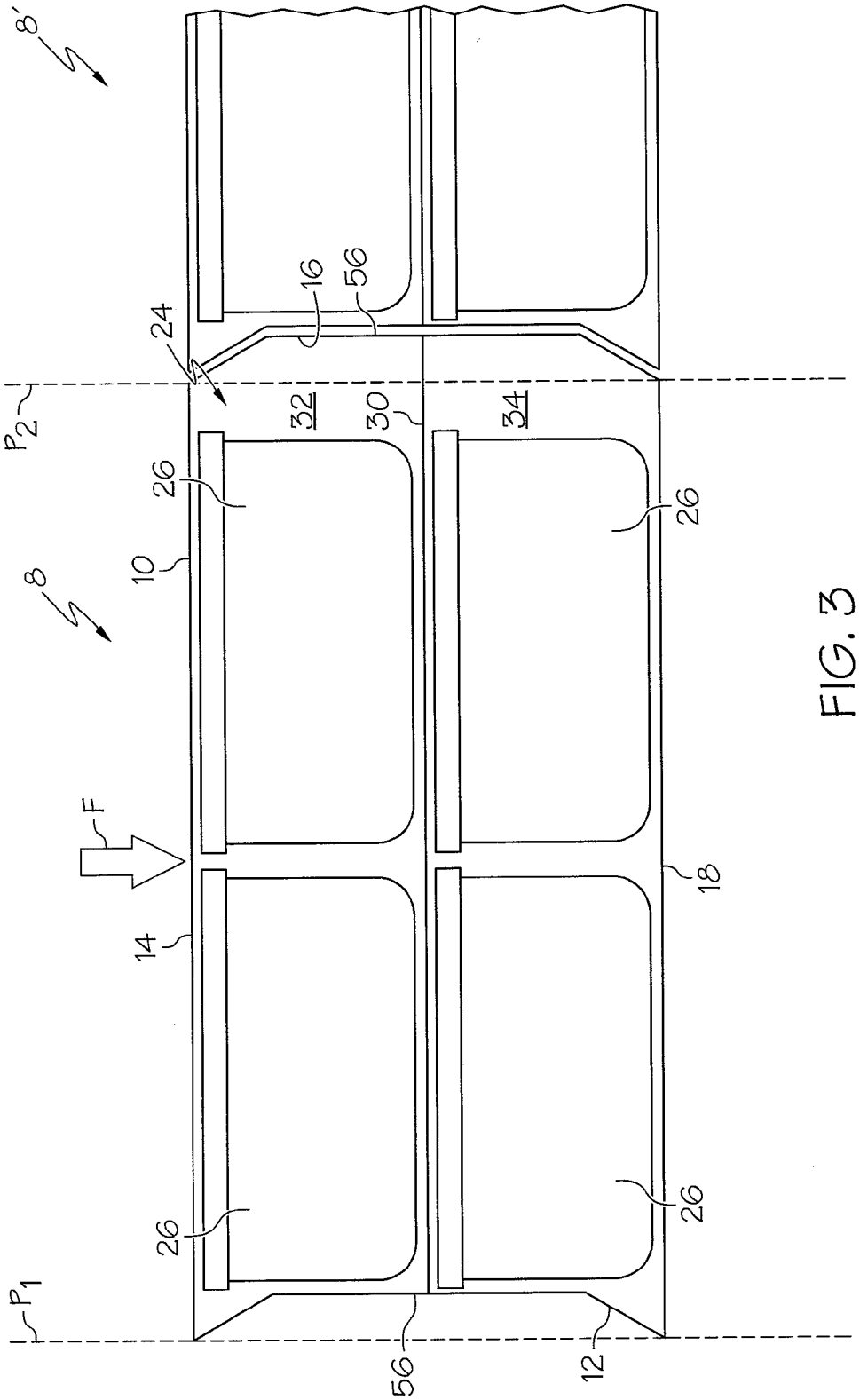
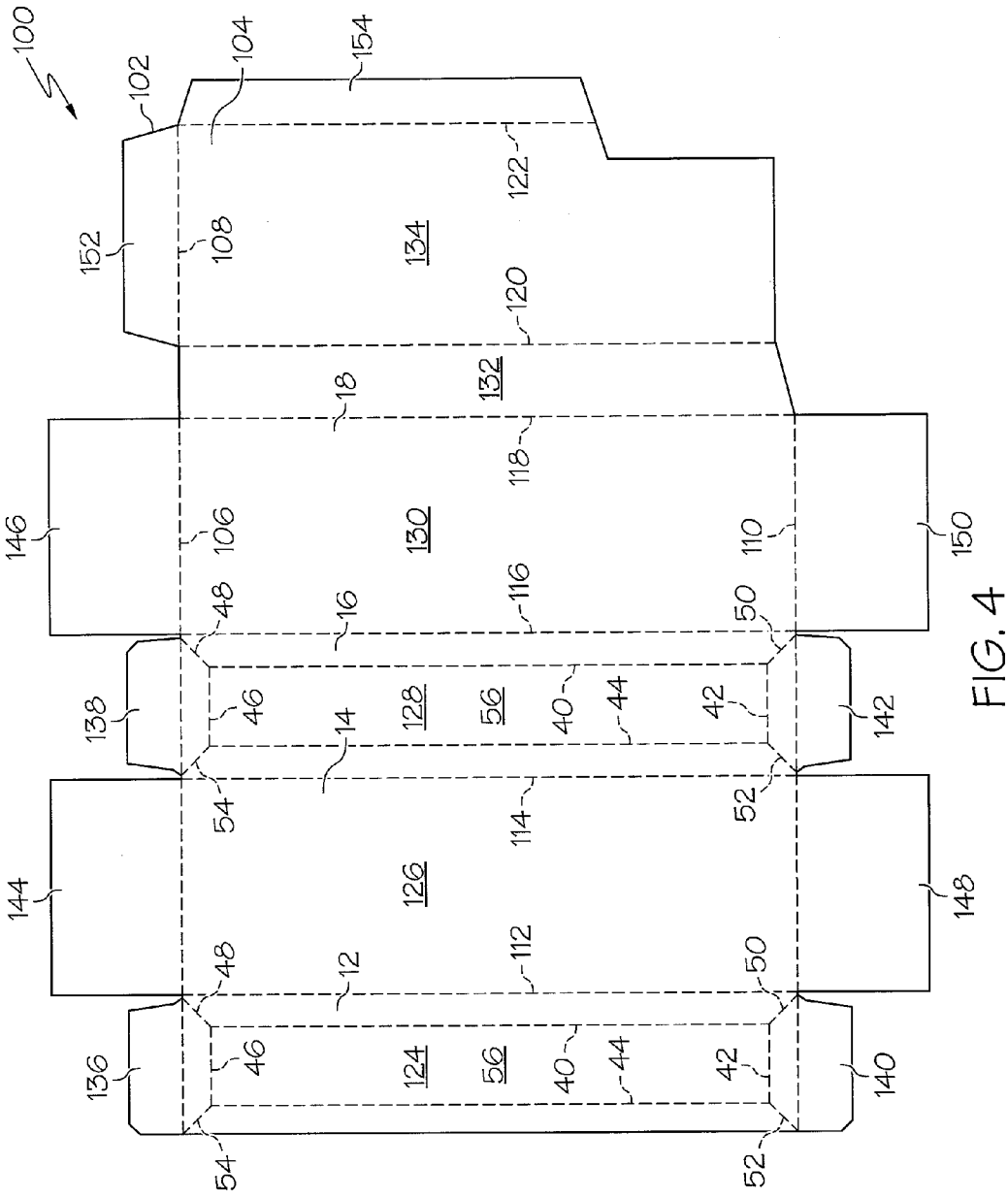


FIG. 3


100
102
104
154
152
108
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120
132
18
118
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106
130
110
150
48
16
116
50
138
46
14
128
56
40
44
42
142
54
114
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144
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148
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12
112
50
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46
124
56
40
44
42
140
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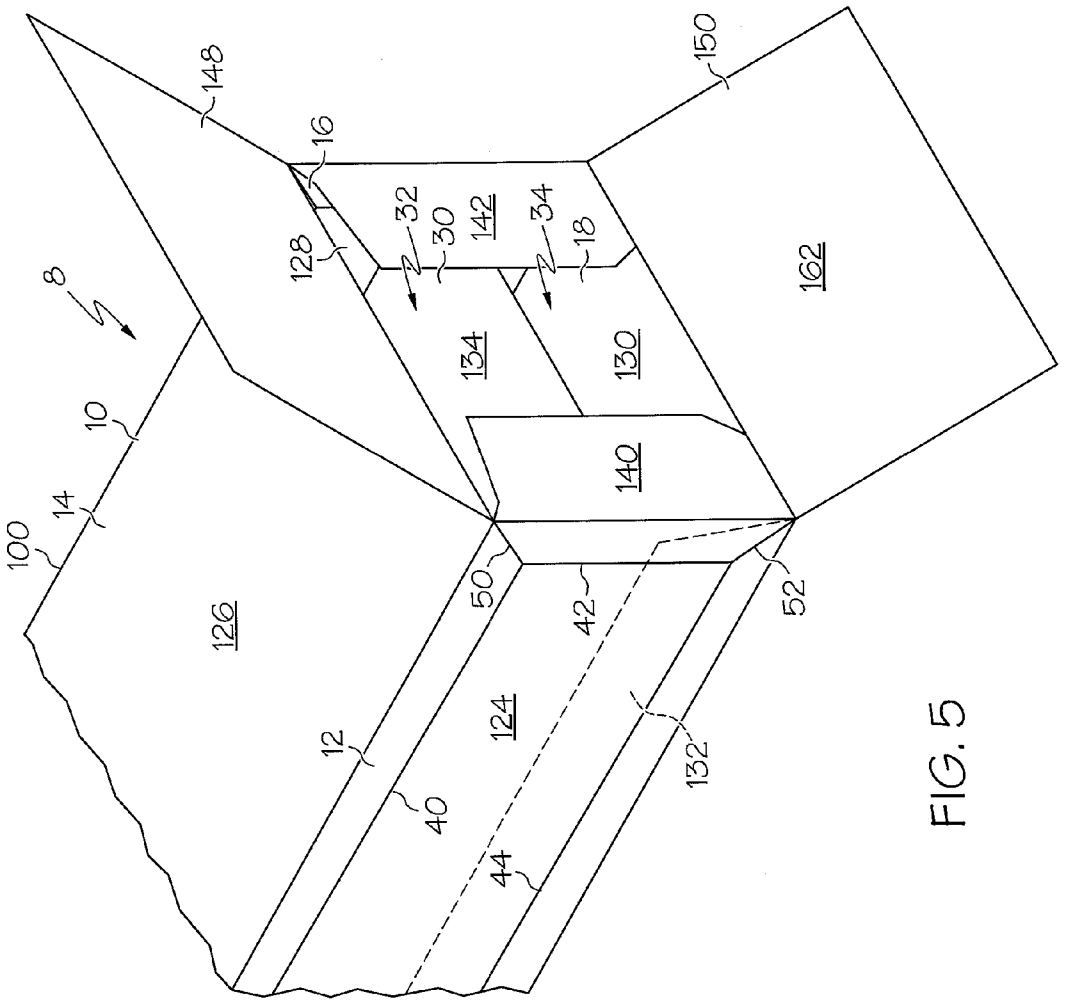
52

FIG. 4


148
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150
32
30
142
34
18
128
8
162
134
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140
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100
50
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126
124
12
40
132
44

FIG. 5

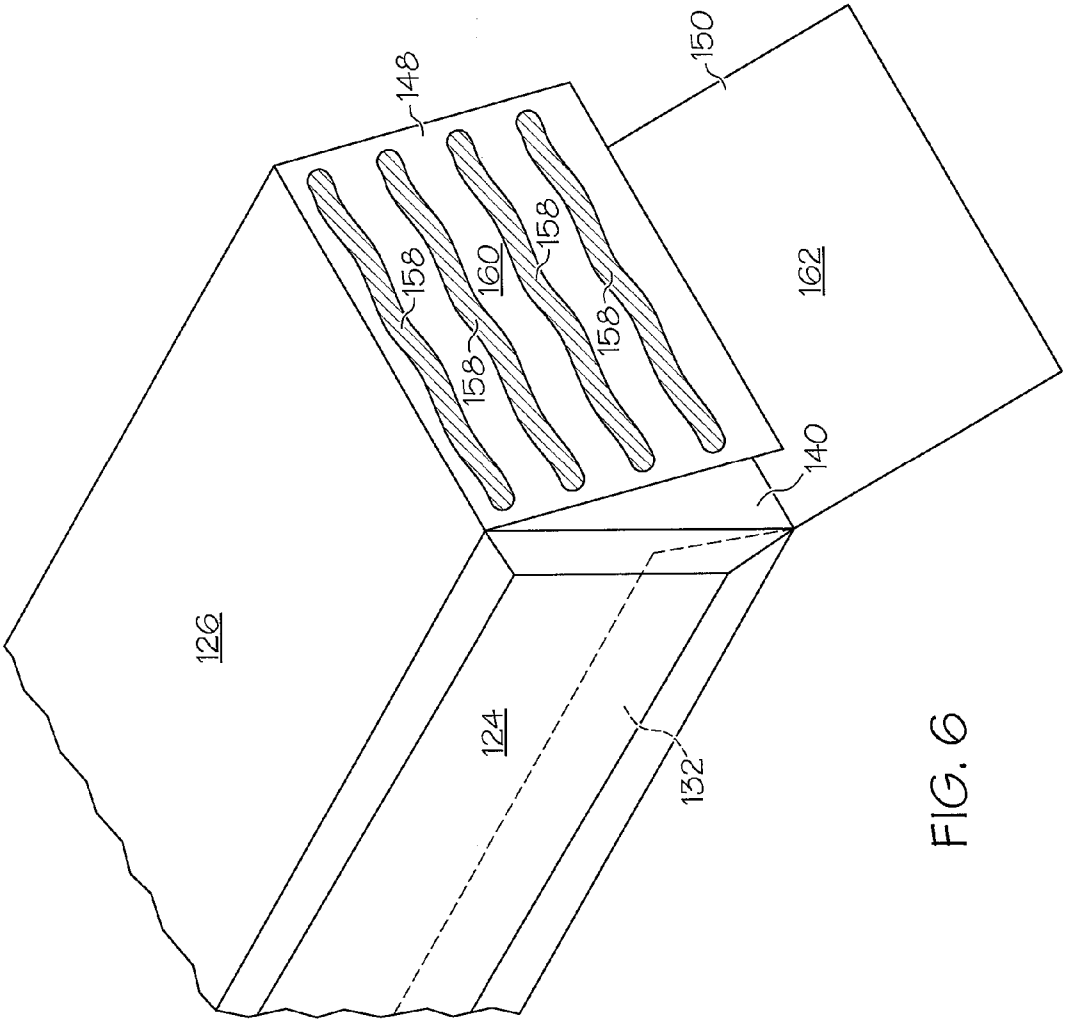

FIG. 6

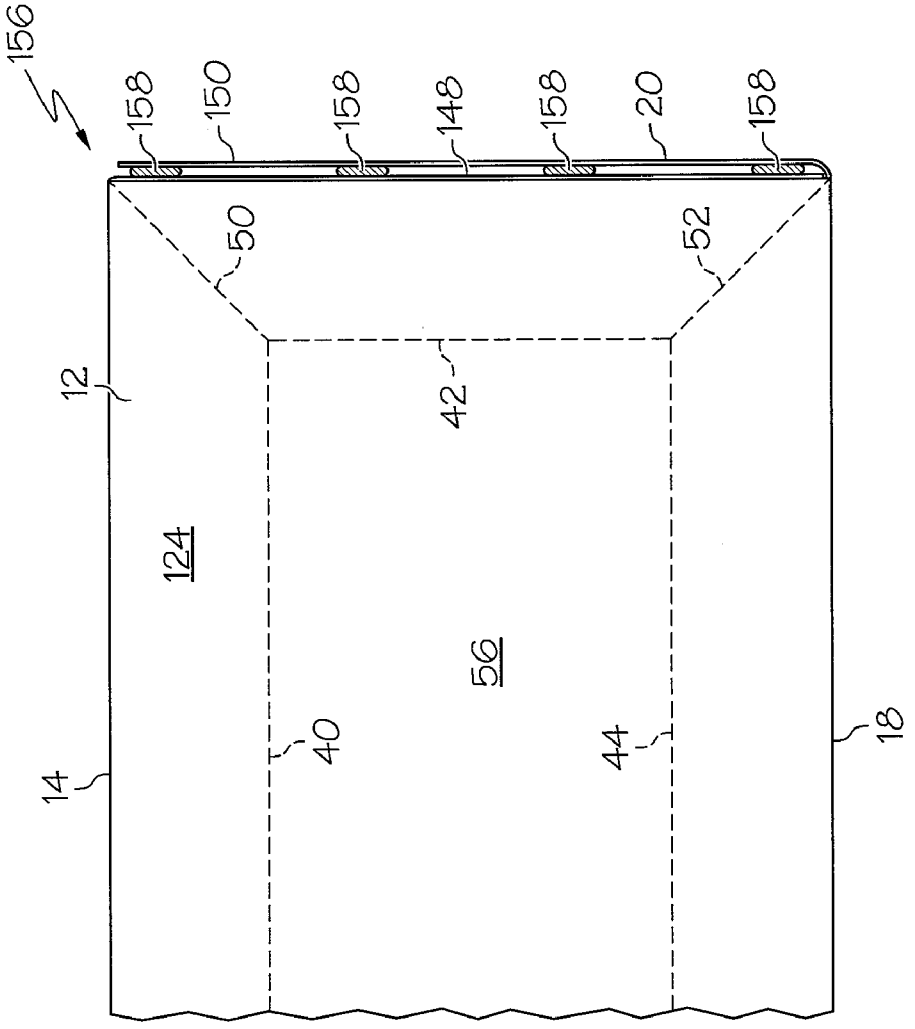

FIG. 7

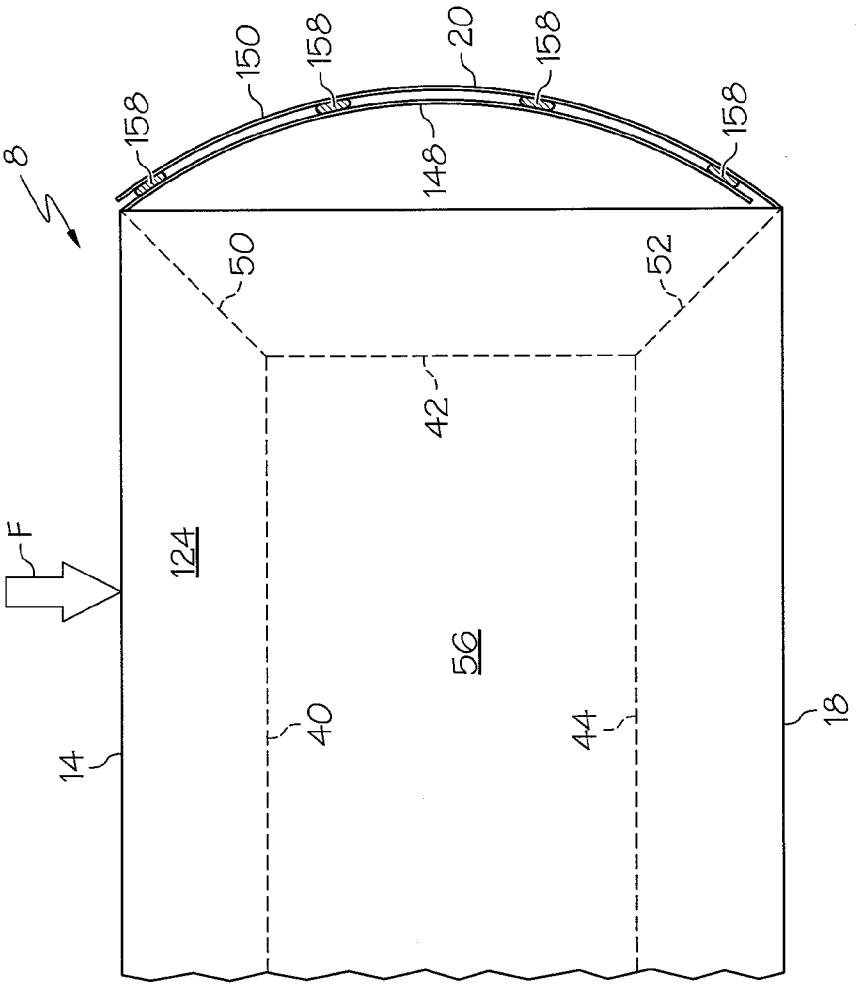

FIG. 8

COMPRESSIBLE PAPERBOARD CONTAINER

FIELD

[0001] This application relates to containers and, more particularly, to paperboard containers having pre-formed fold lines configured to facilitate desired deformation of one or more walls when such paperboard containers are under compression.

BACKGROUND

[0002] Products are typically shipped to retailers in bulk by enclosing multiple product units in a container, such as a paperboard carton or box, and stacking multiple such containers on a pallet. For example, canned soup may be shipped to a retailer on a pallet supporting multiple containers, with each container containing multiple individual cans. Then, a stock clerk typically removes the individual product units from the container and presents them (e.g., on a shelf) to consumers.

[0003] Alternatives to the traditional package-ship-unpack-display model are being developed in an effort to improve operating efficiency. For example, U.S. patent application Ser. No. 12/777,444 filed on May 11, 2010, the entire contents of which are incorporated herein by reference, discloses a new system for dispensing and displaying products packaged in a container. Specifically, the system includes a dispenser having a frame, a product display area and an opening tool. The dispenser may be positioned on a retailer's shelf and loaded with product simply by placing a container comprising multiple units of product onto the frame of the dispenser. As the container is being placed onto the frame, the opening tool of the dispenser opens the container in such a manner that product rolls from the container to the product display area of the dispenser under the force of gravity.

[0004] In an effort to encourage products to move (e.g., roll) out of such containers and into the dispenser as desired, excess headspace if often provided between the products and the container. The excess headspace is believed to reduce the drag on individual product units from the container and adjacent product units. Unfortunately, when several such containers are stacked, such as on a pallet, the loads acting on the containers cause undesired deformation and creasing of the containers due to the excess headspace. Such deformation and creasing may be particularly undesirable when the external surfaces of such containers are printed with advertising indicia.

[0005] Accordingly, those skilled in the art continue with research and development efforts directed to packaging containers.

SUMMARY

[0006] In one aspect, the disclosed compressible paperboard container may include a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein at least one of the walls includes a plurality of pre-formed fold lines.

[0007] In another aspect, the disclosed compressible paperboard container may include a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein two opposed walls each include a plurality of pre-formed fold lines that facilitate controlled deformation of the wall when the container is under compression.

[0008] In another aspect, the disclosed compressible paperboard container may include six walls assembled into a three-dimensional rectilinear body that defines an internal volume, wherein a first of the six walls includes a first plurality of pre-formed fold lines, and wherein a second of the six walls includes a second plurality of pre-formed fold lines, the second wall being laterally opposed from the first wall.

[0009] In another aspect, the disclosed compressible paperboard container may include six generally rectangular walls assembled into a three-dimensional rectilinear body that defines an internal volume, wherein a first of the six walls defines a first periphery and a first plane, and includes a first plurality of pre-formed fold lines that define a first central portion and couple the first central portion with the first periphery, and wherein a second of the six walls defines a second periphery and a second plane, and includes a second plurality of pre-formed fold lines that define a second central portion and couple the second central portion with the second periphery, the second wall being laterally opposed from the first wall such that the first plane is generally parallel with the second plane, and wherein the first central portion is displaced from the first plane and the second central portion is displaced from the second plane when a compression force is applied to the body in a direction generally parallel with the first plane.

[0010] In yet another aspect, disclosed is a packaging system that includes a first container including a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein at least one of the walls of said first container includes a plurality of pre-formed fold lines, and a second container stacked on top of the first container, the second container including a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein the wall with pre-formed fold lines is creased along the pre-formed fold lines.

[0011] Other aspects of the disclosed compressible paperboard container and associated packaging system will become apparent from the following detailed description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a front perspective view of one aspect of the disclosed compressible paperboard container;

[0013] FIG. **2** is a side elevational view, in section, of the compressible paperboard container of FIG. **1**;

[0014] FIG. **3** is a side elevational view, in section, of the compressible paperboard container of FIG. **2** shown under compression and nested with an adjacent compressible paperboard container that is also under compression;

[0015] FIG. **4** is a top plan view of a container blank useful in forming the compressible paperboard container of FIG. **1**;

[0016] FIG. **5** is an end perspective view of a portion of the compressible paperboard container of FIG. **1**, shown in a first partially assembled configuration;

[0017] FIG. **6** is an end perspective view of the portion of the compressible paperboard container of FIG. **5**, shown in a second partially assembled configuration;

[0018] FIG. **7** is a front elevational view of the portion of the compressible paperboard container of FIG. **6**, shown in a fully assembled configuration; and

[0019] FIG. **8** is a front elevational view of the portion of the compressible paperboard container of FIG. **7**, shown under compression.

DETAILED DESCRIPTION

[0020] Referring to FIGS. **1** and **2**, one aspect of the disclosed compressible paperboard container, generally designated **8**, may be formed as a three-dimensional rectilinear body **10** including a plurality of walls **12**, **14**, **16**, **18**, **20**, **22** that define an internal volume **24**. As shown in FIG. **2**, the internal volume **24** may receive one or more products **26** therein, leaving headspace **28** between the products **26** and the container **8**.

[0021] Optionally, a partition **30** may extend through the internal volume **24** of the container **8** to divide the internal volume **24** into a first chamber **32** and a second chamber **34**. For example, the partition **30** may extend between laterally opposed front and rear walls **12**, **16** and between laterally opposed first end and second end walls **20**, **22** such that the partition **30** is generally parallel with the upper and lower walls **14**, **18**. Therefore, a first quantity of products **26** may be received in the first chamber **32** and may be isolated from a second quantity of products **26** received in the second chamber **34**.

[0022] The container **8** shown in FIG. **1** may be formed from the container blank **100** shown in FIG. **4**. In one specific implementation, the container blank **100** may be pre-cut from a sheet of paperboard substrate material to define an outer periphery **102** of the container blank **100**. Those skilled in the art will appreciate that various types of paperboard-based materials may be used to form the container blank **100** and, ultimately, the container **8**. As one example, the paperboard-based substrate material may be C1S paperboard, which may have a coating (e.g., clay) on a first major surface **104** thereof and an uncoated second major surface (i.e., the underside of the container blank **100** shown in FIG. **4**). As another example, the paperboard-based substrate material may be C2S paperboard, which may have a coating (e.g., clay) on both the first **104** and second major surfaces thereof. Optionally, at least one side of the paperboard-based substrate material, such as the coated side, may be marked with various indicia, such as printed text and graphics.

[0023] The container blank **100** may include a plurality of pre-formed fold lines **106**, **108**, **110**, **112**, **114**, **116**, **118**, **120**, **122** that define wall panels **124**, **126**, **128**, **130**, a transition panel **132**, a partition panel **134**, minor end flaps **136**, **138**, **140**, **142**, major end flaps **144**, **146**, **148**, **150** and partition flaps **152**, **154**. Specifically, wall panel **124** may be defined by the periphery of the blank **100** and fold lines **106**, **110**, **112**, and may form the front wall **12** of the assembled container **8** (FIG. **1**). Wall panel **126** may be defined by fold lines **106**, **110**, **112**, **114**, and may form the upper wall **14** of the assembled container **8**. Wall panel **128** may be defined by fold lines **106**, **110**, **114**, **116**, and may form the rear wall **16** of the assembled container **8**. Wall panel **130** may be defined by fold lines **106**, **110**, **116**, **118**, and may form the lower wall **18** of the assembled container **8**. Partition panel **134** may be defined by the periphery **102** of the blank **100** and fold lines **108**, **120**, **122**, and may form the partition **30** (FIG. **2**) of the assembled container **8**. Transition panel **132** may be defined by the periphery **102** of the blank **100** and fold lines **118**, **120**, and may function to space the partition **30** between the upper **14** and lower **18** walls of the assembled container **8**. Minor **140**, **142** and major **148**, **150** end flaps may be defined by the periphery **102** of the blank **100** and fold line **110**, and may form the first end wall **20** of the assembled container **8**. Minor **136**,**138** and major **144**,**146** end flaps may be defined by the periphery **102** of the blank **100** and fold line **106**, and may form the second end wall **22** of the assembled container **8**. Partition flaps **152**, **154** may be defined by the periphery **102** of the blank **100** and the fold lines **108**, **122**, respectively, and may be used to secure the partition **30** between the upper **14** and lower **18** walls of the assembled container **8**.

[0024] The container **8** may be assembled by folding the container blank **100** along the longitudinal fold lines **112**, **114**, **116**, **118**, **120**, **122** and connecting wall panel **124** to transition panel **132** to form the three-dimensional body **10** of the container, as shown in FIG. **5**. Additionally, partition flap **154** may be connected to wall panel **128** to secure the partition **30** between the front **12** and rear **16** walls of the container **8**. The connections between wall panel **124** and transition panel **132** and wall panel **128** and partition flap **154** may be made using any available technique, including using adhesives and/or mechanical fasteners.

[0025] With the container **8** partially assembled, the first **32** and second **34** chambers may be filled with product **26**, as shown in FIG. **2**. Then, as shown in FIGS. **5-7**, the filled container **8** may be sealed by arranging the major **148**, **150** and minor **140**, **142** end flaps into a first layered stack **156** (FIG. **7**) to form the first end wall **20** of the container **8** and arranging the major **144**, **146** and minor **136**, **138** end flaps into a second layered stack (not shown, but may be the same as layered stack **156**) to form the second end wall **22** of the container **8**.

[0026] Still referring to FIGS. **5-7**, in one particular expression, the first end wall **20** may be formed by connecting major end flap **148** to major end flap **150** without connecting the major end flaps **148**, **150** to the minor end flaps **140**, **142**. The second end wall **22** may also be formed in a similar manner.

[0027] Specifically, as shown in FIG. **5**, the minor end flaps **140**, **142** may be folded inward into the plane (defined by the edges of walls **12**, **14**, **16**, **18**) of the first end wall **20**. Then, as shown in FIG. **6**, the first major end flap **148** may be folded inward into the plane of the first end wall **20** and an adhesive **158** may be applied to the external surface **160** of the first major end flap **148**. Finally, as shown in FIG. **7**, the second major end flap **150** may be folded inward into generally parallel alignment with the first major end flap **148** such that the adhesive **158** connects the internal surface **162** (FIG. **6**) of the second major end flap **150** to the external surface **160** of the first major end flap **148**.

[0028] Thus, when a compression force F is applied to the upper wall **14** of the container **8**, such as when a second container (not shown) is stacked on top of the container **8**, the interconnected major end flaps **148**, **150** of the end wall **20** may bow outward from the container **8**, as shown in FIG. **8**. As such, indicia **170** (FIG. **1**) printed on the first end wall **20** is not marred by creases and the like when the container **8** is compressed.

[0029] Referring back to FIG. **1**, the front wall **12** may include a plurality of pre-formed fold lines **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54**, which may be formed, for example, by stamping (e.g., embossing) or scoring the front wall **12**. Pre-formed fold lines **40**, **42**, **44**, **46** may define a central portion **56** of the front wall **12**, which, for example, may have a shape that corresponds to the shape of the front wall **12**. For example, when the front wall **12** is generally rectangular, the central portion **56** may also be generally rectangular. Pre-formed fold

lines **48**, **50**, **52**, **54** may couple the central portion **56** to the periphery **58** of the front wall **12**. For example, pre-formed fold lines **48**, **50**, **52**, **54** may extend from the corners of the central portion **56** to the corners of the front wall **12**.

[0030] Thus, when a compression force F is applied to the upper wall **14** of the container **8**, as shown in FIG. **3**, the front wall **12** may flex along the pre-formed fold lines **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54** such that the central portion **56** of the front wall **12** is displaced (e.g., inward) from the plane P_1 defined by the uncompressed front wall **12**.

[0031] Like the front wall **12**, the rear wall **16** may also include a plurality of pre-formed fold lines **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54** (FIG. **4**) having a similar configuration as the pre-formed fold lines **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54** of the front wall **12**, such that the central portion **56** of the rear wall **16** is displaced (e.g., outward) from the plane P_2 defined by the uncompressed rear wall **16**. While not shown, one or more of the other walls **14**, **18**, **20**, **22** of the container **8** may also include pre-formed fold lines to facilitate controlled deformation.

[0032] Still referring to FIG. **3**, when two adjacent containers **8**, **8'** are placed under compression (i.e., a compression force F is applied to the upper walls **14** of the containers **8**, **8'**), the outwardly extending rear wall **16** of the first container **8** may nest with the inwardly extending front wall **12'** of the second container **8'**. Therefore, the disclosed compressible paperboard containers **8** may be stacked several containers high and in close proximity to adjacent stacks of containers **8**, without compromising the controlled deformation achieved by the pre-formed fold lines **40**, **42**, **44**, **46**, **48**, **50**, **52**, **54** on the front **12** and rear **16** walls of the containers **8**.

[0033] While the disclosed compressible paperboard container **8** is described with reference to a rectangular carton having six walls **12**, **14**, **16**, **18**, **20**, **22**, those skilled in the art will appreciate that various shapes and configurations may be used without departing from the scope of the present disclosure.

[0034] Accordingly, the disclosed compressible paperboard container **8** is configured to deform in a controlled manner when a compression force, such as another container, is applied thereto, thereby reducing or eliminating the undesirable random creasing and deformation that occurs when prior art containers are placed under compression. Furthermore, the deformation of the disclosed compressible paperboard container **8** may be controlled such that adjacent containers **8** nest under compression.

[0035] Although various aspects of the disclosed compressible paperboard container have been shown and described, modifications may occur to those skilled in the art upon reading the specification. The present application includes such modifications and is limited only by the scope of the claims.

What is claimed is:

1. A container comprising a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein at least one wall of said plurality of walls comprises a plurality of pre-formed fold lines.

2. The container of claim **1** wherein said plurality of walls comprise paperboard.

3. The container of claim **2** wherein said paperboard is C1S paperboard.

4. The container of claim **1** wherein at least one wall of said plurality of wall is marked with indicia.

5. The container of claim **1** wherein said plurality of pre-formed fold lines are configured to facilitate controlled deformation of said wall when said body is under compression.

6. The container of claim **1** wherein said wall includes a periphery, and wherein said plurality of pre-formed fold lines define a central portion of said wall and couple said central portion with said periphery.

7. The container of claim **6** wherein said wall is generally rectangular and includes four corners, and wherein said central portion is generally rectangular and includes four corners.

8. The container of claim **7** wherein a first pre-formed fold line of said plurality extends from a first corner of said four corners of said wall to a first corner of said four corners of said central portion, a second pre-formed fold line of said plurality extends from a second corner of said four corners of said wall to a second corner of said four corners of said central portion, a third pre-formed fold line of said plurality extends from a third corner of said four corners of said wall to a third corner of said four corners of said central portion, and a fourth pre-formed fold line of said plurality extends from a fourth corner of said four corners of said wall to a fourth corner of said four corners of said central portion.

9. The container of claim **6** wherein said wall defines a plane, and wherein said central portion is displaced from said plane when a compression force is applied to said body in a direction generally parallel with said plane.

10. The container of claim **9** wherein said central portion is displaced into said internal volume.

11. The container of claim **9** wherein said central portion is displaced away from said internal volume.

12. The container of claim **1** wherein two opposed walls of said plurality of walls each comprise said plurality of pre-formed fold lines.

13. The container of claim **1** wherein two opposed walls of said plurality each include a major flap extending therefrom, and wherein one wall of said plurality comprises said major flap of said first opposed wall connected to said major flap of said second opposed wall, with the proviso that said major flaps are not connected to any other flaps.

14. A container comprising six generally rectangular walls assembled into a three-dimensional rectilinear body that defines an internal volume, wherein a first wall of said six walls comprises a first plurality of pre-formed fold lines, and wherein a second wall of said six walls comprises a second plurality of pre-formed fold lines, said second wall being laterally opposed from said first wall.

15. The container of claim **14** wherein said six walls comprise paperboard.

16. The container of claim **14** wherein said first and second pluralities of pre-formed fold lines are configured to facilitate controlled deformation of said first and second walls when said body is under compression.

17. The container of claim **14** wherein said first and second walls each include a periphery, and wherein said first plurality of pre-formed fold lines define a central portion of said first wall and couple said central portion of said first wall with said periphery of said first wall, and wherein said second plurality of pre-formed fold lines define a central portion of said second wall and couple said central portion of said second wall with said periphery of said second wall.

18. The container of claim **17** wherein said first wall defines a first plane and said second wall defines a second plane, and wherein said central portion of said first wall is displaced from said first plane into said body and said central portion of

said second wall is displaced from said second plane away from said body when a compression force is applied to said body.

19. The container of claim **14** wherein said first wall includes a first flap extending therefrom and second wall includes a second flap extending therefrom, and wherein laterally opposed third and fourth walls of said six walls each include a major flap extending therefrom, and wherein a fifth wall of said six walls comprises said major flap extending from said third wall connected to said major flap extending from said fourth wall, with the proviso that said major flaps are not connected to said first and second flaps.

20. A packaging system comprising:

a first container comprising a plurality of walls assembled into a three-dimensional body that defines an internal volume, wherein at least one wall of said plurality of walls of said first container comprises a plurality of pre-formed fold lines; and

a second container stacked on top of said first container, said second container comprising a plurality of walls assembled into a three-dimensional body that defines an internal volume,

wherein said wall is creased along said plurality of pre-formed fold lines.

* * * * *