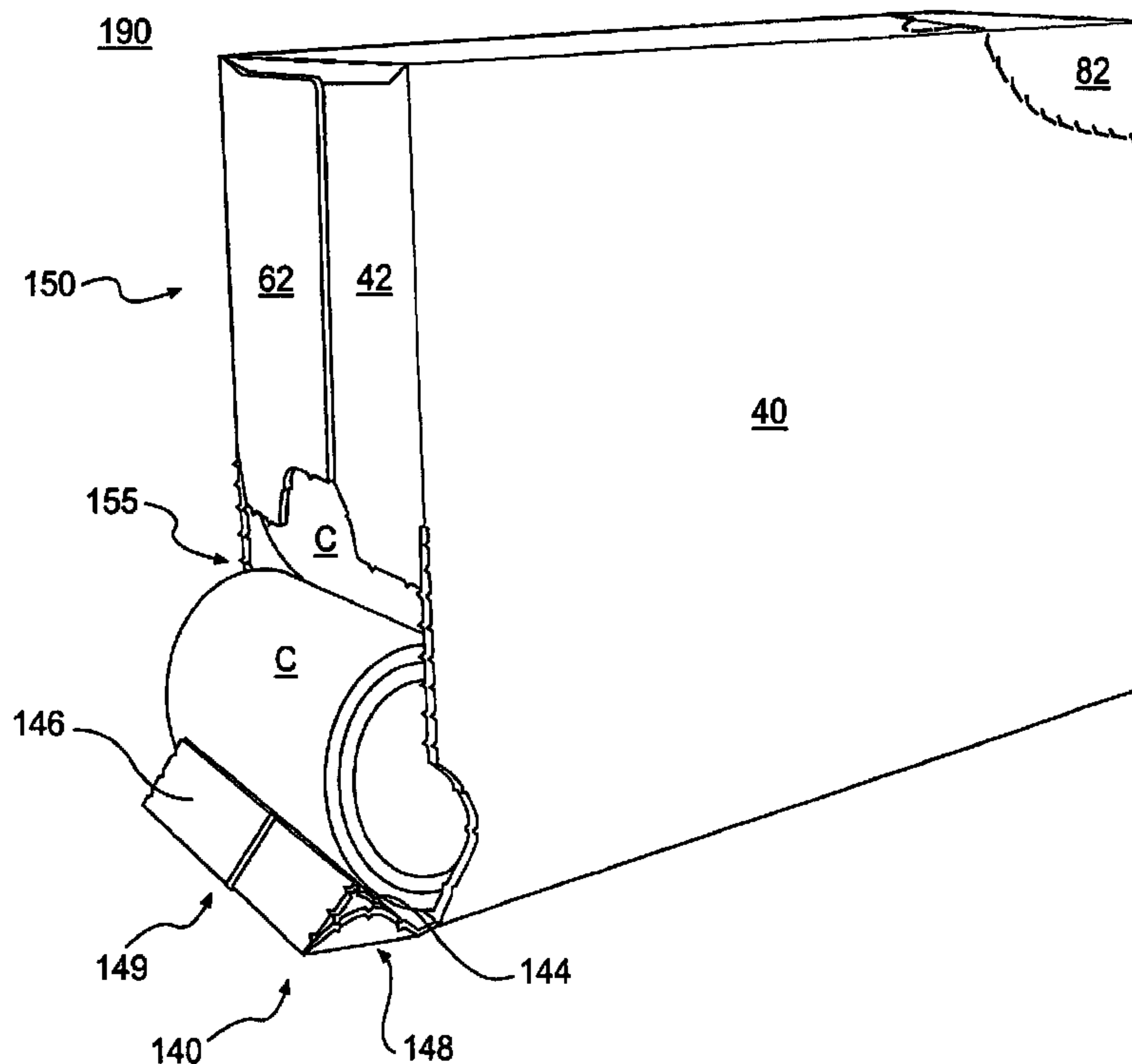




(86) Date de dépôt PCT/PCT Filing Date: 2007/05/16
 (87) Date publication PCT/PCT Publication Date: 2007/12/13
 (85) Entrée phase nationale/National Entry: 2008/10/31
 (86) N° demande PCT/PCT Application No.: US 2007/011711
 (87) N° publication PCT/PCT Publication No.: 2007/142791
 (30) Priorité/Priority: 2006/05/31 (US11/443,984)

(51) Cl.Int./Int.Cl. *B65D 71/00* (2006.01),
B65D 5/72 (2006.01)
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(54) Titre : CARTON MUNI D'UN ELEMENT DE RETENUE D'ARTICLES
 (54) Title: CARTON WITH ARTICLE RETAINING FEATURE



(57) **Abrégé/Abstract:**

A carton (190) includes a retaining structure (140) that is arranged to retain articles (C) within the carton when an end of the carton has been opened. The retaining structure includes an obstruction (149) spaced from the opened end of the carton that abuts an article (C) located at a dispenser opening (155) of the carton.

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

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
13 December 2007 (13.12.2007)

PCT

(10) International Publication Number
WO 2007/142791 A1

(51) International Patent Classification:

B65D 71/00 (2006.01) **B65D 5/72** (2006.01)

(21) International Application Number:

PCT/US2007/011711

(22) International Filing Date: 16 May 2007 (16.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

11/443,984 31 May 2006 (31.05.2006) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, 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, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

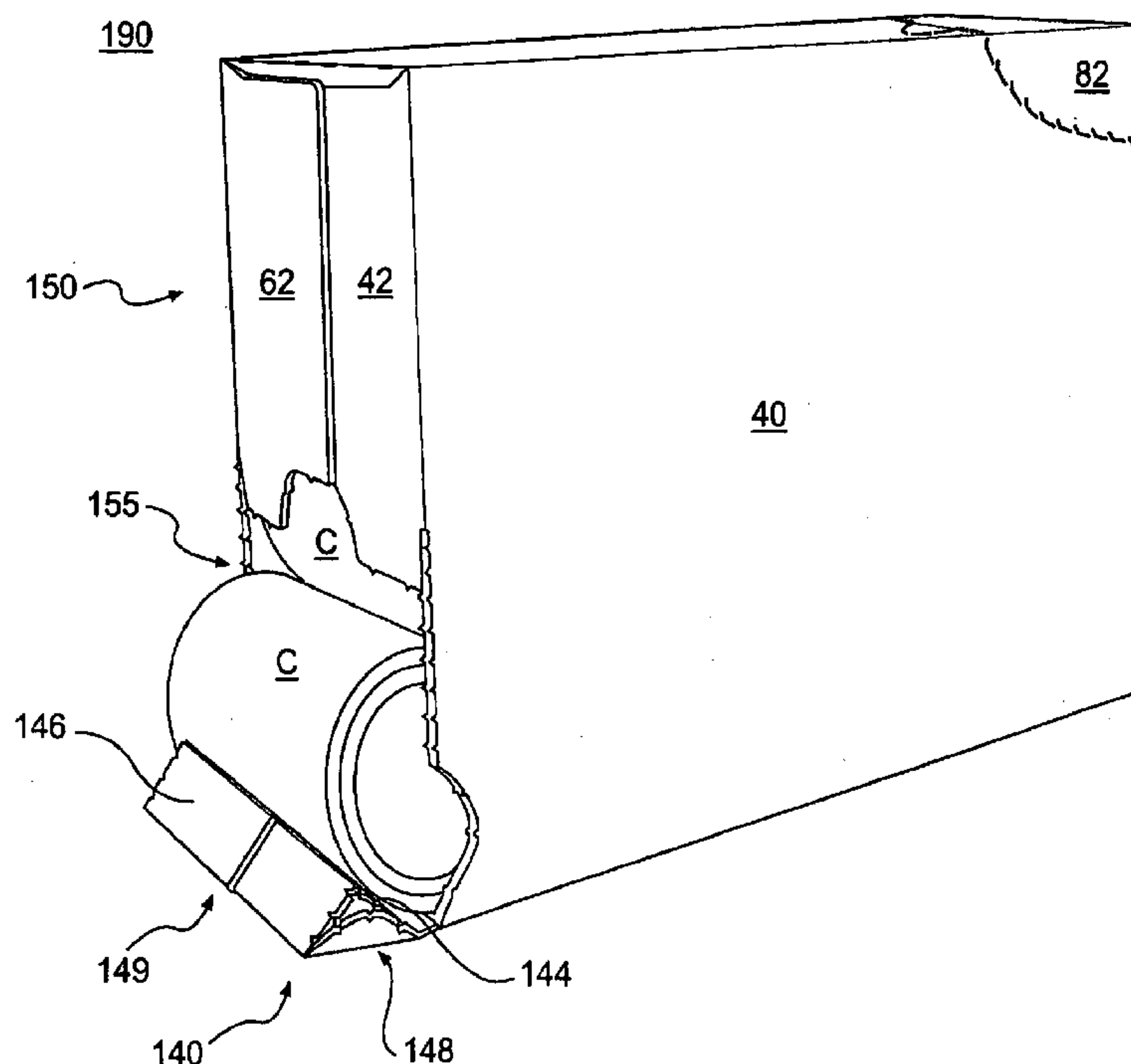
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, 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
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CARTON WITH ARTICLE RETAINING FEATURE



(57) Abstract: A carton (190) includes a retaining structure (140) that is arranged to retain articles (C) within the carton when an end of the carton has been opened. The retaining structure includes an obstruction (149) spaced from the opened end of the carton that abuts an article (C) located at a dispenser opening (155) of the carton.

WO 2007/142791 A1

CARTON WITH ARTICLE RETAINING FEATURE

BACKGROUND

[0001] Cartons with gravity-feed dispensing features are known. A gravity-feed dispensing feature is typically located at a low point on the carton so that containers held within the carton advance toward the dispenser opening under the action of gravity. Gravity-feed dispensing features typically rely on friction between the dispenser opening and the containers held within the carton to retain the containers and prevent them from inadvertently exiting the carton under the force of gravity. Conventional gravity-feed dispensers, however, may not be robust enough to retain certain heavy containers. Movement of the carton or shifting of the containers within the carton may also cause containers to overcome the retaining force of the dispenser and inadvertently exit the carton.

SUMMARY

[0002] According to a first embodiment of the present invention, a carton comprises a first side panel, a top panel, a second side panel, a bottom panel, a first end panel, a second end panel, and a retaining structure defined at least in the first end panel. The retaining structure comprises a plurality of panels that, when the carton is opened at its first end and the retaining structure is placed in a retaining configuration, define an obstruction that prevents containers from inadvertently exiting through a dispenser opening the carton.

[0003] According to one exemplary aspect of the first embodiment, containers may be fed to the dispenser opening by the action of gravity. A container at the dispenser opening abuts the obstruction so that the containers are securely retained at the dispenser opening. The containers are therefore unlikely to fully escape from the carton due to movement of the carton or due to shifting of the carton contents. The dispenser opening may be formed simultaneously with placing the retaining structure in its retaining

configuration, and the retaining structure may be formed from the first end panel and the side panels of the carton so that it does not utilize additional board area.

[0004] According to another exemplary aspect of the first embodiment, the obstruction may be spaced from the first end panel so that a significant portion of the container at the dispenser opening extends through the dispenser opening. The container at the dispenser opening is therefore easily grasped and pulled from the carton.

[0005] According to yet another exemplary aspect of the invention, a second dispenser may be defined in a second end of the carton. When the second end of the carton is opened, the second dispenser opening can be used to withdraw containers from the carton and/or to assist in advancing containers toward the dispenser opening in the first end of the carton.

[0006] Other aspects, features, and details of embodiments of the present invention can be more completely understood by reference to the following detailed description of preferred embodiments, taken in conjunction with the drawings figures and from the appended claims.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0007] According to common practice, the various features of the drawings are not necessarily drawn to scale. Dimensions of various features and elements in the drawings may be expanded or reduced to more clearly illustrate the embodiments of the invention.

[0008] **FIG. 1** is a plan view of a blank used to form a carton having a retaining structure according to a first embodiment of the present invention.

[0009] **FIG. 2** illustrates the blank of **FIG. 1** in a partially erected state.

[0010] **FIG. 3** is a perspective view of the carton erected from the blank of **FIG. 1**.

[0011] **FIG. 4** illustrates a first end of the carton.

[0012] **FIG. 5** is a perspective view of the second end of the carton.

- [0013] **FIGS. 6-8** illustrate opening of the carton.
- [0014] **FIG. 9** illustrates the carton in a dispensing configuration with the retaining structure in a retaining configuration.
- [0015] **FIG. 10** illustrates the carton with both the first and second ends open.

DETAILED DESCRIPTION

- [0016] The first embodiment of the present invention generally relates to a carton suitable for storing and dispensing articles such as, for example, containers containing beverages, foodstuffs and other products. The carton includes a retaining structure that prevents articles from inadvertently rolling out of the carton when the carton is in a dispensing configuration.
- [0017] Articles accommodated within the present carton embodiments can include containers such as, for example, petaloid bottle containers, beverage cans, cans containing foodstuffs, glass or plastic bottles, etc. For the purposes of illustration and not for the purpose of limiting the scope of the invention, the following detailed description describes generally cylindrical metallic containers as disposed within the carton. In this specification, the terms "side," "end," "bottom," "lower," "upper" and "top" indicate orientations determined in relation to a fully erected carton placed in a dispensing orientation.
- [0018] **FIG. 1** is a plan view of a blank **8** used to form a carton **190** (illustrated in **FIGS. 3-5**) according to a first embodiment of the present invention. The exterior or print side of the blank **8** is illustrated in **FIG. 1**. The blank **8** comprises a first or inner bottom panel **30** foldably connected to a first side panel **40** at a transverse fold line **35**, a top panel **50** foldably connected to the first side panel **40** at a transverse fold line **45**, a second side panel **60** foldably connected to the top panel **50** at a transverse fold line **55**, and a second or outer bottom panel **70** foldably connected to the second side panel **60** at a transverse fold line **65**. The panels **30**, **40**, **50**, **60**, **70** of the blank **8** are rectangular in shape.

[0019] The first side panel **40** is foldably connected to a first side first end flap **42** along a longitudinal fold line **41** and a first side second end flap **48** along a longitudinal fold line **47**. The top panel **50** is foldably connected to a first top end flap **52** along a longitudinal fold line **51** and a second top end flap **58** along a longitudinal fold line **57**. The second side panel **60** is foldably connected to a second side first end flap **62** along a longitudinal fold line **61** and a second side second end flap **68** along a longitudinal fold line **67**. The outer bottom panel **70** is foldably connected to a first bottom end flap **72** along a longitudinal fold line **71** and second bottom end flap **78** along a longitudinal fold line **77**.

[0020] The first end flaps **42, 52, 62, 72** extend along a first marginal area of the blank **8**, and close a first end of the carton **190** (illustrated in **FIGS. 3-5**). The second end flaps **48, 58, 68, 78** extend along a second marginal area of the blank **8**, and close a second end of the carton **190**. The longitudinal fold lines **41, 51, 61, 71** may be collinear, straight fold lines, or, one or more of the lines **41, 51, 61, 71** may be offset at one or more locations to account for, for example, blank thickness. The longitudinal fold lines **47, 57, 67, 77** may be also collinear or one or more of the lines may be offset at one or more locations.

[0021] According to one exemplary aspect of the invention, first and second side retaining patterns **100a, 100b**, and a bottom retaining pattern **130** are formed along the first marginal area of the blank **8**. The retaining patterns **100a, 100b, 130** define a retaining structure **140** in the erected carton **190** (illustrated in **FIGS. 3-5**).

[0022] The first and second side retaining patterns **100a, 100b** are similar in construction and arrangement, and are arranged to align with one another in the erected carton **190**. The perimeter of the first retaining pattern **100a** is defined by a line of disruption **102a** at a top edge of the retaining pattern **100a**, a transverse line of disruption **104a** extending from the line **102a** to the longitudinal fold line **41**, a longitudinal line of disruption **106a** extending along the fold line **41**, and a curved line of disruption **108a** extending from the end of the line **106a** to the transverse fold line **35**. The transverse fold

lines **110a**, **112a**, **114a** may be parallel to one another, and define a first locking projection section **116a**, a first inner stop panel section **118a**, a first outer stop panel section **120a**, and a first bottom stop panel section **122a**.

[0023] The perimeter of the second retaining pattern **100b** is defined by a line of disruption **102b** at a top edge of the retaining pattern **100b**, a transverse line of disruption **104b** extending from the line **102b** to the longitudinal fold line **61**, a longitudinal line of disruption **106b** extending along the fold line **61**, and a curved line of disruption **108b** extending from the end of the line **106b** to the transverse fold line **65**. Transverse fold lines **110b**, **112b**, **114b** may be parallel to one another, and define a second locking projection section **116b**, a second inner stop panel section **118b**, a second outer stop panel section **120b**, and a second bottom stop panel section **122b**.

[0024] The bottom retaining pattern **130** can be, for example, a pattern of cut lines **132**, **134**, **136** defining an aperture in the first bottom end flap **72**. The cuts **132**, **134** may be longitudinal, parallel cuts, and the cuts **136** may include transverse, oblique and longitudinal sections. Alternatively, the perimeter of the retaining pattern **130** can comprise a pattern of breachable lines of disruption that define a knockout in the blank **8**. The perimeter of the pattern **130** is arranged in the bottom end flap **72** to provide a friction lock to interact with the locking projection sections **116a**, **116b**. The end flap **42** includes bottom edges **134a** and **136a** that are similar in contour with and arranged to align with the lines **134**, **136**, respectively. Similarly, the end flap **62** includes bottom edges **134b** and **136b** that are similar in contour with and arranged to align with the lines **134**, **136**, respectively.

[0025] A second end dispenser pattern **80** may optionally be included at the opposite end of the blank **8**. The dispenser pattern **80** defines a dispenser panel **82** that may be removed to open a second end of the carton **190** (illustrated in **FIGS. 3-5**). The dispenser pattern **80** comprises lines of disruption **84**, **86** extending from edges of the blank **8** and into the top panel **50**. An access panel or flap **92** is defined by a longitudinal fold line **90**

and a curved line of disruption **88** and provides an entry point by which a user can initiate opening of the carton at the dispenser panel **82**.

[0026] The fold lines **35, 45, 55, 65, 41, 47, 61, 67, 51, 57, 71, 77, 90, 110a, 112a, 114a, 110b, 112b, 114b** formed in the blank **8** may be, for example, score lines, cut-space lines, cut-crease lines, combinations thereof, or other lines of disruption that facilitate folding of the blank **8**. The periphery of the first and second side retaining patterns **100a, 100b**, defined by the lines of disruption **102a, 104a, 106a, 108a, and 102b, 104b, 106b, 108b**, respectively, and the periphery of the dispenser pattern **80** defined by the lines **84, 86, 88** may be generally characterized as “tear lines.” One or more sections of the pattern perimeters may be, for example, replaced by cuts to facilitate separation of selected sections of the patterns in the carton **190** (illustrated in **FIGS. 3-5**).

[0027] An exemplary method of erection of the carton **190** will now be discussed with reference to **FIGS. 1-3**. Referring to **FIG. 1**, to construct the carton, glue or other adhesive may be applied to the interior side of the outer bottom panel **70** and/or to the exterior side of the inner bottom panel **30**. The blank **8** is then folded about the transverse fold lines **45, 65** so that the interior side of the outer bottom panel **70** overlaps the exterior side of the inner bottom panel **30** and is adhered thereto. The partially erected blank **8** may then be opened up into the generally tubular sleeve form illustrated in **FIG. 2**.

[0028] Referring to **FIGS. 1 and 2**, the end flaps **58, 78** may be folded about the fold lines **57, 77**, respectively, over the open second end of the carton (not shown in **FIG. 2**), and the side end flaps **48, 68** folded over the end flaps **58, 78**. The interior sides of the side flaps **48, 68** may be adhered to the exterior sides of the end flaps **58, 78** to close the second end of the carton. Similarly, the interior sides of the side end flaps **42, 62** may be adhered to the exterior sides of the end flaps **52, 72** to close the first end of the carton. The second side first end flap **62** may, for example, overlap a portion of the first side first end flap **42** and may be adhered to the flap **42** at the overlapping portion. Articles such as, for example, generally cylindrical containers **C** may be loaded into the tubular sleeve

in a conventional manner before one or both ends of the carton are closed by the end flaps. In the illustrated embodiment, the containers **C** (illustrated in **FIG. 8**) are arranged in a 3 x 4 x 1 configuration, although other arrangements are within the scope of the invention.

[0029] **FIG. 3** illustrates the erected carton **190**, which has a generally parallelepipedal shape, loaded with containers **C** (not shown in **FIG. 3**). Referring also to the end view of **FIG. 4**, in the erected carton **190**, the overlapping end flaps **42, 52, 62, 72** at the first end of the carton **190** form a first end panel **150**, and the end flaps **48, 58, 68, 78** at the second end of the carton form a second end panel **160** (illustrated in **FIG. 5**). In the first end panel, the first and second side retaining patterns **100a, 100b** align with one another to define a retaining structure **140** at the first end of the carton **190**. The retaining patterns **100a, 100b** align to define the following elements of the retaining structure **140**: a locking projection **142** formed from the sections **116a, 116b**; an inner stop panel **144** formed from the sections **118a, 118b**; an outer stop panel **146** formed from the sections **120a, 120b**; and a bottom stop panel **148** formed from the sections **122a, 122b**. As shown in **FIG. 4**, the second side first end flap **62** overlaps the first side first end flap **42** and is adhered thereto at the overlapping portion.

[0030] The bottom edges **134a, 136a** of the end flap **42** and the bottom edges **134b, 136b** of the end flap **62** generally align with the contour of the retaining pattern **130** in the bottom end flap **72**. The aligned contours of the end flaps **42, 62** and the bottom retaining pattern **130** define a locking aperture **138** in the first end panel **150**. The locking aperture **138** is sized and shaped to receive the locking projection **142**, as discussed in further detail below.

[0031] An exemplary method of opening the first end of the carton **190** and placing the carton in a dispensing configuration will now be discussed below with reference to **FIGS. 6-9**.

- [0032] Referring to **FIG. 6**, the first end panel **150** is breached at the locking projection **142** by tearing the panel at the tear lines **102a**, **102b**. Referring to **FIG. 7**, by pulling outwardly on the retaining structure **140**, the carton **190** is torn along the tear lines **104a**, **106a**, **108a** on one side of the carton and along the tear lines **104b**, **106b**, **108b** (not shown in **FIG. 7**) on the opposite side.
- [0033] **FIG. 8** illustrates the carton **190** with the partially separated retaining structure **140** pivoted away from the remainder of the carton **190**. The retaining structure **140** is placed into its retaining configuration by folding the inner stop panel **144**, the outer stop panel **146** and the locking projection **142** back toward the bottom stop panel **148** in the direction of the arrow **A**, and pressing the locking projection **142** into the locking aperture **138**. If the bottom retaining pattern **130** defines a cutout that is wholly or partially separated from the carton to create the locking aperture **138**, the cutout may be removed before or during insertion of the locking projection **142** into the aperture.
- [0034] **FIG. 9** illustrates the retaining structure **140** in its retaining configuration, with the locking projection **142** engaged with and extending through the locking aperture **138**. The carton **190** is now in a dispensing configuration, where a dispenser opening **155** is left at the first end of the carton **190** through which the containers **C** can be pulled from the carton **190**. The folded panels **144**, **146**, **148** form a generally triangular-shaped obstruction **149** which a container **C** disposed at the dispenser opening **155** abuts. The retaining structure **140** therefore restrains the containers **C** from inadvertently rolling out through the dispenser opening **155** due to the force of gravity. A container **C** may be pulled past the retaining structure **140** by lifting up on the container and pulling the container away from the dispenser opening **155** and over the obstruction **149**. Because the obstruction **149** is spaced a small distance from the first panel **150**, significant portions of the side ends of container **C** at the dispenser opening **155** extend outward past the first end panel **150** and are accessible to grasp during dispensing.
- [0035] **FIG. 10** illustrates the carton **190** opened at the second end of the carton. The dispenser panel **82** can be removed by tearing the carton **190** along the dispenser pattern

80 (illustrated in **FIG. 1**). A second dispenser opening **180** is left when the panel **82** is removed. Containers **C** can be withdrawn from the carton **190** through the dispenser opening **180**, or, if necessary, a user can insert his hand into the dispenser opening **180** and advance containers toward the dispenser opening **155** when there are only a few containers remaining in the carton **190**.

[0036] According to the above embodiment, containers **C** may be fed to the dispenser opening **155** by the action of gravity. The containers are securely retained at the dispenser opening of the carton by the retaining obstruction **149**, and are not likely to fully escape from the carton due to movement of the carton or shifting of the carton contents. The retaining structure **140** may be formed from the first end and side panels of the carton, and therefore does not require additional board area. The retaining obstruction **149** may be spaced from the first end panel **150** so that a container at the dispenser opening **155** may be easily grasped and removed from the carton.

[0037] In the above embodiments, the carton is shown as accommodating generally cylindrical metallic containers. Other types of containers, however, can be accommodated within a carton according to the present invention. The dimensions of the blank **8** may also be altered, for example, to accommodate various container forms. In addition, various numbers and arrangements of containers **C** can be accommodated in a carrier carton according to principles of the present invention, for example, by adjusting the size of the blank **8**.

[0038] The blank according to the present invention can be, for example, formed from coated paperboard and similar materials such as cardboard, hard paper, or any other material having properties suitable for enabling the carton to function at least generally as described above. The blank can also be laminated to or coated with one or more sheet-like materials at selected panels or panel sections. The interior and/or exterior sides of the blank can be coated with a clay coating. The clay coating may then be printed over with product, advertising, price coding, and other information or images. The blank may then be coated with a varnish to protect any information printed on the blank. The blank

may also be coated with, for example, a moisture barrier layer, on either or both sides of the blank.

[0039] Fold lines can be any line of disruption that facilitates folding therealong. More specifically, but not for the purpose of narrowing the scope of the present invention, fold lines include: a crease, such as formed by folding; a score line, such as formed with a blunt scoring knife, or the like, which creates a crushed portion in the material along the desired line of weakness; a score that extends partially into the material along the desired line of weakness, and/or a series of spaced apart scores or cuts that extend partially into and/or completely through the material along the desired line of weakness; or various combinations of these features.

[0040] A tear line can be any form of weakening intended to facilitate tearing therealong. More specifically, but not for the purpose of narrowing the scope of the present invention, tear lines include: a score that extends partially into the material along the desired line of weakness, and/or a series of spaced apart scores or cuts that extend partially into and/or completely through the material along the desired line of weakness, or various combinations of these features. As a more specific example, one type of tear line is a series of spaced apart cuts that extend completely through the material, with adjacent cuts being spaced apart slightly so that a nick (e.g., a small somewhat bridging-like piece of the material) is defined between the adjacent cuts for typically temporarily connecting the material across the tear line. The nicks are broken during tearing along the tear line.

[0041] In the present specification, a “panel” need not be flat or otherwise planar. A “panel” can, for example, comprise a plurality of interconnected generally flat or planar sections.

[0042] The above embodiments may be described as having one or more panels adhered together by glue. The term “glue” is intended to encompass all manner of adhesives commonly used to secure paperboard carton panels in place.

[0043] It will be understood by those skilled in the art that while the present invention has been discussed above with reference to exemplary embodiments, various additions, modifications and changes can be made thereto without departing from the spirit and scope of the invention as set forth in the following claims.

WHAT IS CLAIMED IS:

1. A carton, comprising:
 - a first side panel;
 - a top panel;
 - a second side panel;
 - a bottom panel;
 - a first end panel at a first end of the carton; and
 - a second end panel at a second end of the carton, whereina retaining structure is defined at least in the first end panel by a plurality of lines of disruption in the carton, the retaining structure comprising a plurality of stop panels, and wherein
 - the plurality of lines of disruption comprises a plurality of tear lines defining at least a part of a perimeter of the retaining structure.
2. The carton of claim 1, wherein the retaining structure further comprises a locking projection.
3. The carton of claim 2, wherein the retaining structure further comprises a locking aperture, wherein the locking aperture is sized to receive the locking projection.
4. The carton of claims 1-3, wherein the stop panels are foldably connected to one another.
5. The carton of claims 1-4, wherein the plurality of stop panels comprises at least two foldably connected stop panels disposed in the first end panel between the locking projection and the locking aperture.
6. The carton of claim 5, wherein the plurality of stop panels further comprises a bottom stop panel adjacent to the locking aperture.

7. The carton of claim 6, wherein the at least two foldably connected stop panels comprises an inner stop panel and an outer stop panel, wherein the outer stop panel is foldably connected to the bottom stop panel.

8. The carton of claim 7, wherein the locking aperture is adjacent to the bottom panel and the locking projection is disposed in the first end panel at an upper portion of the retaining structure.

9. The carton of claim 3, wherein the locking aperture is adjacent to the bottom panel and the locking projection is disposed in the first end panel at an upper portion of the retaining structure.

10. The carton of claims 1-9, wherein the stop panels are foldably connected to one another at a plurality of spaced parallel fold lines.

11. The carton of claims 1-10, wherein the carton has a generally parallelepipedal shape.

12. The carton of claims 1-11, further comprising a removable dispenser panel defined by a plurality of lines of disruption at the second end of the carton.

13. The carton of claims 1-12, wherein the first end panel comprises a plurality of end flaps.

14. A method of placing a carton in a dispensing configuration, comprising:
providing a carton according to claim 3;
tearing the carton along the plurality of tear lines, wherein the retaining structure is torn away from part of the carton and a dispenser opening is left at the first end of the carton;
folding the retaining structure; and

engaging the locking projection with the locking aperture.

15. A carton in a dispensing configuration and a plurality of articles disposed in the carton, comprising:

a first side panel;

a top panel;

a second side panel;

a bottom panel;

a first end panel at a first end of the carton;

a second end panel at a second end of the carton; and

a retaining structure comprising a retaining obstruction, the retaining obstruction being spaced from the first end of the carton, wherein a dispenser opening is defined in the carton at least in the first end panel, and wherein the articles can be withdrawn from the carton through the dispenser opening, at least one of the articles being in a dispensing position at the dispenser opening and abutting the retaining obstruction.

16. The carton and plurality of articles of claim 15, wherein the article in the dispensing position extends through the dispenser opening.

17. The carton and plurality of articles of claims 15-16, wherein the retaining structure comprises a bottom stop panel that connects the retaining obstruction to a remainder of the carton.

18. The carton and plurality of articles of claims 15-17, wherein the retaining structure further comprises a locking aperture and a locking projection received within the locking aperture.

19. The carton and plurality of articles of claims 15-18, wherein the retaining obstruction comprises at least two foldably connected stop panels, the article in the dispensing position abutting at least one of the stop panels.

20. The carton and plurality of articles of claims 15-19, further comprising a dispenser opening at the second end of the carton.

21. The carton and plurality of articles of claims 15-20, wherein the carton has a parallelepipedal shape and the first end panel comprises a plurality of end flaps.

22. A method of placing a carton in a dispensing configuration, comprising:
providing a carton having a first end and a second end, a retaining structure being defined at least in the first end;
providing a plurality of articles in the carton;
separating a part of the retaining structure from a remainder of the carton, wherein a dispenser opening is left in the first end of the carton; and
deforming a distal portion of the retaining structure to form a retaining obstruction.

23. The method of claim 22, wherein one of the plurality of containers is located at the dispenser opening in a dispensing position and abutting the retaining obstruction.

24. The method of claims 22-23, wherein the article in the dispensing position extends through the dispenser opening.

25. The method of claims 22-24, wherein deforming a distal portion of the retaining structure comprises folding the retaining structure at a fold line between at least two stop panels of the retaining structure.

26. The method of claims 22-25, wherein deforming a distal portion of the retaining structure further comprises engaging a locking projection with a locking aperture.

27. The method of claim 26, wherein engaging a locking projection with a locking aperture comprises removing a knockout section.

28. A carton blank, comprising:

a first side panel;

a top panel;

a second side panel;

at least one bottom panel;

a first side end panel foldably connected to the first side panel, a first retaining pattern defining a first plurality of foldably connected stop panel sections in the first side end panel; and

a second side end panel foldably connected to the second side panel, a second retaining pattern defining a second plurality of foldably connected stop panel sections in the second side end panel, the first and second pluralities of stop panel sections being combinable to form a retaining structure.

29. The carton blank of claim 28, wherein the first retaining pattern comprises a first plurality of fold lines and the second retaining pattern comprises a second plurality of fold lines.

30. The carton blank of claim 29, wherein the first retaining pattern further comprises at least one first tear line and the second retaining pattern further comprises at least one second tear line.

31. The carton blank of claims 28-30, wherein:

the first plurality of stop panel sections comprises a first locking projection section, a first inner stop panel section, and a first outer stop panel section; and

the second plurality of stop panel sections comprises a second locking projection section, a second inner stop panel section, and a second outer stop panel section.

32. The carton blank of claims 28-31, further comprising a first bottom end panel foldably connected to the at least one bottom panel, a bottom retaining pattern defining a retaining aperture in the first bottom end panel.

33. The carton blank of claims 28-32, further comprising a plurality of second end flaps extending along a second marginal area of the carton blank.

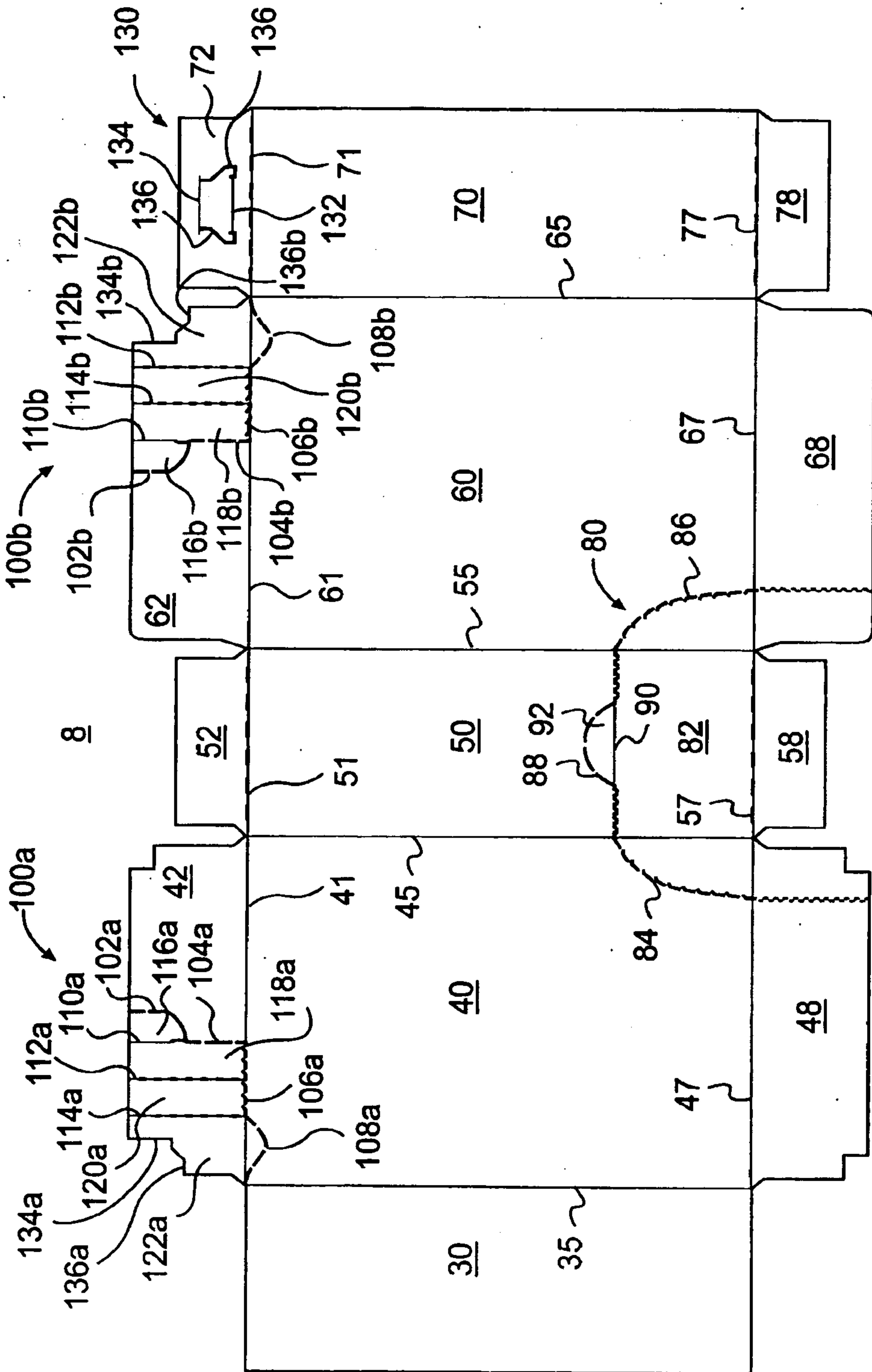


FIG. 1

2/10

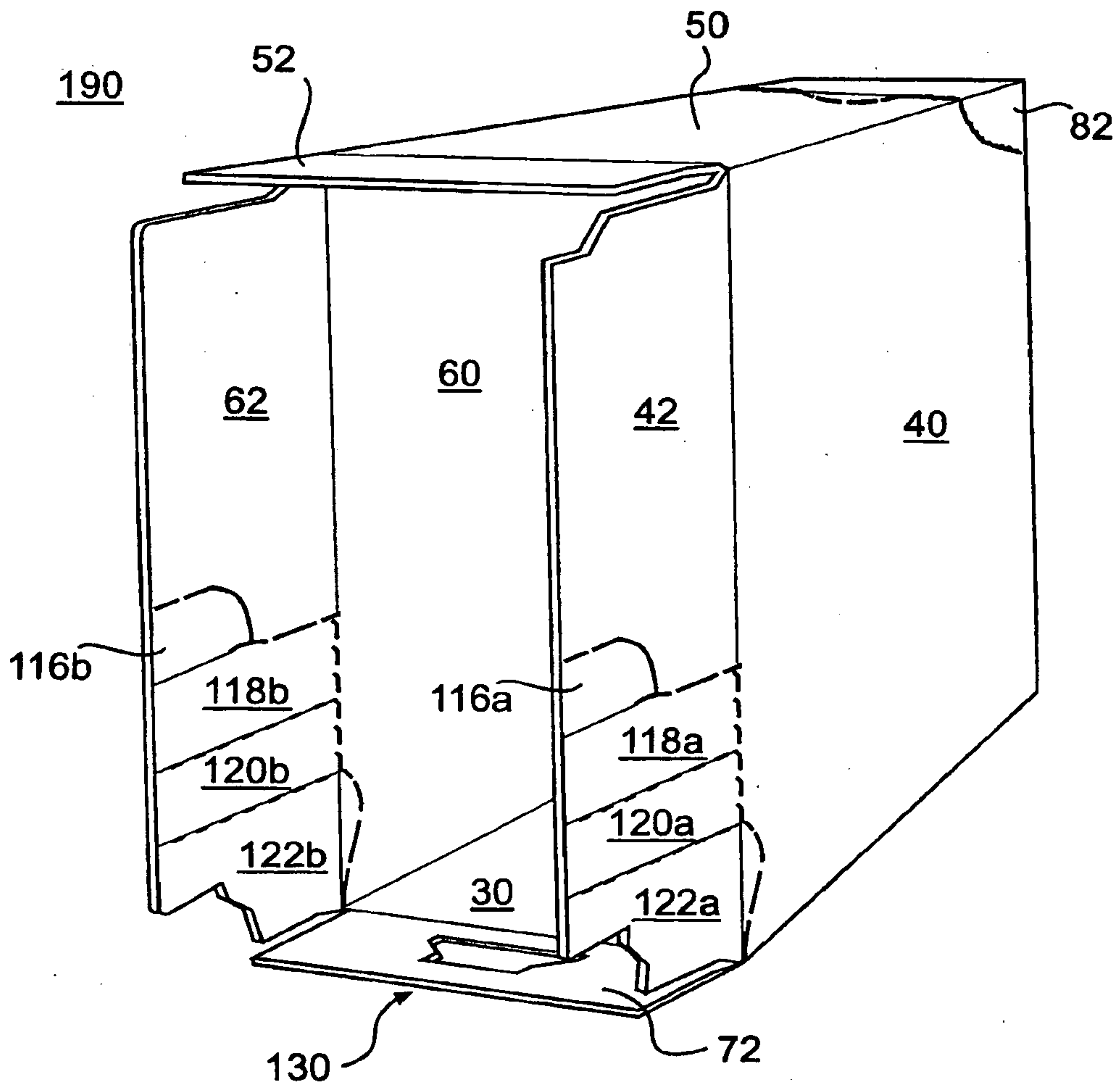


FIG. 2

3/10

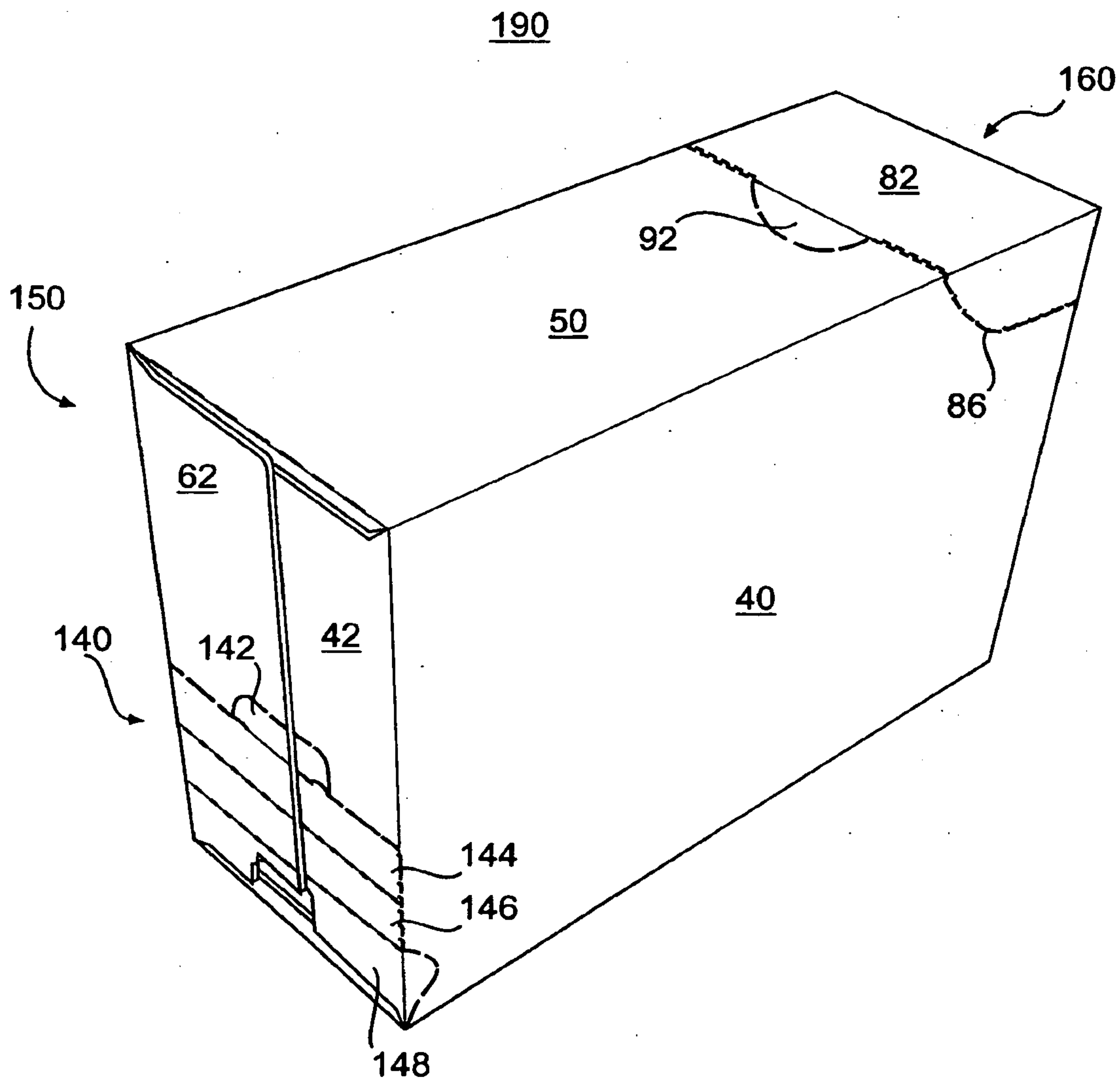
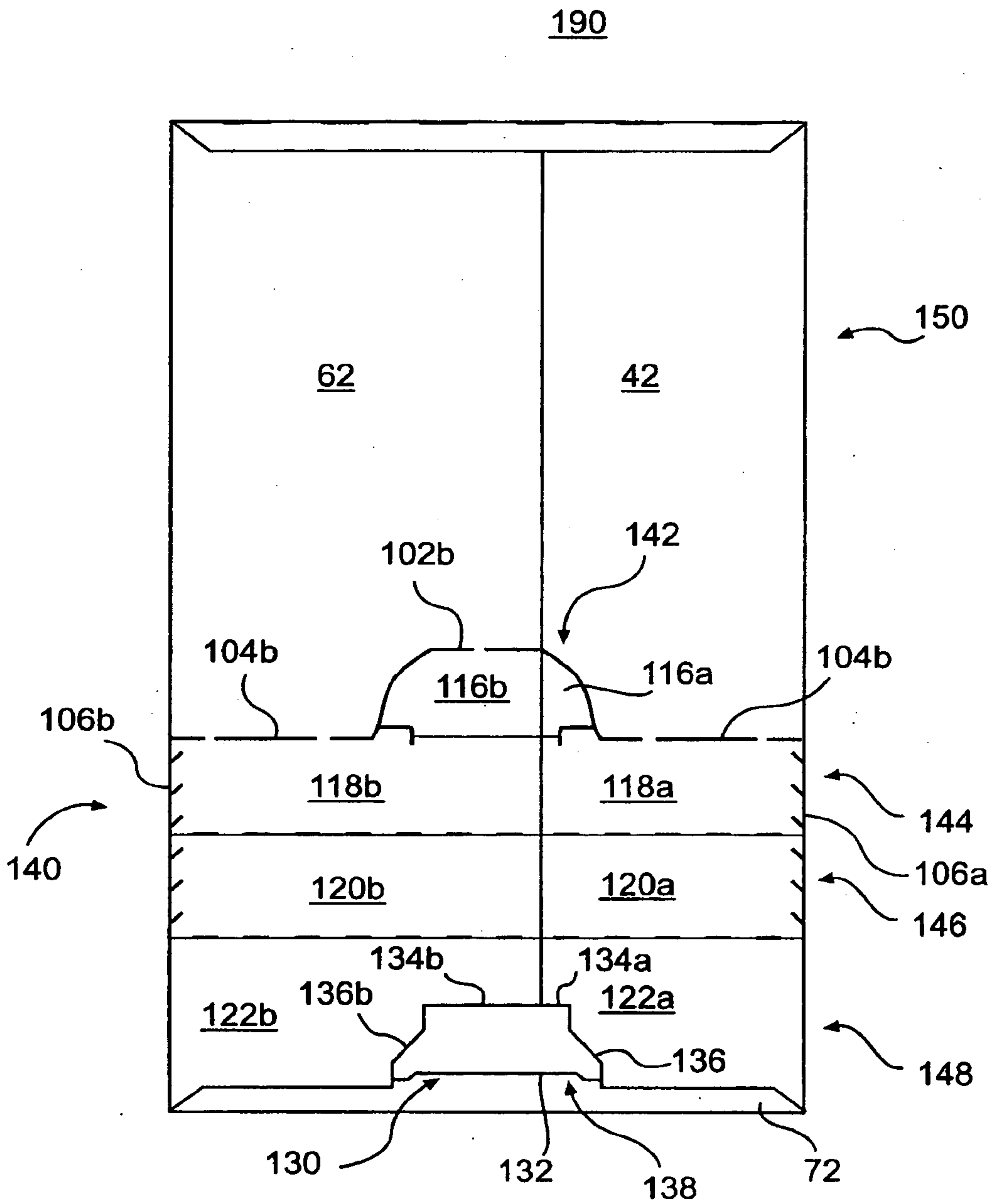


FIG. 3

4/10



5/10

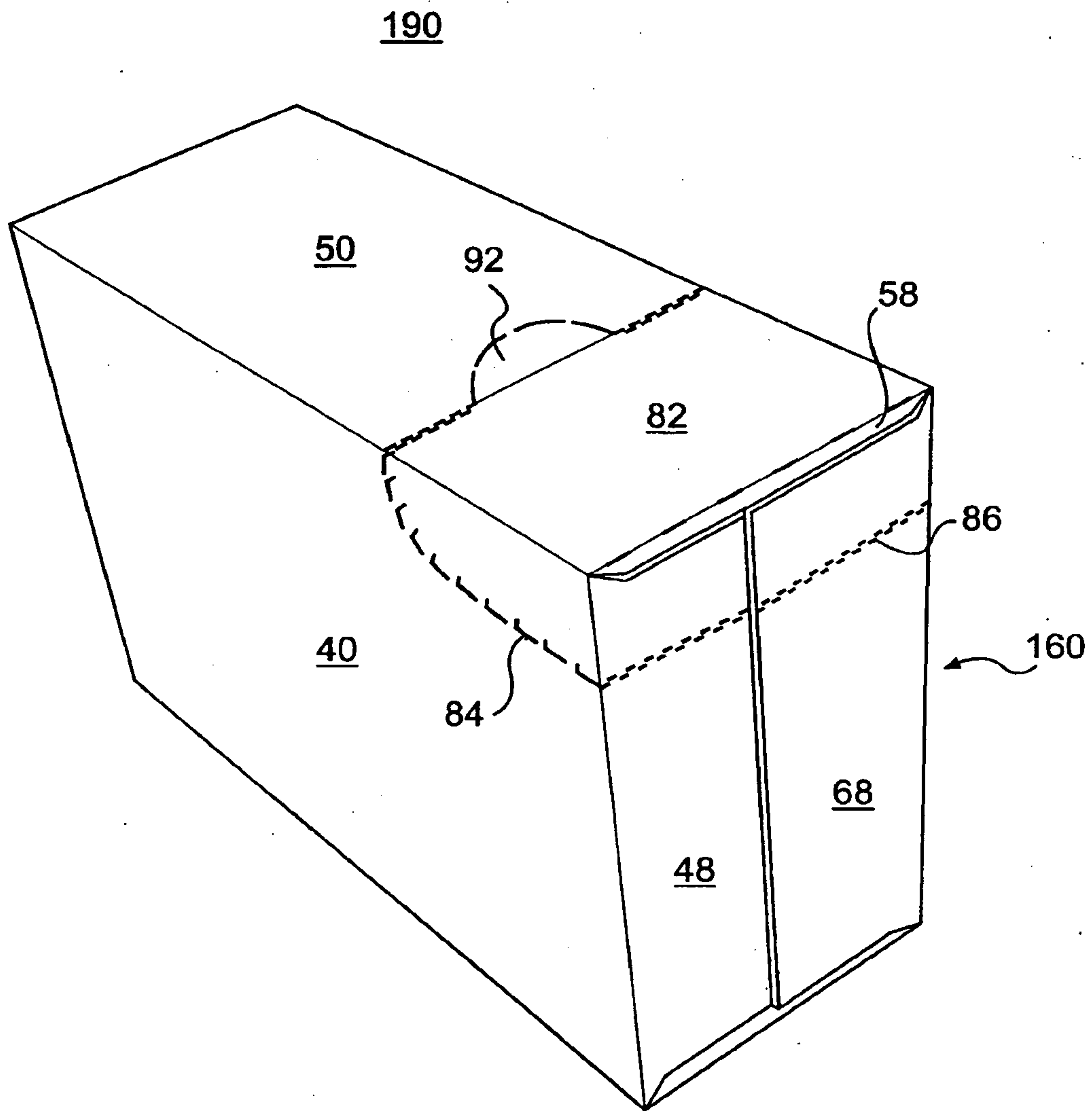


FIG. 5

6/10

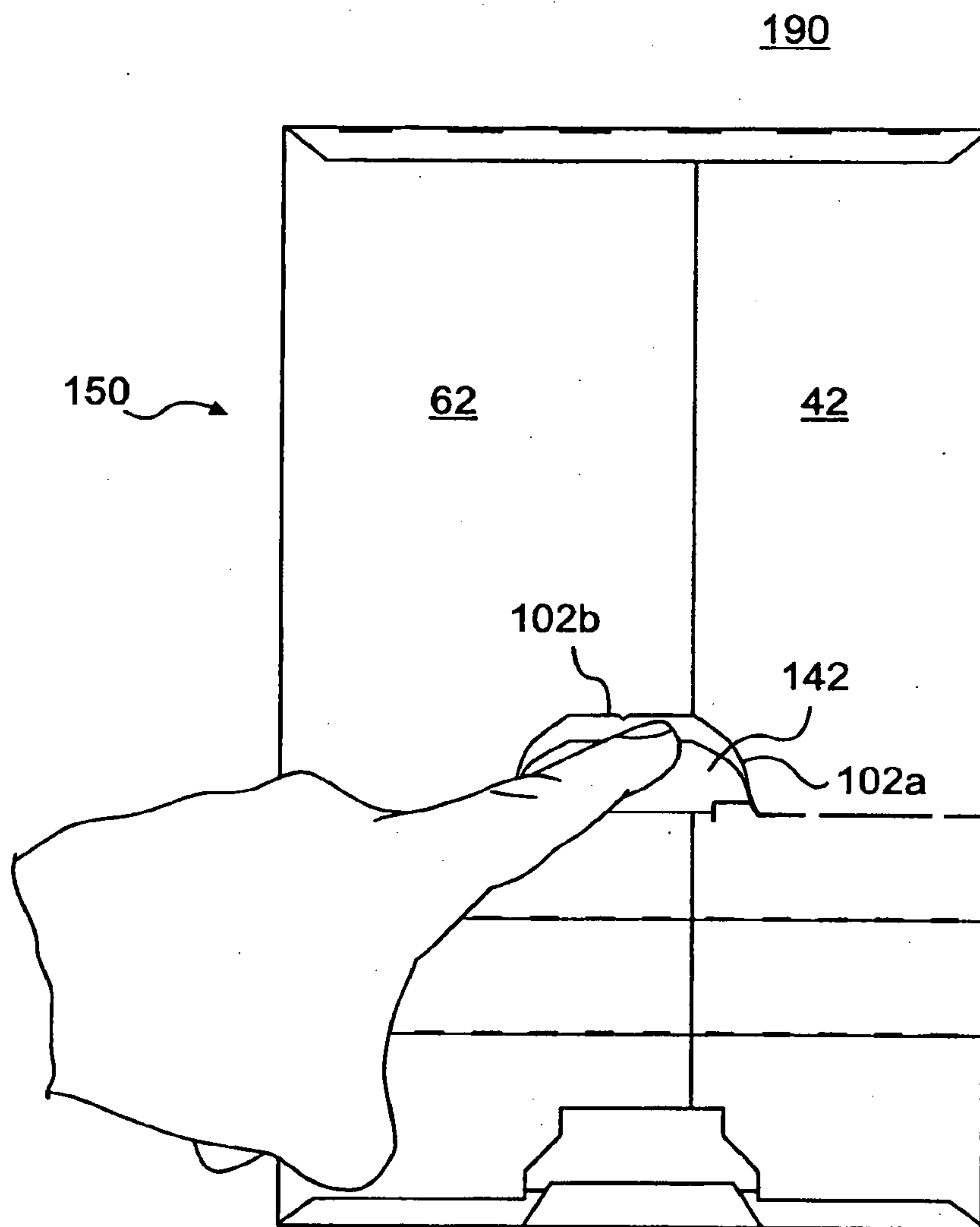


FIG. 6

7/10

190

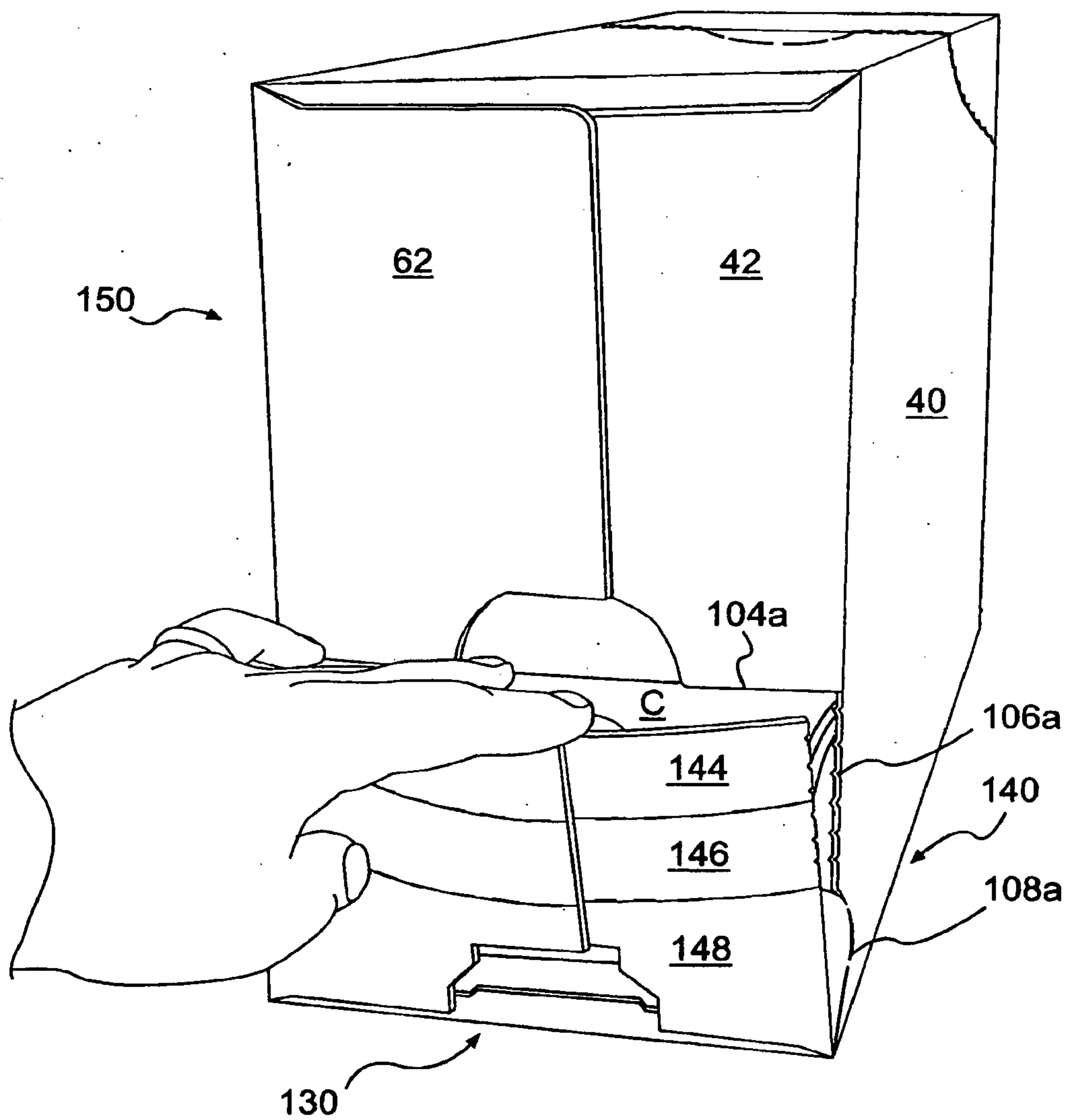


FIG. 7

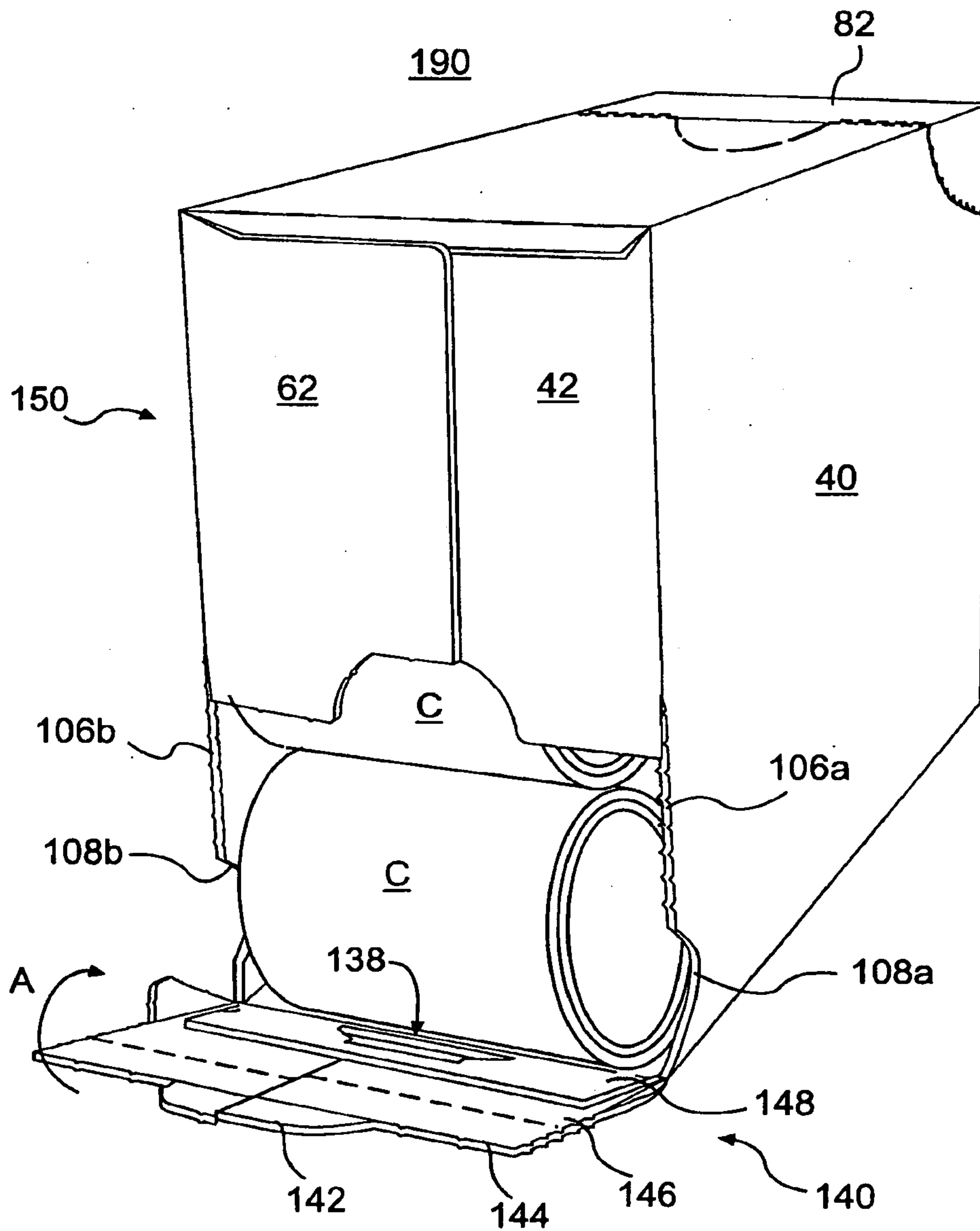


FIG. 8

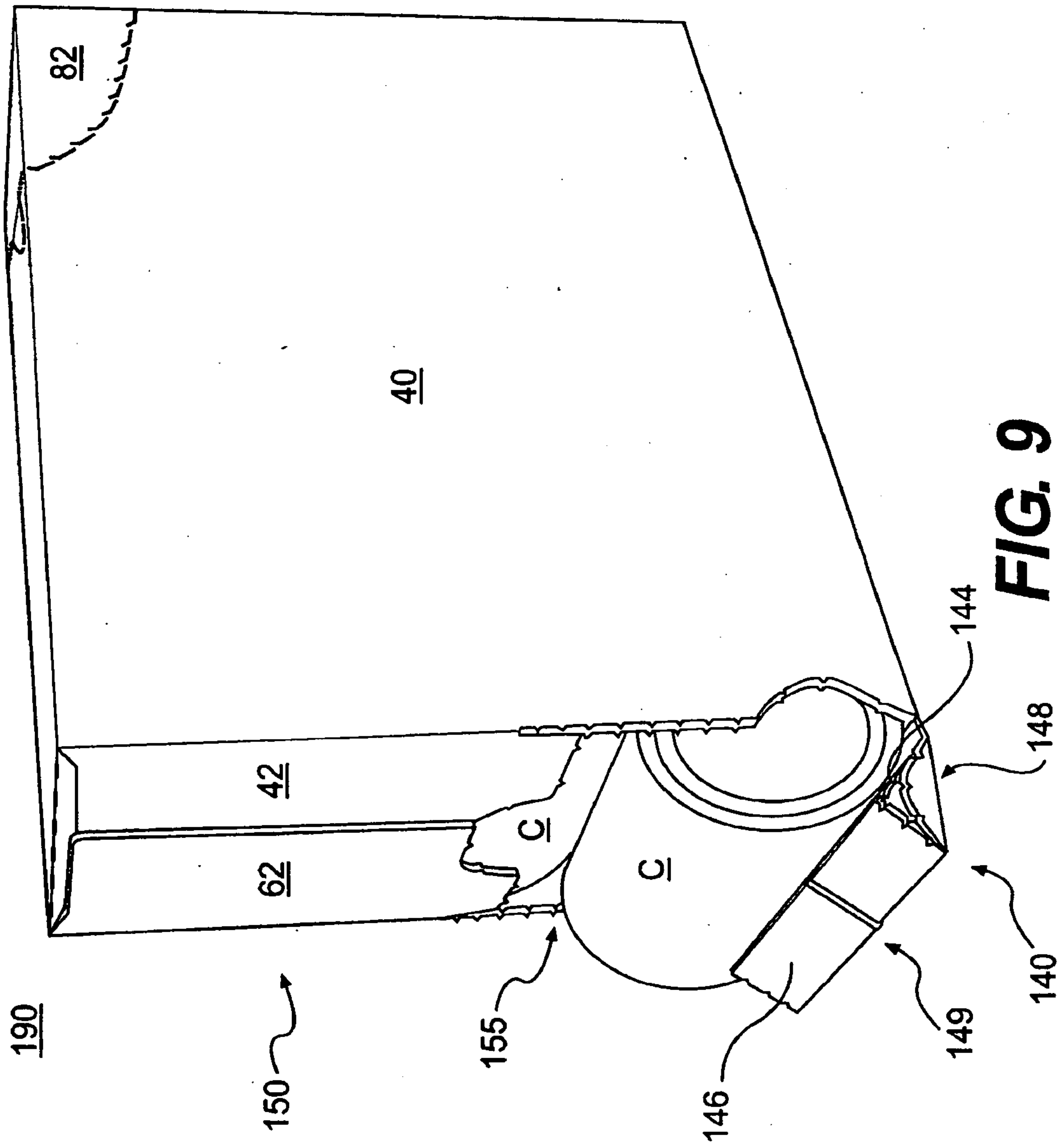


FIG. 9

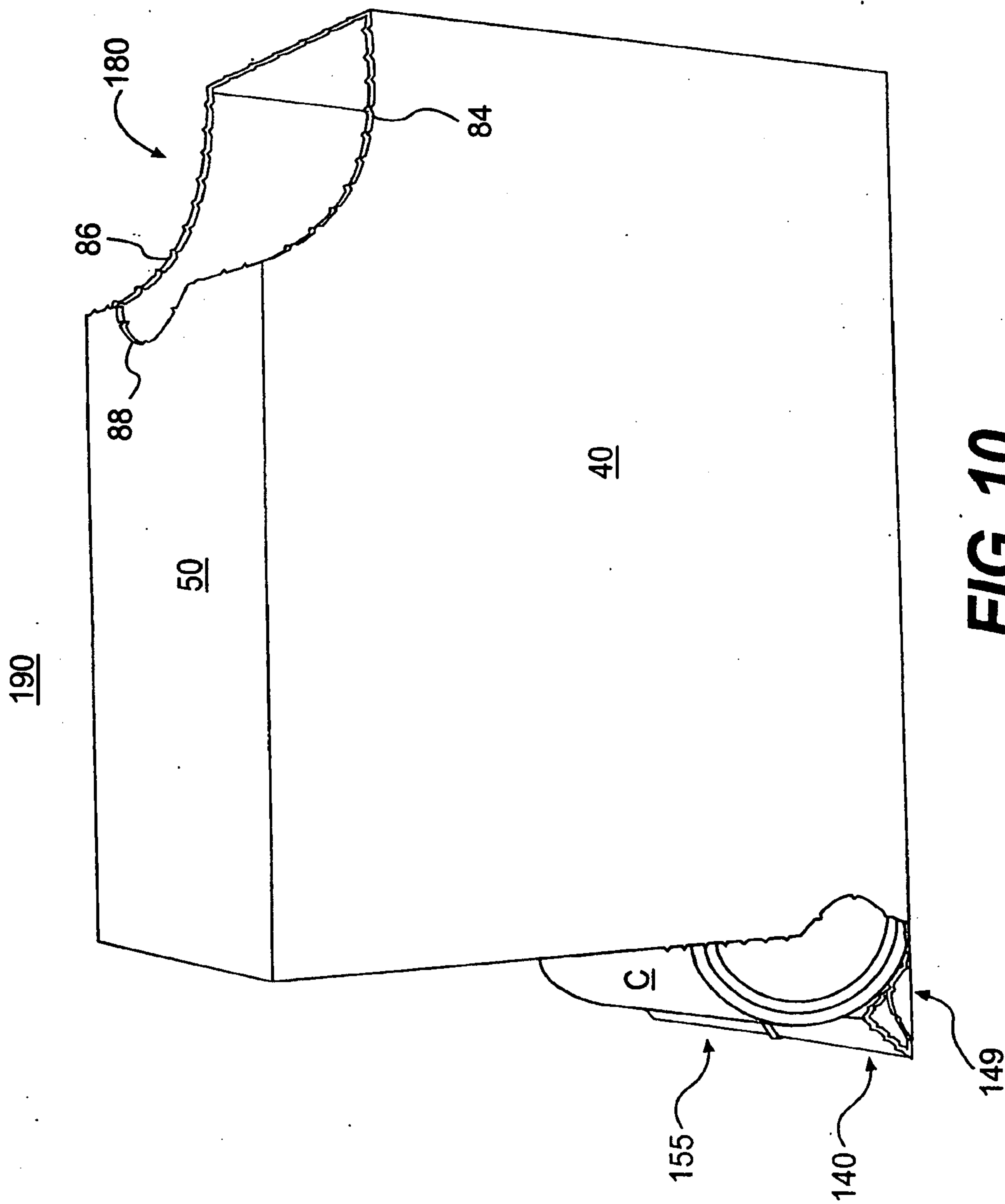


FIG. 10

