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Declaration under Rule 4.17:
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

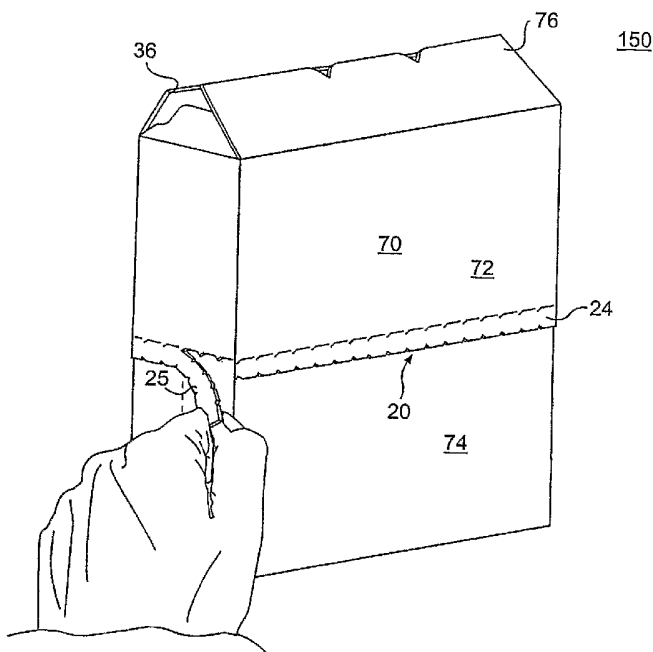
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(54) **Title:** CARTON HAVING SPACE SAVING FEATURE



(57) **Abstract:** A carton (150) includes a space-saving feature which allows it to be split into two sections. When a portion of the carton contents have been used, an upper section (70) of the carton can be separated, leaving the lower section (74) in which to store the remaining contents. The upper section can also be slid down or telescoped over the lower section as the carton contents are consumed.

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CARTON HAVING SPACE SAVING FEATURE

BACKGROUND

[0001] Conventional paperboard cartons are known. Such cartons often include a bag or other vessel held within the interior of the paperboard carton, which is used to store foodstuffs or other dispensable products. Conventional paperboard cartons, however, occupy a volume that is determined by the amount of product held within the carton upon initial sale. When a portion of the product held within the carton is consumed, the carton continues to occupy a relatively large storage space, which may be limited, to store a reduced amount of product.

SUMMARY

[0002] According to a first embodiment, a carton comprises a first side panel, a front panel adjacent to the first side panel, a second side panel adjacent to the first side panel, a back panel adjacent to the first and second side panels, a top panel, a bottom panel, and a tear strip extending around a perimeter of the carton.

[0003] According to the first embodiment, the height of the carton can be reduced by removing the tear strip, thereby separating the carton into upper and lower sections. The carton can be reduced in size when, for example, a portion of the contents of the carton have been consumed or otherwise dispensed. The remainder of the contents, which are accommodated within the lower section of the carton, are thereby stored in a carton which occupies less space than the original carton. The reduced size of the carton also allows a consumer to visually evaluate the reduced amount of product remaining in the carton, which may serve as cue to purchase more product.

[0004] The upper section of the carton may be discarded, or, slid down over the lower section as carton contents are consumed.

[0005] Other aspects, features, and details of the present invention can be more completely understood by reference to the following detailed description of a preferred embodiment, taken in conjunction with the drawings and from the appended claims.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

- [0006] **FIG. 1** is a plan view of a first, interior side of a blank used to form a carton according to a first embodiment.
- [0007] **FIG. 2** is a plan view of a second, exterior side of the blank.
- [0008] **FIG. 3** is a plan view of an erection step of the carton.
- [0009] **FIG. 4** is a perspective view of an erection step of the carton.
- [0010] **FIG. 5** is a perspective view of the erected carton.
- [0011] **FIG. 6** is a perspective view illustrating use of the space saving feature of the carton.
- [0012] **FIG. 7** is a perspective view illustrating use of the space saving feature of the carton.
- [0013] **FIG. 8** is a perspective view illustrating use of the space saving feature of the carton.
- [0014] **FIG. 9** is a perspective view illustrating use of an alternative space saving feature of the carton.

DETAILED DESCRIPTION

- [0015] The present embodiments are addressed to cartons having a space saving feature which allows a carton to be reduced in size after a portion of the contents of the carton have been consumed or otherwise dispensed.
- [0016] **FIG. 1** is a plan view of a first, interior side **5** of a blank **8** used to form a carton **150** (illustrated in **FIG. 5**) according to a first embodiment. The first side **5** will be disposed in the interior of the erected carton **150**.
- [0017] The blank **8** comprises a first side panel **10** foldably connected to a front panel **30** at a first transverse fold line **31**, a second side panel **50** foldably connected to the front panel **30** at a second transverse fold line **51**, and a back

panel 70 foldably connected to the second side panel 50 at a third transverse fold line 71.

[0018] The blank 8 includes a section that is foldable into a “z” configuration, generally referred to as a “z-fold 20 section,” that extends across the entire length of the blank 8. The z-fold 20 section includes a folding panel 21 defined by a fold line 22 at a first edge, and a tear strip 24 at a second edge. The tear strip 24 is defined by a top tear line 26 and a bottom tear line 28 extending parallel to one another across the length of the blank 8, and may include a tab portion 25 at one or both ends of the strip 24. The tear strip 24 illustrated in FIG. 1 has a zipper or knife cut configuration, although other tear strip configurations may be used. The z-fold 20 section divides the first side panel 10 into upper and lower first side panel sections 12, 14, the front panel 30 into upper and lower front panel sections 32, 34, the second side panel 50 into upper and lower second side panel sections 52, 54, and the back panel 70 into upper and lower back panel sections 72, 74. A first adhesive panel 82 may be foldably connected to the upper back panel section 72 at a fold line 84, and a second adhesive panel 86 may be foldably connected to the lower back panel section 74 at a fold line 88.

[0019] The height of the upper panel sections 12, 32, 52, 72 plus the height of the tear strip 24 may be H_1 , and the lower panel sections 14, 34, 54, 74 have a height H_2 . The height H_2 illustrated in FIG. 1 is slightly larger than the H_1 . The relative heights H_1 , H_2 can be varied, however, to achieve varying space-saving characteristics in the carton 150. In selected embodiments, H_1 is within +/- 30% of H_2 .

[0020] The first side panel 10 is foldably connected to a first side top flap 16 and a first side bottom flap 18. The front panel 30 is foldably connected to a front top flap 36 and a front bottom flap 38. The second side panel 50 is foldably connected to a second side top flap 56 and a second side bottom flap 58. The back panel 70 is foldably connected to a back top flap 76 and a back bottom flap 78. The flaps 16, 36, 56, 76 extend along a top marginal portion of the blank 8, and the flaps 18, 38, 58, 78 extend along a bottom marginal portion of the blank 8.

When the carton **150** is erected, the flaps **16, 36, 56, 76** close a top opening of the carton **150**, and the flaps **18, 38, 58, 78** close a bottom opening of the carton **150**.

[0021] The front top flap **36** can include a closure tab **40** that is sized to be received in a closure slit **80** formed in the back top flap **76**. The closure tab **40** and closure slit **80** provide for recloseable sealing of the carton **150** after the top of the carton **150** is opened. One or more cut lines **92, 94** can be included to aid in sliding an upper section of the carton **150** over a lower section, as discussed below with reference to **FIG. 9**. One or more apertures **96, 98, 100** can be included in the blank **8** to prevent binding during erection.

[0022] The process of erecting the carton **150** will be discussed with reference to **FIGS. 1-4**. Referring to **FIG. 2**, which shows a second, exterior side **6** of the blank **8**, adhesive **102** is applied to the exterior side of the z-fold **20** section. The adhesive **102** can be formed from, for example, liquid glue, glue strips, or other materials. Referring to **FIG. 3**, which shows the interior side **5**, the z-fold **20** section is folded about the fold line **22** and about the bottom tear line **28** (shown in **FIG. 1**) so that the bottom panel sections **14, 34, 54, 74** are raised “upwardly,” or toward the upper panel sections **12, 32, 52, 72**, in the direction of the arrow **A**. Folding the z-fold **20** section causes the bottom panel sections **14, 34, 54, 74** to be adhered to the z-fold **20** section by the adhesive **102** (shown in **FIG. 2**).

[0023] Referring to **FIG. 4**, the exterior sides of the adhesive panels **82, 86** (shown in **FIG. 1**) are provided with an adhesive and adhered to the interior sides of the upper and lower first side panel sections **12, 14**, respectively. The blank **8** is then “opened” or “set up” to have the tubular shape shown in **FIG. 4**.

[0024] **FIG. 5** is a front perspective view of the erected carton **150**. Referring also to **FIG. 4**, the carton **150** is fully erected when the top flaps **16, 36, 56, 76** are adhered in a conventional manner to form a top panel **110**, and the bottom flaps **18, 38, 58, 78** are adhered in a conventional manner to form a bottom panel **120**. The tear strip **24** extends around the entire perimeter of the carton **150**. A bag (not shown) or other vessel filled with product may be inserted in the carton in a conventional manner before closing the flaps **16, 36, 56, 76, 18, 38, 58, 78**.

[0025] FIGS. 6-8 illustrate use of the space-saving feature of the carton 150. Referring to FIG. 6, after the top of the carton 150 has been opened, and a portion of the contents within the carton have been consumed, the tear strip 24 is grasped at the tear tab 25 and pulled around the perimeter of the carton 150. Referring to FIG. 7, with the tear strip 24 removed, the carton 150 may now be separated into two sections. Referring to FIG. 8, the carton 150 is separated into an upper section 160 and a lower section 170. In the embodiment shown in FIG. 8, the tear strip 24 divides the carton 150 roughly in half. Therefore, when about half of the carton contents have been consumed or otherwise dispensed from the carton 150, the upper section 160 can be removed. In general, the height of the upper section 160 may be at least a third of the height H of the carton 150 (shown in FIG. 5).

[0026] The upper section 160 can be discarded, and the lower section 170 houses the remainder of the carton's contents. In FIG. 8, the contents are shown as held within a bag 130. The bag 130 can be folded over and clipped, or otherwise sealed, to close off the contents of the carton lower section 170.

[0027] FIG. 9 illustrates an alternative space-saving feature of the carton 150 in which the upper section 160 of the carton 150 is not discarded after removing the tear strip 24. Instead, the tear strip 24 can be removed at any time, and the upper section 160 is slid down over the lower section 170 in the direction of arrow B as the carton contents are consumed. Advantageously, when the upper section 160 is retained, the engageable flaps 36, 76 can be used to close the top of the carton 150. Also, the upper section 160 of the carton 150 may be repeatedly slid, or "telescoped," over the lower section 170 so that the variable height of the carton H_3 closely tracks the height of product remaining in the carton 150. In many common consumer products, including cereals, there is considerable settling of carton contents during shipping. Therefore, the space-saving feature shown in FIG. 9 can be utilized immediately upon purchase, because of the typically large unoccupied volume at the top of the carton upon purchase.

- [0028] According to the above-described embodiments, the space required to store a newly purchased or partially consumed product is reduced substantially by either removing or “telescoping” the top section of the carton. Referring to FIG. 5, the indicated height H_1 (also shown in FIG. 1) is at least about one third of an initial, unmodified, height H of the carton 150. In other embodiments, the height H_1 can be about half the height H of the carton 150. The relative heights H_1 , H can be varied, for example, to achieve varying space-saving characteristics in the carton 150.
- [0029] According to the above-described embodiments, the height of a carton can be reduced by separating the carton into upper and lower sections. The cartons can be reduced in size, for example, as the contents of the carton are consumed or otherwise dispensed. The remainder of the contents are thereby stored in a carton section which occupies less space than the original carton. The reduced size of the carton also allows a consumer to more easily determine the reduced amount of product remaining in the carton, which may serve as cue to purchase more product.
- [0030] Referring to FIG. 8, the tear strip 24, or the exterior remainder of the z-fold 20 revealed when the tear strip 24 is removed, may, for example, include a coupon or a reminder to purchase additional product.
- [0031] In the exemplary embodiments discussed above, the blank may be formed from clay coated newsprint (CCN). In general, the blank may be constructed of paperboard, having a caliper of at least about 14, for example, so that it is heavier and more rigid than ordinary paper. The blank, and thus the carton, can also be constructed of other materials, such as cardboard, or any other material having properties suitable for enabling the carton to function at least generally as described above. The first and second sides of the blank can be coated with, for example, a clay coating. The clay coating may then be printed over with product, advertising, and other information or images. The blank may then be coated with a varnish to protect 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 blanks. The blank can also be laminated to or coated with one or more sheet-like materials at selected panels or panel sections.

[0032] In accordance with the exemplary embodiments, a fold line can be any substantially linear, although not necessarily straight, form of weakening that facilitates folding therealong. More specifically, but not for the purpose of narrowing the scope of the present invention, fold lines include: a score line, such as lines formed with a blunt scoring knife, or the like, which creates a crushed portion in the material along the desired line of weakness; a cut that extends partially into a material along the desired line of weakness, and/or a series of cuts that extend partially into and/or completely through the material along the desired line of weakness; and various combinations of these features.

[0033] A tear line can be any substantially linear, although not necessarily straight, form of weakening that facilitates tearing therealong. Specifically, but not for the purpose of narrowing the scope of the present invention, tear lines include: a cut that extends partially into the material along the desired line of weakness, and/or a series of 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 in the form of a series of cuts that extend completely through the material, with adjacent cuts being spaced apart slightly so that small somewhat bridge-like pieces of the material (e.g., 'nicks') are defined between adjacent cuts. The nicks are broken during tearing along the tear line. Such a tear line that includes nicks can also be referred to as a cut line, since the nicks typically are a relatively small in relation to the cuts. The term "line" as used herein includes not only straight lines, but also other types of lines such as curved, curvilinear or angularly displaced lines.

[0034] In situations where cutting is used to create a fold line, typically the cutting will not be overly extensive in a manner that might cause a reasonable user to incorrectly consider the fold line to be a tear line. In contrast, where nicks are present in a cut line (e.g., tear line), typically the nicks will not be overly large

or overly numerous in a manner that might cause a reasonable user to incorrectly consider the subject cut line to be a fold line.

[0035] The above embodiments are described as having one or 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.

[0036] The foregoing description of the invention illustrates and describes the present invention. Additionally, the disclosure shows and describes only selected preferred embodiments of the invention, but it is to be understood that the invention is capable of use in various other combinations, modifications, and environments and is capable of changes or modifications within the scope of the inventive concept as expressed herein, commensurate with the above teachings, and/or within the skill or knowledge of the relevant art.

WHAT IS CLAIMED IS:

1. A carton blank for forming a carton, comprising:
 - a first side panel;
 - a front panel;
 - a second side panel;
 - a back panel;
 - at least one top flap extending across a first marginal portion of the blank;
 - at least one bottom flap extending across a second marginal portion of the blank; and
 - a tear strip extending along at least substantially an entire length of the blank, through the first side panel, the front panel, the second side panel, and the back panel.

2. The blank of claim 1, wherein:
 - the tear strip divides the front panel into a lower front panel section and an upper front panel section; and
 - in a carton formed from the carton blank, a height of the upper front panel section plus a height of the tear strip is at least about one third of a height of the carton.

3. The blank of claim 1, wherein:
 - the tear strip divides the front panel into a lower front panel section and an upper front panel section; and
 - a height of the upper front panel section plus a height of the tear strip is within about +/- 30% of a height of the lower front panel section.

4. The blank of claim 1-3, wherein a length of the front panel is approximately equal to a length of the back panel.

5. The blank of claim 1-4, further comprising a z-fold section extending along a length of the blank and adjacent to the tear strip.

6. The blank of claim 1-5, wherein the front panel, the first side panel, the back panel, and the second side panel are substantially rectangular.

7. A carton erected from the blank of claim 3.

8. The carton of claim 7, wherein the tear strip extends around substantially an entire perimeter of the carton.

9. A method of erecting a carton, comprising:
providing a blank according to claim 5;
folding the blank at the z-fold section;
folding the blank about transverse fold lines so that the front panel and the back panel are substantially parallel;
closing the at least one top flap to form a top panel; and
closing the at least one bottom flap to form a bottom panel.

10. The blank of claim 1-6, wherein the blank is constructed of paperboard.

11. A carton, comprising:
a first side panel;
a front panel adjacent to the first side panel;
a second side panel adjacent to the first side panel;
a back panel adjacent to the first and second side panels;
a top panel;
a bottom panel; and
a tear strip extending around a perimeter of the carton.

12. The carton of claim 11, wherein:
the tear strip divides the front panel into a lower front panel section and an upper front panel section; and
a height of the upper front panel section plus a height of the tear strip is at least about one third of a height of the carton.

13. The carton of claim 11 or 12, further comprising a z-fold section extending around a perimeter of the carton adjacent to the tear strip.

14. The carton of claim 11, 12, or 13, wherein the carton is constructed of paperboard.

15. A method of conserving space occupied by a carton, comprising:
providing a carton according to claim 11; and
separating the carton into an upper section and a lower section by removing the tear strip.

16. The method of claim 15, further comprising sliding the upper section downwardly over the lower section after separating the carton into upper and lower sections.

17. A carton, comprising:
a first side panel;
a front panel adjacent to the first side panel;
a second side panel adjacent to the first side panel;
a back panel adjacent to the first and second side panels;
a top panel;
a bottom panel; and
means for separating the carton into an upper section and a lower section,
wherein

a height of the upper section is at least about one third of a height of the carton.

18. The carton of claim 17, wherein a length of the front panel is approximately equal to a length of the back panel.

19. The carton of claim 17 or 18, further comprising a z-fold section extending around a perimeter of the carton adjacent to the tear strip.

20. A method of conserving space occupied by a carton, comprising:
providing a carton according to claim 17; and
separating the carton into an upper section and a lower section using the means for separating.

21. The method of claim 20, further comprising consuming a portion of a product held within the carton before separating the carton into the upper and lower sections.

22. The method of claim 20, further comprising sliding the upper section over the lower section after separating the carton into upper and lower sections.

23. A carton, comprising:
a first side panel;
a front panel adjacent to the first side panel;
a second side panel adjacent to the first side panel;
a back panel adjacent to the first and second side panels;
a top panel;
a bottom panel;
a tear strip extending around a perimeter of the carton, the tear strip dividing the front panel into a lower front panel section and an upper front panel section; and

a z-fold section extending around a perimeter of the carton adjacent to the tear strip, wherein

a height of the upper front panel section plus a height of the tear strip is at least about one third of a height of the carton, and

the front panel, the first side panel, the back panel, and the second side panel are substantially rectangular.

24. A carton blank for forming a carton, comprising:

a first side panel;

a front panel;

a second side panel;

a back panel, wherein a length of the front panel is approximately equal to a length of the back panel;

a plurality of top flaps extending across a first marginal portion of the blank;

a plurality of bottom flaps extending across a second marginal portion of the blank; and

a tear strip extending along at least substantially an entire length of the blank, through the first side panel, the front panel, the second side panel, and the back panel, wherein the tear strip divides the front panel into a lower front panel section and an upper front panel section; and

a z-fold section extending along a length of the blank and adjacent to the tear strip, wherein

in a carton formed from the carton blank, a height of the upper front panel section plus a height of the tear strip is at least about one third of a height of the carton, and

the front panel, the first side panel, the back panel, and the second side panel are substantially rectangular.

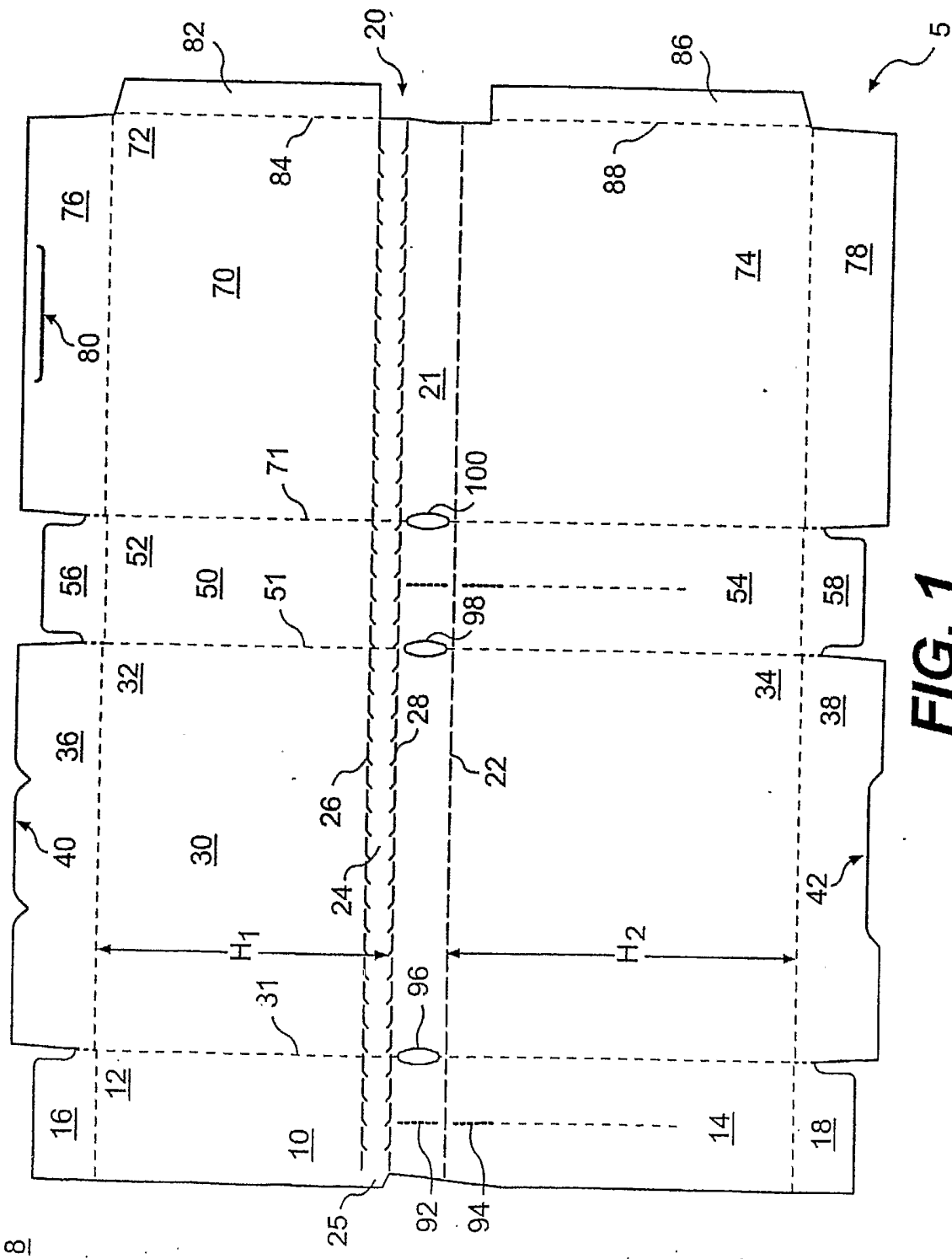


FIG. 1

8

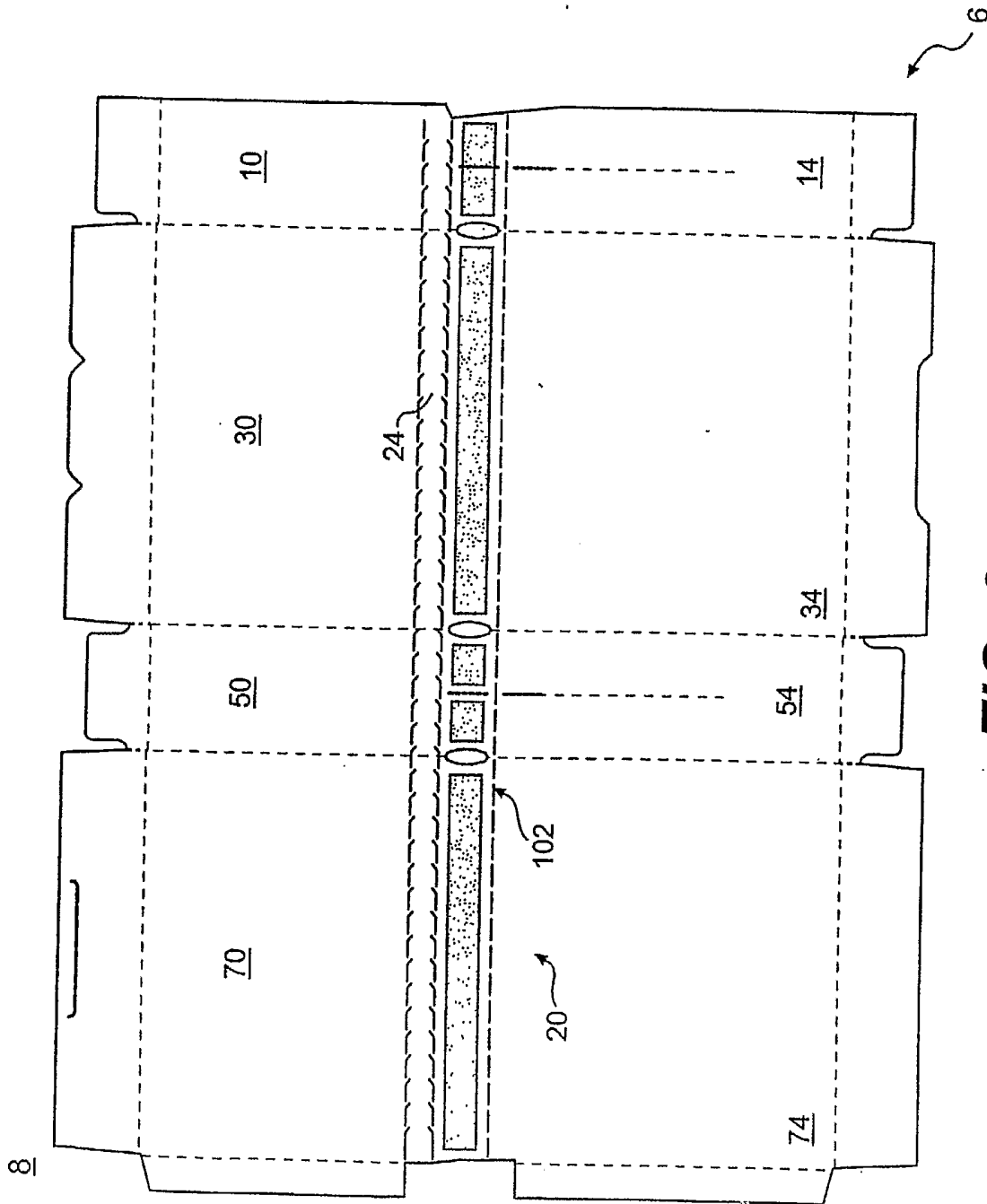


FIG. 2

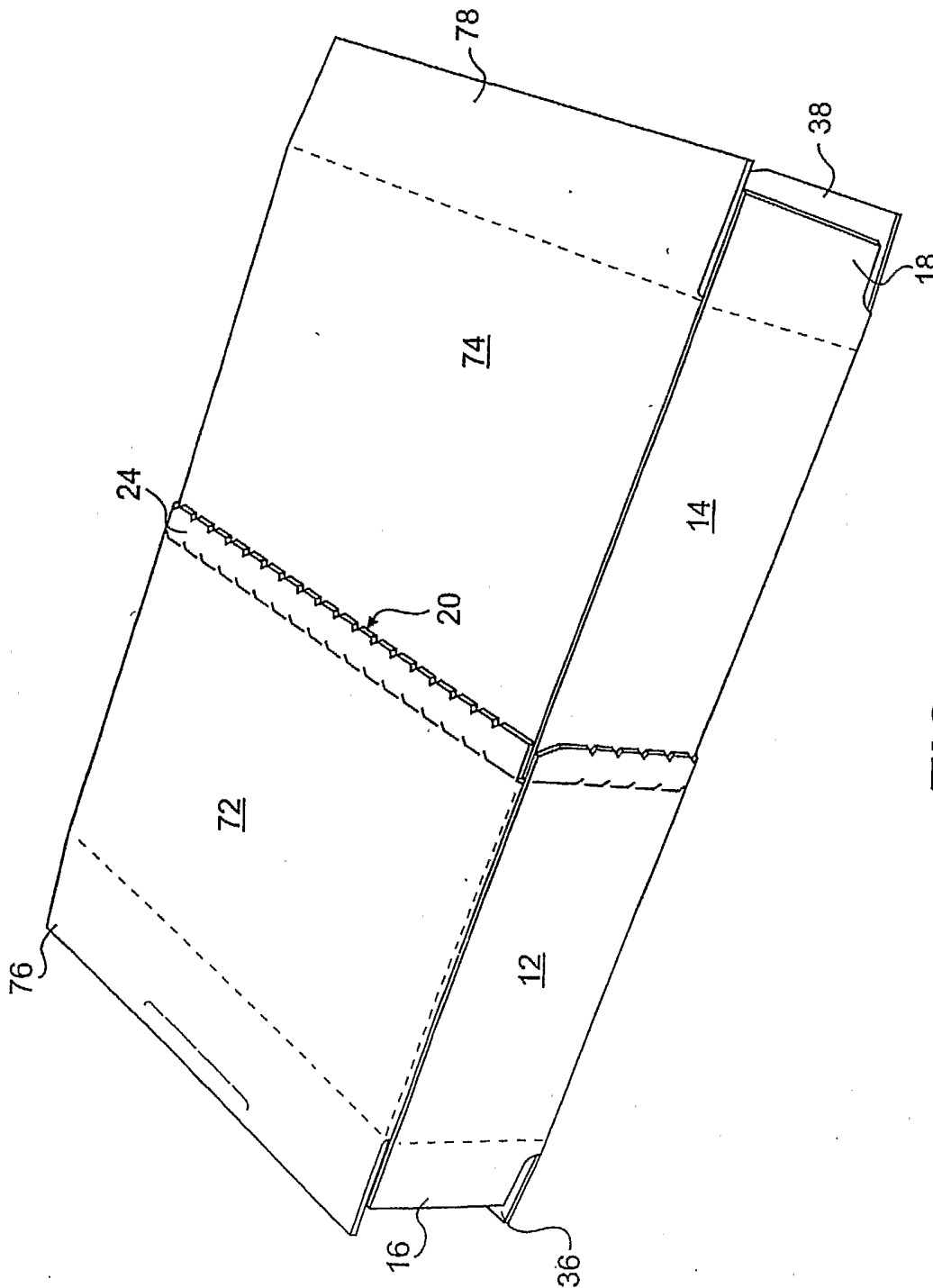


FIG. 4

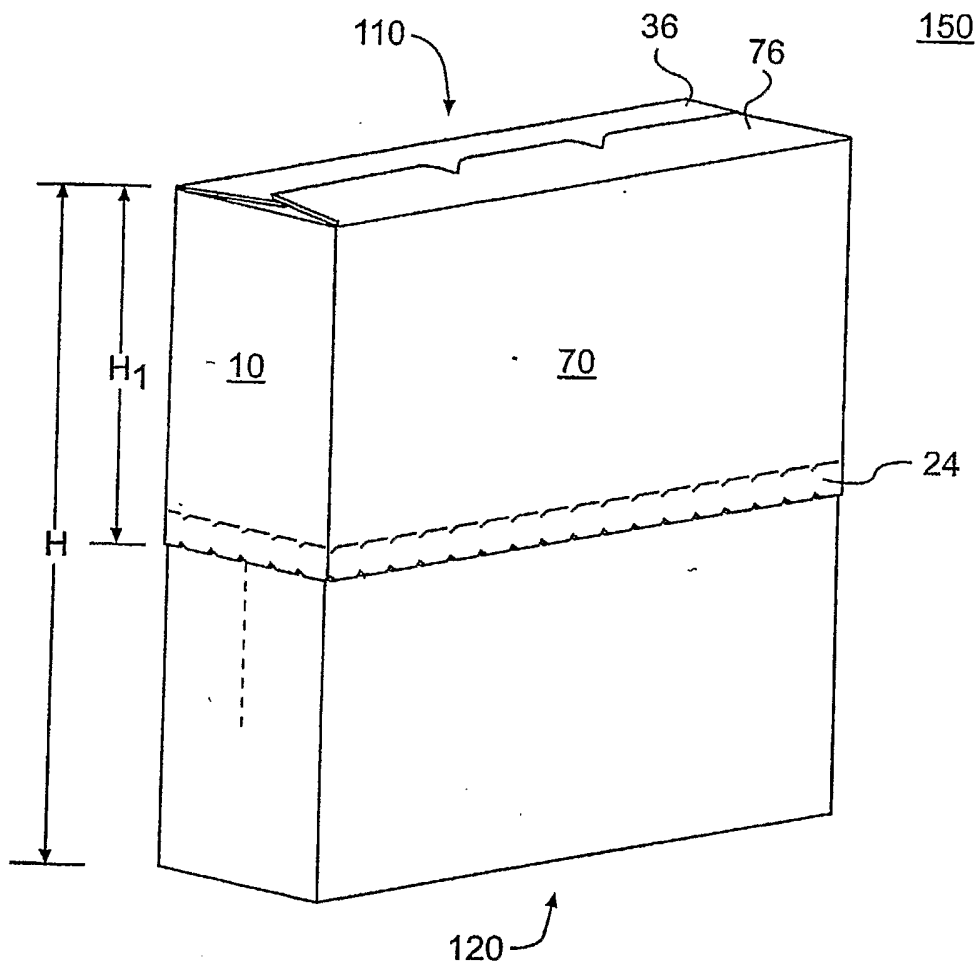


FIG. 5

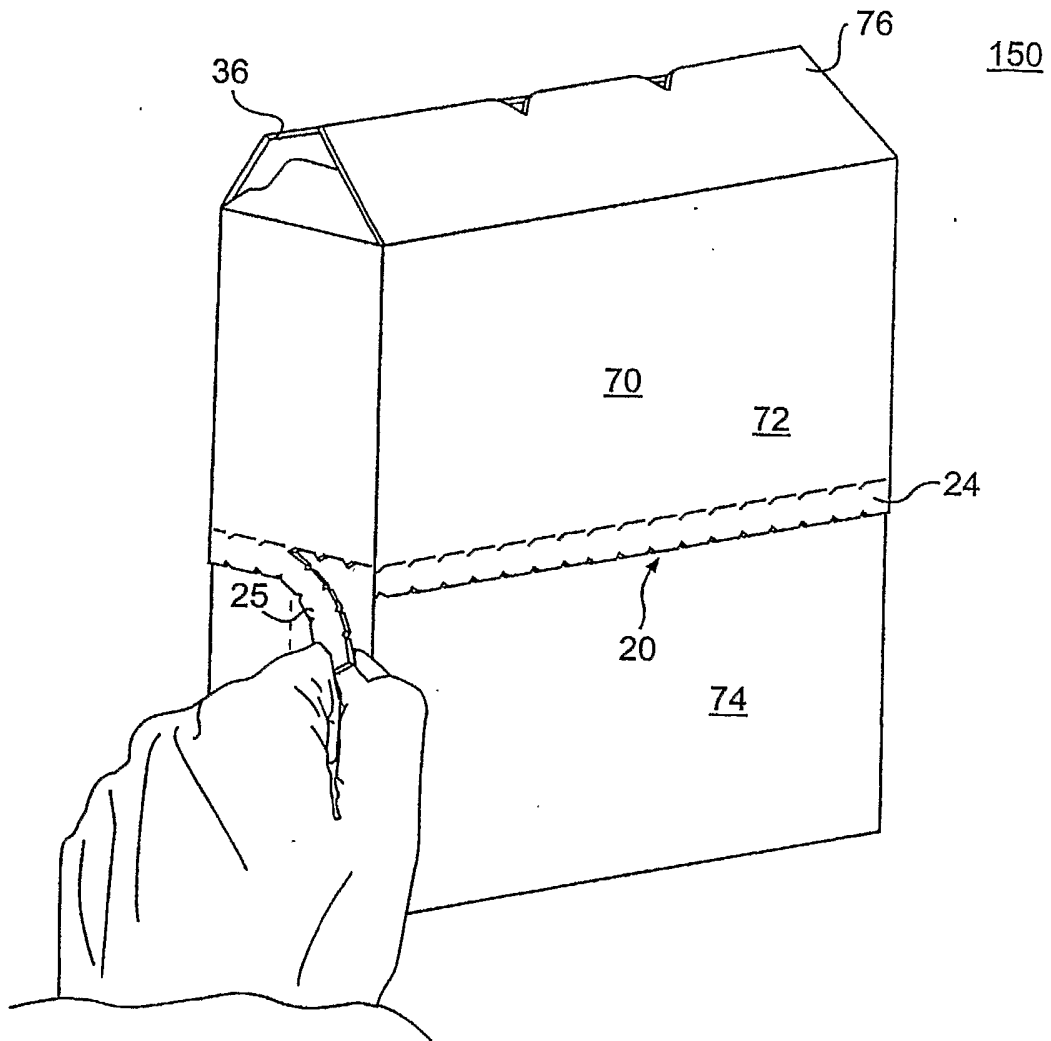


FIG. 6

150

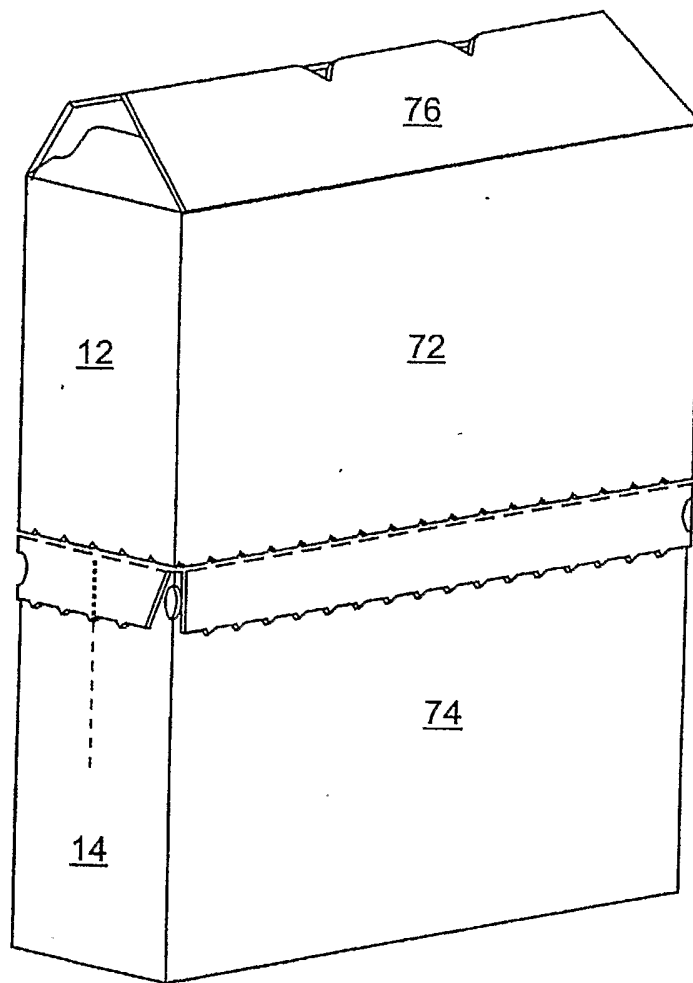


FIG. 7

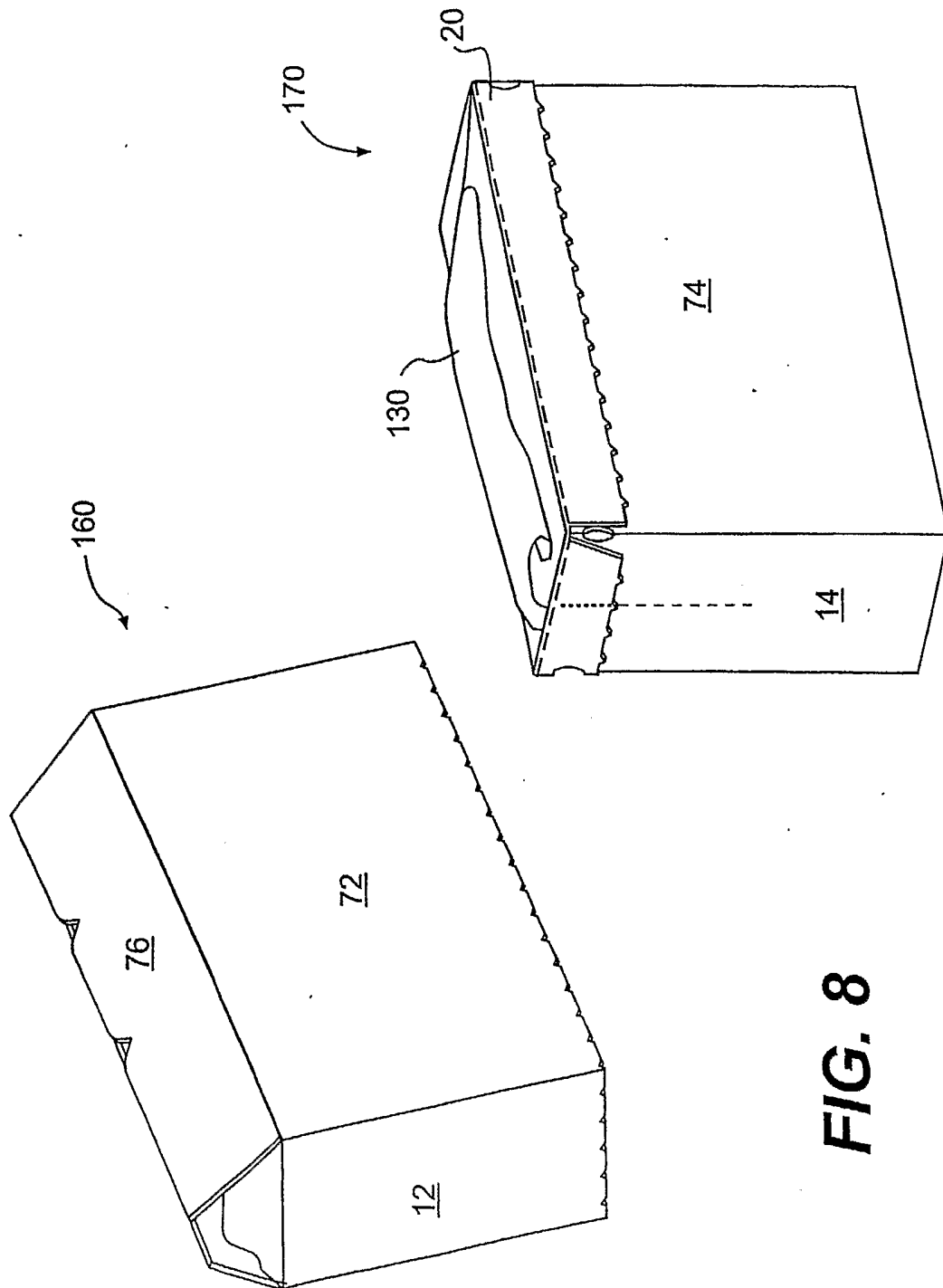


FIG. 8

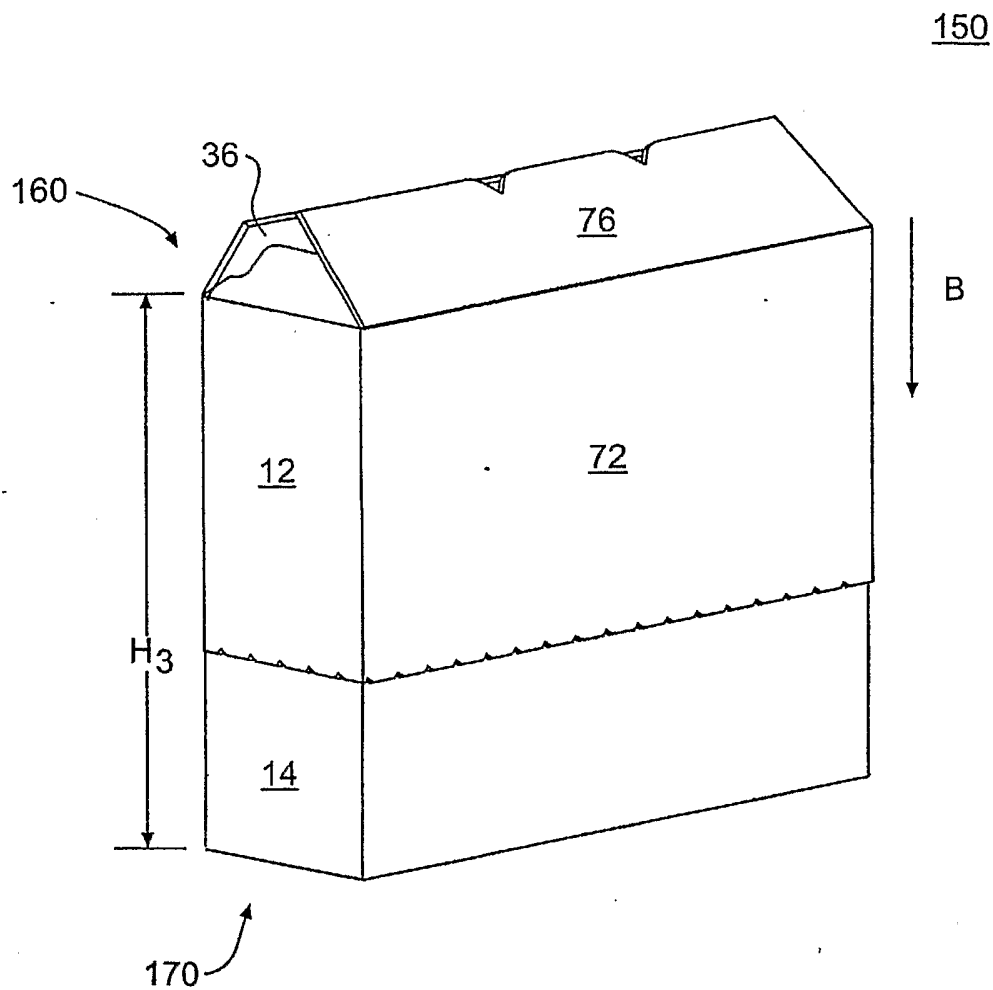


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/013582

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D5/00 B65D5/54

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)
B65D

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X | GB 2 363 372 A (ANDREW * KEPHALAS; KYRIACOS * KYRIACOU) 19 December 2001 (2001-12-19) abstract; figures 1-4 page 5, line 9 - page 7, paragraph 2 | 1-24 |
| X | US 6 102 277 A (KRAPOHL, SR. ET AL) 15 August 2000 (2000-08-15) abstract; figures 1,2,5 column 3, line 57 - column 5, paragraph 1 | 1-24 |
| X | US 4 558 785 A (GORDON ET AL) 17 December 1985 (1985-12-17) column 2, last paragraph - column 4, paragraph 1; figures 1-3 column 4, line 34 - line 44; figure 6 | 1-24 |
| | -/-- | |

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

4 August 2006

Date of mailing of the international search report

14/08/2006

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Segeer, H

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/013582

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|--|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | DE 87 08 078 U1 (EUROPA CARTON AG, 2000 HAMBURG, DE) 3 September 1987 (1987-09-03) page 2, last paragraph - page 3, paragraph 1 page 4, paragraph 3 - page 6, last paragraph; figure 1 ----- | 1-24 |
| A | US 4 508 218 A (FOCKE ET AL) 2 April 1985 (1985-04-02) column 3, line 20 - line 50; figures 1,4,5 ----- | 5,13,19, 23,24 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

| |
|---|
| International application No PCT/US2006/013582 |
|---|

| Patent document cited in search report | A | Publication date | Patent family member(s) | Publication date |
|--|----|------------------|-------------------------|------------------|
| GB 2363372 | A | 19-12-2001 | NONE | |
| US 6102277 | A | 15-08-2000 | NONE | |
| US 4558785 | A | 17-12-1985 | CA 1241609 A1 | 06-09-1988 |
| DE 8708078 | U1 | 03-09-1987 | NONE | |
| US 4508218 | A | 02-04-1985 | BR 8203564 A | 14-06-1983 |
| | | | DE 3124118 A1 | 03-02-1983 |
| | | | GB 2101565 A | 19-01-1983 |
| | | | JP 1247883 C | 16-01-1985 |
| | | | JP 58011674 A | 22-01-1983 |
| | | | JP 59024952 B | 13-06-1984 |