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(54) **Rigid foldable box**

(57) A foldable rigid box (1) comprises a collapsible tubular blank (20) and a foldable blank (10). The tubular blank (20) is hingeably connected to a portion of the foldable blank (10) so that said tubular blank (20) can assume a collapsed position with the panels of the tubular blank

(20) substantially parallel with said portion of the foldable blank (10) so that the complete box (1) is flat and an expanded position with the panels of the tubular blank (20) or at a substantially right angle with said portion of said foldable blank (10).

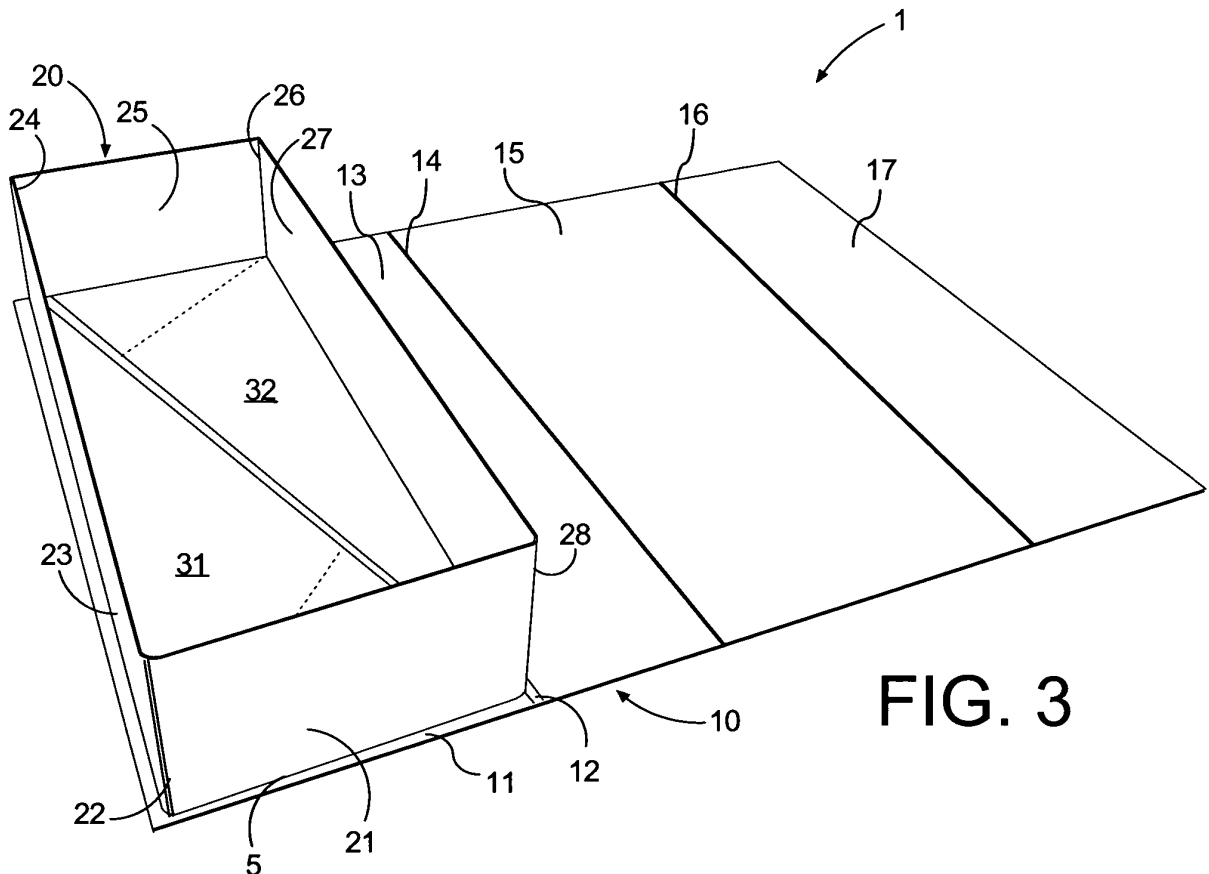


FIG. 3

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DescriptionFIELD OF THE INVENTION

[0001] The present invention relates to a rigid box, in particular to a foldable rigid box.

BACKGROUND OF THE INVENTION

[0002] Rigid boxes with a box shaped base and a tray shaped hood are commonly used in the packaging industry for packaging a large variety of items, such as glassware, shoes, etc. Typically, these boxes are made of carton and cannot be folded. These known rigid boxes provide a relatively elegant means of packaging. However, since they cannot be folded and they consume a large amount of space during transport and storage of the boxes themselves (the empty boxes). Further, the base and the hood are separate components which is from a logistical point of view added advantage relative to a single component box.

DISCLOSURE OF THE INVENTION

[0003] On this background, it is an object of the present invention to provide rigid box that can be folded to assume a substantially flat configuration and that includes only a single component.

[0004] This object is achieved by providing a foldable rigid box comprising a collapsible tubular blank and a foldable or flat blank, the tubular blank being hingeably connected to a portion of the foldable blank so that the tubular blank can assume a collapsed position with the panels of the tubular blank substantially parallel with the portion of the foldable blank and an expanded position with the panels of the tubular blank being at a substantially right angle with the portion of the foldable blank.

[0005] By linking a collapsible tubular blank to a foldable blank by link mechanism is possible to provide a box that can be collapsed to a substantially totally flat item with the advantages associated therewith. The box can also be erected quickly again and serve its purpose as a packaging container.

[0006] One of the panels of the tubular blank can be hinged along one of the peripheral areas of the foldable blank.

[0007] The tubular blank can be hinged along one of the peripheral areas of the foldable blank by a simple hinge. This simple hinge may include a fold line in a piece of sheet material.

[0008] Another wall of the tubular blank can be suspended from the foldable blank by a link that causes the tubular blank to assume a substantially rectangular configuration in the expanded position. Thus, the blank automatically assumes the correct shape when it assumes the expanded position.

[0009] The link make calls the tubular blank to assume a substantially flat configuration in the collapsed position.

[0010] The link and the hinge may allow the tubular blank to swing between the collapsed and expanded position.

[0011] The foldable blank may comprise a bottom panel forming the bottom of the box.

[0012] In the tubular blank may comprise four panels forming the side walls of the box.

[0013] The tubular blank can be hinged along one of the edges of the bottom panel.

[0014] The foldable blank may comprise a rear panel adjacent the bottom panel and is connected to the bottom panel by a fold line.

[0015] The foldable blank may comprises a top panel adjacent the rear panel and is connected to the rear panel by a fold line.

[0016] The foldable blank may comprises a front panel adjacent the top panel and is connected to the top panel by a fold line.

[0017] The fold lines in the foldable blank may be substantially parallel to one another.

[0018] The front panel can be provided with attachment means for releasably securing the front panel to one of the side panels of the tubular blank.

[0019] The link and/or the hinge can be made of sheet material.

[0020] The link can be a foldable link.

[0021] The portion of the foldable blank that is hingeably connected to the tubular blank may have a contour that substantially corresponds to the contour of the tubular blank in the expanded position.

[0022] The tubular blank may abut in the expanded position with its edges on one of the two sides of the portion of the foldable blank.

[0023] Further objects, features, advantages and properties of the box according to the invention will become apparent from the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] In the following detailed portion of the present description, the invention will be explained in more detail with reference to the exemplary embodiments shown in the drawings, in which:

Figure 1 is an elevated view of collapsible rigid box according to an embodiment the invention in an expanded state with the lid closed,

figure 2 is the same view as shown in figure 1 with the lid partially opened,

figure 3 is the same view as shown in figure 1 with the lid completely opened,

figure 4 is a top view of the collapsible rigid box shown in figure 3,

figure 5 is an elevated view of the box according to the preceding figures with a tubular member of the box in a position between an expanded state and the retracted state,

figure 6 is a top view on the box according to the

preceding figures with the tubular member of the box in the retracted state, and figures 7 to 9 are top- and elevated views of another embodiment of the collapsible rigid box according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] In the following detailed description, the collapsible rigid box according to the invention will be described by the preferred embodiments.

[0026] Figure 1 shows an embodiment of the rigid collapsible box 1 according to the present invention. The box 1 typically has a rectangular, i.e. cuboid shape and can be made of paper, carton, combinations thereof or other material typically used for boxes that are used in the packaging industry and may include plastic material.

[0027] As shown in figures 2 and 3, the box 1 is assembled from a foldable blank 10 and a tubular blank 20. The tubular blank 20 is connected to the foldable blank by a hinge 5. The hinge five is in this embodiment formed by default lying in a piece of sheet material that is attached to both blanks.

[0028] The foldable blank 10 comprises a bottom panel 11 connected by a fold line 12 to a rear flap 13. The rear flap 13 is connected by a fold line 14 to a top panel 15. The top panel 15 is connected by a fold line 16 to a front flap 17. The panels 13, 15 and 17 form the lid of the box 1. The fold lines 12, 14 and 16 are substantially in parallel to one another, and can be formed by any known suitable way.

[0029] The tubular blank 20 comprises a first side panel 21 connected by a fold line 22 to a front panel 23. The front panel 23 is connected by a fold line 24 to the second side panel 25. The second side panel 25 is connected via a fold line 26 to a rear panel 27. The rear panel 27 is connected by a fold line 28 to the first side panel 21. Thus, the four panels 21, 23, 25 and 27 form a foldable tubular member with a substantially rectangular outline in the expanded position (as shown in figure 2 and 3) and the fold lines 22, 24, 26 and 28 allow the tubular blank 20 to assume a collapsed position in which it is substantially flat. The fold lines 22, 24, 26 and 28 are in place embodiment substantially parallel to one another.

[0030] In order to assure that the tubular blank 20 assumes a substantially rectangular position when this is required and a substantially flat position when this is required there is provided a link including element 31.

[0031] This link will be shown in greater detail with respect to figures 4 to 6 and includes a first link member 31 that is in the shown embodiment formed by a piece of sheet material that is hingeably connected to the bottom panel 11 via a fold line 35 and hingeably connected to the front panel 23 via a fold line 37. In the shown embodiment the link is made of a piece of sheet material that includes members 31 and 33. Members 31 and are in an embodiment formed by a single piece of sheet ma-

terial and connected by the fold line 35. Member 33 is secured to the bottom panel 11, e.g. by adhering, whilst member 31 is hingeably connected to be front panel 23 via fold line 37.

[0032] The hinge allows a pivotal movement of the blank 20 between the expanded position shown in figures 1 to 4 and the collapsed position shown in figure 6. Figure 5 illustrates an intermediate position. The hinge ensures that the tubular blank 20 assumes its substantially rectangular position when it is placed on top of the bottom panel 11 (the expanded position). The hinge also ensures that the tubular blank 20 assumes its collapsed and substantially flat position when it is positioned along the side of the foldable blank 10 in the collapsed position shown in figure 6.

[0033] In the shown embodiment in the tubular blank 20 is provided with a further link 32,34 that includes a piece of sheet material with sections 32,34 that are connected to one another by a fold line 36. Section 32 is hingeably connected to the rear panel 27 via a fold line 38. Section 34 is hingeably connected to the second side panel 25 via a fold line 39. The further link 32,34 increases the stability of the tubular blank 20 in the expanded position.

[0034] The show will blank 20 can be moved between the collapsed position shown in figure 6 and the expanded position in figures 1 to 4 with the relative ease by any kind of user or employee in the packaging industry.

[0035] The rigid collapsible box 20 is closed by folding the lid with the rear flap 13, top panel 15 and front flap 17 over the tubular blank 20. In order to ensure that the front flap 17 remains in close contact with the front panel 23 fastening means may be provided that secure the front flap 17 to the front panel 23. In figure 6 an example of such fastening means is illustrated by embedded permanent magnets 40 in the front panel that interact with magnetically attractive embedded plates 42 in the front flap 17. The plates 42 may for example be iron or steel plates. Other forms of fastening, such as clips, hooks, locks or Velcro® could also be used for securing the front flap 17 to be front panel 23.

[0036] Figures 7 to 9 show another embodiment of the box according to the present invention. This embodiment is essentially identical with you and the human shown in figures 1 to 6 except that the "foldable" blank 10 only consists of a single panel 11: the bottom panel. The term "foldable" is different exactly appropriate in this case and we refer to this blank as a flat blank 10.

[0037] This box can be moved between a retracted and an expanded position in the same way as the box is treated with reference to figures 1 to 6.

[0038] The box according to this embodiment does not have an integrated lid. Instead any conventional lid (not shown), such as a paper or plastic lid can be placed on the box according to this embodiment.

[0039] Alternatively, the lid can be formed by a second box according present embodiment with a tubular blank that is sized to just fit within the tubular blank of the other

box or sized just to fit around the tubular blank of the other box. Thus, the complete box with lid consists of two elements that can be folded flat and are easy to store and transport.

[0040] The invention has numerous advantages. Different embodiments or implementations may yield one or more of the following advantages. It should be noted that this is not an exhaustive list and there may be other advantages which are not described herein. One advantage of the invention is that it provides a rigid box that can be collapsed so as to reduce the amount of space that it occupies during storage and transport. It is another advantage of the invention that it allows for a rigid box that can be easily collapsed. It is yet another advantage of the invention that it provides for a collapsible box that is relatively inexpensive to manufacture. It is a further advantage of the invention that it provides for a rigid box with a lid, wherein the box that is for logistical purposes a single component.

[0041] The term "comprising" as used in the claims does not exclude other elements or steps. The term "a" or "an" as used in the claims does not exclude a plurality.

[0042] Whilst endeavoring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon. Moreover, it should be appreciated that those skilled in the art, upon consideration of the present disclosure, may make modifications and/or improvements on the device hereof and yet remain within the scope and spirit hereof as set forth in the following claims.

Claims

1. A foldable rigid box comprising a collapsible tubular blank and a foldable or flat blank, said tubular blank being hingeably connected to a portion of said foldable blank so that said tubular blank can assume a collapsed position with the panels of the tubular blank substantially parallel with said portion of the foldable blank and an expanded position with the panels of the tubular blank being at a substantially right angle with said portion of said foldable blank.
2. A box according to claim 1, wherein one of the panels of said tubular blank is hinged along one of the peripheral areas of the foldable blank.
3. A box according to claim 2, wherein said tubular blank is hinged along one of the peripheral areas of the foldable blank by a simple hinge.
4. A box according to claim 2 or 3, wherein another wall of said tubular blank is suspended from said foldable blank by a link that causes said tubular blank to assume a substantially rectangular configuration in said expanded position.
5. A box according to claim 4, wherein said link causes said tubular blank to assume a substantially flat configuration in said collapsed position.
6. A box according to claim 5, wherein said link and said hinge allow said tubular blank to swing between said collapsed and expanded position.
7. A box according to any of the preceding claims, wherein said foldable blank comprises a bottom panel forming the bottom of the box.
8. A box according to any of the preceding claims, wherein said tubular blank comprises four panels forming the side walls of the box.
9. A box according to claim 8, wherein said tubular blank is hinged along one of the edges of said bottom panel.
10. A box according to claims 7 to 9, wherein said foldable blank comprises a rear panel adjacent said bottom panel and is connected to the bottom panel by a fold line.
11. A box according to claim 10, wherein said foldable blank comprises a top panel adjacent said rear panel and is connected to the rear panel by a fold line.
12. A box according to claim 11, wherein said foldable blank comprises a front panel adjacent said top panel and is connected to the top panel by a fold line.
13. A box according to claim 11 or 12, wherein the fold lines in said foldable blank are substantially parallel to one another.
14. A box according to claim 12 or 13, wherein said front panel is provided with attachment means for releasably securing the front panel to one of the side panels of the tubular blank.
15. A box according to any of claims wherein said link and/or said hinge are made of sheet material.
16. A box according to claim 15, wherein said link is a foldable link.
17. A box according to any of the preceding claims, wherein said portion of the foldable blank that is hingeably connected to the tubular blank has a contour that substantially corresponds to the contour of the tubular blank in the expanded position.

18. A box according to claim 17, wherein the tubular blank abuts in the expanded position with its edges on one of the two sides of said portion of the foldable blank.

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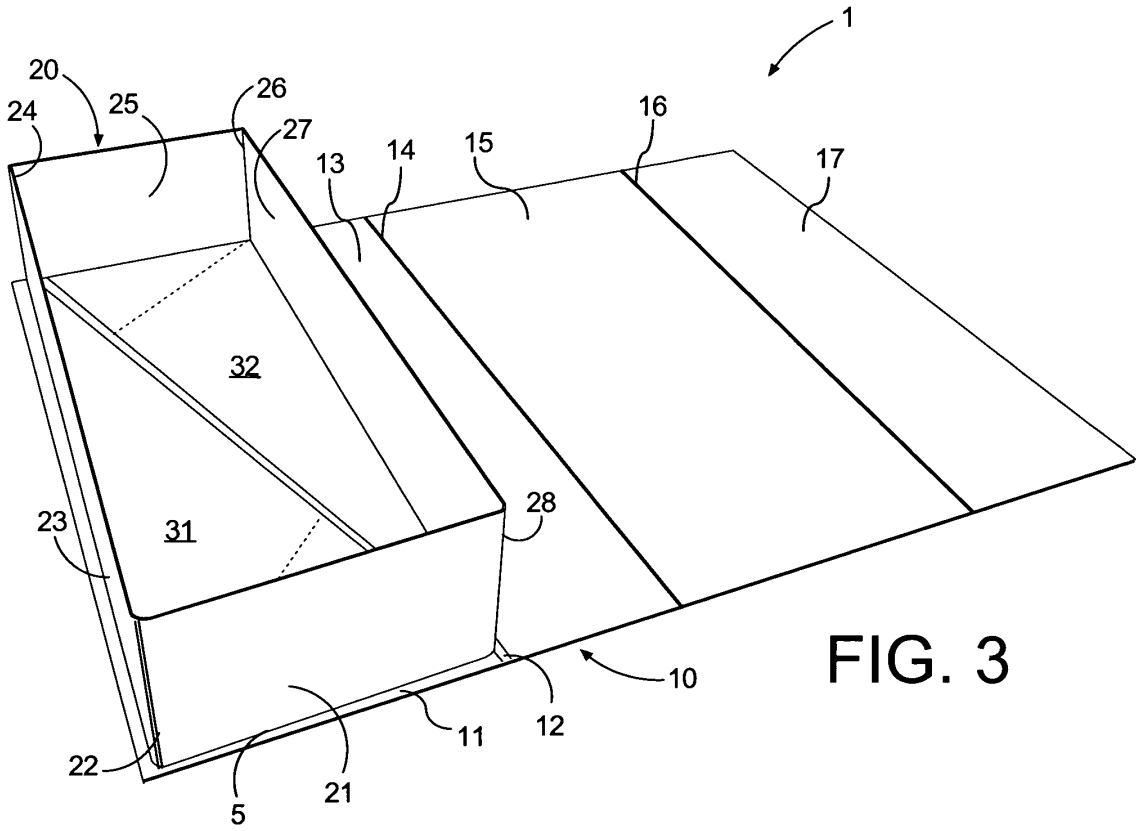
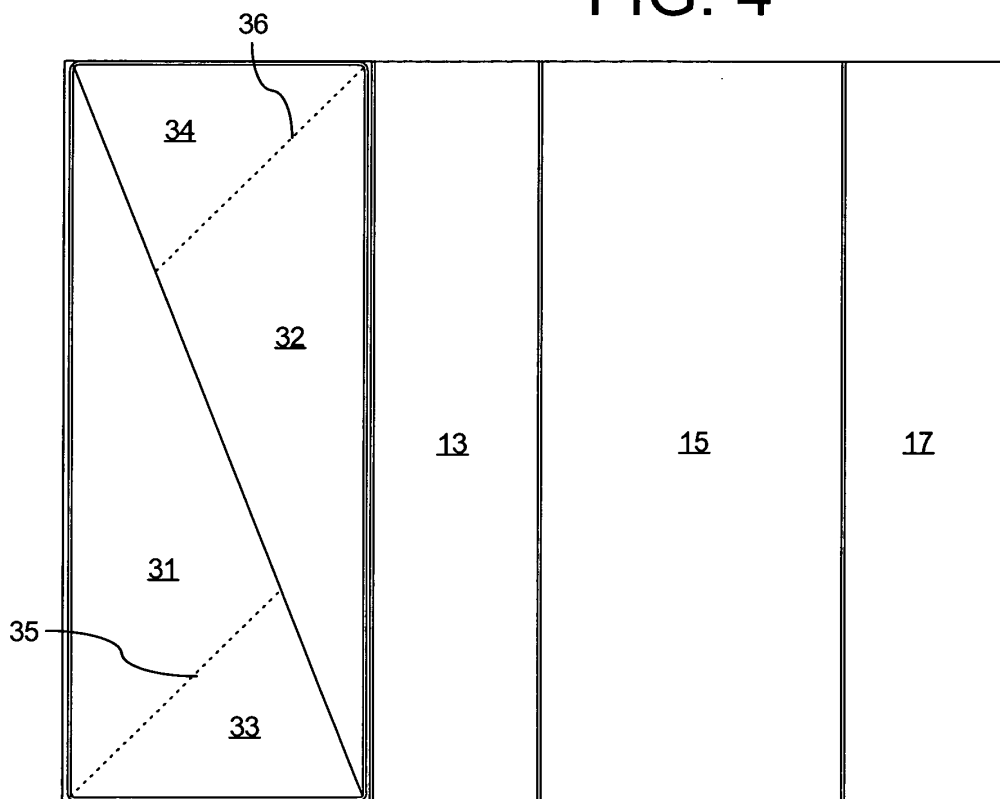
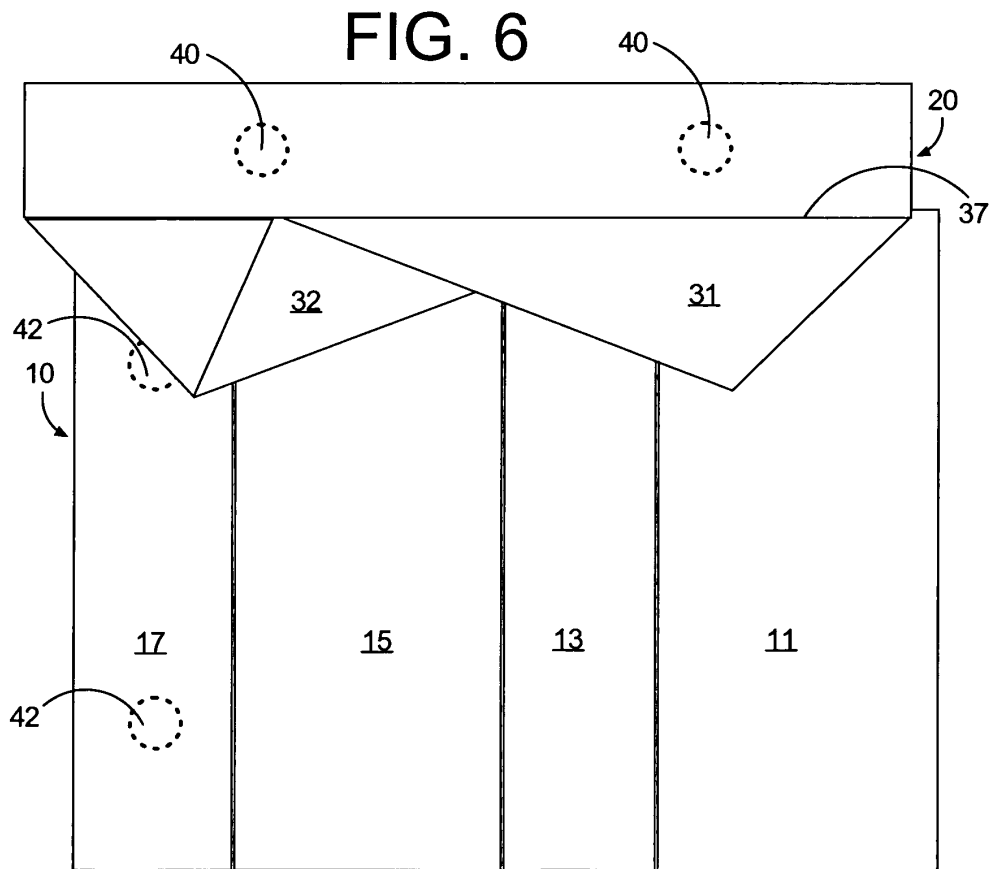
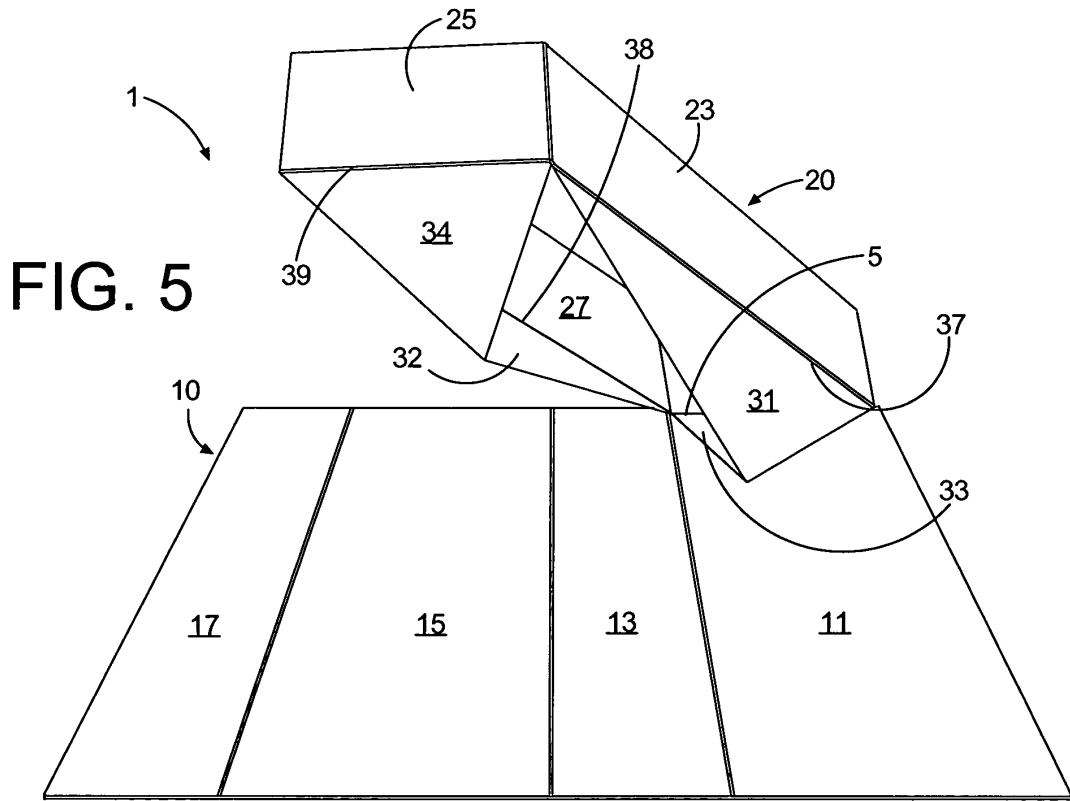


FIG. 3

FIG. 4





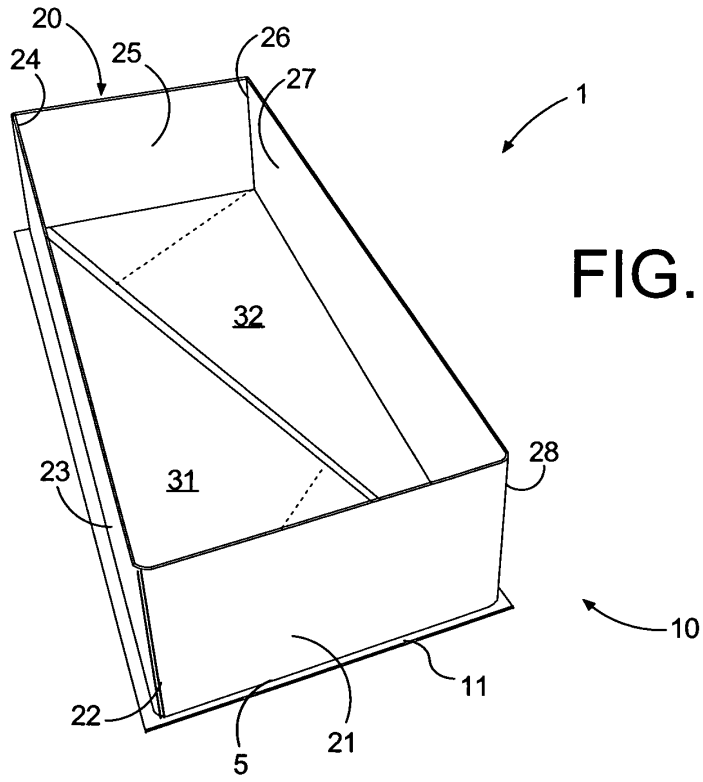


FIG. 7

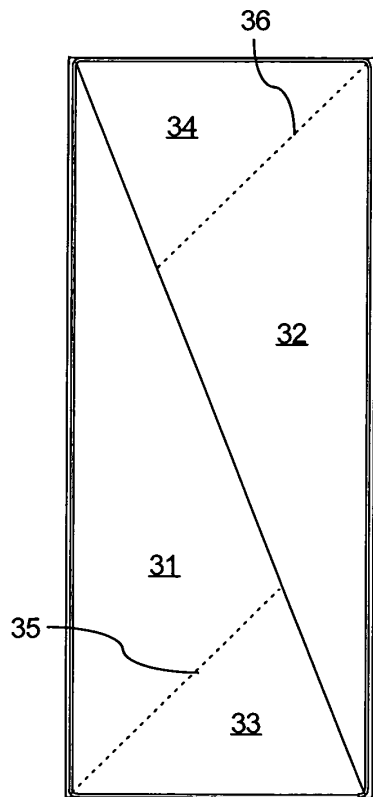


FIG. 8

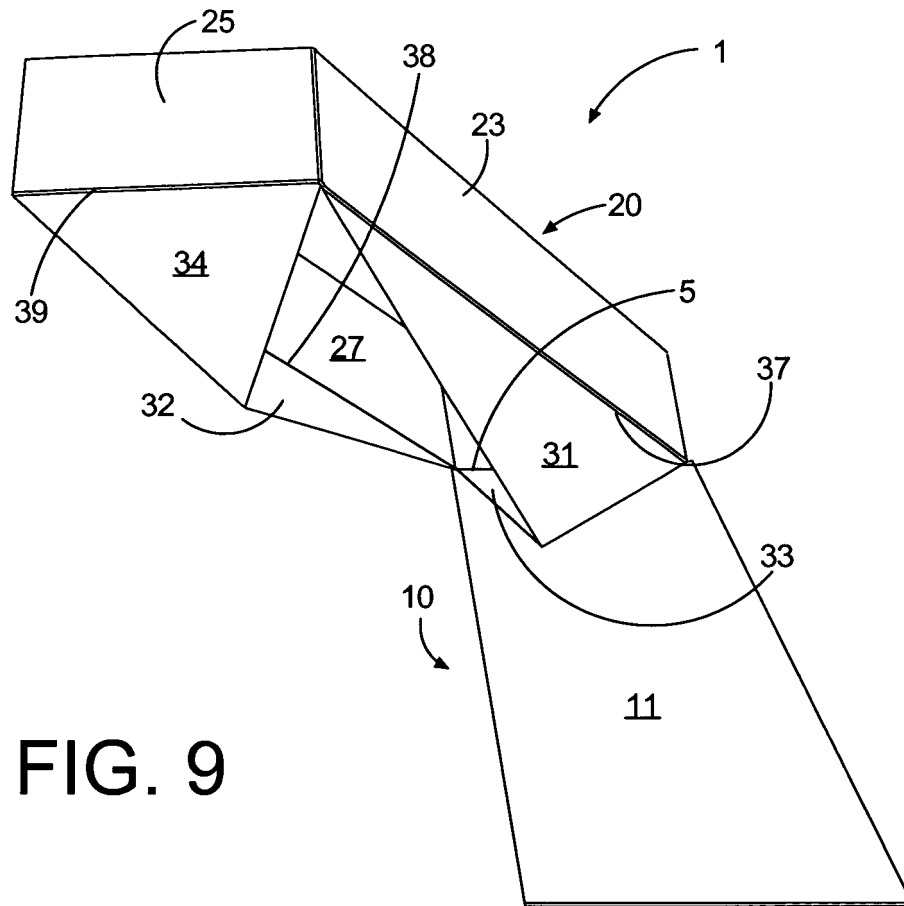


FIG. 9



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 733 972 A (HILLEBRAND HOLGER [DE]) 20 December 2006 (2006-12-20) * page 1, line 34 - line 38 * * paragraphs [0030], [0041], [0047]; figures 1,3 * -----	1-18	INV. B65D6/18 B65D5/36 B65D5/32
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 May 2008	Examiner Sundell, Olli
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 00 0476

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-05-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1733972	A	20-12-2006	NONE

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