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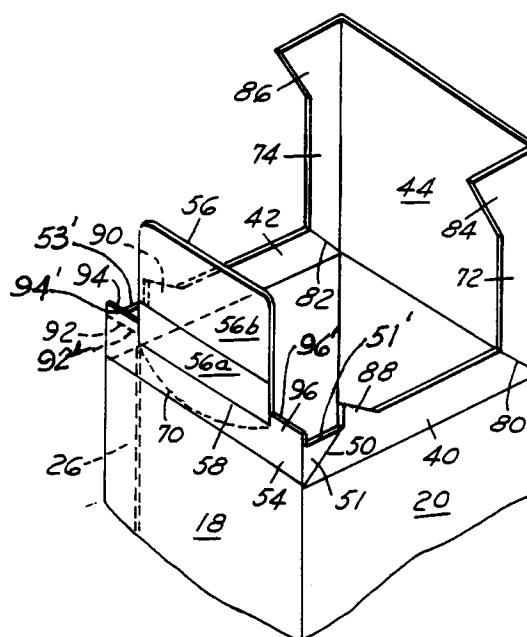
(71) Applicant: **ELOPAK SYSTEMS AG**
Flughofstrasse 41 Postfach
CH-8152 Glattbrugg(CH)

(72) Inventor: **Lisiecki, Robert Edward**
4307 Foxpointe
West Bloomfield, Michigan 48033(US)
Inventor: **Murrah, Howard Elwood**
12400 Holtforth
Fenton, Michigan 48430(US)

(74) Representative: **Burrows, Anthony Gregory et al**
Business Centre West, Avenue One,
Business Park
Letchworth Garden City, Hertfordshire SG6
2HB (GB)

(54) **Container and blank for constructing same.**

(57) A flat top closure of a thermoplastic coated container and blank includes side edge panels 40 and 42, a front edge panel 46 foldable back onto itself and having an arcuate-shaped perforated line 70 formed thereon, and a cover panel 44 having cover edge panels 72 and 74 connected to the sides thereof. The perforated line 70 breaks upon the cover panel 44 being opened to form a horizontal, arcuate-shaped pouring edge. The cover edge panels 72 and 74 are secured to the side edge panels 40 and 42 effectively to control film delamination upon the cover panel 44 being opened. A side seam 26 is at a front corner of the container. Triangular segments 51 and 53, a side seam extension panel extension 92, and front panel extensions 94 and 96 have cut and thus uncoated edges 51', 53', 92', 94' and 96' which, in the closed condition, occupy positions stepped relative to each other. Widening 84 to 90 of the cover edge panels 72 and 74 and the side edge panels 40 and 42 are sealed together inwards of the inner ends of the edges 51', 53', 92', 94' and 96'.

FIG. 8**EP 0 552 928 A1**

This invention relates generally to containers and, more particularly, to a blank and a container including an end closure of an improved construction.

Containers for beverages such as milk, cream, other dairy products, juices, and the like, are conventionally constructed from thermoplastics-coated paperboard. Typically, these containers include a top end closure with a folded roof structure adapted to providing a readily available pouring spout when the contents of the container are to be dispensed.

Coated paperboard blanks for constructing such a container are made on converting machines similar to those disclosed by US-A-2,672,208 and 3,731,600. After construction, the blanks are processed by forming, filling and sealing machines, such as those disclosed by US-A-3,303,761; 3,918,236; 3,398,659; or 4,193,833, to produce the formed, filled and sealed containers of the type referred to above and shown and described in US-A- 3,270,940 or 4,422,570.

Other flat top container arrangements, which do not include a pouring spout as in US-A-3,270,940 and 4,422,570, are disclosed in US-A-4,397,415; 4,702,407, and 4,784,272. These three Patents disclose cartons which are adapted to hold frozen juices or "spoonable" products, and to have their top closures fully opened to provide access to the contents.

The structure disclosed in US-A-4,784,272 is formed to include perforations along the score line between the front panel and the adjacent flat top panel. The structure disclosed in US-A-4,702,407 is formed to include perforations on the front panel adjacent the top end portion thereof, and along the fold lines between the side panels and the respective side edge panels.

US-A-4,397,415 discloses a perforated line or partial cut formed horizontally across the fold line between a front fold-in panel segment and a fold-out segment. Accordingly, when the top is opened by breaking the perforated line or partial cut, and lifting the cover panel, a horizontal front edge panel remains, as well as a pair of oppositely disposed side fold-in edge panels, each bearing paper tear surfaces.

US-A-2,758,775 discloses a flat top container wherein perforations are formed along the length of the cover panel adjacent the side edges thereof for co-operation with side edge panels connected to fold-in side panels of the container.

US-A-2,819,832 discloses a flat top container having edge panels formed on the sides of an outer cover panel, and which are cut apart from side edge panels connected to the top ends of the respective container side panels.

US-A-3,661,321 discloses a paperboard carton for packing particulate, granular or powdery products and also discloses a method of folding closure flaps for adhesive application and closing the carton. Gusset side flaps are first folded out and a major flap to which the side flaps are connected is folded in. This forms a virtual coplanar surface to which adhesive is applied. Next the gusset side flaps are folded in and under the major flap. A second major flap substantially equal in area to the first is then folded down over the first major flap to form a cover flap. Two cut-score lines which operate in conjunction with a grip tab integrally connected to one side flap provide an easy-open feature which makes a triangular opening.

In the container of US-A-4784272, for example, certain problems can arise. Firstly, opening of the container can produced a random delamination of the cover panel, sometimes leaving undesired, thin, delamination webs extending inwards from the side edge panels. Secondly, the heating of the respective opposite edges of the blank transverse to the row of body panels in side-seaming can render that edge of the thermoplastics inside surface of the cover panel less effective for subsequent heat-sealing of the cover panel to the adjacent side edge panel. Thirdly, short, cut, and thus uncoated, edges of triangular, edge panel segments and of a side seam extension panel in the top end closure extend across the side edge panels from the inner edges of the side edge panels to the outer edges thereof and thus provide short paths for seepage or "wicking" of fluid contents of the container to the outside of the container. Fourthly, pairs of these cut edges lie one upon the other as steps each two-thicknesses high, so that the thermoplastics of the closure panels sandwiching such step between them may not fully seal the gap at the step.

According to a first aspect of the present invention, there is provided a thermoplastic-coated paperboard container, including:

(a) a tube of first, second, third and fourth body panels, and

(b) one end closure panels comprised of a loop of first, second, third and fourth closure panels, the closure panels being connected to the respective body panels, said first closure panel being a cover panel covering the second, third and fourth closure panels,

characterized by said one end closure panels including first and second cover edge panels connected to respective opposite edges of the cover panel by fold lines and to the respective adjacent second and fourth closure panels by diagonal fold lines and sealed to the respective second and fourth closure panels.

According to a second aspect of the present invention, there is provided a thermoplastic-coated

paperboard blank, including:

- (a) a row of body panels comprised of first, second, third and fourth body panels, and
- (b) one end closure panels comprised of a row of end closure panels comprised of first, second, third and fourth closure panels connected to respective ends of the respective body panels, characterized in that said first closure panel is of a larger area than any one of said second, third and fourth closure panels for providing a cover panel, and in that said one end closure panels include first and second cover edge panels connected to respective opposite edges of said first closure panel by first and second lines of weakness and to the respective adjacent second and fourth closure panels by diagonal lines of weakness for sealing to the respective second and fourth closure panels.

Owing to these aspects of the invention, it is possible to avoid significant delamination of the cover panel during opening.

According to a third aspect of the present invention, there is provided a thermoplastic-coated paperboard container, including:-

- (a) a tube of body panels comprised of first, second, third and fourth body panels, and
- (b) one end closure panels comprised of first, second, third and fourth closure panels, the closure panels being connected to the body panels, one closure panel of the one end closure panels including an inwardly extending edge which extends inwards from a plane of one of the body panels and which is sandwiched between two closure panels of the one end closure panels,

characterized in that said two closure panels include respective portions which extend inwardly beyond and are sealed together inwardly of the inner end of said inwardly extending edge, in order to deter access to said edge by contents of said container.

According to a fourth aspect of the present invention there is provided a thermoplastic-coated paperboard blank for forming into a container, wherein the blank includes:-

- (a) a row of body panels comprised of first, second third and fourth body panels, and
- (b) one end closure panels comprised of first, second, third and fourth closure panels, the closure panels being connected to the body panels, at least one closure panel of the closure panels including a longitudinal edge which extends along said row of body panels for extending inwards from a plane of one of the body panels and for being sandwiched between two closure panels of the one end closure panels,

characterized in that respective portions of said two closure panels extend to such respective dis-

tances from a longitudinal centreline of said row of body panels that, in the formed container, they extend inwardly beyond and can thus be sealed together inwardly of the inner end of said edge in order to deter access to said edge by contents of said container.

According to a fifth aspect of the present invention, there is provided a container including:-

- (a) a tube of body panels comprised of first, second, third and fourth body panels, and
- (b) one end closure panels comprised of first, second, third and fourth closure panels, the closure panels being connected to the body panels, respective closure panels of the one end closure panels including respective inwardly extending edges which are sandwiched between two closure panels of the one end closure panels,

characterized in that said inwardly extending edges are stepped relative to each other.

According to a sixth aspect of the present invention, there is provided a blank for forming into a container wherein the blank includes:-

- (a) a row of body panels comprised of first, second, third and fourth body panels, and
- (b) one end closure panels comprised of first, second, third and fourth closure panels, the closure panels being connected to the body panels, respective closure panels of the one end closure panels including respective longitudinal edges extending along said row of body panels for sandwiching between two closure panels of the one end closure panels,

characterized in that said longitudinal edges extend at respective different distances from a longitudinal centreline of said row of body panels.

Owing to these four aspects of the invention, it is possible to deter passage of fluid contents to the outside of the container by way of a path at such edge(s).

According to a seventh aspect of the invention, there is provided a thermoplastic-surfaced blank for forming into a container, wherein the blank includes:

- (a) a row of body panels comprised of first, second, third and fourth body panels, and a seam flap extending from one of said first and fourth body panels at one end of said row for heat-sealing to the other of said first and fourth body panels at the opposite end of said row, and
- (b) a row of fold-in closure panels comprised of first, second, third and fourth fold-in closure panels parallel to and extending along the row of body panels, the closure panels being connected to respective ends of the respective body panels, one of said closure panels being a cover panel for heat-sealing relative to the other clo-

sure panels,

characterized in that the body panel to which said cover panel is connected is other than said first and fourth body panels.

According to an eighth aspect of the invention, there is provided a thermoplastic-surfaced container, including:

(a) a tube of body panels comprised of first, second, third and fourth body panels, and a side seam flap connected, along one edge thereof extending longitudinally of said tube, to one of said first and fourth body panels and heat-sealed to the other of said first and fourth body panels, and

(b) a loop of fold-in closure panels comprised of first, second, third and fourth fold-in closure panels, the closure panels being connected to respective ends of the respective body panels by way of respective fold lines, one of said closure panels being a cover panel heat-sealed relative to the other closure panels,

characterized in that the body panel to which said cover panel is connected by way of one of said fold lines is other than said first and fourth body panels.

Owing to these two aspects of the invention, it is possible to avoid degrading of the thermoplastic inside surface of the cover panel during seaming.

Owing to the invention, it is possible to provide a thermoplastic-coated paperboard container including an improved top closure which is of increased liquid-tightness, yet which is conveniently openable and from which the contents are readily pourable.

In order that the invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is a fragmentary layout view of the inside surface of a thermoplastics-coated paperboard container blank used to construct a container having a top end closure;

Figure 2 is a fragmentary layout view of the outside surface of the blank illustrated in Figure 1 after it has been side-seamed;

Figures 3 and 4 are enlarged fragmentary perspective views illustrating the initial not folded and final completely folded and sealed steps involved in forming the flat top end closure;

Figure 5 is a fragmentary perspective view showing the container of Figure 4 after the top closure has been sealed closed and then opened;

Figures 6, 7, 8, 9 and 12 are views similar to Figures 1, 2, 3, 4 and 5, respectively, showing an alternate embodiment;

Figure 10 is a cross-sectional view taken along the plane of the line X-X of Figure 9, and looking

in the direction of the arrows, showing the inside of the sealed top closure; and

Figure 11 is a fragmentary sectional view, taken along the line XI-XI in Figure 10, of an operational step involved in the sealing of a portion of the top closure.

Referring now to the drawings in greater detail, Figure 1 illustrates a container blank 10 generally in three sections consisting of a top end closure 12, a body portion 14, and a conventional flat bottom end closure (not-shown). The latter may be any suitable end closure arrangement and is not a part of this invention.

More specifically, horizontal score lines 16a, 16b, 16c, 16d and 16e extend transversely across the container blank 10 and define the boundary between the top end closure 12 and the body portion 14. Likewise, the bottom horizontal score lines (not shown) extend transversely across the container blank 10 and define the boundary between the bottom end closure (not shown) and the body portion 14.

The body portion 14 comprises a plurality of integrally connected body panels, namely, in Figure 1 from right to left, a front panel 18, a side panel 20, a back panel 22 and a side panel 24, and a side seam flap or narrow fifth panel 26 formed adjacent the panel 24. The container blank 10 is defined on its longitudinal sides by edges 28 and 30. The body panels 18, 20, 22 and 24, and the side seam flap 26, are defined by vertical score lines 32, 34, 36 and 38. It should be apparent that the body panels may be equal in width and, hence, adapted to forming a square cross-section container, or may be formed such that one pair of alternate body panels is wider than the other pair and, hence, adapted to forming an oblong rectangular cross-section container.

The top end closure 12 comprises side fold-in edge panels 40 and 42. The panels 40 and 42 are connected integrally to the upper ends of the body panels 20 and 24, respectively. A cover panel 44 and a front edge panel 46 are connected integrally to the body panels 22 and 18, respectively. A further panel 48 is connected integrally to the upper end of the side seam flap 26. The panel 40 terminates in a free cut edge 49. A diagonal score line 50 extends from the approximate junction of the score lines 16b and 32 to the free cut edge 49 of the panel 40, forming a triangular fold-over panel segment 51. The panel 42 terminates in a free cut edge 43. A diagonal score line 52 extends from the approximate juncture of the score lines 16d and 38 to the free cut edge 43 of the panel 42, forming a triangular fold-over panel segment 53. Alternatively, the triangular fold-over panel segments and their diagonal score lines could be formed in a fold-in segment 54.

The front edge panel 46 includes the fold-in segment 54 connected to the body panel 18 and a narrower segment 56 extending from the panel segment 54, with a score line 58 formed therebetween. A horizontal score line 60 is formed across the panel segment 56 at a distance from the score line 58 approximately equal to the height of the panel segment 54, dividing the segment 56 into a fold-out portion 56a and a fold-down portion 56b, the latter to become a lift tab, as will be explained.

An arcuate-shaped perforated line 70 is formed in the panel segment 54 arcing from the juncture of the free cut edges of the panel segment 54 and the portion 56a on the right, to the juncture of the free cut edges of the panel segment 54 and the portion 56a on the left, and substantially touching the midpoint of the score line 16a.

Cover edge panels 72 and 74 are connected by weakened lines 76 and 78, respectively, to the sides of the cover panel 44. The score lines 76 and 78 are continuations of the score lines 34 and 36, respectively. The weakened lines 76 and 78 may be either score lines or half-cut lines. Diagonal score lines 80 and 82 integrally connect the side edge panel 40 and cover edge panel 72, and the side edge panel 42 and cover edge panel 74, respectively.

The container blank 10 is formed into a side seamed blank in the customary manner by firstly heating the outside surface of the side seam panel 26 and the inside surface of the edge zone (28) of the panel 18 to render them tacky. Secondly, the body panel 24 and the side seam flap 26 are rotated as a unit about the vertical score line 36, the inside surface of the body panel 24 coming into contact with the inside surface of the body panel 22, with the vertical score line 38 positioned next to the vertical score line 34, and with the inside surface of the side seam flap 26 contacting the inside surface of the body panel 20 adjacent the vertical score line 34. Simultaneously, the cover edge panel 74 is rotated about the score line 78 to come into contact with cover panel 44. Thirdly, the body panel 18 is rotated about the vertical score line 32 to bring its inside surface into contact with the inside surface of the body panel 20. The inside surface of the body panel 18 along the edge 28 comes into contact with the outside surface of the side seam flap 26, and the edge 28 is positioned parallel and aligned with the vertical score line 38. The various members of the top end closure 12 and the bottom end closure will make similar movements. The container blank 10 is sealed where the tacky inside area of the body panel 18 comes into contact with the tacky outside surface of the side seam flap 26.

If desired, in the formation of the side seamed blank the side seam panel 26 could be sealed to

the outside surface of the adjacent panel 18, rather than to the inner surface thereof as described above.

As the side seamed blank is opened up into a squared condition, the panels 18 and 24 form a right angle about the vertical score line 38, and the panels 20 and 22 form a right angle about the vertical score line 34. Simultaneously, the cover edge panel 72 assumes a right angle relationship with the cover panel 44 about the score line 76.

It should be noted that the body panel 22 to which the cover panel 44 is attached is not an end panel in the row of body panels 18 to 24, in fact the side seam panel 26 is located at the end body panel 24 of the blank, to be secured to the other end or front body panel 18. This is in contrast to the heretofore normal practice of having the side seam panel located at a rear corner, such as shown in US-A-4,397,415; 4,702,407; 4,784,272; and 4,911,305.

The advantage of the front corner side seam panel location may be appreciated by considering the manner in which the usual first and fifth, or side seam flap, panels are normally heated and sealed.

While being conveyed as a flat blank longitudinally through a so-called "flame sealer", both outside edges are heated, as already mentioned. More specifically, the outside surface of the side seam flap 26 and the inside surface of the first or front panel 18 are heated while they travel through the flame sealer. Hence, if the rear panel 22 and the adjacent cover panel 44 were positioned as an end section, the cover panel 72 or 74 would also be heated. Once heated, it thereafter loses some of its effective sealing characteristic. Hence, being positioned at an intermediate location eliminates any heating of either of the cover edge panels 72 and 74 until they are finally heat-sealed, for example by ultrasonic sealing or high-frequency vibration sealing, in the condition shown in Figure 4, with the side seam flap 26 now positioned at a front corner.

Instead of a side seam, it is possible to employ a centre seam, but preferably not in the panels 22 and 44.

After the side seamed blank is opened up into a squared condition, the various parts of the eventual top end closure 12 are folded on the various score lines in the following manner so as to form the top end structure. The front edge panel 46 is folded or bent inwardly on the score line 16a and outwardly about the score line 58, and then downwardly about the score line 60, resulting in the fold-out panel portion 56a engaging the fold-in panel segment 54, and the fold-down panel portion 56b engaging the upper end of the front body panel 18. Such action will have caused the panel segment 51 to begin to bend along the diagonal score line 50 toward the side edge panel 40 and the panel

segment 53 to begin to bend along the diagonal score line 52 toward the side edge panel 42.

The side edge panels 40 and 42 are next folded or bent inwardly toward each other and begin to pull the cover edge panels 72 and 74 inwardly. Finally, the cover panel 44 is folded or bent inwardly and downwardly, causing the cover edge panels 72 and 74 to fold onto the side edge panels 40 and 42, and the panel segments 51 and 53 to be pressed downwardly into engagement with the respective panels 40 and 42.

The sealing of the interrelated elements of the top closure 12 is then accomplished by conventional means, such as a sonic or high frequency vibration sealing means. the sealing of the various top end closure elements may also be accomplished by other means, such as gas heat, if desired. Figure 4 illustrates the top end closure 12 structure once the sealing thereof has been effected. While the cover panel 44 is tightly sealed to the fold-out panel portion 56a, and to the cover edge panels 72 and 74 which, in turn, are sealed to the side edge panels 40 and 42, respectively, the lift tab 56b may be merely spot welded to the cover panel 44 as shown, or to the front body panel 18, for easy release therefrom.

In opening the carton, the lift tab formed by the panel portion 56b is lifted from the cover panel 44 (or the front body panel 18) and torn back, pulling the panel portion 56a away from the panel segment 54 and breaking the arcuate weakened line 70. As the lift tab 56b is raised further, the cover edge panels 72 and 74 are pulled away from the side edge panels 40 and 42. Simultaneously, the two fold-over panel segments 51 and 53 are partially peeled away from the panels 40 and 42, thus providing an open top for pouring the liquid contents over the arcuate edge 70.

The cover edge panels 72 and 74 serve efficiently to control film delamination as the top cover panel 44 is torn back, and the cover edge panels 72 and 74 separate from the adjacent side edge panels 40 and 42, respectively, remaining with the cover panel 44.

Referring now to Figures 6 and 7, all elements identical to those of Figures 1 and 2 bear the same reference numerals. Triangular extensions 84 and 86 are formed on the free edges of the cover edge panels 72 and 74, respectively, adjacent the distal ends thereof. Triangular extensions 88 and 90 are formed on the free edges of the side edge panels 40 and 42, respectively, adjacent the fold-over panel segments 51 and 53, respectively.

A first rectangular extension 92 is formed on the free distal edge of the side seam flap extension panel 48. A second rectangular extension 94 is formed on the free edge of the panel segment 54 adjacent one side of the fold-out portion 56a. A

third rectangular extension 96 is formed on the free edge of the panel segment 54 adjacent the other side of the fold-out portion 56a and fold-over panel segment 51. Cut lines 98 and 100 separate the second and third extensions 94 and 96 from the fold-out portion 56a. As measured perpendicularly from a centreline of the row of body panels 18 to 24, that free cut edge 94' of the extension 94 parallel to the centreline is further from the centreline than is that free cut edge 92' of the extension 92 parallel to the centreline, whilst the free cut edge 53' of the segment 53 is nearer to the centreline than is the above-mentioned free cut edge 92' of the extension 92. Similarly, that free cut edge 96' of the extension 96 parallel to the centreline is further from the centreline than is the free cut edge 51' of the segment 51.

The container blank 10' of Figure 6 is formed into the side seam blank of Figure 7 in the same manner as the side seam blank of Figure 2 is formed from the blank 10 of Figure 1.

The side seam blank is opened up into the tube shown in Figure 8, and the top closure is closed and sealed into the condition shown in Figure 9 in the following manner:

The side fold-in edge panels 40 and 42 are first folded inwardly, bending about the diagonal score lines 50 and 52, with the front fold-in panel segment 54 following on top thereof. The cover edge panels 72 and 74 are first pulled inwardly by the initial folding of the side fold-in edge panels 40 and 42. The cover panel 44 and the adjacent in-folded edge panels 72 and 74 are then folded onto the respective edge panels 54, 40 and 42, and the fold-out portion 56a of the segment 56.

Referring now to Figures 10 and 11, the inside surfaces of the sealed top closure are shown. It is noted that the edges 51' and 96' of the segment 51 and the extension 96 are stepped relative to each other, as are the edges 53', 92' and 94' of the segment 53 and the extensions 92 and 94. As such, when sealed by a mandrel, represented as 100 in Figure 11, the panel 42 assumes a stepped-down character over the edges 53', 92' and 94', rather than having to bend abruptly over a three-high single step and thus being more prone to leakage. Similarly, the panel 40 assumes a stepped-down character over the edges 51' and 96'. The face 102 of mandrel 100 is shaped to suit the inside final configuration of the sealed top closure. The sealed-together edge portions of each pair of triangular extensions, e.g. 86 onto 90, seal off and thus serve to prevent any leakage path along and/or in e.g. the edges 53', 92' and 94' of the items 53, 92 and 94 confined between the fold-in edge panels 42 and 74.

The seepage prevention would be even more effective if the longitudinal edge 30 of the side

seam panel 26 and the extension panel 48 were skived and hemmed, i.e., tapered and folded over to eliminate a free cut edge exposed to the liquid product and tending to soak up the same to produce undesirable bulging of the carton.

In the opening process, as shown in Figure 12, upon being lifted by the lift tab 56b, the triangular extensions 84 and 86 peel away cleanly from the triangular extensions 88 and 90, respectively, substantially eliminating unsightly delamination films.

It should be apparent that the embodiments described with reference to the drawings provide an improved thermoplastic-coated paperboard carton wherein cover edge panels are connected to the sides of the cover panel and integrally connected to side edge panels by score lines and secured thereto such that film delamination is effectively controlled when the closure is being opened, with the cover edge panels separating from the side edge panels to provide a clean opening.

It may also be apparent that, by virtue of the cover edge panels connected to the cover panel and folded there-against, the top closure is substantially self-aligning and deterred from skewing during the forming and sealing operations.

Claims

1. A thermoplastic-coated paperboard container, including:
 - (a) a tube of first, second, third and fourth body panels (18-24), and
 - (b) one end closure panels (40-48, 72, 74) comprised of a loop of first, second, third and fourth closure panels (40-46) the closure panels (40-48, 72, 74) being connected to the respective body panels (18-24), said first closure panel (44) being a cover panel (44) covering the second, third and fourth closure panels (40, 46, 42), characterized by said one end closure panels (40-48, 72, 74) including first and second cover edge panels (72, 74) connected to respective opposite edges of the cover panel (44) by fold lines (76, 78) and to the respective adjacent second and fourth closure panels (40, 42) by diagonal fold lines (80, 82) and sealed to the respective second and fourth closure panels (40, 42).
2. A container according to claim 1, wherein said first and second cover edge panels (72, 74) are sealed to an inside surface of said cover panel (44).
3. A container according to claim 1 or 2, wherein said cover panel (44) is of a larger area than any one of said second, third and fourth closure panels (40, 46, 42).
4. A container according to any preceding claim, wherein said fold lines (76, 78) are half-cut lines.
5. A container according to any preceding claim, wherein at least one closure panel (40, 42, 46, 48) of the one end closure panels (40-48, 72, 74) includes an inwardly extending edge (51', 53', 92', 94', 96') which extends inwards from a plane of one (20; 24) of the body panels (18-26) and which is sandwiched between two closure panels (40, 72; 42, 74) of the closure panels (40-48, 72, 74).
6. A container according to claim 5, wherein said tube of body panels (18-26) includes a side seam flap (26) extending from one (24) of said second, third and fourth body panels (20, 18, 24) at a corner of said tube and sealed to an adjacent panel (18) of said second, third and fourth body panels (20, 18, 24) at that corner, and said end closure panels (40-48, 72, 74) include an extension panel (48) extending from one (42) of said second, third and fourth closure panels (40, 46, 42) at one end of said loop of closure panels (40-46), connected to an adjacent end of said side seam flap (26), and sealed to an adjacent closure panel (46) of said second, third and fourth closure panels (40, 46, 42), said two closure panels (40, 72; 42, 74) being said one (42) of said second, third and fourth closure panels (40, 46, 42) and that one (74) of said cover panels (72, 74) overlying said one (42) of said second, third and fourth closure panels (40, 46, 42), and said inwardly extending edge (92') being the inner end edge (92') of said extension panel (48).
7. A container according to claim 5 or 6, and further comprising first and second, triangular, closure panel segments (51, 53) bounded by respective diagonal fold lines (50, 52) and having respective inwardly extending edges (51', 53') each sandwiched between two closure panels (40, 72; 42, 74) of said one end closure panels (40-48, 72, 74).
8. A container according to claim 7, wherein said inwardly extending edges (51', 53') extend transversely of said second and fourth closure panels (40, 42).
9. A container according to claim 7 or 8, wherein said triangular segments (51, 53) are in the regions of those ends of second and fourth

closure panels (40, 42) further from said first body panel (22).

10. A container according to any one of claims 5 to 9, wherein the or each said inwardly extending edge (51', 53', 92') is stepped relative to an inwardly extending, closure panel edge (94', 96'). 5
11. A container according to claim 10, wherein the or each inwardly extending, closure panel edge (94', 96') is of a closure panel extension (94, 96). 10
12. A container according to any one of claims 5 to 11, wherein the or each said two closure panels (40, 72; 42, 74) include respective portions which extend inwardly beyond and are sealed together inwardly of the or each said inwardly extending edge (51', 96'; 53', 92', 94') sandwiched therebetween, in order to deter access to that edge (51', 53', 92', 94', 96') by contents of said container. 15
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13. A container according to claim 12, wherein the or each said inwardly extending edge (51', 53', 92', 94', 96') is uncoated. 25
14. A thermoplastic-coated paperboard blank, including: 30
 - (a) a row of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and
 - (b) one end closure panels (40-48, 72, 74) comprised of a row of end closure panels (40-46) comprised of first, second, third and fourth closure panels (40-46) connected to respective ends of the respective body panels (18-24), 35

characterized in that said first closure panel (44) is of a larger area than any one of said second, third and fourth closure panels (40, 46, 42) for providing a cover panel (44), and in that said one end closure panels (40-48, 72, 74) include first and second cover edge panels (72,74) connected to respective opposite edges of said first closure panel (44) by first and second lines of weakness (76, 78) and to the respective adjacent second and fourth closure panels (40, 42) by diagonal lines of weakness (80, 82) for sealing to the respective second and fourth closure panels (40, 42). 40
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15. A blank according to claim 14, wherein said first and second lines of weakness (76, 78) are half-cut lines. 55

16. A blank according to claim 14 or 15, wherein at least one closure panel (40, 42, 46, 48) of the closure panels (40-48, 72, 74) includes a longitudinal edge (51', 53', 92', 94', 96') which extends along said row of body panels (18-26) for extending inwards from a plane of one (20, 24) of the body panels (18-26) and for being sandwiched between two closure panels (40, 72; 42, 74) of the closure panels (40-48, 72, 74).
17. A blank according to claim 16, wherein said row of body panels (18-26) includes a side seam flap (26) extending from one (24) of the third and fourth body panels (18, 24) at one end of said row for sealing to the other (18) of said third and fourth body panels (18, 24) at the opposite end of said row, and said closure panels (40-48, 72, 74) include an extension panel (48) extending from one (42) of said third and fourth closure panels (46, 42) at one end of the row of closure panels (40-46) and connected to an adjacent end of said side seam flap (26) for being sealed to the other (46) of said third and fourth closure panels (46, 42) and for subsequently being sealed between said first and fourth closure panels (44, 42) with said first closure panel (44) overlying said fourth closure panel (42), said two closure panels (40, 72; 42, 74) being said fourth closure panel (42) and that one (74) of said cover edge panels (72, 74) for overlying said fourth closure panel (42), and said longitudinal edge (92') being the outer end edge (92') of said extension panel (48).
18. A blank according to claim 16 or 17, and further comprising first and second, triangular, closure panel segments (51,53) bounded by respective diagonal score lines (50, 52) and having respective longitudinal edges (51', 53') extending along said row of closure panels (40-48, 72, 74) and each for sandwiching between two closure panels (40, 72; 42, 74) of said one end closure panels (40-48, 72, 74).
19. A container according to claim 18, wherein said longitudinal edges (51', 53') are of said second and fourth closure panels (40, 42).
20. A blank according to claim 18 or 19, wherein said triangular segments (51, 53) are in the regions of those ends of said second and fourth closure panels (40, 42) further from said first closure panel (44).
21. A blank according to any one of claims 16 to 20, wherein the or each said longitudinal edge

- (51', 53', 92') is at a distance from a longitudinal centreline of said row of body panels (18-26) different from that of a longitudinal, closure panel edge (94', 96') extending along said row of body panels (18-26).
22. A blank according to claim 21, wherein the or each longitudinal, closure panel edge (94', 96') is of a closure panel extension (94, 96).
23. A blank according to any one of claims 16 to 22, wherein the or each said two closure panels (40, 72; 42, 74) are each of a dimension perpendicularly to said row of body panels (18-26) greater than the dimension longitudinally of said row of body panels (18-26) of the or each said longitudinal edge (51', 53', 92', 94', 96') sandwiched therebetween.
24. A blank according to claim 23, wherein the or each said longitudinal edge (51', 53', 92', 94', 96'), is uncoated.
25. A thermoplastic-coated paperboard container, including:-
 (a) a tube of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and
 (b) one end closure panels (40-48, 72, 74) comprised of first, second, third and fourth closure panels (40-46), the closure panels (40-48, 72, 74) being connected to the body panels (18-26), one closure panel (40; 42; 46; 48) of the one end closure panels (40-48, 72, 74) including an inwardly extending edge (51', 53', 92', 94', 96') which extends inwards from a plane of one (20; 24) of the body panels (18-26) and which is sandwiched between two closure panels (40, 72; 42, 74) of the one end closure panels (40-48, 72, 74),
 characterized in that said two closure panels (40, 72; 42, 74) include respective portions which extend inwardly beyond and are sealed together inwardly of the inner end of said inwardly extending edge (51', 53', 92', 94', 96'), in order to deter access to said edge (51', 53', 92', 94', 96') by contents of said container.
26. A container according to claim 25, wherein said inwardly extending edge (51', 53', 92', 94', 96') is uncoated.
27. A container according to claim 25 or 26, wherein said tube of body panels (18-26) includes a side seam flap (26), said end closure panels (40-48, 72, 74) include a side seam extension panel (48) and said inwardly extending edge (92') is of a side seam extension panel (48).
28. A container according to claim 25, 26, or 27, and further comprising first and second, triangular, closure panel segments (51, 53) bounded by respective diagonal fold lines (50, 52) and having respective inwardly extending edges (51', 53') each sandwiched between two closure panels (40, 72; 42, 74) of said end closure panels (40-48, 72, 74) which two closure panels (40, 72; 42, 74) extend inwardly beyond and are sealed together inwardly of the inner end (51'; 53') of the edge (51', 53') sandwiched therebetween, in order to deter access to that edge (51'; 53') by said contents.
29. A container according to any one of claims 25 to 28, wherein the or each said inwardly extending edge (51', 53', 92') is stepped relative to an inwardly extending, closure panel edge (94', 96') beyond the inner end of which the or each said two closure panels (40, 72; 42, 74) extend and are sealed together in order to deter access to that edge (94', 96') by said contents.
30. A thermoplastic-coated paperboard blank for forming into a container, wherein the blank includes:-
 (a) a row of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and
 (b) one end closure panels (40-48, 72, 74) comprised of first, second, third and fourth closure panels (40-46), the closure panels (40-48, 72, 74) being connected to the body panels (18-26), at least one closure panel (40, 42, 46, 48) of the closure panels (40-48, 72, 74) including a longitudinal edge (51', 53', 92', 94', 96') which extends along said row of body panels (18-26) for extending inwards from a plane of one (20, 24) of the body panels (18-26) and for being sandwiched between two closure panels (40, 72; 42, 74) of the closure panels (40-48, 72, 74),
 characterized in that respective portions of said two closure panels (40, 72; 42, 74) extend to such respective distances from the longitudinal centreline of said row of body panels (18-26) that, in the formed container, they extend inwardly beyond and can thus be sealed together inwardly of the inner end of said edge (51', 53', 92', 94', 96') in order to deter access to said edge (51', 53', 92', 94', 96') by contents of said container.

31. A container including:-

(a) a tube of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and

(b) one end closure panels (40-48, 72, 74) comprised of first, second, third and fourth closure panels (40-46), the closure panels (40-48, 72, 74) being connected to the body panels (18-26), respective closure panels (40, 42, 46) of the one end closure panels (40-48, 72, 74) including respective inwardly extending edges (53', 92', 94'; 51', 96') which are sandwiched between two closure panels (40, 72; 42, 74) of the one end closure panels (40-48, 72, 74),

characterized in that said inwardly extending edges (53', 92', 94'; 51', 96') are stepped relative to each other.

32. A container according to claim 31 and of thermoplastic-coated paperboard, wherein said edges (53', 92', 94'; 51', 96') are uncoated.

33. A container according to claim 31 or 32, wherein said edges (53', 92', 94'; 51', 96') include an edge (92') of a side seam extension panel (48).

34. A container according to claim 31, 32, or 33, wherein said edges (53', 92', 94'; 51', 96') include an edge (51'; 53') of a triangular segment (51-53) of one (40; 42) of said first, second, third and fourth closure panels (40-46).

35. A container according to any one of claims 31 to 34, wherein said edges (53', 92', 94'; 51', 96') include an edge (94'; 96') of an extension (94;96) of one (46) of said first, second, third and fourth closure panels (40-46).

36. A blank for forming into a container wherein the blank includes:-

(a) a row of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and

(b) one end closure panels (40-48, 72, 74) comprised of first, second, third and fourth closure panels (40-46), the closure panels (40-48, 72, 74) being connected to the body panels (18-26), respective closure panels (40, 42, 46) of the one end closure panels (40-48, 72, 74) including respective longitudinal edges (53', 92', 94'; 51', 96') extending along said row of body panels (18-26) for sandwiching between two closure panels (40, 72; 42, 74) of the one end closure panels (40-48, 72, 74),

characterized in that said longitudinal edges (53', 92', 94'; 51', 96') extend at respective different distances from a longitudinal centreline of said row of body panels 18-26).

37. A thermoplastic-surfaced blank for forming into a container, wherein the blank includes:

(a) a row of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and a seam flap (26) extending from one (24) of said first and fourth body panels (18,24) at one end of said row for heat-sealing to the other (18) of said first and fourth body panels (18,24) at the opposite end of said row, and

(b) a row of fold-in closure panels (40-48) comprised of first, second, third and fourth fold-in closure panels (40-46) parallel to and extending along the row of body panels (18-24), the closure panels (40-46) being connected to respective ends of the respective body panels (18-24), one (44) of said closure panels (40-48) being a cover panel (44) for heat-sealing relative to the other closure panels (40, 42, 46, 48),

characterized in that the body panel (22) to which said cover panel (44) is connected is other than said first and fourth body panels (18, 24).

38. A blank according to claim 37, wherein said seam flap (26) is a side seam flap (26).

39. A blank according to claim 37 or 38, and further comprising first and second cover edge panels (72, 74) connected to respective opposite edges of the cover panel (44) for being heat-sealed to the closure panels (40-48).

40. A thermoplastic-surfaced container, including:

(a) a tube of body panels (18-26) comprised of first, second, third and fourth body panels (18-24), and a side seam flap (26) connected, along one edge thereof extending longitudinally of said tube, to one (24) of said first and fourth body panels (18, 24) and heat-sealed to the other (18) of said first and fourth body panels (18, 24), and

(b) a loop of fold-in closure panels (40-48) comprised of first, second, third and fourth fold-in closure panels (40-46), the closure panels (40-48) being connected to respective ends of the respective body panels (18-26) by way of respective fold lines (16), one (44) of said closure panels (40-48) being a cover panel (44) heat-sealed relative to the other closure panels (40, 42, 46,48),

characterized in that the body panel (22) to

which said cover panel (44) is connected by way of one (16c) of said fold lines (16) is other than said first and fourth body panels (18, 24).

41. A container according to claim 40, wherein said seam flap (26) is a side seam flap (26). 5
42. A container according to claim 40 or 41, and further comprising first and second cover edge panels (72, 74) connected to respective opposite edges of the cover panel (44) by way of respective fold lines (76, 78) and heat-sealed relative to the closure panels (40-48). 10
43. A container according to claim 40, 41 or 42, wherein that edge of said seam flap (26) opposite said one edge thereof is in a skived and hemmed condition and is disposed inwards of said other (18) of said first and fourth body panels (18,24). 15 20

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FIG.1

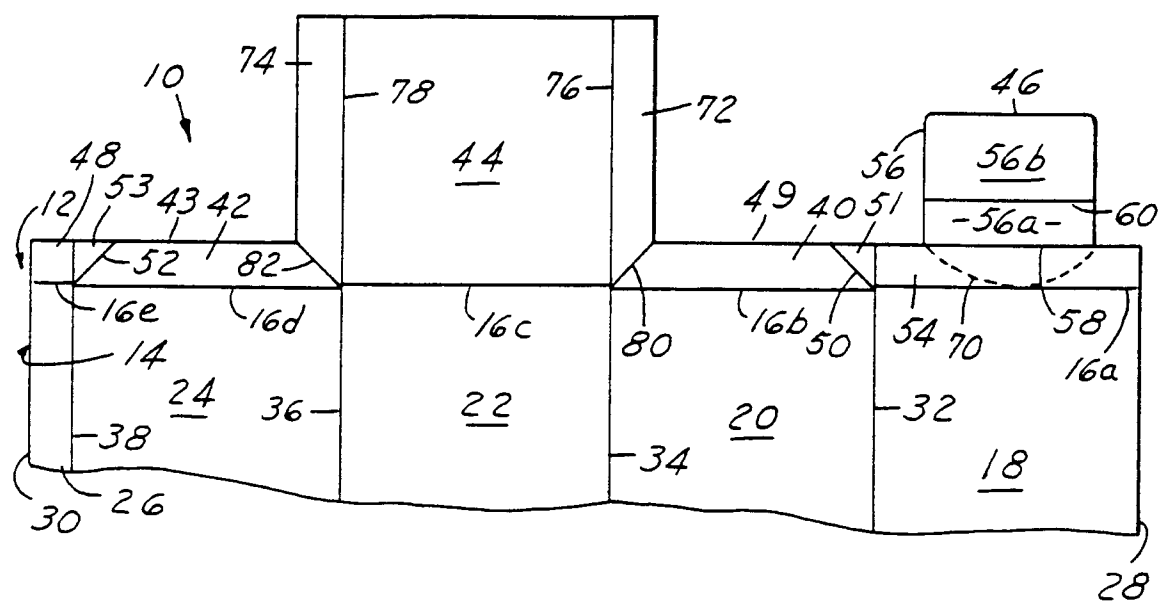


FIG. 2

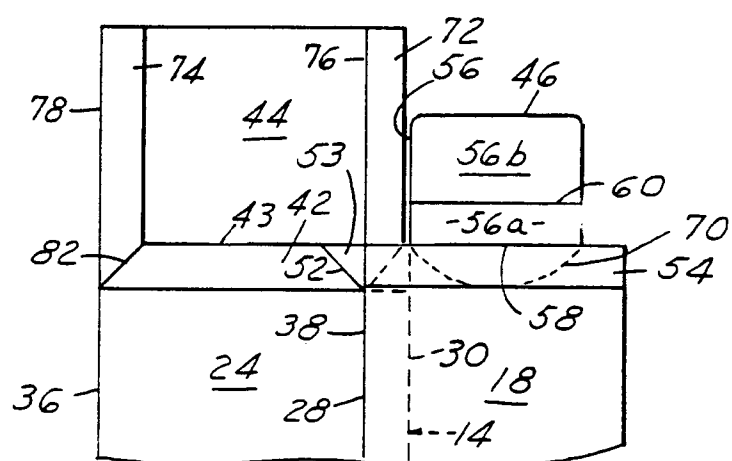


FIG.3

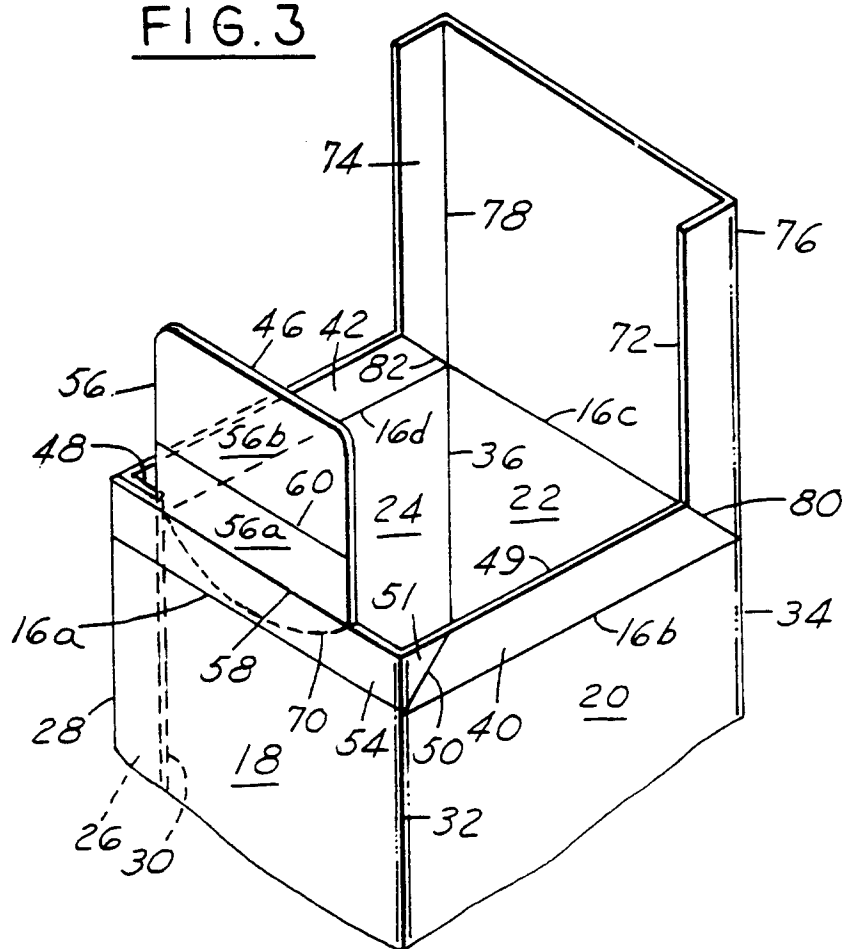


FIG.4

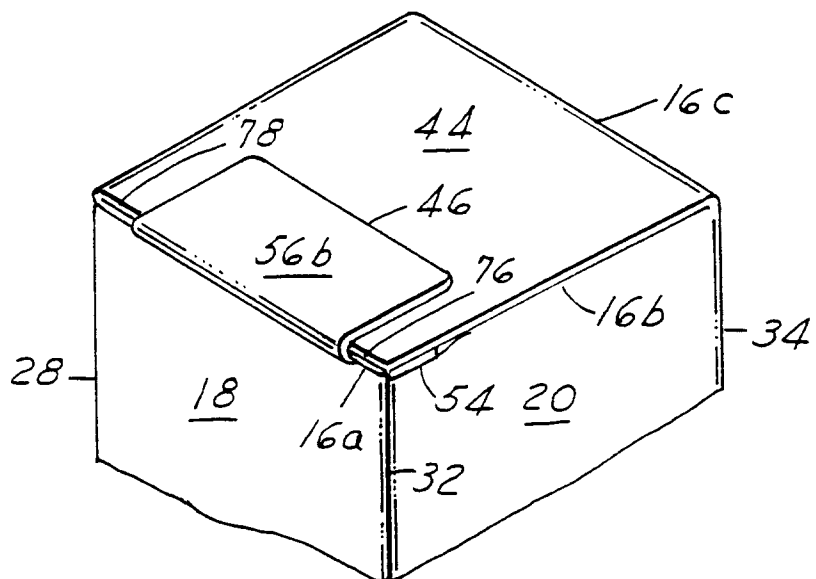


FIG.5

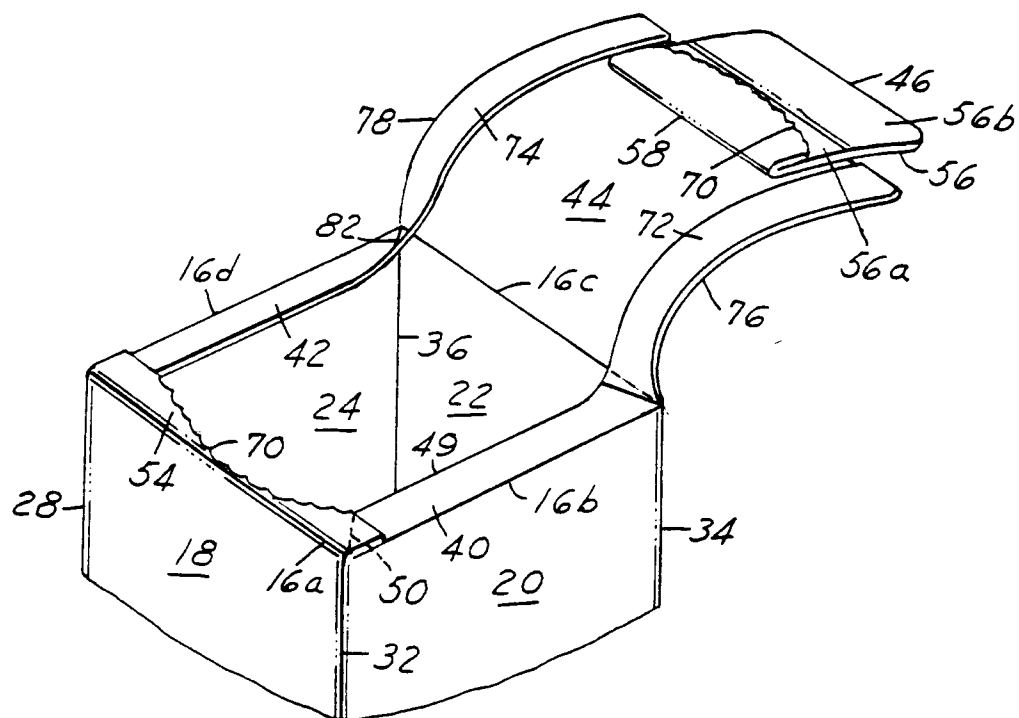


FIG.6

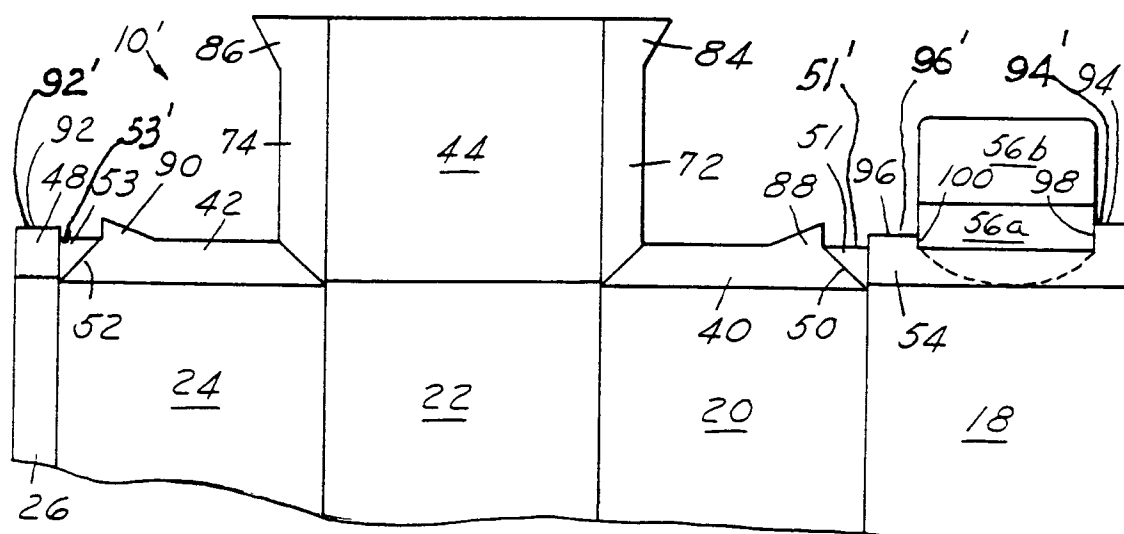


FIG. 7

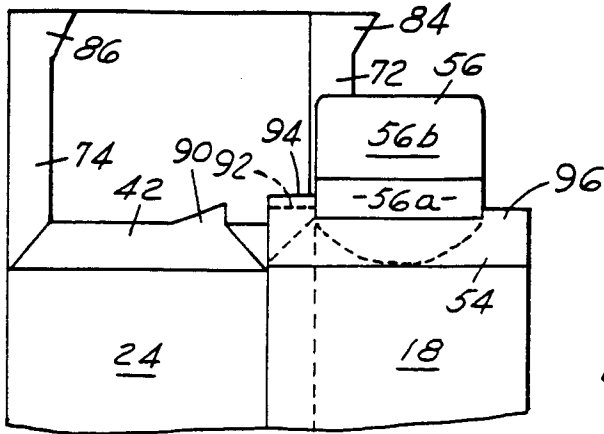


FIG. 8

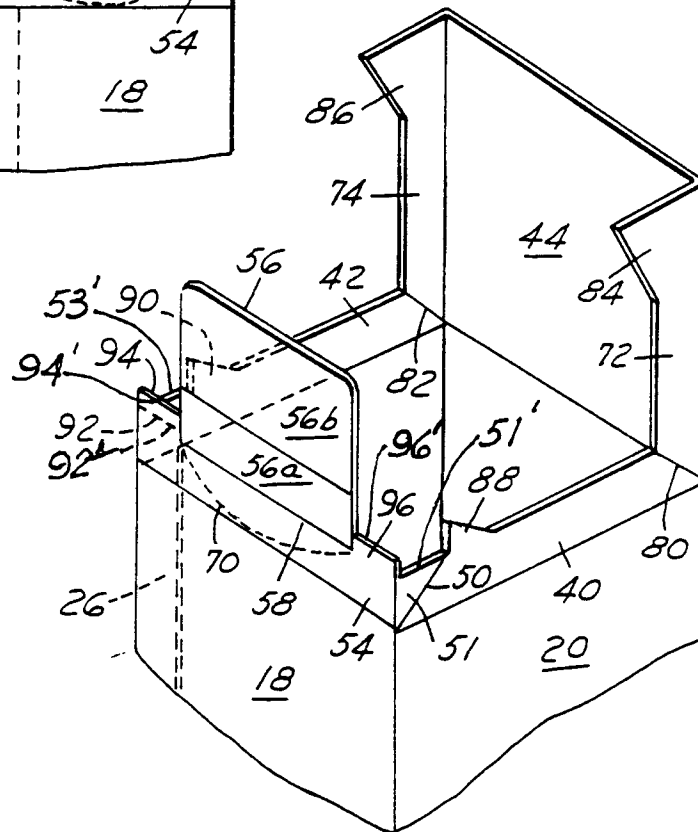


FIG. 9

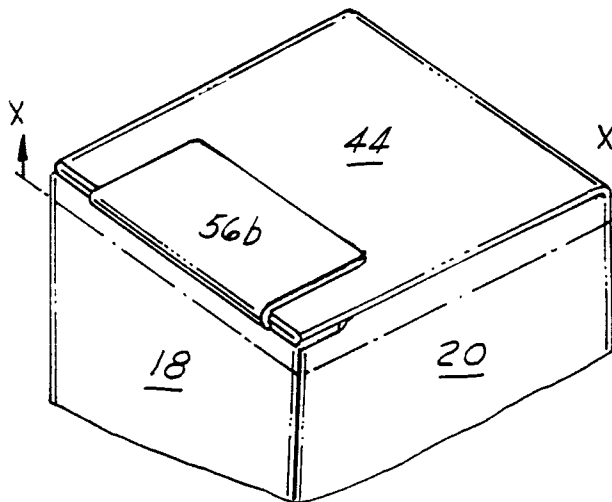


FIG. 10

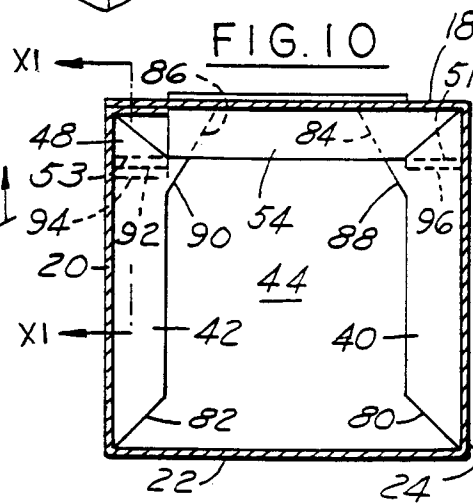


FIG. 11

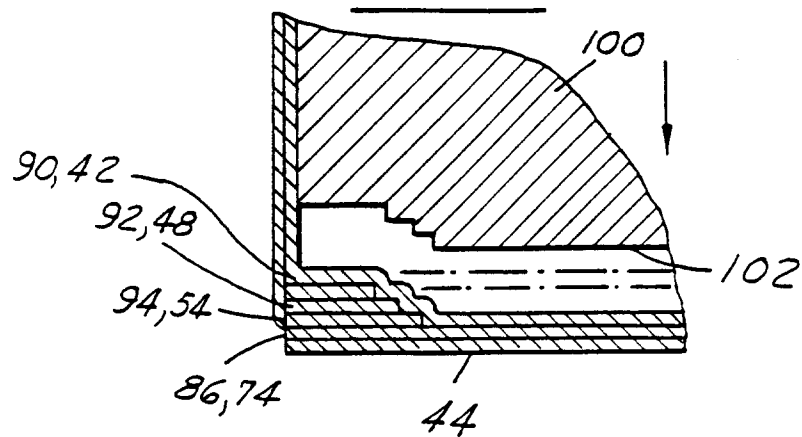
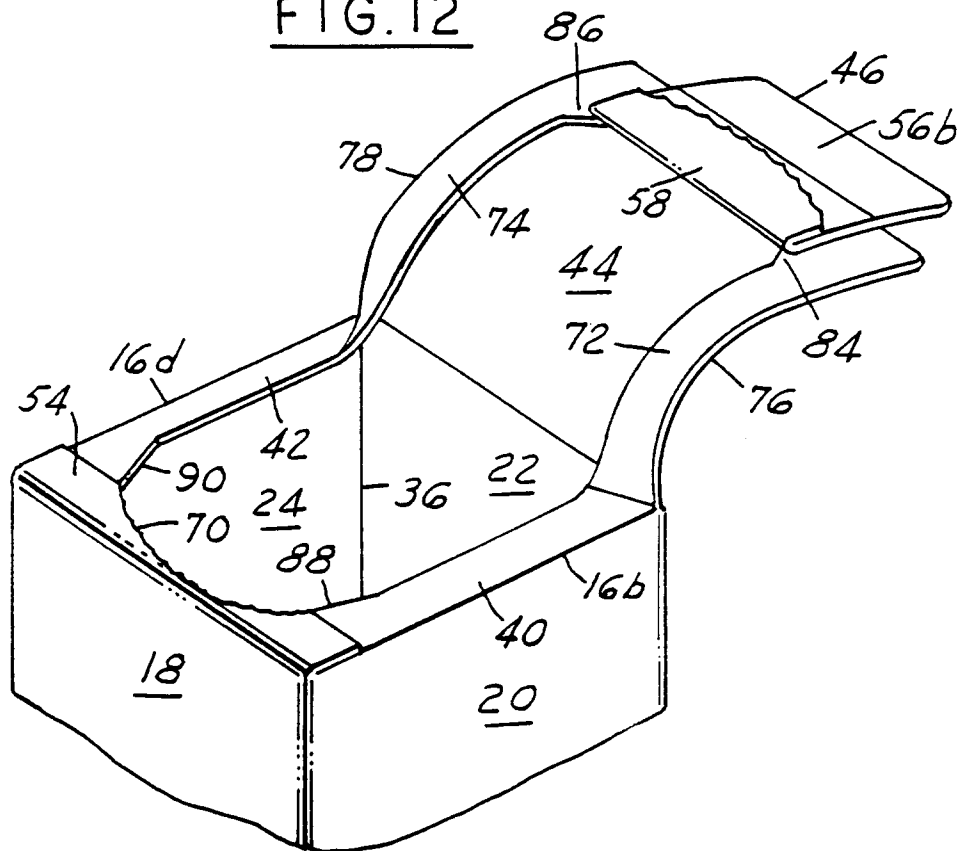


FIG. 12





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 93 30 0370

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 124 248 (EX-CELL-0) * abstract; figures * ---	1, 14, 25, 30, 31, 36, 37, 40	B65D5/06 B65D5/70
A	US-A-3 958 748 (SMITH) * abstract; figures * ---	1, 14, 25, 30, 31, 36, 37, 40	
A	US-A-3 971 506 (ROENNA) * figures * ---	1, 14, 25, 30, 31, 36, 37, 40	
A	EP-A-0 119 303 (SANYO KOKUSAKI) * claims; figures * ---	1, 14, 25, 30, 31, 36, 37, 40	
A	US-A-5 076 439 (KUCHENBECKER) * claims 1,2; figures * ---	1, 14, 25, 30, 31, 36, 37, 40	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	FR-A-2 131 481 (SILVER) * claim 1; figures 1,4,7,9 * ---	1, 14, 25	B65D
A	US-A-3 281 048 (KOLTZ) * figures * ---	1	
P,A	EP-A-0 471 529 (ELOPAK) * figures * ---	1, 30	
P,A	US-A-5 086 928 (ELOPAK) * figures 1-5 * -----	31, 36	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 APRIL 1993	Examiner NEWELL P.G.
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			