May 22, 1951 J. A. ZINN, JR 2,553,804

CARTON HAVING END CLOSURES OF SUBSTANTIALLY UNIFORM THICKNESS

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Fig. 1.

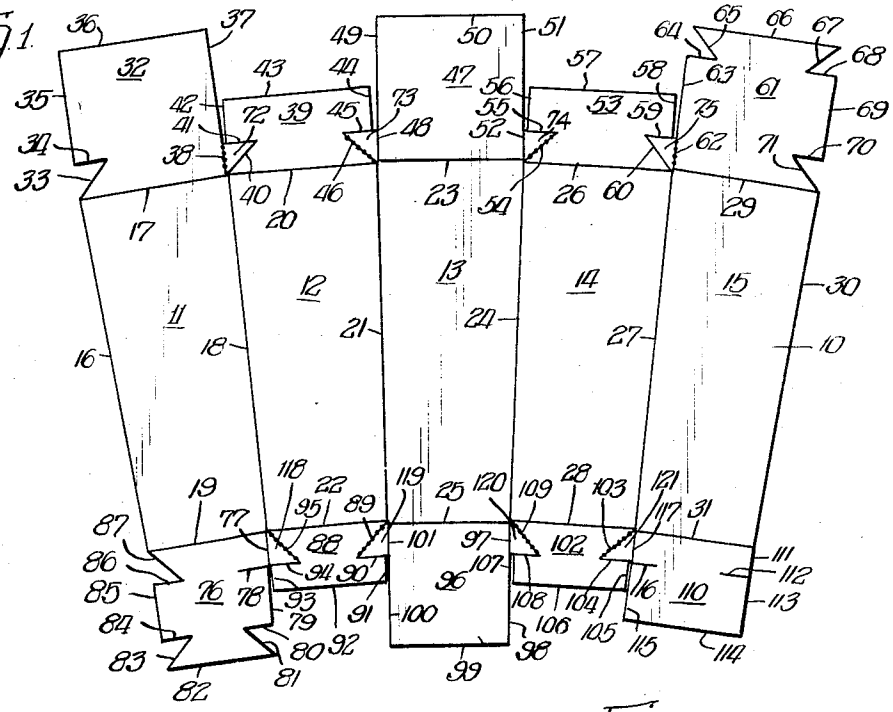


Fig. 2.

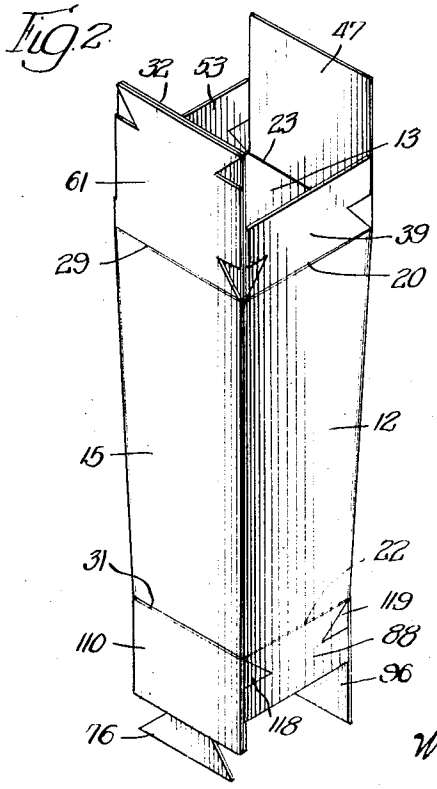
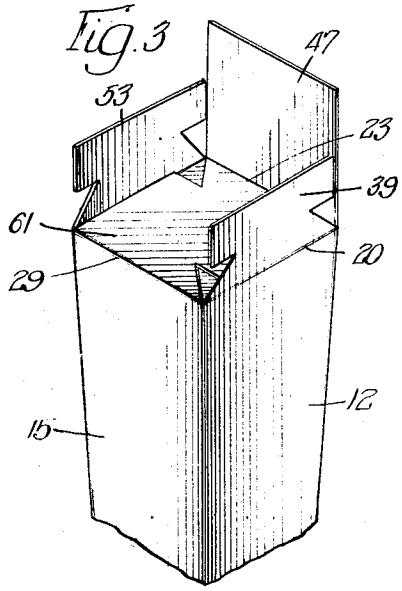


Fig. 3.



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Fig. 4

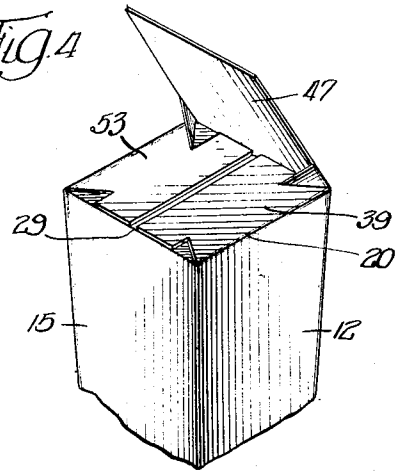


Fig. 5

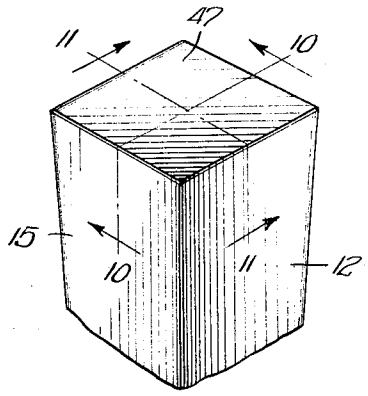


Fig. 10

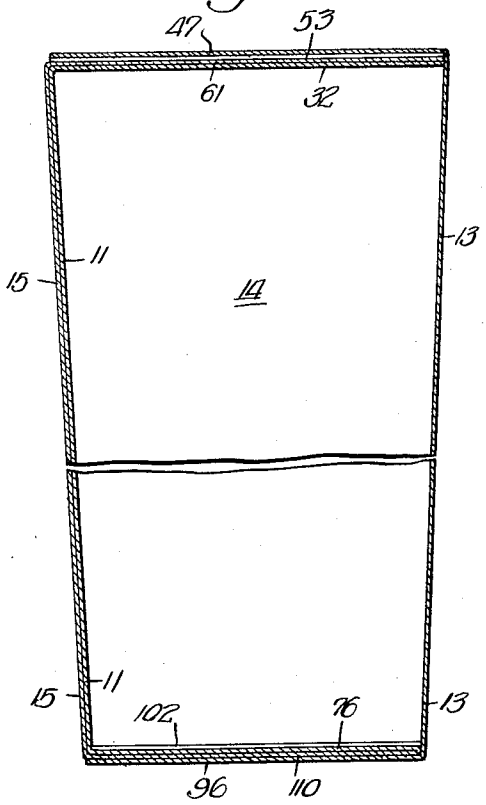
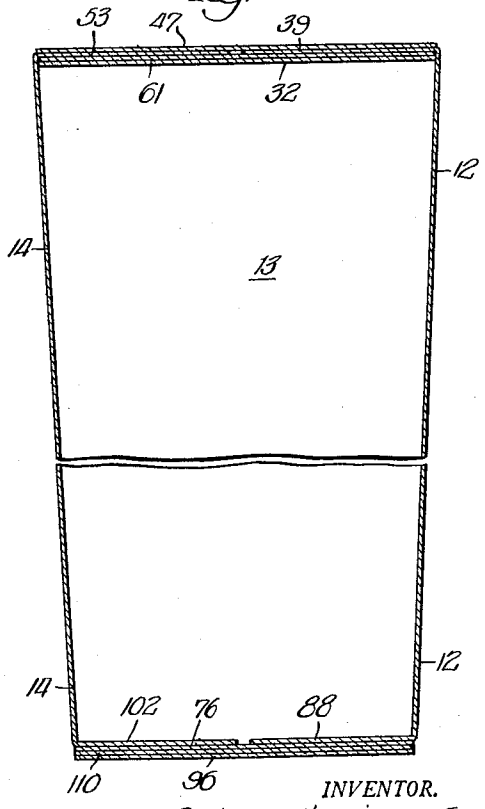


Fig. 11



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Fig. 6

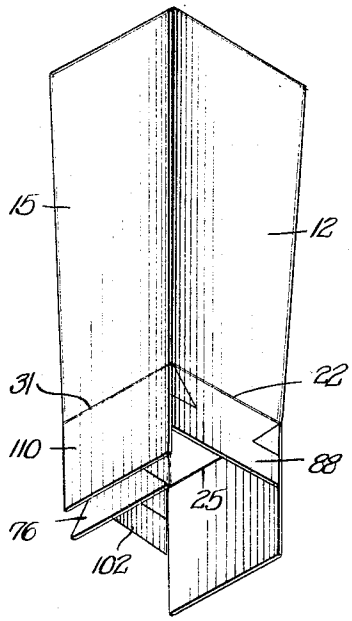


Fig. 7

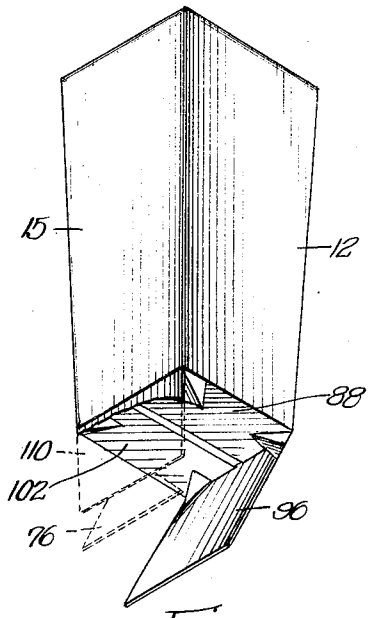


Fig. 8

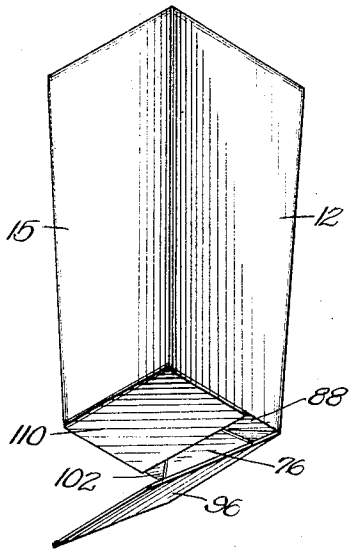
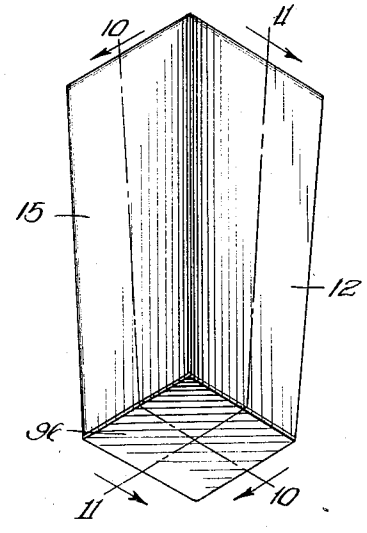


Fig. 9



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UNITED STATES PATENT OFFICE

2,553,804

CARTON HAVING END CLOSURES OF SUBSTANTIALLY UNIFORM THICKNESS

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Application March 28, 1947, Serial No. 737,868

8 Claims. (Cl. 229—37)

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The present invention relates to improvements in cartons having end closures of substantially uniform thickness.

An object of the present invention is to provide an improved carton having rigidity, and which is efficient in stopping seeping therefrom.

A further object is to provide a carton which, although made of relatively thin gauge material, has strength and good appearance.

A further object is to provide a blank for an improved carton in which wastage of material is minimized.

A further object is to provide a carton and a blank for forming said carton having the advantage that sealing of the carton may be accomplished without crushing, even though the carton contains only non-rigid material.

A further object is to provide an improved carton well adapted to meet the needs of commercial service.

Further objects will appear as the description proceeds.

Referring to the drawings:

Figure 1 is a view of a blank embodying the principles of the present invention, the blank being shown with that surface uppermost which is to be presented outwardly of the carton;

Figure 2 is a view in perspective of the blank illustrated in Figure 1, having the walls or panels thereof assembled in operative positions, the top and bottom closures being open;

Figure 3 shows the top closure at an intermediate stage of assembly;

Figure 4 is a perspective view illustrating the top closure in a later stage of assembly;

Figure 5 shows the top closure completely sealed;

Figure 6 is a perspective view looking upwardly toward the bottom of the carton, with the parts of the bottom closure not yet folded into position;

Figure 7 is a view taken from the same angle as the view in Figure 6, but showing the bottom closure partly assembled;

Figure 8 shows the bottom closure at a later stage of assembly;

Figure 9 shows the bottom closure in fully closed position;

Figure 10 is a sectional view on an enlarged scale taken along the plane indicated by the arrows 10—10 of Figures 5 and 9; and

Figure 11 is a sectional view taken along the plane indicated by the arrows 11—11 of Figures 5 and 9.

Referring to Figure 1, the numeral 10 indicates

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a blank which may be of cardboard or the like. The particular blank chosen for illustration is intended for a carton having tapering cross-section from top to bottom, that is, a carton of the nesting type although the invention is equally applicable to cartons having uniform cross-section from top to bottom.

The particular blank chosen for illustration includes five panels indicated by the numerals 11, 12, 13, 14 and 15. Said panels are swingingly connected together at crease lines.

The panel 11 is defined by the edge 16, crease line 17, crease line 18 and the crease line 19.

The panel 12 is defined by the crease line 18, the crease line 20, the crease line 21 and the crease line 22.

The panel 13 is defined by the crease line 21, the crease line 23, the crease line 24 and the crease line 25.

The panel 14 is defined by the crease line 24, the crease line 26, the crease line 27 and the crease line 28.

The panel 15 is defined by the crease line 27, the crease line 29, the edge 30 and the crease line 31.

The panel 11 is adapted to be disposed flatwise against the under surface of the panel 15. The panel 11 may be referred to as the fold-under panel.

Swingingly connected to the panel 11 at the top thereof is the flap 32, which flap is defined by the crease line 17, edge 33, edge 34, edge 35, edge 36, edge 37 and the crease line 38. The edges 33 and 34 define a triangular cutout, the edge 33 being disposed in forty-five degree relationship with the crease line 17. The edge 34 is in substantial parallelism with the crease line 17. The edges 35 and 37, as well as the crease line 38, will be disposed in right angular relationship with the crease line 17, and the edge 36 is parallel with the crease line 17.

Swingingly connected to the panel 12 at the top thereof is the tab 39, defined by the crease line 20, crease line 40, slit 41, edge 42, edge 43, (parallel with the crease line 20), edge 44, slit 45 and crease line 46. The dimension of the tab 39 perpendicular to the crease line 20 is a little less than half of the length of the crease line 23.

Swingingly connected to the panel 13 at the top thereof is the flap 47, defined by the crease line 23, crease line 48, edge 49, edge 50 (parallel with the crease line 23), edge 51 and crease line 52.

Swingingly connected to the panel 14 at the top thereof is the tab 53, defined by the crease

line 26, crease line 54, slit 55, edge 56, edge 57 (parallel with the crease line 26), edge 58, slit 59 and crease line 60. The dimension of the tab 53 perpendicular to the crease line 26 is a little less than half the length of the crease line 23.

Swingingly connected to the panel 15 at the top thereof is the flap 61, defined by the crease line 29, crease line 62, edge 63, edge 64, edge 65, edge 66, edge 67, edge 68, edge 69, edge 70 and edge 71. The edges 64 and 65 define a triangular cutout; the edges 67 and 68 define another triangular cutout; and the edges 70 and 71 define still another triangular cutout. The edge 66 is in substantial parallelism with the crease line 29; and the edges 65 and 67 are in forty-five degree relationship with the edge 66. The edges 64 and 68 are in parallelism with the crease line 29. The edge 71 is in forty-five degree relationship with the crease line 29; and the edge 70 is in parallel relationship with the crease line 29. The edge 66 is of approximately equal length with the crease line 29.

The edges 42 and 44 are offset toward each other from positions which would intersect the junctures of crease line 20 with crease lines 18 and 21, respectively. Likewise the edges 56 and 58 are offset toward each other from positions which would intersect the junctures of crease line 26 with crease lines 24 and 27, respectively. The edge 37 and crease line 38 are offset toward the left from intersecting relationship with the juncture of crease lines 17 and 18. The edge 49 with its aligned crease line 48 and the edge 51 with its aligned crease line 52 are offset toward each other from intersecting relationship with the junctures of crease lines 21 and 24, respectively, with crease line 23. Edge 63 with its aligned crease line 62 are offset toward the right from intersecting relationship with the juncture of crease line 29 with crease line 27.

The crease lines 40 and 46 are in forty-five degree relationship with the crease line 20 and intersect the junctures of crease line 20 with crease lines 18 and 21, respectively, thereby leaving a space between the juncture of crease lines 20 and 40 and the juncture of crease lines 38 and 17 and also leaving a space between the juncture of crease lines 46 and 20 and the juncture of crease lines 48 and 23.

The crease lines 54 and 60 are in forty-five degree relationship with the crease line 26 and intersect the junctures of crease line 26 with crease lines 24 and 27, respectively, thereby leaving a space between the juncture of crease lines 26 and 54 and the juncture of crease lines 23 and 52 and also leaving a space between the juncture of crease lines 60 and 26 and the juncture of crease lines 62 and 29.

The crease line 40, slit 41 and the crease line 38 define a web 72 and of unclosed approximately triangular contour. The crease line 46, slit 45 and crease line 48 define a web 73 of unclosed approximately triangular contour. The crease line 52, slit 55 and crease line 54 define a web 74 of unclosed approximately triangular contour. The crease line 60, slit 59 and crease line 62 define a web 75 of unclosed approximately triangular contour.

The spacing of the slits 41 and 45 from the crease line 20, the spacing of the slits 55 and 59 from the crease line 26, the spacing of edge 70 from the crease line 29, and the spacing of edges 64 and 68 from the edge 66 may all be approximately equal. The spacing of the edge 34 from the crease line 17 may be slightly greater than

the spacings immediately above referred to, in order to promote ease in folding of the parts of the upper closure of the carton.

The crease lines illustrated in Figure 1 may be conveniently provided by ruling into the material of the blank 10. Inasmuch as Figure 1 shows that surface of the blank which is to be presented outwardly, the crease lines which define the panels 11, 12, 13, 14 and 15 will be ruled into the blank 10 from the under side thereof. These crease lines, together with other crease lines ruled into the blank from the under side, are represented by plain solid lines. Crease lines, such as 38, 46, 54 and 62, will be ruled into the blank 10 from the upper surface thereof. Such crease lines are represented by solid lines with dots spaced therealong.

The crease lines represented by plain solid lines will bias the parts connected thereby toward the bottom side of the blank as viewed in Figure 1, that is, toward the inside of the carton. Such crease lines may be referred to as direct crease lines.

Those crease lines represented by solid lines with dots placed therealong will bias the parts connected thereby upwardly as the blank is viewed in Figure 1; that is, reversely to the bias of the crease lines represented by plain solid lines. Such reversed bias crease lines will be referred to as reverse crease lines.

The bottom portion of the blank 10 is provided with parts to form the bottom closure of the carton. In many respects the portion of the blank forming the bottom closure of the carton is similar to the portion above described for forming the top closure of the carton.

Inasmuch as the illustrated embodiment of the present invention discloses a blank for forming a tapered carton, the parts forming the bottom closure will be smaller in dimensions than the parts comprising the top closure. Moreover, certain parts of the bottom closure will be tapered to avoid interference with other parts of the bottom closure. Further, the drawings illustrate a construction utilizing a different order of folding of the parts of the bottom closure from the order of closing of the parts of the top closure, which accounts for certain other differences between the part of the panel forming the bottom closure from that part forming the top closure.

Swingingly connected to the panel 11 at the bottom thereof is the flap 76, defined by the crease line 19, crease line 77, slit 78, edge 79, edge 80, edge 81, edge 82, edge 83, edge 84, edge 85, edge 86 and edge 87. The slit 78 and edges 80, 82, 84 and 86 are in substantial parallelism with the crease line 19. The edge 87 is in forty-five degree relationship with the crease line 19, and the edges 81 and 83 are in forty-five degree relationship with the edge 82.

Swingingly connected to the panel 12 at the bottom thereof is the tab 88, defined by the crease line 22, crease line 89, slit 90, edge 91, edge 92, edge 93, slit 94 and crease line 95. The edge 92 is substantially parallel with the crease line 22 and is spaced therefrom a little less than half the length of the crease line 25.

Swingingly connected to the panel 13 at the bottom thereof is the flap 96, defined by the crease line 25, crease line 97, edge 98, edge 99, edge 100 and crease line 101. The edge 99 is substantially parallel with the crease line 25 and is spaced therefrom a distance approximately equal to the length of the crease line 22.

Swingingly connected to the panel 14 at the

bottom thereof is the tab 102, defined by the crease line 28, crease line 103, slit 104, edge 105, edge 106, edge 107, slit 108 and crease line 109. The edge 106 is substantially parallel with the crease line 28 and is spaced therefrom a little less than the length of the crease line 25.

Swingingly connected to the panel 15 at the bottom thereof is the flap 110, defined by the crease line 31, edge 111, slit 112, edge 113, edge 114, edge 115, slit 116 and crease line 117. The edge 114 is substantially parallel with the edge 31 but is spaced therefrom a distance a little less than the spacing of edges 80 and 84 from the crease line 19.

The spacing of the edge 86, slit 78 below the crease line 19, the spacing of the slits 90 and 94 below the crease line 22, the spacing of the slits 104 and 108 below the crease line 28, and the spacing of the slits 112 and 116 below the crease line 31, may be approximately equal.

The crease line 77 is offset to the left from a position which would intersect the juncture of crease lines 18 and 22. The crease lines 97 and 101 are offset toward each other from positions which would intersect with the juncture of crease lines 21 and 22 and the juncture of crease lines 24 and 28, respectively. The crease line 117 is offset toward the right from a position which would intersect with the juncture of crease lines 27 and 28. The crease lines 95 and 89 are in forty-five degree relationship with the crease line 22 and intersect the junctures of crease line 22 with crease lines 18 and 21, respectively, thereby leaving a space between the juncture of crease lines 22 and 95 and the juncture of crease lines 77 and 19 and also leaving a space between the juncture of crease lines 89 and 22 and the juncture of crease lines 101 and 25.

The crease lines 109 and 103 are in forty-five degree relationship with the crease line 28 and intersect the junctures of crease line 28 with the crease lines 24 and 27, respectively, thereby leaving a space between the juncture of crease lines 28 and 109 and the juncture of crease lines 25 and 97, and also leaving a space between the juncture of crease lines 28 and 103 and the juncture of crease lines 31 and 117.

The crease line 77, crease line 95 and slit 94 define a web 118 of unclosed approximately triangular contour. The crease line 101, slit 90 and crease line 89 define a web 119 of unclosed approximately triangular contour. The crease line 97, slit 108 and crease line 109 define a web 120 of unclosed approximately triangular contour. The crease line 103, slit 104 and crease line 117 define a web 121 of unclosed approximately triangular contour.

For convenience in folding the top closure, the junctures of crease lines 48 and 52 with the crease line 23 will be at a slightly higher level than the juncture of crease lines 20 and 21 and the juncture of crease lines 26 and 24. This difference may be approximately equal to the thickness of material of blank 10.

The crease line 29 intersects the crease line 62 at a slightly higher level than the juncture of crease line 26 with the crease line 60. This difference in level may be approximately equal to the thickness of the material of the blank 10. The juncture of crease line 17 with crease line 38 is at a slightly lower level than the juncture of crease lines 20 and 18, this difference in level being approximately three times the thickness of the material of the blank 10.

Considering the bottom closure, the junctures of crease line 25 with crease lines 101 and 97 will be at a lower level than the juncture of crease lines 22 and 89 and the juncture of crease line 28 with crease line 109. This difference in level may approximate three times the thickness of the material of the blank 10. The intersection of crease line 19 with crease line 77 will be at a slightly lower level than the intersection of crease lines 22 and 95, this difference in level being approximately equal to the thickness of the material of blank 10.

The intersection of crease line 31 with crease line 117 will be at a slightly lower level than the intersection of crease lines 103 and 28, the difference in level approximating twice the thickness of the material of blank 10.

The panel 13 will be slightly longer than the neighboring panels 12 and 14, which panels 12 and 14 will be of equal height, the difference in height between the panel 13 and the panels 12 and 14 approximating four times the thickness of the material of the blank 10.

The panel 11 will be of approximately the same height as the panels 12 and 14, and the panel 15 will be slightly longer than the panels 12 and 14, the difference approximating the thickness of the material of the blank 10.

In forming a carton from the blank illustrated in Figure 1, the panel 11, which has been referred to as the fold-under panel, will be brought into surface contact with the panel 15, the upper surface of the panel 11 as viewed in Figure 1 being brought into engagement with the under surface of the panel 15. This will form a tube of tapering cross-section, as illustrated in Figure 2. Said panels 11 and 15 will be adhesively secured together.

In forming the bottom closure, a preferred procedure is as follows:

The tabs 88 and 102 will be moved from their positions as illustrated in Figures 2 and 6 into positions at right angles to the axis of the tube. The flap 76 will then be folded into surface engagement with said tabs 88 and 102, the cutout portions defined by the edges 83 and 84 on the one side and by the edges 81 and 80 on the other side receiving the webs 119 and 120, respectively.

The contacting surfaces of the tabs 88 and 102 with the flap 76 will be provided with adhesive. The flap 110 of panel 15 will then be folded down into surface engagement with the flap 76, the contacting surfaces having been provided with adhesive. Inasmuch as the flap 110 is relatively short, said flap 110 will clear the webs 119 and 120. The flap 96 will then be folded down into surface engagement with the flap 110, the contacting surfaces having been provided with adhesive.

The steps above recited will preferably have been carried out with the blank 10, firmly wrapped around a mandrel, and the various elements of the bottom closure may be tightly sealed together by the use of sealing machinery well known to those skilled in the art.

The webs 118, 119, 120 and 121 will form siftproof closures at the corners of the bottom closure. The parts will fit together by reason of the cutouts in the flap 76.

The slit 78 in the flap 76 provides a certain amount of "give" to clear the web 118. The slits 112 and 116 will also provide a certain amount of "give" to clear the webs 118 and 121. Though the web 118 provides one more thickness of material than is present in adjacent

parts of the bottom closure, the give due to the slit 112 will render this difference immaterial. However, if preferred, the slits 78, 112 and/or 116 may be omitted.

Referring now to the top closure, a different order of folding of the flaps and tabs is illustrated and described.

In moving the parts of the top closure into position, the flap 32 will be moved into right angular relationship with the axis of the carton. The flap 61 will then be folded into surface engagement with the flap 32, the contacting surfaces having been provided with adhesive. The tabs 39 and 53 will then be folded down into surface engagement with the flap 61. Inasmuch as said tabs are relatively short, they will not quite meet each other when folded down into operative position.

The contacting surfaces between the flap 61 and the tabs 39 and 53 will also have been provided with adhesive. The web 72 will be received within the cutout defined by the edges 70 and 71. The crease lines 54 and 46 will be received within the cutouts defined by the edges 65 and 64 and by the edges 67 and 68, respectively. The flap 47 will then be folded down into flatwise engagement with the tabs 39 and 53, the contacting surfaces having been provided with adhesive.

The webs 72, 73, 74 and 75 will provide sift-proof sealing features at the corners and by reason of the cutouts defined by the edges 33, 34, 64, 65, 67, 68, 70 and 71, the webs will be neatly folded into place, the top closure having substantially uniform thickness throughout.

Although a preferred embodiment has been described in detail, many modifications will occur to those skilled in the art and it is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. A blank for a carton, including five panels defined by crease lines, said panels being adapted to be folded into tubular form of rectangular cross section, the outermost panels being provided with flaps swingingly connected thereto at the ends thereof along one edge portion of the blank, one of said flaps having a contour to fit within the tube at the corresponding end of said tube, the flap of the panel at the other end of said blank being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the other of said flaps and over said tabs, said flaps and said tabs being connected to each other adjacent to their axes of swing by webs of approximately triangular contour, flaps of the end panels being provided with cut-outs to receive said webs to provide a tight closure of substantially uniform thickness.

2. A blank for a carton, including five panels defined by crease lines, said panels being adapted to be folded into tubular form of rectangular cross section, the outermost panels being provided with flaps swingingly connected thereto at the ends thereof along one edge portion of the blank, one of said flaps having a contour to fit within the tube at the corresponding end of said tube, the flap of the panel at the other end of said blank being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the other of said flaps and over said tabs, said flaps and said tabs being connected to each other adjacent to their axes of swing by webs of approximately triangular contour, each of said webs being defined by a slit and two crease lines having mutually reversed bias, flaps of the end panels being provided with cut-outs to receive said webs to provide a tight closure of substantially uniform thickness.

3. A blank for a carton, including five panels defined by crease lines, said panels being adapted to be folded into tubular form of rectangular cross section, the outermost panels being provided with flaps swingingly connected thereto at the ends thereof along one edge portion of the blank, one of said flaps having a contour to fit within the tube at the corresponding end of said tube, the flap of the panel at the other end of said blank being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the other of said flaps and over said tabs, said flaps and said tabs being connected to each other adjacent to their axes of swing by webs of approximately triangular contour, each of said webs being defined by a slit and two crease lines having mutually reversed bias, certain of said flaps being provided with cutout portions to fit said webs when said flaps and tabs are in operative positions.

4. A carton including five panels, one of said panels being secured flatwise against another of said panels to form the tube of rectangular cross section, said two panels being provided with flaps swingingly connected thereto at the ends thereof at one end of the carton, one of said flaps having a contour to fit within the tube at the corresponding end thereof, the flap of the other of said two panels being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the others of said flaps and over said tabs, said flaps and tabs being connected together at the regions thereof adjacent to their axes of swing by means of webs of approximately triangular contour, flaps of the end panels being provided with cut-outs to receive said webs to provide a tight closure of substantially uniform thickness.

5. A carton including five panels, one of said panels being secured flatwise against another of said panels to form the tube of rectangular cross section, said two panels being provided with flaps swingingly connected thereto at the ends thereof at one end of the carton, one of said flaps having a contour to fit within the tube at the corresponding end thereof, the flap of the other of said two panels at the other end being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the others of said flaps and over said tabs, said flaps and tabs being connected together at the regions thereof adjacent to their axes of swing by means of webs of ap-

proximately triangular contour, each of said webs being defined by a slit and two crease lines having mutually reversed bias, flaps of the end panels being provided with cut-outs to receive said webs to provide a tight closure of substantially uniform thickness.

6. A carton including five panels, one of said panels being secured flatwise against another of said panels to form the tube of rectangular cross section, said two panels being provided with flaps swingingly connected thereto at the ends thereof at one end of the carton, one of said flaps having a contour to fit within the tube at the corresponding end thereof, the flap of the other of said two panels at the other end being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the others of said flaps and over said tabs, said flaps and tabs being connected together at the regions thereof adjacent to their axes of swing by means of webs of approximately triangular contour, each of said webs being defined by a slit and two crease lines having mutually reversed bias, certain of said flaps being provided with cutout portions to fit said webs when said flaps and tabs are in operative positions.

7. A blank for a carton, said blank including five panels, one of said panels being adapted to be secured flatwise against another of said panels to form a tube of rectangular cross section, said two panels being provided with flaps swingingly connected thereto at the ends thereof at one side of said blank, one of said flaps having a contour to fit within said tube at the corresponding end thereof, the flap of the other of said two panels being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the others of said flaps and over said tabs, said flaps and tabs being connected together at the regions

thereof adjacent to their axes of swing by means of webs of approximately triangular contour, each of said webs being defined by a slit and two crease lines, the flap of one of said end panels being provided with cutouts coinciding with the outlines of said webs.

8. A carton including five panels, one of said panels being secured flatwise against another of said panels to form the tube of rectangular cross section, said two panels being provided with flaps swingingly connected thereto at the ends thereof at one end of the carton, one of said flaps having a contour to fit within the tube at the corresponding end thereof, the flap of the other of said two panels at the other end being adapted to be folded over said one flap, the middle panel being provided with a flap, the panels on two sides of said middle panel being provided with tabs adapted to be disposed crosswise of said tube, the flap of said middle panel being adapted to be folded over the others of said flaps and over said tabs, said flaps and tabs being connected together at the regions thereof adjacent to their axes of swing by means of webs of approximately triangular contour, each of said webs being defined by a slit and two crease lines, one of said flaps being provided with cutout portions to fit said webs when said flaps and tabs are in operative positions.

JULIUS A. ZINN, JR.

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The following references are of record in the file of this patent:

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