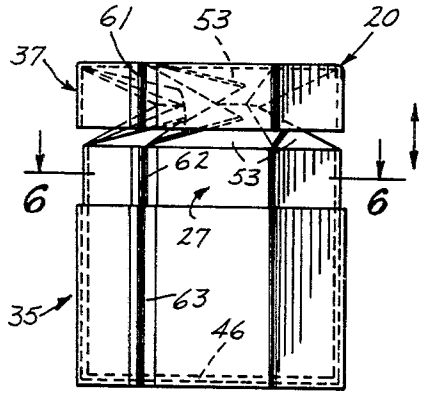
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COLLAPSIBLE CARTON

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FIG. 3



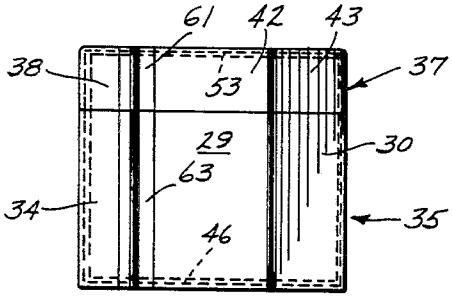


FIG. 1

FIG. 4

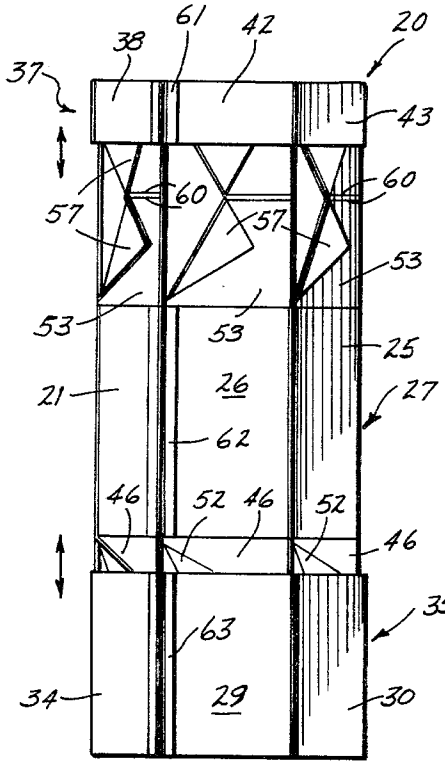
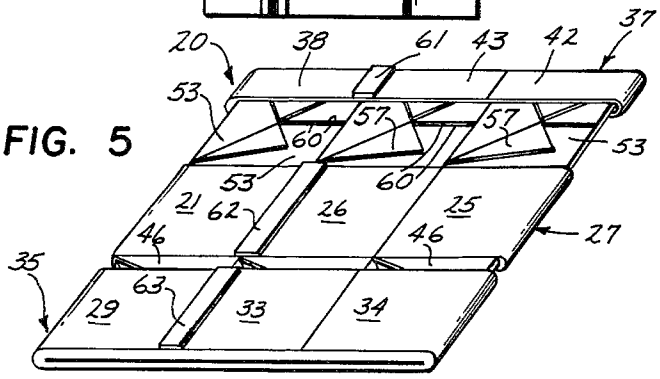


FIG. 5



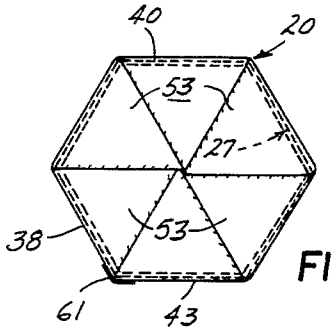


FIG. 2

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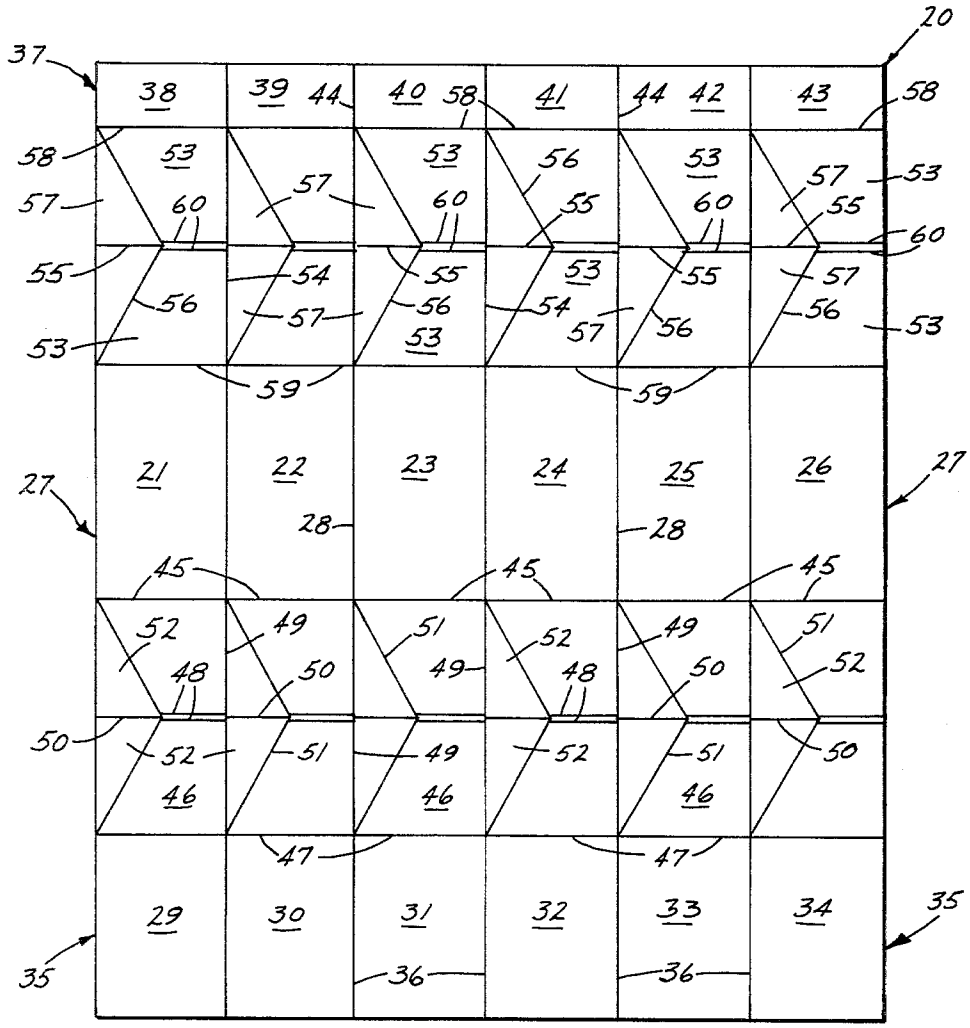


FIG. 7

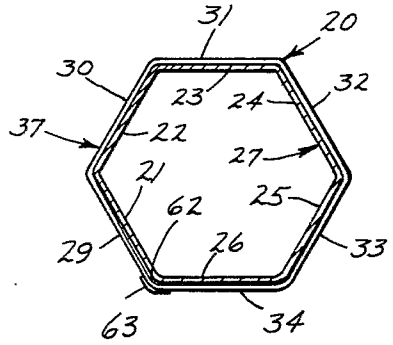


FIG. 6

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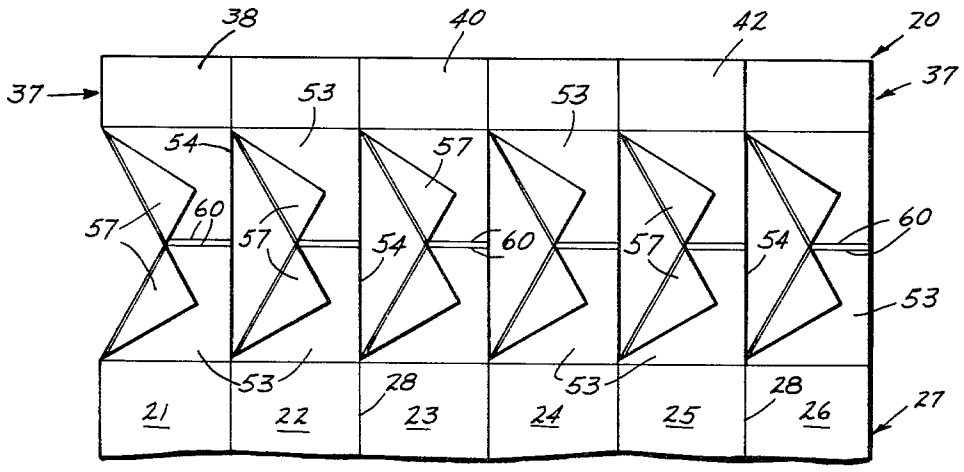


FIG. 8

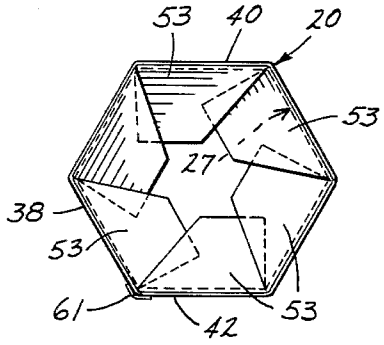


FIG. 12

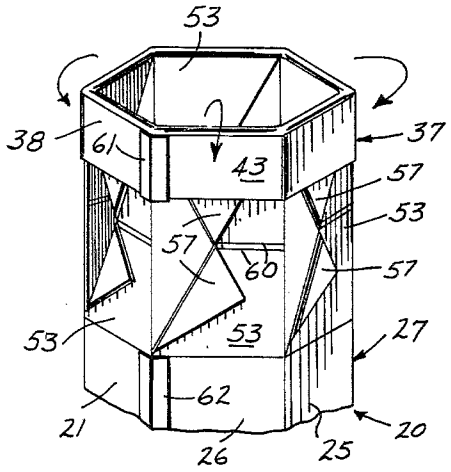
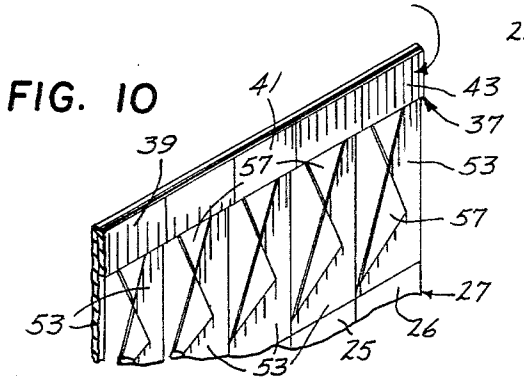


FIG. 11

FIG. 10



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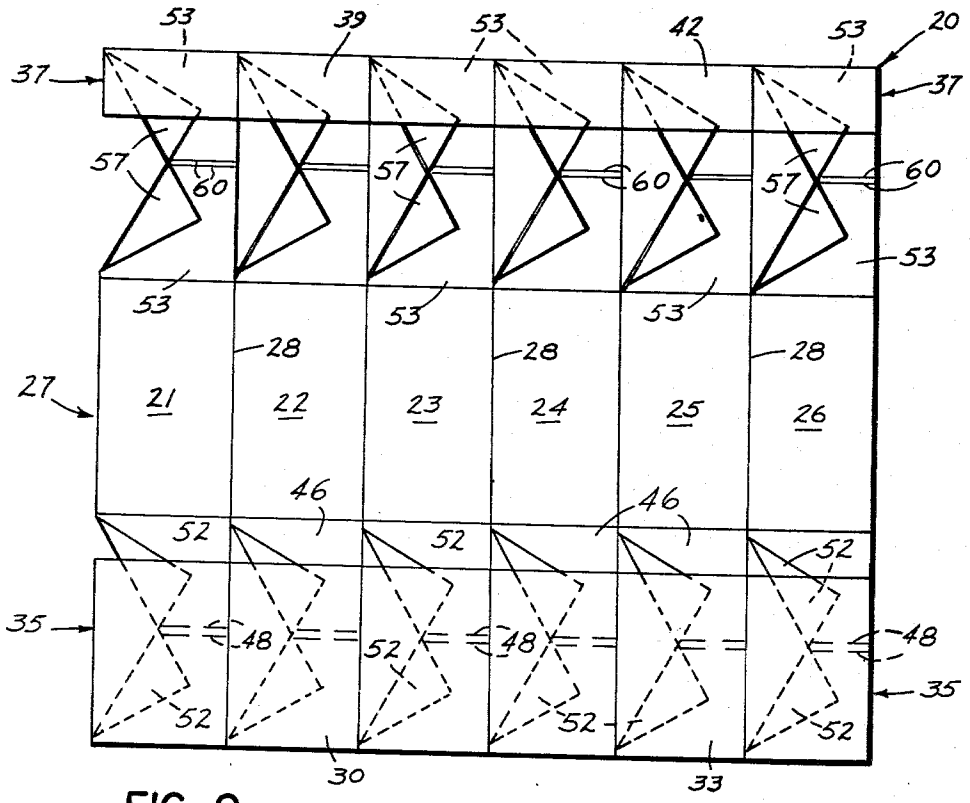


FIG. 9

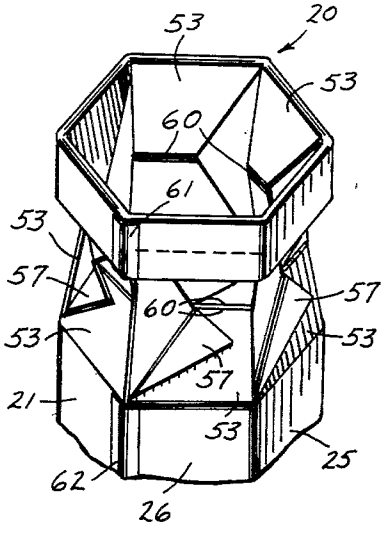


FIG. 13

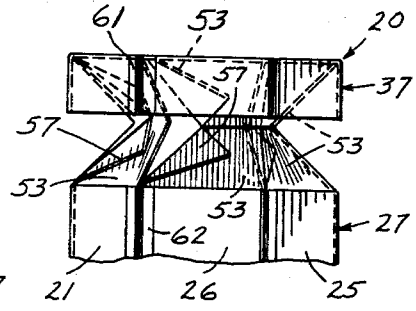


FIG. 14

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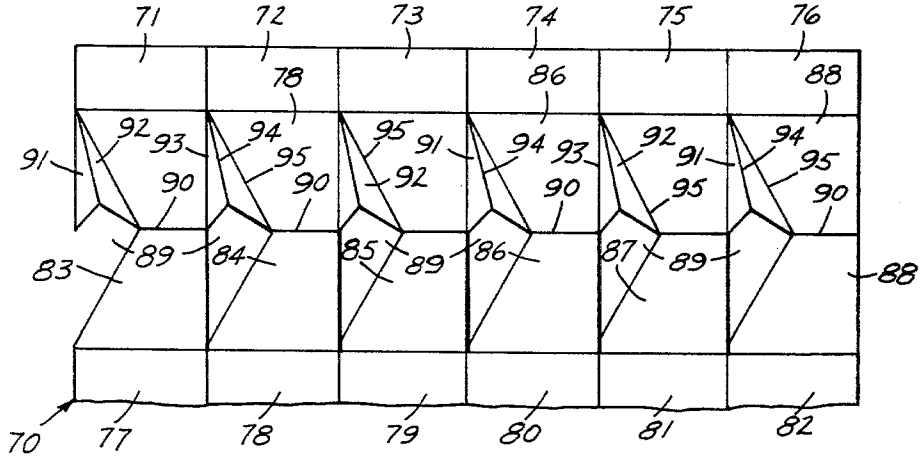


FIG. 15

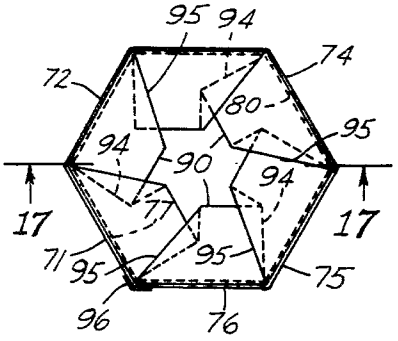


FIG. 16

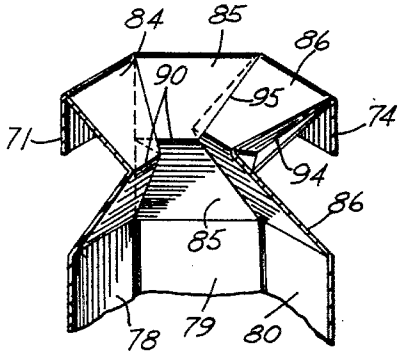


FIG. 17

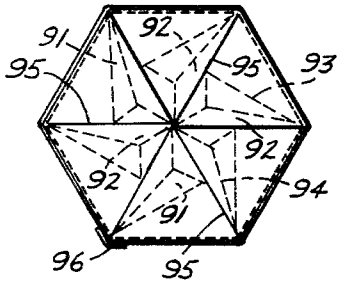


FIG. 18

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United States Patent Office

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Patented Mar. 1, 1966

3,237,840

COLLAPSIBLE CARTON

Clifford H. Keith, Cincinnati, Ohio, assignor to The Mead Corporation, Dayton, Ohio, a corporation of Ohio

Original application Jan. 10, 1961, Ser. No. 81,865, now Patent No. 3,107,042, dated Oct. 15, 1963. Divided and this application Oct. 9, 1963, Ser. No. 314,951

5 Claims. (Cl. 229—41)

This application is a division of application Serial No. 81,865, filed January 10, 1961, which now has issued as Patent No. 3,107,042 on October 15, 1963.

The present invention relates to a collapsible carton and more particularly to a collapsible carton formed from a single blank of corrugated cardboard or equivalent material die cut and creased to define five rows of horizontally aligned edge-joined panels, the middle set of which are joined at their free edges to define a circumferentially continuous carton liner, the upper and lower rows being folded to the outside and then likewise joined at their free edges to define continuous outer carton portions telescopically engageable over the top and bottom ends of the carton liner, and the intermediate rows being notched and creased so as to automatically interleave to form the top and bottom closures as the carton parts are telescoped together.

Specifically, there is provided a single die cut blank of corrugated cardboard or similar relatively stiff but bendable material. The blank has a central row of edge-joined panels, the free edges of the end panels of which are joined to each other as by the use of a strip of adhesive tape to define a circumferentially continuous carton inner wall or liner. The blank also has a top and bottom row of panels folded to the outer side of the carton and similarly joined at their free edges to define continuous bands telescopically slidable over the upper and lower ends of the liner portion. Between the said upper and central and again between the central and lower rows of panels, which define the double thickness walls of the carton, there is a row of closure forming panels each of which is centrally and horizontally creased so as to be foldable upon itself and is cut away along the edge of one or both halves thereof to define a notch into which the folded edge of an adjacent panel may extend as said closure forming panels fold inwardly and interleavingly to automatically form multiply top and bottom closures of the carton as the wall portions thereof are telescoped together, or to open the same on a reverse movement of the parts.

It is accordingly an object of the invention to provide a single blank carton having telescopically mating inner and outer walls and top and bottom closures automatically closed or opened by the relative telescopic movements of the carton walls.

It is another object to provide a carton of this type which can be collapsed into a flat package for shipping or storage either before or after use as a carton.

It is another object to provide a device of the character described in which all of the blank material initially encompassed within its margins is utilized to provide multiple walls for the carton sides and closure.

It is a further object of the invention to provide a collapsible carton which is simple in construction, inexpensive to manufacture and yet effective and efficient in use.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

FIGURE 1 is a side elevational view of a closed carton embodying the invention;

FIGURE 2 is a plan view of the carton of FIGURE 1;

FIGURE 3 is an elevational view of the carton of FIGURE 1, illustrating the beginning of the top opening operation;

FIGURE 4 is a side elevational view of the carton fully open at both top and bottom;

FIGURE 5 is a perspective view of the opened carton of FIGURE 4 collapsed into a flat package;

FIGURE 6 is a plan view of the carton in section taken on line 6—6 of FIGURE 3;

FIGURE 7 is a plan view of the die cut blank prior to any folding operations;

FIGURE 8 is a fragmentary plan view of the upper half of the showing of FIGURE 7, illustrating the folding operations producing the interleaving closure elements;

FIGURE 9 is a plan view of the blank immediately prior to folding into its tubular condition;

FIGURE 10 is a fragmentary perspective view of the upper right portion of FIGURE 9;

FIGURE 11 is a perspective view of the upper end of the assembled carton;

FIGURE 12 is a plan view showing the upper closure structure partially closed;

FIGURE 13 is a fragmentary, perspective view showing the beginning of the infolding operation that closes the upper closure member;

FIGURE 14 is a fragmentary elevational view showing the upper closure member more nearly closed;

FIGURE 15 is a fragmentary plan view of a blank for a modifiefid form of the carton;

FIGURE 16 is a plan view of the partially closed carton formed by the blank of FIGURE 15;

FIGURE 17 is a fragmentary elevational view of the showing of FIGURE 16, in section and taken on line 17—17 of FIGURE 16; and,

FIGURE 18 is a plan view similar to FIGURE 16 but showing the carton fully closed.

With reference now to FIGURES 1 through 14 of the drawings, numeral 20 generally designates the die cut rectangular blank. Blank 20 may be cut from any suitable sheet material such as corrugated cardboard. A central transverse extending row of rectangular panels 21 through 26 defines the inner or liner portion of the two ply carton, said liner being generally designated by numeral 27. The panels 21 through 26 are defined by the hinge score lines at 28.

A second row of panels 29 through 34 is collectively designated by numeral 35. The panels of row 35 are similarly hingedly connected and defined by score lines 36. The row of panels 35 constitutes the lower portion of the telescopic outer members of the completed carton.

The upper portion of the outside carton walls is formed by a row 37 consisting of panels 38 through 43 similarly joined by score lines 44.

As best seen in FIGURE 7, each of the panels 21 through 26 is joined at its lower edge along fold lines 45 to the upper end of one of the identical panels 46 which form the bottom closure of the carton in a manner hereinafter fully described.

The panels **46** are likewise connected at their lower ends to the upper edges of panels **29** through **34** at scored hinge lines at **47**.

Each panel **46** has impressed therein a double score line **48** horizontally and medially disposed in the right half of each panel **46**. Each panel **46** is separated from adjacent panel **46** by a die cut slit **49**. Each panel **46** is further provided with a slit **50** and with a pair of score lines **51**, which together define flaps **52**, the purpose of which will hereinafter be more fully described.

Liner panels **21** through **26** are similarly connected to the upper outside panels **38** through **43** by a series of identical panels **53** which, except for their location, are substantially identical with the closure panels **46** described above. Panels **53** are severed from each other by the severance lines **54**, and are slit medially at **55** to define in cooperation with score lines **56**, the flaps **57**. Like panels **46** previously described, closure panels **53** are hingedly connected at their upper and lower ends respectively to the panels of row **37** and row **27** at score lines **58** and **59**. Double score lines **60** divide panels **53** into lower and upper halves foldable onto each other about score lines **60**.

FIGURES 8 and 9 illustrate the next step of folding flaps **52** and **57** against the inside surfaces of folding closure panels **46** and **53**, respectively, in which positions they are firmly retained by application of adhesive to the engaging surfaces thereof.

FIGURES 9 and 10 show the next step of folding the outside panel rows **37** and **35**, respectively, down over the upper portion of panels **53** and upwardly over the bottom portion of closure panels **46**.

The final assembly step is indicated in FIGURE 5 in which the free ends of rows **37**, **27** and **35**, respectively, are joined together by strips of adhesive tape **61**, **62** and **63**. The strips of adhesive tape **61**, **62** and **63** hingedly connect the adjacent edges of the panel rows aforesaid.

To erect the box, the same is positioned as shown in FIGURE 4, standing on the row of panels **35** as a base. Downward pressure on the upper edge of panel row **37** initiates the inward bowing of the rows of closure panels **53** and **46** as shown in FIGURES 3, 12, 13 and 14. Further downward movement of panel row **37** (now defining a hexagon in plan view) causes the interleaving of the closure panels, as shown in FIGURE 12 to progress toward the closure panel arrangement of FIGURE 2, and further initiates the telescoping of outside carton portions **37** and **35** over the liner portion **27** to bring the parts of the carton first into the nearly closed condition of FIGURE 3 and finally into the fully closed condition of FIGURE 1.

Because of the greater vertical dimension of panel row **35** as compared to panel row **37**, the frictional inter-engagement between panel row **35** and liner **27** will be greater than between liner **27** and panel row **37**. Thus, an upwardly exerted pull on portion **37** will tend to cause an opening of the upper closure formed by panels **53** before liner **27** will begin to slide from the lower outside carton portion **35**. Only when it is desired to re-collapse the carton back to its condition of FIGURE 5 for storage, will liner **27** be withdrawn from the lower carton portion **35**.

In the species of FIGURES 15 through 18, numeral **70** generally designates the die cut rectangular blank. Blank **70** has the same basic construction and arrangement of parts described in the species of FIGURES 1 through 14, and, therefore, only the portions thereof containing the structural differences have been illustrated in FIGURES 15 through 18.

The row of edge-joined panels **71–76** form the upper outer carton wall portions and correspond to telescopic part **37** of the first-described species. The row of edge-joined panels **77–82** (corresponding to panels **21–26**) constitute the inner wall or liner of this carton.

Blank **70** differs from blank **20** essentially in the configurations of closure forming panels **83–88**, which interleave to form the upper closure. (The lower closure, not shown, is of similar construction.) However, panels **83–88** are only laterally disconnected from their adjacent panels for half of their lengths by the cut out areas designated **89**. These areas receive the edges of panels **83–88** when they fold about their scored midlines **90**. The upper portions of the panels **83–88** are laterally joined by integral webs **91** and **92** defined by scored fold lines **93**, **94** and **95**, which render the webs sufficiently flexible to insure proper interleaving of the closure forming panels **83–88**. Webs **91** and **92** perform the important function of providing a seal between the adjacent upper edges of closure panels **83–88** to prevent leakage into or from the carton between the overlapped panel portions. The free edges of panel rows **77–82** and **83–88** are joined (as by adhesive tape **96**) to form circumferentially continuous paneled bands, as in the first-described species.

As panels **77–82** telescope down over panels **83–88** (FIGURES 16 and 17), webs **91** and **92** first fold toward each other about fold lines **94** to permit initiation of the interleaving of panels **83–88**, and then as the process continues they unfold into their initial coplanar relationships (as shown in phantom in FIGURE 18).

While the foregoing presents preferred embodiments and methods of the present invention, it is obvious that other modifications and/or equivalents may be employed without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

1. A plurality of edge-joined panels defining a circumferentially continuous inner wall of a carton, a like number of edge-joined panels defining the lower portion of the outer wall of said carton, a mating set of edge-joined panels defining the upper portion of the outer wall of said carton, and sets of vertically elongated closure forming panels joining the top and bottom edges of said inner wall panels respectively to the top and bottom edges of the panels defining the upper and the lower outer wall portions, each of said closure forming panels having a horizontal medial fold crease formed therein and being provided with at least one vertically elongated wedge-shaped cut-out area in and along one side thereof with the apex of said area lying at a corner of said panel and the base of said area being closely adjacent the medial fold crease, said closure forming panels having wedge-shaped crease-defined webs connecting lateral edges of adjacent panels beyond the base of said cut-out areas and having fold creases extending longitudinally and from the apices thereof to enhance the flexibility thereof, said webs sealing the margins of the flat spaces between interleaved panels against leakage, whereby said latter panels will fold inwardly with each receiving the medially folded edge of an adjacent panel within the pocket defined by the base of said area to provide a sequential interleaving of said sets of closure forming panels to define top and bottom closures for said carton as said upper and lower outer wall portions are telescoped axially over the upper and lower ends of said carton inner wall.

2. Structure according to claim **1**, said carton being formed of a single die cut blank, the upper and lower edge-joined panels of which are folded to the outside thereof after which said blank is formed into a tubular configuration by joining the free edges of each set of edge-joined panels.

3. Structure according to claim **2**, said free edges being joined by strips of adhesive coated sheet material.

4. Structure according to claim **1**, said blank, for economy of manufacture, having the surface thereof providing the telescopically engaging and normally concealed surfaces of said carton, provided with a less expensive finish than the other surface of the blank providing the inner and outer surfaces of said carton.

5. Structure according to claim 1, said panels defining the lower portion of the carton outer wall being considerably greater in vertical dimension than said panels defining the upper portion of the carton outer wall, whereby the latter portion will tend to move more readily relatively to the carton inner wall due to smaller friction producing contact therebetween, so as to open without objectionable movement of said lower outer carton portion relative to the inner carton wall when a carton-opening pull is exerted between said outer wall portions.

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