June 15, 1965 C. D. FALLERT 3,189,249

CONTAINER AND BLANK THEREFOR

Filed June 21, 1963 2 Sheets-Sheet 1

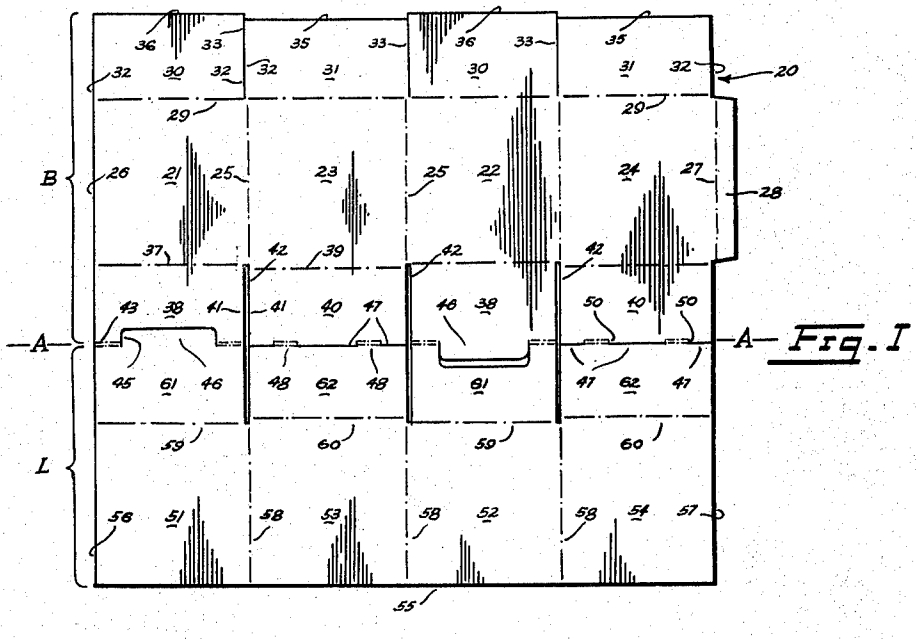


Fig. 1

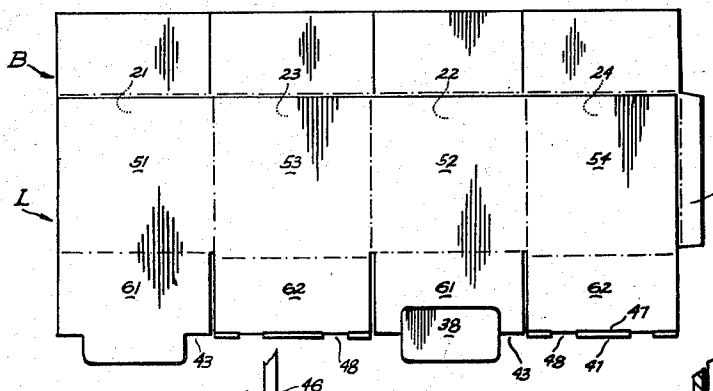


Fig. 2

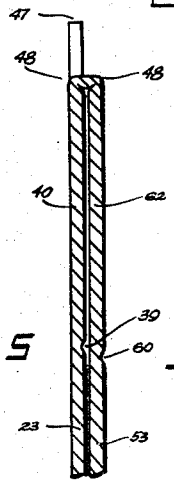


Fig. 5

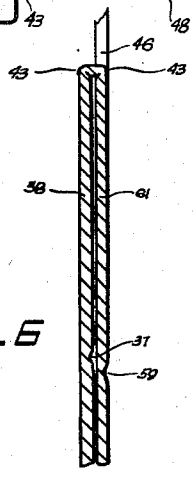


Fig. 6

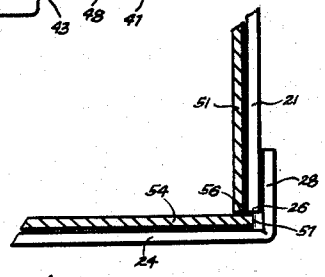


Fig. 4

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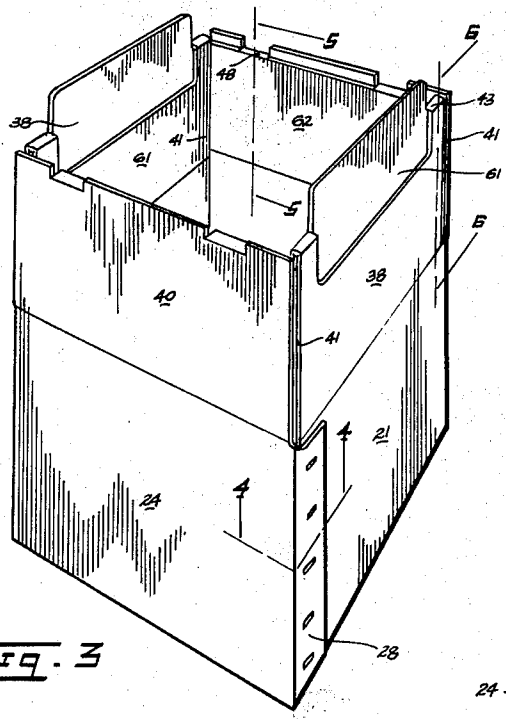


Fig. 3

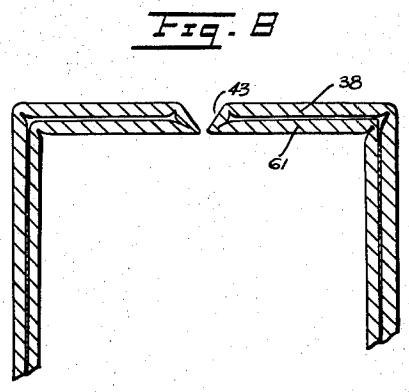


Fig. 8

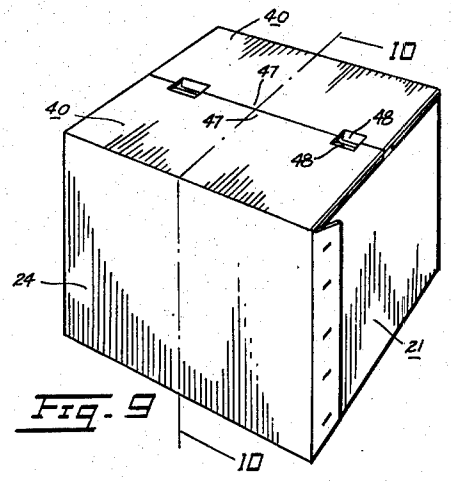


Fig. 9

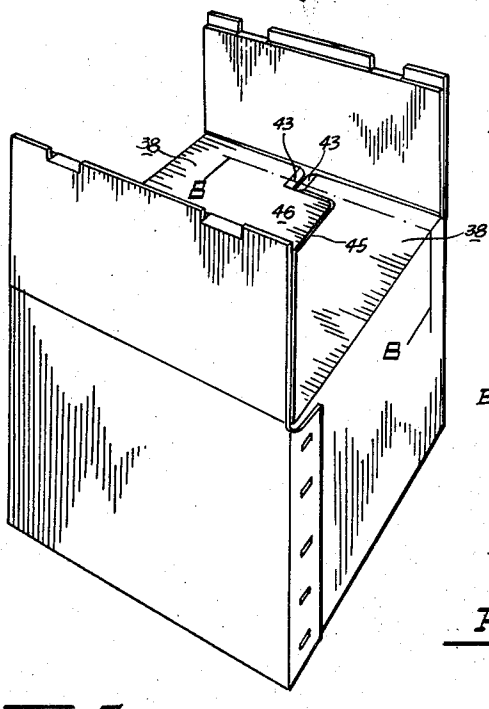


Fig. 7

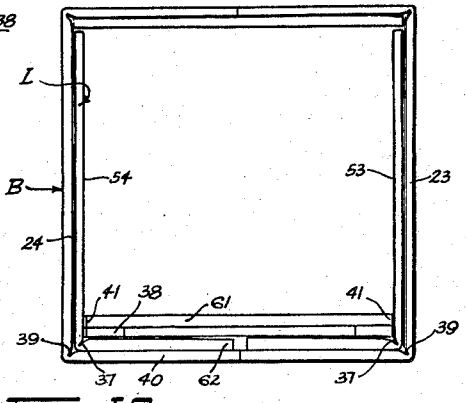


Fig. 10

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3,189,249

CONTAINER AND BLANK THEREFOR

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Filed June 21, 1963, Ser. No. 290,285
6 Claims. (Cl. 229—37)

This invention relates to a container formed from a foldable blank, and more particularly to a corrugated fibreboard container having a reinforced construction adapted to heavy duty usage. The invention is an improvement of copending application Serial No. 98,638, filed March 27, 1961, now Patent No. 3,114,494.

As described in the copending application, a very common and useful style of fibreboard carton construction is the slotted carton style formed from a foldable blank and including vertical walls foldably connected together along their side edges and having top and bottom closure flaps foldably connected to the respective vertical walls. However, the usual slotted carton construction is obviously inadequate for certain purposes as there are openings between the abutting edges of the closure flaps which permits possible leakage of the container contents such as nails and other small loosely packed items placed in such containers. Additionally, the slotted carton type of construction must often be reinforced to provide required stacking and handling characteristics when the contents to be placed therein are of substantial weights or of a nature that they might penetrate or otherwise injure the walls of the carton or the end closures thereof.

The prior application discloses an improved slotted carton type construction having double thickness bottom closure flaps and vertical walls wherein the interior ply of the double thickness is integrally connected to the end edges of the bottom closure flaps and wherein sealing tabs were struck from alternate plies at the end edges of an opposed pair of bottom closure flaps and disposed in overlapping relation to the respective opposed flap and in the aligned void. By this means a heavy duty container was provided with reinforced walls, bottom closure flaps and flap scores and further the integral sealing tabs insured effective retention of the container contents such as nails. However, while this prior construction proved its efficacy for the packaging of nails and other heavy items, it afforded some difficulty in that the double ply construction afforded undue tension in the folding of the double thickness closure flaps which hindered the carton setup and closure operation and the securement of said flaps.

The present invention, while retaining the advantages of the prior carton construction, has effectively eliminated the undue stresses and tension afforded by the double ply slotted carton type construction. This is accomplished by means affording relief at the integral connection of the plies at the end edges of the bottom closure flaps whereby the inner and outer ply of the closure flaps are in slidable relation one to another because of a compensating movement of the said integral connection. Further the improvement is gained through an offsetting of the flap scores constituting the hinge connections between the double thickness closure flaps of the respective vertical wall panels and between the inner and outer ply hinge connections of each closure flap.

Thus, with reference to the drawings, there is herein disclosed a heavy duty carton formed from a foldable blank which is erectable to a container condition by forming the vertical walls into tubular relation about their vertical corner hinge connections and infolding the top and bottom closure flaps about the hinge connections to the top and bottom edges of the walls; the container

being of double ply thickness throughout at least the bottom closure flaps, vertical walls and hinge connections therebetween with the inner ply being integrally connected to the outer ply at the end edges of the respective flaps by means affording sliding movement between the inner and outer plies of each such double ply flap to relieve tension of the flap hinge connections to the vertical walls.

It is therefore an object of the invention to provide a slotted carton type of construction which is adapted to the usual handling and setup equipment and yet includes therein reinforcing and sealing features.

A further object of the invention is to provide a container of a slotted carton type construction with integral reinforcing and sealing features which is of simple and economical construction.

Still a further object is to provide a carton of the described characteristic which avoids undue stress on the container parts and flap and wall hinge connections to facilitate erection and closure of the container.

Other objects and advantages of this invention will be apparent to those skilled in the art upon a full and complete understanding of the construction, and operation of the invention by reference to the accompanying drawings and detailed description, in which are set forth an illustrative embodiment of the invention.

In the drawings:

FIGURE 1 is a plan view of a blank for forming the container;

FIGURE 2 is the first stage of the assembly of the blank shown in FIGURE 1 showing the liner portion folded flatwise against the container portion of the blank;

FIGURE 3 is a perspective view of a container formed from the blank of FIGURE 2 erected to tubular relation and inverted;

FIGURE 4 is a cross sectional view through lines 4—4 of FIGURE 3 showing the securement of the adjacent side edges of the blank;

FIGURE 5 is a cross section through lines 5—5 of FIGURE 3 showing the integral connection at the end edges of the inner and outer plies of a side bottom closure flap preparatory to infolding;

FIGURE 6 is a cross section through lines 6—6 of FIGURE 3 showing an end bottom closure flap preparatory to folding;

FIGURE 7 is a perspective view of an intermediate stage of assembly of the carton showing the end wall bottom flaps in infolded relation;

FIGURE 8 is a cross section through lines 8—8 of FIGURE 7;

FIGURE 9 is a perspective view of the container with the bottom closure completed by the infolding of the outer pair of closure flaps;

FIGURE 10 is a cross sectional view along lines 10—10 of FIGURE 9.

Referring in detail to the drawings wherein like numerals designate like parts throughout the several views, the generally rectangular blank 20 from which the container is formed is shown in FIGURE 1, wherein cut edges are shown as solid lines and lines of scoring or hinge connections are shown as intermittent lines. For purposes of description, the blank is described in terms applicable to the setup container and is divided along line A—A into a body section denoted B and liner section denoted L. The body section B includes end wall panels 21–22 and side wall panels 23–24 which are arranged in side by side relation and foldably joined by hinge connections 25. End wall panel 21 has a free side edge 26 which is one side edge of the blank 20, while the remote side wall panel 24 has a side edge determined by corner score 27. The corner score 27 further serves as the hinge connection of

the corner connecting flap 28. The wall panels 21–24 are further provided with a top edge 29 determined by a flap score which serves as the fold connection of the top end flaps 30 and top side flaps 31. The top flaps 30–31 are provided with free side edges 32 determined by the blank edges and by slits 33. The slits 33 are offset from the line of the hinge connections 25 to afford clearance for the infolding of the end flaps 30 in the final closure of the erected container. Also the top side flaps 31 have free end edges 35 which are foreshortened in relation to the end flap end edges 36 in respect to the spacing from the flap scores 29.

The end wall panels 21–22 have bottom edges 37 determined by aligned flap score lines serving as the fold connection to end wall bottom flaps 38. The side wall 23–24 bottom edges 39 are determined by aligned flap score lines which serve as the fold connection of side wall bottom flaps 40. The flap scores constituting the bottom edges 37 and 39 are in offset relation whereby the end wall bottom edges 37 are spaced upwardly from the side wall bottom edges 39.

The adjacent side edges 41 of the bottom flaps are determined and separated by slots 42. Said slots 42 are disposed with one edge thereof substantially in alignment with the wall panel hinge connections 25 and the slots are struck substantially from the end wall bottom flaps 38 and the respective adjacent liner flaps hereinafter described. The end edges of the end wall bottom flaps 38 are determined by spaced apart parallel double lines of scoring 43. Said double scores 43 are interrupted by cut edges 45 so that said double scores 44 extend only a minor portion of the widths of the end flaps 38. The cut edges 45 have a substantially U-shaped conformation determining a sealing tab 46.

The free end edges 47 of the side wall bottom flaps 40 are determined by a slit in alignment with the remote or lower one of the double scores 44. The slit 47 is interrupted by connecting webs 48 which are determined by double lines of scoring and free side edges 50, with the lines of scoring, in alignment with the beforementioned double scores 43.

Continuing with FIGURE 1, the liner section L of the blank 20 includes end wall liner panels 51–52 and side wall liner panels 53–54. Said liner panels 51–54 are determined in part by a top edge 55 and end wall liner panel 51 side edge 56 and side wall liner panel 54 side edge 57. Said wall liner panels 51–54 are arranged in side by side relation in foldable relation along hinged corner connections 58. The hinge connections 58 are in alignment with body section wall panels 23–24 hinge connections 25.

The end wall liner panels 51–52 have bottom edges 59 in offset relation to the side wall liner panels 53–54 bottom edges 60 in the same manner as described in reference to the body section wall panel bottom edges 37–39 and as shown in the drawings.

Liner flaps 61 are foldably connected to the bottom edges 59 and liner flaps 62 are foldably connected to the bottom edges 60. The adjacent edges of the liner flaps 61–62 are determined and separated by extensions of the beforementioned slots 42. The double scores 43 determine the end edges of the liner flaps 61 in conjunction with the cut edges 45. It is to be noted that the U-shaped cut edges 45 are oppositely directed in the respective pairs of end wall bottom flaps 38 and liner flaps 61, so that the sealing tabs 46 are struck from a liner flap 61 in one instance and is an extension of the liner flap 61 in the other instance being struck from the end wall bottom flap 38. The end edges 64 of the liner flaps 62 are determined by the slits 47 and the double scores 48. It is important to note from the foregoing that the end edges of the body section bottom flaps 38 and 40 and the end edges of the liner flaps 61–62 are integrally foldably connected by double scores 43 and 48 which constitute connecting webs to provide a flexible connection therebetween affording specific characteristics and advantages which will be recited hereinafter. Further, the double scores 43 and 48 are disposed in alignment with each other and in closer proximity to the body section B flap scores 37 and 39 than to the liner section L flap scores 59–60. The difference being approximately the thickness of the board from which the blank 20 is formed, which in the case of conventional B-flute corrugated board is on the order of one-eighth inch. Thus the end wall liner flaps 61 are of greater length than their respective connected end wall bottom flaps without regard to the sealing tabs. This is best shown in FIGURE 6 wherein the distance in the bottom end flap 38 from the flap score 37 to the adjacent one of the double scores 43 is less than the distance between flap score 59 of the liner ply to the adjacent double score 43.

In the case of the side wall bottom flaps 40 and their respective paired liner flap 62, as shown in cross-section FIGURE 5, the cut edge 47 is in alignment with the remote one of the double scores 48 as regards the side wall bottom flaps 40, this flap 40 constituting the outer ply is thus of greater length than the corresponding liner flap 62 throughout the major part of the flap width as shown in FIGURE 5, although the flap score 39 and 60 to end edge double score 48 distance relationship is the same as in the beforementioned end flaps.

After the container blank 20 is cut and scored as described above, the first step in the assembly of the container involved the folding of the liner section L into flatwise relation with the blank body section B, as shown in FIGURE 2. It is to be noted that the liner wall panels 51–54 substantially correspond in extent to the respective paired side and end wall panels 23 and 24 and the liner flaps 61–62 likewise correspond to their respective paired side and end wall bottom flaps 38 and 40 subject to the before-mentioned offset scoring. For maximum strength characteristics of the resulting container, the liner panels 51–54 are adhesively secured to the side and end wall panels 23–24 but the bottom flaps 38 and 40 and attendant liner flaps 61–62 are not secured and are therefore in slidable relation to each other as will be brought out hereinafter in greater detail.

A further step in the assembly of the container is shown in FIGURE 3 wherein the blank is erected to tubular wall formation with the corner connecting flap 28 secured to the end wall panel 21 free side edge 26. In this view the container is inverted to clearly show the detail of the double ply thickness bottom closure flaps comprised of the bottom flaps 38 and 40 and their respective liner flaps 61–62.

It is to be noted that the end wall bottom flaps 38 with their liner flaps 61 are reduced in width to permit infolding between the side wall bottom flaps 40 and liner flaps 62 by reason of the beforementioned offsetting of the slots 42 which determine the bottom flap side edges 41. Additionally, the proportions of the blank is such that the end wall 21 and related flaps and liner panels are reduced in width so that the side edges thereof 26 and 56 are adapted to disposition within the side wall panel 24 and liner panel 54 as best shown in the cross-sectional view in FIGURE 4. This dimensional relationship in conjunction with the offsetting of the free side edge 57 from the corner score 27 tends to relieve tension at the so-called manufacturer's joint or connection of the corner connecting flap 28 to the remote blank edge 26.

The cross-sectional views in FIGURES 5 and 6 taken through the connecting webs of the side and end wall bottom flaps in vertically extended position assist in the understanding of the effect of the slidable arrangement of the respective closure flaps and attendant liner flaps in connection with the flexible web connections and offset flap scores. For example, in FIGURE 5 the connecting web 48 is disposed in substantially right angular relation to the closure flap 40 and liner flap 62 whereas the scores 39 and 60 determining the fold connections to the bottom edges of the wall panel 23 and liner panel 53 are in off-

set relation with the so determined length of the liner flap 62 being greater than the side wall bottom flap 40. In a like manner in FIGURE 6, the connecting webs determined by the double scores 43 flexibly connects the ends of the end wall closure flap 38 and liner flap 61 in right angular disposition and the hinge connections 37 and 59 to the respective wall panels 21 and 51 are in offset relation. The effect of this arrangement of parts is shown in FIGURES 7, 8 and 9 wherein, as shown in FIGURE 8, the web connections 43 are angularly disposed due to the slidable movement of the end wall closure flap 38 and liner flap 61 relative to each other. By this means there is gained a flexibility of these double ply closure flaps even though each ply is integrally foldably connected to the bottom edges of the respective wall panel and wall liner panel. Looking more particularly to FIGURE 7, there is shown a stage in the completion of the bottom closure of the container wherein the end wall flaps 38 and liner flaps 61 are inturned to form the inner bottom closure wherein the sealing tabs extending alternately from the end wall bottom closure flap 38 and the opposed flap liner flap 61 are each disposed in the void defined by the opposed flap cut edge 45 to provide an overlapping and sealing engagement between these flaps.

Finally, as shown in FIGURE 9, the side wall bottom flaps 40 and their respective liner flaps are infolded in container closing relationship. Note that the end edges 47 of the ends of the side wall bottom flaps 40 are in substantially abutting relation to provide an effective seal in conjunction with the inner bottom closure and sealing tabs to prevent possible leakage of such articles as nails or the like which may be loosely and randomly packed in a container. Due to this desirable condition it is necessary that commercial embodiments of the invention be of a rectangular conformation as the relative lengths of the side wall and end wall closure flaps is necessarily different due to the offsetting of the respective wall panels as previously evidenced by the disclosures and descriptions in relation to FIGURES 1, 5 and 6. Nevertheless this necessity of rectangular conformation of the container is minimized by the disposition of the cut edge 47 determining the ends of the side wall bottom flaps 40 in that the blank portions in alignment with the double score connecting webs 48 is included in the length of the said side flap 40. It is to be noted that the flexible connections comprised of the double score connecting webs 48 become extended in acute angular relation to the body section and liner section flaps 40 to accommodate the extra length of the liner flap 62 in comparison to the container flap 40 as previously described.

FIGURE 10 is a cross-section through line 10—10 of FIGURE 9 in inverted condition to disclose the upright condition of the container. In this view the liner section L side wall panels 53–54 are shown in flatwise relation with their corresponding paired body section side wall liner panels 23–24. Further, this view shows the end wall bottom flaps 38 and 61 disposed interiorly of the side wall bottom flaps 40 and 62 to form the inner closure with the side edges 41 of the inner bottom closure disposed intervening the interior surfaces of the side wall liner panels 53–54 due to the vertical inward offsetting of the fold connections 37 to the end wall bottom edges as particularly disclosed in FIGURES 1 and 2. This vertical offsetting of the fold connections of the flaps to the bottom edges of the wall panels permits the flatwise parallel disposition of these double ply thickness inner and outer closure flaps which relieves the stress on the flap fold connections 37, 39, 59 and 60 in addition to the hereinbefore described flexible connections between the inner and outer dissimilar length plies of each flap.

It is to be understood that the embodiments of the invention herein described are illustrative and not restrictive, and the invention may be susceptible to embodiment in other modified forms, and that all such modifications which are similar to or equivalent hereto come equally within the scope of the claims next appearing.

In the claims:

1. A container having foldably connected wall panels and closure flaps on one end thereof formed from a foldable blank comprised of a body section and a liner section folded in mutual flatwise contacting relationship with body and liner sections in contacting engagement with wall panels, closure flaps and fold connections therebetween of double ply thickness, the container having body section wall panels foldably connected in rectangular tubular formation and closure flaps with fold connections to one end of the said wall panels, the closure flaps comprising an opposed pair of inner closure flaps and an opposed pair of outer closure flaps, the fold connections of the inner closure flaps being vertically offset from the outer bottom closure fold connections, the liner section having corresponding foldably connected wall panels and closure flaps disposed interiorly and in flatwise contacting relation to the respective paired wall section panels and flaps, the respective fold connections between the liner section wall panels and closure flaps being offset from the corresponding body section folds vertically inwardly from the end of the container to relieve fold tension in infolded relationship, connecting webs each determined by parallel lines of scoring and free side edges, slit edges extending between the webs and defining free end edges of the flaps, the connecting webs each being in closer proximity to the body section flap fold connections than to the liner section flap fold connections and the liner section flaps being of greater length than the body section flaps, the connecting webs providing a slidable relation between each respective paired wall section and liner section closure flap upon the folding movement of said flaps between an open position and a closure position in perpendicular relation to the wall panels compensating for the differential in length between said respective flaps, whereby the double ply thickness of the fold connections between each of the wall panels and flaps is relieved of stress consequent to the folding thereof.

2. A container as set forth in claim 1 wherein the flexible connections extend a minor portion of the width of the flaps, the major portion of the ends of the flaps being determined by said slit edges.

3. A unitary foldable blank for a double ply thickness container comprising a body section and a liner section folded into flatwise contacting relationship providing wall panels, closure flaps and fold connections therebetween of double ply thickness, each such section having corresponding paired wall panels and closure flaps, the wall panels of the sections being arranged respectively in side by side foldably connected relation with bottom edges thereof defined by lines of fold connections in alternating offset relation, closure flaps connected respectively to each such wall panel at said fold connections with flap end edges opposite thereto, the respective paired wall panels and flaps of the sections being in aligned flatwise contacting relation with the end edges of the paired flaps flexibly connected by fold lines together in slidable relation, said flexible connections comprising connecting webs each determined by parallel lines of scoring with free side edges and slit edges extending between the ends of said lines of scoring and defining the free ends of said flaps, said free ends being in offset relation with the flexible connection fold lines, the connecting webs being in closer proximity to the body section flap fold connections than to the liner section flap fold connections and in mutually aligned relationship, the liner flaps being of greater length than the respective paired body section flaps in respect to the distance between the fold connection to the wall panels and said flexible connections.

4. A unitary foldable blank as in claim 3 wherein the bottom edges of the wall panels of each section are in alternating vertical offset relation.

5. A unitary foldable blank as in claim 3 wherein the

flexible connections extend a minor portion of the width of the flaps, the major portion of the ends of the flaps being determined by cut edges.

6. A container as set forth in claim 1 wherein said flap slit edges in at least one opposed pair of closure flaps are disposed in alignment with the remote one of the connecting web parallel lines of scoring in respect to the body section closure flaps to provide a substantially abutting relation between said flap edges in the infolded closure position thereof.

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