

June 22, 1965

L. P. LARSON

3,190,533

REINFORCED CONTAINER

Filed Oct. 23, 1963

2 Sheets-Sheet 1

FIG. 1

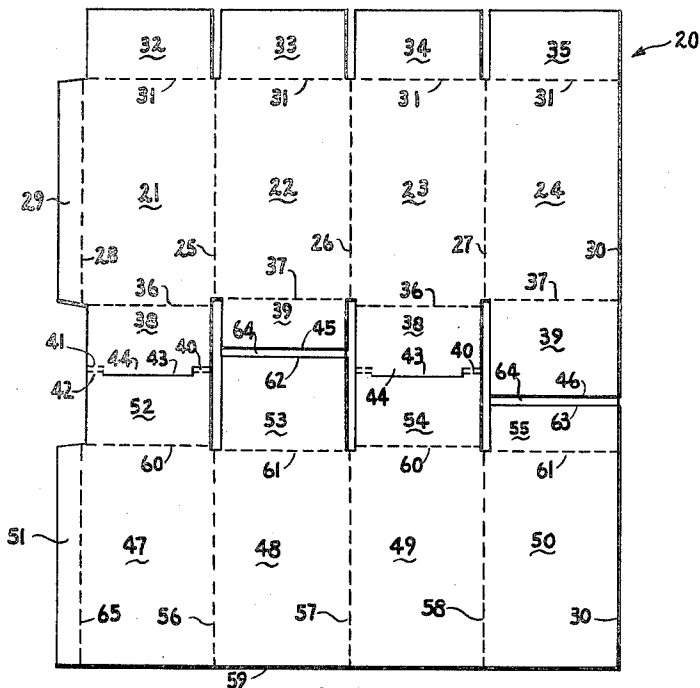


FIG. 2

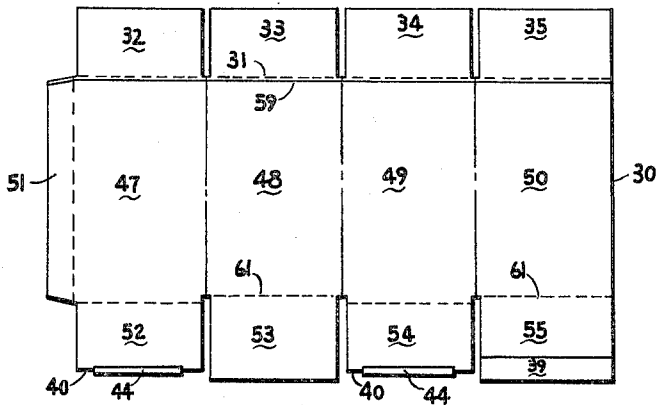
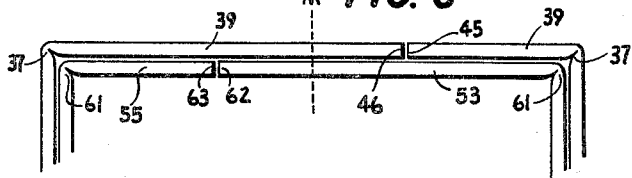


FIG. 6



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FIG. 3

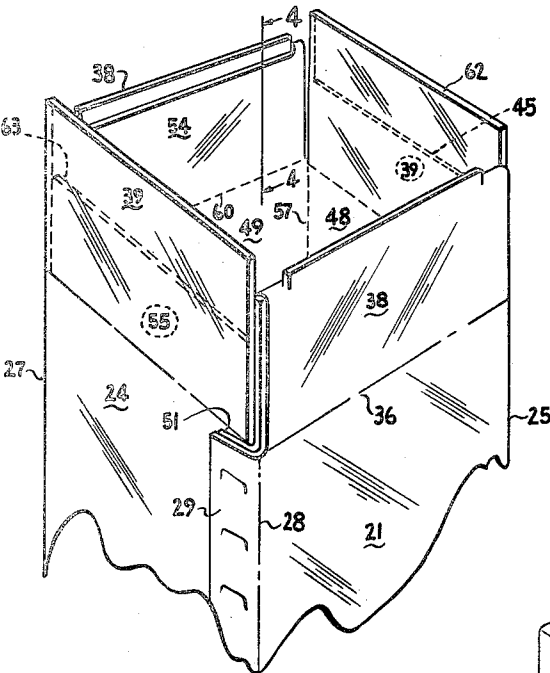
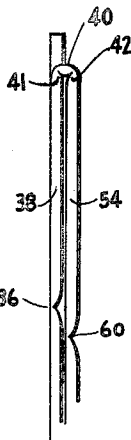


FIG. 4

FIG. 7

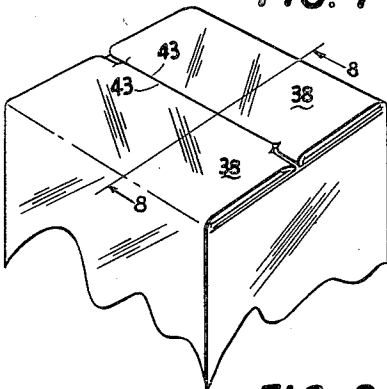


FIG. 8

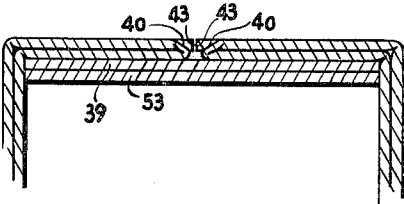
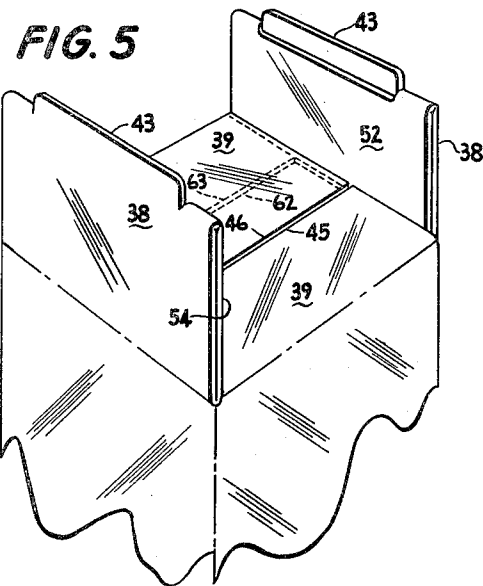


FIG. 5



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3,190,533

REINFORCED CONTAINER

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3 Claims. (Cl. 229-14)

This invention relates to a reinforced container formed from a foldable blank, and more particularly to a corrugated fibreboard container which is adapted to ordinary setting up, filling, and closing operations as commonly practiced on regular slotted cartons.

Many styles of reinforced containers have been proposed for heavy duty usages such as the packaging of nails, other hardware items, or heavy materials which are bulk packed or randomly packed in a container. Packaged goods of this class are particular problem in that such heavy randomly packed articles exert considerable stresses on the container which cause failure in stacking, or rupturing of the vertical corner score, or bottom closure. Additionally, such articles and packages are commonly utilized under conditions wherein rough handling and storage under difficult conditions are the norm.

These problems have been long recognized in the art and numerous solutions thereto have been proposed and used. However, prior art packages are generally characterized by compromising one or more of the important factors in packaging, i.e., economy, ease of operation, and adaptability to conventional apparatus and modes of operation. It is further recognized that regular slotted cartons are a standard for evaluating packages of various types in that regular slotted cartons are by far the most common and standardized equipment is readily available for setting up, filling and closing such containers. For this purpose, regular slotted cartons may be briefly defined as cartons formed from a foldable blank having wall panels arranged in side by side foldably connected relation with top and bottom end flaps foldably connected to the ends of each wall panel. To form the carton from this blank, the free side edges of the remote wall panels are secured together and the wall panel arrangement expanded to tubular form. Finally the end flaps are infolded to complete the top and bottom closures. However, conventional regular slotted cartons are inadequate for the presently contemplated heavy duty usages as they are deficient in strength qualities without the addition of additional reinforcements such as liners and the like.

The applicant herein discloses and claims an advance in the art of reinforced cartons which retains the advantages of a regular slotted carton style and may be formed from a unitary foldable blank of corrugated fibreboard or the like and which comprises tubularly arranged upright wall panels with foldably connected closure flaps on at least one end, wherein said panels and flaps on one end thereof are of two ply thickness as are the fold connections between each of the adjacent said panels and flaps. Further, the present invention accomplishes the preceding in an advantageous manner whereby undue stress on the fold connections is eliminated and the line of abutment of the end edges of the opposed flaps are offset in the several plies whereby the end closure is free of communication between the container interior and exterior. Additionally, the foregoing advantages may reside in a container of a very desirable square transverse section.

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

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an illustrative embodiment of the invention.

In the drawings:

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

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

FIGURE 3 is a perspective view of an end portion of the box prior to infolding the double ply closure flaps; FIGURE 4 is a cross-section through lines 4-4 of FIGURE 3;

FIGURE 5 is a perspective view showing an end portion of the container wherein the double ply inner closure flaps are infolded in container end sealing relation;

FIGURE 6 is a cross-section through line 6-6 of FIGURE 5;

FIGURE 7 is a perspective view of an end portion of the container with the outer pair of double ply closure flaps infolded to complete the end closure;

FIGURE 8 is a cross-section through line 8-8 of FIGURE 7.

Referring in detail to the drawings wherein like numerals designate like parts throughout the several views, the unitary rectangular blank 20 is cut and scored, as indicated by solid lines and dotted lines respectively, to determine an arrangement of foldably connected panels and flaps. More particularly, there are a series of wall panels 21-24 in side by side relation. These panels have their respective adjacent side edges connected by vertical corner scores 25-27. A first wall panel 21 additionally has a side edge determined by corner score 28 which serves as the fold connection of the connecting flap 29. The remote wall panel 24 has a free side edge 30.

The top edges of the wall panels 21-24 are determined by flap scores 31 constituted by a line of scoring which serve as the fold connection of the top flaps 32-35 to the respective wall panels. The bottom edges of the paired alternate wall panels 21 and 23 are determined by flap scores 36 constituted by lines of scoring in aligned relation transversely of the blank. The remaining alternate pair of wall panels 22 and 24 have bottom edges determined by flap scores 37 constituted by aligned lines of scoring but in vertically offset relation from the flap scores 36. This offsetting will preferably be on the order of twice the thickness of the material of the blank 20 as for example corrugated paperboard.

A pair of bottom flaps 38 are foldably connected by flap scores 36 to the bottom edges of the wall panels 21 and 23 and the second pair of bottom flaps 39 are foldably connected to the bottom edges of wall panels 22 and 24 by flap scores 37. The end edges of the paired bottom flaps 38 are determined by connecting webs 40 which are each constituted by parallel lines of scoring 41-42 and the free cut edges 43 which are of a substantially U-shaped conformation intersecting the ends of the lines of scoring 41-42 and extending beyond the remote one of said lines of scoring 42 thus defining tabs 44 constituting a projection on the ends of bottom flaps 38 and preferably extending a major portion of the width of said flaps. The elongated transverse portion of cut edges 43 are spaced from the respective flap scores 36 a distance substantially equal to one-half the width of the adjacent wall panels 22-24. The end edges 45-46 of the alternate pair of bottom flaps 39 are in offset relation as regards their transverse disposition in the blank whereby one bottom flap 39 is of a length less than the flaps 38 and less than one-half the width of the adjacent wall panels 21 and 23. The remaining bottom flap 39 is of a length, measured from its flap score 37 to end edge 46, greater than the flaps 38 and likewise greater than one-half the width of the wall panels 21

and 23. The foregoing comprises the outer ply section of the container as will be described hereinafter in greater detail.

An inner ply section of the blank 20 is comprised of inner wall panels 47-50, connecting flap 51 and inner ply bottom flaps 52-55. The inner wall panels 47-50 are foldably connected by vertical corner scores 56-58 disposed longitudinally of the blank and in aligned relation to the respective outer wall panel vertical corner scores 25-27. The top edge 59 of the inner wall panels 47-50 is determined by the transverse edge of the blank and the blank longitudinal edge 30 determines the remote free side edge of inner ply wall panel 50. The alternate pair of inner wall panels 47 and 49 are provided with corresponding inner ply bottom flaps 52 and 54 which are foldably connected to the bottom edges of said panels by flap scores 60 in transversely aligned relation. The other alternate pair of inner wall panels 48 and 50 are provided with inner ply bottom flaps 53 and 55 of different relative lengths. These inner ply bottom flaps 53 and 55 are foldably connected to their respective inner wall panels 48 and 50 by the flap scores 61. Flap scores 61 are in vertically offset relation from the beforementioned flap scores 60. The bottom flap 53 is provided with a free end edge 62 and is of a determined length exceeding one-half the width of the inner wall panels 47 and 49. The inner ply bottom flap 55 has a free end edge 63 and is of a determined length less than one-half the width of the inner wall panels 47 and 49. Additionally, the inner ply section connecting flap 51 is foldably connected to one inner ply wall panel 47 by corner score 65.

In the preferred embodiment shown, the blank 20 is proportioned to provide a container having a square transverse section. Thus the confronting flap end edges 45 and 62, and 46 and 63 respectively are in spaced apart relation with the intervening material of the blank being removed forming slots 64. This is necessitated by the fact that the flap scores 37 and 61 are in offset relation to the flap scores 36 and 60. Being in greater spaced apart relation there would otherwise result a condition wherein these flaps being of an excessive length would be an overlapping condition in the erected container.

In the assembly of the container, the first step is shown in FIGURE 2 wherein the inner ply section of the blank is folded about the connecting webs 40 into flatwise relation with the inner surfaces of the outer ply section of the blank whereby the inner wall panels 47-50 overlies and are in flatwise substantially coextensive extent and contacting the corresponding outer ply wall panels. In this condition the top edge 59 of the inner ply section is in closely spaced relation with the top flap scores 31 commensurate with the necessary allowance for infolding these flaps. To attain maximum strength characteristics the inner ply wall panels 47-50 are adhesively secured to their counterpart outer ply wall panels 21-24. However, the inner and outer plies of each of the bottom flaps are free of adhesive attachment but are respectively in flatwise contacting slidable relation.

As a further step in the assembly operation, the double ply container walls are formed into tubular relation with the connecting flaps 29 and 51 secured to the remote free side edge 30, as shown in FIGURE 3, whereby the panels of each section are foldably connected at their adjacent corner edges by double thickness fold connections 25-28 in the outer ply and 56-58 and 65 in the inner ply. It is noted that the alternate closure flaps 38 with their respective inner ply flaps 52 and 54 of the blank are in paired opposed relation in the tubular condition of the container. Likewise, the alternate double ply closure flaps 39 with their respective inner plies 53 and 55 are in paired opposed relation.

In this latter condition of the container with tubularly arranged walls and the closure flaps in extended open

position, the opposed pair of flaps 39 with their inner plies 53 and 55 have their respective free end edges 45 and 62 in one instance and 46 and 63 in the other instance in staggered unconnected relation whereby the respective plies of each flap are capable of relative movement one to the other upon the infolding of the flaps as will be described hereinafter. In the case of the opposed flaps 38 with their respective inner plies 52 and 54, the end edges are flexibly connected as can be seen more particularly in the enlarged cross sectional view, FIGURE 4, taken through line 4-4 of FIGURE 3. Here the lines of scoring 41-42 determine the connecting webs 40 which form the flexible connection between the plies 38 and 54 which will permit relative slidable movement of these plies upon the infolding of the flaps about the flap scores 36 and 60. The offset relation between the inner ply flap score 60 and the outer ply flap score 36 is such that each ply may assume a right angular infolded relation to its respective wall panel 21 and 47 without undue stress on the outer ply flap score 36. However, this desirable offsetting of the scores results in the greater length of the inner ply 54 of the flap between the flap score 60 and line of scoring 42 as compared to the distance between flap score 36 and line of scoring 41. Nevertheless, this difference in length is adequately compensated for by the breadth of the flexible connecting web 40.

As the opposed flaps 39 are infolded along with their inner plies 53 and 55 respectively, the end edges 45-46 are disposed in confronting substantially abutting relation, while the free end edges 62-63 of the inner plies assume a like confronting substantially abutting relation but in offset relation to the beforementioned line of abutment whereby there is an overlapping inter-engagement of the plies of these flaps. There is thus avoided any opening extending through the confronting end edges of these flaps which would permit possible penetration or leakage of articles packed in the container and there further is gained a strengthening of the closure through the overlapping relationship of the plies of these flaps. This is best shown in the cross sectional view FIGURE 6 wherein the outer ply flaps 39-39 have free end edges 45-46 in abutting relation on one side of the medial line of the end closure shown at M in the drawing, while the inner ply flaps 53 and 55 have free end edges 62-63 in abutting relation on the opposite side of said medial line.

In the final folding operation in the assembly of the end closure of the container, the opposed flaps 38 with their inner plies 52 and 54 are infolded into flatwise relation with the inner pair of opposed flaps 39 and may be secured thereto by conventional means such as tape, adhesive, or stitches. This second pair of opposed flaps will have free end edges determined by cut edges 43 in substantially abutting relation along the mid-width of the container, in the preferred container conformation having a square transverse section. This desirable condition is attained through the effective extension of these flaps by means of the tabs 44. This is more particularly shown in the cross sectional view, FIGURE 8, wherein the cut edges 43 are shown in abutting relation while the connecting webs 40 are angulated to accommodate the differential in length between the outer ply and inner ply as previously described.

There is thus described in the foregoing a very desirable container construction which may be formed from a rectangular blank of foldable material suitably cut and scored to provide a container which may be collapsible for storage and shipment in the manner of a conventional slotted carton but which container provides a double thickness throughout the container vertical walls and bottom closure flaps and further provides fold connections in each ply between the adjacent corner edges of the inner and outer wall panels and between each such wall panel and the respective ply of each bottom closure flap. The resulting container can be erected from collapsed condition

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in the user's plant on conventional box forming equipment which erects the walls to tubular relation and infolds and seals the bottom closure flaps, whereafter the container may retain high density bulk commodities such as nails and the like which may penetrate ordinary slotted carton constructions. The final closure is completed by infolding and securing the top closure flaps 32-35 or other suitable conventional top closure means.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. A reinforced container in the form of a slotted carton, the container having tubularly arranged wall panels with closure flaps on one end thereof formed from a unitary foldable blank having an inner ply section and an outer ply section with said sections in flatwise foldably connected relation, each section having corresponding foldably connected upright wall panels and end closure flaps, said sections providing a container with two ply thickness throughout the wall panels and closure flaps and the fold connections therebetween, a pair of said closure flaps disposed in mutually opposed relation with their respective end edges comprised in part of a fold connection determined by parallel lines of scoring between the inner and outer plies thereof with said plies in slidable relation, a

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major portion of the flap end edges between said fold connections determined by free cut edges defining a tab struck from the inner ply and coplanar with the outer ply, said end edge portions when folded being in substantially abutting relation along the mid-width of the container, a second pair of said closure flaps including inner and outer plies of unequal length, each flap comprising a short panel and a long panel overlying each other and each of said panels being free of connection between the plies and having free end edges in substantially abutting relation with the corresponding edge of the opposed flap and in offset relation between the plies, the said pairs of closure flaps being disposed in overlapping secured together relation and forming a four ply thickness closure throughout with the fold connections to the upright walls being of two ply thickness and lines of abutment between flap end edges being in offset spaced relation.

2. A reinforced container as in claim 1 including means for closing the opposite end of the container.

3. A reinforced container as in claim 1 wherein the upright wall panels of inner and outer plies are secured together.

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