April 23, 1963 D. H. BECK 3,086,690

PARTITIONED CARTON

Filed Jan. 9, 1961

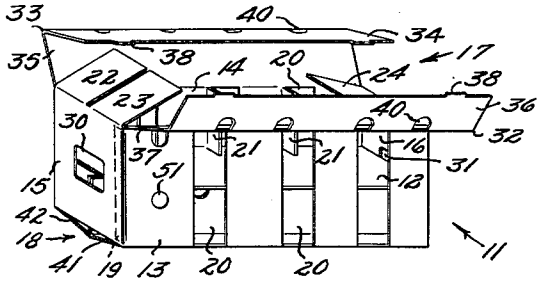


FIG. 1

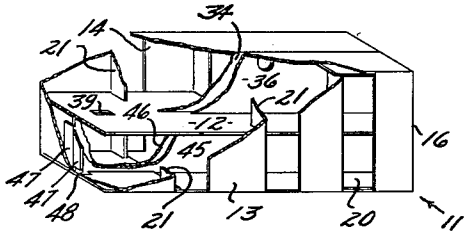


FIG. 5

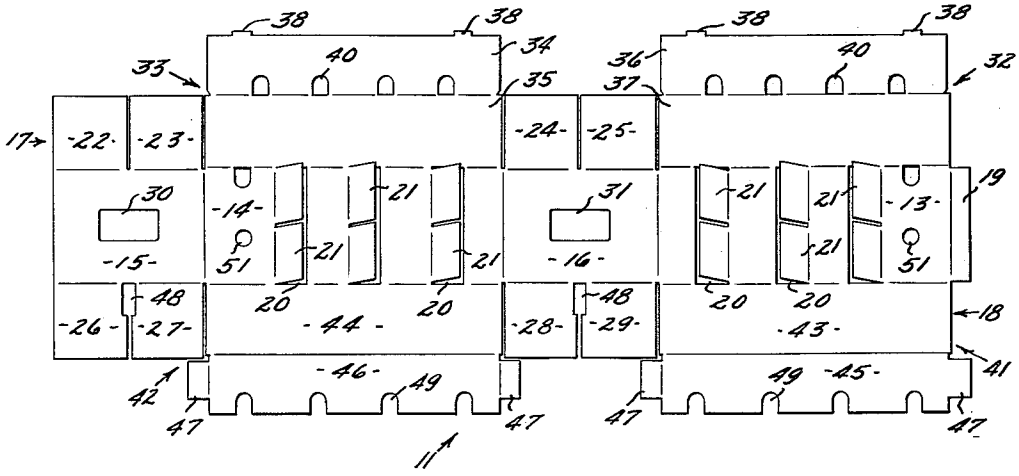


FIG. 3

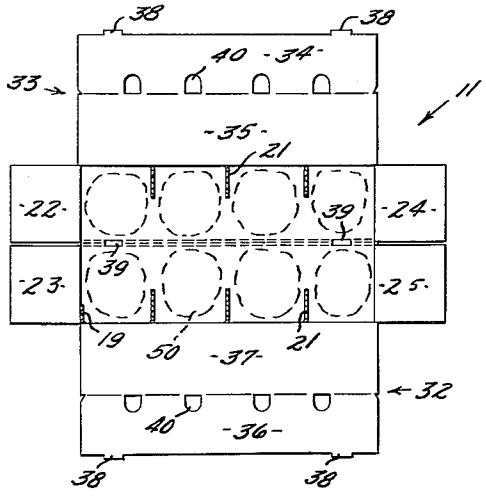


FIG. 2

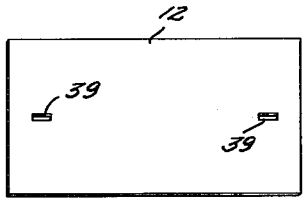


FIG. 4

INVENTOR.

DAN H. BECK

BY

Miller, Morriss & Pappas

ATTORNEYS

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PARTITIONED CARTON

Dan H. Beck, 6160 W. Maple Rapids Road, Rte. 3, St. Johns, Mich.

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The present invention relates to a new and useful partioned carton and more specifically to a carton wherein the sides are provided with fold-in division elements so as to partition the interior of the carton while enhancing the resistence of the carton to crushing. The present invention also contemplates the provision of a carton which is integrally prepared in the carton blank form so that easy assembling of the carton from a single blank is made available. The invention also contemplates a carton structure as indicated which is collapsible into knock-down flat form for return shipping and reuse. In other respects the present invention teaches a ventilating system for partitioned cartons making the cartons especially adaptable to the packing and transport of fruit, berries, vegetables, and the like.

The concept of providing a partitioned carton structure from cardboard or corrugated paper stock is quite old. Further, Naylor, in United States Letters Patent 314,069 (1906) proposed a partitioned carton wherein the flaps, in-folded from the sides, created a ventilating and fruit separating function. Such a concept was expanded by Sherman in United States Letters Pattent 1,890,951 wherein separate divider elements were provided and mere openings or vents were prepared in the sides. None of the references to partitioned cartons involve the opening of panels for the height of the entire carton and folding them inward as separators toward a lengthwise flap insert from the top and bottom case elements, thereby placing the inturned side panels in bearing or load transmitting relation from top to bottom of the carton. The consequence of such an arrangement is a stronger case and an integral separate partition structure wherein each partition is appropriately vented. The bent-in panels, while initially suggesting a weakening of the carton sides, in practice have enhanced carton stability and strength by reason of the through support and the right angle corner bend. This is true in resistence to both vertical torsional and lateral loading since the bent-in portions carry two-way thrust through the carton. Further, as will be seen the double effect of the in-folding of top and bottom closure flaps increases "backbone" effect during handling to avoid carton sag and thereby resists damage from crushing and twisting effect. Material placed within each of the partitions is stabilized by the folded-in panels and conversely the stored material assists in stabilizing the divider elements integrally formed from the bent-in panels. The resultant carton is very stable and aside from the use of a false bottom in plural layer units the carton is in complete form for ready assembly upon delivery from the presses. After use the cartons so prepared are readily collapsed for storage and for reuse.

Accordingly the principal object is to provide a carton wherein separator flaps are integrally formed from the carton sides and wherein the strength of the carton is enhanced thereby in resistance to deforming pressures.

Another object is to provide such a crate or carton having partitions which efficiently transmit loading and handling stresses in a cellular distribution and wherein the partition separators are integrally formed from the sides of the carton.

Still another object is to provide a carton having the above indicated qualities and wherein the top and bottom closures provide a longitudinal double plane support for the length of the carton.

Other objects including good resistance to deformation, easy assembly and knock-down, and very good ventilation will be readily apparent as the description proceeds.

General Description

In general the inventive carton comprises a single sheet of carton or carboard stock material blanked to provide a pair of end plates, a pair of side members; a top flap and bottom flap closures extending from each of said sides; and split top and bottom plates extending from said end pieces, wherein said split portion admits of passing the closure flaps therethrough; integral portion dividers formed from panel openings through the side members; and a wrap-around glue or rivet tab closure extending from one of said sides or ends to accomplish the closing of four panels of two sides and two ends as between sides and ends. In the plural layer system the thrust from the uppermost layer is transmitted to the next lower layer through a separator plate which bears on the folded-in transverse or torsional carton support. In single layer cartons the false bottom separator plate is unnecessary.

In the drawing:

FIGURE 1 is a perspective view of a carton in accord with the present invention with the upper closure flaps open.

FIGURE 2 is a top plan view of the carton as assembled with the upper closure flaps open and revealing compartment orientation.

FIGURE 3 is a stretch out plan view of the carton blank and revealing the separator tabs folded slightly inwardly.

FIGURE 4 is a plan view of the separator plate as used intermediate the carton layers.

FIGURE 5 is a perspective view of the carton as shown in FIGURE 1 but with a portion of the side and end cut away and with the upper closure flaps closed.

Specific Description

Referring specifically to FIGURE 1 in the drawing a carton **11**, in accord with the present invention, is shown and comprises a single wrap around cardboard or corrugated stock wrapper as will be seen and provided with a layer separator or false bottom **12** intermediate successive layers. The single wrap around wrapper comprises the carton **11** upon folding of sides **13** and **14**, ends **15** and **16**, top **17**, bottom **18** and glue or closure tab **19**. As will be appreciated glueing, stapling, or stitching as common in the art may be used. As will be appreciated from FIGURE 1, the sides **13** and **14** are provided with window-like openings **20** formed by the inturning of panels or tabs **21** in spaced apart opposed register. The openings **20** are rectangular and upon infolding the panels **21** comprise vertical stress transmitting supports bearing upon the top **17** and bottom **18** when the box or carton **11** is closed. In addition, the panels **21** provide vertical compartment separators partially extending toward the center of the carton **11**. The right angle inturning of the panels **21**, as shown, increases the overall rigidity of the carton **11** by reason of the spaced plurality of such folds at the sides **13** and **14**.

A pair of identical and adjacent flaps **22** and **23** extend from the end **15** to provide a reinforcement of the top **17**. The end **16** is similarly provided with upper flaps **24** and **25** which also fold inwardly (tab **25** cannot be seen in FIGURE 1). As will be seen substantially identical bottom flaps (**26**, **27** and **28**, **29**) extend from the ends **15** and **16** respectively for reinforcement of the bottom **18**. This is best appreciated by reference to FIGURE 3. The ends **15** and **16** are also provided with grip-vent openings **30** and **31**, respectively. The top **17** also includes plane extensions **32** and **33** integral at their edge to the sides **13** and **14** respectively. These extensions are folded to pro-

vide top plates 35 and 37 (extension 32). Where a double layer construction is employed, as shown, the infolding plates 34 and 36 are provided with matching lugs 38 which interlock in recesses 39 located on the longitudinal centerline and provided in the false bottom 12. (FIGURE 4.) A plurality of vents 40 are provided through extensions 32 and 33 in such manner as to provide center openings as between adjacent compartments as will be seen.

The bottom 18 is similarly constructed, but is additionally provided with interlocks as will be seen.

By reference to FIGURE 2 the plan view of the carton 11 in open position at the top 17 reveals how the plates 34 and 36 fold inwardly between the pairs of flaps 22, 23 and 24, 25 with the tabs 38 locking into the recesses 39 in the false bottom 12. On assembly (phantom line) the plates 34 and 36 are in planal adjacent relationship. A similar form of closure at the bottom 18 is accomplished as will be better appreciated in reference to the stretch-out of FIGURE 3. The bottom 18 comprises extensions 41 and 42, respectively, from sides 13 and 14 and are integral therewith at the bottom edges of sides 13 and 14. These extensions 41 and 42 are longitudinally folded to form bottom plates 43 and 44 and infolding plates 45 and 46 respectively. From the ends of the plates 45 and 46 extend protuberances 47 which upon assembly are tucked into the openings 48 defined intermediate the pairs of flaps 26, 27 and 28, 29 respectively, thereby providing a bottom interlock upon assembly. Slots 49 in spaced apart relation at the edges of plates 45 and 46 provide upon assembly communicating passages intermediate the compartments. The plurality of compartments formed by the panels 21, the plates 34 and 36 (top) and the sides 13 and 14 and ends 15 and 16, are ideal for retaining and separating product 50 as shown in phantom line in FIGURE 2. The product 50 may be individual fruits, vegetables, or other produce or individual berry cartons, for example. With reference to FIGURES 1 and 3, supplemental openings 51 provided through the walls 13 and 14 provide adequate cross ventilation of the end compartments not directly served by the panel openings 20.

In FIGURE 5 the assembled carton 11 is shown partially cut away to reveal the rigid construction resulting from the described structure. On the upper layer the plates 34 and 36 are infolded between the end tabs 22, 23 and 24, 25 to bear against the false bottom 12 with the tab interlocks inserted in the recesses 39. Similarly, and in parallel register therewith are the infolded ends 45 and 46, their upper edges bearing against the false bottom 12 and inserted between the bottom tabs 26, 27, and 28, 29 and lockably engaged by interaction of the lock tabs 47 expanding against the ends 15 and 16 through the opening 48 provided by the bottom flaps 26, 27, and 28, 29. The panels 21 infolded from the sides 13 and 14 perform a concurrent separator function and also bear against the top and bottom of the carton 11. The resultant structure gives the carton 11 very good resistance to crushing by reason of the integral cellular construction wherein vertical stresses, top to bottom, are carried by the panels 21 through the carton 11 and wherein the infolded top and bottom plates 34, 36 and 45, 46 provide excellent "backbone" or "spine" to the carton 11. As will be appreciated the openings 20, 30, 31, 40, 49 and 51 assure cross ventilation throughout the compartments of the carton 20 and the sides 13 and 14 are not weakened, but actually strengthened by the vertical right angle bends formed at the sides 13 and 14 by the infolding of the panels 21 therefrom. In addition the carton 11 is very resistant to torsional loading and lateral stresses by reason of the double longitudinal center partition and the additional stabilizing effect of the panels 21 and the interlock of the bottom closure intermediate the infolded side flaps and by the upper closure interlock against the false bottom 12. The box or carton 11 in testing proved to have excellent corner stability and in ordinary cardboard and corrugated carton strength this rigidity was substantially stable through a wide humidity range, 74 degrees Fahrenheit and 50% relative humidity to 85 degrees Fahrenheit and 85% relative humidity. Both strength and humidity resistance was enhanced by the use of resin coated (waterproofed) carton material.

While the embodiment illustrated is a plural layer multiple compartment unit, it will be readily appreciated that the structure may be also constructed in single layer form, and the number of compartments may be varied to suit individual packaging needs. To those skilled in the art variations in size and relative proportions will be readily appreciated and it is also possible to utilize a wide range of carton material strength both treated and untreated, corrugated and uncorrugated. The integral construction of the carton formed from a single simple blanked sheet of stock renders the production of the carton economical using simple blanking, folding, and punching dies. The cartons thus formed are easily shipped flat, and in production, assembly at the point of use requires 31 to 45 seconds with a total carton loading time, of assembly and loading, between 1 minute and 20 seconds to 1 minute flat. Unloading of the cartons is accomplished between 36 and 40 seconds and the used cartons may be easily knocked down for reuse and return in 31 to 45 seconds using unskilled personnel.

Having thus described my invention those skilled in the art will perceive modifications and improvements. Such modifications and improvements are intended to be included herein limited only by the scope of the hereinafter appended claims.

I claim:

1. A compartmented carton comprising: a carton having top, bottom, sides and ends; panels folding inwardly from both sides and integrally formed from said sides and structurally transmitting vertical stresses through said carton from top to bottom; and parallel portions of said top and bottom being infolded to provide a substantially double strength spine through said carton.

2. A compartmented carton comprising: a carton having top, bottom, sides, and ends; a plurality of panels in spaced apart opposed register integral with and extending from both of said sides and folding inwardly to form compartmental spacers and in stress transmitting contact with said top and said bottom; said top and bottom having infolded tabular portions providing, upon assembly, a double strength spine longitudinally through said carton.

3. In an integrally formed knock-down divided compartmented carton, the combination comprising: a single sheet stretch out piece of carton stock providing a pair of top and bottom extensions extending from a pair of side pieces each of said side pieces being joined by an end piece, and each of said side pieces provided with fold-in window panels, said fold-in window panels forming partitions in top and bottom registering support and said tops and bottoms foldable to form a double intermediate support longitudinally separating compartment rows; and a floor plate intermediate plural layers of compartments and defining openings therethrough in aligning register with said in-folded tops and bottoms.

4. A plural layer compartmented carton, comprising ends, sides, top, bottom, end flaps and fold-in panels from said sides in contact with said top and bottom in stress transmitting relation and all formed from a single piece of stock; and a false bottom intermediate each layer in said compartmented carton longitudinally centering a double in-folded layer of said top and bottom and providing a stress transmitting means for said folded-in panels through each layer, top to bottom.

5. A reinforcement structure for cartons comprising: a side; a tab transversely and inwardly bendable from said side and integral therewith; a top member in planal bearing relation against the upper inturned edge of said

tab; and a bottom member in parallel spaced apart relation to said top member bearing against the lower edge of said tab, said bottom and said top providing an infolded double strength spine longitudinally through said structure.

6. A reinforcement and separator structure for cartons comprising: a pair of sides; a top integrally secured to said sides; a pair of ends integrally secured to said tops and said sides; a bottom integrally secured to said sides and in spaced parallel relation to said top; infolded end portions of said top and said bottom extending through said structure and providing a longitudinal double strength spine and vertical separator; and tabs integrally formed

from said sides bent inwardly forming a plane transverse between said top and said bottom and in bearing relationship at the upper and lower edges thereof with said top and said bottom respectively.

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