May 18, 1965 G. VRANA 3,184,141

COLLAPSIBLE CELLULAR CARTON

Filed Sept. 5, 1963 2 Sheets-Sheet 1

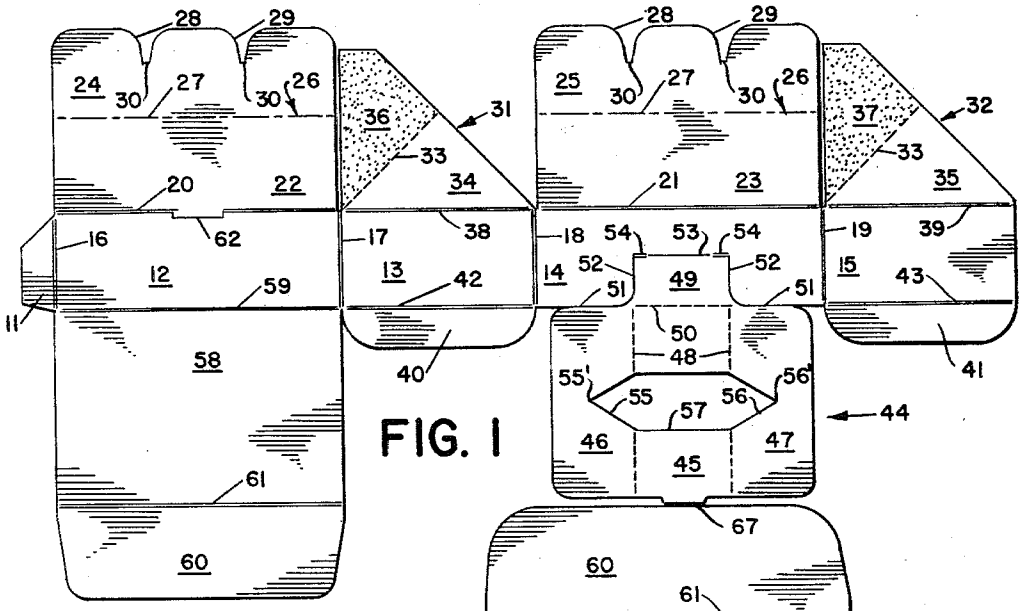



FIG. 1

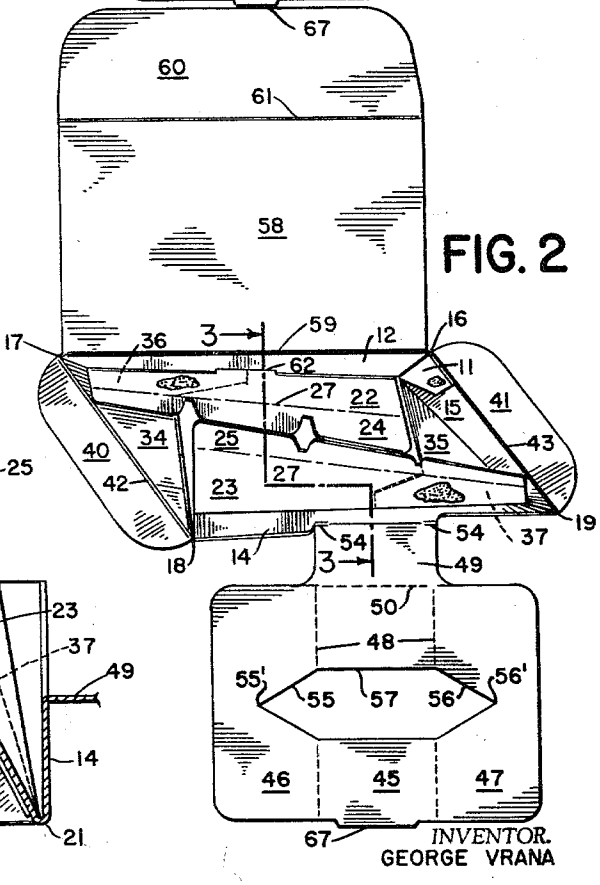



FIG. 2

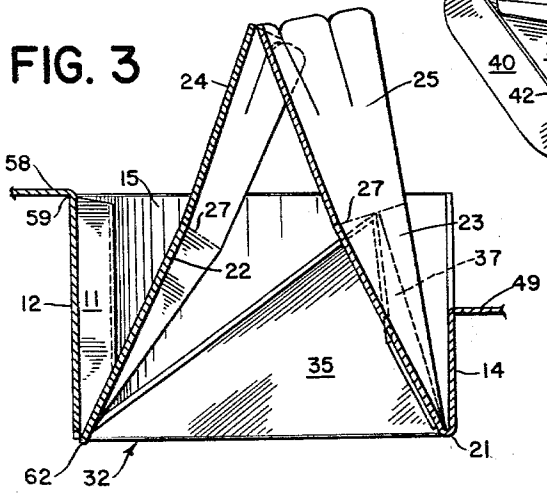



FIG. 3

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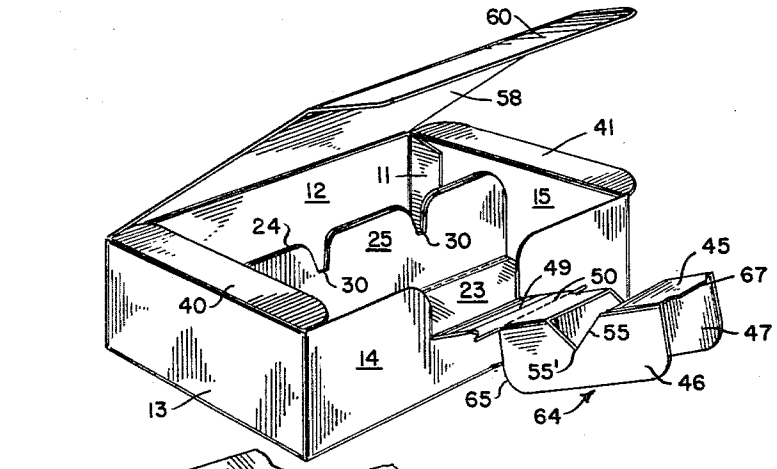



FIG. 4

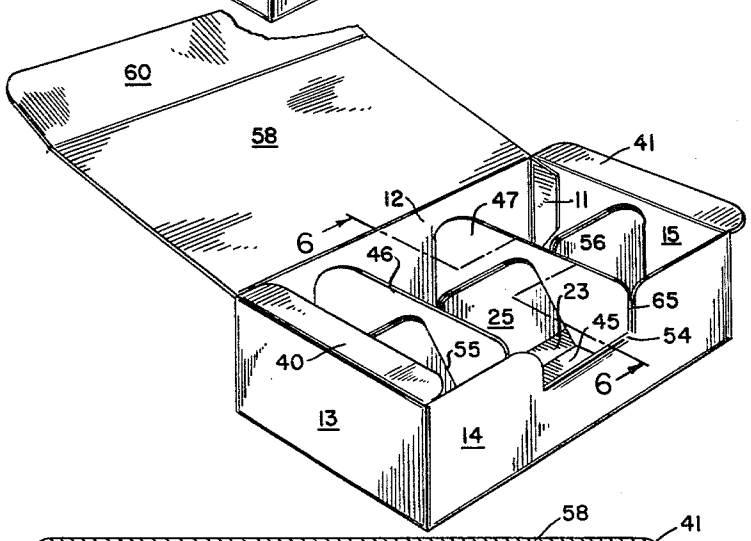



FIG. 5

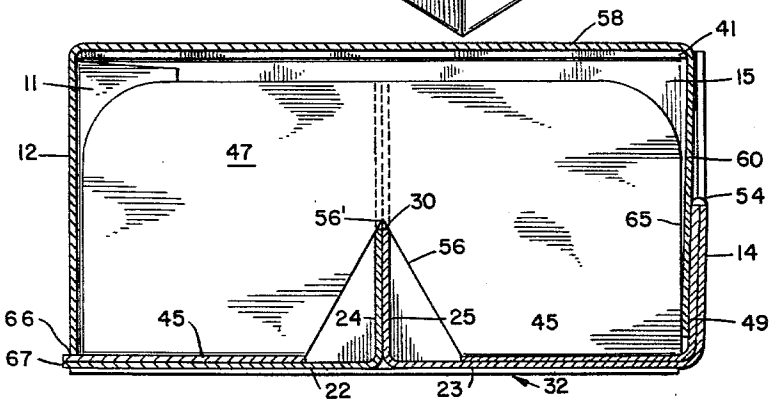



FIG. 6

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# COLLAPSIBLE CELLULAR CARTON

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12 Claims. (Cl. 229—28)

The present invention relates to collapsible cartons and more particularly to collapsible cellular cartons which may be quickly and easily erected by hand.

In accordance with the present invention, a rigid rectangular carton having a plurality of individual compartments or cells may be formed from a one-piece blank which includes an integral, novel divider structure. The new and improved divider structure of the invention comprises a two-ply longitudinal divider panel integral with and extending from the bottom wall of the carton and a cell-forming, rigidifying channel member cooperating therewith. Specifically, the plurality of cells is formed by the carton walls, the divider panel and the channel member, in a manner which provides each cell with four walls and a base.

More specifically, the carton, itself, comprises front and rear walls, side walls, and an "automatic bottom" of the type generally well known to the art. A cover with an integral closing flap is articulated to the upper edge of the carton rear wall, while closing flaps are articulated to the upper edges of each of the side walls. In accordance with one specific aspect of the invention, a pair of upwardly projecting, self-erecting or "automatic" divider panels extend between the side walls medially of the front and rear walls. The self-erecting divider panels are held compressively in a fixed relation by a unique, rigidifying, cell-forming channel member which is articulated to the front wall of the carton body in accordance with another aspect of the invention.

For a more complete understanding of these and other specific aspects of the invention, reference should be made to the following detailed description taken in conjunction with the drawings, in which:

FIG. 1 is a top plan view of a carton blank embodying the principles of the present invention;

FIG. 2 is a top plan view of a partially erected carton embodying the principles of the invention;

FIG. 3 is a cross-sectional view of the carton of FIG. 2 taken along line 3—3 thereof;

FIG. 4 is a perspective view of the carton of the invention with the divider structure thereof partially erected;

FIG. 5 is a perspective view of a completely erected carton made in accordance with the invention; and

FIG. 6 is a cross-sectional view of the carton of FIG. 5 taken along line 6—6 thereof.

Referring to FIG. 1, a carton blank 10 made from paperboard or a like sheet material is cut and scored to form the requisite structural elements for the new cellular carton. Specifically, a glue flap 11, a rear wall 12, an end wall 13, a front wall 14, and an end wall 15 are consecutively articulated to one another along vertical score lines 16–19, respectively, which form the corners of the erected carton, as will be understood. Articulated to the rear and front panels 12, 14 along score lines 20, 21 are bottom panels 22, 23. In accordance with the invention, the bottom panels are of half the carton width and have a pair of self-erecting divider panels 24, 25 articulated thereto along hinge lines 26 formed by a line of perforation 27. A pair of guide slots 28, 29 extends from the free edge partially into each of the divider panels to trisect them. The lower extremity 30 of each guide slot constitutes a bearing surface for a channel member 64, to be described in more detail hereinafter.



A pair of self-erecting or "automatic" bottom flaps 31, 32 are articulated to the bottom edges of the end panels 13, 15, respectively, along score lines 38, 39 and a pair of end closing flaps 40, 41 are articulated to the top edges of the end panels along score lines 42, 43. In accordance with well known principles, the bottom flaps 31, 32 are divided along diagonal (45°) score lines 33 into inner, triangular portions 34, 35 and outer, glue-carrying portions 36, 37, respectively.

In accordance with the principles of the invention, a unique channel-forming panel 55 is provided having a web 45 and integral transverse divider panels 46, 47 articulated thereto along lines of perforation 48. As clearly shown in FIG. 1, the inner end of the web is articulated to a hinge panel 49 along a line of perforation 50, the hinge panel 49 being formed by spaced parallel cuts 52 and being, itself articulated to the front panel 14 along a hinge line suitably defined by a cut score 53 and hinge creases 54. The inner ends of the divider panels 46, 47 are separated from the front wall panel 14 by cuts 51 which extend to the intersection of the lines 48 and 50.

The transverse divider panels include triangular notches 55, 56 having apices 55', 56' located at a distance from the perforation lines 48 equal to the distance of the lower extremities 30 of the slots 28, 29 from the hinge line 26. As shown in FIGS. 1 and 2, an assembly slot 57 extends across the central web portion 45 of the channel-forming panel and connects the notches 55, 56. The outer end of the web 45 has a locking tab 67 integral therewith adapted to cooperate with a locking slot 66 (FIG. 6) formed by a U-shaped cut 62 (FIGS. 1, 2) in the rear panel immediately adjacent the score line 20, for purposes to be explained in greater detail hereinafter.

The blank 10 also includes a cover panel 58, articulated to the rear wall 12 along score line 59, having a closing or tuck flap 60 integral therewith and articulated thereto along a score line 61.

The carton blank of the present invention is folded and glued by the manufacturer into a collapsed or flattened tube and shipped in a flat condition to the user, who erects the collapsed tube into a carton merely by exerting pressure at opposite bottom corners of the flattened tube, as indicated schematically in FIG. 2. To this end, such a flattened tube may be formed by initially folding the bottom half of the blank 10 over the top half of the blank along longitudinal score lines 20, 38, 21, 39 and then folding the glue portions 36, 37 along score lines 33 back upon the triangular portions 34, 35. The collapsed tube may be completed by then folding the rear wall panel 12 along the score line 17 and folding the end wall panel 15 over, along the score line 19 onto itself, so that the glue carrying sections 36, 37 and 11 are adhered to the bottom panels 22, 23 and the end panel 15, respectively. In accordance with the invention, the longitudinal divider panels 24, 25 partially overlap one another in the flattened tubes.

Squaring of a flattened tube to initiate formation of the multiple-celled carton of the invention is accomplished, as shown in FIG. 2, by urging the opposite corners 17, 19 of the collapsed tube toward each other. In this manner the folded bottom flaps 31, 32 will tend to open into a single horizontal plane, drawing the bottom panels along therewith to form automatically the bottom wall of the carton. In accordance with the principles of the invention and as shown best in FIG. 3, the divider panels 24, 25 will increase their mutual engagement as the bottom panels are urged downwardly by the flaps 31, 32 and will be automatically folded along the lines of perforation 27 into an upright, two-ply position (FIG. 4) when the bottom is completely formed. Due to the

natural resiliency of paperboard, especially after having been folded, the bottom flaps may in some instances tend to spring back to a position intermediate their fully erected position and their flat-folded, collapsed position giving the bottom a slightly bowed effect.

In accordance with the principles of the invention, a channel member **64** formed from the panel **44** extends between the front and rear walls to rigidify the entire carton, to hold the bottom flat, to hold the longitudinal divider panels upright, and, at the same time, to form a plurality of individual compartments. Specifically, as shown in FIG. 4, the channel **64**, having a U-shaped cross section and including the web **45** and transverse divider panels **46**, **47**, is attached to the front wall by the hinge panel **49**. By folding the hinge panel **49** in and back upon the front wall **14**, and by lightly forcing the assembly slot **57** of the channel **64** over the upright longitudinal divider panels and into the carton body, as shown in FIGS. 4–6, and then inserting the locking tab **67** into the locking slot **66**, the manual erecting of the carton may be easily and simply completed.

As will be understood, a prime function of the transverse divider panels **46**, **47** of the channel is to cooperate with the longitudinal divider panels **24**, **25** to define six individual carton cells, each of which has four walls and a base. Furthermore, it should be appreciated that the channel will rigidly brace the entire carton while the underside **45***a* of its web will bear down upon the bottom to flatten it and maintain it in its desired, fully erected position, as shown in FIGS. 5 and 6. Importantly, and in accordance with one aspect of the invention, the apices **55′**, **56′** of the notches **55**, **56** will bear down upon the bearing surfaces **30** of the divider slots **28**, **29** to hold the divider panels **24**, **25** firmly and rigidly upright and centered between the longitudinal carton walls **12**, **14**. Moreover, it will be understood that the triangularly-shaped notches are suitably proportioned to ensure that the longitudinal divider panels are held in a plane parallel with the front and rear walls.

Advantageously, the cover **58** and the closing flap **60** are held firmly closed, as shown in FIG. 6, by the interaction of the hinge panel **49**, which joins the channel member to the carton front wall, and the free front edges **65** of the transverse divider panels **46**, **47**. This cooperative relationship is illustrated in FIG. 6.

It will be appreciated that the carton of the present invention provides an unusually rigid container for items, such as glass ornaments, fruits, and like fragile, delicate or damageable articles, that must be safely packaged in individual compartments. Moreover, the structure of the carton lends itself to substantially instant, manual erecting, with a minimum of effort, from a collapsed tube. In addition to the many structural features, which may be readily appreciated, the carton of the present invention may be manufactured with conventional equipment at minimum costs and from an integral one-piece paperboard blank.

Although the present invention has been described with reference to a specific, preferred embodiment, it should be understood that the disclosure has been made only by way of example and that certain changes in details of construction and in the combination and arrangement of the parts may be made without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. In a paperboard container having substantially full depth, front, rear, side and bottom planar walls, an integral divider structure comprising:

(*a*) a two-ply central divider portion integral with said full bottom wall and extending upwardly therefrom and having free edge portions disposed a predetermined distance above said bottom wall,

(*b*) said divider portion being located in a plane intermediate and substantially parallel with said front and rear walls,



(*c*) a channel member having a planar web and integral transverse divider panels,

(*d*) said channel member being associated with one of said front and rear walls and extending to the other of said walls,

(*e*) said transverse divider panels having recesses therein extending upwardly from said web for said predetermined distance,

(*f*) said web defining a slot communicating with said recesses,

(*g*) means securing said channel member to said other of said walls,

(*h*) said recesses engaging free edge portions of said central divider portion and thereby supporting said divider portion in an upright position, and

(*i*) said transverse divider panels cooperating with said central divider portion and said full planar walls to form a plurality of compartments.

2. A cellular container comprising a single paperboard blank cut, folded and scored to form

(*a*) front, rear, and end walls hingedly connected to form a container body,

(*b*) a self-erecting, substantially full planar bottom wall associated with said front, rear and end walls,

(*c*) said self-erecting bottom wall including a pair of longitudinal bottom wall panels of half carton width,

(*d*) each of said bottom wall panels having a self-erecting longitudinal divider panel hingedly connected thereto along a predetermined line,

(*e*) a U-section channel member including a web panel and transverse divider panels extending transversely across said container body,

(*f*) said transverse divider panels cooperating with said central divider panel and said container walls to form a plurality of cells,

(*g*) said transverse divider panels defining inverted V-shaped recesses extending upwardly from said web panel and having apex portions engaging said longitudinal divider panels to maintain said longitudinal divider panels rigidly erect,

(*h*) said channel member acting between said front and rear walls to rigidify said container, and

(*i*) a hinge means connecting said channel member to said container body.

3. A one-piece paperboard blank for a cellular container comprising a sheet of paperboard or the like cut and scored to form

(*a*) consecutively articulated front, rear, and end wall panels,

(*b*) self-erecting bottom flaps articulated to said end wall panels,

(*c*) bottom wall panels of half carton width articulated to said front and rear wall panels,

(*d*) self-erecting longitudinal divider panels articulated to said half carton width bottom wall panels and adapted to be mutually engaged upon the erecting of said container, said divider panels having free edge portions adapted to be spaced from said bottom walls a predetermined distance,

(*e*) a hinge panel in said front wall panel and adapted to be folded out of the plane thereof,

(*f*) said hinge panel being articulated to said front wall panel, and

(*g*) a channel panel articulated to said hinge panel and having a web panel and connected transverse divider panels,

(*h*) said transverse divider panels having notches therein extending upwardly from said web for said predetermined distance,

(*i*) said web defining an assembly slot therein joining said notches.

4. A paperboard blank according to claim 3, in which

(*a*) said web panel includes a locking tab at the free end thereof, and

(*b*) said rear wall defines a locking slot therein for receiving said locking tab when an erected carton is formed from said blank.

5. A paperboard blank according to claim 3, in which

(*a*) said longitudinal divider panels define guide slots extending inwardly from the free edges thereof and terminating at said predetermined distance from said bottom wall panels.

6. A paperboard blank according to claim 5, in which

(*a*) said guide slots trisect said longitudinal divider panels, and

(*b*) said notches bisect said transverse divider panels.

7. A multiply celled structure comprising

(*a*) a container body including substantially full front, rear, bottom and end walls,

(*b*) longitudinal divider panels integral with and extending freely upwardly from said bottom wall, and

(*c*) a channel member having a web and connected transverse divider panels,

(*d*) said transverse divider panels having notches therein extending upwardly from said web,

(*e*) said web panel having a slot therein joining said notches,

(*f*) said transverse divider panels cooperating with said longitudinal divider panels to form a plurality of cells,

(*g*) said notches engaging and holding said longitudinal divider panels in a rigidly upright position,

(*h*) said channel member acting between said front and rear walls to rigidify said container body.

8. The structure of claim 7, in which

(*a*) said channel member includes at least one locking tab integral therewith, and

(*b*) said container body defines at least one locking slot,

(*c*) said locking tab being adapted to cooperate with said locking slot to maintain said channel member in a fixed relationship with said container body.

9. The structure of claim 7, in which

(*a*) said longitudinal divider panel includes a pair of guide slots extending from the free edge thereof to a predetermined distance above said bottom wall,

(*b*) said slots trisecting said divider panel,

(*c*) said notches in said transverse divider panels being triangularly shaped and extending for a distance equal to said predetermined distance,

(*d*) said notches bisecting said flanges.

10. The divider structure of claim 7, in which

(*a*) said web panel acts against said bottom wall, and

(*b*) said notches act against said longitudinal divider panels to hold said longitudinal divider panels rigidly between said bottom wall and said transverse divider panels.



11. A six-celled container comprising

(*a*) front, rear, end, and substantially full planar bottom walls joined together to form a rectangular container body,

(*b*) a longitudinal divider panel extending upwardly from said full planar bottom panel longitudinally of said container body and medially between said front and rear walls,

(*c*) said longitudinal divider panel defining a pair of guide slots therein extending downwardly from the free edge thereof to a point located at a predetermined distance from said bottom wall,

(*d*) said guide slots trisecting said longitudinal divider panel,

(*e*) a channel member having a web panel and transverse divider panels, and

(*f*) a hinge panel connecting said channel member to said front wall,

(*g*) said transverse divider panels each defining a notch extending upwardly from said web for said predetermined distance,

(*h*) said notches bisecting said transverse divider panels,

(*i*) said web defining a slot extending thereacross and linking said notches,

(*j*) said transverse divider panels extending transversely of said container body to rigidify the same and cooperating with said longitudinal divider panel to form six individual cells,

(*k*) said notches cooperating with said slots in said longitudinal divider panel to hold said longitudinal divider panel erect.

12. The container of claim 11 which includes

(*a*) a covel panel with a closing flap articulated to said rear wall,

(*b*) said cover adapted to be held closed by the engagement of said closing flap between said hinge panel and the front edges of said transverse divider panel.

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