May 25, 1965 C. W. ROSENBURG, JR 3,185,378

COLLAPSIBLE CARTONS

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FIG. 1.

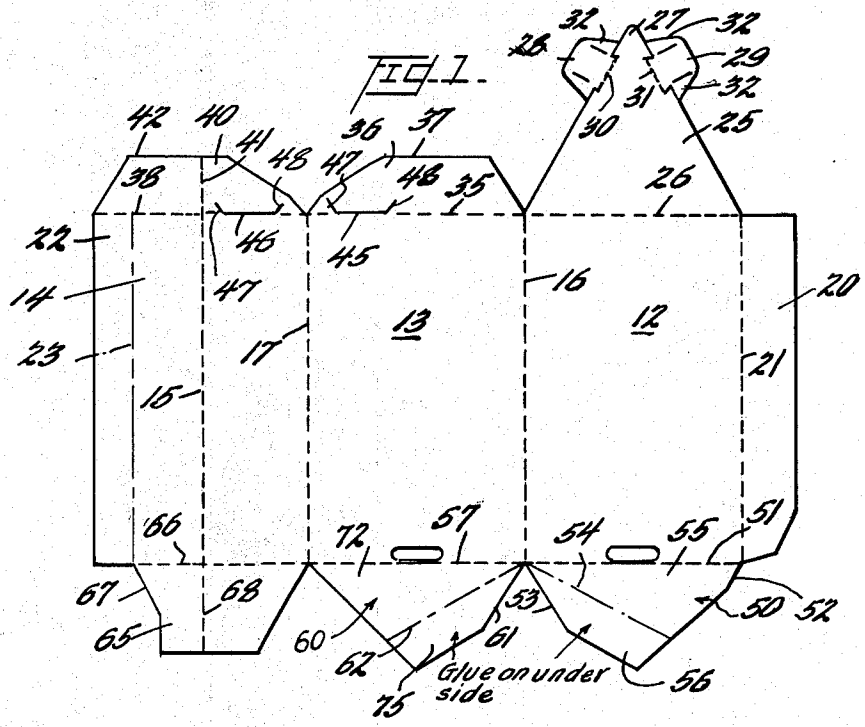


FIG. 2.

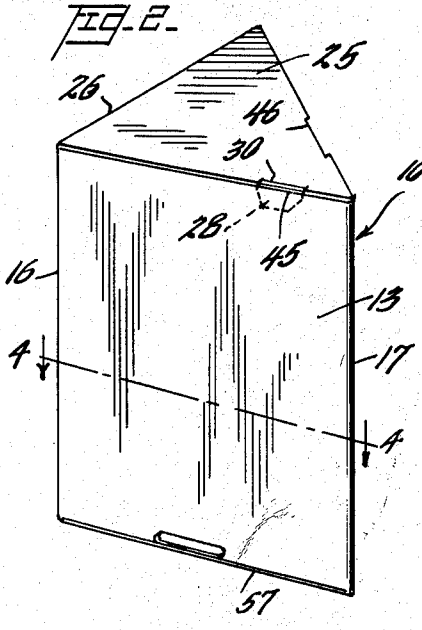


FIG. 4.

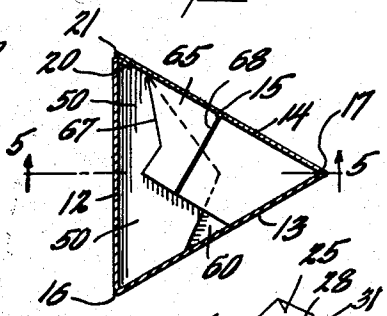
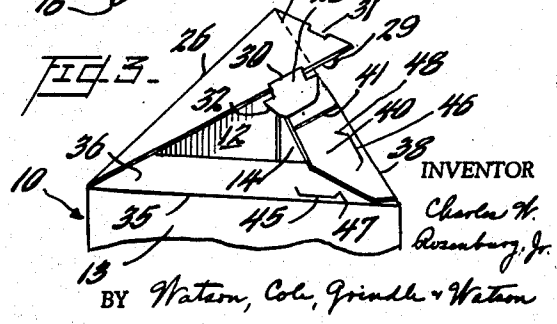


FIG. 3.



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FIG. 5.

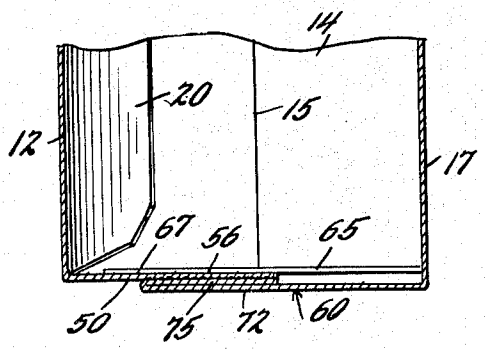


FIG. 7.

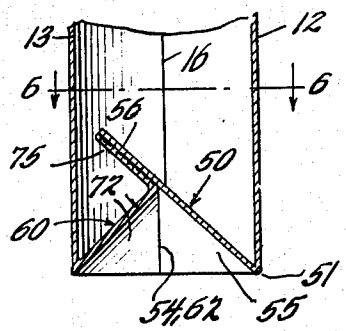


FIG. 6.

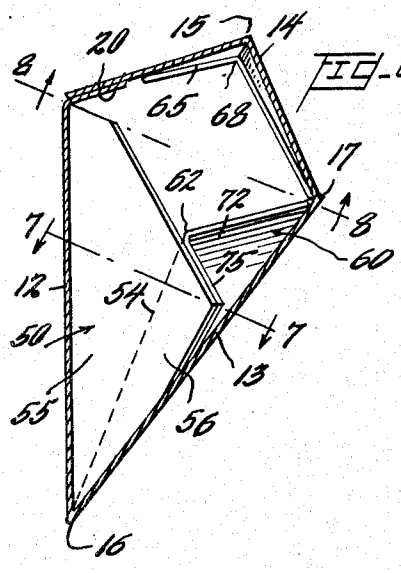


FIG. 10.

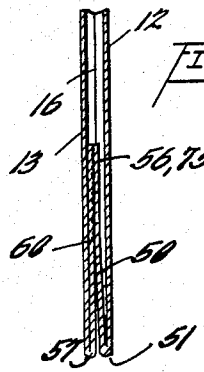


FIG. 8.

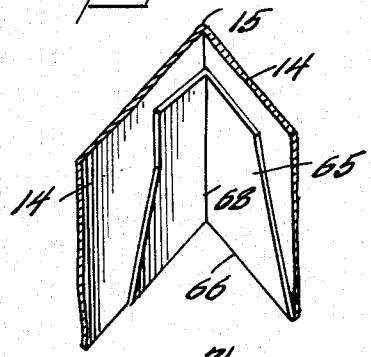
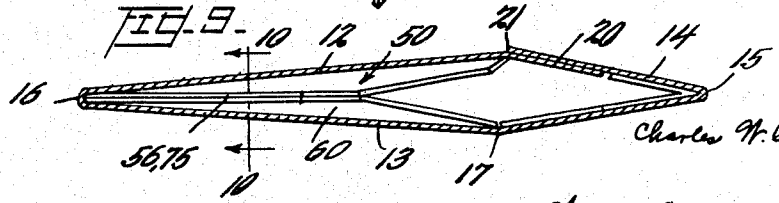


FIG. 9.



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United States Patent Office 3,185,378 Patented May 25, 1965

3,185,378

COLLAPSIBLE CARTONS

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Filed June 14, 1963, Ser. No. 287,992
1 Claim. (Cl. 229—22)

This invention relates to cartons or boxes, and more particularly to knock-down or collapsible cartons constructed of cardboard or similar bendable and creasable material.

The general object of the invention is the provision of a novel and improved carton of the class described, in the form of a triangular prism.

Although prismatic cartons of cardboard material are already known, the construction and erecting of such cartons have presented some problems, particularly in connection with the provision of bottom structures which will resist sagging under the weight of the contents, and of top or load structures affording adequate means for closing and securing the carton when filled.

Therefore, in its preferred embodiments, the invention contemplates the provision of a collapsible carton and a blank for making such a carton, which have three principal side panels with a flap for joining the remote side edges of the outer panels, and extending from each opposite end of these three panels respectively, three closure flaps. These closure flaps at the lower ends of the panels are so constructed, arranged, and connected as to provide a collapsible bottom for the carton which is readily foldable inwardly but resists strongly any force tending to bulge the bottom downwardly. The closure flaps at the upper ends of the side panels are arranged to cooperate to provide an interlocking top closure device of novel and convenient construction.

One advantageous feature of novelty in the bottom structure resides in the use of a minimum amount of material while at the same time affording adequate overlapping of the flaps and sufficient structural strength.

Also, an advantageous feature of the top construction resides in the interlocking of the principal flap attached to one of the side panels, with portions of the other two panel structures at an apex of the box located at a permanent junction of the said two other panels, thus strengthening the structure at the top of the carton.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which one embodiment of the invention is illustrated by way of example.

In the drawings:

FIGURE 1 is a plan view of a blank from which a carton may be made embodying the principles of the invention, the inner surfaces of the various panels and flaps being uppermost;

FIGURE 2 is a view in perspective of the completed and erected carton;

FIGURE 3 is a fragmentary view in perspective of the upper portion of the carton with the major top flap in half-open position;

FIGURE 4 is a horizontal section taken on line 4—4 of FIGURE 2;

FIGURE 5 is a view in vertical section taken substantially on line 5—5 of FIGURE 4;

FIGURE 6 is a view in horizontal section taken on line 6—6 of FIGURE 7 and similar to the section of FIGURE 4 but with the carton in an intermediate condition;

FIGURE 7 is a vertical sectional view taken on line 7—7 of FIGURE 6;

FIGURE 8 is a fragmentary view in perspective as the inner rear portion of the container would appear from line 8—8 of FIGURE 6;

FIGURE 9 is a view similar to FIGURE 6 but with the carton in almost fully collapsed condition; and

FIGURE 10 is a fragmentary vertical sectional view, such as would appear on line 10—10 of FIGURE 9, were the carton completely flattened out in fully collapsed condition.

Triangular cartons or boxes of the general type illustrated have a certain commercial appeal in connection with the merchandising of fancy goods, for example, confections, cosmetics, and bottled products of various types; and, according to principles of engineering, the triangular cross-section of such a carton is such as to afford maximum strength. However, means must be provided for building into such a collapsible carton sufficient structural stability in both the bottom structure and the top or closure structure.

A triangular prismatic carton embodying the principles of the invention is illustrated in erected condition in FIGURE 2 of the drawings and is given the general designation **10**.

Before describing the assembly of the carton, it would be better to first describe the blank from which the carton is made, and this is illustrated clearly in FIGURE 1 of the drawings.

The blank will be seen to comprise a side panel **12** to which the largest end flaps are hingedly connected, a second side panel **13**, and a third side panel **14** which is provided with a central crease **15** dividing the panel into two substantially equal halves. Panels **12** and **13** are hingedly connected by the crease line **16** and panels **13** and **14** are similarly joined by the crease line **17**.

A connecting tab or flap **20** is hingedly connected to the remote side edge of the panel **12** by the crease line **21** and is designed to underlie the remote edge area **22** of the outer half of the panel **14** as suggested by the broken line **23**.

The main side panel **12** has a top flap **25** hinged thereto along the crease line **26** and this panel is preferably of a general triangular configuration of a size to coincide with the cross-section of the carton and to constitute the outer covering closure element. On both sides of the triangular flap **25** near the apex **27** thereof are provided the locking tabs **28** and **29**. These tabs are hinged along the fold lines **30** and **31** and are each provided with lateral hook-like keying interlocking ears **32**. The purposes and operation of these parts will be described presently.

Hinged as along the crease line **35** to the intermediate side panel **13** is the top flap **36** which is truncated as at **37**, since complete coverage of the top opening of the box by this particular flap is not required.

The foldable remote side panel **14** is provided with a crease line **38** which serves as a hinge for the flap **40** which itself is creased or folded along a line **41** which is a prolongation of the crease line **15** of the panel **14**. The flap **40** is also truncated as at **42** as in the case of the flap **36** of the panel **13**.

Slits are formed adjacent the roots of the flaps **36** and **40** coinciding with or just outside of the crease lines **35** and **38**, these slits being indicated at **45** and **46** respectively. At each end of the slits, diverging angular extensions **47** and **48** are provided projecting further into the bodies of the flaps **36** and **40**.

Now referring to the bottom forming structure of the blank, it will be seen that a relatively large flap **50** is hinged along the crease line **51** to the lower edge of the main side panel **12**. The flap **50** is of an approximately triangular configuration, but is bevelled at **52** and **53** on opposite sides. The broken line **54** divides flap **50**

into two areas, a proximate area 55 and a distal area 56, the significance of which will appear presently.

Hingedly connected along the crease line 57 to the panel 13 is a bottom flap 60. This flap 60 is also approximately triangular and is substantially a mirror image of flap 50 having a similar bevelled edge 61. The line 62 represents a crease which divides the area of flap 60 into two triangular parts, a proximate part 72 and a distal part 75.

Finally, a flap 65 is hinged along the crease 66 to the foldable panel 14, this flap being of a rather irregular configuration. The shape could be called that of an equilateral trapezoid with a portion of one of its halves cut away on an angular line as at 67. The flap 65 is also foldable along the crease line 68 which is a downward prolongation of the main crease 15 of the side panel 14.

The erection of the novel carton 10 from the blank shown in FIGURE 1 will be readily understood from the remaining figures of drawing, the inside bottom plan view of the completed carton being clearly depicted in FIGURE 4, where the panels, flaps, and crease or fold lines are given the same reference characters as in the case of the blank of FIGURE 1.

One of the first steps in assembling and erecting the carton would be to turn the connecting tab 20 of panel 12 beneath the edge portion 22 of the panel 14, and, by means of suitable fastening means such as an adhesive, securing these areas together, thus joining the remote edges of the panels 12 and 14 to form a tubular structure of triangular section.

Then it would be proper to coat the outward surface of the area 56 on flap 50 with adhesive. Alternatively, the bottom or rearward surface of the area 75 constituting the outward portion of the flap 60 of the panel 13 could be coated with adhesive, since these similar and corresponding triangular areas 70 and 72 are to be glued firmly together, the portion 75 being folded along crease line 62 for this purpose. The flap 60 with its inner portion 72 and its glue-coated portion 75 is designed to be the outer or bottom flap of the carton, and the flap 50 is to be positioned as the intermediate flap. When folded properly the areas 56 and 75 coincide and are securely fastened together as clearly shown in FIGURES 5 and 7.

As already indicated, the novel box or carton is collapsible and that is the purpose of the median crease lines 15, 41 and 68 extending along the panel 14 and its respective top and bottom flaps 40 and 65. The panel 14 bulges outwardly as the other two panels 12 and 13 move together, until the entire carton occupies a substantially flat position. The various parts are approaching the ultimate collapsed position as they are shown in FIGURE 9 of the drawings.

FIGURES 6, 7 and 8 are clearly explanatory of the intermediate positions of the various parts of the bottom structure during their collapsing and erecting movements. In these figures it will be clearly seen how the flap 65 doubles along the crease line 68 and the two separate wings thereof approach the two halves of the bending wall 14. These portions of the flap 65 have already contacted the inner faces of the wall 14 in the view shown in FIGURE 9.

As the box or carton begins to collapse from the positions shown in FIGURES 2, 4 and 5, the creased flap 65 of the panel 14 begins to rise and to buckle at the same time, passing through the positions shown in FIGURES 6, 8 and 9 to a final position where the walls and creased flap are tightly compressed together.

The ultimate position of the crucial portions of the bottom structure in finally collapsed condition is shown in the view designated FIGURE 10. Here, the folding flap 60 comprising the glued area 75 and the inward area 72 lies flat and in the same plane against the inner face of the wall 13. The flap 50 attached at 51 to the wall 12 remains straight and its two areas 55 and 56 lie in the same plane in contact with the wall 12 and with the flap 60. Of course, the portion 56 is glued to the area 75 of the flap 60 and the four layers of cardboard at this portion of the collapsed bottom structure are clearly shown in FIGURE 9.

Now the purpose of the double layered projection 56–75 is to prevent movement of the foldable bottom structure downwardly, under the influence of the weight of the contents, beyond the horizontal condition shown in FIGURES 2, 4 and 5 for example. As the foldable outward bottom structure 60 moves downwardly to occupy a common plane, the rigid projecting portion 56 of the rigid flap 60, together with the flap portion 75, strikes the upper surface of the unglued area of the flap 60 and the stiffness of the material prevents the bottom structure from moving any further downwardly, the projecting triangular portion 56–75 thus becoming a brake on the collapsing movement of the bottom of the carton.

The top closure portion of the novel carton cooperates well with the bottom structure just described, the principal lid element 25 being formed as a part of the same main wall structure 12 as the principal bottom flap 50.

After the box has been assembled and the flap 20 glued to the area 22 of the flap 14, the top closure may be operated as follows. The flaps 36 and 40 are bent downwardly into a plane perpendicular to the axis of the prismatic carton structure and then the main closure flap 25 is moved downwardly with the locking tabs 28 and 29 folded inwardly at right angles to the main portion of the flap 25. The flap 28 is then introduced into the slit 45, the bendable ears 32 angling slightly to conform to and enter the angled portions 47 and 48 of the receiving slit. Flap 29 is introduced and locking into slit 46 in similar fashion.

When the flap 25 is fully closed the ears 32 are adapted to snap back toward their position in alignment with the main portion of the ears 28 and 29 and thus releasably lock the ears in place within the slits. The squared-off portions of the ears 32 are sufficiently flexible to re-enter the slit portions 47 and 48 when upward pressure is applied to the main lid flap 25, but the interlocking arrangement is sufficient to prevent casual or inadvertent removal of the ears from the locking slits.

It will be noted that the slits 45 and 46 are positioned rather closely to the integral hinge portion 17 between the walls 13 and 14 and not at the glued junction of the box corner which involves the flap 20 in the area 22, as will be the case if the principal panel bearing the complete flaps 25 and 50 were the intermediate or central panel of the blank shown in FIGURE 1.

It is understood that various changes and modifications may be made in the embodiment of the invention illustrated and described herein without departing from the scope of the invention as defined in the following claim.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

In a collapsible triangular prismatic carton which includes three rectangular side-wall panels having their adjacent lateral margins secured together to form a tubular structure of triangular cross-section; a bottom closure construction comprising a bottom flap hingedly connected with the lower edge of each of the three panels, the bottom flap which is uppermost in the completed carton being free of attachment to the other bottom flaps, the other two bottom flaps being connected with each other by the adhesion of distal portions of the areas of their external surfaces, the first of said two last named flaps being creased along a diagonal line adjacent the adhering areas to provide a hinge between proximal and distal areas thereof, said distal area of said first flap being folded completely over and in contact with its prox-

imate area when said carton is in erected condition, and the adjacent overlying distal portion of the other of the said two flaps being secured to the upwardly facing portion of the folded-over distal area of the first flap, said second flap being of relatively rigid uncreased structure, the doubled secured two flap portions thus providing a substantial stop means for preventing downward movement of the bottom structure beyond the horizontal plane of the bottom of the carton, the collapsing of the carton by the moving of the panels together serving to straighten out and unfold the said first flap while the two connected flaps move to parallel fully face-to-face contact with each other on their external sides and each into full back-to-back contact with their respective attached wall panels.

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