March 31, 1959 T. E. FLYNN 2,879,934

CARTON

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FIG. 1

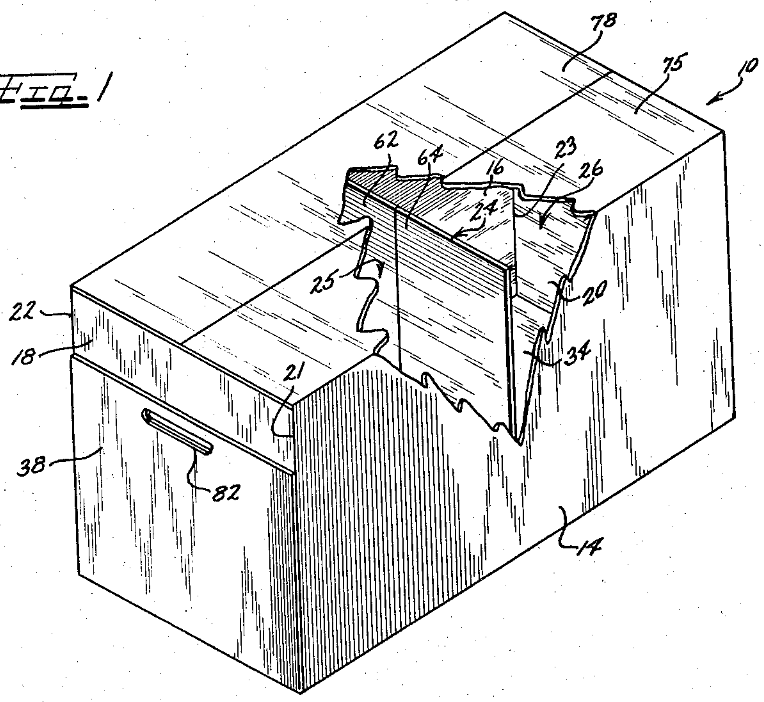
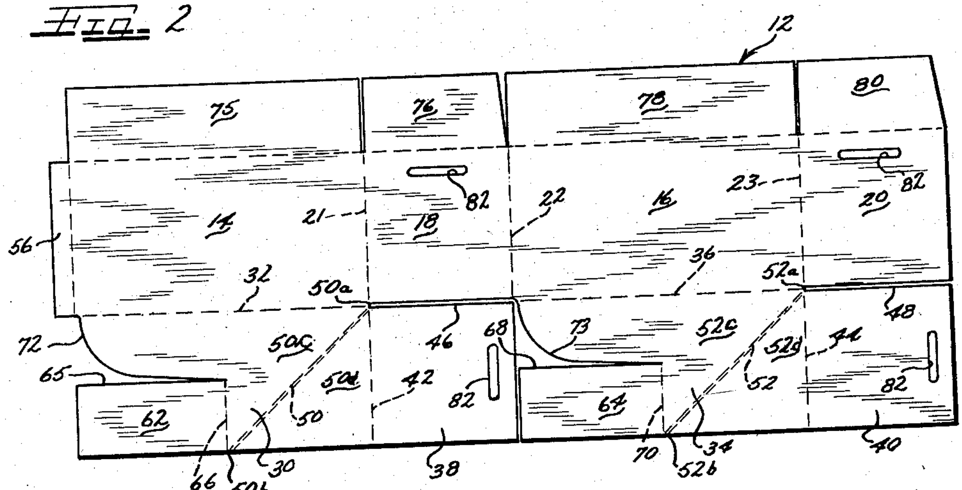


FIG. 2



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CARTON

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Fig. 3

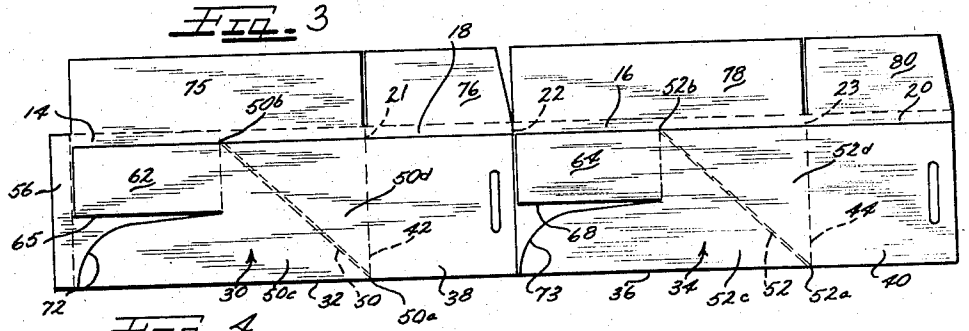


Fig. 4

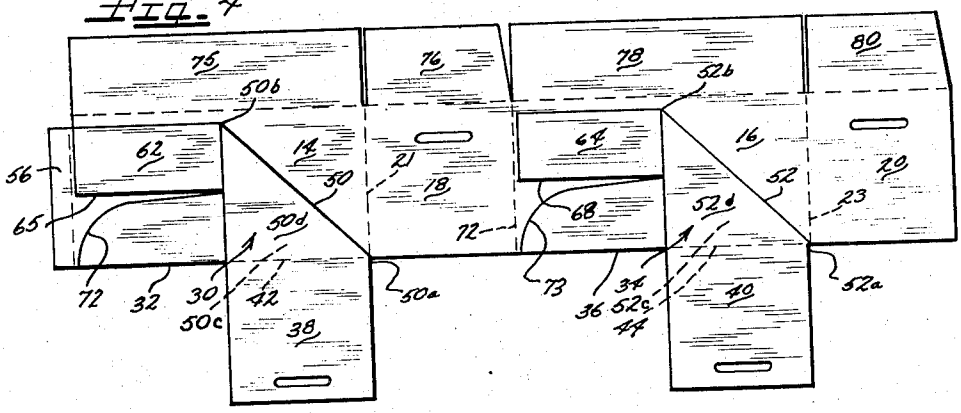


Fig. 5

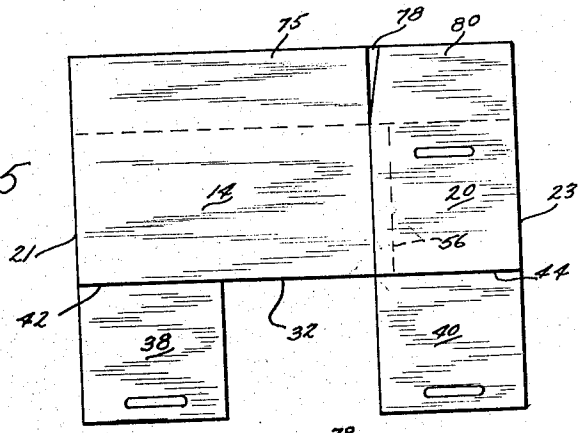
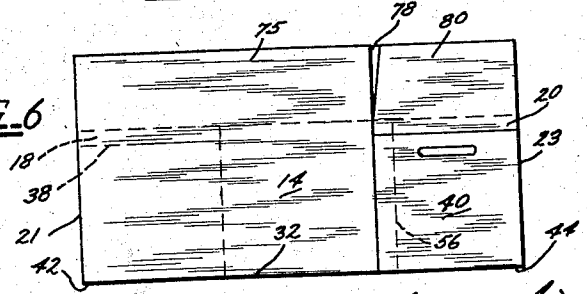


Fig. 6



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CARTON

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Fig. 7

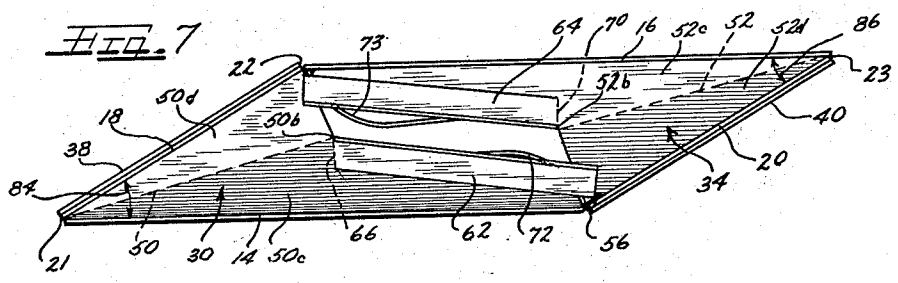


Fig. 8

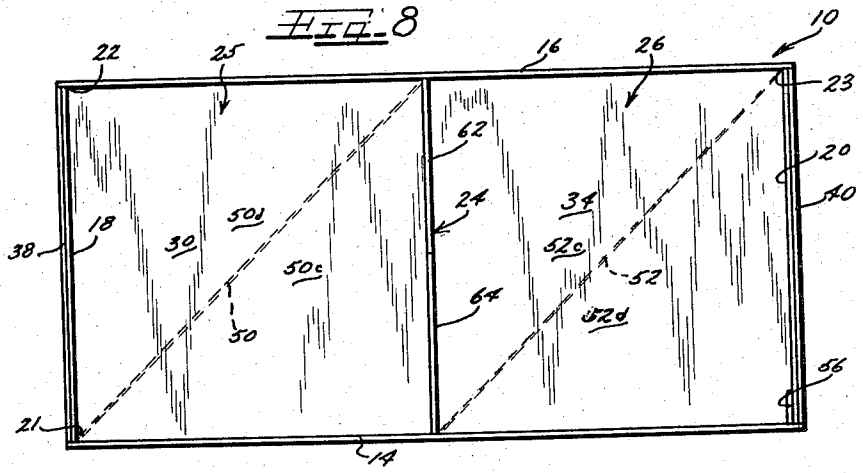
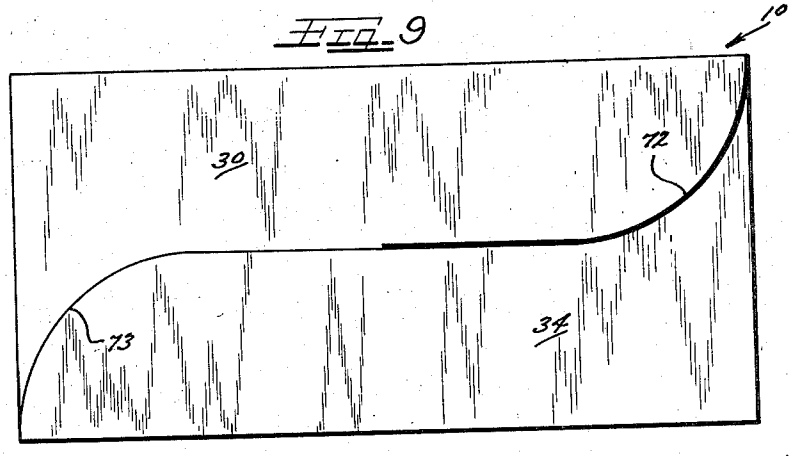


Fig. 9



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United States Patent Office 2,879,934 Patented Mar. 31, 1959

2,879,934

CARTON

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Application August 14, 1956, Serial No. 603,904

4 Claims. (Cl. 229—27)

This invention relates to containers, and has particular application to semi-rigid boxes or cartons such as are formed by corrugated board, fiber board, or the like. A desirable use for a container of the present invention is as an egg case, although other uses will be apparent.

It is an object of the present invention to provide a container of novel and advantageous construction, which will be relatively economical to manufacture, and which may be readily and quickly assembled even by an unskilled operator.

A further object is to provide a novel container particularly adapted for ready and convenient assembly from a generally flat shipping condition.

A further object of the present invention is to provide a container having novel means for providing an intermediate or central panel or partition to effectively divide the container into a plurality of compartments.

A still further object is to provide a container having an intermediate or divider panel which is automatically movable into compartment-dividing position in response to manipulation of the closure walls of the container into assembled condition.

A still further object is to provide a compartmented collapsible container which is readily and conveniently manipulatable from an assembled condition to a collapsed or flattened condition, from which condition the container may be re-opened or re-erected when desired to again effect an assembled carton.

A still further object is the provision of an upright divider panel formed by portions of a horizontally extending panel, yet which divider panel is caused to be folded relative to the horizontal panel into upright position automatically in accordance with movement of the side-walls and end-walls of the box into carton-forming position.

These and other objects, features, and advantages of the present invention will be readily apparent from the following description of an illustrative embodiment thereof, taken in conjunction with the accompanying drawings, in which:

Figure 1 is an isometric view of a carton or container embodying principles and concepts of the present invention, the container being shown in assembled condition;

Figure 2 is a lay-out view of a carton blank from which the container of Fig. 1 may be formed;

Figures 3, 4, 5, and 6 are sequential assembly views illustrating successive steps in manipulating the blank of Fig. 2 into the assembled condition shown by the container of Fig. 1;

Figure 7 is a top plan view of the container with cover flaps removed, during an intermediate step in the manipulation thereof into assembled condition;

Figure 8 is an enlarged top plan view of the container in fully assembled condition, likewise with cover flaps removed; and

Figure 9 is a bottom plan view thereof.

A container **10** embodying concepts and principles of the present invention is shown in the drawings, and is

by way of illustration shown as formed from a unitary blank **12** (Fig. 2) of semi-rigid material, such as corrugated board, fiber board, or the like to provide a longitudinally extending series of connected side walls **14** and **16** and end walls **18** and **20**. These walls or panels are flexibly connected, as by transversely extending score lines **21**, **22** and **23**, respectively, located between panels **14** and **18**, **18** and **16**, and **16** and **20**, those lines providing upright corner edges for the carton.

According to a principal feature of the present invention, the blank **12** is so slit, cut, scored and arranged as to provide novel means for effecting a central or dividing partition or panel **24** (Fig. 1) which divides the container **10** into compartments **25** and **26**.

Fig. 2 illustrates the box blank **12** in its initial completely non-assembled condition. There extends from the side panel **14** a bottom-forming panel **30**, the panels **14** and **30** being connected along a bottom corner edge-forming score line **32**. Similarly, there extends from the bottom of side panel **16** a bottom-forming panel **34**, the panels **16** and **34** being connected along a score line **36**.

The bottom-forming panels **30** and **34** include panels or tabs **38** and **40** adapted, when the carton is erected, to be associated with the respective end-panels **18** and **20**. The panels **38** and **40**, as will become hereinafter apparent, provide means both for securing the associated bottom panels **30** and **34** to the associated end panels **18** and **20**, as well as for adding rigidity to those end panels. The panels **38** and **40** are flexibly connected to the bottom-forming panels **30** and **34**, respectively, only by transversely extending score lines **42** and **44**. The panels **38** and **40** are separated from the end panels **18** and **20**, as by slits **46** and **48**, respectively.

The bottom-forming panels **30** and **34** are divided by diagonal score lines **50** and **52**, respectively. These lines **50** and **52**, respectively, are shown as extending diagonally from points **50***a* and **52***a* at the juncture of the panels **14**, **30**, and **38**, and of panels **16**, **34**, and **40**, to intermediate points **50***b* and **52***b*, respectively, along the free edges of the bottom-forming panels **30** and **34** opposite the score lines **32** and **36**. The panel-portions lying on opposite sides of score line **50** are designated as **50***c* and **50***d*; and the panel-portions lying on opposite sides of score line **52** are designated as **52***c* and **52***d*. These score lines **50** and **52** it will be noted are desirably of a double-score nature, permitting the panel portions separated thereby to be folded against each other about those score lines when in a carton-collapsed or flat, knocked-down condition.

Means such as a flap **56** is provided on one end of the series of side-wall and end-wall panels for uniting adjacent ones of such panels when the blank is formed into a carton, as will be hereinafter described. In the embodiment illustrated, the flap **56** is formed as a tab integrally extending laterally from side-wall **14**.

For providing the carton-dividing panel **24** when the carton is assembled (Fig. 1), the carton-blank **12** (Fig. 2) includes a pair of rectangular panels **62** and **64**, respectively connected to the bottom-forming panels **30** and **34**. In the form shown, the panel **62**, which extends from the bottom-forming panel **30**, is bounded by a slit **65** longitudinally extending along panel **30** and parallel to the score line **32**, and by a transversely extending score line **66** which extends perpendicularly to the score line **32** and which interconnects the end of slit **65** with the end **50***b* of the diagonal score line **50**. The only connection of panel **62** to the bottom-forming panel **30** is thus along the score line **66**.

Similarly, the panel **64**, which extends from the bottom-forming panel **34**, is bounded by a slit **68** extending along panel **34** parallel to score line **36**, and by a transversely

extending score line 70 which extends perpendicularly to the score line 36 to interconnect the end of slit 69 with the end 52*b* of the score line 52. Thus the only connection of panel 64 to the bottom-forming panel 34 is along the score line 70.

The portions of the bottom-forming panels 30 and 34 are curved as at 72 and 73, respectively adjacent the divider-forming panels 62 and 64 at the entrance of the slits 65 and 68. This curved configuration facilitates the manipulation of the carton blank 12 into carton-forming position, as will hereinafter be apparent.

Cover panels 75, 76, 78, and 80, respectively, desirably extend from the panels 14, 18, 16, and 20, to provide foldable cover or closure flaps for the container.

Carrying handle means are desirably provided, and as shown comprise elongated finger-slots 82 provided in the end walls 18 and 20 and in the end-rigidifying panels 38 and 40. The slots are suitably located and oriented on the blank 12 so that slots of panels 18 and 38, and of panels 20 and 40, will be properly aligned when those respective pairs of panels are superimposed during assembly, as will be hereinafter described.

From the open position shown in the layout drawing of Fig. 2, the other figures show steps in assembly and erection of the container. Accordingly, in Fig. 3, the bottom-forming panels 30 and 34, with their associated panels 38 and 40, have been folded upwardly along score lines 32 and 36, respectively, to superimpose the panels 30 and 34 over the side panels 14 and 16.

As illustrated in Fig. 4, the bottom-forming panel 30 has been folded downwardly along score line 50, superimposing the panel portion 50*d* over the panel portion 50*c*, and bringing the panel 38 below the score line 32, and with the score line 42 generally superimposed over the score line 32. In like manner, the bottom-forming panel 34 has been folded along score line 52, superimposing panel portions 52*d* and 52*c* and score lines 44 and 36, with the panel 40 projecting below the score line 36.

Figure 5 illustrates a next step in the assembly. The side-panel 14 and its bottom-forming panel 30 have been folded forwardly about score line 21 to generally superimpose those panels over the end panel 18 and the adjacent portion of the side panel 16. Moreover, the end panel 20 has been folded forwardly along the score line 23, into generally superimposed position over the adjacent portion of the side panel 16.

At this stage of assembly, the originally-remote ends of the lay-out blank 12 are interconnected to provide that the end-walls and side-walls of the carton are joined in a peripherally continuous series. This interconnection is shown as effected as by joining the tab 56, which extends from the free edge of the side panel 14, to the free edge of the end panel 20, as by glue or other suitable securing means.

Next, as is illustrated in Fig. 6, the panel 38 is folded upwardly and rearwardly about score line 42 to a superimposed position behind the end panel 18, and is secured thereto. This connects the portion 50*d* of the bottom-forming panel 30 with the lower edge of end panel 18, and the substantial extent of superimposition of panel 38 with the end panel 18 serves to rigidify the end panel. Similarly, the end panel 40 is folded upwardly but forwardly about score line 44 into superimposed relation with the end panel 20, and is secured thereto. This interconnects the panel portion 52*d* of the bottom-forming panel 34 with the lower edge of the end panel 20, and also serves to rigidify the end panel 20.

It will be observed that the container at the assembly state illustrated in Fig. 6 is generally flat, providing a desirable shipping or delivery condition of the carton.

A partially open, intermediate state in erection of the carton is illustrated in Fig. 7. Movement of the container from the flattened condition may be desirably initiated by the user applying an inward force against the end panel 18 and side panel 14 at the score line 21, and by applying a similar inward force against side panel 16 and end panel 20 at the score line 23.

As illustrated in Fig. 7, as the carton is being opened from flattened condition, with the angle 84 between the end wall 18 and side wall 14 correspondingly progressively increasing, and with the angle 86 between the end wall 20 and the side wall 16 also progressively increasing, the bottom-forming panels 30 and 34 are drawn downward toward horizontal position. Correspondingly, there occurs a corresponding unfolding of panel portions 50*c* and 50*d* about the score line 50 and of panel portions 52*c* and 52*d* about score line 52.

As the bottom-forming panels 30 and 34 are drawn toward horizontal position, they correspondingly translate generally toward each other. Also, it should be noted that during the condition of carton-erection during which the panel portions 50*c* and 50*d* and 52*c* and 52*d* are yet relatively angularly related about the respective score lines 50 and 52, the angular relationship of those panel portions provide that they are rather rigid.

These characteristics are utilized in providing the desired carton-dividing panel 24 (Figs. 1 and 8), by the partition-forming panels 62 and 64.

Accordingly, at a state of carton-erection subsequent to the partly-opened condition illustrated in Fig. 7, the divider panels 62 and 64 are caused to be pressed together by reason of the relative movement of the bottom-forming panels 30 and 34 towards one another. This forced engagement of panels 62 and 64 causes them to swing about score lines 66 and 70, respectively, and out of the planes of the panel-portions 50*c* and 52*c* from which portions the divider panels 62 and 64 extend.

During continued relative movement toward each other of the bottom-forming panels 30 and 34, to cause those panels to be lowered down into horizontal position, the portions thereof adjacent the panels 62 and 64 progressively swing laterally outward, bringing panel 62 adjacent one side 16 of the carton and towards the score line 36; correspondingly, the panel 64 is brought toward the opposite side 14 of the carton, towards the score line 32, thus approaching the carton-erected position shown in Figure 8.

This movement of panels 62 and 64 to opposite lateral side portions of the carton causes them to pass in a general abutting, sweeping motion, finally assuming the edge-to-edge upright relationship illustrated in Fig. 8. It will sometimes be found desirable to manually align or adjust the position of the panels 62—64; however, not much adjustment is ordinarily required, since the general edge-to-edge arrangement of panels 62—64 is generally achieved automatically as above described.

By the concepts and principles as herein set forth, it is thus seen that the erection of the novel divider panel 24 of the present invention, which panel 24 is formed as a composite arrangement of panel members 62 and 64, is automatically effected by the movement of the knocked-down container into carton-forming condition, without separate specific manipulation of the members which comprise the divider panel 24.

The curved or rounded portions 72 and 73, respectively, of the bottom-forming members 30 and 34, which provide the leading portions thereof and which move across portions 52*d* and 50*d* of the bottom-forming members 34 and 30, respectively, provide smooth engagement as the panel portions sweep past each other in moving between collapsed and carton-forming positions.

The relative sizes of the panel members 62 and 64 are desirably co-ordinated with the other proportions herein involved so that these divider panel members will be frictionally retained in their upright position, as shown in Figs. 1 and 8, by their edge-wise engagement with each other and with the side-walls 14 and 16.

The friction grip of divider-panel-members **62** and **64** by the carton sides **14** and **16** acts through those panel-members to hold down the bottom-forming members **30** and **34** in the carton-bottom-forming position.

If or when it is desired to dis-assemble the carton, it is easily folded back into the flattened condition illustrated in Figure 6. This flattened or collapsed condition is effected by the user grasping the divider panels **62** and **64** with each hand, and pulling on those panels upwardly and in a direction toward the opposite carton-side. Then with those panels **62** generally crisscrossed, and with panel **62** adjacent carton side-wall **14** and with panel **64** adjacent side-wall **16**, the panels are pointed or extended longitudinally in generally opposite directions, that is, panel **62** toward end-wall **20** and panel **64** toward end wall **18**. Then the sidewalls **14** and **16** are drawn together, causing the carton to pass through the intermediate stage illustrated in Figure 7 to the flattened or collapsed condition illustrated in Figure 6.

It will thus be seen from the foregoing description, considered in conjunction with the accompanying drawings that the present invention provides a new and improved carton or container having the desired advantages and characteristics, and accomplishing its intended objects, including those hereinbefore pointed out and others which are inherent in the invention as described.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A unitary carton-forming blank of semi-rigid sheet material so slit, cut, scored and arranged as to provide an aligned, longitudinally extending series of connected side and end wall-forming panels foldable about transversely extending score lines to form upright corner edges; a pair of similarly shaped bottom wall-forming panels connected to said respective side wall-forming panels along spaced bottom corner edge-forming score lines, each of said bottom wall-forming panels having a curved free edge, a rectangularly shaped divider-forming panel adjacent the corresponding one of said curved free edges and connected only along a transversely extending score line to the coresponding one of said bottom wall-forming panels, a reinforcing end wall-forming panel connected only by a transversely extending score line to each of said bottom wall-forming panels, there being diagonal score lines in each of said bottom wall-forming panels extending between opposite ends of corresponding pairs of said last mentioned transversely extending score lines to permit folding of said bottom wall-forming panels therealong, and a flap on one end of said series of connected side and end wall-forming panels for uniting adjacent end and side wall-forming panels when said blank is formed into a carton, said carton being then in a flattened, folded condition for shipping.

2. A unitary carton-forming blank of semi-rigid sheet material so slit, cut, scored and arranged as to provide an aligned, longitudinally extending series of connected side and end wall-forming panels foldable about transversely extending score lines to form upright corner edges; a pair of similarly shaped bottom wall-forming panels connected to said respective side wall-forming panels along spaced bottom corner edge-forming score lines, each of said bottom wall-forming panels having a curved free edge, a rectangularly shaped divider-forming panel adjacent the corresponding one of said curved free edges and connected only along a transversely extending score line to the corresponding one of said bottom wall-forming panels said divider panels together dividing said carton into a pair of separate compartments, a reinforcing end wall-forming panel connected only by a transversely extending score line to each of said bottom wall-forming panels, there being diagonal score lines in each of said bottom wall-forming panels extending between opposite ends of corresponding pairs of said last mentioned transversely extending score lines to permit folding of said bottom wall-forming panels therealong, and a flap on one end of said series of connected side and end wall-forming panels for uniting adjacent end and side wall-forming panels when said blank is formed into a carton, said carton being then in a flattened, folded condition for shipping and being capable of being set up into an open carton by applying inwardly directed forces to one pair of diagonally opposite upstanding corner-forming portions of said carton and by manually aligning said divider-forming panels in edge-to-edge upright relationship.

3. A unitary carton-forming blank of semi-rigid sheet material so slit, cut, scored and arranged as to provide an aligned, longitudinally extending series of connected side and end wall-forming panels foldable about transversely extending score lines to form upright corner edges; a pair of similarly shaped bottom wall-forming panels connected to said respective side wall-forming panels along spaced bottom corner edge-forming score lines, each of said bottom wall-forming panels having a curved free edge, a rectangularly shaped divider-forming panel adjacent the corresponding one of said curved free edges and connected only along a transversely extending score line to the corresponding one of said bottom wall-forming panels, said divider panels bisecting the longitudinal axis of said assembled carton and together dividing the same into a pair of separate compartments, a reinforcing end wall-forming panel connected only by a transversely extending score line to each of said bottom wall-forming panels, there being diagonal score lines in each of said bottom wall-forming panels extending between opposite ends of corresponding pairs of said last mentioned transversely extending score lines to permit folding of said bottom wall-forming panels therealong, and a flap on one end of said series of connected side and end wall-forming panels for uniting adjacent end and side wall-forming panels when said blank is formed into a carton.

4. A unitary carton-forming blank of semi-rigid sheet material so slit, cut, scored and arranged as to provide an aligned, longitudinally extending series of connected side and end wall-forming panels foldable about transversely extending score lines to form upright corner edges; a pair of bottom wall-forming panels connected to said respective side wall-forming panels along spaced bottom corner edge-forming score lines, a divider-forming panel carried by each bottom wall-forming panel adjacent the edge thereof remote from the bottom corner edge-forming score lines and connected to the corresponding one of said bottom wall-forming panels only along a score line extending laterally with respect to said bottom corner edge-forming score line to centrally divide said assembled carton into separate compartments, a connecting tab connected only along a transversely extending score line to the corresponding one of said bottom wall forming panels, there being diagonal socre lines in each of said bottom wall-forming panels extending between opposite ends of corresponding pairs of said last mentioned laterally and transversely extending score lines to permit folding of said bottom wall-forming panels therealong, and a flap on one end of said series of connected side and end wall-forming panels for uniting adjacent end and side wall-forming panels when said blank is formed into a carton.

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