

June 30, 1953

O. L. VINES

2,643,813

CARTON

Filed Aug. 24, 1951

FIG. 1

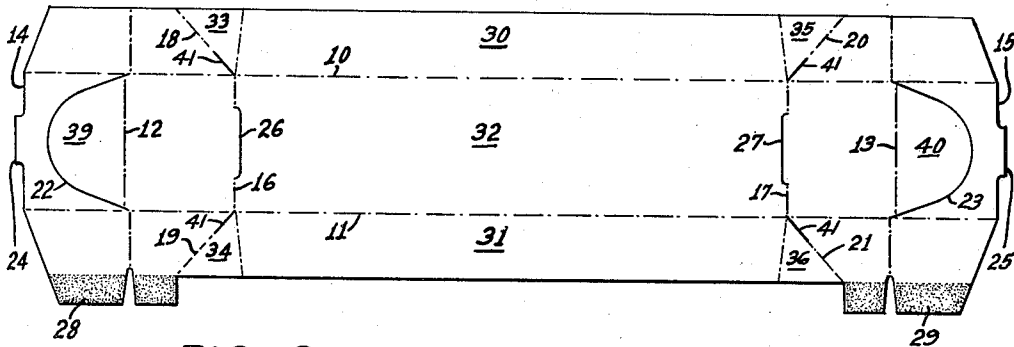


FIG. 2

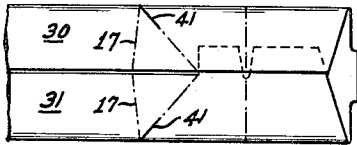


FIG. 3

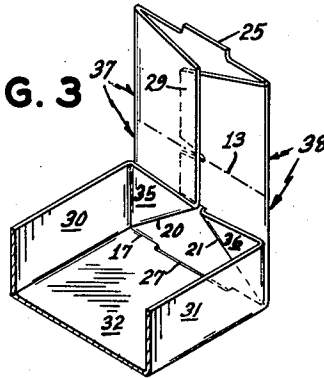


FIG. 4

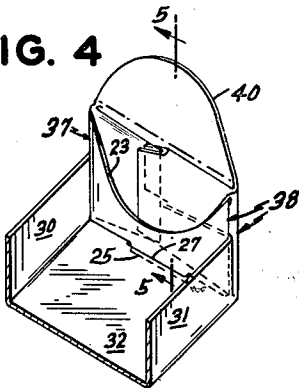


FIG. 7

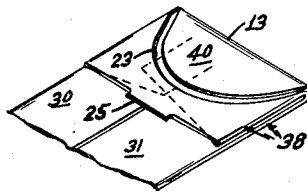


FIG. 6

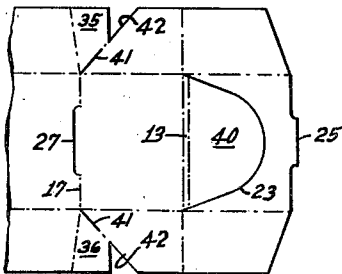
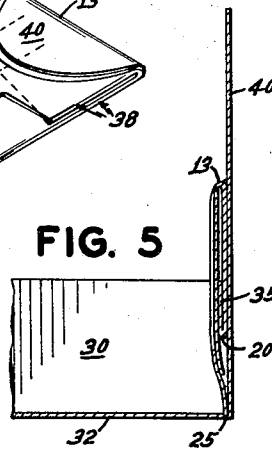


FIG. 5



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UNITED STATES PATENT OFFICE

2,643,813

CARTON

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5 Claims. (Cl. 229—31)

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This invention relates to cartons and, more particularly, to folding cartons adapted to contain fruit and the like. The folding carton of the present invention is of the knockdown, set-up type such that the carton in its knocked-down condition can be set up by a bending motion applied to the end portions of the carton.

There has been extensive development in recent years of folding cartons suitable for use in the packaging of fruit such as tomatoes and the like. These tomato trays, as they are generally referred to, are commonly provided with an open top so that the filled tray can be subsequently wrapped with a transparent material which will leave the contents of the tray exposed to view. A particularly successful form of tomato tray has thus been developed in which the tray is composed of a blank having two side panels folded over and inwardly on top of a central panel about two fold lines extending longitudinally of the blank so as to form a substantially flat structure in the knocked-down condition. For erection of the folded tray, each end portion of the flat structure is folded upwardly about an inner transverse fold line so that a folding web, defined in each of the two side panels adjacent the transverse fold line, causes the side walls to assume an upstanding position. In the resulting structure, it is particularly important that the end walls of the erected tray stand straight and provide strength for not only the ends of the carton but also for the adjoining portions of the side walls of the carton. An additional feature which is generally required in such structures is a flap at each end of the carton adapted to project inwardly a short distance from the upper edge of each end portion. The purpose of these inwardly projecting flaps is to provide a horizontal platform upon which another filled tray can be supported when a plurality of the filled trays are stacked for shipment or display.

I have now devised a carton blank of the type which forms a folding tomato tray of the aforementioned type and which is further characterized by improved qualities in its end wall construction. The carton blank of the invention has a substantially rectangular shape and is provided with two parallel fold lines extending longitudinally the full length of the blank, each of these longitudinal fold lines being disposed substantially the same distance from and parallel to the longitudinal sides of the blank. The blank is further provided with a first pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at

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substantially the same spaced distance inwardly therefrom and with a second pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same distance inwardly from the proximate fold line of the first pair as the distance between said proximate fold line and the proximate end of the blank. The blank is further provided with four separate fold lines extending diagonally outwardly to the two sides of the blank at an angle of about 45° thereto from each of the four intersections of the two longitudinal fold lines and the two transverse fold lines of said second pair thereof. The portion of each end of the blank defined by the two longitudinal fold lines, the end of the blank and the transverse fold line proximate thereto is provided with an arched cut line having its ends positioned adjacent the intersections of said longitudinal fold lines with the aforementioned proximate transverse fold line. Each end portion of the blank is provided with an end-locking arrangement advantageously composed of an outwardly projecting tongue portion on each end of the blank and a substantially centrally disposed transverse cut line in the body of the blank adjacent the inboard side of each of the transverse fold lines of said second pair thereof.

The carton blank of my invention is capable of forming a carton comprising two side panels folded over and inwardly on top of a central panel about the two longitudinal fold lines extending longitudinally of the blank so as to form a substantially flat structure. Each end portion of the flat structure is capable of being folded upwardly about an inner transverse fold line with resulting erection of the side panels of the blank by the folding of a web portion of each side panel about a diagonally disposed fold line therein. Each upwardly extending end portion is folded inwardly and downwardly into a locked position within the interior of the resulting carton about a transverse fold line positioned substantially centrally of said end portion of the flat structure. An arched-shaped flap struck up from the end portion of the central panel which is folded downwardly into the interior of the carton is capable of being folded about the aforesaid fold line positioned substantially centrally of the end portion of the flat structure so as to assume a substantially horizontal position for protection of the contents of the carton.

These and other novel features of the carton blank and assembled carton of the invention will be more readily understood from the following

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description taken in conjunction with the drawings in which

Fig. 1 is a plan view of a carton blank of the invention;

Fig. 2 is a partial plan view of the assembled carton in its knocked-down or flat form showing a representative end portion of this structure;

Fig. 3 is a perspective view of the structure shown in Fig. 2 after erection of the side panels by folding upwardly the end portions of the assembled carton;

Fig. 4 is a perspective view of the structure shown in Fig. 3 after the upper part of the upstanding end portion of the structure has been folded inwardly and downwardly into a locked position within the interior of the carton;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4;

Fig. 6 is a partial plan view of another modification of a carton blank embodying the invention; and

Fig. 7 is a perspective view of the end portion of a folded carton in a further folded condition.

The carton blank shown in Fig. 1 is of substantially rectangular shape and is provided with two parallel fold lines 10 and 11 extending longitudinally the full length of the blank. Each of the longitudinal fold lines 10 and 11 is parallel to the longitudinal sides of the blank and each is disposed substantially the same distance inwardly from the longitudinal sides of the blank. The blank is further provided with a first pair of parallel fold lines 12 and 13 each of which extends transversely across a separate end portion of the blank. Each of the transverse fold lines 12 and 13 is positioned at substantially the same spaced distance inwardly from the respective ends 14 and 15 of the blank. If desired, the transverse fold lines 12 and 13 may be positioned at a distance from the ends of the blank greater than the distance from the longitudinal fold lines 10 and 11 to the sides of the blank so that the end wall section of the erected carton will be higher than the side walls thereof as in a conventional tomato tray. Of course, these dimensions may be changed at will to provide any desired relative height to the end walls and side walls of the assembled carton embodying my invention. The blank is also provided with a second pair of parallel fold lines 16 and 17 extending transversely across separate end portions of the blank. The distance between the ends 14 and 15 of the blank and the proximate transverse fold lines 12 and 13 of the first pair thereof is substantially the same as the distance between the transverse fold lines 12 and 13 and the transverse fold lines 16 and 17, respectively, of the second pair thereof.

The aforementioned longitudinal and transverse fold lines define in the blank the side wall panels and end wall portions of the assembled carton. In order to provide a folding web portion between each side panel and the adjacent end wall structure, the blank is further provided with four separate fold lines 18, 19, 20 and 21 extending diagonally outwardly to the two sides of the blank at an angle of about 45° thereto from each of the four intersections of the two longitudinal fold lines 10 and 11 with the two transverse fold lines 16 and 17 of the second pair thereof. If the fold lines 18, 19, 20 and 21 are not disposed at 45° to the sides of the blank, the side walls 30 and 31 will not stand vertically but will slope inwardly or outwardly depending upon whether the aforementioned angle is larger or

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smaller, respectively, than 45°. The portions of the ends of the blank defined by the two longitudinal fold lines 10 and 11, the ends 14 and 15 of the blank and the transverse fold lines 12 and 13 approximate thereto are each provided with an arched cut line 22 and 23, respectively, the ends of the arched cut lines 22 and 23 being positioned adjacent the intersections of the longitudinal fold lines 10 and 11 with said proximate transverse fold lines 12 and 13. The opposite ends of the blank are provided with outwardly projecting tongue portions 24 and 25, and the body of the blank is provided with substantially centrally disposed transverse cut lines 26 and 27 adjacent the inboard side of each of the transverse fold lines 16 and 17 of said second pair thereof. The blank is advantageously, although not necessarily, provided with glue tabs 28 and 29 projecting outwardly from a side of the blank near each end thereof and adapted to join together the extremities of the two side portions of the blank when the blank is folded along the two longitudinal fold lines 10 and 11.

The resulting carton blank is adapted to be assembled into a form ready for erection simply by bending the two side wall panels 30 and 31 about the longitudinal fold lines 10 and 11, respectively. If, as shown in Fig. 1, in contradistinction to the form of blank shown in Fig. 6, the blank is provided with glue tabs 28 and 29 along one side wall panel, these tabs will subsequently be secured to the surface of the opposite side wall panel so as to secure the two panels in a position in which they are folded flat against the central panel 32 as shown in Fig. 2.

Erection of the assembled carton is effected, as shown in Fig. 3, by first raising the end portion of the carton upwardly about the second-mentioned pair of transverse fold lines 16 and 17. As this is done, the diagonal fold lines 18, 19, 20 and 21, remaining close to the body of the end portions, causes the webs 33, 34, 35 and 36 to fold outwardly and upwardly with resulting setting-up of the side wall panels 30 and 31. The uppermost section of the resulting upstanding end portion of the carton structure is then folded inwardly and downwardly about the first-mentioned pair of transverse fold lines 12 and 13 until, as shown in Fig. 4, the tongue at the extreme end of the blank snaps into the transverse cut line in the bottom panel of the blank, these parts being the tongue 25 and the cut line 27 in the partial views shown in Figs. 3 and 4.

By referring to Fig. 5 it will be seen that the end wall of the erected carton stands upright with no tendency to slope outwardly or bulge in any other way. This result is achieved largely by virtue of the fact that both sections of the end portion of the assembled carton are provided along its edges with a folded section as indicated at 37 and 38 in Figs. 3 and 4. The rigidity offered by these fold sections 37 and 38 securely holds the two folded sections of the end portion in engagement with the end wall portion defined by the webs 35 and 36. By thus holding the end walls in their desired vertical position, the structure contributes to the utility of the top flaps 39 and 40 defined by the arched cut lines 22 and 23 and further provides outstanding vertical support for these flaps. When the end walls of a tray-like carton are permitted to bulge or slope outwardly, the distance between the uppermost ends of these walls substantially exceeds the length of the bottom panel of another carton

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superposed thereupon with the result that the weight of the overlying loaded cartons is capable of deforming the horizontally disposed end flaps and thus damage the contents of the loaded carton. But as clearly shown in Figs. 4 and 5, the end portion of the erected carton of the present invention retains its desired vertical position and, by virtue of the fold sections 37 and 38 along the two halves of each end portion positioned on opposite sides of the webs 35 and 36, affords maximum end strength for a carton of this general type.

It will be observed in Figs. 4 and 5 that the innermost surface of the end structure is part of the central panel of the carton which also forms the outermost surface of the end wall structure. Inasmuch as the outermost and innermost surfaces of the end structure are composed of the same panel section, these two surfaces lock securely between them all other intermediate portions of the end structure so as to insure the desired rigidity and strength of the entire end structure. The arched contour of the cut lines 22 and 23 which define the end flaps 39 and 40 has a desirable function in that it provides a rounded cut-out contour along the innermost surface of the end sections of the erected carton, as shown clearly in Fig. 4. This rounded contour eliminates any sharp edges which might otherwise injure or mark the fruit or other perishable objects loaded thereinto.

If, for greater simplicity in erecting the folded carton, it is desired to supply the users of the carton with a folded carton in which the extreme end sections of the end portions of the carton have been folded over as shown in Fig. 7, I have found it advisable to form the fold lines 12 and 13, the latter being shown in Fig. 6, as a relatively wide score band so as to permit the end flaps 39 and 40 to lie flat against the folded carton.

In order to facilitate erection of the assembled carton, I have found it advantageous, as shown in Figs. 1, 2 and 6, to form the innermost portion of the diagonal fold lines 18, 19, 20 and 21 by a cut line 41. Moreover, as further shown in the modification illustrated in Fig. 6, I have found that the erection of the assembled carton is further facilitated by providing notch-shaped cut-outs 42 adjacent the outermost ends of the folding webs 33, 34, 35 and 36. Carton blanks incorporating these features are characterized by extreme simplicity of erection such that the cartons can be set up in automatic loading machines.

I claim:

1. A carton blank of substantially rectangular shape provided with two parallel fold lines extending longitudinally the full length of the blank, each of said longitudinal fold lines being disposed substantially the same distance from and parallel to the longitudinal sides of the blank, the blank being further provided with a first pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same spaced distance inwardly therefrom and with a second pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same distance inwardly from the proximate fold line of the first pair as the distance between said proximate fold line and the proximate end of the blank, the blank further having four separate fold lines extending diagonally outwardly to the

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two sides of the blank at an angle of about forty-five degrees thereto from each of the four intersections of the two longitudinal fold lines and the two transverse fold lines of said second pair thereof, the portion of each end of the blank defined by the two longitudinal fold lines, the end of the blank and the transverse fold line proximate thereto being provided with an outwardly arched cut line having its ends positioned adjacent the intersections of said longitudinal fold lines with said proximate transverse fold line, the ends of the blank being provided with an outwardly projecting tongue portion, and the body of the blank being provided with a substantially centrally disposed transverse cut line adjacent the inboard side of each of the transverse fold lines of said second pair thereof.

2. A carton blank of substantially rectangular shape provided with two parallel fold lines extending longitudinally the full length of the blank, each of said longitudinal fold lines being disposed substantially the same distance from and parallel to the longitudinal sides of the blank, the blank being further provided with a pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same spaced distance inwardly therefrom and with a second pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same distance inwardly from the proximate fold line of the other pair as the distance between said proximate fold line and the proximate end of the blank, the blank further having four separate fold lines extending diagonally outwardly to the two sides of the blank at an angle of about forty-five degrees thereto from each of the four intersections of the two longitudinal fold lines and the two transverse fold lines of said second pair thereof, the inboard portion of each of said diagonal fold lines comprising a cut line, the portion of each end of the blank defined by the two longitudinal fold lines, the end of the blank and the transverse fold line proximate thereto being provided with an outwardly arched cut line having its ends positioned adjacent the intersections of said longitudinal fold lines with said proximate transverse fold line, the ends of the blank being provided with an outwardly projecting tongue portion, and the body of the blank being provided with a substantially centrally disposed transverse cut line adjacent the inboard side of each of the transverse fold lines of said second pair thereof.

3. A carton blank of substantially rectangular shape provided with two parallel fold lines extending longitudinally the full length of the blank, each of said longitudinal fold lines being disposed substantially the same distance from and parallel to the longitudinal sides of the blank, the blank being further provided with a pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same spaced distance inwardly therefrom and with a second pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same distance inwardly from the proximate score line of the other pair as the distance between said proximate fold lines and the proximate end of the blank, the blank further having four separate fold lines extending diagonally outwardly to the two sides

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of the blank at an angle of about forty-five degrees thereto from each of the four intersections of the two longitudinal fold lines and the two transverse fold lines of said second pair thereof, the portion of each end of the blank defined by the two longitudinal fold lines, the end of the blank and the transverse fold line proximate thereto being provided with an outwardly arched cut line having its ends positioned adjacent the intersections of said longitudinal fold lines with said proximate transverse fold line, the ends of the blank being provided with an outwardly projecting tongue portion, the body of the blank being provided with a substantially centrally disposed transverse cut line adjacent the inboard side of each of the transverse fold lines of said second pair thereof, and a glue tab projecting outwardly from a side of the blank near each end thereof and adapted to join together the extremities of the two side portions of the blank when the blank is folded along said two longitudinal fold lines.

4. A carton blank of substantially rectangular shape provided with two parallel fold lines extending longitudinally the full length of the blank, each of said longitudinal fold lines being disposed substantially the same distance from and parallel to the longitudinal sides of the blank, the blank being further provided with a pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same spaced distance inwardly therefrom and with a second pair of parallel fold lines each of which extends transversely across a separate end portion of the blank at substantially the same distance inwardly from the proximate score line of the other pair as the distance between said proximate fold lines and the proximate end of the blank, the distance between each of the transverse fold lines of the first pair and the proximate end of the blank being greater than the distance between each of the longitudinal fold lines and the proximate side of the blank, the blank further having four separate fold lines extending diagonally outwardly to the two sides of the blank at an angle of about forty-five degrees thereto from each of the four intersections of the two longitudinal fold lines and the two transverse fold lines of said second pair thereof, the portion of each end of the blank defined by the two longitudinal fold lines, the end of the blank and the transverse fold line proximate thereto being provided with an outwardly arched cut line having its ends posi-

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tioned adjacent the intersections of said longitudinal fold lines with said proximate transverse fold line, the ends of the blank being provided with an outwardly projecting tongue portion, and the body of the blank being provided with a substantially centrally disposed transverse cut line adjacent the inboard side of each of the transverse fold lines of said second pair thereof.

5. A carton comprising a bottom panel, two upright side wall panels joining the bottom panel adjacent the longitudinal edges thereof, two upright outer end wall panels joining the bottom panel adjacent the transverse edges thereof, each outer end wall panel having an integrally formed reinforcing panel folded inwardly along each of the vertical side edges of said outer end wall panel, each reinforcing panel being provided with a web integrally joined to the end of the proximate side wall panel, an upright inner end wall panel integrally joined to the top of each outer end wall panel along a transverse fold line and extending downwardly into the interior of the carton in locked position on the inboard side of said web, each inner end wall panel having an integrally formed reinforcing panel folded inwardly along each of the vertical side edges of said inner end wall panel and integrally joined to the first-mentioned proximate reinforcing panel, and an arch-shaped flap struck up from each inner end wall panel and foldable about the aforesaid transverse fold line adjacent the top of both said inner and outer end wall panels, whereby each end of the carton is provided with two end wall sections held erect by said web with each section being vertically reinforced by the fold adjacent its vertical side edges.

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