Oct. 6, 1959 O. L. VINES 2,907,510

CARTON

Filed June 14, 1955 2 Sheets-Sheet 1

FIG. 1

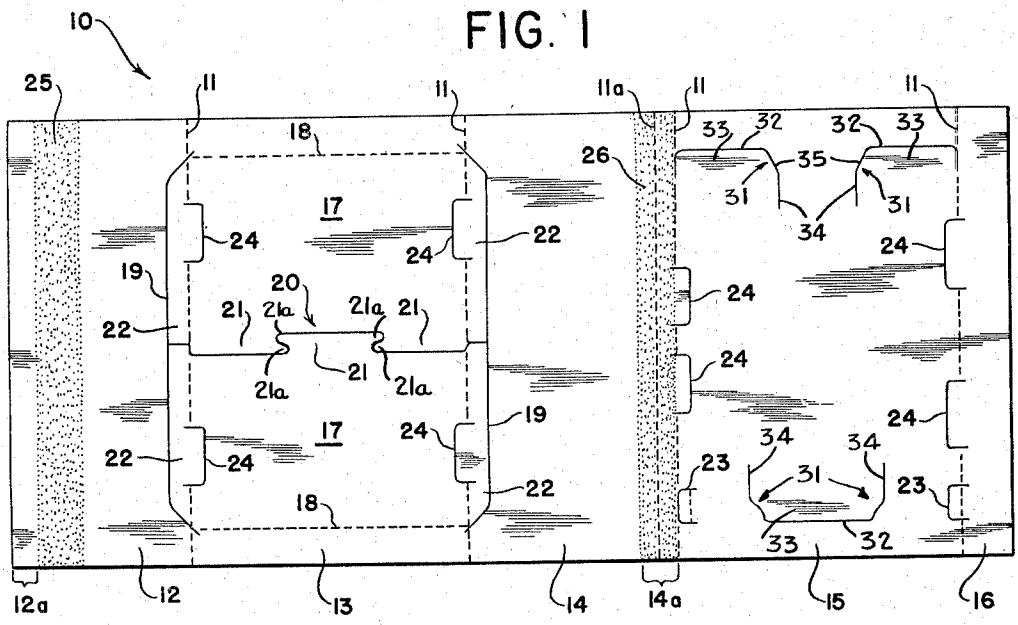

FIG. 2

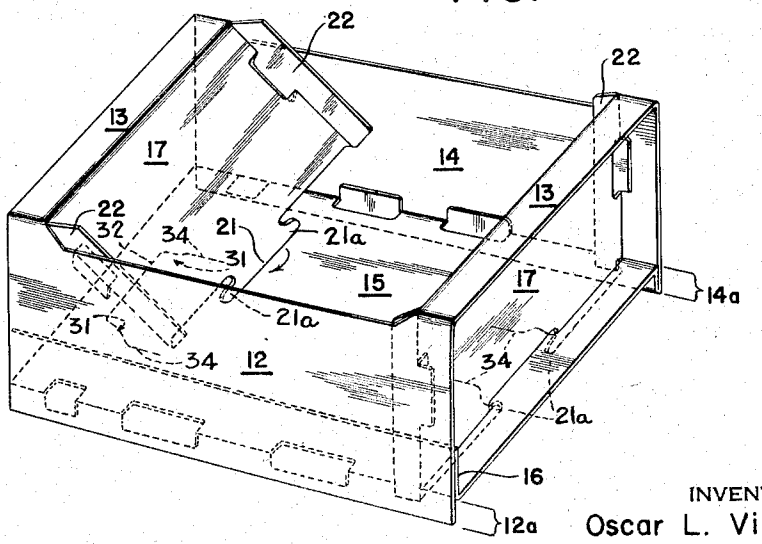

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FIG. 3

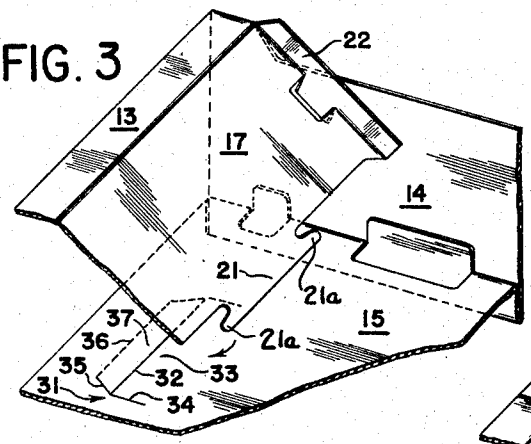


FIG. 4

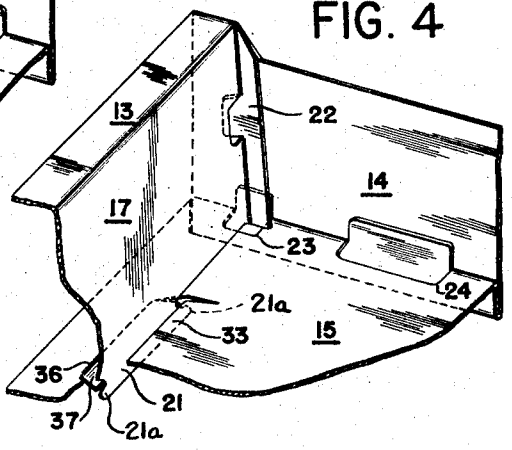
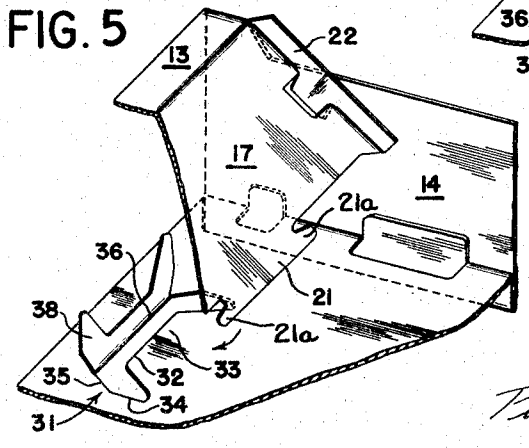


FIG. 5



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CARTON

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Application June 14, 1955, Serial No. 515,464

4 Claims. (Cl. 229—16)

This invention relates to folding cartons, and more particularly to a carton construction wherein a latching tongue portion of one panel of the carton is received in a coextensive opening in a second panel of the carton.

Folding cartons fabricated of sheet material such as paperboard are widely used for packaging a variety of articles. In such cartons it is frequently necessary to position one panel of the carton substantially normal or perpendicular to another panel of the carton, and to secure the two panels in this relative position by engaging a latching tongue portion of the first panel in a coextensive opening in the second panel. For example, in a useful carton construction I have devised, a hinged panel or fold section of the carton is swung into a final position substantially normal to and in contact with a second panel of the carton, the hinged panel having a projecting tongue portion adapted to extend into and through a coextensive opening in the second panel when the two panels are in their final position normal to one another. I have found, however, that under certain conditions of use the projecting tongue portion of the hinged panel of my carton tends to become dislodged from the opening in the second panel in which it is received due to the flexibility and consequent bending of the sheet material from which the panels of the carton are made. To overcome this problem I have devised an improved carton construction in which the latching tongue portion of the hinged panel is provided with laterally extending ears and in which the coextensive opening in the second panel is uniquely formed to permit ready entry of the modified tongue portion thereunto and to prevent withdrawal of the tongue portion therefrom when in its final position with respect to the second panel.

Specifically, my invention relates to a carton construction wherein, during erection of the carton, a hinged panel is swung into a final position substantially normal to and in contact with a second panel, the hinged panel having a projecting tongue portion adapted to extend into and through a coextensive opening in the second panel when the two panels are in their final position normal to one another. My improvement in this carton construction comprises providing the sides of the projecting tongue portion of the hinged panel with laterally extending ear portions, and forming the coextensive opening in the second panel from two longitudinally disposed cut lines and a laterally disposed cut line extending between the longitudinally disposed cut lines, said cut lines together defining a resilient flap in the second panel positioned in the arcuate path of the tongue portion of the hinged panel. The longitudinally disposed cut lines in the top panel are provided with coextensive and substantially parallel inboard portions spaced apart a distance slightly greater than the extreme span of the ears of the latching tongue portion, and are further provided with coextensive and convergent outboard portions the outboard extremities of which are spaced apart a distance less than the extreme span of the ears of the

latching tongue portion. The laterally disposed cut line is positioned with respect to the inboard extremities of the two longitudinally disposed cut lines so as to define a resilient flap portion therebetween that is readily deflectable from the plane of the second panel. When the hinged panel approaches its final position with respect to the second panel, the latching tongue portion of the hinged panel bears against the deflectable portion of the second panel thereby forcing it out of the plane of its panel and permitting the lateral ears of the tongue portion to enter and extend through the plane of the second panel adjacent the relatively widely spaced coextensive inboard portions of the longitudinally disposed cut lines. When the hinged panel reaches its final position with respect to the second panel, the latching tongue portion extends through the coextensive opening in the second panel adjacent the relatively closely spaced extremities of the convergent portions of the longitudinal cut lines so that the ears of the tongue portion engage the surface of the second panel opposite the main body portion of the hinged panel. Thus, the latching tongue portion of the hinged panel cannot be withdrawn from the coextensive opening in the second panel in course of usual use and handling of the carton.

A particularly useful application of my improvement in carton construction is in connection with a five-sided berry box I have devised. Accordingly, my invention will be described in conjunction with this carton construction and in conjunction with the accompanying drawings of which

Fig. 1 is a plan view of a carton blank from which a five-sided carton is formed, the hinged end wall panels of the blank being provided with latching tongue portions having laterally extending ears and the bottom wall panel being provided with one form of coextensive tongue receiving openings pursuant to my invention;

Fig. 2 is a perspective view of the partially erected carton formed from the blank of Fig. 1;

Fig. 3 is a fragmentary perspective view of a partially erected carton showing another form of coextensive tongue-receiving opening in the bottom panel;

Fig. 4 is a perspective view showing the hinged panel of Fig. 3 in its final position; and

Fig. 5 is a fragmentary perspective view of a partially erected carton showing still another form or coextensive tongue-receiving opening in the bottom panel of the carton.

The five-sided open top carton or berry box to which my invention is particularly applicable is formed from a substantially rectangular piece of sheet material such as paperboard provided with appropriate cut lines, fold lines and glue strips as described. The substantially rectangular blank **10** is formed with a plurality of spaced parallel fold lines **11** extending longitudinally across the blank and defining serially a first side panel **12**, a top panel **13**, a second side panel **14**, a bottom panel **15** and a glue panel **16**. The top panel **13** is formed with a pair of fold sections **17** that, when folded downwardly into the erected carton, become the two end walls thereof, leaving the top of the carton open to view. The fold sections **17** are defined by a pair of fold lines **18** extending laterally across the top panel **13**, a pair of channel-shaped cut lines **19** disposed longitudinally in the adjacent portions of the side panels **12** and **14**, and a cut line **20** extending laterally across the top panel from one longitudinal cut line **19** to the other and positioned between the fold lines **18**. The laterally disposed cut line **20** is so configured that it defines along abutting edges of the two fold sections **17** a plurality of latching tongue portions **21**, the latching tongue portions **21** being formed with laterally extending ears **21***a*. Each fold section **17** is provided with wing

portions 22 formed from the side panels 12 and 14. These wing portions 22 are defined by the channel-shaped cut lines 19, the proximate fold line 11, and the lateral cut line 20 and are attached to the associated fold section 17 along the said longitudinal fold lines 11.

The side panels 12 and 14 are advantageously provided with auxiliary portions 12*a* and 14*a* respectively which form foot portions on which the carton stands when it is fully erected. In such case an auxiliary longitudinal fold line 11*a* is provided in the side panel 14 to facilitate erection of the carton. The bottom panel 15 of the carton blank 10 is formed with coextensive openings adapted to receive the latching tongue portions 21 and laterally extending ears 21*a* of the hinged fold sections 17 when the carton is erected. Each of the said coextensive openings formed in the bottom panel 15 are defined by two longitudinally disposed cut lines 31 connected by a laterally disposed cut line 32 which together define a resilient flat portion 33 of the bottom panel. Other openings in the bottom panel 15 defined by the channel-shaped cut lines 23 are provided to receive the lower ends of the wing portions 22 of the fold sections 17. The top and bottom panels of the carton blank are also advantageously provided with channel-shaped cut lines 24 the ends of which communicate with the fold lines 11 whereby ventilation openings will be formed in the top and bottom panels when the carton blank is folded and the carton is erected.

To erect the carton, a longitudinal strip of glue is applied to the side panel 12 (or to the glue panel 16). When the side panels 12 and 14 of the carton are provided with auxiliary foot portions 12*a* and 14*a*, respectively, the glue strip 25 must be spaced an appropriate distance inboard of the longitudinal edge of the side panel 12 as shown in Fig. 1 of the drawing. In addition, in such case glue is also applied in a strip 26 along the auxiliary portion 14*a* of the side wall panel 14 as shown in Fig. 1, care being taken to avoid applying glue to any part of the bottom panel 15, and in particular to any of the cutout portions thereof that might as a result interfere with the ready erection of the carton. The side wall panel 14 of the carton blank is then folded about the fold line 11*a*, and the side wall panel 12 is folded about the proximate lateral fold line 11, the glue strip 25 thereon adhering to the glue panel 16 of the carton.

The fold sections 17 of the top panel are then folded downwardly and inwardly into the interior of the folded and glued carton blank to form the end walls of the erected carton. A semi-erected carton one of the fold sections of which has thus been folded to form an end wall is shown in Fig. 2. As each fold section 17 is pressed into the interior of the carton, the wing portions 22 thereof are automatically folded inwardly and upwardly until they are at right angles to the main portion of the fold section 17. As the fold section 17 comes into contact with the bottom panel 15, the latching tongue portions 21 with ears 21*a* and the ends of the wing portions 22 snap into the coextensive openings in the bottom panel adapted to receive these tongue portions and ends of the wing portions.

As previously noted, the coextensive openings formed in the bottom panel 15 (modifications of which openings are shown in Figs. 1 and 2, Figs. 3 and 4, and Fig. 5) are defined by two longitudinally disposed cut lines 31 connected by a laterally disposed cut line 32 which together define a resilient flap portion 33 of the bottom panel. Moreover, in each of the modifications of my invention shown in the drawings, the two longitudinally disposed cut lines 31 are provided with coextensive and substantially parallel inboard portions 34 spaced apart a distance slightly greater than the extreme span of the laterally extending ears 21*a*. The cut lines 31 are further provided with coextensive and convergent outboard portions 35 the outboard extremities of which are spaced apart a distance appreciably less than the extreme span of the laterally extending ears of the latching tongue portions 21. The cut lines 31 and 32 are so positioned on the bottom panel 15 that, as the hinged fold section 17 swings in an arcuate path towards its final position approximately perpendicular or normal to the bottom panel, the latching tongue portion 21 thereof first strikes or touches the bottom panel between the coextensive inboard portion 34 of the cut lines 31. Further arcuate outward travel of the hinged section 17 causes the tongue portion 21 to depress the resilient flap portion 33 of the bottom panel 15, which in turn permits the lateral ears 21*a* to enter and pass through the plane of the bottom panel adjacent and between the coextensive inboard portions 34 of the longitudinal cut lines 31. In this connection it is important to note that the inboard portions 34 of the coextensive cut lines 31 must be long enough (at least about 10 times the thickness of the paperboard from which the carton is made) to permit ready deflection of the resilient flap 33 by the tongue portion 21. Thus, the latching tongue portion 21, and in particular the laterally extending ears 21*a* thereof, readily enter and extend through the coextensive opening in the bottom panel 15 of the carton.

As the hinged fold section 17 swings further toward its final position with respect to the bottom panel 15, the bottom edge of the tongue portion 21 slides off the outboard edge of the resilient flap portion 33 allowing the flap to spring back toward its initial position in the plane of the bottom panel. When it reaches its aforesaid final position, the outermost surface of the latching tongue portion 21 comes to rest against the outboard edge of the coextensive opening in the bottom panel 15 which effectively prevents further outward movement of the hinged section 17. Similarly, inward arcuate movement of the hinged fold section 17 is checked by the edge of the resilient flap 33 that bears against the innermost surface of the tongue portion 21.

When the hinged fold section 17 is in its aforesaid final position, the latching tongue portion 21 is positioned between the convergent outboard portions 35 of the coextensive cut lines 31. The main body portion of the hinged section 17, of course, is disposed above the plane of the bottom panel 15, and the laterally extending ears 21*a* of the tongue portion 21 are disposed below the plane of the bottom panel opposite thereto. The convergent portions 35 of the cut lines 31, being spaced appreciably closer together than the extreme span of the lateral ears 21*a*, effectively prevent withdrawal of the latching tongue portions 21 vertically from the coextensive openings in the bottom panel 15. Thus as outward, inward and vertical movement of the hinged fold section 17 with respect to the bottom panel 15 is effectively prevented, the dislodgment of the latching tongue portion 21 from its final position in the coextensive tongue-receiving opening in the bottom panel is also effectively prevented.

As hereinbefore noted, the foregoing description of my invention is pertinent to all of the modifications thereof shown in the drawings. In the specific modification shown in Figs. 1 and 2, the laterally disposed cut line 32 connects the outboard extremities of the two longitudinally disposed cut lines 31. Thus, when the hinged section 17 approaches its final position approximately normal to the bottom panel, and the bottom edge of the tongue portion 21 slides off the outboard edge of the resilient flap 33, the flap 33 springs back toward its initial position in the plane of the bottom panel. However, due to the presence of the tongue portion 21 in the opening in the bottom panel, the outboard edge of the flap 33 binds against the innermost surface of the tongue portion before it can return all the way to its aforesaid initial position. The tongue portion 21 is therefore wedged firmly against the outboard edge of the coextensive opening in the bottom panel by the action of the resilient flap 33 thereagainst. As a result, the tongue portion 21 is locked firmly in the narrowest por-

tion of said coextensive opening so that it is practically impossible to dislodge the tongue portion therefrom without destroying the carton.

In the modification of my invention shown in Figs. 3 and 4, the laterally disposed cut line **32** connects the two longitudinally disposed cut lines **31** at a point approximately intermediate the inboard and outboard extremities of said longitudinal cut lines **31**. A weakened fold line **36** connects the outboard extremities of the longitudinal cut lines **31**. The fold line **36**, the convergent outboard portions **35** of the longitudinal cut lines **31** and the lateral cut line **32** together define a fold section **37** that folds downwardly about the fold line **36** to form an opening in the bottom panel in which the tongue portion **21** is readily received. When the bottom edge of the tongue portion **21** slides off of the outboard edge of the resilient flap **33** as shown in Fig. 4, the tongue portion strikes the fold section **37** rather sharply causing the fold section to snap downwardly to form the aforesaid opening in the bottom panel. Further outward arcuate travel of the hinged fold section **17** allows the ends of the wing portions **22** to snap into the opening **23** provided for that purpose and thus maintain the tongue portion **21** between the convergent portions **35** of the longitudinally disposed cut lines **31**. As a result, the tongue portion **21** cannot be dislodged or withdrawn from the coextensive opening in the bottom panel in the course of ordinary use and handling of the carton.

In the carton construction shown in Fig. 5, the laterally extending cut line **32** is channel-shaped and is disposed so that it connects the inboard extremities of the two longitudinally disposed cut lines **31**. The channel-shaped configuration of the cut line **32** defines the resilient flap **33** the outboard edge of which is positioned approximately intermediate the inboard and outboard extremities of the longitudinal cut lines **31**, as in the case of the modification of my invention shown in Fig. 3. Moreover, the outboard extremities of the longitudinal cut lines **31** are connected by a weakened fold line **36** as in the preceding case. The fold line **36**, the channel-shaped cut line **32** and the longitudinal cut lines **31** together define a crescent-shaped fold section **38** adapted to be folded upwardly as shown in Fig. 5 to form an opening in the bottom panel in which the tongue portion **21** can be received. The fold section **38** is folded upwardly as shown, either manually or by automatic machinery, before the hinged fold section **17** is swung into its final position. The hinged fold section is then pressed into its aforesaid final position precisely as in the case of the modification of the invention shown in Figs. 3 and 4.

Although my invention has been described with particular reference to the unique five-sided berry box of my devising, it is apparent that it can be applied with equal success to any carton construction in which a latching tongue portion of a hinged first panel enters and extends through a coextensive opening in a second panel, in the manner described herein. In all events, for satisfactory performance the hinged first panel must be free to swing in an arcuate path so that the latching tongue portion thereof will bear against the second panel without impediment. For example, in the carton blank shown in Figs. 1 and 2, the longitudinal fold lines **11** forming the boundary between the top panel and the two side panels **12** and **14** are advantageously modified so that the portion of these fold lines extending across each fold section **17** converge slightly toward each other as they approach the laterally disposed cut line **20**. The slight convergence of these portions of the fold lines **11** provides each fold section **17** with a slight taper so that, when the fold sections are folded downwardly into the erected carton, the side edges of the fold section will not bind against the side panels of the carton or become hung up on the glue panel **16** or the flaps formed by the ventilation openings in the bottom panel **15**.

From the foregoing description of my invention it will be seen that I have devised an important and valuable contribution to the art to which it relates.

I claim:

1. In a foldable carton construction wherein, during erection of the carton, a first panel, hinged about an axis parallel to and spaced from the plane of a second panel, is swung into a final position substantially normal to and in edge-on contact with the second panel, the hinged panel having a projecting tongue portion adapted to extend into and through an opening in the second panel when the two panels are in their final position substantially normal to one another, the improvement which comprises providing the sides of the projecting tongue portion with laterally extending ear portions, and forming said coextensive opening in the second panel from two longitudinally disposed cut lines and a laterally disposed cut line extend between said longitudinally disposed cut lines, said longitudinally disposed cut lines having coextensive substantially parallel inboard portions spaced apart a distance slightly greater than the extreme span of the ears of the latching tongue portion and further having coextensive and convergent outboard portions the outboard extremities of which are spaced apart a distance appreciably less than the extreme span of the ears of the latching tongue portion, the laterally disposed cut line being positioned with respect to the inboard extremities of said longitudinally disposed cut lines so that a portion of the second panel between the longitudinally disposed cut lines is readily deflectable from the plane of the second panel as the hinged panel approaches its final position with respect to the second panel and the latching tongue portion of the hinged panel bears against said deflectable portion of the second panel, thereby permitting the laterally extending ears of said tongue portion to enter and pass through the plane of the second panel adjacent the coextensive inboard portions of the longitudinally disposed cut lines, the ears of the latching tongue portion being disposed on the side of the second panel opposite to the main body portion of the hinged panel when said hinged panel is in its said final position.

2. In a foldable carton construction wherein, during erection of the carton, a first panel, hinged about an axis parallel to and spaced from the plane of a second panel, is swung into a final position substantially normal to and in edge-on contact with the second panel, the hinged panel having a projecting tongue portion adapted to extend into and through a coextensive opening in the second panel when the two panels are in their final position substantially normal to one another, the improvement which comprises providing the sides of the projecting tongue portion with laterally extending ear portions, and forming the coextensive opening in the second panel from two longitudinally disposed cut lines and a laterally disposed cut line connecting said longitudinally disposed cut lines, said longitudinally and laterally disposed cut lines together defining a resilient flap portion disposed in the arcuate path of travel of the latching tongue portion of the hinged panel, said longitudinally disposed cut lines having coextensive substantially parallel inboard portions spaced apart a distance slightly greater than the extreme span of the ears of the latching tongue portion and further having coextensive and convergent outboard portions the outboard extremities of which are spaced apart a distance less than the extreme span of the ears of the latching tongue portion, the central portion of said laterally disposed cut line being spaced an appreciable distance outboard of the inboard extremities of said longitudinally disposed cut lines, whereby the latching tongue portion of the hinged panel forces said resilient flap portion of the second panel out of its normal position in the plane of its panel when the hinged panel approaches its final position with respect to the second panel, and whereby said resilient flap springs back toward its normal position when the latching tongue portion of the hinged panel is in its final position with respect to said second panel.

3. In a foldable carton construction wherein, during erection of the carton, a first panel, hinged about an axis parallel to and spaced from the plane of a second panel, is swung into a final position substantially normal to and in edge-on contact with the second panel, the hinged panel having a projecting tongue portion adapted to extend into and through a coextensive opening in the second panel when the two panels are in their final position normal to one another, the improvement which comprises providing the sides of the projecting tongue portion with laterally extending ear portions, and forming the coextensive opening in the second panel from two longitudinally disposed cut lines and a laterally disposed cut line connecting said longitudinally disposed cut lines, said longitudinally and laterally disposed cut lines together defining a resilient flap portion disposed in the arcuate path of travel of the latching tongue portion of the hinged panel, said longitudinally disposed cut lines having coextensive substantially parallel inboard portions spaced apart a distance slightly greater than the extreme span of the ears of the latching tongue portion and further having coextensive and convergent outboard portions the outboard extremities of which are spaced apart a distance less than the extreme span of the ears of the latching tongue portion, said laterally disposed cut line connecting the two longitudinally disposed cut lines approximately intermediate the outboard and inboard extremities of said longitudinally disposed cut lines, the second panel being further provided with a lateral fold line connecting the outboard extremities of said longitudinally disposed cut lines, said lateral fold line together with said laterally disposed cut line and the outboard extremities of said longitudinally disposed cut lines defining a fold section, whereby the latching tongue portion of the hinged panel forces said resilient flap portion of the second panel out of its normal position in the plane of its panel when the hinged panel approaches its final position with respect to the second panel, and whereby said resilient flap springs back to its normal position in the plane of the second panel when the latching tongue portion of the hinged panel is in its final position with respect to said second panel.

4. In a foldable carton construction wherein, during erection of the carton, a first panel, hinged about an axis parallel to and spaced from the plane of a second panel, is swung into a final position substantially normal to and in edge-on contact with the second panel, the hinged panel having a projecting tongue portion adapted to extend into and through a coextensive opening in the second panel when the two panels are in their final position normal to one another, the improvement which comprises providing the sides of the projecting tongue portion with

laterally extending ear portions, and forming the coextensive opening in the second panel from two longitudinally disposed cut lines and a channel-shaped laterally disposed cut line connecting the inboard extremities of said longitudinally disposed cut lines, said cut lines together defining a resilient flap disposed in the arcuate path of travel of the latching tongue portion of the hinged panel, said longitudinally disposed cut lines having coextensive substantially parallel inboard portions spaced apart a distance slightly greater than the extreme span of the ears of the latching tongue portion and further having coextensive and convergent outboard portions the outboard extremities of which are spaced apart a distance less than the extreme span of the ears of the latching tongue portion, the central portion of the laterally disposed cut line being spaced an appreciable distance outboard of the inboard extremities of said longitudinally disposed cut lines, said cut lines together defining a resileint flap disposed in the arcuate path of travel of the latching tongue portion of the hinged panel, the second panel being further provided with a lateral fold line connecting the outboard extremities of said longitudinally disposed cut lines, said lateral fold line together with said channel-shaped cut line and said longitudinally disposed cut lines defining a crescent-shaped fold section adapted to fold about said lateral fold line, whereby the latching tongue portion of the hinged panel forces said resilient flap portion of the second panel out of its normal position in the plane of its panel when the hinged panel approaches its final position with respect to the second panel, and whereby said resilient flap springs back to its normal position in the plane of its panel when the latching tongue portion is in its final position with respect to said second panel.

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