

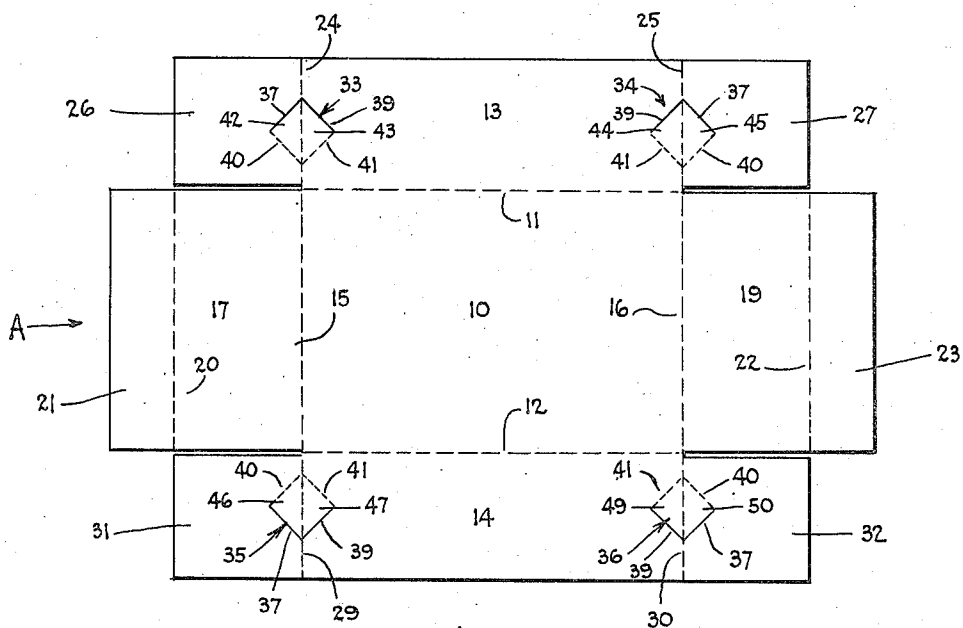
Oct. 10, 1950

A. S. NAPIER
CARTON STRUCTURE

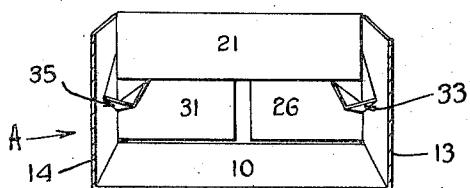
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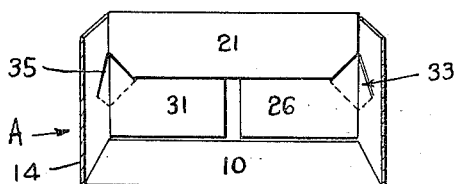
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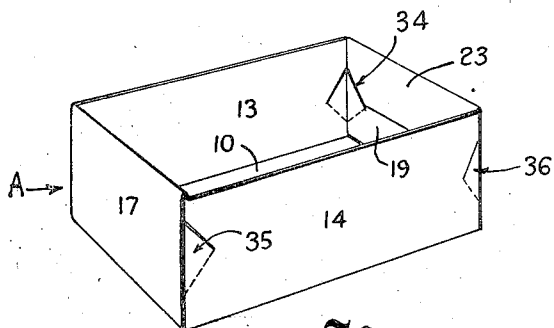
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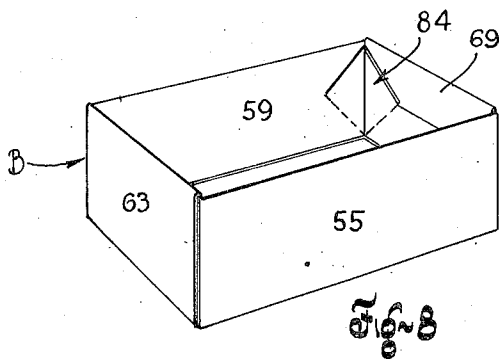
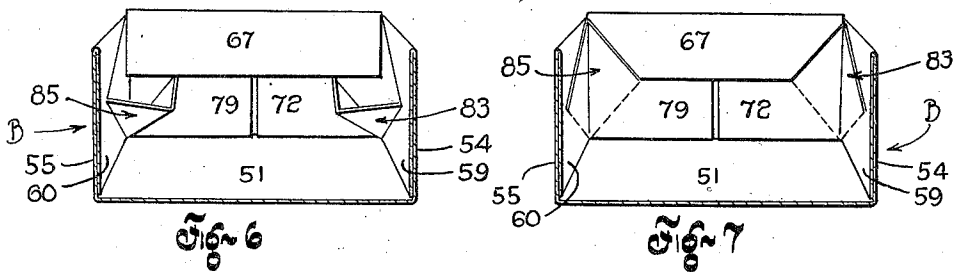
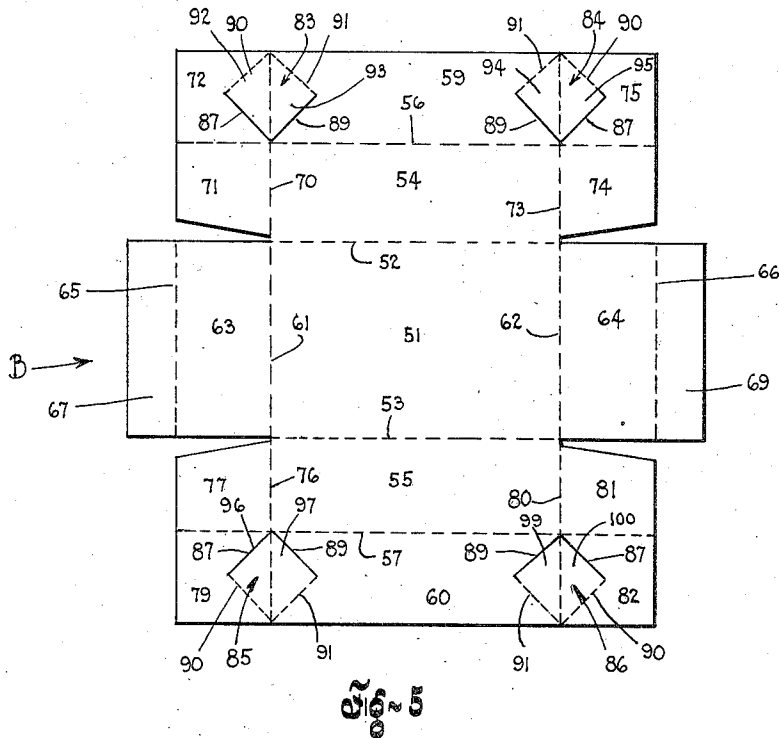
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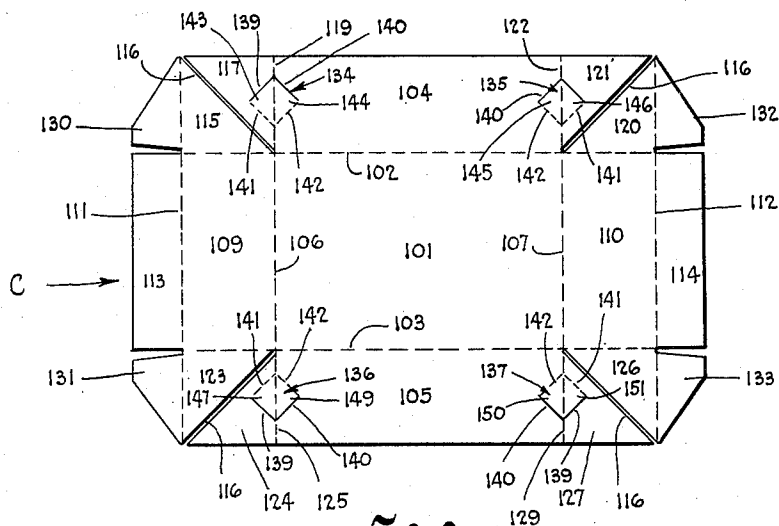


Figure 9

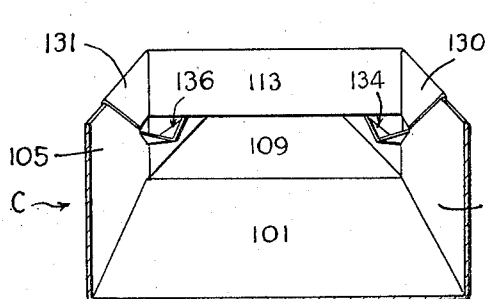


Figure 10

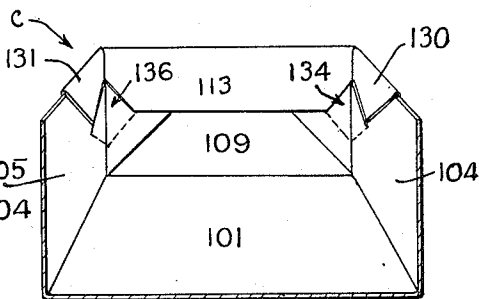


Figure 11

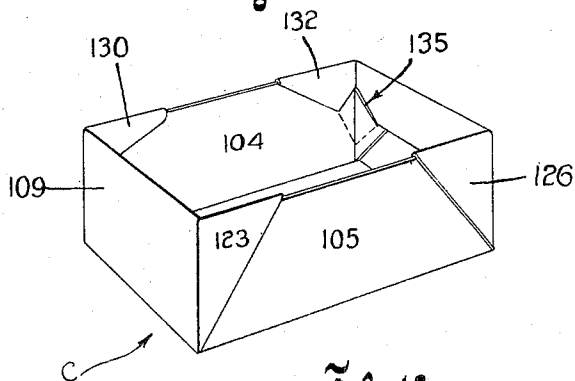


Figure 12

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UNITED STATES PATENT OFFICE

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CARTON STRUCTURE

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Application July 18, 1947, Serial No. 761,850

12 Claims. (Cl. 229—34)

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My invention relates to an improvement in carton and deals more particularly with a type of carton which may be locked in open position.

Many types of cartons have been made which are in the form of a tray having a base and encircling side walls. In many instances the side walls of the tray are locked together in some manner to hold the walls in fixed relation to the base. Many such locking devices are not particularly positive in action, thereby allowing the side walls to unfold if strain is placed against them. It is important to provide an efficient lock which will definitely retain the walls in fixed relation.

It is the object of the present invention to provide a carton having a base and side walls foldably connected thereto and in providing a novel locking means at each corner of the carton by means of which the various side walls may be held in proper fixed relationship. This locking means is designed to effectively engage flaps on certain of the side walls to hold the parts in assembled relation.

A feature of the present invention lies in the provision of a corner lock which is produced by a pair of diverging cut lines extending on either side of a line of fold and which combine with a pair of fold lines diverging from the first named fold line to the ends of the cut lines. This structure provides a rectangular or diamond shaped area having cut lines along two adjoining sides and score or fold lines along the remaining two sides. The score line also extends diagonally across the rectangular or diamond shaped area to provide the lock.

A feature of the present invention lies in providing a lock which is in the form of a pair of connected generally triangular portions which may be bent in unison out of the plane of the panels from which they are formed. When these triangular areas are again folded into substantially the plane of the panels from which they are cut, they may overlie a flap or tongue in such a manner as to hold this flap or tongue in fixed relation to the walls.

A further feature of the present invention lies in the provision of a lock which includes a pair of triangular portions connected along a fold line and cut from the panels on opposite sides of the fold line. One such lock may be provided at each corner of a carton. By folding the triangular portions out of alignment with the remainder of the panels from which they are formed, a relatively large opening is exposed in the walls. A flap or carton portion may be folded to overlie portions of the openings. By fold-

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ing the locking means back toward original position the portion of the carton folded to overlie the openings is sandwiched between the locking means and the remainder of the wall from which the locking means is cut.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a diagrammatic view of a blank from which my carton is formed.

Figure 2 is a sectional perspective view of the blank in partially set up form.

Figure 3 is a view similar to Figure 4 showing the blank completely set up.

Figure 4 is a perspective view of the finished carton.

Figure 5 is a diagrammatic view of a blank showing a modified form of construction.

Figure 6 is a sectional perspective view showing the carton partially set up.

Figure 7 is a view similar to Figure 6 showing the carton completely set up.

Figure 8 is a perspective view of the type of carton shown in Figures 5, 6, and 7.

Figure 9 is a diagrammatic view of a blank from which another modified form of carton construction may be made.

Figure 10 is a sectional perspective view showing the carton partially set up.

Figure 11 is a view similar to Figure 10 showing the carton completely set up.

Figure 12 is a perspective view of the carton of Figures 9, 10, and 11 in completely set up form.

The carton A illustrated in Figures 1 through 4 of the drawings includes a bottom panel 10 which is connected along parallel fold lines 11 and 12 to side wall panels 13 and 14 respectively. The bottom panel 10 is likewise connected along parallel fold lines 15 and 16 to end wall panels 17 and 19 respectively. The end wall 17 is connected along a fold line 20 to a locking flap 21. The end wall panel 19 is connected along a fold line 22 to a locking flap 23.

The side wall 13 is connected at its ends along parallel fold lines 24 and 25 to flaps or tabs 26 and 27. The side wall 14 is likewise connected along parallel fold lines 29 and 30 to end tabs or flaps 31 and 32 respectively. The fold lines 24 and 29 are in substantial alignment with, or a continuation of, the fold line 15. Likewise the fold lines 25 and 30 are substantially aligned with the fold line 16.

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Locking tabs 33 and 34 are provided along the fold lines 24 and 25 respectively. Locking tabs 35 and 36 are provided along the fold lines 29 and 30 respectively. These locking tabs are shown as generally rectangular in shape and each of the locking tabs includes a pair of diverging cut lines 37 and 39 which come together at an apex along the respective fold line. The cut lines 37 and 39 are preferably of equal length and their ends are joined by score lines or lines of fold 40 and 41 which come together at an apex along the fold lines intersecting the locking tabs.

In other words, each locking tab is similarly formed and comprises a pair of rectangular areas of similar size and shape on opposite sides of a fold line. The locking tab 33 thus includes two similar triangular areas 42 and 43 on opposite sides of the fold line 24. The locking tab 34 includes two opposed similar triangular areas 44 and 45 on opposite sides of the fold line 25. The locking tab 35 includes two triangular areas 46 and 47 on opposite sides of the fold line 29. The locking tab 36 includes two similar rectangular areas 49 and 50 on opposite sides of the fold line 30.

The locking tabs are so spaced and proportioned relative to the locking flaps 21 and 23 that the flaps 21 and 23 extend substantially to the junction between the cut line 37 and the score lines 40 in folded position of the carton. The reason for this structure will be more obvious upon an explanation of the manner in which the carton is erected.

In setting up the carton A, the flaps 26, 27, 31 and 32 are bent upwardly along their respective fold lines connecting them to the side walls 13 and 14. Simultaneously with this action the locking tabs 33, 34, 35, and 36 are bent inwardly out of the plane of the remaining portions of the panels so that the locking tabs are bent inwardly in spout like form from the walls to which they are attached. The side walls 13 and 14 are erected relative to the base panel 10 and the end walls 17 and 19 are folded upwardly to lie outwardly of the flaps 26, 27, 31 and 32.

The locking flaps 21 and 23 are then folded over the upper edges of the inwardly bent flaps 26, 27, 31 and 32 to overlie a portion of the inner surface of these flaps. The locking flap 21 lies inwardly of the end flaps 26 and 31 while the locking flap 23 lies inwardly of the flaps 27 and 32. The carton is now in the position illustrated in Figure 2 of the drawings with the locking flaps 21 and 23 partially covering the apertures formed by the inward folding of the various locking tabs.

The next step of the operation is to fold the locking tabs upwardly toward the plane of the panels from which they are formed. The locking flaps 21 and 23 prevent the locking tabs from returning completely to their original form, but these tabs engage inwardly of the locking flaps 21 and 23 to hold these flaps in folded position. The triangular areas 42 and 46 lie inwardly of the locking flap 21 to hold this locking flap from unfolding along the fold line 20. Similarly the triangular areas 45 and 50 of the locking tabs 34 and 36 engage inwardly of the locking flap 23 holding this flap from unfolding along the fold line 22. In completed form the set up carton A appears as illustrated in Figure 4.

In actual practice two trays such as the tray A may be used in telescoping relation or a cover panel may be attached to one of the side walls 13 or 14 to form a top closure for the carton. When once erected into the form illustrated in

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Figure 4 it is extremely difficult to interlock the carton locking means as the locking tabs are extremely resistant to folding when in the position shown in Figure 4.

By folding the locking tabs inwardly during the folding operation of the carton no strain is placed upon these locking tabs to place them in the condition shown in Figure 2. When these tabs are folded from the position shown in Figure 2 to the position shown in Figure 3, the paper bends somewhat until the two triangular areas are in the same plane. After the two triangular portions of each locking means passes co-planar relation the bow of the paper snaps the locking tabs into locked position. It is extremely difficult to interlock the locking tabs without tearing the board of which the carton is made.

In Figures 5 through 8 of the drawings I disclose a modified form of carton construction which is indicated in general by the letter B. The carton B is generally similar to the carton A in form. However, the carton B has the advantage that the cut lines about the locking tabs are not visible from the exterior of the carton. The carton B also has the advantage that the locking tabs may extend the entire height of the walls of the carton, thus allowing the lock to be employed on a carton having narrow side and end walls.

The carton B includes a bottom panel 51 which is connected along parallel fold lines 52 and 53 to outer side wall panels 54 and 55 respectively. The panels 54 and 55 are connected along parallel fold lines 56 and 57 to side wall liner panels 59 and 60 respectively. The bottom panel 51 is likewise connected along two opposed ends by fold lines 61 and 62 to end wall panels 63 and 64 respectively. The end walls 63 and 64 are connected along parallel fold lines 65 and 66 to locking flaps or flanges 67 and 69. A line of fold 70 connects the side wall 54 to the end flap 71 and also connects the side wall panel 59 to the end flap 72. The fold line 56 continues between the flaps 71 and 72 to form a foldable connection therebetween. A line of fold 73 connects the side wall panel 54 to an end flap 74 and likewise connects the side wall panel 59 to the end wall flap 75.

A fold line 76 connects the side wall 55 to an end flap 77 and likewise connects the panel 60 to the end flap 79. A fold line 80 connects the panel 55 to the end flap 81 and likewise connects the panel 60 to the end flap 82. The fold line 57 continues between the flap 77 and the flap 79 and between the flaps 81 and 82 to form a foldable connection therebetween. The fold lines 70 and 76 are substantially aligned with the fold line 61 while the fold lines 73 and 80 form substantial continuations of the fold line 62.

Locking tabs 83, 84, 85 and 86 are provided in the fold lines 70, 73, 76 and 80 respectively. Each locking tab includes a pair of diverging cut lines 87 and 89 which come together at the juncture of the fold line intersecting the locking tab and the fold lines connecting the inner lining panels 59 and 60 to the outer side wall panels 54 and 55. The locking tabs also include diverging score lines of fold lines 90 and 91 which extend from the extremities of the cut lines 87 and 89 to the adjacent ends of the blank at the ends of the fold lines intersecting the locking tabs.

In other words, the locking tab 83 includes two triangular areas 92 and 93 which are oppositely disposed on opposite sides of the fold lines 70 and extend the full height of the inner side wall

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lining panel 59. The locking tab 84 is formed of two rectangular areas 94 and 95 which are equal in size and shape and are on opposite sides of the fold line 73. The locking tab 85 comprises two similar triangular areas 96 and 97 arranged on opposite sides of the fold line 76. The locking tab 86 comprises two similar triangular areas 99 and 100 on opposite sides of the fold line 80. These locking tabs are thus similar to the locking tabs previously described in the carton A, but are different in the fact that the diverging cut lines outlining one-half of each locking tab may extend to the fold lines 56 and 57 respectively, thus making the locking tabs the full height of the side walls rather than a smaller fraction thereof. This is permissible in view of the fact that the side walls and the connected end flaps are connected along fold lines so that the cut lines do not extend to the edge of the blank.

The manner in which the carton B is set up is very similar to the setting up process of the carton A. The side walls are folded so that the panel 59 overlies the panel 54 and the panel 60 overlies the panel 55. The end flaps on the ends of the side walls may then be bent at right angles to the side walls, the locking tabs being simultaneously forced inwardly to form spout like retaining members as illustrated in Figure 6 of the drawings. The side walls may be erected relative to the base panel 51 and the end panels 63 and 64 may be folded upwardly to lie externally of the end flaps. The locking flanges or flaps 67 and 69 may then be folded downwardly to overlie portions of the opening formed in the inner side wall panels and the adjacent end flaps as illustrated in Figure 6 of the drawings. With the locking flanges held in this position the locking tabs may be folded upwardly toward their normal coplanar relation with the panel portions from which they are formed. In this position portions of the locking tabs overlie portions of the locking flaps or flanges as illustrated in Figures 7 and 8, thus holding the carton assembled in the form illustrated in Figure 8.

When in this position the locking tabs 83 and 85 overlie portions of the locking flange 67 to retain this flange in folded form, while the locking tabs 84 and 86 lie inwardly of portions of the locking flange 69 to hold this locking flange in folded form.

A modified form of carton C is illustrated in Figures 9 through 12 of the drawings. This form of construction has some similarity to the previously described constructions in that a similar locking tab means is used to hold the carton erect. The difference lies entirely in the detail construction of the flaps connecting the side and end walls.

The carton C includes a base panel 101 connected along parallel fold lines 102 and 103 to side wall panels 104 and 105. The base panel 101 is likewise connected along parallel fold lines 106 and 107 to end wall panels 109 and 110. The end wall panels 109 and 110 are connected along parallel fold lines 111 and 112 to locking flaps or flanges 113 and 114.

The end wall panel 109 is connected along a continuation of the fold line 102 to a triangular flap 115. The rectangular areas between the side and end walls of the carton are divided into two triangular flaps along a diagonal cut line indicated in all instances by the numeral 116. One triangular flap of each corner section is connected to the adjacent end wall while the other triangular flap of each corner section is con-

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nected to the adjacent side wall. As previously stated the flap 115 is connected to the end wall 109 along a continuation of the fold line 102. A similar triangular flap 117 is connected along a fold line 119 to the side wall 104.

The end wall panel 110 is connected to the triangular end flap 120 along a continuation of the fold line 102. The triangular flap 121 is connected to the side wall 104 along a fold line 122. The flaps 120 and 121 are separated along the cut line 116.

The end wall 109 is connected to the triangular flap 123 along a continuation of the fold line 102. A similar triangular flap 124 is connected to the side wall 105 along a fold line 125. The end wall 110 is connected to the triangular flap 126 along a continuation of the fold line 103. The triangular flap 127 is connected to the side wall 105 along a fold line 129.

The end wall flaps 115 and 123 are connected to locking flanges 130 and 131 along continuations of the fold line 111. The end wall flaps 120 and 126 are connected to the locking flanges 132 and 133 along continuations of the fold line 112. The fold lines 119 and 125 are in substantial alignment with the fold line 106. Similarly the fold lines 122 and 129 are in substantial alignment with the fold line 107.

Locking tabs 134, 135, 136, and 137 are provided in the fold lines between the side wall panels and the end flaps thereon. Each locking tab is formed by a pair of cut lines 139 and 140 which converge at the line of fold and by a pair of converging fold lines 141 and 142 also converging along the same fold lines. Thus the locking tab 134 is formed of two similar triangular areas 143 and 144 which are connected along the fold line 119. The locking tab 135 is formed of two similar areas 145 and 146 connected along the fold line 122. The locking tab 136 is formed of two similar triangular areas 146 and 149 connected along the fold line 125. The locking tab 137 includes two similar triangular areas 150 and 151 connected along the fold line 129.

In erecting the carton C the side walls 104 and 105 are folded upwardly from the base panel 101. The end flaps 117, 121, 124, and 127 are folded inwardly at right angles to the side wall panels and the locking tabs 134, 135, 136 and 137 are simultaneously pressed inwardly to form inwardly projecting spout like members as illustrated in Figure 10 of the drawings. The end walls 109 and 110 are folded upwardly and the end wall flaps thereon are folded to lie externally of portions of the side wall panels. The flaps 115 and 120 lie outwardly of the side wall 104 while the flaps 123 and 126 lie outwardly of the side wall panel 105. The locking flanges 113 and 114 are folded to lie inwardly of the end flaps on the side wall panels. The locking flanges 130, 131, 132 and 133 of the end wall flaps are folded over the upper edges of the side walls 104 and 105 to lie interiorly of portions thereof. All of the locking flanges cooperate in partially covering the openings formed by the inward bending of the locking tabs.

The locking tabs are then folded upwardly into the position shown in Figures 11 and 12 of the drawings, retaining the various locking flanges in place. It will be seen that each locking tab tends to hold two separate locking flanges in locked position. Thus with this carton structure, each locking tab engages two locking flanges in place of one as in the previously described structures.

Various modifications of my locking tab have

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been made. In each instance, however, the locking tab is formed of two generally triangular portions on opposite sides of a fold line, two adjacent sides of the two triangles being defined by cut lines. If desired portions of the triangular flaps may be cut away to simplify the folding operation. For example the apex of the two fold lines forming each locking tab could be cut away so as to prevent bulging of the stock at these converging folds. However, in such an event the operation of my device is similar.

In accordance with the patent statutes, I have described the principles of construction and operation of my carton construction and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A carton lock for connecting a panel to a pair of panels connected along a fold line, the lock comprising a pair of similar generally triangular sections on opposite sides of the fold line, said triangular sections being defined by diverging cut lines meeting at the fold line, and a pair of fold lines extending from the outer ends of cut lines to the first named fold line, said lock being engageable against the first named panel when this first named panel is interposed between at least one of the triangular sections and the panel from which this section is cut.

2. A lock for locking carton panels together, the lock including a locking tab formed in a pair of panels connected along a fold line, the locking tab including a pair of connected diverging cut lines forming an apex at the fold line, and a pair of fold lines extending from the outer extremities of the cut lines and forming an apex at the first named fold line, said locking tab being foldable into or out of the planes of the panels when said panels are folded into angular relationship, said locking tab being engageable with a locking panel engaged between a portion of the locking tab and the panel from which the locking tab portion is formed.

3. A carton corner lock including a pair of panels foldably connected along a fold line and a lock formed in said panels a locking tab formed in said panels, said locking tab including a pair of connected cut lines forming an apex at the fold line and diverging therefrom, and a pair of fold lines extending from the ends of the cut lines and converging toward the first named fold line, said locking tab being foldable into or out of the plane of the two panels when the panels are folded into angular relationship.

4. A carton construction including a base panel, side and end walls extending upwardly from said base panel, end flaps on the ends of said side walls foldable into parallel adjacent relation to said end panels, a corner lock in said side walls and said end flaps, said locks including a pair of diverging cut lines connected at the fold line between said side walls and said end flaps, and a pair of fold lines extending from said cut lines toward said fold lines, and a locking flange on said end walls engageable between portions of said locks and said end flaps.

5. A carton construction including a base panel, a series of side wall panels extending upwardly therefrom, certain of said side wall panels being connected along a vertical fold line to a flap lying in surface contact to an adjacent side wall, a locking tab at the juncture between said

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certain side wall and said flap, said locking tab including a pair of cut lines connected at said fold line and diverging therefrom, and a pair of fold lines extending from the ends of said cut lines to said first named fold line, and a locking flange on the overlapping side wall extending between said locking tab and said flap.

6. A carton including a base panel, rectangularly arranged side wall panels thereupon extending upwardly therefrom, a flap on one of said side walls overlying the next adjacent side wall, a locking tab intersecting the line of fold between said one side panel and said flap, said locking tab including a pair of substantially triangular areas arranged on opposite sides of said fold line and being defined by two cut lines connected at an apex at the line of fold and a pair of converging lines of fold extending from the inner ends of said cut lines toward the line of fold, and a locking flap on the wall overlapped, said locking flap being folded over the first named flap and engaged between the locking tongue and the remainder of the flap.

7. A carton including a base panel, side wall panels foldably secured thereto and extending upwardly therefrom, two opposed side wall panels having flaps thereon folded inwardly of the intermediate panel, locking tabs formed at the juncture between said side walls and said flaps, said locking tabs comprising a pair of connected cut lines connected at said fold line and diverging therefrom, and a pair of converging fold lines extending from said cut lines toward said first named fold line, and a locking flange on the side wall overlapped extending between portions of said locking tabs and the remainder of said flaps.

8. A carton including a base panel, rectangularly arranged side wall panels extending upwardly therefrom, two opposed side wall panels having end flaps thereupon connected thereto along vertical lines of fold, said end flaps being foldable inwardly of the intermediate side wall, a locking flange on said intermediate side wall folded over the upper edges of said flaps and lying inwardly of portions of said flaps, and locking tabs holding said anchoring flap in place, said locking tabs including similar triangular areas on opposite sides of the line of fold connecting the opposed side walls to said end flaps, said similar triangular areas being defined by a common base at the fold line, two diverging connected cut lines, and two converging fold lines from said cut lines to said line of fold, said anchoring flange being positioned between portions of said locking tabs and the remainder of said end flaps.

9. A carton including a base panel, side wall panels extending upwardly therefrom, side wall liner panels foldably connected to the upper edges of said side wall panels and foldable into parallel surface contact therewith, end flaps on said side wall liner panels foldable into angular relation with said side wall panels, end wall panels foldably connected to said base panel and extending upwardly therefrom outwardly of said end flaps, and a locking flange on the edge of said end walls foldable over the end flaps of said side panels to lie inwardly thereof, and locking tabs engaged outwardly of said locking flange to hold said locking flange in folded form, said locking tabs including a pair of diverging cut lines connected at the lines of fold connecting said liner panels to said end flaps, and converging lines of fold connecting the outer ends of said

cut lines to said lines of fold between said liner panels and said end flaps.

10. A carton blank including a bottom panel, side wall panels connected thereto along parallel fold lines, end wall panels connected to said base panel along parallel fold lines, end flaps connected to said side wall panels along parallel fold lines, locking flanges connected to said end wall panels along parallel fold lines, and locking tabs formed at the juncture between said side wall panels and said end flaps, each locking tab including a pair of diverging cut lines connected at the last named fold lines, and lines of fold extending from said cut lines and converging toward said last named fold lines.

11. A carton blank including a base panel, side wall panels foldably connected thereto along parallel fold lines, side wall liner panels foldably connected to said side wall panels along parallel fold lines, end wall panels connected to said base panel along parallel fold lines intersecting said first named fold lines, said intersecting fold lines extending through said side wall panels and side wall liner panels to connect these last named panels with end flaps, locking tabs in said intersecting fold lines between said liner panels and said end flaps connected thereto, said locking tabs including cut lines diverging from said intersecting fold lines and connected at said intersecting fold lines, and converging score lines extending from said cut lines to said intersecting

fold lines, and locking flanges foldably connected to said end wall panels along parallel fold lines.

12. A carton including a base panel, side wall panels foldably connected thereto along intersecting fold lines, end wall panels foldably connected to said base panel along lines of fold intersecting said first named fold lines, said intersecting fold lines and said first named fold lines continuing through said side walls and end walls to connect all of said walls to end flaps, locking tabs at the intersection between said intersecting fold lines between said side walls and the end flaps connected thereto, each locking tab including a pair of diverging cut lines connected at said intersecting fold lines, and converging score lines extending from said cut lines to said intersecting fold lines, and locking flanges foldably connected to said end walls and the end flaps connected thereto along parallel fold lines.

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