Jan. 19, 1965 E. W. SCHROEDER 3,166,235

FLAT-FOLDABLE FOOD BOX

Filed April 3, 1964 2 Sheets-Sheet 1

FIG. 1

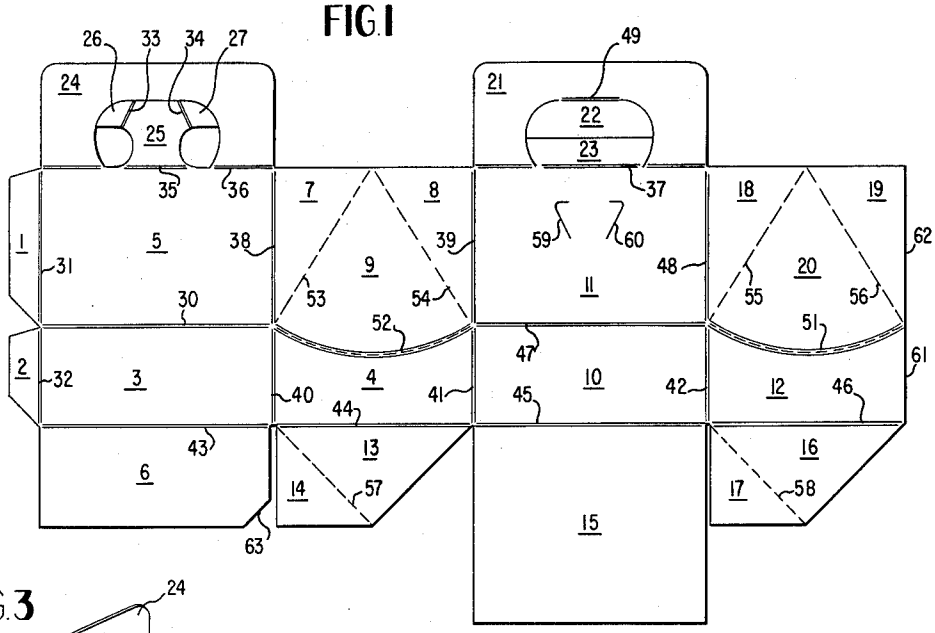
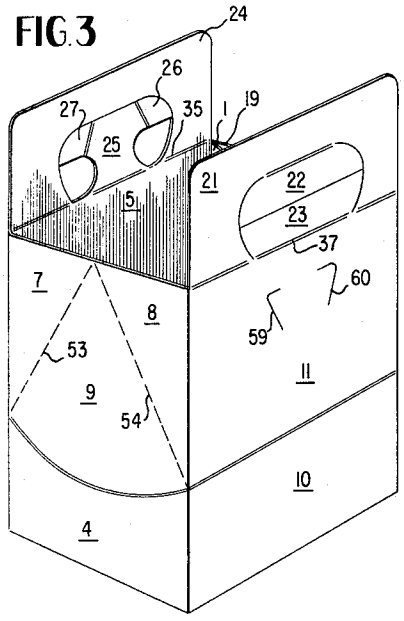


FIG. 3



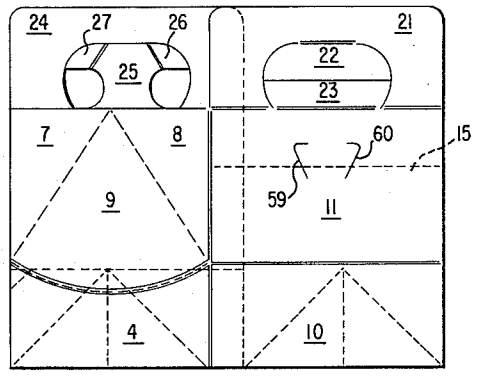


FIG. 2

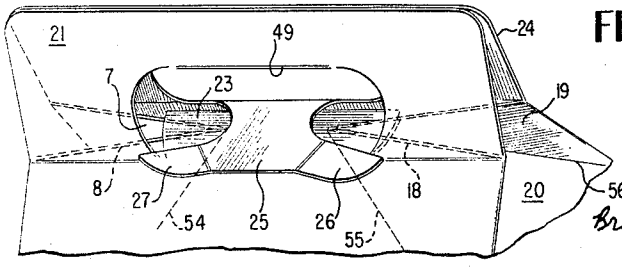


FIG. 4

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FIG. 5

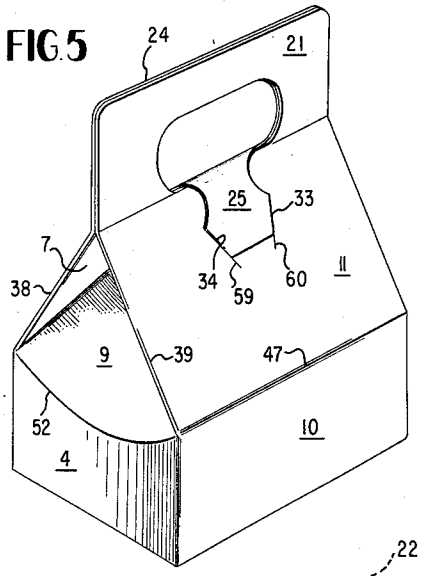
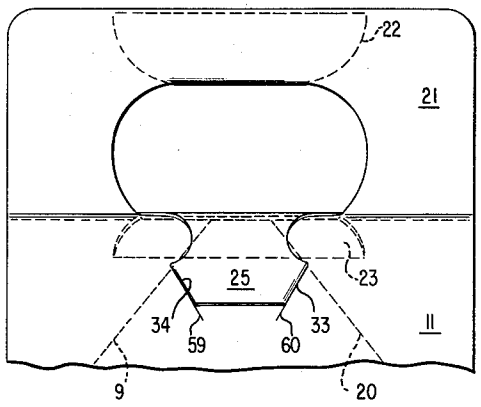


FIG. 6



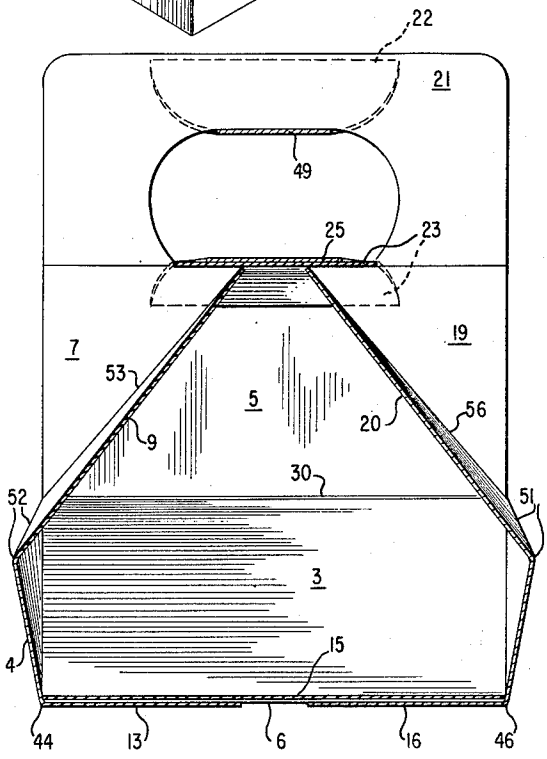
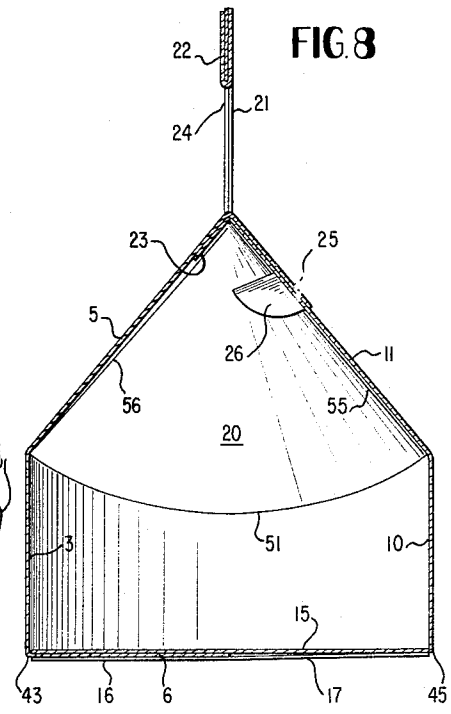


FIG. 7

FIG. 8



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FLAT-FOLDABLE FOOD BOX

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Filed Apr. 3, 1964, Ser. No. 357,213
4 Claims. (Cl. 229—52)

This invention relates to flat-folded boxes and more particularly to food containers which are erectable into a relatively vaporproof, heat-retaining form for packaging take-out foods at a counter.

A number of prior packages are known in which the box is formed of precut sections stamped from a single sheet of cardboard, or the like, with formed fold lines so that the packages may be readily erected prior to use. It is also known to supply flat folded boxes which unfold to form side walls, a bottom, a top and a handle. Prior boxes of this type have been found deficient in requiring too much time for erecting the box. A further deficiency is that the bottom and cover sections are not sufficiently tight to maintain heat therein. One prior art form has a fixed bottom and up-folding sides and is tight at the bottom but does not lend itself to quick assembly as required for hot counter-packed foods. Another prior art box of flat-folded form which is easily erected uses a down-folding multipiece bottom, but this form of box has been unsatisfactory for heat retention and for the carrying of larger quantities of food having substantial weight. A further difficulty in top closures of prior packages has been that slots remain open at the top of the container so that vapors are permitted to escape, thereby to cool the contents too rapidly for hot take-out food use, and with objectionable food aromas during transportation from the sales area.

It is accordingly an object of this invention to provide a quick-erecting tight paper box.

Another object is to provide a flat-foldable box having a bottom section of improved strength and heat-sealing characteristic.

A further object of the invention is to provide a food package closure which is rigid and tight after its erection from a flat-folded condition.

Another object is to provide an economical construction for a quick-erecting package having a reinforced handle and a tight reinforced gable roof cut from a single piece of box material.

A still further object of the invention is to provide an instantly assembled paper box of pleasing proportions for the attractive display of appropriate advertising printing thereon.

These and other objects of the invention will become more apparent as the description proceeds in connection with the accompanying drawings in which:

FIG. 1 illustrates a cut blank cardboard piece from which the box is formed;

FIG. 2 illustrates the blank of FIG. 1 joined and flat-folded in storable condition;

FIG. 3 is a perspective view of the blank of FIG. 1 formed into an open box;

FIG. 4 illustrates the box of FIG. 3 partially closed at the top;

FIG. 5 illustrates the completely closed gable roof construction of the box in perspective;

FIG. 6 illustrates the interlocking features of the closure of FIGS. 4 and 5;

FIG. 7 is a longitudinal sectional view of the closed box showing the tight closure features; and

FIG. 8 is a transverse sectional view through the center of the box showing bottom and roof reinforcement and locking features.

These objects are achieved by first forming a box blank from a sheet of flat stock of thin cardboard or the like

as in FIG. 1. Fold lines are formed therein, preferably by pressure creasing, and by partial perforation along certain lines. The outer edges are cut according to a predetermined plan so that the blank may be preassembled in an open box condition and two opposite edges joined, thus to form four sides of the box. Bottom flap or panel portions are shown at the bottom of FIG. 1 extending below the straight line across the lower edges of side panel portions. Top closure panels are formed adjacent the side panels to be assembled as a gabled roof closed at both ends. Two handle portions are hinged at the outer edges of the top panels, as will be decsribed in detail. A box according to this invention is made generally in the manner of previously known foldable boxes except that improvements in the bottom structure, in ease of erection and assembly, in a better fitting closure for the gabled roof, locking means, and other features have been added to meet the objects of this invention.

In order to facilitate description, the box parts will be described beginning at the left of FIG. 1. Strip portions 1 and 2 are integral extensions, respectively, of a side panel 3 and a roof panel 5 which in turn connect along fold lines to one end panel 4 and a foldable gable end closure comprising three foldable panels 7, 8 and 9. These portions connect along further fold lines to the second side panel 10 and to a roof portion 11, which also connect along fold lines to the second end panel 12 and the foldable gable end closure portions 18, 19 and 20. Two handle portions 24, 21 connect at the upper edges of the gable roof portions 5, 11 and four bottom flaps 6, 13–14, 15, 16–17 connect at the lower edges of the side and end panels. Side panel 3 is a rectangle formed adjacently to end panel 4, rectangular roof panel 5, and rectangular bottom panel 6. End panel 4 is rectangular except at its arcuate upper edge which meets gable end portions 7, 8 and 9, and has along the edge opposite panel 3 a second side panel 10, being generally identical to panel 3. At the upper edge of panel 10 is a second rectangular roof panel 11 and at a side edge thereof end panel 12 identical with end panel 4. Fold lines 30–48 are preferably pressure-creased lines hingedly connecting adjacent panels for folding.

At the lower edge of panel 4 is a second bottom panel comprising portions 13 and 14. Panels 13–14 and 6 have a width approximating one-half the widths of the finished box. Panel 15 is hinged along the lower edge of panel 10 and has a width approximately equal to the full width of the finished box. At the lower edge of panel 12 is a panel comprising portions 16 and 17 which are identical to portions 13 and 14. A cutaway portion of narrow and preferably parallel dimensions separates panels 6 and 14 and a similar cutaway portion separates panels 15 and 17 which facilitate folding and unfolding. Panels 6, 13, 15 and 16 are creased along the lines 43, 44, 45, and 46, respectively, to fold at right angles to panels 3, 4, 10, and 12. Panels 13 and 16 are of isosceles triangular shape folding along the base thereof and are joined to portions 14 and 17 which are of triangular shape being foldably attached to panels 13 and 16 along the hypotenuse of the right triangles extending from crease lines 44 and 46 to the centers of panels 13 and 16 so that a 45° angle fold is made between panels 13 and 14 and between panels 16 and 17, for reasons which will later appear. Panels 18, 19 and 20 are similar to panels 7, 8 and 9 and form the closure for the opposite end of the gable.

Handle portion 21 hingedly attaches to the upper edge of panel 11 at 37 and has partially cutout portions 22 and 23 to permit formation of a hand hole therein. A similar portion 24 hingedly attaches to gable portion 5 and has a tongue portion 25 precut therefrom along lines corresponding to the cut lines between panels 22, 23 and

the portion 21, remaining hinged along line 35. To provide for locking the closure portions of the cutout region of handle flap 24 are removed to leave outstanding ear portions 26 and 27 connected to tongue 25 along creased lines 33 and 34. Handle portion 24 is generally creased for folding with respect to panel 5 at line 36. Portion 23 cut from handle portion 21 is also hinged at 37 to panel 11 as is the remainder of the handle portion 21.

Fold lines 38 and 39 permit bending the end portion of the gable with respect to gable roof portions 5 and 11. End panel 4 is foldable at right angles to side panels 3 and 10 along lines 40 and 41, whereas side panel 10 is foldable at right angles to end panel 12 along line 42 and each of the end and side panels has a crease line with respect to the attached bottom panel portion as along lines 43, 44, 45 and 46. Panel 11 folds with respect to panel 10 along line 47 and with respect to end closure panel 18 along line 48. A similar crease line shown in 49 permits folding cutaway tab 22 with respect to handle portion 21 along the upper line thereof oppositely to the folding of tab 23 with respect to panel 11. Each of the fold lines thus far described is preferably formed by a rolling operation or by a pressing operation in which the creasing tool is not sharp so that the material is creased and not cut.

For some purposes, it is desirable to provide an increased tendency to fold, that is, an easier folding than for other hinge lines, in order that the box may be readily assembled in a few seconds by merely pressing out portions thereof from the flat-folded position. Two arcuate or otherwise curved fold lines are desirable at the ends of the box to provide a spring pressure beneath the roof peak line. These are formed along lines 51 and 52 and give to panels 9 and 20 a so-called "pie shape." A fold along a curved line is ordinarily difficult to effect. It is accordingly desirable to more heavily crease lines 51 and 52 either by partially perforating the material along this line as by alternately slitting the stock at intervals constituting about half of the arcuate length, or by more deeply impressing the creasing tool so as to partially cut through the entire length of the foldable arc.

Other lines at 53, 54, 55, 56, 57 and 58 also require considerably easier bendability than lines 30–48 in order that the box may be readily erected from the storage condition of FIG. 2 without the use of both hands. These lines are accordingly shown as cut-through lines where approximately half of the material is severed throughout the length of these lines, as by a suitable rolling or stamping operation, well known in the art. Additional cuts remove material for clearance purposes between panels 6 and 14, 15 and 17, 24 and 25. Ears 26 and 27, and tabs 22 and 23 are partially cut through, as shown in solid lines, permitting folding relative to the handle portions 21 and 24. Lines 53 to 58 are preferably of easier foldability since these are lines along which a flat stored box according to FIG. 2 would offer most resistance to erecting according to mechanical advantage considerations. A flat folding box construction is readily utilized by the packer of a food product at a counter, where it is frequently necessary for the operator to open or erect the box with one hand while handling a food distributing implement with the other hand. During the erecting operation all bottom folds are partially unfolded and only crease lines 31, 32, 39 and 41 are first folded at this time.

When the top is to be closed the gable ends are more easily formed if lines 53, 54, 55 and 56 are also made very easily foldable so that a light pressure on panels 9 and 20 will be sufficient to assure formation of the reinforcing end portions of the gable roof. Furthermore, it is desired that these lines be formed strictly according to structural straight lines at sharp bends of more than a right angle. Additionally, it may be appreciated that gable portions 7, 8 and 18, 19 underlie gable portions 5 and 11 in the erected position and that the resistance to

folding along lines 53, 54, 55 and 56 would tend to cause the gable roof to remain open at the ends of the ridge unless provided with decreased resistance to folding. It is also evident that these fold lines are not subject to much strain after the package has been completed so that a partial cutting therealong facilitates foldability without objectionably decreasing the strength of the package. Lines 31, 38, 39 and 48, on the other hand, are exterior structural lines which considerably affect the appearance and strength of the finished box, and these are left uncut as in the case of most other fold lines of the box, but that increased foldability of the gable ends is, nevertheless, effected by the partially perforated lines to be folded at the same time.

Lines 51 and 52 present a different problem requiring controlled resistance to foldability because of the greater difficulty experienced in forming an arcuate fold. A considerable strength is required, and a tendency to return to the unfolded position is desirable in order to keep the upper ends of panels 9 and 20 firmly pressed against the peak of the gable roof. This provides an important feature in retention of vapors in the package since a tight closure is thereby assured. A spring action arises in that end walls 4 and 12 are bowed outward by action of the bending along lines 51 and 52, as best seen in FIGS. 7 and 8, with the result that tension is maintained at all times forcing the peak of panels 9 and 20 into firm engagement with the gable roof peak after the package is closed.

Assembly of the blank into a prefolded or flat-folded package for storage as in FIG. 2 is accomplished by cementing tabs 1 and 2 and panels 14 and 17 to corresponding parts of the desired box. It will be noted that glue may be applied to the inner surfaces of bottom flap portions 14 and 17 which are then glued to the outer surfaces of bottom panels 6 and 15 when lines 40 and 42 are folded to form a right angle corner. Glue tabs 1 and 2 have glue or cement applied to the exterior surfaces for engagement of the interior surfaces of panel portions 12 and 19. These four glued portions are sufficient to determine the shape of the finished package. Panel 15 is then folded upwardly and inwardly along line 45 into contact with panel 10 thereby forming a bend of 180° along line 45 and along line 58. Similarly, panel 6 is folded inwardly to contact with panel 3 along line 43 at the same time folding panel 14 upwardly against panel 13 as panel 13 is folded inwardly against panel 4, panel 3 and panel 4 being folded together also along a 180° bend. Gable panel 7 likewise folds against panel 5 and gable panel 18 against panel 11. Since tabs 1 and 2 are glued to surfaces of panels 19 and 12, exterior lines 61 and 62 lie along fold lines 32 and 31. Each of lines 43, 44, 45, 46, 57 and 58 of the bottom structure accommodates a fold at 180° and the bottom panels lie within panels 3, 4, 10 and 12. The 180° bends made along unperforated lines of the blank are folds made during manufacture of the flat-foldable box and can be done by automatic machinery. Each of the other fold lines of the package is left unfolded or flat as the box is ready for shipment.

When the box is to be used, it is removed from a stack and opened as in FIG. 3 merely by squeezing at opposite edges of the flat folded assembly, namely, by pressure along lines 40 and 42 which are the exterior lateral outlines of the flat-folded box. As the panels 4 and 10 are separated from panels 3 and 12, hinge lines 57 and 58 begin to straighten and thereby to draw panels 6 and 15 away from panels 3 and 10. Panel 15 is retained longer in contact with panel 10 by virtue of its own greater dimension along line 42 than in the case of panel 6 unfolding from panel 3. It is preferable to relieve the corner of panel 6 as at 63 in order to assure that the panel 6 unfolds more rapidly than panel 15. By this arrangement, panels 14 and 17, being hingedly connected to panels 13 and 16, as folds along lines 40 and 42 are decreased from 180° to 90° panels 6 and 15 are thereby

drawn down to the horizontal position to form the bottom of the box, panel **15** overlying panels **6, 13, 14, 16** and **17**, as seen in FIGS. 7 and 8.

Since panel **15** is of nearly the full size of the completed box, it serves both as a reinforcing structure for a substantial weight of food in the box and as a vapor seal overlying all joints between the other panels of the bottom member and being pressed at its edges against panels **6, 13** and **16** to effect a vapor seal. The importance of this feature will be recognized in connection with the need to prevent "breathing" of the box due to carrying stresses since the escape of vapors would quickly cool a hot food product transported from the sales area to a distant location, such as the home of the purchaser.

When the bottom has been formed as described, the box remains in a rectangular form having upright sides and top portions as in FIG. 3. The box is then ready for filling with items such as fried shrimp, chicken, French fried potatoes, or the like. When the desired portions have been placed in the box it is then closed by a simple inward movement of the gable portions to become a completed vapor tight package. Inward pressure at panels **9** and **20** causes reverse bends along lines **53, 54, 55** and **56** and a corresponding folding along lines **31, 38, 39** and **48**, at the same time effecting the arcuate bowing along lines **51** and **52**. Panels **5** and **11** are thereby brought into close proximity along lines **35** and **37**. As panels **5** and **11** approach contact, tab **23** is depressed along fold line **37** sufficiently to pass beneath panel **5** before contact is made between the upper edges of panels **5** and **11**, and tongue **25** is passed through the opening occupied by tabs **22** and **23** and brought into contact with the outer surface of panel **11** after the roof section has been completely closed. This is shown in FIG. 4.

Cut slots **59** and **60** are spaced in panel **11** so that ears **26** and **27**, when folded at right angles to tongue **25** along lines **33** and **34**, may be passed through cut slits **59** and **60**. Upon completion of the insertion of ears **26** and **27**, slits **59** and **60** reclose to form an essentially vapor tight closure, at the same time holding ears **26** and **27** in position as illustrated in FIG. 6. Locking tab **22** is foldable along the line **29** and it is convenient to lock handles **21** and **24** together prior to insertion of tab **23** beneath panel **5**. This may be readily accomplished in the construction inasmuch as handle portions **21** and **24** contact each other before the roof line is closed and are highly resilient so that tab **23** may be turned through the opening in handle **24** by forcing tongue **25** from its flat position in handle portion **24**. Tab **22** is then turned up to lock together the upper portions of handles **21** and **24**, leaving sufficient room so that tab **23** may be inserted beneath the upper edge of panel **25** in a position to lie between the gable roof which is panel **5** and the end gable roof members **7** and **19**, thereby to lock tab **23** into firm engagement beneath panel **5** as in FIGS. 6 and 8.

Tab **23** is of length more than sufficient to cover the space between folded panels **7, 5** and **19, 5**, so that no opening remains at the top of the container as is best illustrated in FIG. 7. When tongue **25** is folded into position and held by ears **26** and **27** a tight and rigid roof peak is formed to seal the top of the package and prevent the escape of vapors. This provides a structure which is both pleasant in appearance and strong in structure. The strength has particular importance in this application since the carrying of flexible walled folded packages containing substantial weight normally causes varying degrees of flexure especially of top wall portions and a consequent "panting" or "breathing" of the box as a whole to permit excessive evaporation cooling. By the rigid structure here provided, this breathing is prevented and the vapors are retained in the box during transportation to avoid excessive cooling. A further importance of this feature lies in the prevention of objectionable escape to the outside air of the food aromas, and this

causes better acceptance by the public of hot take-out food products, and the tight packaging according to this invention provides a particular utility for hot food products.

While the invention has been described in connection with a particular embodiment, it will be understood that it may be otherwise practiced without departing from the scope of the invention as set forth in the following claims.

What is claimed is:

1. In a flat-foldable box including vertical walls hinged together at vertical corners and closed at the bottom by lower wall extension portions hinged, respectively, to said walls being unfoldable to form overlapping bottom panels, and having a gabled upper closure, in combination

a pair of hinged upper wall extensions on opposed sides, respectively, being dimensioned to fold inwardly to form lateral gable roof surfaces,

a pair of end closure members hingedly connected as upper wall extensions of opposed ends, respectively, along arcuate lines convex downwardly and being creased from the ends of said lines upwardly toward a central point to form fold lines whereby said end extensions form each a "pie-shaped" closure member sloped from the end walls inwardly toward the center of said gable,

said side walls extensions further having upper extensions foldable to form a composite handle and including locking means for holding said upper extensions joined at said handle,

one said side wall extension having a further extension hingedly foldable beneath the other said wall extension and immediately above points of said "pie-shaped" closure members to form a reinforced gable closure,

the other said side wall extension having a further hinged locking member foldable over said further extension thereby to overlap a portion of the side wall extension opposite thereto for locking said lateral surfaces in mutual engagement above said further extension, means hinging said end members along arcuate lines comprising tensioned spring means when in the closed position to thrust said "pie-shaped" member upward against said reinforced gable closure.

2. A paperboard box blank cut from flat stock being divided and creased for assembly, comprising

four laterally adjacent portions of two lengths alternately positioned to form a pair of like end walls and a pair of like side walls,

an adhesive tab extending beyond an outer edge of one of said walls for adhering to a second of said walls,

parallel creased fold lines dividing said walls and said tab from each other,

first and second bottom flaps connected at crease lines to said end walls, respectively, each being of width less than half the length of said end walls,

a third bottom flap connected at a crease line along the lower edge of a first side wall and having a width comparable to said first and second flaps,

a fourth bottom flap connected at a crease line along the lower edge of a second side wall and having a width substantially equal to the length of said end walls,

adhesive means securing a portion of said first flap to said third flap and of said second flap to said fourth flap adjacent opposite corners thereof when said blank is in an assembled and erected position,

means including crease lines in said first and second flaps extending from said corners between adhered and unadhered portions of said first and third flaps, to cause said bottom flaps, except at said adhered portions of the first and third flaps, to fold inwardly against said wall portions thereby to effect flat storage of said blank after adhering said tab and flap portions, and

closure means including a gabled roof comprising side

wall upper extensions and end wall upper extensions hinged along crease lines to meet at a peak line,

said end wall extensions being hingedly secured to adjacent side wall extensions, and having crease lines extending diagonally from the ends of the junctions therewith, respectively, substantially to upper midpoints thereof, whereby said end wall extensions may be folded inwardly to underlie said peak in the closed position, said wall extensions each being of height not substantially less than two-thirds the length of the end walls to provide rigid support along said diagonally extending lines for said side wall extensions at said peak.

3. A rigidly tight closure for a flat-foldable paperboard box having bottom, side and end wall members creased and secured for erecting into an open-topped box, comprising

an upward extension of each side member hingedly connected thereto and each extending more than half the box width to meet at an acute angle forming a roof peak over the box,

a hingedly connected upward extension of each end wall member being foldably connected to each said side member and upwardly coextensive therewith,

scoring lines from the lower portion of each said end member extension at points adjoining corresponding side members and extending toward a central point substantially at the upper extremity of the end member to form a pair of converging fold lines,

said end members being inwardly foldable at the junctions of said side members and at said intersecting fold lines to form end gable portions underlying said peak, the upper extremities of each end member lying adjacently beneath said peak in supporting relation thereto,

at least one upper extension of a said side extension foldably connected thereto being insertable above a said upper extremity and beneath the opposite said side member extension, and

an upper extension of the other said side extension being securably folded over said side member extension opposite thereto for sealing said box.

4. A vapor-retaining closure for a prepared food box having vertical side and end walls joined in a rectangular cylinder before closing, comprising

a folding crease extending peripherally around said box at an elevation defining vertical wall upper limits thereof when closed, with wall extensions thereabove,

a vertical folding crease at each corner of said box extending upwardly from said peripheral crease,

a diagonal crease extending from each peripheral and vertical crease junction upwardly and inwardly substantially to the midpoint of the upper extremity of the respective end walls, being formed to cause folding of the end walls therealong to provide inwardly sloped A-shaped end portions with complementary portions of the end walls folded underneath and in contact with side wall portions as the side walls are joined at a peak line,

a foldably attached tongue portion at the upper extremity of one side wall extension to close the peak line above said complementary portions of said end walls and beneath one said side wall,

closure locking means including a tab portion attached to the other said side wall and foldable over first said side wall extension, and

handle means attached to said side walls and joinable upon closure thereof at said peak line.

References Cited by the Examiner

UNITED STATES PATENTS

2,903,180	9/59	Holmes	229—52
2,959,337	11/60	Crane	229—52
3,096,012	7/63	Bryant et al.	229—52

FOREIGN PATENTS

1,031,438	6/53	France.
1,154,223	4/58	France.

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