Feb. 25, 1964 G. E. SEGER, JR 3,122,298

CONTAINER CONSTRUCTION

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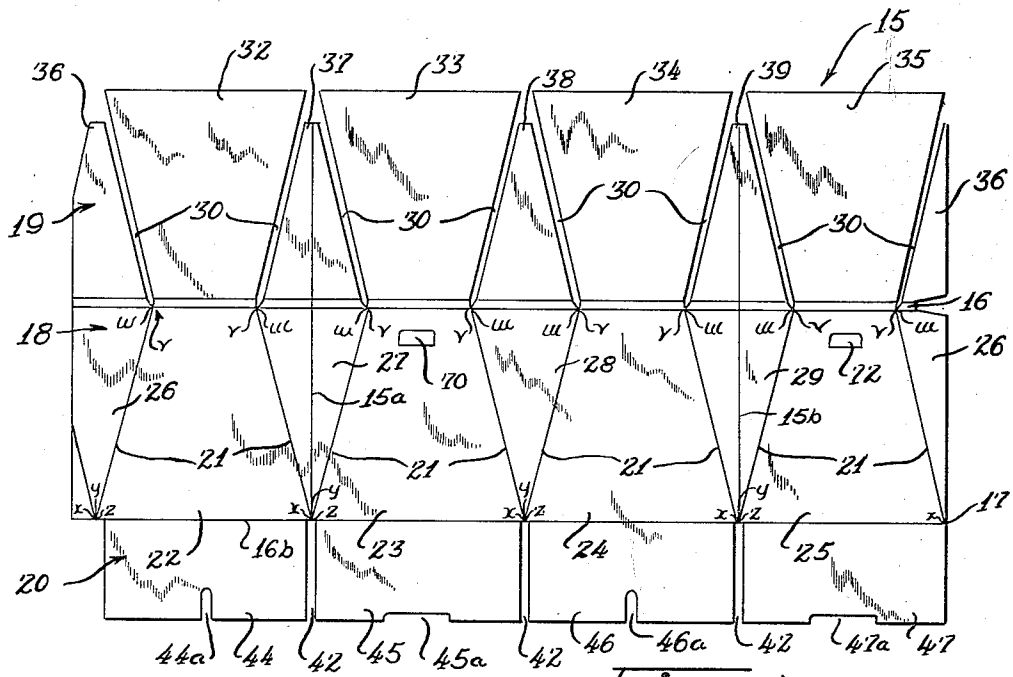


Fig 1

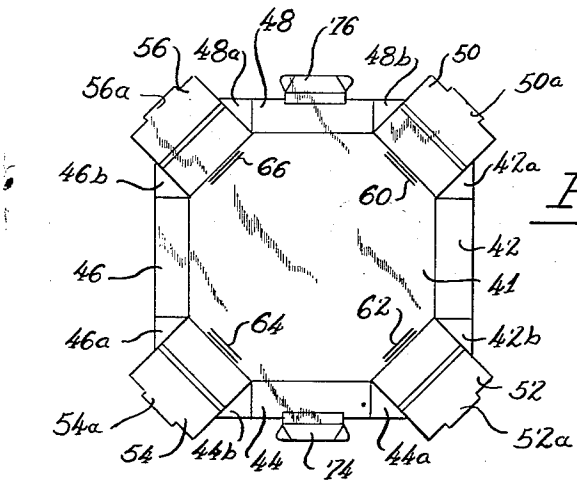


Fig 2

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Fig 3

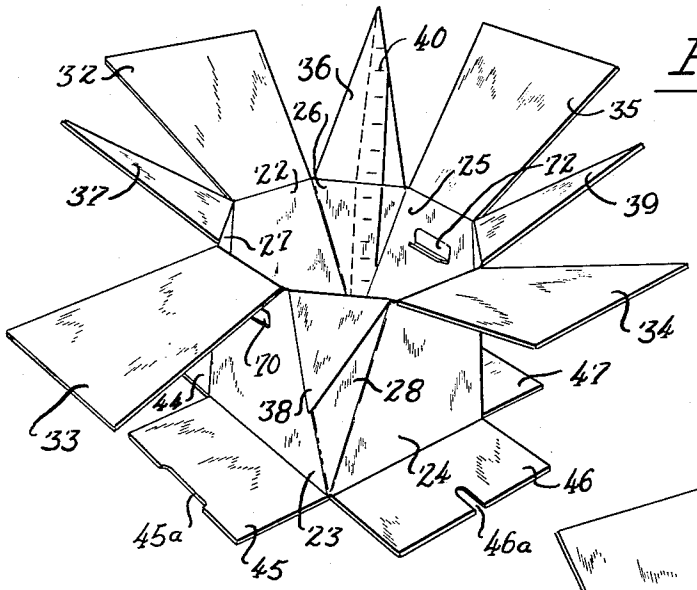
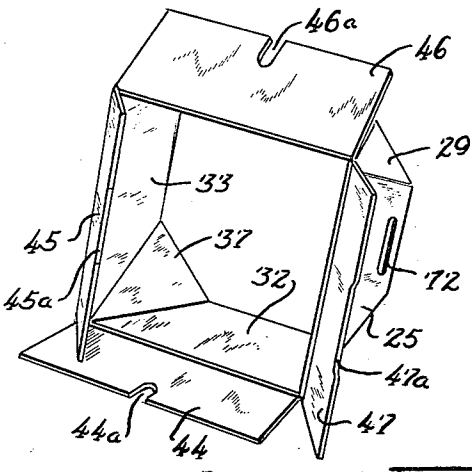


Fig 4



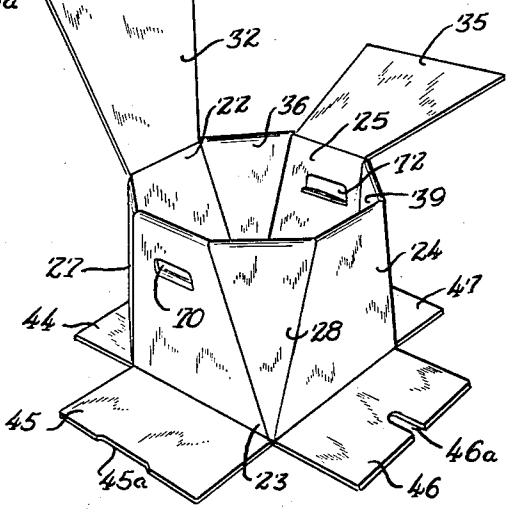


Fig 5

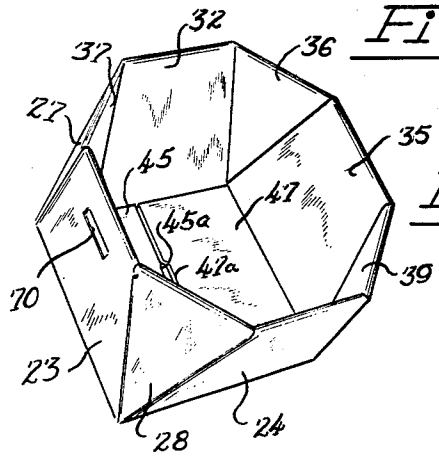


Fig 6

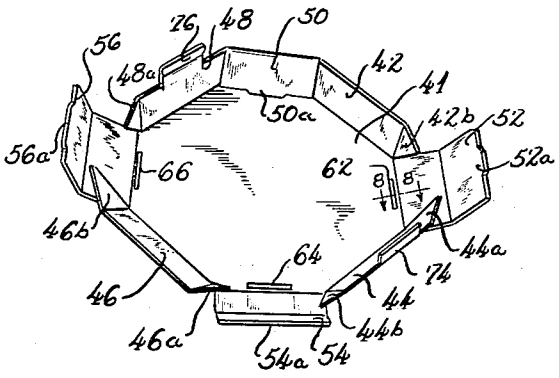
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CONTAINER CONSTRUCTION

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Fig 7



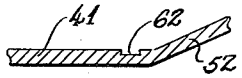
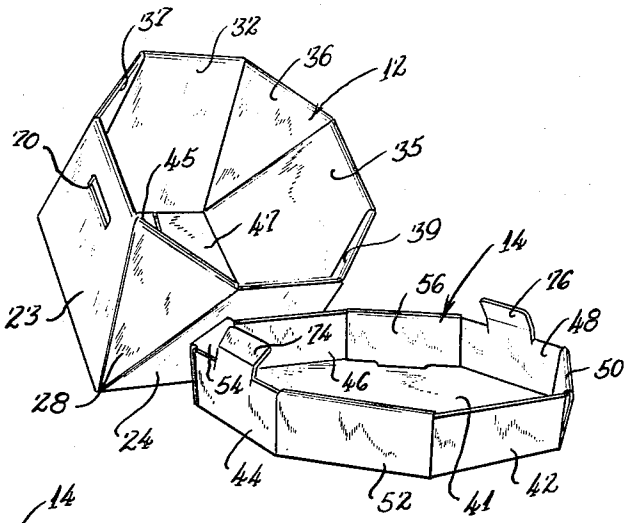


Fig 8

Fig 9



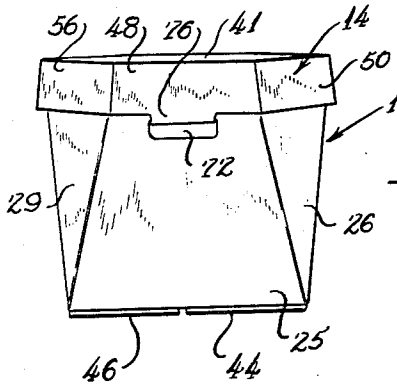


Fig 10

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CONTAINER CONSTRUCTION

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4 Claims. (Cl. 229—16)

This invention relates to a container construction and more particularly to a container construction adapted for use in the packing of produce.

In the harvesting and packing of produce such as peaches, for example, the produce is first gathered in the grove and then taken to the packing plant where grading occurs. After grading, the produce is packed into a shipping container as, for example, a conventional wooden bushel basket, and the filled basket is then subjected to a cooling step customarily referred to as "hydro-cooling." The purpose of hydro-cooling is to reduce the latent and field heat of the packed produce, thus eliminating the possibility of spoilage due to this cause. This cooling step may be accomplished, for example, by subjecting the packaged produce to a spray of cool water or by causing cooled air to pass thereover.

When the produce is packed in conventional wooden bushel baskets, it is necessary to first load a metal form in the shape of an inverted basket and then to transfer the produce from this form into the basket.

One form of a prior art carton construction especially adapted for the packing and shipping of produce is disclosed in United States Patent No. 2,950,850. This prior art carton, which consists of two nested units, is constructed in such a manner that after the produce has been packed therein, it may be subjected to "hydro-cooling." Ways have been sought to improve and further simplify the manufacture of the carton or container as well as to further facilitate the packing thereof.

It is one object of this invention, therefore, to provide an improved container construction which will materially simplify the packing of produce.

It is a further object of this invention to provide an improved container which may be packed with produce without requiring special forms, protective liners, or other special packing devices or procedures heretofore required.

It is still a further object of this invention to provide a tapered produce container which may be manufactured on standard semi-automatic and/or automatic box making machines with a maximum of hand operations involved.

It is an additional object of this invention to provide a lightweight and compact container which affords adequate ventilation for its contents, is not deleteriously affected by water or excessive moisture from its contents, and is of a shape suitable for stacking of the produce during transit or storage.

It is an additional object of this invention to provide a container which may be readily collapsed and in such condition shipped in bulk to the user and then readily set up at the times of use.

Other objects will be seen and a further understanding of the invention may be had by referring to the following descriptions and claims taken in conjunction with the accompanying drawings.

The container constructed in accordance with this invention comprises a receptacle portion and a cover portion. Both portions of the container may be manufactured from foldable material such as corrugated box board, and the receptacle portion is particularly adapted to be manufactured on standard automatic and/or semi-automatic box making machines.

In accordance with one embodiment, the receptacle part

of the improved container includes a side section consisting of a plurality of side panels, the edges of which are joined and the ends of which lie in parallel planes and define first and second polygonal end openings for the container. The polygon of the first end opening is preferably an octagon and has a greater number of sides than the polygon of the second end opening which is preferably a square. The side panels are equal in height, and the panel configurations are such that the adjacent corner angles are supplementary. Thus, the end limits of the side panels define two parallel coextensive end lines; and therefore, although the areas of the two polygonal end openings differ, the peripheries of the two openings which are delimited by the coextensive end lines of the panels are substantially equal.

End pieces, identical in shape and just slightly smaller than the side panels and integral with the panel ends which define the sides of the first or octagonal end opening, are foldable along the top end line inwardly to reinforce the side panels and to form a side liner or cushion for the produce. End flaps integral with the panel ends which define the sides of the second or square end opening are foldable along the bottom end line inwardly to close this end of the container.

The cover member of the improved container has an end panel substantially the same shape as the first or octangonal end opening, and peripheral flange portions which depend from the end panel are adapted to accommodate therewithin the portions of the receptacle adjacent the first end opening. Means is also provided for releasably latching the cover member in position closing the first end opening.

For a complete understanding of this invention reference should be made to the drawings wherein:

FIGURE 1 is a blank of corrugated box board or other suitable material from which the receptacle portion of the container may be constructed in accordance with this invention;

FIG. 2 is a blank of corrugated box board or other suitable material from which the cover portion of the container may be made;

FIG. 3 is a perspective view of the blank illustrated in FIG. 1 after the outer side panels thereof have been set up and preliminary to the folding inwardly of the end pieces and flaps;

FIG. 4 is a perspective view of the receptacle portion of the container in further state of being set up and showing the manner in which the end pieces may be folded into the octagonal end thereof to provide a liner or cushion therewithin;

FIG. 5 is a perspective view looking into the square or bottom end of the receptacle portion and showing the opposite end pieces after they have been folded into the receptacle to form the liner;

FIG. 6 is a perspective view looking into the top or octagonal end of the receptacle portion after the bottom flaps have been folded inwardly to close the square or bottom end;

FIG. 7 is a perspective view of the blank illustrated in FIG. 2 showing the manner in which the various portions of this blank may be folded to form the cover portion of the container;

FIG. 8 is an enlarged sectional view taken substantially along line 8—8 of FIG. 7;

FIG. 9 is a perspective view of the receptacle and cover portions of the container; and

FIG. 10 is a side perspective view of the container showing the receptacle and cover portions thereof in interlocking assembled relationship.

With more particular reference to the drawings, the container constructed in accordance with this invention includes a receptacle portion 12 and a cover portion 14

(see FIGS. 9 and 10). Both the cover and the receptacle portions may be formed of foldable material such as corrugated box board, and the receptacle portion is particularly adapted for manufacture on standard automatic and/or semi-automatic box making machines.

The blank 15 from which the receptacle portion 12 is made may be elongated and substantially rectangular as illustrated in FIG. 1. A pair of longitudinally extending end fold lines 16 and 17 divide the blank 15 into three sections: a central or receptacle side section 18, a top or end piece section 19, and a bottom or end flap section 20. A plurality of fold lines 21 divide the central side section 18 into four identical primary side panels 22, 23, 24 and 25, which are preferably in the shape of isosceles trapezoids and four substantially identical secondary side panels 26, 27, 28 and 29, which are preferably in the shape of inverted isosceles triangles. The width of the base of each trapezoidal panel 22–25 is preferably equal to the height of the panel. It will be noted that the triangular and trapezoidal side panels are of equal height and that the triangular panels 26–29 are disposed between trapezoidal panels 22–25.

The adjacent corner angles of the panels are supplementary, i.e., they form a straight (180°) angle along the longitudinal fold lines 16 and 17. For example, the angle *v* at the top of each trapezoidal panel and the angle *w* at the base of each adjacent inverted triangular panel are supplementary; and the angle *x* at the base of each trapezoidal panel, the apex angle *y* of each triangular panel and the angle *z* at the base of each trapezoidal panel are supplementary. The shortest (top) of the parallel sides of the trapezoidal side panels 22–25 are thus aligned with the bases of the inverted triangular side panels 26–29 along the fold line 16, and the apexes *y* of the triangular side panels are aligned with the bases of the trapezoidal side sections along fold line 17. The feature of having all adjacent corner angles of the side panels 22–29 supplementary is important, for the entire side section 18 which comprises these panels is thus contained within and defined at top and bottom by the parallel fold lines 16 and 17. It is this feature which makes it possible to form the blank and the receptacle portion of the container on standard automatic and/or semi-automatic box making machines.

A plurality of transverse slots 30 extending between the top of the blank and the top fold line 16 divide the top or end piece section 19 of the blank into four trapezoidal end pieces 32, 33, 34 and 35 and four triangular end pieces 36, 37, 38 and 39. The slots 30 and the end pieces 32–39 defined thereby are mirror images of the fold lines 21 and the panels 22–29 defined thereby in the central or side section 18 of the blank 15. As a result, the end pieces 32, 33, 34 and 35 are the same shape as trapezoidal side panels 22, 23, 24 and 25, and the short parallel (top) side of each such end piece is attached to the short parallel side of its corresponding trapezoidal side panel along the fold line 16. Also, end pieces 36, 37, 38 and 39, except for a slight blunting or truncating of their apexes, are substantially the same shape as triangular side panels 26, 27, 28 and 29; and the base of each such end piece is attached to the base of its corresponding inverted triangular side panel along the fold line 16. The end pieces 32–35 are of equal height; however, they are preferably just slightly smaller than the side panels 22–29, and thus they may be folded inwardly as will be hereinafter more fully described.

The bottom or end flap section 20 is divided by slots 42 into four rectangular end flaps 44, 45, 46 and 47, each flap being connected to the base of a corresponding primary or trapezoidal side panel along fold line 17. The flap width is approximately equal to the width of the primary panel base to which it is attached, and the length of each flap is approximately equal to half the flap width. It will be noted that at the edge of each flap there is a central half slot, the half slots 44*a* and 46*a* in flaps 44 and 46 respectively extending lengthwise, and the half slots 45*a* and 47*a* of flaps 45 and 47 respectively extending widthwise. The function of these half slots will hereinafter be more fully described.

The sides of the blank 15 consist of portions of triangular side panel 26 and triangular end piece 36. When these sides are overlapped and joined, as by staples 40, to form the receptacle portion 12 in the manner illustrated in FIG. 3, a single partially overlapped side panel 26 and partially overlapped end piece 36 will be formed at the juncture identical with the corresponding triangular side panels and end pieces. Thus formed, the receptacle portion 12 may be shipped or stored in a "knocked down" or flat form, and for this purpose medial fold lines 15*a* and 15*b* are provided (see FIG. 1). When the box is opened as shown in FIG. 3, the bases of the four inverted triangular side panels 26–29 and the tops of the trapezoidal side pieces 22–25 will form an octagonal opening at one end of the container. At the same time, the bases of the trapezoidal side panels will form a square opening at the opposite end of the container, as best illustrated in FIG. 5.

The side pieces 32–39 which are substantially mirror images of the side panels to which they are attached may be folded inwardly against their respective side panels to form a lining which will reinforce the side panels and will act as a cushioning for the produce which may be placed in the container.

The bottom end of the container which is square is closed by means of the end flaps 44, 45, 46 and 47. As previously described, these end flaps are provided with half slots 44*a*, 45*a*, 46*a* and 47*a*, and thus when panels 44 and 46 are simultaneously closed, a central slot 44*a*–46*a* remains; and subsequently, when panels 45 and 47 are closed over the flaps 44 and 46, a second slot 45*a*–47*a* will remain which is coincident with the first slot. Thus, proper ventilation and draining is provided at the bottom of the container.

The combination of the triangular and trapezoidal side panels provide a side taper; see FIG. 10. The taper of the side panels serves to more effectively cushion the packed produce and thus reduce bruising thereof.

The trapezoidal side panels 22–25, which in the illustrated embodiment provide approximately two-thirds of the area of the side section 18, actually taper or slope inwardly from the octagonal or top end of the container to the square or bottom end thereof, whereas the triangular side panels 26–29 which provide only about one-third of the area of side section 18 taper outwardly from top to bottom. It is to be noted that the area of the container receptacle portion at the octagonal or top end is substantially (approximately 17%) greater than the area at the square or bottom end; however, the perimeter or peripheral dimension of the receptacle is the same at both top and bottom.

The cover portion of the container is formed from the blank illustrated in FIG. 2 and includes a top panel 41 which is the same shape as the opening in the top of the container and just slightly larger in size. Since in the preferred embodiment, the top opening is in the shape of a regular octagon, the top panel 41 of the container is also in the shape of a regular octagon. Integral with and extending from alternate sides of this octagonal top panel 41 are four leaves 42, 44, 46 and 48. Each leaf has a pair of oppositely disposed, laterally extending tabs: leaf 42 has tabs 42*a* and 42*b*; leaf 44 has tabs 44*a* and 44*b*; leaf 46 has tabs 46*a* and 46*b*; and leaf 48 has tabs 48*a* and 48*b*. Integral with the top panel 41 and extending from the remaining four sides thereof are clamping sections 50, 52, 54 and 56.

It will be noted that the length (measured radially) of the clamping members 50–56 is just slightly greater than twice the length of the leaves 42–48; and when the leaves have been folded into depending position normal to the plane of top panel 41, as illustrated in FIG. 7,

the clamping sections may be folded about the lateral tab of each of the two adjacent leaves to clamp the leaves in this position. Thus, for example, and as illustrated in FIG. 7, clamping section 50 will be folded about tabs 42*a* and 48*b* to clamp leaves 42 and 48 into positions normal to the plane of panel 41. In order to maintain the clamping sections in their folded position, tabular appendages 50*a*, 52*a*, 54*a* and 56*a* are provided on the respective clamping sections, and slots or recesses 60, 62, 64 and 66 are formed in the undersurface of top panel 41 (see FIG. 8). When the clamping sections are folded over the lateral tab of each of the two adjacent leaves, the tabular appendage thereon may be inserted within the corresponding recess in the top panel 41; and the clamping section will thus be locked in its folded or clamping position.

Since the top panel 41 is just slightly larger than the top of the receptacle portion 12 of the container, the top portions of the side panels 22–29 will be accommodated within the depending lip of the cover formed by the interlocking arrangement of the leaves 42–48 and the clamping sections 50–56. Thus, the cover will close the top end of the receptacle 12.

In order to latch the cover in this position, hand holes 70 and 72 are provided near the top of the trapezoidal side panels 23 and 25 which are adapted to accommodate a pair of tongues 74 and 76 formed on cover leaves 44 and 48, respectively. The tips of the tongues 74 and 76 are distended and are slightly wider than the width of hand holes 70 and 72 in the side panels of the receptacle. When the cover member 14 has been positioned over the octagonal opening at the top of the receptacle 12, the tips of tongues 74 and 76 may be inserted within hand holes 70 and 72 in the side panels of the receptacle to thereby releasably lock the cover in its closed position.

In utilizing the improved container for packing produce therein subsequent to grading of said produce, the receptacle and cover portions of the container are first assembled and are locked together by means of the tongues 74 and 76 and hand holes 70 and 72. The container is then inverted with the cover functioning as the base. The bottom end flaps 44–47 of the receptacle are then opened. If desired, the lower layer of the produce adjacent the cover 14 may be faced by hand to provide a more attractive appearance for display purposes. After facing the bottom layer of produce, the remainder of the inverted container is filled with the produce arranged in random fashion. The end flaps 44–47 are then closed and sealed by well-known means such as stapling or gluing.

The hydro-cooling step, as previously described, may then be accomplished by either spraying the container and its contents with cool water or causing cool air to circulate throughout the container.

The box board from which the container is constructed is preferably treated with a water or moisture resistant composition so that the container is not adversely affected by the hydro-cooling operation. The slots in the bottom container formed by the edge slots 44*a*, 45*a*, 46*a* and 47*a* in the end flaps, together with the relatively loosely fitting cover member 14, permit adequate ventilation of the produce during transit and storage and also enable any water used in the hydro-cooling process or any moisture associated with the packed produce to be readily drained from the interior of the container. Since the container is in the shape of a regular polygon, and the top panel 41 of the cover portion is parallel to the folded end flaps 44–47 of the receptacle portion, the filled container may be easily stored and transported in regular stacks and rows with maximum economy of space.

The construction of the container has been found to effect a saving in material of approximately 11% over that of a regular cubical container of the same contents. Also due to the tapered construction, the receptacle portion of the container is in effect pre-bulged, and no additional bulging, such as is common with packed containers of a previous design, is permitted to take place even after prolonged storage.

It will be seen that an improved container construction has been provided which materially simplifies the packing of produce and eliminates the need for special forms, protective liners, and other special packing devices or procedures. The container has a pleasing tapered appearance, and yet the major portion of this container may be made on a standard semi-automatic and/or automatic box making machine. The container is compact, sturdy, and serves as an attractive display case for the contents thereof. Furthermore, the container is capable of being collapsed and when in such condition readily shipped or stored in bulk and then readily set up at the time of use.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that many modifications and changes in various details may be resorted to without departing from the spirit and scope of the invention, as hereinafter claimed.

What is claimed is:

1. A foldable container having a plurality of edge joined side panels, the ends of said side panels defining first and second polygonal end openings, the polygon of said first end opening having a greater number of sides than the polygon of said second end opening, and the peripheral dimensions of said polygonal end openings being substantially equal, each of said side panels having an end piece integral with the end thereof which defines a portion of said first polygonal end opening, said end pieces being foldable inwardly to reinforce said side panels and to form a side cushion for the contents of said container, and a plurality of end flaps integral with the panel ends defining said second polygonal end opening and foldable inwardly to close said second end opening.

2. A foldable container having a plurality of trapezoidal side panels and a plurality of interposed inverted supplementary triangular panels, said panels being substantially equal in height and having their ends in substantial alignment to define two polygonal end openings, the peripheral dimensions of which are substantially equal, the polygon of one of said end openings having twice the number of sides of the polygon of the other end opening, each of said side panels having an end piece attached to the end thereof which defines a portion of said one polygonal end opening, said end pieces being foldable inwardly to reinforce said side panels and to form a cushion for the contents of said container, and each of said trapezoidal side panels having attached to the opposite end thereof an end flap foldable inwardly to close said other polygonal end opening.

3. A blank of foldable material from which a receptacle may be formed having polygonal ends, the areas of which differ and the peripheral dimensions of which are substantially the same, said blank being substantially rectangular and having a pair of parallel longitudinally extending fold lines defining a central receptacle side section and a pair of end sections integral therewith, said side section having a plurality of transverse secondary fold lines defining a plurality of interspersed trapezoidal and triangular side panels of equal height, one of said end sections having a plurality of transverse slots dividing said section into a plurality of end flaps for closing one of the polygonal ends of the receptacle, and the other end section having a plurality of transverse slots dividing said section into a plurality of end pieces which are joined to and are substantial mirror images of the panels of said side section, said end pieces being foldable inwardly to form a liner for the sides of the receptacle.

4. A foldable container having a plurality of edge joined side panels, the ends of said side panels defining first and second polygonal end openings, the polygon of said first end opening having a greater number of sides

than the polygon of said second end opening, and the peripheral dimensions of said polygonal end openings being substantially equal, each of said side panels having an end piece integral with the end thereof which defines a portion of said first polygonal end opening, said end pieces being foldable inwardly to reinforce said side panels and to form a side cushion for the contents of said container, a cover member having substantially the same shape as said first polygonal opening and having depending peripheral portions for accommodating the portions of said side panels adjacent said first polygonal end opening, means for releasably attaching said cover member in position to close said first polygonal end opening, and a plu-

rality of end flaps integral with the panel ends defining said second polygonal end opening and foldable inwardly to close said second end opening.

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