

April 9, 1968

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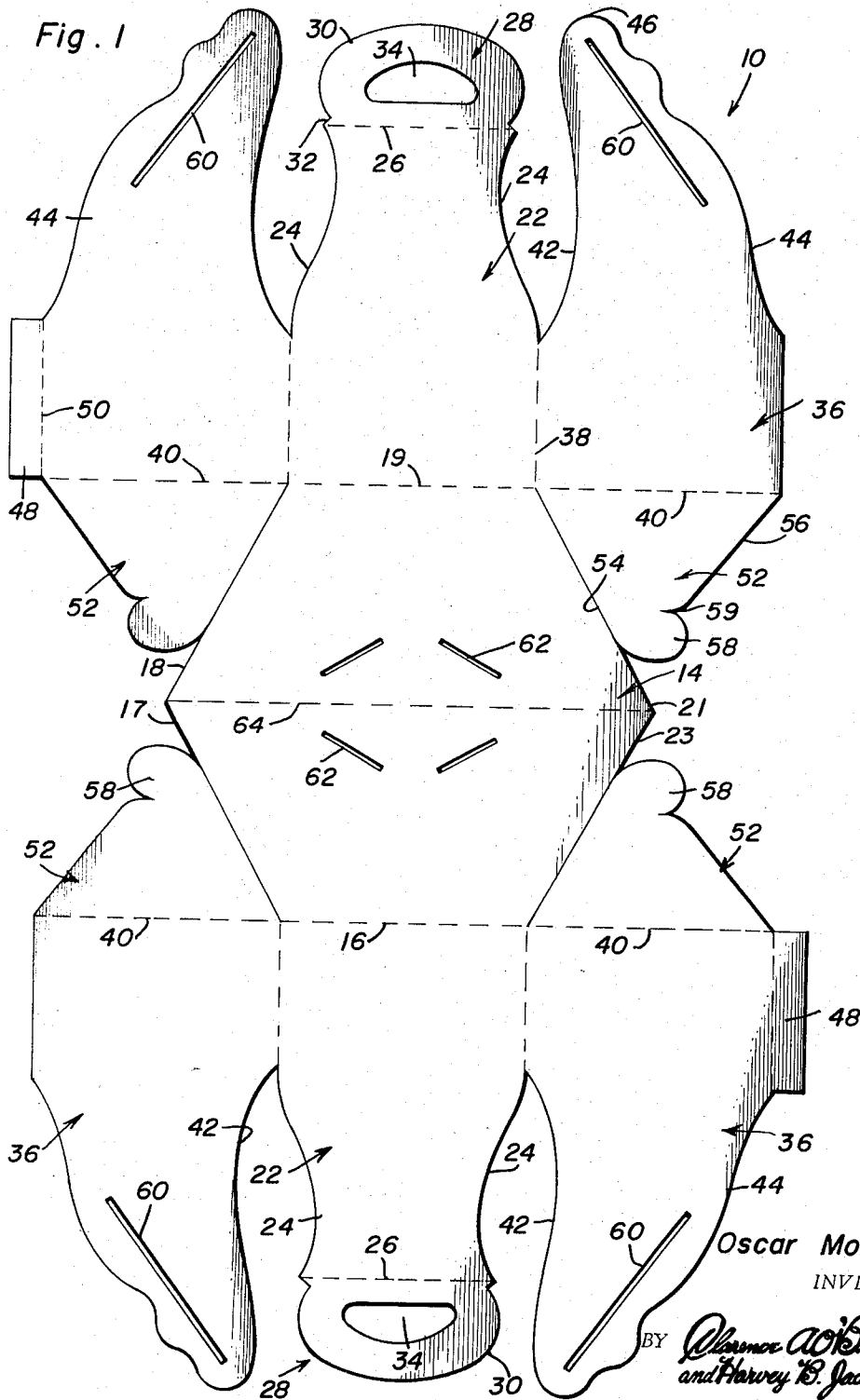
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SIX-SIDED FOLDABLE BOX CONSTRUCTION

Filed March 22, 1966

3 Sheets-Sheet 1

Fig. 1



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Fig. 2

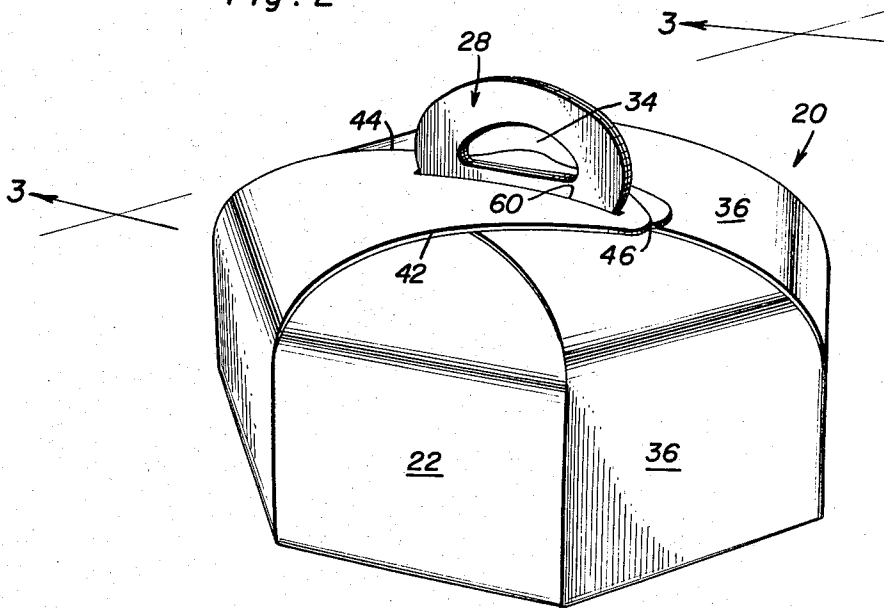
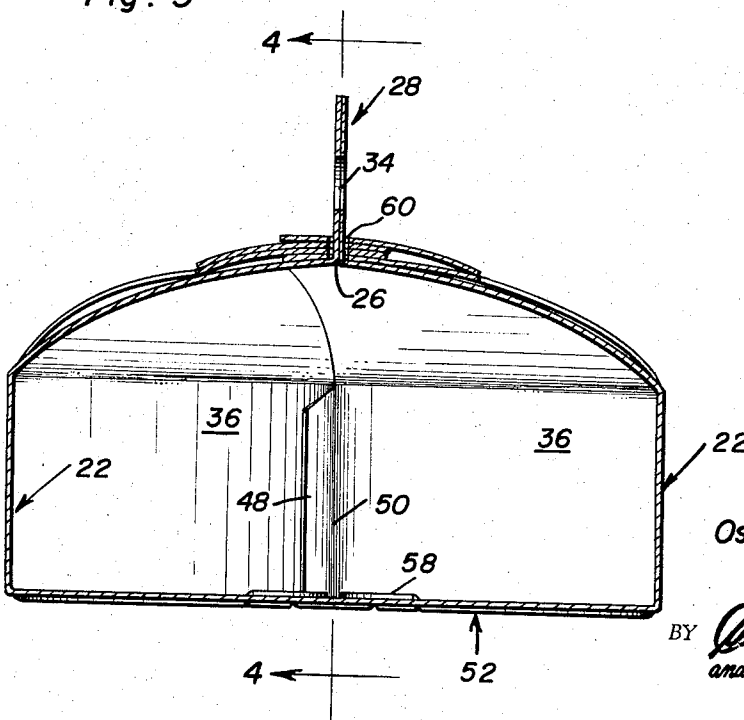


Fig. 3



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Fig. 4

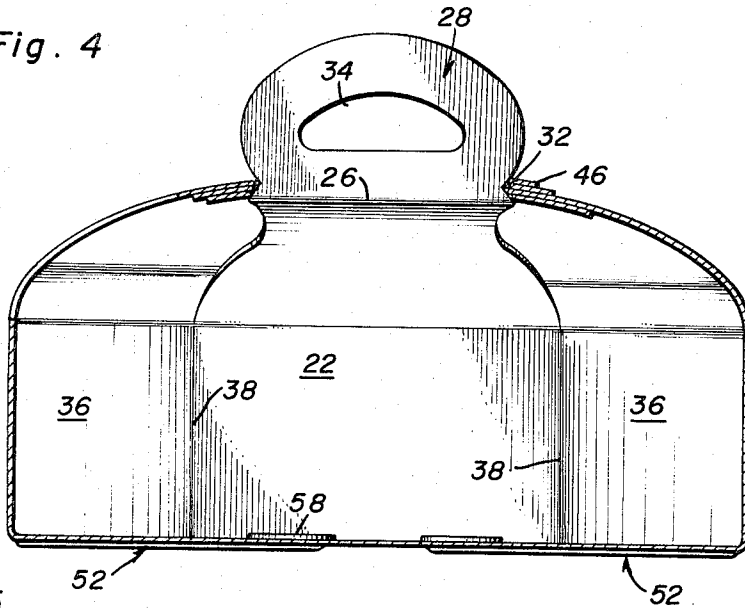


Fig. 5

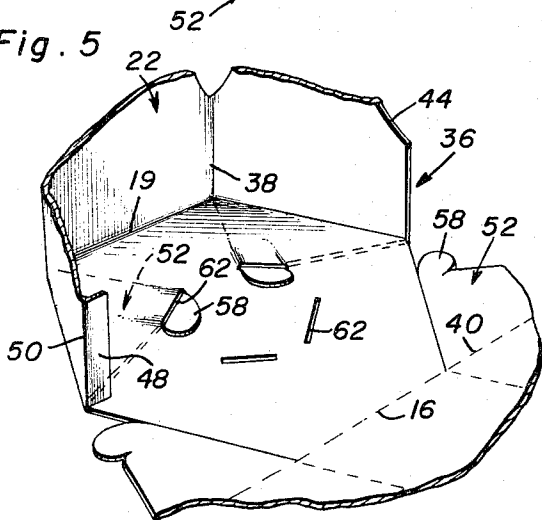


Fig. 6

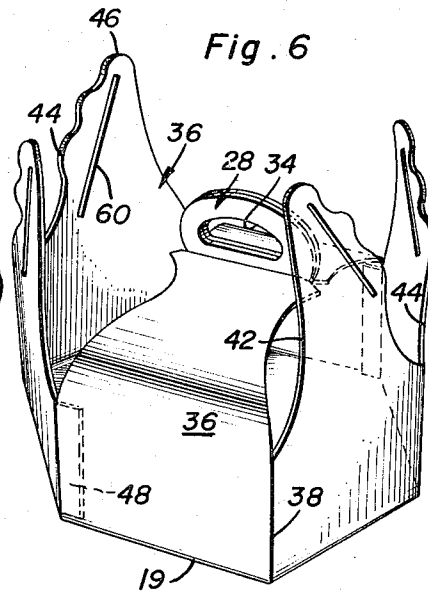
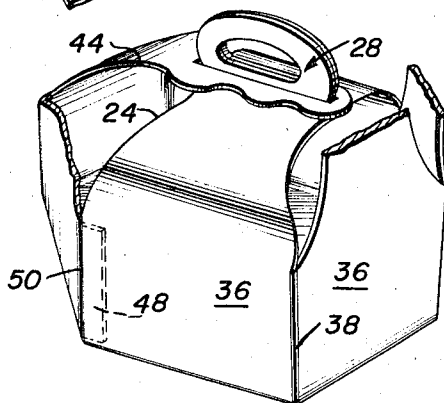


Fig. 7



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SIX-SIDED FOLDABLE BOX CONSTRUCTION

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ABSTRACT OF THE DISCLOSURE

Hexagonal box construction comprising a hexagonal base with two side and top defining portions secured, in each instance through a central panel, to a pair of opposed edges on the base, each section including, in addition to the central panel, two side panels which, for a portion of the height thereof, correspond in width to the edges of the base adjacent the edge to which the central panel is secured. The two sections are folded vertically and the side panels swung inwardly so as to define an open top hexagonal box. The upper portions of the panels are then folded inwardly into a domed configuration and locked together in a manner which defines a pair of upwardly projecting handle portions.

The instant invention generally relates to containers or boxes of paperboard or the like, and is more particularly concerned with a box construction wherein a single foldable blank is utilized in forming a domed container such as would be particularly adaptable for use as a cake box.

It is a particularly significant object of the instant invention to provide a folding box which can be assembled from a single blank without the use of adhesive or other extrinsic fastening means, and which at the same time can be unfolded into its original blank form for ease of shipping, storage or the like.

Further, it is a significant object of the instant invention to provide a collapsible box wherein the side walls thereof are positively interlocked at both the base and top thereof with the closing sequence of the box enabling an initial formation of an open top container for the introduction of a cake or the like with the top subsequently being formed and locked closed in a positive manner which, during the forming thereof, also provides for a unique integral carrying handle.

Also, it is a significant object of the instant invention to provide a foldable box which is formed from a compact blank in a simple and easy-to-follow manner with the resultant completed box providing an attractive symmetrical appearance such as might be desired should the box be utilized as a container for salable items.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a plan view of the blank utilized in forming the box of the instant invention;

FIGURE 2 is a perspective view of the completely formed box;

FIGURE 3 is an enlarged cross-sectional view taken substantially on a plane passing along line 3-3 in FIGURE 2;

FIGURE 4 is a transverse cross-sectional view taken substantially on a plane passing along line 4-4 in FIGURE 3; and

FIGURES 5, 6 and 7 illustrate a sequence of steps in folding the blank into the box form.

Referring now more specifically to the drawings, reference numeral 10, noting FIGURE 1, is utilized in designing the blank. This blank consists of a single piece of sheet material, such as paperboard or the like, this material being such so as to enable an arcuate forming thereof without a corresponding creasing so as to enable the production of a dome-shaped finished box 20 as illustrated in FIGURE 2.

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The finished box 20 is to be hexagonal in cross-section below the domed upper portion thereof, and as such, the blank 10 includes a hexagonal base panel 14 having six equal length edges 16, 17, 18, 19, 21 and 23 defining the periphery thereof. Integrally formed with an opposed pair of the bottom panel edges, 16 and 19, is a pair of outwardly projecting handle-forming panels 22, the adjacent bottom panel edges 16 and 19 being in fact defined by full length fold lines between the bottom panel 14 and the handle panels 22. Each of the handle panels 22, for a portion of the length thereof corresponding to the desired vertical walls of the finished box 20, is to be of a width equal to the width of the adjacent bottom panel edge. Above this height, each of the side edges 24 of the handle panels 22 is generally ogee in shape, first arcuately converging toward each other, and then arcuately diverging from each other. These edges 24 terminate on a transverse fold line 26 which divides an upper handle or handle-forming portion 28 from the main handle panel 22.

This handle-forming portion 28 has a generally oval shape with the peripheral edge 30 thereof terminating in an inset portion or notch 32 inward of the upper end of each of the ogee-shaped sides 24 immediately above the fold line 26. In addition, a finger-receiving aperture 34 is provided through each of the handles or handle portions 28. Integral with each handle panel 22, along substantially the full height of that portion of each of the handle panels 22 which is of a width equal to the length of the corresponding bottom panel edge 16 or 19, is a pair of laterally directed side panels 36. Each of the side panels 36 is separated from the adjacent handle panel, for the full height of the integrally engaged portions thereof, by a fold line 38. The bottom edge 40 of each side panel 36, defined by a fold line constituting an extension of the fold line which defines the adjacent bottom panel edge 16 or 19, is of a width equal to the length of one of the bottom panel edges with this width extending through a height substantially equal to the height of the full width portion of the adjacent handle panel 22. Above this height, the edge 42 adjacent the corresponding handle panel 22 is arcuately formed so as to initially diverge from the adjacent handle panel edge 24 and subsequently gradually converge toward the handle-forming portion 28, while still maintaining a substantial spacing therebetween. The outer edge 44 of each of the side panels 36, above the height of the constant or maximum width portion, converges along an arcuate generally ogee or wavy path toward the edge 42 and terminating in a rounded upper or outer end 46, thereby defining, in conjunction with the arcuate edge 42, an arcuately shaped upper portion for each side panel 36. In addition, it will be noted that one side panel 36, of the pair of side panels integral with each handle panel 22, includes an integral tab 48 along the full width portion of the lateral outer edge 44, this tab 48 being separated from the side panel 36 by a full height fold line 50.

Integral with each of the side panels 36 and a separated therefrom by the bottom edge defining fold line 40 is a generally triangular shaped securing panel 52. Each of these panels 52 has one edge 54 lying along the bottom panel edge immediately adjacent the edge to which the adjoining handle panel 22 is secured, with this edge 54 of course being completely free of the adjoining bottom panel edge. The opposite edge 56 of the extension panel 52 converges inwardly, from the side panel bottom edge 40, toward the edge 54 with both edges terminating in a lateral outwardly directed locking lug 58 which in turn

includes a locking slit or recess 59 immediately adjacent thereto on the same side of the panel 52 as the edge 56.

The actual interlocking engagement of the various panels is made possible by the provision of a plurality of locking slots, including an inclined slot 60 in the outer portion of each side panel 36 generally paralleling the arcuate edge 44 thereof with each of the slots 60 being of a size so as to receive the oval-shaped handle 28 therethrough. In addition, four diagonal slots 62 are provided centrally within the bottom panel 14 inwardly of the four bottom panel edges 17, 18, 21 and 23 a distance approximately equal to the height of the extension panels 52 between the base thereof, defined by the line or edge 40, and the locking lug 58.

In folding the blank 10 of FIGURE 1 into the finished box 20 of FIGURE 2, the handle panels 22 along with the adjoining side panels 36 are folded vertically along the fold lines which define the bottom panel edges 16 and 19, as well as along the aligned side panel fold lines 40. Next, the side panels 36 associated with each handle panel 22 are folded inwardly along the fold lines 38 so as to lie adjacent the two adjacent bottom panel edges with the extension panels 52 underlying the bottom panel. At this point, the locking lugs 58 are engaged upwardly through the bottom panel slots 62 through a horizontal sliding movement thereof which causes a locking of the adjoining portion of the bottom panel 14 within the slit or recess adjacent each lug 58. With reference to FIGURE 5, which shows the initial folding of one of the handle panels 22 and its corresponding side panels 36, it will be noted that each of the locking lugs 58 is in fact slightly larger than the receiving slot 62 thereof, thus requiring a side-slipping of the rounded lug into the slot 62 for an engagement of the adjacent portion of the bottom panel within the recess or slit immediately above the lug. Further, it will be appreciated that this engagement of the lug will be effected by a slight outward movement of the extension panel 52 toward its unfolded position, and as such, any further movement toward an unfolding of the panel will be positively resisted. By the same token, to dismantle the panel, the side panels 36, along with their extension panels 52, will initially have to be moved inwardly toward a folded position, shifted slightly to the side, and then moved outwardly, all of this making it highly unlikely that an accidental unfolding of the box 20 will occur.

Once the four extension panels 52 have been locked to the bottom panel 14 with the side panels projecting vertically upward, it will be appreciated that an open top container has been provided for the reception of a cake or the like. Incidentally, with reference to FIGURES 3, 5, 6 and 7, it will be noted that the flaps 48 are positioned within the vertically positioned side panels so as to extend over the open joint between the side panels associated with the opposite handle panels 22, in this manner providing a substantially completely closed lower box portion.

After the object to be received in the box 20 is positioned therein, the handle panels 22 are arcuately bowed inward toward each other and the handle-defining portions 28 are vertically directed about their corresponding fold lines 26 so as to abut each other centrally above the bottom panel 14. This inward curving of the handle panels 22 will occur, for the most part, upwardly of the full width lower portion thereof so as to define an arched cover over a straight wall lower portion.

The final step in closing the container consists of inwardly arcing the upper portions of the side panels 36 so as to overlap each other with the slots 60 therein aligning with each other and receiving the vertically projecting pair of handle portions 28 therethrough. As the outer portions of the side panels 36 are received over the pair of vertically projecting handles 28, there will be a tendency for these side panel portions 36 to spring outwardly and return to their normal flat shape. In resisting this

tendency, and at the same time positively locking the upper portions of the side panels 36 in their dome-defining position, it will be noted that the outer portion of each of the side panels 36 just outward of the slot 60 is received within the notches or recesses 32 which, in conjunction with the outwardly curving edge of the handle immediately thereabove, effectively lock and retain the outer or upper portions of the side panels 36.

With continued reference to FIGURE 7, it will be appreciated that the arcuate edges of both the handle panels 22 and the side panels 36 result in a reduction of the upper or outer portions of these panels in a manner so as to allow for a smooth overlapping of the upper portions of the adjacent panels in defining the domed top. In addition, the angular orientation of each of the slots 60 is such so as to, upon positioning the upper portion of the corresponding side panel 36 substantially horizontally across the top of the box 20, parallel the vertically extending handles 28 with such slots being in overlying relation both to each other and to these handles for the reception of the handles therethrough in the manner previously described. Once the handles 28 are received through the overlapping slots 60, it will be appreciated that a positive locking of the box in its erected position has been achieved without the use of extrinsic mechanical fasteners. Further, it will be appreciated that the various panels are interlocked in a manner which will substantially preclude any accidental release thereof. Likewise, it will be recognized that the upper portions of the side panels 36, when overlapped, define a completely closed dome formed in effect by three overlapping arches, each in turn defined by a pair of opposed vertically directed panels.

From the foregoing, it will be appreciated that a highly unique foldable box construction has been defined, this construction enabling the utilization of a single blank in the forming of a rigid domed and completely closed container incorporating an integral handle. Incidentally, while not mentioned supra, it will be noted that a final fold line 64 is provided diagonally across the base panel 14, this fold line enabling a folding of the blank itself into a more compact package for purposes of storage, while in no way affecting the rigidity and stability of the assembled box 20 wherein a support of the bottom panel 14 is effected by the subjacent locked extension panels 52.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A foldable box construction comprising a bottom panel including six equal-length edges defining a hexagonal shape, a pair of handle-forming panels foldably fixed to an opposed pair of said edges, said handle panels terminating in handle-defining outer ends, each of said handle panels, at the bottom or inner end thereof adjacent the bottom panel, being of a width generally equal to the length of the adjoining edge, a pair of side panels foldably fixed to the opposed sides of each handle panel, each of said side panels projecting in generally the same direction as the corresponding handle panel and terminating in a handle engaging outer end, each side panel, at the bottom or inner end thereof, being of a width generally equal to the length of that edge of the bottom panel positioned to the same side of the handle as the particular side panel, and means on the bottom end of each side panel engageable with the bottom panel for retaining the bottom end thereof adjacent the corresponding edge of the bottom panel, each of said side panels having the edge thereof adjacent the corresponding handle panel spaced from the adjacent handle panel edge for a

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substantial portion of the length thereof inward from the outer ends thereof.

2. The construction of claim 1 wherein said spaced edges between each side panel and the corresponding handle panel arcuately diverge from each other.

3. The construction of claim 2 wherein each of said side panels has an elongated slot defined in the outer end portion thereof for the reception of the two handle defining outer ends of the handle panels therethrough.

4. The construction of claim 3 wherein said means for retaining the bottom end of each side panel comprises an extension panel foldably fixed to the bottom end of the side panel and positionable in locked underlying relation to the bottom panel.

5. A blank for a foldable box comprising a hexagonal bottom panel having six straight edges, a pair of elongated handle forming panels integral with and extending from an opposed pair of said edges, fold lines along said pair of edges, said handle panels, for a first portion of the length thereof outward from the bottom panel, being of a width equal to the length of the corresponding bottom panel edge and including parallel side edge lengths, each of said handle panels, beyond the first portion thereof, having the side edges thereof gradually converging toward each other, each of said handle panels terminating in an outer section defining a handle, an integral side panel projecting laterally from each side edge of each handle panel and having a length of the edge thereof common with the adjoining side edge length of the handle panel along the parallel length thereof, a fold line along said parallel length of the edge, the adjoining edge of each side panel, above the parallel length of the handle panel edge, arcuately diverging from the handle panel, each side panel having a bottom edge in alignment with the edge of the bottom panel from which the corresponding handle panel extends, and an extension panel integral with the bottom edge of each side panel, a fold line along each bottom edge separating the side panel from the corresponding extension panel, each extension panel having a first free side edge paralleling an adja-

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cent bottom panel edge and being substantially coextensive therewith, and a second side edge on each extension panel converging toward the first side edge thereof, said extension panels each terminating in a locking lug engageable with said bottom panel.

6. The construction of claim 4 wherein each of said side panels includes a second edge paralleling the edge adjacent the corresponding handle panel for a distance outward from the inner end of the side panel to approximately the point at which the first mentioned side panel edge is spaced from the adjacent handle panel edge, said side panel second edge continuing from this point along a generally arcuate converging path relative to the first mentioned side panel edge so as to define a generally tapered outer end portion on each side panel.

7. The construction of claim 5 wherein each side panel includes a second edge paralleling the first side panel edge for a distance generally equal to the length of the first side panel edge common with the adjoining handle panel edge length, said second side panel edge continuing along an arcuate converging path relative to the first side panel edge.

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