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D. L. CRADDOCK ET AL
TAPERED COLLAPSIBLE CONTAINER

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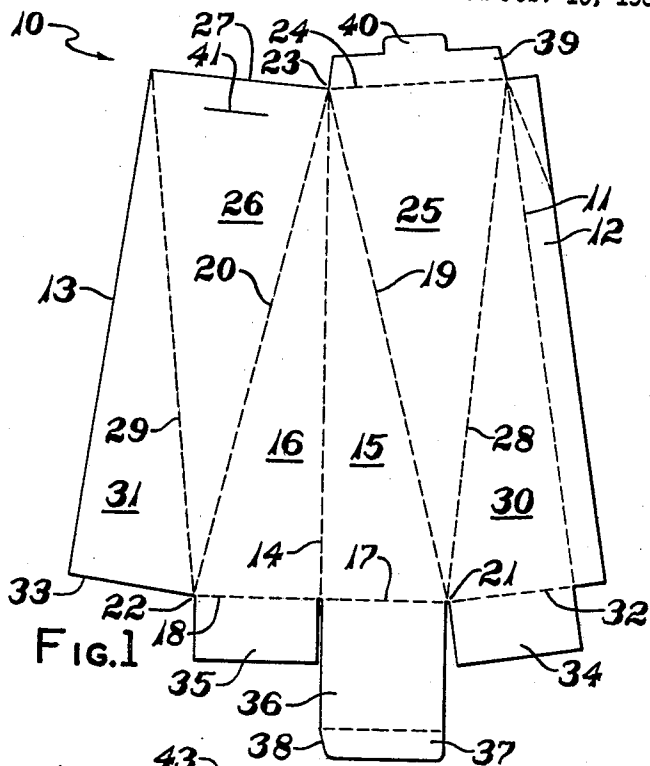


FIG. 1

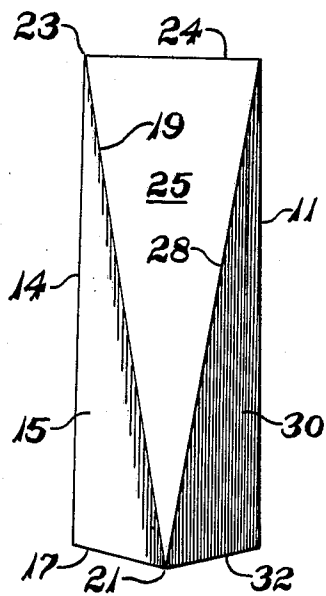


FIG. 2

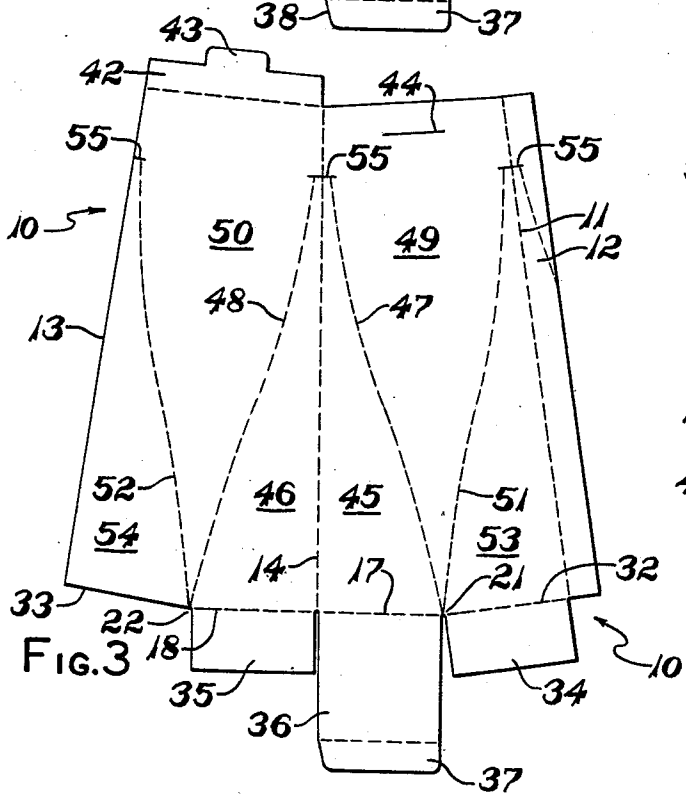


FIG. 3

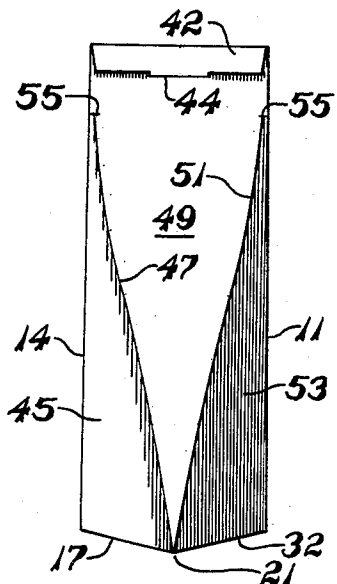


FIG. 4

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TAPERED COLLAPSIBLE CONTAINER

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8 Claims. (Cl. 229-16)

This invention relates to collapsible containers, such as cardboard boxes, suitable for holding articles having a smaller dimension at one end than at the other.

An object of this invention is to provide a collapsible container occupying a volume only slightly greater than that of an article with one small end contained in it. Another object is to provide a collapsible container differing in shape from one end to the other and provided with an absolutely flat end, permitting it to be stood on end for counter or shelf display. Still another object is to provide a collapsible container having a display panel of greater width than any side of the end or base on which the container rests when placed on a counter or shelf for display.

These objects are accomplished by constructing the container from a blank of cardboard or other suitable foldable material so designed that one end will fold into a quadrilateral shape, which end may be provided with a conventional tucked in flap closure, and the other end will come to a more or less sharp edge disposed diagonally of the first end, and with six longitudinally fold lines dividing the sides into six triangular panels. Four of these triangular panels will have bases adjoining the four edges of the bottom end of the finished container and apices at the ends of the diagonal top edge and the other two panels will have bases along the diagonal top edge of the finished container and apices at two opposite corners of the bottom. The diagonal edge opposite to the quadrilateral or bottom end may be left open if desired, since the edges of the stiff material will normally stay close together, or the diagonal edge may be closed by gluing or folding. When such a blank is properly assembled, with its glue flap adhered to the opposite edge of the blank in the usual manner, it will lie flat for storage and shipment and can be set up by opening the end described above as the bottom end to its intended quadrilateral configuration, after which the contents can be inserted and the bottom end can be closed by folding and tucking in the closure flaps. The container so made is a 7-faced polyhedron with a quadrilateral flat base and six vertical triangular side faces terminating in a single edge at the top.

This invention is illustrated in the accompanying drawings, in which FIG. 1 shows a cut-out blank for constructing one form of the container. FIG. 2 is a perspective view of the finished container. FIG. 3 shows a blank for making a modified form of the container, and FIG. 4 is a perspective view of the finished container of FIG. 3.

In FIG. 1 the cut-out container blank consists of a sheet of cardboard or other suitable foldable material 10 having at one longitudinal edge 11 a glue flap 12 for adhesion to the other longitudinal edge 13. Since the edge 11 will later become a fold, it is suitably scored to facilitate folding. In addition, five other score lines are provided between the edges 11 and 13, as will be explained below. The edges 11 and 13, which will come together to form one folded edge, and the central score line 14 are always straight, so that the container with the glue flap 12 adhered to the opposing edge 13 will lie flat for storage and shipment. The other four longitudinal score

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score line 14 forms the edge between two panels 15 and 16 of triangular shape. In the simple form of the invention illustrated, in which the bottom is square and the top edge has a length equal to the diagonal of the square, these panels 15 and 16 are right triangles with bases 17 and 18 forming common edges with the square bottom and each having as a hypotenuse score lines 19 and 20 respectively, extending from opposite corners 21 and 22 of the square bottom to one end 23 of the diagonal top edge 24 of the container. Adjoining the score lines 19 and 20 are two more panels 25 and 26 in the shape of isosceles triangles, the bases of which are at the diagonal top edge of the container formed by the score line 24, which is the base of triangular panel 25, and the mating free edge 27, which is the base of the corresponding opposite triangular panel 26. The remaining sides of these isosceles triangular panels 25 and 26 are formed by score lines 28 and 29, respectively, equal in length to lines 19 and 20. The score lines 28 and 29 form the hypotenuse of the remaining panels 30 and 31, respectively, equal in size to panels 15 and 16. Panels 30 and 31 will ultimately come together at a folded edge formed by junction of the folded edge 11 of the glue flap and free edge 13 of the blank. The bases of panels 30 and 31 are the remaining two sides 32 and 33 of the square bottom of the finished container and are equal in length to sides 17 and 18. For closure of the square end any three of the sides 17, 18, 32 and 33 are provided with the usual flaps 34, 35 and 36, one of which, 36 in this case, is of sufficient size to cover the entire square opening and has the usual tuck-in flap 37. Since the tuck-in flap 37 will lie against the inside of a triangular panel, it is necessary for one corner of the tuck-in flap to be cut away at the same angle as the hypotenuse of the triangular panel, as indicated at 38.

The top or diagonal edge of the container, formed by juxtaposition of fold line 24 at the top of panel 25 and free edge 27 of the panel 26, may be closed by a flap 39 having a tongue 40, which can be inserted in a slit 41 in the opposing face 26 of the finished container.

The cut-out blank is put together by applying glue in the usual manner to the glue flap 12 and by folding the blank along score lines 11 and 14, so as to adhere the glue flap 12 to the blank adjacent to its opposite edge 13. The glued blank will then be perfectly flat for convenience in storage and handling with panels 15, 25 and 30 on one side and panels 16, 26 and 31 on the other side.

When the box is to be set up, flap 39 is folded on score line 24 which attaches it to panel 25, and the tongue 40 is inserted in the slit 41, which operation closes the top diagonal edge of the final container. The bottom end is then opened by spreading edges 17 and 32 from edges 18 and 33 to an approximately square opening, through which the contents of the container may be inserted. The square bottom end is then closed by folding down flaps 34 and 35, followed by flap 36, which is held in place by the tuck-in flap 37 in the usual manner.

The finished container has a perfectly flat square base upon which it can be stood perfectly steady without any rocking. When so stood up it will have the appearance of a square prism with parallel vertical faces, having two of the vertical edges sliced off from corners 21 and 22 at the bottom to a diagonal line 24 at the opposing or top end. This will leave triangular remnants 15, 30, 16, and 31 of the hypothetical originally rectangular side faces and will produce two triangular wedge faces 25 and 26 coming together at the diagonal edge just mentioned. This aspect is illustrated in FIG. 2, showing the completed container so turned that the right-hand edge will be the edge 11 resulting from folding back and gluing of the glue flap 12. The left-hand edge in FIG. 2 is the

central straight fold line 14. The two visible bottom edges are edges 32 and 17 and the visible one of the two wedge faces is panel 25 extending from bottom corner 21 to the diagonal top edge 24.

The new form of container exhibits numerous advantages. As already mentioned, it has an absolutely flat steady base for display purposes and has a pair of display panels 25 and 26 having a width over 40% greater than any of the square edges of the bottom surface, so that it lends itself particularly well to self-serve marketing, in which an extensive display surface is especially desirable. If desired, one of these display panels, or any of the other panels, may be provided with a window for inspection of the contents without the necessity of opening the container. Since the top of the container ends in an edge rather than a surface, the volume of the finished container is very much less than that of a conventional completely rectangular container of the size required to contain the kind of article smaller at one end than at the other for which this new type of container is intended. Consequently, such articles packaged in these containers can be shipped in cartons in double rows with the bases facing away from one another and with the diagonal top edges intermeshed so as to reduce very substantially the volume required for shipping and storage of the packaged articles.

In spite of the substantial reduction in volume occupied by these containers, they are adequate to hold articles of considerable bulk if the bulky portion is near one end. Thus the container of the kind described above will receive a circular disc or cylinder of the same diameter as the length of the square edges of the base, without any bulging of the walls, if the top edge of the disc or cylinder is located not over twenty-nine-hundredths of the height of the container from the base. Moreover, the container will receive a sphere of the same diameter as the length of the square edges of the base, or a spherical end portion of an article smaller at the other end, without any bulging of the walls, if the height of the container from the square base to the diagonal top is at least twice of the length of the square edges of the base.

In the embodiment shown in FIG. 3 some of the score lines and the resulting fold edges are curved. The blank 10 of FIG. 3 may have the same external dimensions as that of FIG. 1, with the same straight fold edges 11 adjacent the glue flap 12 which is to be adhered to the opposite straight edge 13, the same straight central fold line 14, and the same equal edges 17, 18, 32 and 33 defining the square bottom end closed with folded flaps 34, 35, and 36, the latter having the usual tuck-in flap 37. The top closure flap 42, in this illustration, has been shown as connected to the left hand panel, and its tongue 43 is consequently intended for insertion in slit 44 in the right-hand panel.

The principal difference between this embodiment and that of FIG. 1 is that the intermediate score lines are curved so as to form curved edges when the box is set up. Thus the panels 45 and 46 on either side of the central fold line 14 are not simple triangles but are bounded by curved score lines 47 and 48 instead of a straight hypotenuse, these lines in this instance being doubly curved in the form of an ogee curve. The next pair of panels 49 and 50 are bounded on their opposite edges by symmetrically turned ogee shaped score lines 51 and 52, leaving marginal panels 53 and 54 of the same shape as the central panels 45 and 46.

Since the ogee shaped score lines have their extremities tangential or nearly so to straight fold lines 11 and 14, and to the free edge 13 which will be adhered to fold line 11, it is preferred to omit those portions of the ogee score lines which lie close to other fold lines, and to terminate them at short transverse slits or score lines 55 joining the closely adjacent branches of the ogee shaped score lines. When the glue flap 12 is adhered to the op-

posite margin 13, the slits or score lines 55 will appear as transverse interruptions in the folds of the sheet material. When the container is set up, this permits the material to break into clean folds along the entire length of the ogee score lines 47, 48, 51 and 52, up to the slits or score lines 55, with the remaining portions of the wide longitudinal panels 49 and 50 near the top of the container being separated by short straight single folds instead of a plurality of closely adjacent folds.

In this embodiment, as in the other, the glued folded box, before it is set up, lies perfectly flat. When it is set up by folding flap 42 and tucking tongue 43 in slit 44, opening the square end and folding tucking the closure flaps, the box has an absolutely flat bottom on which it can stand without rocking. In this case, as shown in FIG. 4, the diagonal panels, such as panel 49 extending from the diagonal top edge of one of the corners of the bottom, maintain a width nearly as great as the length of the diagonal top edge for almost half the length of the container, so as to provide an extensive area for identification or other display purposes. At the same time, the lower half of the container has its volume only slightly reduced, because of the narrowness of panel 49 between the lower branches of ogee fold lines 47 and 51, and the consequent non-planar, curved shape of the face of panel 49.

It is plain that other proportions may be used, since it is not essential that the container have a square bottom, or parallel side panels, or a sharp upper diagonal edge, or the exact shape of straight or curved intermediate score lines shown in these embodiments, if the shape of the article to be contained should make it desirable to modify some of these elements. Nevertheless, it appears now to be most advantageous to incorporate square bottoms and parallel sides when the shape of the contained article permits.

We claim:

1. A tapered collapsible container of foldable material having 7 faces, one face being a flat quadrilateral base provided with a closure, two pairs of faces being generally triangular vertical sides with each side having a common edge with the base and each pair of sides joined along a straight vertical fold line, a pair of vertically converging wedge faces connecting the pairs of sides along their entire vertical lengths and extending from opposite corners of the base to a narrow top having a direction diagonal to the base.
2. A container as in claim 1 in which the base is square and the top has a length equal to the diagonal of the square.
3. A container as in claim 2 in which all the edges are straight.
4. A container as in claim 2 in which the lateral edges of the wedge faces are convexly curved near the top.
5. A container as in claim 2 in which the lateral edges of the wedge faces are concave near the bottom.
6. A container as in claim 2 in which the lateral edges of the wedge faces are convex near the top and concave near the bottom.
7. A tapered collapsible container of foldable material having 7 faces, one face being a flat quadrilateral base provided with a closure, two pairs of faces being generally triangular vertical sides with each side having a common edge with the base and each pair of sides joined along a straight vertical fold line, a pair of vertically converging wedge faces connecting the pairs of sides along their entire vertical lengths and joined to them by curved fold lines extending from opposite corners of the base and approaching the said straight fold lines approximately tangentially, the said curved fold lines terminating short of the top at short lines each of which extends from one curved fold line across a straight fold line to another curved fold line, the said wedge faces terminating in a narrow top having a direction diagonal to the base.

8. A container as in claim 7 in which the base is square, and the top is a folded edge having a length equal to the diagonal of the square and is closed by a flap.

References Cited in the file of this patent

UNITED STATES PATENTS

1,025,606	Bayless et al.	May 7, 1912
1,597,757	Berger	Aug. 31, 1926
1,833,974	Powell et al.	Dec. 1, 1931

5

2,063,645
2,067,998
2,143,646
2,147,087
2,341,056

Ware	Dec. 8, 1936
Williamson	Jan. 19, 1937
Chapman	Jan. 10, 1939
Butler	Feb. 14, 1939
Moore	Feb. 8, 1944

FOREIGN PATENTS

Great Britain	Nov. 8, 1943
Norway	July 9, 1945

557,165
69,436

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

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February 26, 1963

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 30, for "longitudinally" read -- longitudinal --; column 3, line 5, for "The" read -- This --; column 4, line 13, after "folding" insert -- and --; line 17, for "of", first occurrence, read -- to --.

Signed and sealed this 1st day of October 1963.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents