

Oct. 31, 1961

H. B. SULLIVAN
COLLAPSIBLE CONTAINER

3,005,992

Filed Oct. 10, 1960

2 Sheets-Sheet 1

FIG. 1

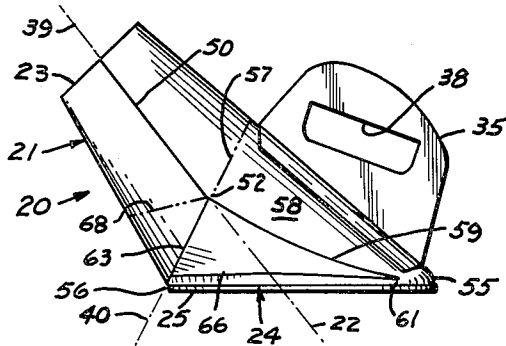


FIG. 2

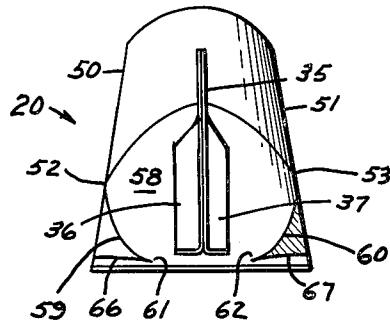


FIG. 3

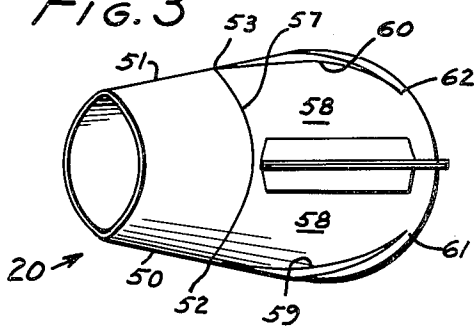


FIG. 4

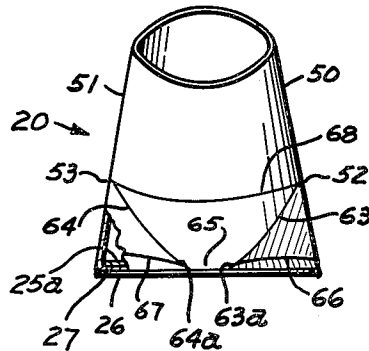


FIG. 5



FIG. 6



FIG. 7

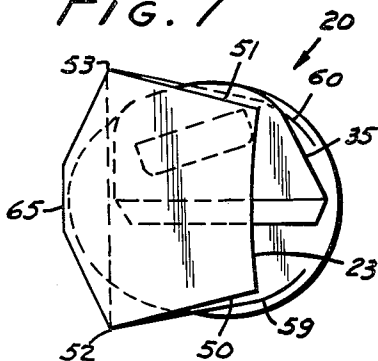
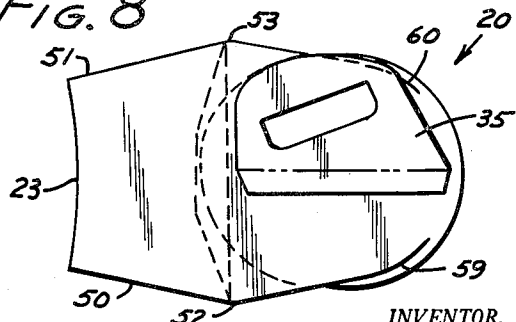


FIG. 8



INVENTOR.
HETTY B. SULLIVAN

BY

Angus & Men
ATTORNEYS.

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H. B. SULLIVAN
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FIG. 9

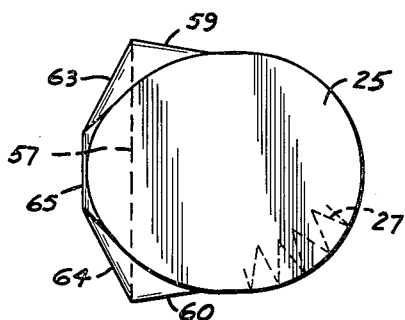


FIG. 10

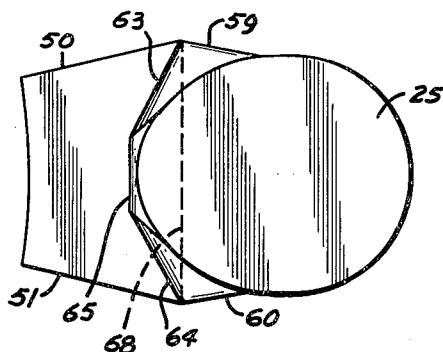


FIG. 11

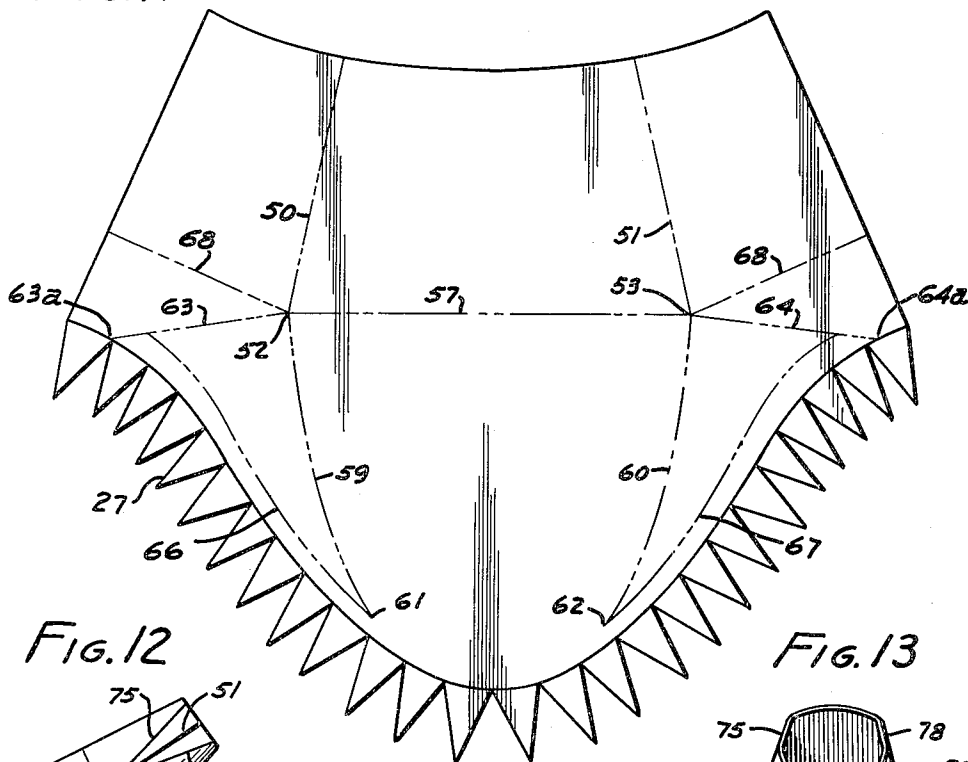


FIG. 12

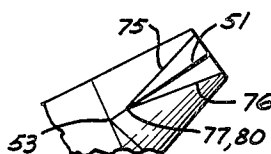


FIG. 13

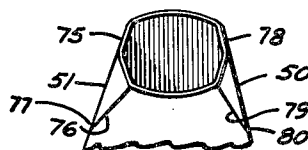


FIG. 14



FIG. 15



INVENTOR.
HETTY B. SULLIVAN

BY
Angus & Mow
ATTORNEYS.

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3,005,992

COLLAPSIBLE CONTAINER

Hetty B. Sullivan, 5260 Palm Drive, La Canada, Calif.

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6 Claims. (Cl. 4-110)

This invention relates to a disposable urinal.

There is a need in hospital operations, particularly in air evacuation operations, for a urinal which can be stored in a small volume, set up conveniently and, after usage, be easily disposed of. In addition, a disposable urinal should be light in weight, water-proof, and have such rigidity that it will remain in its folded or its set-up configuration as desired.

A urinal according to this invention meets the above requirements, and includes a frusto-conical wall which opens downwardly, and has a central axis. The smaller end of the frusto-conical wall is uppermost and open. A bottom wall extends across and closes off the larger end of the frusto-conical wall, and the central axis makes an oblique angle with the bottom wall. At least the frusto-conical wall is flexible enough to be folded.

A feature of this invention resides in scorings which permit the frusto-conical wall to be collapsed in such a manner that the urinal can be folded substantially flat to occupy a much smaller volume than the set-up configuration occupies.

The above and other features of this invention will be fully understood from the following detailed description and the accompanying drawings, in which:

FIG. 1 is a side elevation of a urinal according to the invention in its set-up configuration;

FIG. 2 is a right-hand elevation of FIG. 1;

FIG. 3 is a top view of FIG. 1;

FIG. 4 is a left-hand elevation of FIG. 1, partly in cut-away cross-section;

FIG. 5 is a side elevation of the embodiment of FIG. 1 in one of its folded configurations;

FIG. 6 is a side elevation of the device of FIG. 1 in another of its folded configurations;

FIGS. 7 and 8 are top views of FIGS. 5 and 6, respectively;

FIGS. 9 and 10 are bottom views of FIGS. 5 and 6, respectively;

FIG. 11 is a plan view of the scored blank which is formed up to form the frusto-conical wall of FIG. 1;

FIGS. 12 and 13 are side and end elevations of a modification of the device of FIG. 1 in its set-up configuration; and

FIGS. 14 and 15 are side and end elevations of the modification of FIGS. 12 and 13 in its stored configuration.

FIG. 1 shows a side elevation of the presently-preferred embodiment of urinal 20 according to the invention. This urinal has a frusto-conical wall 21 with a central axis 22. The frusto-conical wall has an open smaller end 23 and a larger end 24 which is closed off by a bottom wall 25.

The preferred embodiment of bottom wall 25 is shown in FIG. 4. This bottom includes an inner bottom wall 25a and an outer bottom wall 26 which are cemented together to hold between them tabs 27 (see FIGS. 9 and 11) which are integral with the frusto-conical wall at its larger end. When the tabs are folded under the inner

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bottom wall, the frusto-conical wall makes a fluid seal with the inner bottom wall which is reinforced by the outer bottom wall.

A handle 35 (FIGS. 1 and 2) has a pair of flaps 36, 37 and an opening 38. The flaps are cemented or otherwise affixed to the top portion of the frusto-conical wall. The handle is hinged adjacent to the flaps so that it can be folded flat when the device is in its stored configuration (see FIGS. 7 and 8).

Ordinarily, the bottom wall will be made of rather rigid material. However, for flushable devices, the bottom may be somewhat flexible, being stiff enough to keep from collapsing when in use. The frusto-conical wall, however, will be made of relatively flexible, but foldable, material which can be folded to enable the device to be collapsed to its stored configuration, or opened to its set-up configuration. Waxed or plastic-coated paper stock of adequate weight, strength and thickness, for example, are suitable for the frusto-conical wall. In fact, for very light-weight urinals intended to be used only once and then thrown away, fairly heavy grades of parchment will be adequate. These have the advantage that the entire device can be rendered flushable. Means for forming and sealing the material so that it does not leak at the seams are well-known in the paper-forming art. The particular sealing means used form no part of the invention, and will not be discussed in detail.

The frusto-conical configuration is rolled up from the flexible, flat blank shown in FIG. 11. Even though the material is flexible, once its edges are joined to form the frustum, and the larger end is joined to the base, the structure is comparatively rigid. It is, of course, possible to flatten the device simply by stepping on it, but this means of collapsing it would be suitable only for disposing of it. What is desirable is to have a device which can thereafter be neatly stored, then be set up for use, and which can thereafter be as easily and neatly folded up again. Accordingly, means are provided for guiding the folding movements of the frusto-conical wall so that the device will reliably fold in such a manner as to form a substantially flat stored configuration.

The means for guiding the folding action to achieve a sensibly flat stored configuration will hereinafter be called "scores." The term is used broadly, and includes any means which suitably weaken the frusto-conical wall so that a folding action will occur along the score instead of at some other region. The preferred form of score is that generally used in the cardboard folding art which consists of a local compression along a line at which folding is to take place, and is formed by pushing a die into the material. There are, of course, other means for appropriately weakening the wall, and the term "score" is used to include all of them.

For convenience in disclosure, the urinal in its set-up condition will be divided into several arbitrary regions. An upper region and a lower region are divided by that plane which includes the central axis and which forms a dihedral angle with the bottom wall, the dihedral edge of which is normal to the central axis. In FIG. 1, the edge of this plane is shown by dotted line 39, the upper region lying above and to the right of the plane, and the lower region lying below and to the left of it. The terms "forward" and "rear" refer to the directions left and right, respectively, in FIG. 1. A neck region and a base region

are divided by a plane lying normal to the plane of FIG. 1, and departing from the forward end of the bottom wall, extending upwardly and to the right therein. The edge of this plane is shown by dotted line 40. The base region lies below and to the right of plane 40, and the neck region lies above and to the left of it.

Note that the intersection of plane 39 with the frusto-conical wall is coincident with the position of generators of the frusto-conical surface.

Neck scores 50, 51 are formed on the generators intersected by plane 39. These scores extend from the open end 23 along the generators partway to the bottom wall, terminating at medial points 52, 53, respectively, on said generators. The location of the medial points will be fully described below.

It will now be observed that it is at least theoretically possible for those portions of the frusto-conical wall which lie on opposite sides of scores 50 and 51 to be folded flat against each other, the generators dividing the frusto-conical wall into upper and lower neck regions which are mirror images of each other, except for the bottom portion of the lower neck region which is axially longer than the upper neck region. Scores 50, 51 will therefore define the outermost edges of a structure which can be flattened. This could, of course, conveniently be carried out were it not for the non-conical bottom member which prevents total flattening by folding along the generators. In order to fold the device flat to either of the configurations shown in FIGS. 5 and 6, it is necessary to form the neck portion to a substantially flat structure. To enable this movement to occur, the upper region hinges at rear end 55, and the lower region hinges at forward ends 56. The upper region of the base region, and the lowermost part of the lower region of the neck region fold toward each other until they nearly abut. At this position, the neck region is flattened and can be folded at this abutment. The ends of the last-named fold determines the location of the medial points.

An upper medial score 57 passes over the upper portion and interconnects the medial points. The upper medial score, while curved and generally elliptical when the device is set up, is defined as that curve which joins the two medial points which, when laid flat, forms a straight line. The importance of this curvature is shown in FIGS. 5 and 7 where it is seen that the area denoted by numeral 58 is flattened out and folded cleanly in a straight line transverse fold.

Side scores 59, 60 extend from medial points 52 and 53, respectively, back to end points 61, 62 which are spaced laterally from the rear end and somewhat above the bottom wall. Scores 59 and 60 are gradual curves along their upper portions where their path does not incline too steeply to plane 39. Toward their lower ends they are more sharply curved. When flattened out, they form a gradually curved edge of a flat plane, as will be seen.

Transition scores 63, 64 extend from medial points 52 and 53, respectively, to intersect the bottom wall at points 63a, 64a laterally spaced from the forward end thereof. Points 63a, 64a are spaced apart far enough to permit a hinge 65 to be formed at the forward end. Scores 63 and 64 are curves which become straight lines when folded down into a plane as shown in FIGS. 7 and 8. They serve to divide the lower parts of the neck region and the base region so that these parts can fold into respective planes.

Basal scores 66, 67 extend from points 61, 62 to intersect with transition scores 63, 64, respectively. The latter intersections are spaced from the bottom wall. The basal scores are gentle curves, which approximately maintain the same elevation relative to the bottom wall, except that it is slightly crowned upwardly near its mid-point. Substantially all the distortion, in the sense of wrinkling, which takes place on collapsing this structure occurs between the bottom wall and the basal scores. Taking the distortion in this region enables almost all the rest of the

device to be collapsed into flat surfaces without wrinkling.

It will be seen that the amount of distortion is small and that it tends to take place on and near well-defined folding lines which are far enough removed from the bottom wall so that the distortion will not tend to cause a leak where the frusto-conical wall joins to the bottom wall.

A lower medial score 68 extends between the medial points along that path which, while curved when the urinal is set up, would be a straight line when the portions between the side scores are brought flat together. It is laterally opposed to the upper medial score. Both the upper and lower medial score may be provided if desired. This will enable a device to be folded into the configurations of both FIGS. 5 and 6. Should it be desired to have a device which is only foldable to the configuration of FIG. 5, then only the upper medial score and not the lower medial score would be provided. Should it be desired to have a device which is only foldable to the configuration of FIG. 6, then the lower medial score, and not the upper medial score, would be provided. Both may, of course, be provided to give a full choice.

The blank for the frusto-conical wall is shown in FIG. 11 where the scores are numbered with numerals corresponding to those shown in FIGS. 1-6. In addition, there are shown tabs 27 which are folded between the inner and outer bottom walls for making the sealing joint at the bottom (see FIG. 9). If desired, the tabs could be made large enough to cover the entire bottom, which is particularly useful when only a single bottom wall is used. It is easier to manufacture a leakproof device with a double bottom wall than with a single bottom wall, but it is still possible to use only one of them.

FIGS. 12-15 show an optional embodiment for the neck region, which forms an opening which tends to stay open a little better than that shown in FIG. 4. The urinal structure is identical to that of FIG. 1. Medial point 53 and neck score 51 are shown.

This modification comprises flute scores 75, 76 diverging from point 77 on one side, and flute scores 78, 79 diverging from point 80 on the other side. Points 77 and 80 are located on neck scores 51 and 50, respectively, spaced from the respective medial points. Scores 75, 76, 78, and 79 are curves on the set-up configuration, and fold up to make a straight edge.

It will now be seen that the device is easily set up simply by pulling on the handle so that it will assume the configuration shown in FIG. 1. To refold it, downward pressure is exerted on the upper region, while the areas between the side scores and basal score are squeezed in. At the same time, the neck region is collapsed by folding on scores 50 and 51. Also, the lower part of the lower neck region is hinged rearwardly. That part, and the part of the upper region within the upper medial score and the side scores, now abut. Next, depending on which of the configurations of FIGS. 5 or 6 is desired, the device is folded either along the upper medial score to form the configuration of FIG. 5, or along the lower medial score to form the configuration of FIG. 6. The configuration of FIG. 5 uses the least horizontal storage area and the most vertical storage area, while that of FIG. 6 uses the least vertical area and the most horizontal area. The choice will depend on the particular location in the aircraft or other conveyance where the device is to be stored.

The stored configuration of the modified neck is shown in FIGS. 14 and 15. The areas between the flute scores are tucked in. When the device is set up, the opening tends to be somewhat more open than that of FIG. 4, because the rim of the opening is broken up into shorter segments. This feature, combined with the "snap action" of the fold along the neck score between points 77 and 80, tend to keep the opening open when the device is set up.

Depending on the material which is used, the device may either be rinsed out and folded up for later reuse, or emptied and folded up for disposal. It has been found that a container of approximately one quart capacity can

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be folded down into a folded configuration as shown in FIG. 5, which is about 4 inches wide and 6 inches long by about ½ inch thick. The preferred angle between the bottom wall and the central axis is about 40°. The centroid of the volume preferably lies over the bottom wall. These containers are rarely filled full, so that the centroid of the urinal when partly full of fluid will always lie over the centroid, so that there will be no tendency for the device to tip over when fluid is in it. This is, of course, an important design consideration, and according to best design, the centroid of the empty urinal will overlie the bottom wall.

This invention is not to be limited by the embodiments shown in the drawings and described in the description which are given by way of example and not of limitation, but only in accordance with the scope of the appended claims.

What is claimed is:

1. A disposable collapsible urinal comprising a frusto-conical wall having a central axis and an open smaller end, a bottom wall extending across and closing off the larger end of the frusto-conical wall and disposed in oblique angle to said axis, at least the frusto-conical wall being made of a relatively flexible material, both walls being made of fluid impermeable material, a pair of neck scores extending from the open smaller end along the generators defined by the intersection of the frusto-conical wall with a plane which includes the central axis and forms a dihedral edge with the bottom wall which is normal to said axis, there being two of said neck scores, each of said neck scores extending to a respective medial point on said generators; an upper medial score interconnecting said medial points and being disposed on that path on the opposite side of said generators from the bottom wall, which, when the smaller end of the frusto-conical wall is flattened by folding it along the neck scores so that the regions between them are brought together flat, the line defined by the upper medial score then becomes a substantially straight line; a pair of side scores extending respectively from the medial points to end points spaced from the bottom wall and from each other, said side scores converging toward each other as they extend away from their medial points; a first hinge portion along the bottom wall between said end points; a pair of transition scores extending respectively from the medial points toward the bottom wall, their intersections with the bottom wall being spaced from each other; a second hinge portion along the bottom wall between said last-mentioned intersections a pair of basal scores interconnecting respective transition scores at points spaced from the last-mentioned intersections; a pair of basal scores interconnecting respective transition scores at points spaced from the last-mentioned intersections and the said end points; and a lower medial score extending along the frusto-conical wall between the medial points on the same side of the generators as the bottom wall and directly opposite the upper medial score; whereby when the neck scores are folded to press the regions between them flat, and the region bounded by a medial score and the side scores is pressed toward the base, the frusto-conical wall bends at the hinge portions, and folds at the basal and transition scores to flatten out, that portion between the open end and a medial score can be folded over to flatten the entire structure, and the frusto-conical wall can be folded along one of the medial scores.

2. A urinal according to claim 1 in which a handle is attached to the region between the side scores, said handle including a portion foldable to lie flat against said region.

3. A urinal according to claim 1 in which flute scores are formed in pairs, each pair intersecting a respective neck score at a point thereon spaced from the respective medial point, the members of each pair diverging from each other toward the open end and intersecting said open

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end at locations spaced from each other, whereby the open end is rendered collapsible to a fluted configuration.

4. A urinal according to claim 3 in which a handle is attached to the region between the side scores, said handle including a portion foldable to lie flat against said region.

5. A disposable collapsible urinal comprising a frusto-conical wall having a central axis and an open smaller end, a bottom wall extending across and closing off the larger end of the frusto-conical wall and disposed in oblique angle to said axis, at least the frusto-conical wall being made of a relatively flexible material, both walls being made of fluid impermeable material, a pair of neck scores extending from the open smaller end along the generators defined by the intersection of the frusto-conical wall with a plane which includes the central axis and forms a dihedral edge with the bottom wall which is normal to said axis, there being two of said neck scores, each of said neck scores extending to a respective medial point on said generators; a medial score interconnecting said medial points and being disposed on that path on the opposite side of said generators from the bottom wall, which, when the smaller end of the frusto-conical wall is flattened by folding it along the neck scores so that the regions between them are brought together flat, the line defined by the medial score then becomes a substantially straight line; a pair of side scores extending respectively from the medial points to end points spaced from the bottom wall and from each other, said side scores converging toward each other as they extend away from their medial points; a first hinge portion along the bottom wall between said end points; a pair of transition scores extending respectively from the medial points toward the bottom wall, their intersections with the bottom wall being spaced from each other; a second hinge portion along the bottom wall between said last-mentioned intersections; a pair of basal scores interconnecting respective transition scores at points spaced from the last-mentioned intersections and the said end points; whereby when the neck scores are folded to press the regions between them flat, and the region bounded by a medial score and the side scores is pressed toward the base, the frusto-conical wall bends at the hinge portions, and folds at the basal and transition scores to flatten out, that portion between the open end and a medial score can be folded over to flatten the entire structure, and the frusto-conical wall can be folded along one of the medial scores.

6. A disposable collapsible urinal comprising a frusto-conical wall having a central axis and an open smaller end, a bottom wall extending across and closing off the larger end of the frusto-conical wall and disposed in oblique angle to said axis, at least the frusto-conical wall being made of a relatively flexible material, both walls being made of fluid impermeable material, a pair of neck scores extending from the open smaller end along the generators defined by the intersection of the frusto-conical wall with a plane which includes the central axis and forms a dihedral edge with the bottom wall which is normal to said axis, there being two of said neck scores, each of said neck scores extending to a respective medial point on said generators; a medial score interconnecting said medial points and being disposed on that path on the same side of said generators as the bottom wall, which, when the smaller end of the frusto-conical wall is flattened by folding it along the neck scores so that the regions between them are brought together flat, the line defined by the medial score then becomes a substantially straight line; a pair of side scores extending respectively from the medial points to end points spaced from the bottom wall and from each other, said side scores converging toward each other as they extend away from their medial points; a first hinge portion along the bottom wall between said end points; a pair of transition scores extending respectively from the medial points toward the

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bottom wall, their intersections with the bottom wall being spaced from each other; a second hinge portion along the bottom wall between said last-mentioned intersections; a pair of basal scores interconnecting respective transition scores at points spaced from the last-mentioned intersections and the said end points; whereby when the neck scores are folded to press the regions between them flat, and the region bounded by a medial score and the side scores is pressed toward the base, the frusto-conical wall bends at the hinge portions, and folds at the basal and transition scores to flatten out, that portion between

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the open end and a medial score can be folded over to flatten the entire structure, and the frusto-conical wall can be folded along one of the medial scores.

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