May 6, 1941. W. E. AMBERG 2,240,599

CONTAINER

Filed July 6, 1937 2 Sheets-Sheet 1

Fig. 1.

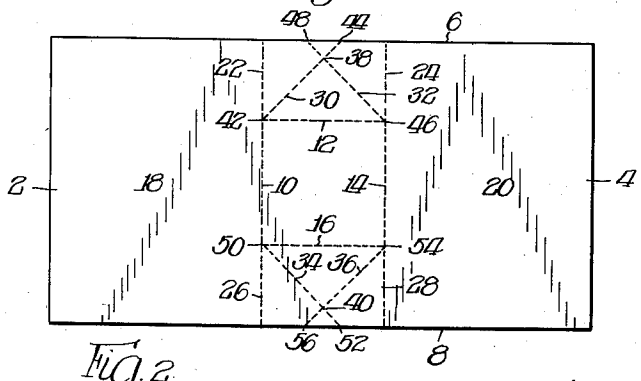


Fig. 2.

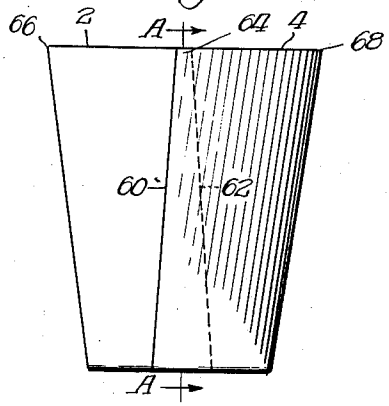


Fig. 3.

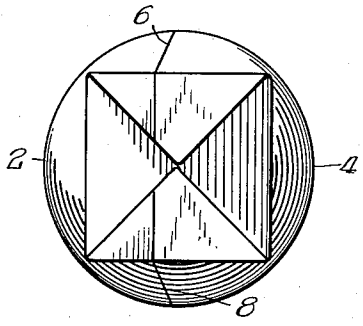


Fig. 4.

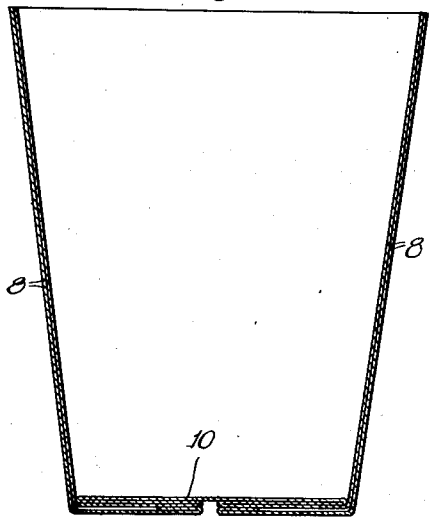
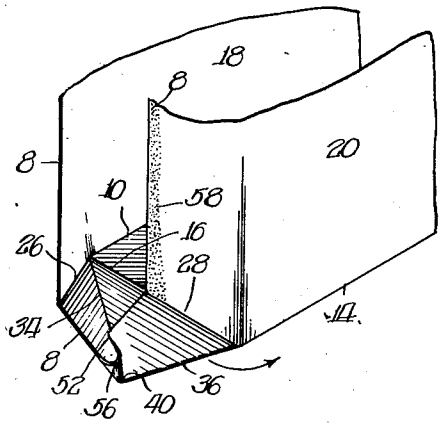


Fig. 5.



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Fig. 7

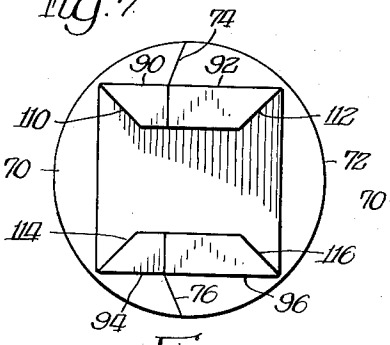


Fig. 6

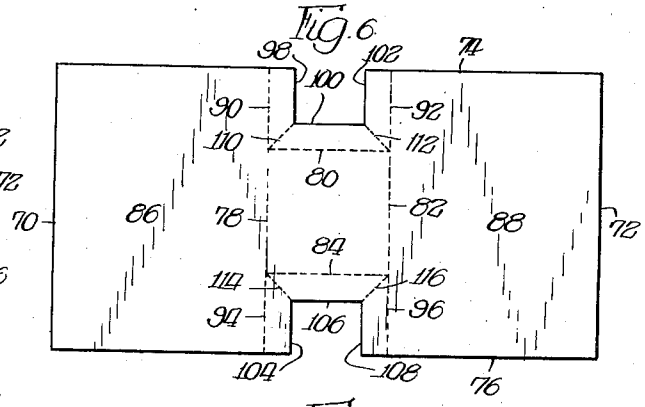


Fig. 8

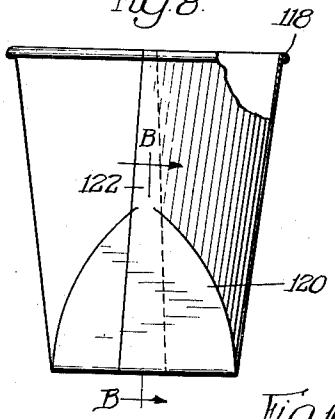


Fig. 9

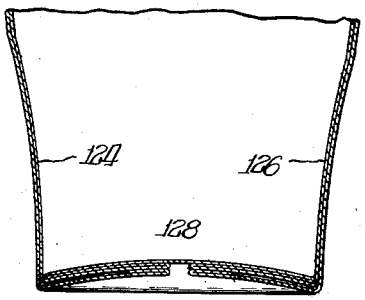
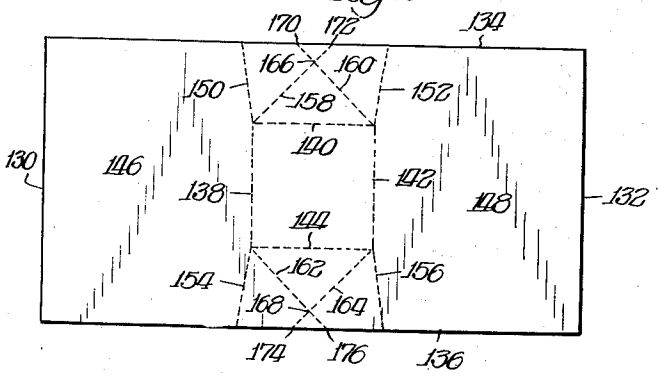


Fig. 10



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Patented May 6, 1941 2,240,599

UNITED STATES PATENT OFFICE

2,240,599

CONTAINER

Walter E. Amberg, Chicago, Ill., assignor to Universal Paper Products Company, Chicago, Ill., a corporation of Illinois

Application July 6, 1937, Serial No. 152,105

6 Claims. (Cl. 229—1.5)

This invention relates to receptacles, more particularly paper containers, and has for an object thereof the provision of an improved type of paper receptacle having a polygonal base which can be made from a rectangular sheet of paper without waste. The invention especially contemplates the provision of a new and improved type of single piece paper drinking cup which is substantially leak-proof and may be used in dispensing water, soda and other liquids.

A cup having a flat polygonal base and a circular mouth has been described by Elliott, U. S. Patent 1,073,481, granted September 16, 1913. Modifications of the Elliott cup have also been described by other workers in the art, as for example, Novick, U. S. Patents 1,910,177 and 1,910,178, granted May 23, 1933, in which the cup has a pull flap either at the base or extending throughout the length of the body portion.

In the manufacture of such cups or receptacles heretofore proposed, owing to the shape or configuration of the blank, a considerable amount of the paper is wasted. Such paper is scrapped and forms no part of the finished cup.

Rectangular blanks have been used in making cylindrical cups as described in Shea, U. S. Patent 759,029, granted May 3, 1904, by rolling a rectangular piece of paper in the form of a cylinder and folding in the bottom edges.

Special forms of containers or packages have also been made by folding two opposite sides of a rectangular sheet material around a rectangular base portion as described, for example, in Warren, U. S. Patent 898,293, granted September 8, 1908, in which portions of the blank forming the lower edges of parts of the side walls are cut and the side walls are arranged to envelop each other to produce a container of pyramidal form.

Certain types of packages have been made from rectangular blanks by folding them in such a way that the fold portions are a necessary part of the side walls. That is to say, without the fold portions, the side walls would not be complete. The latter type of package or container is used for special purposes such as packaging cigarets, and to my knowledge no such container has ever been provided which would be suitable for use as a drinking cup. Nor do the principles of folding the blank so that the fold portions are essential parts of the side walls lend themselves to the production of a leak-proof drinking cup or container.

One of the important features of the present invention is the provision of a cup blank which may be cut from a roll of paper without waste, and the provision of an improved cup formed from said blank likewise without waste.

According to the preferred practice of the invention, the blanks are cut from a roll of paper, the width of which corresponds to either the width or length of the cup blank, by cutting the paper transversely along identical lines in such a manner as to produce successive rectangular blanks. By making the cup from a rectangular blank, no waste is involved in cutting the blank.

The improved cup formed from the blank hereinabove described is distinguished from previously described cups in a number of respects. It differs from previous cups having a flat polygonal base and a circular mouth in that it is formed from a rectangular blank and has a plurality of glued seams in the side walls. The previously described cups having a polygonal base have been made from blanks with curved edges, the cup having a single seam in the side wall. A plurality of glued seams in the side walls as herein described lends a stiffness to the cup which is not ordinarily obtainable in a cup having a single glued side wall seam. A cup produced without waste, as herein described, from a single piece of paper, or other suitable flexible material, is relatively more rigid and less likely to collapse than previously described cups referred to above. The provision of a cup of this type permits the use of lighter stock and a stronger cup is obtained.

The type of cup herein described is not dependent upon seamed elements for the formation of its base, as is the case of the cylindrical cup referred to above. Nor are folded portions necessary for the formation of the side walls, as in the case of some special types of packages previously mentioned. Both the base and the side walls of the present cup or container are complete in themselves and are formed independently of the fold portions at the base. The cup may be formed without cutting away any portions of the blank, giving a cup of maximum volume with minimum of paper used. The fold portions are common continuations of both the base and side walls. If, for any reason, portions of the blank are cut away, care is taken that no cuts are made along the lower edges of the side walls as in the pyramidal container previously described, because cuts at such points may cause leakage.

Other objects and features of the invention will become apparent from a reading of the following specification in the light of the accompanying drawings in which:

Fig. 1 is a view of a blank for forming a cup having a square base showing a method in which the side walls and boundary lines thereof may be defined;

Fig. 2 is a side elevational view of a cup formed from the blank of Fig. 1;

Fig. 3 is a bottom view looking upward of the cup shown in Fig. 2;

Fig. 4 is a sectional view of the cup shown in Fig. 2 along the lines A—A;

Fig. 5 is a view in perspective with parts cut away showing the manner of folding the blank to form the cup;

Fig. 6 is a modified form of blank showing fold lines and cut away portions;

Fig. 7 is a bottom view of a cup made from the blank shown in Fig. 6;

Fig. 8 is a side elevational view of a modified form of cup partly in section and with parts cut away showing a rolled brim and concave side and bottom portions;

Fig. 9 is a section of the cup shown in Fig. 8 along the line B—B illustrating the appearance of the concave side and bottom portions;

Fig. 10 is another form of blank showing a modification in the fold lines.

It will be understood that figures shown in the drawings are diagrammatical. The dotted lines in the drawings indicate fold lines.

As illustrated in Fig. 1, the cup blank is preferably rectangular in shape and may be cut from a roll of paper, not shown, the width of which corresponds to the distance between the edges 2 and 4 of the blank, the successive cuts being made along the edges 6 and 8 of the blank. Fold lines 10, 12, 14 and 16 define the base of the cup. The side wall portions 18 and 20 are integral with the base on sides 10 and 14, respectively, and form continuations thereof.

The fold portions are defined in part by the fold lines 12 and 16 at the edges of the base, in part by portions of the free edges of the blanks 6 and 8, and in part by fold lines 22, 24, 26 and 28 at the lower edges of the side walls 18 and 20.

Within the fold portions 6, 12, 22, 24 and 8, 16, 26, 28, respectively, are other fold lines such that when the fold portions are folded, a triangular fold piece is produced. The auxiliary fold lines 30, 32, 34 and 36 run from the corners of the base square to the outer edges 6 and 8 of the blank intersecting the intermediate points 38 and 40 as shown. Thus, in fold portion 6, 12, 22, 24 auxiliary fold line 30 runs from point 42 to point 44, bisecting the angle formed by lines 12 and 22. Auxiliary fold line 32 runs from point 46 to point 48, bisecting the angle formed by fold lines 12 and 24 and intersecting the auxiliary fold line 30 at point 38. In fold portion 8, 16, 26, 28 auxiliary line 34 runs from point 50 to point 52, bisecting the angle formed by fold lines 16 and 26. Auxiliary fold line 36 runs from point 54 to point 56, bisecting the angle formed by fold lines 16 and 28, and intersecting auxiliary fold line 34 at point 40.

It is to be observed that the fold portions 6, 12, 22, 24 and 8, 16, 26, 28 are each continuations of the side wall portions 18 and 20 and of the base portion defined by lines 12, 10, 14 and 16, and when folded the fold lines 22 and 24 at the lower extremity of the side wall portions 18 and 20 coincide with the edge of the base 12. Similarly the fold lines 26 and 28 on the opposite sides of side wall portions 18 and 20 coincide with the edge of the base 16.

The cup is formed by folding side wall portions 18 and 20 around the base along fold lines 10, 12, 14 and 16 and overlapping the free edges 6 and 8, which may be adhesively secured together in any suitable manner. The fold portions are then folded along lines 12, 22, 24, 30 and 32 forming a triangular shaped fold piece. This fold piece may then be secured to the base or side walls of the cup, depending upon the particular type of container desired. It may likewise be secured either on the inside or outside of the cup, but for the purpose of forming a drinking cup or a container which is leak-proof, the fold portions are preferably folded beneath the base of the cup and adhesively secured thereto.

The manner of folding the side walls and fold portions is illustrated by the perspective view in Fig. 5 showing the blank of Fig. 1 partially folded with parts cut away. As illustrated in Fig. 5 opposite side wall portions 18 and 20 of the blank are brought toward each other and folded along the creased lines of the base 10 and 14. They are then further folded along lines 26 and 28 at their lower extremities so that fold lines 26 and 28 when finally in position coincide with the edge of the base 16.

The fold portion 8, 16, 26, 28 is creased along lines 34 and 26. As this fold portion is creased an apex is formed at point 40 and at said apex a pocket of material is formed containing the portion 40, 52, 56. As the folding is continued the point 56 is folded over toward fold line 36. Side wall fold line 26 is folded over and coincides with base fold line 16. In this position the fold portion is completely folded with an overlying pocket at point 40. It is now ready to be bent into place and secured to the body of the cup to make a leak-proof cup. This is preferably effected by bending the fold portion beneath the base of the cup. The bend along coinciding lines 16, 26 and 28 is made in a downward direction as indicated by the arrow in Fig. 5, effectively locks the same at the base of the side wall, and when the side wall is glued along a suitable glue line 58, leakage is practically impossible. A portion or all of the fold portions may be readily glued on one or both sides, it being only necessary to see that no glue is applied to the outside of the cup which would cause it to stick to other cups when nested therewith.

The other side of the cup is similarly constructed. The side walls of the cup may be straight or converging. The ordinary drinking cup has a curved mouth of larger diameter than the base and in order to obtain this type of cup the overlapped portions of the side walls are varied, being made larger toward the bottom of the cup as illustrated in Fig. 2 by the tapered portion enclosed with lines 60 and 62. With the fold lines as shown in Fig. 1 this cup would be slightly higher at the middle point 64 than at the upper extremities 66 and 68, the drawing of Fig. 2 being merely diagrammatical in this respect. This difference in height is hardly noticeable by casual observation and if desired, the height may be made the same throughout by varying the fold lines in a manner hereinafter described.

The bottom view illustrated in Fig. 3 shows how the fold portions finally appear. Fig. 4 is a section through A—A of Fig. 2, showing a double thickness of material at the glue lines and multiple thicknesses of material at the bottom. The plurality of glued seams greatly strengthens the cup on opposite sides and the manner of constructing the bottom by forming pockets

therein and by having the bottom fold portions continuations of both the side walls and of the base makes leakage practically impossible. Furthermore, in view of the numerous folds in the bottom and the apexes at points 38 and 40 forming pockets it is unnecessary to apply glue to the entire bottom portion.

As illustrated in Fig. 6, before or during the formation of the cup, portions of the blank may be cut away. Thus, in Fig. 6 the blank is generally rectangular in shape, having opposite sides 70 and 72, and 74 and 76. The base portion is defined by fold lines 78, 80, 82 and 84. The side wall portions are indicated by numerals 86 and 88. The fold portions are defined in part by the edges of the blank 74 and 76, in part by the bottom edges of the side walls 90, 92, 94 and 96, and in part by base fold lines 80 and 84. The cut away portions are illustrated by lines 98, 100 and 102, and 104, 106 and 108. Auxiliary fold lines in the fold portions are indicated by lines 110 and 112 on one side, and lines 114 and 116 on the other side. The cut away portions defined by 98, 100 and 102, and 104, 106 and 108 may be made by cutting off the upper portions, or apexes, of the triangular fold portions formed when the blank of Fig. 1 is folded as previously described. It is important to note that there are no cut lines along lines 90, 92, 94 and 96, that is, at the base of the side walls, as in the pyramidal type of container previously described.

A cup made from the blank shown in Fig. 6 would have the appearance looking up from the bottom of the cup illustrated in Fig. 7.

As shown in Fig. 8, any of the cups herein described may have a rolled brim 118, which may be of any suitable configuration. Instead of being rolled, the brim may be merely flared. Different types of rolled and flared edges are well known in the art and are commonly used in making paper cups.

Any of the cups herein described may also have concave side and base portions, as illustrated, for example, by the concave portion 120 shown in Fig. 8. If desired, all of the sides may be concave, as shown by the sectional view in Fig. 9 along line B—B taken through the seamed side wall 122 of Fig. 8. As illustrated in Fig. 9, the lower portions of side walls of the cup 124 and 126 are both concave, and the base portion 128 is concave, tending to give the cup more rigid construction. In making such concave portions of the cup, the lower edges of the base may be straight so that the base is a right angled polygon, or they may be bowed inwardly along lines not shown so that the base is an equiangular polygon, although not a right angle polygon. It will be apparent that other variations may be made in making concave portions at the lower portions of the cup.

A variation of the blank shown in Fig. 1 is illustrated in Fig. 10, the principal difference being in the fold lines and in the height of certain portions of the cup. The blank shown in Fig. 10 comprises opposite sides 130 and 132, and 134 and 136. The fold lines at the base are formed by lines 138, 140, 142 and 144. The side wall fold portions are indicated by numerals 146 and 148. The fold portions at the base are defined in part by the edges of the blank 134 and 136, in part by the edges of the base 140 and 144, and in part by fold lines 150, 152, 154 and 156. Each fold portion contains auxiliary fold lines, in one fold portion lines 158 and 160, which intersect with each other at point 166, and with the side of the blank 134 at points 170 and 172. In the other fold portion the auxiliary lines 162 and 164 intersect with each other at point 168, and with the side of the blank 136 at points 174 and 176. When these fold portions are folded in the manner previously described with reference to Figs. 1 to 5, and the side wall fold portions 146 and 148 are formed around the base portion, as previously described, so that lines 150 and 152 coincide with each other, and the edge of the base 140 and lines 154 and 156 coincide with each other, and the edge of the base 144 and the other fold lines of the fold portions are folded as indicated, a cup is formed, the height of which is controlled by the angles which fold lines 150, 152, 154 and 156 make with the base fold lines 140 and 144. It is possible to make a cup with slanting or converging side walls, that is, a cup having a mouth of larger area than the base while still obtaining uniform height throughout the cup.

Referring again to Figs. 1 and 10, it will be noted that as the angles of the fold lines between the base portions and the lower extremities of the side walls are varied, the height of the cup may be varied. Thus, when the fold lines at the lower extremities of the side walls are perpendicular to opposite edges of the base, as shown in Fig. 1, and the cup is constructed with slanting side walls, the height at the central vertical axis will be somewhat greater than the height at opposite sides of the cup. By making the angles of the lower extremities of the side walls with opposite edges of the base obtuse, as illustrated in Fig. 10, the height of the cup at the central vertical axis can be decreased. The side walls of the cup may be made to converge or slant varying degrees, according to the taper in the glued portions of the side wall seams. If a cup with upright side walls is desired, the blank of Fig. 1 may be used without tapering the side wall seams. That is to say, the cross section of the side wall seams would be substantially the same from the top to the bottom of the cup.

From the foregoing description, it will be observed that the size of the blank depends upon the size of the cup desired. Thus, the distance from the top to the bottom edges of the blank shown in Figs. 1, 6 and 10 must be such that the side wall portions can be lapped around the base portion with due allowance for overlap. The distance between opposite sides of the blanks, as shown in the figures heretofore described, will depend upon the desired height of the cup. Sufficient space must be allowed for formation of the polygonal base in the central portion of the blank and for the side walls on opposite sides of said base.

According to the method involved, the polygon is placed in the blank with opposing sides substantially parallel to those portions of the blank which will eventually form the top edges of the cup. Opposing sides of the blank are then formed around the polygonal sides of the base. A four-sided base is preferred to make a perfectly symmetrical cup. The base should also preferably be regular or equiangular. Ordinarily, best results are obtained with a square base, because of the ease of making the fold portions as heretofore described, but the base may be a rectangle, other than a square, in which case the resultant cup or container would naturally tend to have an elongated shape. Instead of having four sides, the base may be a polygon of a greater number of sides, such as six or eight, but the difficulty of

making the fold portions is increased with an increase in the number of sides. In order to produce a symmetrical container from a rectangular blank, the polygon at the base should have an even number of sides, otherwise it would be necessary to fold down top portions of the container. It will be appreciated that the rectangular blank may be cut along regular curved lines at its outer edges in order to produce special effects. For instance, the blanks of Figs. 1, 6 and 10 may have concave portions cut out of any or all of the sides thereof in order to produce a cup with side walls of varying height, or to form curved seams in the side walls, or to reinforce the cup at the top of the side walls. In such case, the blank would not be rectangular, although it should preferably still be substantially equiangular.

It will be recognized that the cup or container comprehended by this invention may be used for various purposes and that modifications in the design and construction of the cup may be made. For instance, other pliable sheet materials, e. g., moisture-proof regenerated, transparent or translucent cellulosic materials, rubberized sheet materials, and the like, may be substituted for paper without departing from the true spirit of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A single piece paper cup having an equilateral four-sided base, a curved open mouth of larger area than the base, substantially smooth converging side walls which are continuations of the two opposite sides of the base, opposite overlapping glued seams in said side walls on the other two sides of said base and folded portions along the edges of the base made from continuations of portions of the base and continuations of portions of the walls containing the seams, said folded portions not being an essential part of the base and side walls, and being folded in the form of a triangle with a pocket of underlying material at the apex and glued under the base in a manner adapted to lock the seams and to prevent leaking.

2. A rectangular blank for forming single piece receptacles having a four-sided base, said blank comprising two opposite side wall portions, a base portion and fold portions, the base portion being defined by fold lines forming a square in the central portion of the blank with sides substantially parallel to sides of the blank, the side wall portions being defined in part by the sides of the blank, in part by fold lines of the base portion, and in part by side wall fold lines which join opposite base fold lines with the sides of the blank, and the fold portions being defined in part by the sides of the blank, in part by the fold lines at the lower extremity of the side walls and in part by base fold lines which intersect the side wall fold lines, said fold portions each containing two converging fold lines running toward the side of the blank from the intersections of the side wall fold lines and base fold lines and intersecting at an intermediate point in a manner such that the fold portions when folded in making the vessel are triangular in appearance having an apex with an underlying pocket of paper therein.

3. A single piece paper cup having a rectangular base, a curved open mouth of larger area than the base, substantially smooth converging side walls which are continuations of two opposite sides of the base, opposite overlapping glued seams in said side walls on the other two sides of said base and folded portions along the edges of the base made from continuations of portions of the base and continuations of portions of the walls containing the seams, said folded portions not being an essential part of the base and side walls and being folded in the form of a triangle with a pocket of underlying material at the apex adapted to lock the seams and to prevent leaking, said triangular folded portions being adhesively secured to the body of the cup.

4. A rectangular blank for forming single piece receptacles having a polygonal base, said blank comprising two opposite side wall portions, a base portion and fold portions, the base portion being defined by fold lines forming a polygon in the central portion of the blank with sides substantially parallel to sides of the blank, the side wall portions being defined in part by the sides of the blank, in part by fold lines of the base portion and in part by side wall fold lines which join opposite base fold lines with the sides of the blank and the fold portions being defined in part by the sides of the blank, in part by the fold lines at the lower extremity of the side walls and in part by base fold lines which intersect the side wall fold lines, said fold portions each containing two converging fold lines running toward the side of the blank from the intersections of the side wall fold lines and base fold lines and intersecting at an intermediate point in a manner such that the fold portions when folded in making the vessel are triangular in appearance and have an apex with an underlying pocket of paper therein.

5. A paper cup blank consisting of a substantially square area of a size appropriate for the cup bottom, wings extending one from each of two opposite sides of said area a distance sufficient to provide the intended height of the cup and each of sufficiently greater width than the side of said area to provide marginal portions projecting laterally beyond the sides of said area far enough to cause the edges of one wing to overlap the edges of the other when said wings are bent up and their said marginal portions brought together to form the cup sides, and foldable sealing extensions on the basal edges of said marginal portions and also on the other two sides of said substantially square area, said sealing extensions being foldable in the form of a triangle with a pocket of underlying material at the apex adapted to lock the seams and to prevent leaking.

6. A paper cup formed from a blank consisting of a polygonal base, wings extending from opposite sides of said base a distance sufficient to provide the intended height of the cup and each of sufficiently great width to provide marginal portions projecting laterally beyond the sides of said base far enough to cause the edges of one wing to overlap the edges of adjoining wings when said wings are bent up and their marginal portions brought together to form the cup sides and folded sealing extensions on the basal edges of said marginal portions and also on sides of said polygonal base of triangular form with a pocket of underlying material at the apex thereof adapted to lock the seams and to prevent leaking, said sealing extensions being sealed to the cup.

WALTER E. AMBERG.