LOW COST SPILL-RESISTANT CUP

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ABSTRACT

The improved low cost cup and container for storing and dispensing liquids has a scoop-like-baffle that separates the body of the cup with the mouth opening of the cover. It resists spilling when shaken or vibrated suddenly. When the improved cup and container is tilted for pouring, such that the liquid level inside the storage chamber of the cup chamber is higher than the liquid level at the mouth opening, no liquid pours out of the cup. The liquid starts to flow out of the mouth opening after the cup is tilted beyond a start-to-pour angle. The start-to-pour angle is reached when the cup is tilted permitting the outside air to pass through the scoop-like-baffle and into the storage chamber. The improved cup has a removable cover with a scoop-like-baffle bended downward toward the body of the cup.
LOW COST SPILL-RESISTANT CUP

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation-in-part of U.S. patent application Ser. No. 11/307,912 filed Feb. 28, 2006. The entirety of each of these disclosures is incorporated herein by reference for all purposes.

FIELD OF THE INVENTION

[0002] The field of the invention is cups and other containers for dispensing a liquid and more particularly, is cups for dispensing a liquid with a smoother pour and with reduced spilling especially when shaken or vibrated suddenly.

BACKGROUND OF THE INVENTION

[0003] Man has used containers for storing and dispensing liquids for millennia. However, containers still have their problems. For example, full cups of soda or hot coffee sold in fast food restaurants being consumed in moving cars have caused many spilling accidents. Although these cups may be equipped with sealing lids with small mouth openings, spilling mishaps are still very common. Serious burns or a moving car accident may result from a very hot coffee spill. Therefore, there is a need for an improved low cost disposable cup and container, which ideally does not spill while drinking and, realistically is spill-resistant.

[0004] On the market, most low cost drinking cups for take out from a restaurant have attachable cover for customer to prevent spill. These covers are usually flat or have some forms of a dome shape with bent edges that fits snugly to the rim of the cup. A small opening is provided on the cover so that the user can drink from the cup with the cover remains attached. When the cup is shaken or vibrated suddenly due to unexpected breaking in a moving car or any other reason, spilling liquid splashed from the opening is common and often unavoidable. A simple low cost yet effective design is needed to replace the current cup design and prevent the spill is needed.

[0005] This inventor has developed a number of spill-resistant containers; U.S. Pat. Nos. 6,098,850; 6,374,541; 6,460,741; and 6,758,375 using a hydrostatic principle in achieving the spill-resistant feature. The present invention simplifies the design and allows a scoop-like-baffle to be made as an integral part of the cover and achieving the desired low cost spill-resistant cup.

SUMMARY OF THE INVENTION

[0006] The improved cup for storing and dispensing liquids has an integral downward scoop-like-baffle on the cover of the cup. The improved cup resists spilling and pours the liquid more smoothly.

[0007] Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the figures, like reference numerals designate corresponding parts throughout the different views. However, like parts do not always have like reference numerals. Moreover, all illustrations are intended to convey concepts, where relative sizes, shapes and other detailed attributes may be illustrated schematically rather than literally or precisely.

[0009] FIG. 1 is a schematic representation of a cross-sectional side view of an example embodiment of the spill-resistant cup including an ordinary body of the cup, and a cover having a scoop-like-baffle.

[0010] FIG. 2 is the same view of the cover in FIG. 1 without the body of the cup.

[0011] FIG. 3 is the top view of the cover of the spill-resistant cup taken along line 3-3 of FIG. 2.

[0012] FIG. 4 is a schematic representation of a cross-sectional side view of the cover of the spill-resistant cup taken along line 4-4 of FIG. 3.

[0013] FIG. 5 is a schematic representation showing how the spill-resistant cup operates.

DETAILED DESCRIPTION OF THE INVENTION

[0014] FIG. 1 is a schematic representation of the cross-sectional side view of a preferred example embodiment of a spill-resistant cup 10. The heavy dark line shown in this drawing and follow drawings represent the cut walls of the cup. FIG. 1 illustrates a substantially circular shape of the spill-resistant cup 10 (the circular shape of the body of the cup as illustrated here serves only as an example because it can be of many other shapes and forms). This cup consists of a body of the cup 20 and a removable cover 30. The body of the cup 20 has a cone shaped sidewall 40 and a bottom 50 to form a storage chamber 55 for holding the drinking fluid. The upper edge of the sidewall 40 has a rim 60. The removable cover 30 has a lip 70 around the outer circle that can be sealingly snapped onto the rim 60 of the body of the cup 20. The removable cover 30 may be substantially flat or have an optional large or small dome 80. The removable cover 30 has an integral downward scoop-like-baffle 90 to act like a barrier to prevent spilling. One of the methods of making the removable cover 30 is by thermal vacuum forming from a sheet of plastic. In the process of forming this removable cover 30, a cut 100 on the dome 80 allows the integral downward scoop-like-baffle 90 to be bent down from the dome 80. A mouth opening 110 (as better shown in FIG. 3) is included as part of the cut 100. The cut 100 with the downward bend of the scoop-like-baffle 90 and the sidewall 40 of the body of the cup 20 forms a flow passage 120 for the fluid to flow out from the storage chamber 55 through the mouth opening 110. After the storage chamber 55 of the body of the cup 20 is filled with drinking fluid, the lip 70 of the removable cover 30 is sealingly snapped onto the rim 60 of the body of the cup 20 to complete the spill-resistant cup 10. The mouth opening 110 has a lowest point 130 (as better shown in FIG. 3) and the flow passage 120 has an apex point 140 at the scoop-like-baffle 90 when the spill-resistant cup 10 is tilted counter-clockwise for
drinking. Connecting the lowest point 130 and the apex 140 with a straight line forms a start-to-pour line X-X. The angle between the start-to-pour line X-X and the horizontal line Y-Y is the start-to-pour angle X. For example, the start-to-pour angle can be designed to be greater than 45 or 60 degrees or any other angle based on user’s preference. The usage of this start-to-pour line X-X will be described later.

[0015] FIG. 2 is the removable cover 30 in the same view of FIG. 1 without the body of the cup 20. The dome 80 shown in this sample has a raised rim 150 of uneven height and width around the edge of the dome 80 with higher and wider rim at near the mouth opening 110. The dome 80 of the removable cover 30 can be of any suitable size and shape with or without a rim to meet user’s preferences. There is also a small pinhole 160 on the dome 80 as a vent to help the out flow of liquid while drinking.

[0016] FIG. 3 is the top view of the cover 30 of the spill-resistant cup 10 taken along line 3-3 of FIG. 2. The scoop-like-baffle 90 formed from a region of the dome 80 of the cover 30 by bending it downward toward the storage chamber 55 of the body of the cup 20. The left side of the scoop-like-baffle 90 is to be as close to the left sidewall 40 of the body of the cup 20 as practical so that the flow passage area 120 is minimized. This minimal area helps to reduce the chance of spilling when the cup 10 is suddenly shaken.

[0017] FIG. 4 is a schematic representation of a cross-sectional side view of the cover 30 of the spill-resistant cup 10 taken along line 4-4 of FIG. 3. The curved scoop-like-baffle 90 with the apex point 140 are better shown in this view. The shape of this scoop-like-baffle 90 is shown as an example; other suitable form and shape may be used.

[0018] FIG. 5 is a schematic representation of how the spill-resistant cup 10 operates. To explain its operation, first assume that the pinhole 160 does not exist. The fully filled cup of the spill-resistant cup 10 of FIG. 1 is being rotated in counter-clockwise direction in three different angles from the vertical position 1 to the start to pour position 3 through an intermediate position 2. At position 1 the filled spill-resistant cup 10 has a liquid level line A in the liquid storage chamber 55 and a liquid level line B at the scoop-like-baffle 90. When the spill-resistant cup 10 is tilted from position 1 to position 2, the liquid level line A in the liquid storage chamber 55 is moved to liquid level line A' and the liquid level line B at the scoop-like-baffle 90 is moved to liquid level line B'. At this position the start-to-pour line X-X changed to line X'-X' and the angle X reduced to X'. The liquid level line B' at the scoop-like-baffle 90 is lower than the lowest point 130 at the mouth opening 110 and higher than the apex 140 at the scoop-like-baffle 90. Because at this tilting angle, the liquid level line B' stops any outside air from passing through the liquid flow area 120 and entering into the liquid storage chamber 55. Liquid inside the liquid storage chamber 55 cannot flow out of the mouth opening 110. This allows the liquid level A' in the liquid storage chamber 55 to be higher than the mouth opening 110 without allowing the out flow of liquid and thus preventing the spilling of liquid. When the spill-resistant cup 10 is tilted further from position 2 to position 3 where the start-to-pour line X'-X' becomes horizontal. At this tilting angle, the liquid level line A in the liquid storage chamber 55 tilted to liquid level line A" and the liquid level line B at the scoop-like-baffle 90 tilted to liquid level line B". The start-to-pour angle X is reduced from X to X" or zero degrees. The start-to-pour line X"-X" is now parallel to the horizontal line Y-Y and is in line with the liquid level line B" at the scoop-like-baffle 90. At this tilting angle, the liquid level line B" is in line with the lowest point 130 in the mouth opening 110 and the apex 140 at the scoop-like-baffle 90. With any slight increase in tilting angle, outside air will start to enter from the mouth opening 110 into the liquid storage chamber 55 through the apex point 140. Once air starts to enter the liquid storage chamber 55, liquid will start to pour out of the mouth opening 110. This illustration shows that the liquid level B" at the start-to-pour angle X" is parallel to the horizontal line Y-Y and is in line with the liquid level line B" at the scoop-like-baffle 90. At this tilting angle, the liquid level line B" is in line with the lowest point 130 in the mouth opening 110 and the apex 140 at the scoop-like-baffle 90. With any slight increase in tilting angle, outside air will start to enter from the mouth opening 110 into the liquid storage chamber 55 through the apex point 140. Once air starts to enter the liquid storage chamber 55, liquid will start to pour out of the mouth opening 110. This illustration shows that the spill-resistant cup 10 is spill resistant to any sudden shaking or vibration when the spill-resistant cup 10 is upright or at position 1. Because liquid will not flow out until the spill-resistant cup 10 is tilted to the start to pour angle X or position 3. With the presence of a pinhole 160, the start to pour angle will decrease. The amount of decrease is inversely dependant to how fast or how slow the spill-resistant cup 10 is tilted. The faster it is tilted or sudden shaking the less the effect from this pinhole’s existence. Therefore, the effect to the spill resistant feature by the presence of this pinhole is small.

What is claimed is:
1. A cup for dispensing a liquid with less spilling, the cup comprising:
   - a cover;
   - a bottom opposite the cover;
   - a cup body disposed between the cover and the bottom;
   - the cup body including a liquid storage chamber;
   - a mouth opening disposed in the cover and a baffle bended downward on the cover projected to form a start-to-pour line and adapted to allow a liquid in the cup to flow out of the cup when the cup is tilted beyond a start-to-pour angle.
2. The cup of claim 1 wherein the mouth opening has a lowest point and the baffle has an apex point and both points are located at two different elevation of the cover.
3. The cup of claim 1 wherein the baffle is a scoop-like baffle.
4. The cup of claim 1 wherein the start-to-pour angle is greater than 45 degrees.
5. The cup of claim 1 wherein the start-to-pour angle is greater than 60 degrees.
6. The cup of claim 3 wherein the baffle has a curved surface.
7. The cup of claim 1 wherein the cover has a pinhole.
8. A cup for dispensing a liquid with less spilling, the cup comprising:
   - a cover;
   - a mouth opening with a lowest point disposed on the cover;
   - a bottom opposite the cover;
   - a sidewall disposed between the cover and the bottom forms a liquid storage chamber;
   - a scoop-like-baffle bended downward from the cover forms a liquid flow area with the sidewall having an apex point;
   - a start-to-pour line may be drawn from the lowest point to the apex point;
   - the start-to-pour line forms a start-to-pour angle with a horizontal line; and
the mouth opening disposed on the cover and adapted for the liquid in the cup to flow out of the cup when the cup is tilted beyond the start-to-pour angle.

9. The cup of claim 8 wherein the liquid flow area connecting the mouth opening to the liquid storage chamber.

10. The cup of claim 8 wherein the start-to-pour angle is greater than 45 degrees.

11. The cup of claim 8 wherein the start-to-pour angle is greater than 60 degrees.

12. The cup of claim 8 wherein the scoop-like-baffle has a curved surface.

13. The cup of claim 8 wherein the cover has a pinhole.

14. A cup for dispensing a liquid with less spilling, the cup comprising:

   a cover;

   a bottom opposite the cover;

   a cup body disposed between the cover and the bottom;

   a mouth opening in the cover;

   the cup body including a liquid storage chamber;

   a baffle with an opening and adapted for the liquid in the cup to flow through the baffle opening out of the mouth opening when the cup is tilted beyond a start-to-pour angle.

15. The cup of claim 14 wherein the baffle is a scoop-like baffle.

16. The cup of claim 14 wherein the start-to-pour angle is greater than 45 degrees.

17. The cup of claim 14 wherein the start-to-pour angle is greater than 60 degrees.

18. The baffle of claim 15 wherein the scoop-like-baffle has a curved surface.

19. The cup of claim 14 wherein the cover has a pinhole.

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