Sept. 12, 1967 R. E. PHILLIPS 3,341,062

NON-SPILL DRINKING CUP

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FIG. 1.

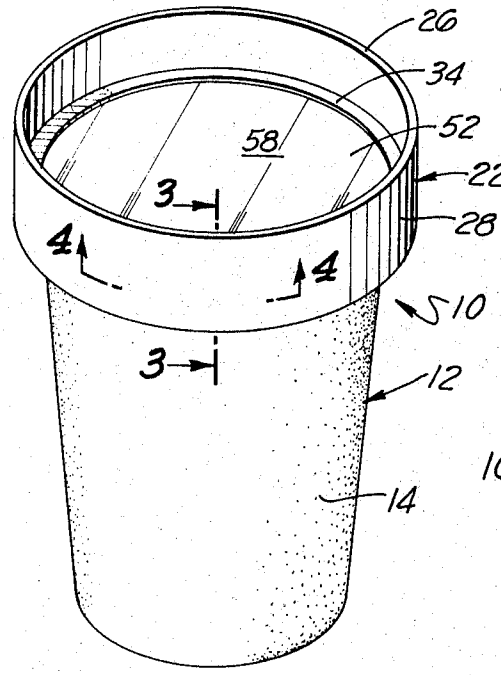


FIG. 2.

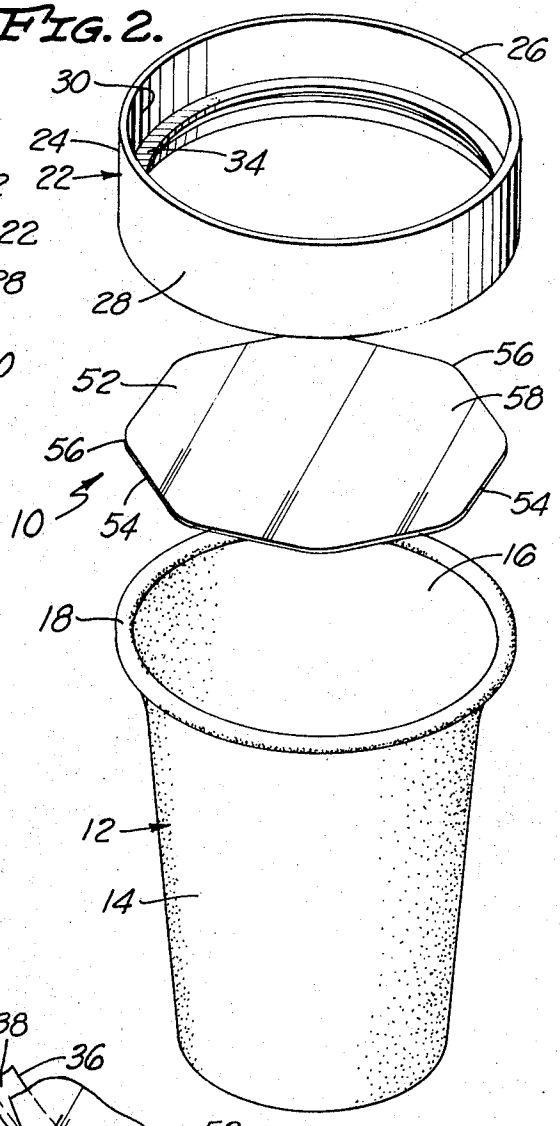
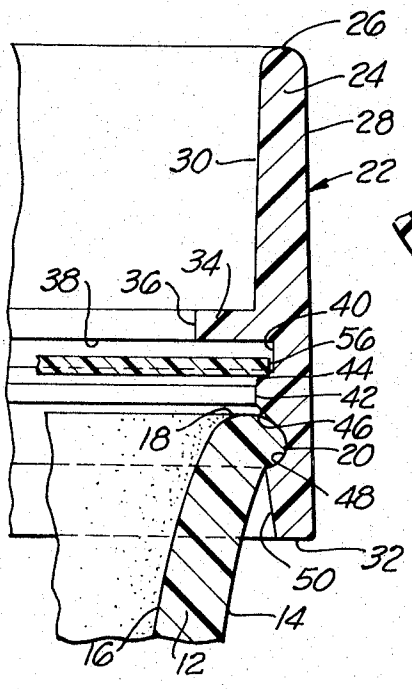


FIG. 3.



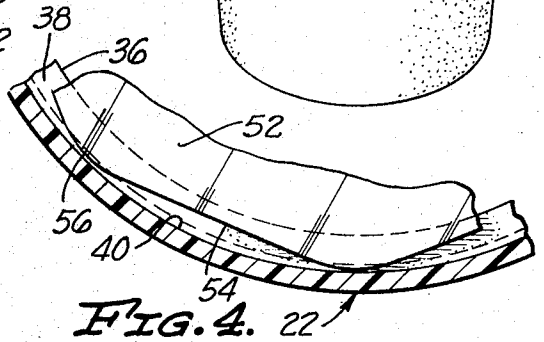


FIG. 4.

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FIG. 5.

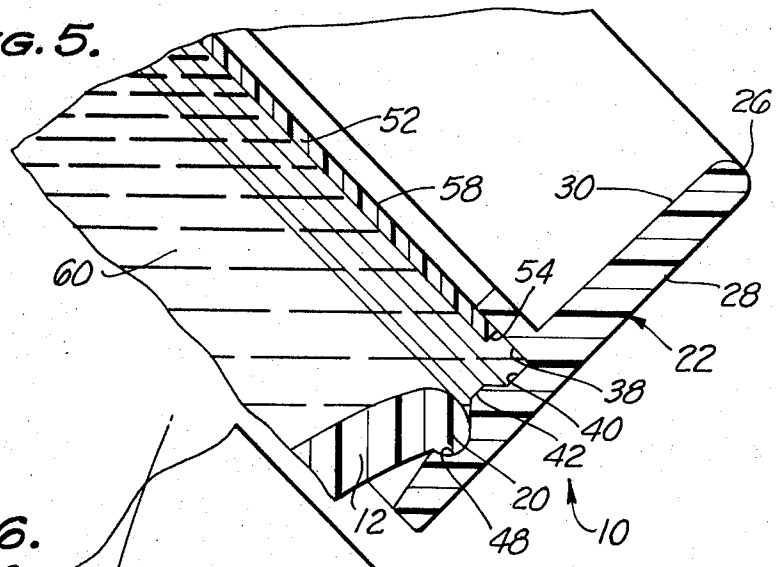
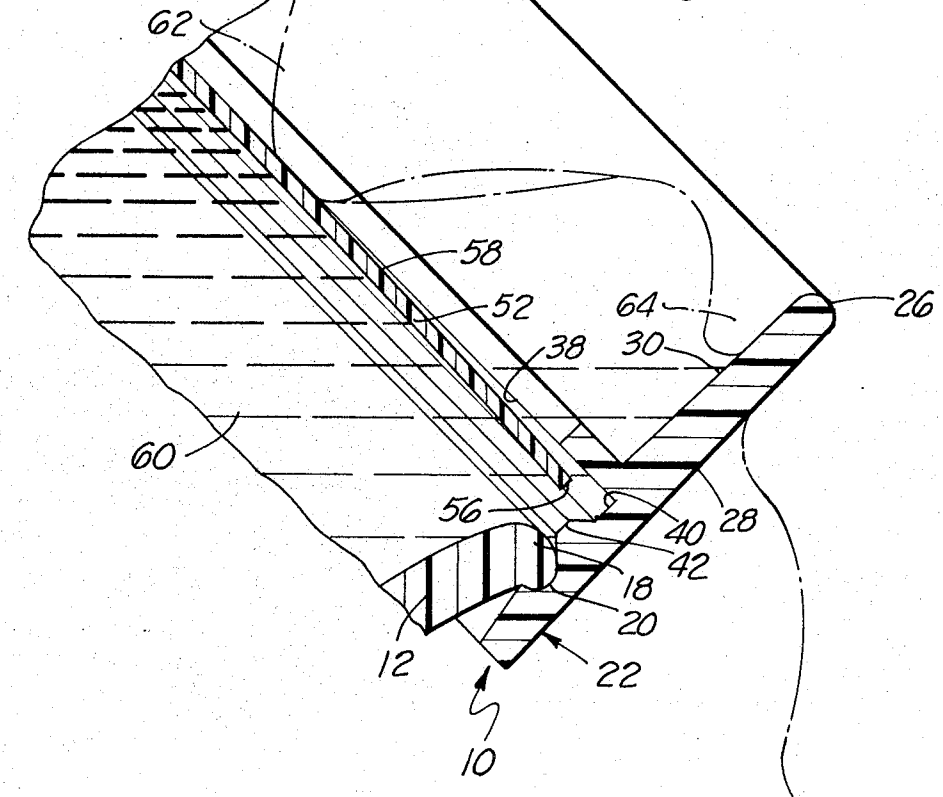


FIG. 6.



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NON-SPILL DRINKING CUP

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6 Claims. (Cl. 220—90.4)

This invention is directed to a non-spill drinking cup particularly useful to prevent spilling of the liquid contents thereof in circumstances where such spilling is likely to occur.

At many times the carrying and drinking of liquids is hazardous. These hazards all stem from the motions of the person attempting to carry a drinking cup or drink from it. These motions may be derived from the fact that the person is in motion either in a vehicle, such as an automobile or ship, or is walking while carrying the cup. The motions tending to spill the contents of the drinking cup may also result from the person being ill or infirm. Furthermore, they may be inadvertent motions such as caused by children. In other cases the person may be recumbent due to illness, and such recumbency causes considerable difficulty in drinking from the ordinary drinking cup without spillage therefrom. Attempts have been previously made to provide non-spill drinking cups, but these have mostly been associated with the principle that if only a small amount of liquid is permitted to flow, spillage cannot become excessive. However, such small amount of flow is unsatisfactory for proper drinking, and even such a small flow can cause spillage, for only the degree is limited.

Accordingly, it is an object of this invention to provide a non-spill drinking cup which is fully sealed when it is not positioned for drinking therefrom, but is opened to permit a flow of proper volume for adequate drinking when it is placed in drinking position.

It is another object of this invention to provide a non-spill drinking cup which comprises a valve which seats against a seal surface to give complete sealing while not in drinking position so as to completely prevent the exit of liquid therefrom.

It is another object of this invention to provide a non-spill drinking cup which is completely sealed until it is placed in proper relationship to a person so that he may drink therefrom, and this relationship opens the seal and permits a proper flow of liquid from the cup to the person's mouth.

It is another object of this invention to provide a non-spill drinking cup which is completely sealed against the exit of liquid therefrom except when it is placed in drinking position with respect to a person and the person's nose opens the seal by depressing a valve plate and such opening of the seal permits the flow of an adequate amount of liquid for drinking purposes.

Other objects and advantages of this invention will become apparent from a study of the following portion of the specification, the claims and the attached drawings in which:

FIG. 1 is a top front view of a drinking cup embodying the non-spill structure of this invention;

FIG. 2 is an expanded view thereof;

FIG. 3 is an enlarged partial section taken generally along the line 3—3 of FIG. 1;

FIG. 4 is an enlarged partial section taken generally along the line 4—4 of FIG. 1;

FIG. 5 is an enlarged partial radial section showing the non-spill drinking cup of this invention in angular position and in fully sealed condition; and

FIG. 6 is an enlarged partial radial section showing the non-spill drinking cup of this invention in inclined

position and showing the seal opened by nose actuation by the drinker therefrom.

As an aid to understanding this invention it can be stated in essentially summary form that it is directed to a non-spill drinking cup. The non-spill drinking cup can either be a standard cup with a non-spill drinking attachment secured thereto, or it can be a specially formed cup for this particular purpose. Inasmuch as standard cups are readily and inexpensively available, the non-spill drinking attachment is illustrated in the drawing. It comprises a cup drinking lip which is particularly adapted to be engaged by the drinker's mouth for drinking therefrom. Below the drinking lip is a sealing lip which has a seal surface on its underside. A valve plate is positioned beneath the sealing rim and is sealed against the sealing rim by the force of liquid within the cup. In order to maintain the valve plate centered, its outer surface is not round, but has feet which position it centrally of the cup. Upon depression of the valve plate by the nose of the drinker, liquid is permitted to flow past these feet and through the now opened seal to the drinker's mouth. As soon as the drinker releases his nose from the valve plate, liquid pressure forces it back into sealing engagement.

This invention will be understood in greater detail by reference to the following portion of this specification wherein the drawings are described. Referring now to FIGS. 1 through 4, the non-spill drinking cup of this invention is generally indicated at **10**. In the embodiment shown, the non-spill drinking cup includes a cup member **12**. Cup member **12** is of conventional construction and has tapered outer side walls **14** and inner side walls **16**. These side walls extend downwardly at an appropriate distance from each other in accordance with the material of cup member **14** and terminate in an integral bottom. In the upward direction the side walls **14** and **16** terminate in an upper lip **18** which has conventional outward extending rib **20**. Cup member **12** is a commercially available structure and may be of the conventional foamed polymer composition material structure, may be of solid polymer composition material or may be made of suitable paper construction or the like. Furthermore, cup member **12** may be of glass or ceramic material, but these materials of construction are not as desirable because of their frangibility upon shock.

The non-spill drinking cup **10** further comprises body **22** which has an upwardly extending substantially cylindrical section **24** which terminates in upper lip **26**. Upper lip **26** and cylindrical section **24** are of such shape and thickness as to be particularly adapted to be engaged in the mouth for drinking therefrom. Cylindrical section **24** is defined by outer wall **28** and inner wall **30**. These walls are preferably not exactly cylindrical so as to aid in injection molding techniques. Outer wall **28** extends downwardly and terminates in bottom edge **32** which is positioned outside of outer side wall **14** when body **22** is positioned upon cup member **12**.

Integrally formed with the remainder of body **22** is inwardly directed flange **34** which has an interior diameter **36** and a bottom, sealing surface **38**. The sealing surface **38** extends outwardly underneath the flange **34** and terminates at cylindrical guide surface **40**. Guide surface **40** is of larger diameter than interior diameter **36** so as to present a substantial sealing surface area **38**.

Below cylindrical guide surface **40** is retaining rib **42**. Retaining rib **42** has a cylindrical inner surface and conical surface **44** which joins guide surface **40**. The lower side of retaining rib **42** has conical surface **46** which extends downward and outward to join in rib receiving recess **48**. Below rib receiving recess **48** is conical surface **50** which aids in the insertion of cup member **12** up into the bottom of body **22** until its rib **20** snaps into rib re-

ceiving recess 48. Body 22 is preferably made of semi-rigid polymer composition material such as polypropylene, or other suitable polyolefins.

Valve plate 52 is a flat sheet of material preferably also made of polymer composition material such as clear acetate. Valve plate 52 is shown as being octagonal with edges 54 presenting a minimum radius from the center of valve plate 52 and rounded corners 56 presenting a maximum radius from the center of valve plate 52. Upper surface 58 is substantially flat, at least around the peripheral edges of valve plate 52 so as to closely mate with sealing surface 38. Valve plate 52 is positioned below the inwardly directed flange 34 and above retaining rib 42. The diameter across corners 56 is slightly less than the diameter of the guide surface 40, but is larger than the interior diameter of retaining rib 42 so that valve plate 52 is retained between the retaining rib 42 and flange 34. The lesser radius represented by edges 54 is greater than the interior diameter 36, as is especially shown in FIG. 4.

It is, thus, seen that valve plate 52 is able to move freely from the position shown in FIG. 3 wherein the rounded corners 56 rest upon a conical surface 44 to an upper position wherein the upper surface 58 of the valve plate is in engagement all the way around flange 34 on the sealing surface 38 thereof. Thus, in the upper position complete sealing is obtained and in the lower position there is a passage for liquid discharge between the guide surface 40 and edges 54 to a location above the upper surface 58 so that the liquid can flow between the surface 58 and sealing surface 38 to be discharged over the interior diameter 36 and inner wall 30 to permit drinking of the liquid. In view of the relatively large passage, liquid flow is relatively unrestricted so that liquid in adequate quantity can be drunk therefrom.

As is indicated in FIG. 6, valve plate 52 is intended to be displaced from its seat or position where it is in engagement with sealing surface 38 to the non-sealed position where drinking can be accomplished by the actuation of the nose of the person drinking from the cup. In order to provide proper nose actuation the various dimensions must be suitable to be compatible with the physiognomy of the average person. To be thus compatible, the diameter of outer wall 28 is approximately three inches while the dimension from the sealing surface 38 axially of body 22 to the upper lip 26 thereof is approximately .55". These dimensions have been established as suitable so that the body 22 fits on a standard cup member 12, and so that the portion of the upper lip 26 away from the drinker's lips extends approximately to the bridge of the average person's nose. Furthermore, these dimensions are suitable for most variations from the average, and are even suitable for children, except the very smallest. Furthermore, the dimension from sealing surface 38 to upper lip 26 is suitable for most nose shapes and dimensions.

While the valve plate 52 is illustrated as being octagonal, it is clear that its functional requirements are that it have an adequate number of points for guidance by guide surface 40 and that it have an adequate portion of reduced diameter which is still larger than inner diameter 36 and yet provides both for seal and for adequate flow. Thus, should other considerations so suggest, a generally circular valve plate can be used wherein the circular diameter is larger than the interior diameter 36 and where guide lugs are formed to extend beyond this diameter substantially to the guide surface 40 so as to maintain the circular portion of the valve plate in proper valving relationship with sealing surface 38.

Referring now to FIGS. 5 and 6, the functional operation of the non-spill drinking cup 10 is indicated. In FIG. 5, liquid 60 within cup member 12 engages upon the lower surface of valve plate 52 when the non-spill drinking cup 10 is tilted. Such liquid engagement with the valve plate causes upward motion of the valve plate 52 so that its upper surface 58 engages with sealing surface 38 to prevent the exit of liquid. At the same time rib 20 is firmly

engaged in recess 48 so that sealing is completely accomplished. The non-spill drinking cup may be turned completely upside down, or at any angle and no leakage will come from it for the liquid 60 cannot escape the seals.

In FIG. 6, the nose 62 of a person is shown as engaging the top surface 58 of valve plate 52. Such engagement is accomplished when the lips 64 are in drinking engagement with upper lip 26. The engagement of nose 62 upon the top surface of valve plate 52 forces the valve plate away from sealing surface 38 so that an opening is provided between edge 54 and guide diameter 40 as well as between sealing surface 38 and upper surface 58. Thus, liquid 60 can flow from the interior of cup member 12 through these openings and up the inner wall 30 so that a person can drink it with his lips 64. As has been previously indicated, these openings are of adequate size to permit a proper flow of liquid for drinking purposes.

This invention having been described in its preferred embodiment, it is clear that it is susceptible to numerous changes and embodiments within the spirit of the invention and without the exercise of the inventive faculty. For example, body 22 can be integrally formed with the cup member so that the non-spill drinking cup is a unitary structure rather than an attachment device. In view of the capability of this invention of being embodied in several forms, the scope of this invention is defined by the scope of the following claims.

I claim:

1. A non-spill drinking cup:

said non-spill drinking cup comprising a liquid reservoir, a body and a valve plate;

said liquid reservoir comprising a vessel having sides and a closed bottom and an open top adapted to retain liquid therein when in an upright position;

said body having an upper end and a lower end, said lower end being contiguous with said open end of said vessel, said upper end having a drinking lip thereon, a downwardly facing inwardly extending continuous sealing surface on said body below its upper end, a guide surface on said body, said guide surface being positioned outwardly from said inwardly extending continuous sealing surface, said sealing surface being substantially planar and extending from an interior diameter outwardly to said guide surface;

said valve plate being positioned below said sealing surface, said valve plate having a continuous upper valving surface of sufficient size to be adapted to lie against said sealing surface to sealingly engage said sealing surface, said valve plate having portions of larger radius and portions of lesser radius, said portions of lesser radius being of larger radius than interior diameter and said portions of larger radius being in sliding engagement with said guide surface to guide said valve plate toward and away from said sealing surface, so that when said valve plate is in engagement with said sealing surface said vessel is closed to the exterior.

2. The non-spill drinking cup of claim 1 wherein said valve plate is positioned away from said drinking lip when in sealing engagement with said sealing surface such a distance that it is adapted to be displaced away from said sealing surface by engagement by a human nose when said drinking cup is engaged by a human for drinking therefrom.

3. The non-spill drinking cup of claim 2 wherein said body is separately formed from said liquid receptacle and is sealingly connected thereto.

4. A dispensing device, said dispensing device comprising a vessel means defining, a dispensing opening, and flow control means between said vessel and said dispensing opening;

said vessel comprising a substantially closed container having an opening therein;

said flow control device being positioned between said opening in said vessel and said means defining a dispensing opening, said means defining a dispensing opening extending to said flow control device and being arranged so that all discharge of contents from said vessel must pass through said flow control device before being dispensed out of said dispensing opening;

said flow control device comprising a continuous radially inwardly directed flange positioned away from said dispensing opening, and a diaphragm positioned adjacent said flange on the side thereof away from said dispensing opening;

guide means on said flange;

guide means on said diaphragm;

said diaphragm having an upper face, said upper face being of such dimension that it is adapted to lie against said flange so as to provide a continuous seal between said diaphragm and said flange, said diaphragm being continuous in the exposed area thereof within the confines of said flange;

said guide means on said flange and said guide means on said diaphragm being in sliding engagement and defining passage means around the edge of said diaphragm connecting said vessel with said flange so that when said diaphragm is moved away from said flange, the contents of said vessel can be discharged from the said vessel through said passage and between said upper face of said diaphragm and said flange to said dispensing opening.

5. The dispensing device of claim **4** wherein said diaphragm is substantially planar and is so positioned with respect to said dispensing opening that it is adapted to be manually displaced from contact with said flange so as to permit the discharge of contents from said vessel.

6. A non-spill drinking cup, said non-spill drinking cup comprising:

a body, said body having an upwardly extending drinking lip, a continuous sealing surface on said body, said continuous sealing surface being substantially planar and being limited in a generally radial interior direction by an interior surface and in a radial outward direction by a guide surface, said sealing surface being positioned interiorly of said body with respect to said drinking lip;

liquid receptacle means below said sealing surface, said liquid receptacle means being continuously liquid tight to said sealing surface, said sealing surface being directed towards said liquid receptacle means;

a continuous valve plate extending across said body and positionable in continuous engagement with said sealing surface to prevent escape of liquid from said liquid receptacle, the improvement comprising:

said valve plate having portions of greater radius and portions of lesser radius, said portions of greater radius being slidably engaged with said guide surface, said portions of lesser radius having a greater radius than the inner edge of said sealing surface, said valve plate being arranged to be deflectable away from said sealing surface so as to permit passage of liquid from said liquid receptacle through said portions of said lesser radius to said drinking lip.

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