United States Patent [19]

Borin

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[45] Jan. 7, 1975

[54] **CUP WITH SELF-SEALING SPOUT**

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[21] Appl. No.: **423,407**

[52] **U.S. Cl.** ..... **222/494**, 222/517, 222/572, 229/1.5 B

[51] **Int. Cl.** **B65d 25/42**

[58] **Field of Search** ..... 222/494, 491, 517, 556, 222/572, 571, 562, 512, 531, 532, 537, 572, 545; 220/90.2, 90.4, 90.6; 229/1.5 B

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[57] **ABSTRACT**

A container for storing and dispensing liquids comprising a disposable plastic cup and lid. The cup has an upper edge which terminates in vertically extending shoulders contiguous with opposite ends of an uninterrupted upper edge of a spout. The spout extends outwardly from a sidewall of the cup with the upper edge of the spout lying in a plane below the upper edge of the cup. The lid covers an open top of the cup, supports a flat flexible and resilient flap, and includes an open-bottom channel for receiving in a fluid-tight seal the upper edge and shoulders of the sidewall of the cup to releasably hold the lid on the cup. The flap is contiguous with a lid and cantilevers outwardly therefrom to normally rest on the upper edge of and seal the spout and to automatically rise from the spout as liquid in the cup presses on an underside thereof with a tipping of the cup to permit a dispensing of liquid through the spout.

2 Claims, 12 Drawing Figures

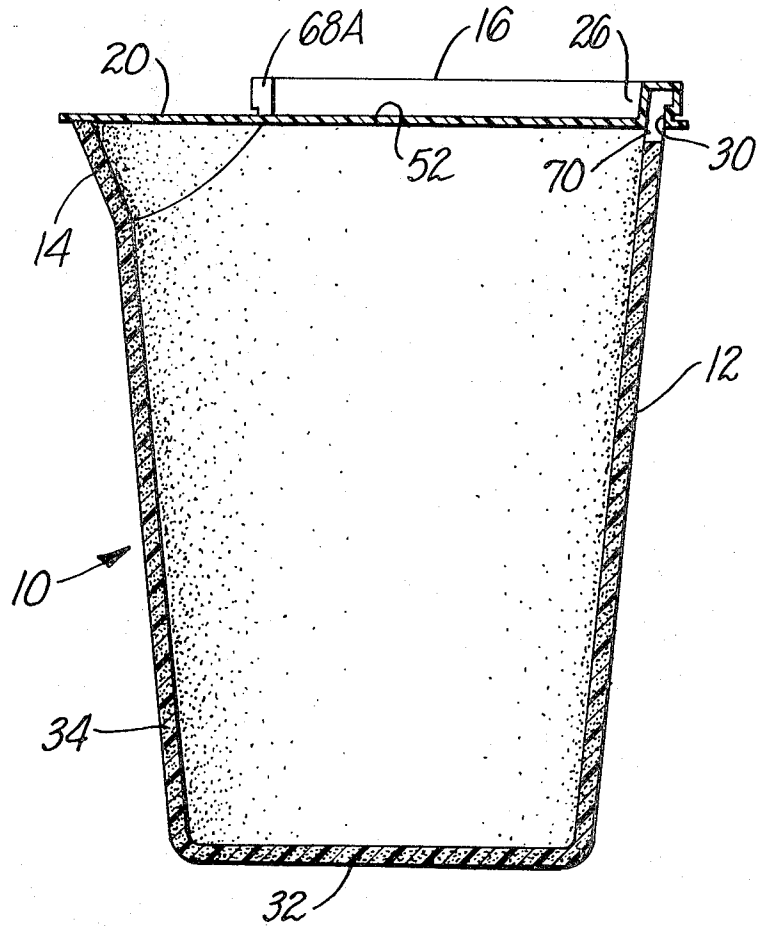


FIG. 2.

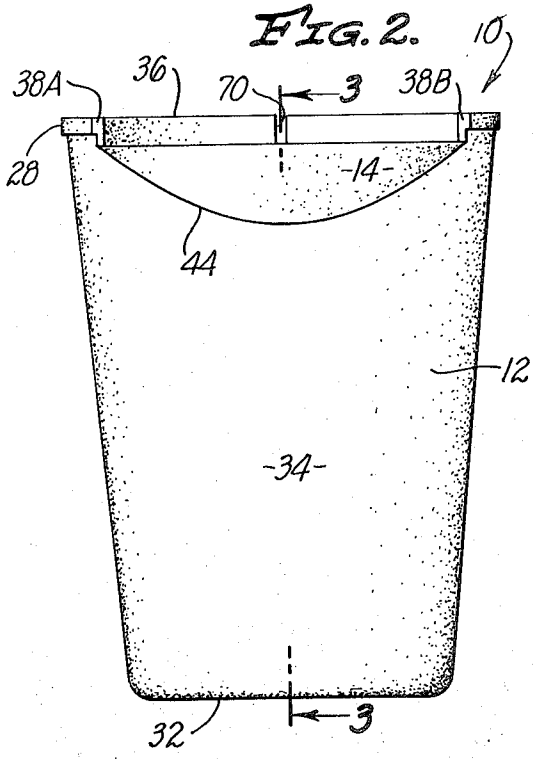


FIG. 1.

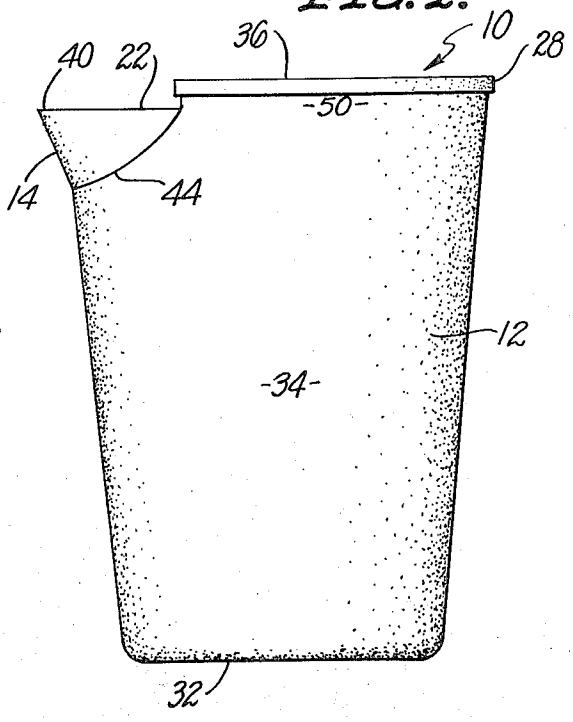


FIG. 3.

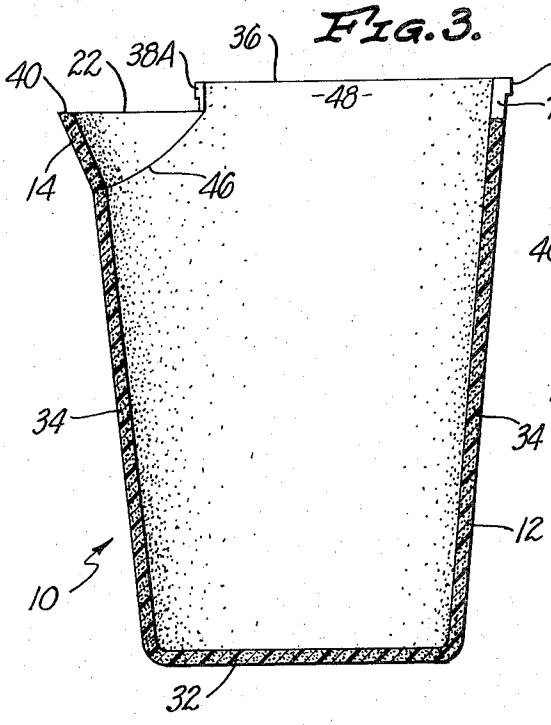


FIG. 4.

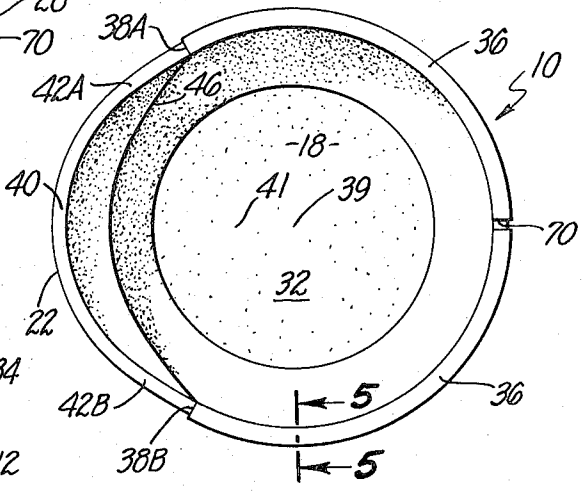


FIG. 5.

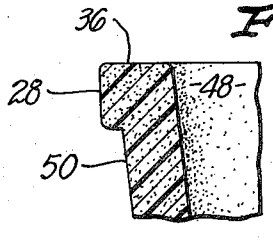


FIG. 7.

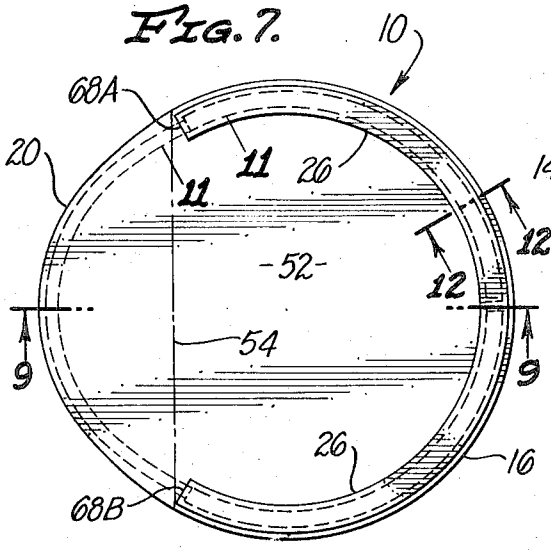


FIG. 6.

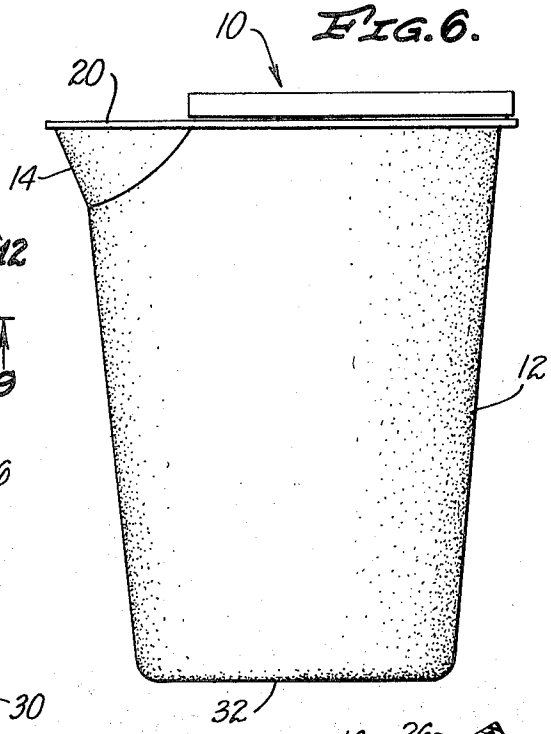


FIG. 9.

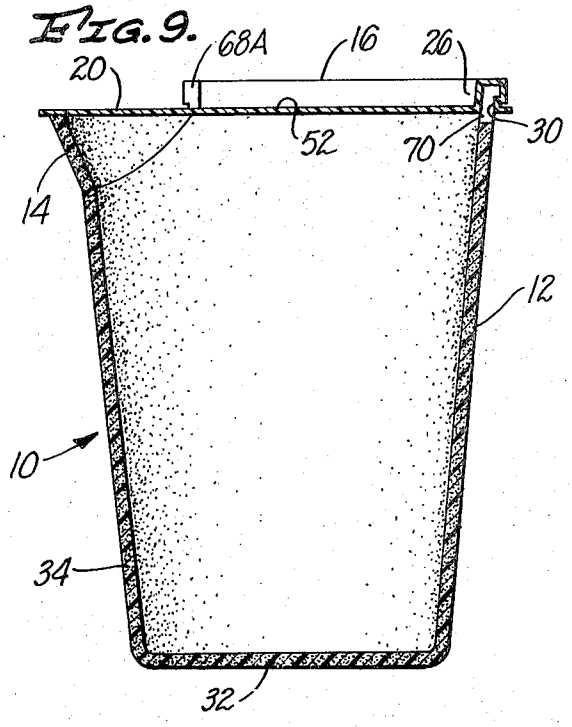


FIG. 10.

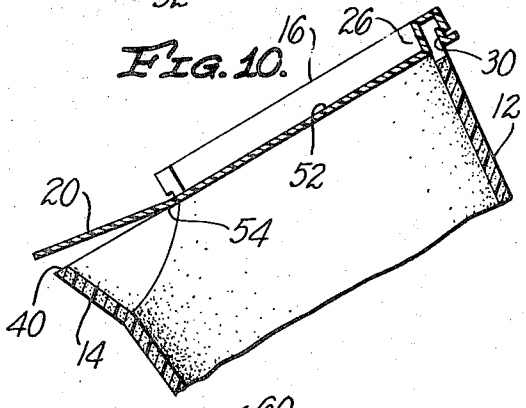


FIG. 11.

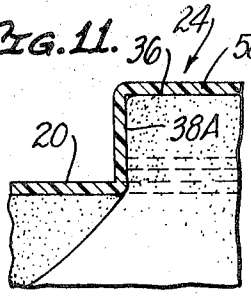


FIG. 12.

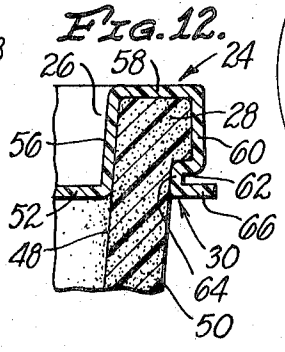
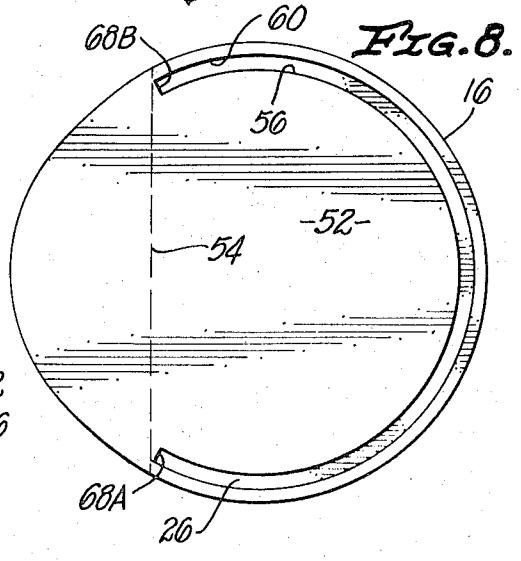


FIG. 8.



CUP WITH SELF-SEALING SPOUT

The present invention relates to liquid dispensing containers and more particularly to a disposable container with a self-sealing spout especially suitable for use in hospitals and other institutions.

In hospitals today it is becoming common practice to serve patients coffee and other hot beverages in foam-type plastic containers sealed with a plastic snap-on lid. Such containers are inexpensive and may be disposed of after a single use, thereby eliminating the need for expensive sterilization. Further, the foam-type plastic container insulates the coffee against heat loss and maintains it hot from the time it leaves the hospital kitchen until it reaches the patient.

Before coffee is delivered in such a container to a patient, the container is usually placed on a serving tray and a separate drinking cup provided into which it is intended that the patient pour the coffee. This requires the patient upon receiving the sealed container to remove the lid to pour from the container into the cup. It is often difficult, particularly for bedridden patients to remove the lid without deforming the container and spilling a portion of the hot coffee onto the tray, bedding, or themselves. Also, patients during the opening of the container will sometimes knock the container over and spill its entire contents, or will tip over the container after the lid has been removed therefrom spilling the balance of the contents over the serving tray.

While the foregoing manner of serving coffee and other hot beverages to hospital patients simulates to some extent the manner in which such beverages would be served at home, serious problems are presented by such serving techniques, particularly for weakened hospital patients, resulting in accidental tipping and spilling of hot beverages over trays, bedding and patients.

In view of the foregoing, it is an object of the present invention to provide an improved disposable lightweight plastic container for coffee and other hot beverages from which the beverage may be dispensed without manually removing the lid which normally seals the open top of the container.

Another objective of the present invention is to provide a disposable container of the foregoing character which is simple in design, and so inexpensive that it may be disposed of after a single use by a hospital patient.

A further object of the present invention is to provide a container of the foregoing character having a self-sealing spout such that if the container is tipped over it will permit only a minimal leakage of the beverage therefrom.

Still another object of the present invention is to provide a container of the foregoing character including a cup having a spout extending from a sidewall thereof below an open top of the cup in combination with a top sealing lid and flexible flap for normally resting on and sealing the spout.

A still further object of the present invention is to provide a container of the foregoing character further including an open-bottom channel in the lid thereof for receiving in a fluid tight seal upper marginal edge portions of the cup contiguous with the spout.

Other objects and advantages of the present invention may be more clearly understood by reference to the following detailed description when considered with the drawings, which by way of example only, illustrate one form of a self-sealing container embodying the features of the present invention.

In the drawings:

FIG. 1 is a side view of the cup included in the container of the present invention;

FIG. 2 is a front view of the cup of FIG. 1;

FIG. 3 is a sectional side view of the cup taken along the line 3—3 in FIG. 2;

FIG. 4 is a top view of the cup of FIG. 1;

FIG. 5 is a partial sectional view taken along the line 5—5 in FIG. 4 showing the top edge of the cup;

FIG. 6 is a side view of the container of the present invention comprising the cup of FIG. 1, and a lid in combination;

FIG. 7 is a top view of the container of FIG. 6;

FIG. 8 is a bottom view of the lid included in the container of FIG. 6;

FIG. 9 is a sectional side view of the container taken along the line 9—9 in FIG. 7;

FIG. 10 is a partial sectional side view of the container in a tipped position to reveal the automatic lifting of a flap portion of the lid from a spout of the cup;

FIG. 11 is an enlarged fragmentary section view taken along the line 11—11 in FIG. 7; and

FIG. 12 is an enlarged fragmentary sectional view taken along the line 12—12 in FIG. 7.

In brief, the container of the present invention is represented in the drawings by the numeral 10 and comprises the combination of a generally cylindrical cup 12 having a spout 14, a lid 16, and a flap 20. The lid 16 covers and seals a top opening 18 of the cup while the flap 20 cantilevers outwardly from a forward portion of the lid 16 to cover and normally seal the spout 14. In this regard, the flap 20 normally bears upon a top edge 22 of the spout 14 to seal the spout and to lift automatically therefrom as liquid in the cup presses thereagainst, as during tipping of the cup to dispense liquid from the container through the spout.

The lid 16 is releasably connected to the cup 12 by closure means 24 including an open bottom channel 26 formed in and extending vertically from the lid 16, and by upper edge and sidewall portions of the cup which extend upwardly into the channel. The closure means 24 further includes a lip 28 extending outwardly from the upper and outer sidewall portion of the cup 12 to engage an inwardly facing bead 30 formed in an outermost sidewall of the channel 26. The lip 28 and bead 30 securely, but releasably, retain the lid 116 in position on the cup 12.

Preferably, both the cup 12, and the lid 16 and flap 20, comprise single-piece molded plastic articles. The cup is formed of a light weight foam-type plastic material having good heat insulation characteristics, such as Styrofoam, while the lid 16 and flap 20 are of a flexible and resilient thin-wall construction. Because of their unitary constructions, the cup and lid may be rapidly and inexpensively mass produced, their low cost making more economical their disposal after use than sterilization for reuse.

More particularly, and is best shown in FIGS. 3 and 9, the cup 12 includes a generally flat bottom 32 for supporting the cup in an upright position. A sidewall 34 of the cup 12 extends upwardly and outwardly from the bottom 32 at an angle of about 7° from the vertical. Such an angulation of the sidewall 34 permits a plurality of like cups to be compactly stacked with the bot-

toms of all but the lowermost cup nesting securely within a top portion of an immediately adjacent cup.

As most clearly shown in FIGS. **1** and **2**, the sidewall **34** includes an uppermost edge **36** which terminates in downwardly extending vertical shoulders **38A** and **38B**. The shoulders also define terminal ends of the upper edge **22** of the spout **14**. The upper edges **36** and **22** of the sidewall and of the spout respectively, are generally flat and lie in parallel horizontal planes spaced apart by a distance corresponding to the vertical height of the shoulders **38A** and **38B**.

As best shown in FIG. **4**, the sidewall upper edge **36** is circular and concentric relative to a vertical axis of concentricity **39** of the cup **12**. As is also shown in FIG. **4**, an outwardmost portion **40** of the upper edge **22** of the spout **14** is also defined by a radius approximately equal to the radius of curvature of the upper sidewall edge **36** and centered at a point **41** offset from the axis **39**. The spout edge **22** further includes terminal end portions **42A** and **42B** which are nearly straight line segments and serve as transitions between the curvatures of the cup sidewall and spout. In this regard, and as most clearly shown in FIG. **2**, the spout **14** intersects the cup sidewall **34** an acute angle of approximately 20° to the outside surface of the cup. The line of intersection or junction between the spout and the sidewall is identified by an arcuate and concave line **44**. A similar arcuate line of intersection **46** is defined on the inside surface of the cup and is most clearly shown in FIG. **4**. Thus formed, the spout includes an upwardly facing open end and a substantially flat upper edge thereby forming a lip of the spout which is preferably parallel with the upper edge **36** of the cup sidewall **34**.

As previously indicated, the top openings of the cup **12** and spout **14** are normally sealed by the lid **16** and flap **20**. This prevents a total loss of the liquid contents of the container **10** in the event of an accidental tipping over of the container. Additionally, the flow rate of liquid from the cup **12** is retarded by the flap **20** during a normal beverage dispensing to prevent any unexpected out-rushing and possible spillage of the beverage such as is often experienced during use of ordinary open-top tumblers or cups. In accomplishing these features, it is important that the lid **16** and flap **20** have contours closely following the shape of the top and uppermost edges of both the sidewall **34** and the spout **14**. Additionally, it is desirable that the curved inner and outer upper sidewall surfaces **48** and **50** of the cup close match the curvature of the open-bottom channel **26** formed in the lid **16**. Such closely matching curvatures form the closure means **24** which further includes the previously mentioned peripheral lip **28** and mating bead **30** which when engaged releasably lock the lid in position on the cup.

As best shown in FIGS. **6–12**, the lid **16** preferably comprises a flat and horizontally extending main body **52** and the semi-circular raised open-bottom channel **26**. The flap **20** is continuous with the main body **52**, is cantilevered outwardly therefrom, and when displaced away from the uppermost edge of the spout, as when dispensing a beverage, bends generally along a line **54** extending between the terminal ends of the open-bottom channel **26** (see FIG. **8**).

In cross-section and as installed on the cup (FIG. **12**), the channel **26** has the shape an inverted letter U. An inner peripheral curved sidewall **56** of the channel extends upwardly and slightly outwardly from the horizontal main body **52**. Preferably the angle of incline of the sidewall **56** is approximately 7° from vertical, that being the same as the angle of incline of the cup sidewall **34**. At its uppermost region the channel side wall **56** bends horizontally outward and then vertically downward forming a top portion **58** and an outer peripheral curved sidewall portion **60** respectively. The lower edge portion of the outer sidewall **60** is contiguous with the inwardly extending bead **30**.

In cross-section the bead **30** resembles a straight sided C wherein the sides of the C are generally horizontal and open outwardly from the main body of the lid. An upper and generally horizontal sidewall **62** of the bead joins the lower edge portion of the outer sidewall **60** of the channel **26** and extends inwardly toward the horizontal main body **52** of the lid. The upper sidewall **62** of the bead then joins a downwardly extending wall **64** which parallels the inner peripheral wall **56** of the channel. The downwardly extending wall **64** is joined to a second and lower horizontal wall **66** of the bead which is parallel to the upper bead wall **62**. It is to be noted that the lower wall **66** of the bead is in the same horizontal plane as the main flat body **52** of the lid, a feature of some importance as concerns a manufacturing simplicity to be described in more detail. The lower wall portion **66** of the bead **30** may extend outwardly by an amount sufficient to facilitate a finger tip gripping of the bead and thereby a flexing of the channel **26** during installation of the lid on the cup.

In FIGS. **12** and **8**, it is shown that starting with the lower wall **66** of the bead **30** the bead is contiguous with the outer sidewall **60** of the channel **26**. The channel extends over the upper edge **36** of the cup and merges into the flat main body **52** of the lid. FIG. **11** shows this in additional detail and also shows the shoulder **38A** which terminates the upper sidewall edge **36**. Corresponding to the shoulder and sidewall edge of the cup, the top horizontal portion **58** and sidewalls **56** and **60** of the channel are joined by vertical end walls **68A** and **68B**. The end walls **68A** and **68B** extend downwardly to the flat surfaces of the main body **52** of the lid and of the flap **20** at junctions which define regions of bending between the flap and main body of the lid. Parallel relationships between the end walls **68A–B** of the lid and the shoulders **38A–B** of the cup are provided to enable a somewhat stretched fit of the lid on the cup to thereby produce a sealing contact between the shoulders and the ends of the channel. In this regard, the horizontal bead **30** is also in continuous mutual contact with the outer periphery of the upper sidewall **50** immediately below the lip **28**.

With regard to the structure of the flap **20** illustrated in FIGS. **6–10**, it is to be noted that during molding, the flap may be formed at a downward angle of about 5° from the plane of the main body **52** as measured along the previously mentioned hinge line **54**. Thus, when the lid is affixed to the cup **12**, the flap **20** is urged upwardly from its 5° downward slope as molded. This means that the flap continuously exerts a downward force toward the upper edge of the spout. When the flap is in contact with the upper edge of the spout, the downwardly directed force exerted by the resilient nature of the single piece molded plastic lid and flap in combination, produces a fluid seal between the flap and upper edge of the spout. As the flap **20** is raised from the edge of the spout in response to liquid pressing upon the underside of the flap, as during a tipping

of the container in the direction of the spout **14**, the flap continues to exert a downward force and effectively rides on the top of the stream of liquid flowing from the container. Because the flap rides on the liquid stream, it controls the flow of the dispensed liquid. Then, as the cup is returned to its upright position, the flap automatically lowers to the top edge of the spout in response to its inherent and downwardly directed force to again seal the spout **14**.

So complete is the fluid tight seal between the flap and the spout and between the lid and the cup that a vent to the atmosphere is required to permit efficient pouring of the beverage from the cup. The vent is illustrated most clearly in FIGS. **2, 3** and **4** and comprises a slot **70** formed in the upper edge and sidewall of the cup. The slot extends through the sidewall of the cup and extends downwardly from the upper edge **36** to terminate below the lower horizontal edge of the lip **28** and below the lower horizontal sidewall **66** of the bead **30** when the cup and lid are in sealed assembly. Such an arrangement permits air at atmospheric pressure to displace the beverage as it is poured from the container.

As previously stated the uppermost sidewall portion of the cup including the lip **28** are closely fitted to the corresponding open bottom channel **26** and bead **30** of the lid. The installation of the lid on the cup, however, requires only small forces to accomplish a full engagement and a complete fluid tight seal. To install the lid, the shoulders **38A** and **38B** of the cup are initially fitted into contact with the channel end walls **64A** and **64B** respectively. Then by lightly pressing downward near the center of the lid and at the same time pulling upward and outward on the lower bead wall **66**, the lid is sufficiently deformed to enable the bead **30** to pass over the lip **28** and engage the horizontal underside surface of the lip **28** thereby releasably locking the lid and flap on the cup.

Typically, in the manufacture of plastic articles such as the preferred one piece molded lid and flap combination **16** and **18**, a trimming operation is required after releasing the molded articles from the mold. As concerns the flap **20**, it is desirable that it be trimmed as well as the outwardly extending lower wall **66** of the bead **30**. The present invention makes it possible to perform such trimming in a single-step operation by placement of the flap **20** and the lower horizontal wall **66** in the same horizontal plane.

From the foregoing detailed description, it is to be understood that the liquid storing and dispensing container of the present invention is an improved disposable lightweight plastic container particularly useful in serving hot beverages to hospital patients. The foam-type plastic cup and simply installed plastic lid provide a sealed container which enables the dispensing of a hot beverage stored within the container by merely tipping the container so as to cause the beverage to bear against the underside of a flexible flap which normally seals a pouring spout formed in the cup. This most simple of procedures for dispensing a beverage precludes the necessity of removing the lid from the cup and eliminates the hazards of spilling the contents of the container. Even in the event of an accidental tipping over the container the flow from the container is minimized because the lid remains in place and the loss of contents is retarded by the self-sealing flap which covers and seals the spout.

While a particular form of container has been described in some detail herein, changes and modifications may be made therein without departing from the spirit of the invention. It is therefore intended that the invention be limited in scope only by the terms of the following claims.

I claim:

1. A liquid storing and dispensing container comprising:

a cup including

a vertically extending sidewall having an upper edge defining an open top for said cup,

a spout extending outwardly from said sidewall below said top and including an upwardly facing open end having an upper edge in a plane lower than said upper edge of said cup, and said upper edge of said cup terminating at vertically extending shoulders in said sidewall adjacent and contiguous with opposite ends of said upper edge of said spout;

a lid of plastic material for covering said open top of said cup substantially in a plane of said upper edge of said spout and including an open bottom channel extending upwardly from a top of said lid for receiving and tightly sealing against an upper portion of said cup between said shoulders, said open bottom channel including

opposing sidewalls for engaging in fluid tight seal inner and outer sidewall portions of said cup adjacent said upper edge of said cup and ends for engaging said shoulders in a fluid tight seal; and

a flat flexible and resilient flap of plastic material continuous and substantially coplaner with and cantilevered outwardly from said lid along a substantially straight line between ends of said channel for normally resting on and sealing against said upper edge of said spout and for bearing tightly on said upper edge of said spout at junctions with said channel ends to maintain a fluid tight seal with said cup at said junctions and for rising from said spout at all but said junctions as liquid in said cup presses thereagainst with a tipping of said cup to permit a dispensing of liquid through said spout to automatically return to sealing engagement with said spout as said cup is returned to an upright position.

2. The container of **1** wherein:

said cup further includes a lip projecting outwardly from said upper edge of said cup; and

an outermost one of said opposing sidewalls of said channel includes an inwardly facing bead for snapping under and sealing against said lip and having a lower horizontal wall in the plane of said lid and flap.

* * * * *