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A. I. W. FRANK

3,421,681

CUP AND LID

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FIG. 1.

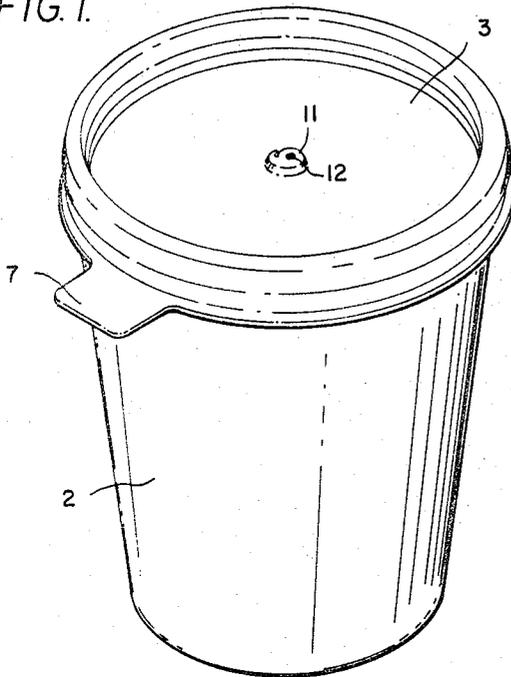


FIG. 4.

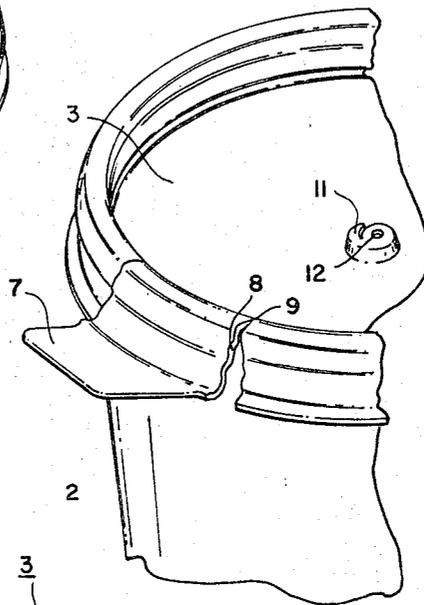


FIG. 2.

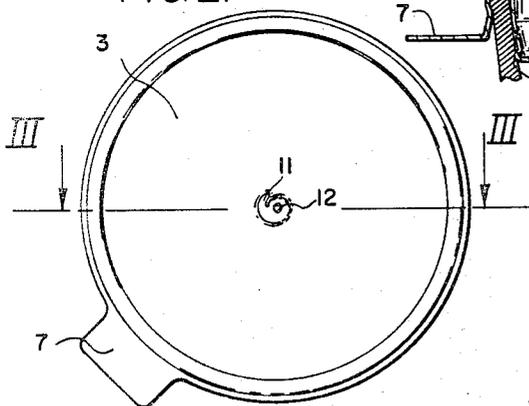


FIG. 7.

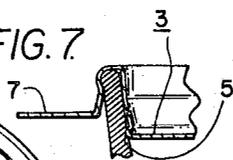


FIG. 5.

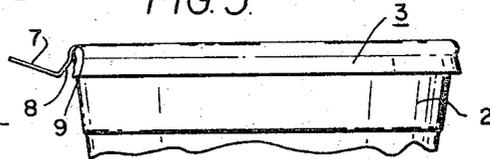
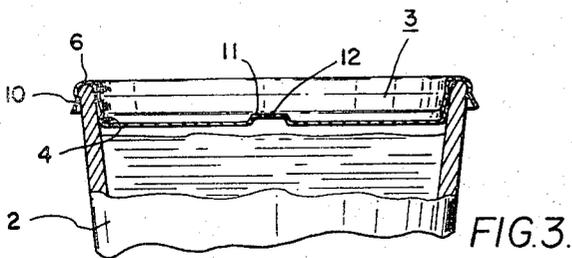
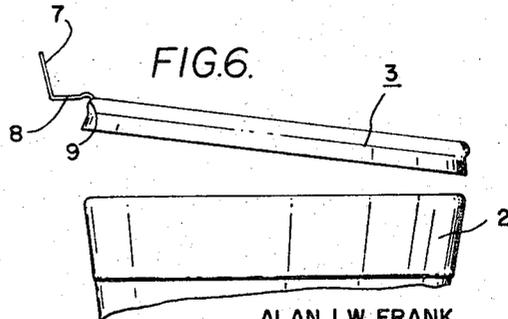


FIG. 6.



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3,421,681

CUP AND LID

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10 Claims

ABSTRACT OF THE DISCLOSURE

A cup and lid combination comprising a generally circular open-topped cup of resilient plastic material which cup adjacent its open top is generally conical with maximum transverse dimension at the open top and a lid of frangible material having a plug portion adapted to be forced down into the open top of the cup to tightly sealingly engage the inside surface of the cup and in so doing depress the resilient plastic material of the cup so that at least a part of the plug portion of the lid substantially interlocks with the cup, the lid having a hood portion embracing the cup rim and terminating outwardly of and below the cup rim with a tab projecting from the outer terminal edge of the hood portion which tab when pulled upwardly tears the material of the lid at opposite sides of the tab at least to the top of the hood portion, loosening the engagement between the cup and the lid, whereafter continued pulling upwardly of the tab removes the lid from the cup. The outer extremity of the hood portion of the lid constitutes a skirt extending generally downwardly but somewhat outwardly away from the cup with the tab projecting from the terminal edge of the skirt. The tab initially lies generally in a plane normal to the axis of the cup and lid. The lid has a generally centrally located upward projection or dome containing a vent hole, such upward projection being of irregular outline promoting damping of waves at the surface of liquid in the cup when the liquid-filled cup is being carried with consequent minimization of sloshing of liquid out through the vent hole. Such minimization of sloshing is further enhanced by proportioning the upward projection so that its depth is less than 2½% of the diameter of the lid and its maximum transverse dimension is less than 15% of the diameter of the lid.

This invention relates to a cup and lid combination in which the lid tightly sealingly engages the cup so as to substantially interlock with the cup, the lid being provided with novel means for loosening the engagement between the cup and lid and facilitating removal of the lid from the cup. The invention also relates to a cup lid having an upward projection or dome containing a vent hole, such projection being of novel shape and dimensions minimizing sloshing of liquid out through the vent hole when a cup filled with liquid to which the lid is applied is being carried.

While my invention is adaptable to cups and lids made of a variety of materials, I have found it to have exceptional utility when embodied in cups and lids of plastic material, especially when the cups are made of expandable polystyrene beads. The cups may be formed in a manner known to those skilled in the art by subjecting to heat and pressure expandable polystyrene beads impregnated with a blowing agent which under the application of heat causes the beads to expand. Cups thus formed are sufficiently deformable that when a cap is tightly applied an interlocking sealing engagement between cup and lid is produced. The lid is preferably made of relatively stiff but frangible plastic material and is provided with a tab which when pulled tears in controlled manner the ma-

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terial of the lid loosening its engagement with the cup and facilitating its removal.

I provide a cup and lid combination comprising a generally circular open-topped cup of resilient plastic material which cup adjacent its open top is generally conical with maximum transverse dimension at the open top and a lid of frangible material having a plug portion adapted to be forced down into the open top of the cup to tightly sealingly engage the inside surface of the cup and in so doing depress the resilient plastic material of the cup so that at least a part of the plug portion of the lid substantially interlocks with the cup, the lid having a hood portion embracing the cup rim and terminating outwardly of and below the cup rim with a tab projecting from the outer terminal edge of the hood portion which tab when pulled upwardly tears the material of the lid at opposite sides of the tab at least to the top of the hood portion, loosening the engagement between the cup and the lid, whereafter continued pulling upwardly of the tab removes the lid from the cup. The outer extremity of the hood portion of the lid constitutes a skirt extending generally downwardly but somewhat outwardly away from the cup with the tab projecting from the terminal edge of the skirt. When the lid is applied to the cup the tab may lie generally in a plane normal to the axis of the cup and lid.

I further provide a cup lid having a portion adapted to seal to a cup and a transverse body portion having a generally centrally located upward projection or dome containing a vent hole, such upward projection being of irregular outline promoting damping of waves at the surface of liquid in the cup when the liquid-filled cup is being carried with consequent minimization of sloshing of liquid out through the vent hole. The depth of the upward projection should be less than 2½% of the diameter of the lid and the maximum transverse dimension of the upward projection should be less than 15% of the diameter of the lid.

Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawings I have shown a present preferred embodiment of the invention in which

FIGURE 1 is a perspective view of a cup and lid combination in accordance with my invention;

FIGURE 2 is a top plan view of the cup and lid combination shown in FIGURE 1;

FIGURE 3 is a fragmentary view largely in central vertical cross-section on the line III—III of FIGURE 2 of the upper portion of my cup and lid combination;

FIGURE 4 is an enlarged fragmentary perspective view of my cup and lid combination illustrating the first step in removal of the lid from the cup;

FIGURE 5 is a fragmentary side elevational view of the cup and lid combination as shown in FIGURE 4;

FIGURE 6 is a view similar to FIGURE 5 but showing the lid removed from the cup; and

FIGURE 7 is an enlarged fragmentary cross-sectional view illustrating the interlocking relationship between the cup and lid when the lid is applied to the cup.

Referring now more particularly to the drawings, there is shown a cup designated generally by reference numeral 2 to which is applied a lid designated generally by reference numeral 3. In the form shown the cup is of circular frusto-conical form with a closed bottom and an open top, the cup being made of expandable polystyrene beads impregnated with a blowing agent as above described. The cup adjacent its open top is generally conical with maximum transverse dimension at the open top. The lid 3 is of relatively stiff but frangible plastic material. It has a plug portion 4 adapted to be forced down into the

open top of the cup to tightly sealingly engage the inside surface of the cup and in so doing depress the resilient plastic material of the cup so that at least a part of the plug portion of the lid substantially interlocks with the cup as shown at 5 in FIGURE 7. The lid has a hood portion 6 embracing the cup rim and exterminating outwardly of and below the cup rim. The outer extremity of the hood portion 6 of the lid constitutes a skirt 10 extending generally downwardly but somewhat outwardly away from the cup with a tab 7 projecting from the terminal edge of the skirt. When the lid is applied to the cup the tab initially lies generally in a plane normal to the axis of the cup and lid.

When the tab is pulled upwardly as illustrated in FIGURES 4 and 5 the material of the lid at opposite sides of the tab is torn in controlled manner as illustrated at 8 in FIGURE 4, such tearing extending at least to the top of the hood portion and normally terminating at that point as shown at 9 in FIGURE 4. Such tearing of the material of the lid loosens the engagement between the cup and the lid. Thereafter continued pulling upwardly of the tab removes the lid from the cup as illustrated in FIGURE 6. The tab normally remains connected with the lid along a line substantially at the top of the hood portion so that after tearing of the material of the lid as above described and illustrated in FIGURE 4 continued pulling upwardly of the tab causes the tab to somewhat change its orientation relatively to the lid as illustrated by comparison of FIGURES 5 and 6 and the lid separates from the cup.

Centrally of the lid 3 is an upward projection 11 containing a vent hole 12. The upward projection 11 is of irregular outline promoting damping of waves at the surface of liquid in the cup when the liquid-filled cup is being carried with consequent minimization of sloshing of liquid out through the vent hole. In the form shown the upward projection or dome is in the form of the figure "6" which may be an indication of the size of the lid and of the cup to which the lid may be applied. The irregular outline of the upward projection or dome interferes with or breaks up the wave action created when a cup full of liquid is being carried and importantly reduces sloshing of liquid out through the vent hole.

The upward projection or dome 11 is also dimensioned to further enhance the characteristic of the lid of minimizing sloshing of liquid out through the vent hole. I have found that its depth should be less than 2½% of the diameter of the lid. Also its maximum transverse dimension should be less than 15% of the diameter of the lid. Each of these factors contributes to minimization of sloshing of liquid out through the vent hole when a cup filled with liquid is being carried but optimum results accrue from the combination of the irregular outline of the upward projection or dome and the proportions above stated.

My cup and lid combination tightly confines the contents of the cup yet due to my novel lid construction the lid may easily be removed from the cup and sloshing of contents of the cup through the vent hole is minimized.

While I have shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A cup and lid combination comprising a generally circular open-topped cup of resilient plastic material which cup adjacent its open top has a generally conical inside surface with maximum transverse dimension at the open top and a lid of frangible material having a plug portion adapted to be forced down into the open

top of the cup to tightly sealingly engage the inside surface of the cup and in so doing depress the resilient plastic material of the cup so that at least a part of the plug portion of the lid substantially interlocks with the cup, the lid having a hood portion embracing the cup rim and terminating outwardly of and below the cup rim with a tab projecting from the outer terminal edge of the hood portion which tab when pulled upwardly tears the material of the lid at opposite sides of the tab at least to the top of the hood portion, loosening the engagement between the cup and the lid, whereafter continued pulling upwardly of the tab removes the lid from the cup.

2. A cup and lid combination as claimed in claim 1 in which the outer extremity of the hood portion of the lid constitutes a skirt extending generally downwardly but somewhat outwardly away from the cup with the tab projecting from the terminal edge of the skirt.

3. A cup and lid combination as claimed in claim 2 in which the tab lies generally in a plane normal to the axis of the cup and lid.

4. A cup lid having a generally conical plug portion adapted to be forced down into the open top of a cup to tightly sealingly engage the inside surface of the cup and a hood portion adapted to embrace the cup rim, the hood portion terminating outwardly of and below the top of the hood portion with a tab projecting from the outer terminal edge thereof, the material of the lid being frangible so that when the lid is applied to a cup and the tab is pulled upwardly it tears the material of the lid at opposite sides of the tab at least to the top of the hood portion, loosening the engagement between the cup and the lid, whereafter continued pulling upwardly of the tab removes the lid from the cup.

5. A cup lid having a portion adapted to seal to a cup and a transverse body portion having a generally centrally located upward projection containing a vent hole, the depth of such upward projection being less than 2½% of the diameter of the lid.

6. A cup lid as claimed in claim 5 in which the maximum transverse dimension of the upward projection is less than 15% of the diameter of the lid.

7. A cup lid having a portion adapted to seal to a cup and a transverse body portion having a generally centrally located upward projection containing a vent hole, such upward projection being of irregular outline promoting damping of waves at the surface of liquid in the cup when the liquid-filled cup is being carried with consequent minimization of sloshing of liquid out through the vent hole.

8. A cup lid as claimed in claim 7 in which the depth of the upward projection is less than 2½% of the diameter of the lid.

9. A cup lid as claimed in claim 7 in which the maximum transverse dimension of the upward projection is less than 15% of the diameter of the lid.

10. A cup lid as claimed in claim 8 in which the maximum transverse dimension of the upward projection is less than 15% of the diameter of the lid.

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U.S. Cl. X.R.

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