Sept. 23, 1958 J. P. GALLAGHER 2,853,222

INSULATED FOIL LINED PAPER CUP

Filed April 20, 1953

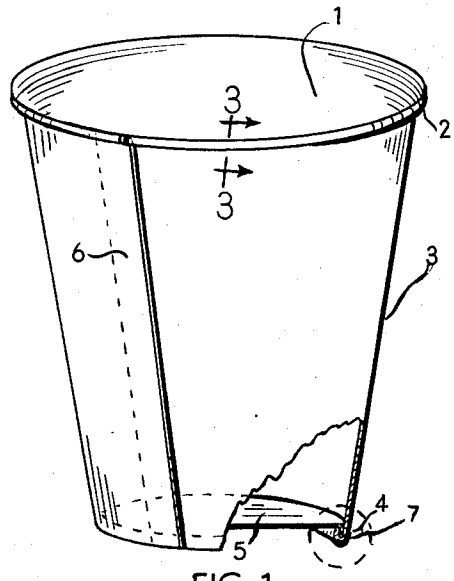

FIG. 1

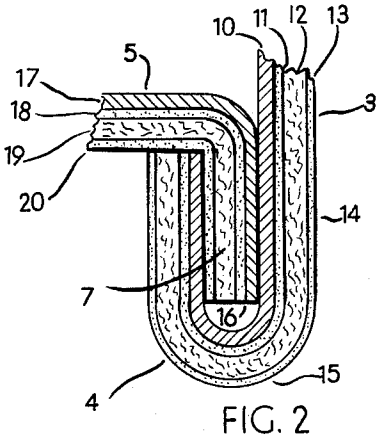

FIG. 2

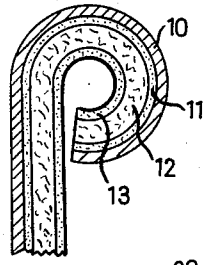

FIG. 3

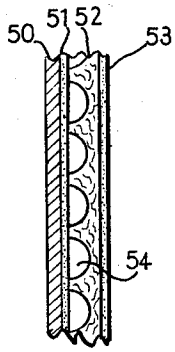

FIG. 5

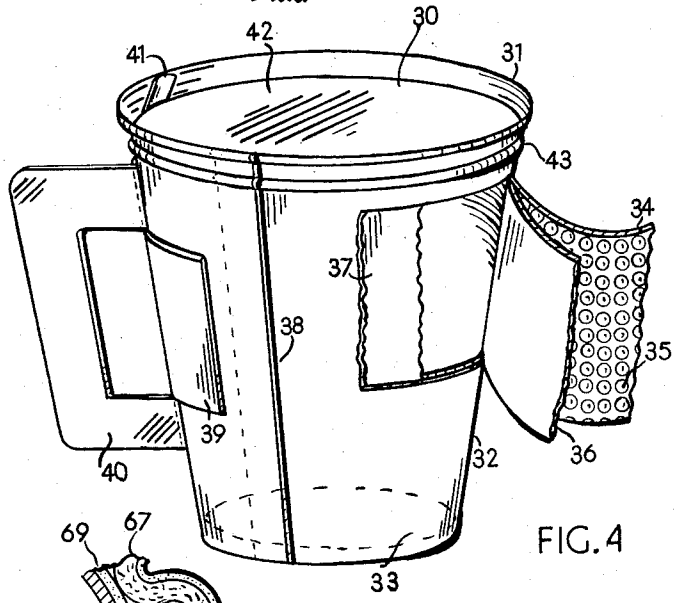

FIG. 4

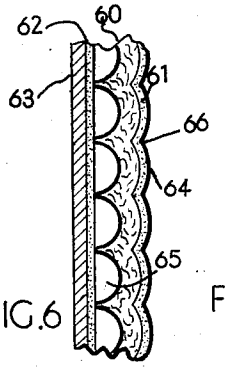

FIG. 6

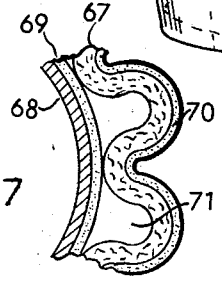

FIG. 7

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INSULATED FOIL LINED PAPER CUP

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7 Claims. (Cl. 229—1.5)

The present invention relates to drinking vessels, such as cups, and has to do more particularly with expendable paper cups.

Paper cups have certain inherent disadvantages. One disadvantage is that liquid in the cup tends to soften the paper, and the cup then may leak or break, or buckle when picked up. In order to overcome such disadvantage, such cups as formerly made, or the paper from which it is made, is coated with wax to prevent absorption of the liquid into and softening the paper. However, the wax coating is disagreeable or distasteful to many people, and has the further disadvantage of rendering the cup relatively expensive.

The above disadvantages are encountered in connection with a "cold cup" i. e., a cup intended for cold drinks. Such a cup is ordinarily not satisfactory for hot drinks, because a hot liquid tends to soften the wax coating. Thus a "hot cup," i. e., one intended for hot drinks, is provided according to former practice relating to paper cups. Such hot cup may be provided with high heat resistant wax, but is more commonly made of a higher grade paper that is free of paraffin wax but which is treated with other sizing and water-proofing compounds. Nevertheless even with this kind of cup, the tendency is for hot liquid to dissolve the paper pulp when it is allowed to stand in the cup for a time. Thus an unpleasant taste is given to the drink. Such a hot cup is relatively expensive. Another disadvantage of the hot cup is that the paper provides very little if any insulation to the heat and the cup is uncomfortably hot to the feel when picked up.

Another disadvantage of most previous paper cups is that they are not satisfactory for alcoholic drinks.

An object of the invention is to provide a novel paper cup overcoming the disadvantages noted above.

Another object is to provide a paper cup having a liquid-impervious liner.

A further and more specific object is to provide a paper cup having a metal foil liner.

A still further object is to provide a paper cup having a metal foil liner in which because of the liquid-imperviousness of the metal foil the following advantages are attained:

(*a*) Wax as used in previous cups is eliminated, at least on the inner surface of the cup;

(*b*) The paper used in the cup may be of inexpensive grade;

(*c*) The paper remains dry and retains its mechanical strength;

(*d*) The metal foil provides additional strength to the cup;

(*e*) Paper of high porosity may be utilized, providing great heat insulation;

(*f*) Corrugated or similarly formed paper may be utilized for providing air spaces between the paper and liner for greater insulation;

(*g*) The same kind of cup can be used for hot, cold, alcoholic or other beverages.

(*h*) The cup is sanitary;

(*i*) The cup is inexpensive.

Other objects and advantages of the invention will be apparent upon reference to the following detail description taken in conjunction with the accompanying drawing in which—

Figure 1 is a perspective view of a cup made according to the present invention, with a portion broken away and shown in section;

Figure 2 is an enlarged view of the portion encircled in dot-dash lines of Figure 1;

Figure 3 is an enlarged sectional view taken on line 3—3 of Figure 1;

Figure 4 is a perspective view of a modified form of cup, showing a portion of the wall opened;

Figure 5 is a cross-sectional view of a portion of the wall of the cup of Figure 4;

Figure 6 is a view similar to Figure 5 showing a modified form of wall structure; and

Figure 7 is a view similar to Figure 5 showing another modified form of wall structure.

Referring in detail to the drawings, the cup **1** of Figure 1 is shaped according to a conventional paper cup having a tapered wall **3** and a bottom element **5**. It is desired that the cup be tapered for stacking purposes, the advantage of which is well understood, as in dispensing, packaging, etc. The wall **3** and bottom element **5** are laminated, or made from laminated stock, as will be pointed out fully in connection with Figures 2 and 3. The cup may be fabricated from the laminated stock in a manner similarly to that employed in the case of conventional cups, the edges of the wall member are lapped at **6** and sealed in a seam, a rolled edge **2** is provided around the upper marginal edge of the wall, the bottom element **5** has a downturned peripheral flange **7** over which the lower edge portion **4** of the wall is rolled and crimped or sealed.

The material or stock from which the cup is fabricated is of laminated structure as shown in Figures 2 and 3. The material includes a body or core **12** in the form of a layer and another layer of metal **10** in the form of a relatively thin foil. It will be understood that the thicknesses of the layers are exaggerated in the drawings for the purpose of more clearly illustrating the construction. The layer or foil **10** is preferably secured to the body or core **12** by a suitable glue or bonding agent **11**. The outer surface of the core **12** is coated with a waterproofing layer **13** and an appropriate bonding material is interposed in the seams **6** and **4**. The bottom element **5** includes layers or elements **17, 18, 19, 20** corresponding to elements **10, 11, 12, 13** of the wall. The wall and bottom element are so positioned and assembled that the metal layers **10** and **17** are disposed on the inner side, thus forming a liner to the cup.

The metallic lining **10, 11** of the cup is preferably aluminum, although tin, brass, copper, and various alloys of these metals could be used with good results. At the time of writing however the cost of these latter metals would be prohibitive as compared with that of aluminum. The aluminum may be applied to the paper core in a continuous process by any of several methods. One method would be to apply a thin layer of foil to the paper with a suitable bonding agent of which there are many commercially available.

The advantages of an expendable paper cup constructed in this manner are readily apparent. First of all the aluminum lining is non-toxic and will not add an unpleasant taste to hot liquids or alcoholic beverages, as it is insoluble. It has a striking appearance that adds to the sale appeal of the product. It offers the potential of increasing the sales of beverage vending machines as it will aid in overcoming the objectionable taste which many people encounter in drinking out of a paper cup.

Second it is a practical, inexpensive cup that can be successfully used for dispensing alcoholic beverages. The cup can actually be washed and cleansed if so desired and reused several times. The advantages are readily apparent for persons employing them for picnics or similar use, as the number of cups required for all day outings would be considerably reduced.

Another extremely important advantage is the cost factor. At the present time the average "hot" cup is approximately 86% more expensive than a "cold" cup. Both of these cups require paper that has a high mechanical wet strength. The cup that I suggest requires a paper core of good mechanical strength but it does not require a high wet strength, consequently a lower priced paper may be employed. Naturally the foil is an important factor and does increase the cost; however the cost of a cup constructed in this manner is not necessarily more expensive than the "cold" cup.

Since the foil liner is impervious to liquid, as it is, and the liquid in the cup is unable to penetrate the paper layer **12**, **19**, the latter may be made of relatively inexpensive paper and still retain its full mechanical strength. In fact it is possible to provide a cup having a metal liner according to the present invention that is less expensive than a presently known hot cup because the paper (layer **12**) utilized may be sufficiently cheaper than the paper now used, to more than compensate for the additional cost of the metal liner.

A further advantage of the cup thus far described is that the paper, because of the metal liner, may be of quite porous nature and thus provide dead air spaces in the paper with consequent good heat insulating effect. Hence such a cup is not only less expensive than present hot cups, but has the additional advantage of being less uncomfortable than present hot cups.

The liner extends over the outer surface of the rolled bead and provides an additional advantageous feature. In drinking from the cup, the liner portion on the bead touches the lips, rather than the paper, and hence the user does not experience the "taste" of the paper, which is found objectionable or uncomfortable by some people.

Referring now to Figure 4 the insulating features of the invention will be described. The cup **30** has a rolled edge **31**, tapered sides **32**, and a bottom element **33** as described in connection with Figure 1. The cup, as shown by the cutout **37**, is of laminated construction, in which an outer paper layer or core **34** with embossings **35** has an inner film of aluminum foil bonded thereto. The tapered sides of the cup are joined and sealed at the overlap **38**. The cup naturally may possess a handle **40** which is secured to the body portion **39**. An annular groove **43** may be incorporated in the cup, in which a lid **42** with a small tab **41** may be removably secured.

Figure 5 is an enlarged cross-sectional view of the wall of the cup of Figure 4. The inner layer **50** of the laminated wall is a layer of aluminum foil and is attached by a bonding agent **51** to the paper layer or core **52** of the cup, the outer surface of the core being waterproofed by a wax or sizing agent **53**. Dead air cells **54** are formed in the inner surface of the paper layer which improves the insulating quality of the cup. Such dead air cells add to the insulating qualities of porous paper when the latter is used as was mentioned above. The dead air cells are formed by depressions in the paper layer, the portions of the surface between the depressions forming projections relative to the depressions. It is understood that the mean inner surface of the layer may be considered as constituting areas which effectively form projections relative to the depressions.

An improved alternate method of construction is exhibited in Figure 6. The main difference between the cups of Figures 5 and 6 is that the embossing **64** in Figure 6 protrudes beyond the otherwise normal outer surface of the cup **61**. The lamination of the structure of Figure 6 is similar to that previously described, **63** representing the aluminum foil, **62** the bonding agent, **60** the paper stock, **61** the outer surface water-proofing agent, with **65** designating the air cells.

The advantages are as follows, a layer of dead air cells may be so constructed which improves the insulating qualities of the cup. Also if the cup were constructed without a handle, a hand would rest in the protrusion of the embossings **64** when grasping it. The valley **66** formed between the protrusions would allow radiation of the heat not only from the hand but also of a hot liquid in the cup.

The advantages are twofold. A cold liquid would not absorb the heat of the hand as rapidly. A hot liquid placed in the cup would be far more comfortable to grasp as there would be a free circulation of air between the valleys of the cup and the hand.

The wall structure of Figure 7 includes a layer or core **67** that is corrugated, that is, the embossings or corrugations extend vertically of the cup. The liner **68** is of metal foil, as above referred to, bonded to the paper by a bonding agent layer **69**, and the outer surface of the paper has a coating **70** of waterproofing material. Dead air cells **71** are thus provided with the advantage pointed out in connection with Figures 5 and 6. The present construction possesses the additional advantage of greater strength in that the corrugations or ribs extend vertically and hence impart additional strength.

The preferred method of forming the cup is to fabricate it from laminated material comprising the layers of paper and foil described above. The paper and foil may be fed from rolls, and passed between pressure rollers, with the bonding material **11**, **18** applied before the layers enter between the rollers, and the water-proofing layer applied at an appropriate time as after leaving the rollers. The material thus laminated is cut to blanks to form the wall element and bottom element which are then shaped and secured together. An appropriate bonding and sealing material is interposed between the interengaging foil portions on the flange **7** and the wall element. The manner of fabricating the cup, after laminating the paper and foil, may be similar to that now employed in making paper cups, and hence the cost of the cup, with respect to this phase, is not greater than in the case of conventional paper cups.

While I have herein shown and described certain preferred embodiments of the invention it will be understood that modifications may be made within the spirit and scole of the appended claims.

I claim:

1. An expendable cup having a surrounding side wall and a bottom element, with edges of parts thereof lapped and water-proof sealed, all portions of the cup being made of laminated stock the laminations of which all extend uniformly and continuously throughout the entire area of the portions, the laminations including a paper core or layer and a metal layer bonded thereto with the metal layer disposed inwardly of the cup and forming a liner thereof, said paper core being provided with depressions in its surface next to the metal layer, said depressions forming dead air spaces between the metal layer and the paper core.

2. The cup of claim 1 wherein the outer surface is smooth.

3. The cup of claim 1 wherein the outer surface has raised portions correlative to the dead air spaces.

4. The cup of claim 1 wherein the paper core or layer has elongated ribs in its inner surface next to the metal layer, and the depressions are formed thereby.

5. The cup of claim 4 wherein the dead air spaces in the side wall extend vertically.

6. The cup of claim 4 wherein the dead air spaces in the side wall extend circumferentially.

7. The cup of claim 1 wherein the paper core or layer of the laminated stock has a waterproofing material on

its surface, opposite the metal layer, said waterproofing material constituting the outer surface of the cup.

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