(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 254 446**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **87305983.6**

(22) Date of filing: **07.07.87**

(51) Int. Cl.4: **B65D 81/34** , B65D 81/20 , B65D 1/26

(30) Priority: **21.07.86 GB 8617764**

(43) Date of publication of application: **27.01.88 Bulletin 88/04**

(84) Designated Contracting States: **DE FR GB**

(71) Applicant: **GENERAL FOODS LIMITED**
Banbury Oxfordshire, OX16 7QU(GB)

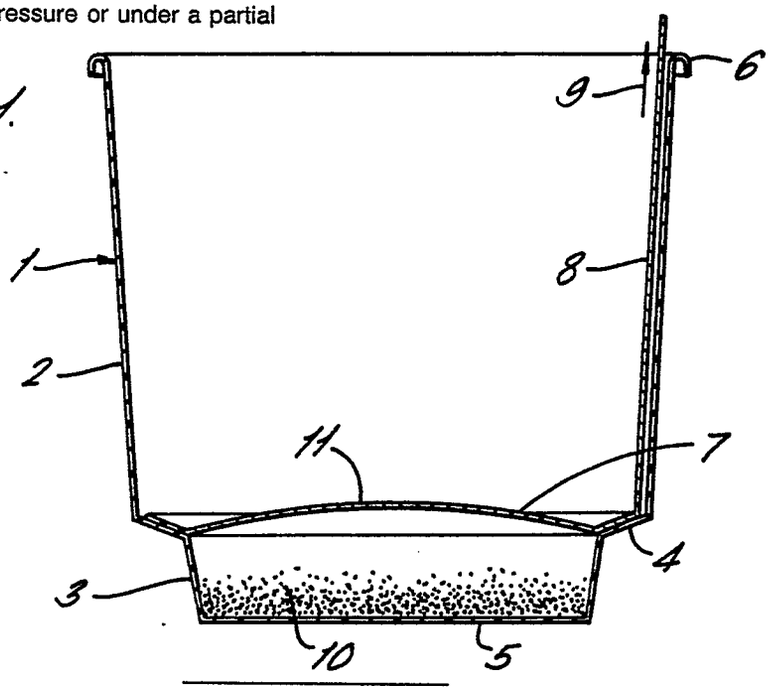
(72) Inventor: **Newman, Alec Thomas**
Greenways Warmington
Banbury Oxfordshire(GB)
Inventor: **Rhodes, David**
2 Upper Wardington Cottages Upper Wardington
Banbury Oxfordshire(GB)

(74) Representative: **Allard, Susan Joyce et al**
BOULT, WADE & TENNANT 27 Furnival Street
London EC4A 1PQ(GB)

(54) **Cup for the preparation of beverages.**

(57) A cup (1) for the preparation of beverages has a diaphragm (7) sealed therein, the space between the diaphragm and the base (5) of the cup containing one or more beverage ingredients (10) and being maintained under positive pressure or under a partial vacuum.

FIG. 1.



EP 0 254 446 A1

CUP FOR THE PREPARATION OF BEVERAGES

The present invention relates to a cup for the preparation of beverages and, in particular, to a cup in which the beverage ingredient or ingredients are hermetically sealed in the bottom portion of the cup. The present invention also relates to a method of manufacture of these cups.

Vending machines which dispense beverage ingredients for reconstitution into hot or cold drinks, are well known in the art. So called "in-cup" dispensing machines are known in which the beverage making ingredients are pre-packaged in the bottom of a paper or plastics cup, a plurality of cups with the selected beverage ingredients therein usually being formed into stacks in a vending machine from which they are generally dispensed in response to a consumer operating an appropriate selection mechanism on the vending machine. The coffee which is dispensed by such vending machines is usually so-called "instant" coffee and the tea which is dispensed by such machines is usually instant tea.

In order to preserve the freshness of beverage making ingredients and to prevent beverage making ingredients which have high moisture absorbent characteristics from absorbing moisture, it has been proposed to package the beverage making ingredients in the lower portion of a cup, the ingredients being sealed in this lower portion by means of a hermetically sealed lid. Proposals of this type are discussed, for example, in British Patent Specifications Nos. 1480545 and 1603421, French Patent No. 7536285 and United States Patent Specifications Nos. 4039435 and 4061782.

We have also described in our British Patent Application No. 8520611 a cup for the preparation of beverages in which leaf tea or ground coffee may be hermetically sealed in the bottom portion of the cup.

In the prior art cups which have beverage ingredients hermetically sealed in the bottom portion thereof, it is generally necessary to inspect the cups, prior to packaging the cups for distribution, in order to ensure that the hermetic seal is intact. It will be appreciated that this is of particular importance if the cup contains a liquid beverage ingredient. The inspection generally has to be carried out as a manual operation and is thus labour intensive. We have now developed a cup having a hermetically sealed diaphragm therein which can be inspected easily in order to ensure that the hermetic seal is intact.

Accordingly, the present invention provides a cup for the preparation of beverages which comprises a base having a body portion upstanding therefrom, the body portion having a diaphragm hermetically sealed therein to extend normal to the axis of the cup, the space between the diaphragm and the base of the cup containing one or more beverage ingredients and being maintained under positive pressure or under a partial vacuum.

When the space between the diaphragm and the base of the cup is maintained under positive pressure, the diaphragm will bow upwardly and will thus appear concave. When the space between the diaphragm and the base of the cup is maintained under a partial vacuum, the diaphragm will bow downwardly and will thus appear convex. If the hermetic seal is ruptured the positive pressure or partial vacuum beneath the diaphragm will dissipate and the diaphragm will no longer be either concave or convex in appearance, but will appear substantially flat. It is therefore possible to use this feature in order to check for cups which have faulty hermetic seals prior to packaging the cups for distribution.

The cup of the present invention may be made from paper or a plastics material, such as polyethylene, polypropylene or polystyrene. The cup is preferably frustoconical, tapering towards its base and the diaphragm is then of a diameter between the maximum and minimum diameters of the cup. The cup may be provided with an internal annular rim onto which the diaphragm is sealed, the said rim being spaced sufficiently far from the bottom of the cup to accommodate the beverage ingredients. The rim may either extend in a direction normal to the side wall of the cup or may be angled in an upwards direction, this latter arrangement facilitating the sealing of the diaphragm thereto. The diaphragm may be formed from aluminium, paper, card, a plastics coated foil material or a laminate material. The diaphragm will usually be coated around the perimeter of its under surface with an adhesive which is activated by heat and/or pressure so that it can be sealed to the annular rim, or with a plastics coating so that it can be heat sealed to the annular rim. Alternatively, the diaphragm may engage means provided on the internal surface of the cup, such as a groove or indent, so that it forms a hermetic seal therewith. The diaphragm is preferably provide with a pull tab or handle so that the consumer can readily remove the diaphragm from the cup. The handle is preferably in the form of a strip about 1 centimetre in width and of the order of 5 to 8 centimetres in length. In a preferred aspect of the invention the handle of the diaphragm extends above the rim of the cup, thereby making it easier to grip.

The cups of the present invention may contain and desired beverage ingredients, such as instant coffee, instant tea or chocolate, together with powdered milk and/or sugar, if desired; liquid concentrates for the preparation of carbonated or still drinks; measured amounts of spirits, such as whisky or gin; or leaf tea or ground coffee contained in an infusion device attached to the diaphragm.

The diaphragm may be sealed into the cup under a positive pressure or a partial vacuum by any means known in the art. For example, to achieve a positive pressure in the space between the diaphragm and the base of the cup, suction may be applied to the base of the cup whilst the diaphragm is sealed therein, or alternatively the whole cup may be enclosed in a chamber or the like maintained under a positive pressure during the sealing of the diaphragm therein. As a further alternative, the temperature of the air in the cavity below the diaphragm may be sufficiently above ambient temperature that when the diaphragm is sealed in the cup and the cup cooled to ambient temperature the pressure of the air above the diaphragm is below atmospheric pressure. To achieve a partial vacuum in the space between the diaphragm and the base of the cup, the whole cup may be enclosed in a chamber or the like maintained under a partial vacuum during the sealing of the diaphragm therein.

The present invention also includes within its scope a stack of cups nested together. It will be understood that if the diaphragm has a handle or tab attached thereto then the handle or tab must be sufficiently flexible to allow the nesting of non-interlocking cups. Furthermore, when the diaphragm is sealed in the cup under positive pressure it is advantageous for the cup to have a concave base in order to facilitate the stacking of the cups one inside the other.

The present invention will be further described by way of Example and with reference to the accompany drawings, in which:-

Figure 1 is a vertical section through a cup of the present invention in which the diaphragm is sealed therein under positive pressure; and

Figure 2 is a vertical section through a cup of the present invention in which the diaphragm is sealed therein under partial vacuum.

The cup 1 has a body portion formed from a plastics material and comprising upper and lower frustoconical sections 2 and 3 which are joined together by an annular flange 4 which is disposed therebetween. The lower frustoconical section 3 includes a base 5 and has an upwardly divergent side wall. Annular flange 4 is inclined at an angle of about 20 to 30° to the plane in which the base 5 lies. The cup is also provided with a rim 6.

The cup has a diaphragm 7, preferably formed from paper or card, hermetically sealed to the annular rim 4. The diaphragm 7 is also provided with a handle 8 which acts as a pull tab to enable the consumer to remove the diaphragm. A pull on the handle 8 by the consumer generally in the direction of arrow 9 will cause the circular diaphragm 7 to progressively peel off the annular rim 4. The handle 8 of the diaphragm 7 extends slightly above the rim 6 of the cup in order to make it easier for the user to grip.

The space between the diaphragm 7 and the base 5 of the cups shown in Figures 1 and 2 is filled with beverage ingredients 10.

In the embodiment as shown in Figure 1 the diaphragm is sealed into the cup under positive pressure and the diaphragm is accordingly concave in appearance as indicated at 11.

In the embodiment as shown in Figure 2 the diaphragm is sealed into the cup under partial vacuum and the diaphragm is accordingly convex in appearance as indicated at 12.

The lower portion 3 of the cup shown in Figure 2 is generally deeper than the lower portion of the cup shown in Figure 1, in order that a sufficient volume for the beverage ingredients is provided, despite the diaphragm being generally convex.

Claims

1. A cup for the preparation of beverages which comprises a base having a body portion upstanding therefrom, the body portion having a diaphragm hermetically sealed therein to extend normal to the axis of the cup, the space between the diaphragm and the base of the cup containing one or more beverage ingredients and being maintained under positive pressure or under a partial vacuum.

2. A cup as claimed in claim 1 wherein the body portion is made from paper or a plastics material.

3. A cup as claimed in claim 1 or claim 2 which is frustoconical tapering towards its base.

4. A cup as claimed in any one of the preceding claims which has an internal annular rim onto which the diaphragm is sealed.

5. A cup as claimed in claim 4 wherein the internal annular rim is angled in an upwards direction.

6. A cup as claimed in any one of the preceding claims wherein the diaphragm is coated around the perimeter of its under surface with an adhesive which is activated by heat and/or pressure so that it can be sealed to the annular rim.

7. A cup as claimed in any one of claims 1 to 5 wherein the diaphragm engages means provided on the internal surface of the cup so as to form a hermetic seal therewith.

8. A method for the manufacture of a cup as claimed in any one of the preceding claims which comprises the steps of filling the empty cup with the desired beverage ingredients and sealing a diaphragm hermetically into the cup under positive pressure or a partial vacuum.

9. A method as claimed in claim 8 wherein the cup is enclosed in a chamber maintained under the desired positive pressure or partial vacuum during the sealing operation.

10. A method as claimed in claim 8 wherein suction is applied to the base of the cup during the sealing of the diaphragm therein in order to achieve a positive pressure beneath the diaphragm.

11. A stack of cups as claimed in any one of claims 1 to 7 which are nested together.

FIG. 1.

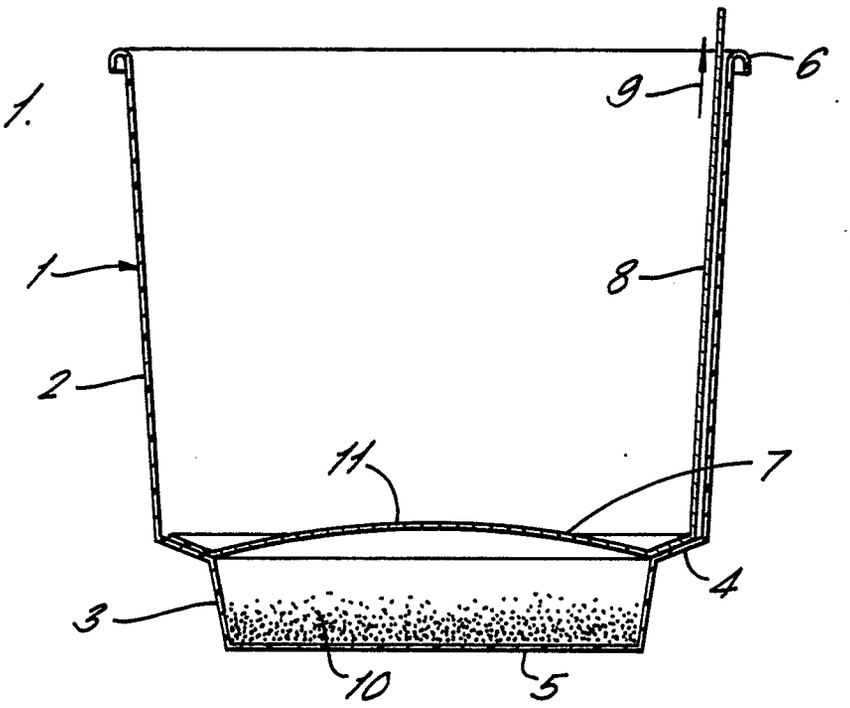
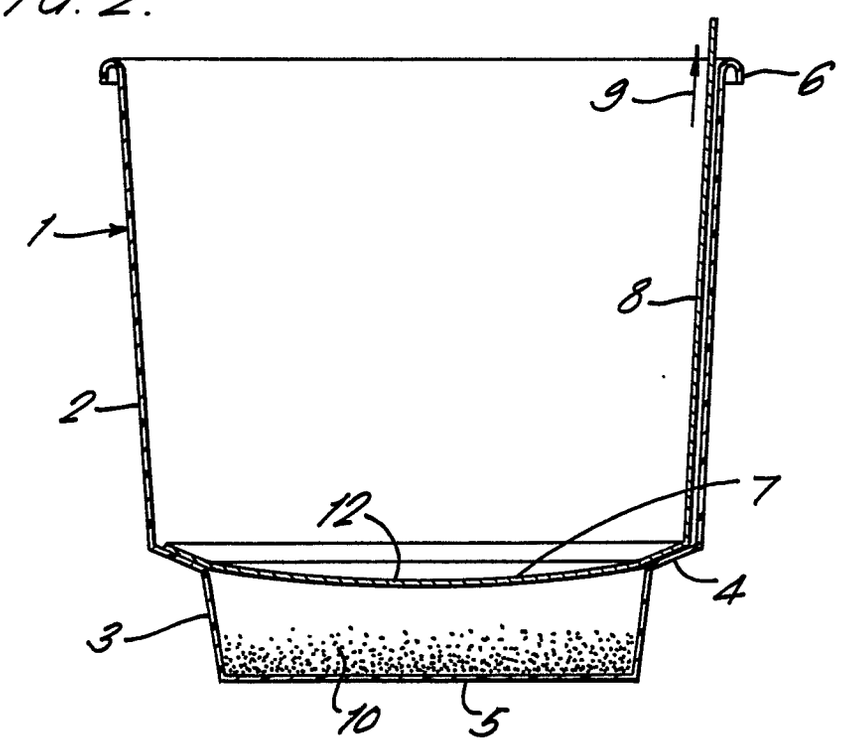


FIG. 2.



European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 87 30 5983

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y,D	US-A-4 061 782 (BAXTER) * Column 2, lines 43-54; column 3, lines 30-65; column 4, lines 39-49; claim 1; figures 1,5,8 *	1-4,6, 18-11	B 65 D 81/34 B 65 D 81/20 B 65 D 1/26
Y	US-A-2 027 430 (HANSEN) * Page 1, left-hand column, lines 1-14; page 1, right-hand column, line 52 - page 2, line 26; claim 1; figures 1,2 *	1-4,6, 8-11	
A	US-A-1 933 468 (ABBOTT) * Claim 1; figures *	7	
A	EP-A-0 090 639 (LIN PAC) * Abstract; figure 4 *	5	TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03-09-1987	NEWELL P.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82