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

(11) Publication number: **0 212 932**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **86306226.1**

(22) Date of filing: **12.08.86**

(51) Int. Cl.⁴: **B 65 D 81/34**, B 65 D 1/26

(30) Priority: **16.08.85 GB 8520611**

(43) Date of publication of application: **04.03.87**
Bulletin 87/10

(84) Designated Contracting States: **AT BE CH DE FR IT LI LU NL SE**

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(54) Cup for the preparation of beverages.

(57) A cup for the preparation of beverages which comprises a body portion having a diaphragm hermetically sealed therein to extend normal to the axis of the cup, the lower surface of the said diaphragm forming the upper part of a beverage infusion device, the lower part of the beverage infusion device being permeable to liquids and being deep drawn or formed to provide a receptacle for a beverage ingredient or ingredients, preferably leaf tea or ground coffee, the said upper and lower parts of the beverage infusion device being joined together around the edges thereof.

EP 0 212 932 A2

CUP FOR THE PREPARATION OF BEVERAGES

The present invention relates to a cup for the preparation of beverages and, in particular, to a cup incorporating therein a beverage infusion device containing leaf tea or ground coffee which is intended to provide an infusion of tea or coffee, respectively.

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. The drinks formed by reconstituting the instant coffee and instant tea with hot water are not acceptable to all consumers and there has therefore been a need for a system whereby infusions of leaf tea and ground coffee can be provided in vending machines.

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 Specification Nos. 1480545 and 1603421, French Patent No. 7536285 and United States Patent Specifications Nos. 4039435 and 4061782.

We have now developed 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.

Accordingly, the present invention provides a cup for the preparation of beverages which comprises a body portion having a diaphragm hermetically sealed therein to extend normal to the axis of the cup, the lower surface of the said diaphragm forming the upper part of a beverage infusion device, the lower part of the beverage infusion device being permeable to liquids and being deep drawn or formed to provide a receptacle for a beverage ingredient or ingredients, the said upper and lower parts of the beverage infusion device being joined together around the edges thereof.

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 infusion device. 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 diaphram thereto. The diaphragm may be formed

from aluminium, paper, card or a plastic coated foil 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. It will also be understood that the diaphragm may be frictionally fitted into the cup, providing that it forms a substantially air and moisture proof seal therewith, so that the contents of the beverage infusion device remain fresh. The diaphragm is preferably provided with a pull tab or handle so that the consumer can readily remove the diaphragm from the cup and can use the handle or tab in order to facilitate the preparation of a beverage from the beverage infusion device by making it easier to swirl the beverage infusion device through the liquid added to 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.

The lower part of the beverage infusion device is preferably made from a water-permeable cellulosic material, a cellulosic material comprising woven paper fibres being particularly preferred. The woven paper fibres may be admixed with fibres of polypropylene, polyvinylchloride and/or polyethylene. The incorporation of these plastics materials into the cellulosic material renders the cellulosic material heat-sealable. The cellulosic material may also be coated with a material which is activated by heat and/or pressure so that it can readily be sealed to

the lower surface of the diaphragm to form the beverage infusion device. The lower part of the beverage infusion device may also be made from a water-permeable synthetic material, for example a spun-bonded polyester web sold under the Trade Name REMAY or a spun-bonded nylon web sold under the Trade Name CEREX.

The lower deep-drawn or formed portion of the beverage infusion device may be circular or square and is preferably pleated around the edges thereof to provide the desired volume of receptacle for housing the beverage ingredients.

The beverage infusion device may have one or more additional receptacles for beverage forming ingredients attached thereto, for example, a band of two or more receptacles may be formed from a cellulosic material and one only of these receptacles attached to the lower surface of the diaghragm. When the diaphragm is inserted into the cup the additional receptacles for beverage forming ingredients are accommodated in the space below the diaphragm.

The beverage infusion device preferably contains leaf tea or ground coffee as the beverage ingredient, together with a whitener and/or sugar as desired. It may also be used for the packaging of other beverage ingredients, such as chocolate and fruit drinks. A particular advantage of the cup of the present invention is that the deep drawn or formed part of the beverage infusion device enables water to penetrate therein more readily, thereby to give a more satisfactory infusion than the type of infusion obtained with flat tea bags or the like. This is

particularly important with regard to the infusion of ground coffee which is a much slower operation than the infusion of leaf tea.

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 resting of non-interlocking cups. In the embodiment of the invention in which an annular rim is provided, the rim will assist in the stacking of one cup inside another.

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

Figure 1 is a vertical section through the lower portion of a cup of the present invention; and

Figure 2 is a perspective view of the cup of Figure 1, partly broken away, to show how the beverage infusion device is removed.

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^{o} 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 aluminium foil hermetically sealed to the annular rim 4. The underneath surface of the diaphragm forms

the top of a beverage infusion device which has a deep drawn lower portion 8 formed from a heat-sealable cellulosic material containing fibres of a mixture of polypropylene, polyvinyl chloride and polyethylene. The infusion device contains a beverage ingredient or ingredients, for example leaf tea or coffee together with a whitener if desired. The diaphragm 7 is also provided with a handle 9 which acts as a pull tab to enable the consumer to remove the diaphragm. A pull on the handle 9 by the consumer generally in the direction of arrow 10 will cause the circular diaphragm 7 to progressively peel off the annular rim 4, thus providing the beverage infusion device ready for use.

In the manufacture of the cup of the invention 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 readily sealed to the annular rim by conventional means. The diaphragm is also sealed to the lower portion of the beverage infusion device by heat sealing.

It will be appreciated that the particular type of infusion device illustrated in the drawings is suitable for incorporation into the round bottomed cups which are currently used in vending machines. The round shape of the infusion device makes it particularly suitable for incorporation into the bottom of such cups.

CLAIMS:

1 A cup for the preparation of beverages which comprises a body portion having a diaphragm hermetically sealed therein to extend normal to the axis of the cup, the lower surface of the said diaphragm forming the upper part of a beverage infusion device, the lower part of the beverage infusion device being permeable to liquids and being deep drawn or formed to provide a receptacle for a beverage ingredient or ingredients, preferably leaf tea or ground coffee, the said upper and lower parts of the beverage infusion device being joined together around the edges thereof.

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

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, preferably angled in an upwards direction, onto which the diaphragm is sealed.

5. A cup as claimed in any one of the preceding claims wherein the diaphragm is made from aluminium, paper, card or a plastics coated foil material.

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 cup as claimed in any one of the preceding claims wherein the diaphragm is provided with a pull tab or handle.

9. A cup as claimed in any one of the preceding claims wherein the lower part of the beverage infusion device is made from a water-permeable cellulosic material, preferably woven paper fibres admixed with fibres of polypropylene, polyvinylchloride and/or polyethylene.

10. A cup as claimed in claim 9 wherein the cellulosic material is coated with a material which is activated by heat and/or pressure so that it can be sealed to the lower surface of the beverage infusion device.

11. A cup as claimed in any one of the preceding claims wherein one or more additional receptacles for beverage forming ingredients is attached thereto.

12. A stack of cups as claimed in any one of the preceding claims which are nested together.

FIG. 1.

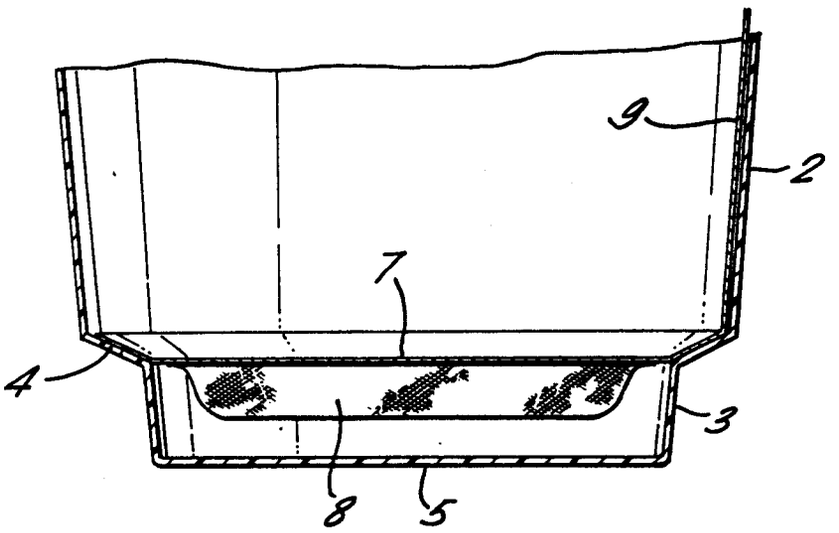

FIG. 2.