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Beverage preparation cartridge.

A beverage package (1) containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment (2) containing the beverage preparation ingredient(s), an inlet (12) which communicates with the said compartment and an outlet (3), a filter (9) being disposed between the compartment and at least a part of the under surface (5) of the top of the package, one or more passages (15) being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.
The present invention relates to packages containing ingredients for the preparation of beverages and, in particular, to sealed packages which are formed from a substantially air- and water-impermeable material and which contain one or more ingredients for the preparation of beverages.

It has previously been proposed to seal beverage preparation ingredients in individual air-impermeable packages. For example, cartridges or capsules containing compacted ground coffee are known for use in certain coffee making machines which are generally termed "espresso" machines. In the production of coffee using these coffee machines the coffee cartridge is placed in a brewing chamber and hot water is generally caused to pass under pressure through the cartridge, thereby extracting the aromatic coffee constituents from the ground coffee and producing a coffee beverage.

Cartridges containing roast and ground coffee in which hot water flows under gravimetric force through the cartridge are also known. A cartridge of this general type is described in British Patent No. 1397116.

In our European Patent Application No. 87311325.2 there is described a package which contains at least one beverage preparation ingredient, e.g. roast and ground coffee. In a preferred embodiment the package is formed from a substantially air- and water-impermeable material and comprises a sealed body portion having a compartment containing the beverage ingredient and an outlet channel, the compartment and the outlet channel co-operating in such a manner that, in use, the beverage is filtered, thereby avoiding the necessity for an external filter.

There is also described in European Patent Application No. 87311325.2, a method for preparing a beverage which comprises positioning a beverage containing package at a brewing station, introducing water through water introduction means into the package, allowing the water to commingle with the beverage ingredient, and collecting the beverage so-formed through an outlet formed in the package.

The beverage packages as described in European Patent Application No. 87311325.2 are primarily intended to be used with a beverage preparation machine which handles the packages automatically or semi-automatically. A machine of this type is described in our European Patent Application No. 89302708.6. The packages may contain roast and ground coffee, leaf tea or one or more powdered beverage preparation ingredients such as powdered chocolate, powdered coffee or powdered soup.

We have now developed a package containing one or more ingredients for the preparation of beverages in which a filter is disposed in such a manner that the beverage so produced is filtered upwardly through the filter.

Accordingly, the present invention provides a beverage package containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment containing the beverage preparation ingredient(s), an inlet which communicates with the said compartment and an outlet, a filter being disposed between the compartment and at least a part of the under surface of the top of the package, one or more passages being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.

The beverage package of the present invention preferably has a body portion which may be formed, for example, from a moulded plastics material. The inlet and/or outlet of the package may be closed by a plug of a plastics material moulded into the inlet and/or outlet nozzle during the moulding of the body portion. Alternatively, the inlet and/or outlet may be covered by a substantially air- and water-impermeable material, for example aluminium foil or a laminated material, such as a laminate of plastic material/metal foil/plastic material, prior to the opening of the inlet and/or outlet. Specific examples of materials which can be used are aluminium foil having a thickness in the range of from 30 to 60 micrometres coated with a layer of polypropylene or a laminate of polypropylene/aluminium foil/polyester.

The outlet in the package may be prepared during the beverage preparation cycle using a cutting and piercing tool for example of the type as described in our European Patent Application No. 89302708.6.

Alternatively, the inlet and/or outlet may be open and the beverage package provided with an outer wrapping or the like. For example, a plurality of packages may be provided with a shrink wrapped outer layer.

In the packages of the present invention, the communication between the inlet and the compartment containing the beverage preparation ingredient(s) is preferably via a channel which is separated from the compartment by a wall which has a plurality of openings formed therein for the entry of a liquid medium into the compartment. The channel preferably extends along at least one side of the compartment, more preferably along three sides of the compartment. The openings in the wall are preferably in the form of elongate slots which are generally arranged in a manner such that an even distribution of the liquid medium through the beverage preparation ingredients is achieved.

The filter is preferably made from a material with a high wet strength, for example a non-woven polyester fibre material or polypropylene. Other materials which may be used include a water-permeable cellulosic material, such as a cellulosic material compris-
The present invention also includes within its scope a method for the preparation of a beverage from a sealed package containing one or more beverage preparation ingredients located in a compartment in the package, which method comprises introducing a liquid medium suitable for the preparation of the beverage under pressure into the package through an inlet formed therein, causing the liquid medium to enter the compartment thereby forming the beverage, filtering the beverage in an upwardly direction through a filter, and collecting the beverage so formed from an outlet formed in the package.

The packages of the present invention are preferably provided with a recognition means whereby, in use, the package is identified by the machine into which it is placed for treatment and the identification of the package thereby causes it to be subjected to the correct treatment steps including the introduction of a liquid medium into the package. For the preparation of beverages from beverage preparation ingredients the liquid medium introduced into the package
will generally be water or a water/air mixture.

The recognition means may comprise one or more surface features formed in the body of the beverage package. For example, the package body may be provided with one or more indents, cut outs, protrusions or holes which can be identified by a mechanical sensor in the beverage preparation machine, the mechanical sensor registering the presence or absence of the indents, cut outs, protrusions or holes.

The recognition means may, alternatively, comprise a system which can be sensed by a simple optical device, for example a bar code printed onto the body of the package, a pattern of through holes in the package, a pattern of contrasting tones or colours printed onto the package or packages containing different comestibles being of different colours.

The recognition means may also comprise one or more strips of a magnetic material applied to the body of the package which can be read by an appropriate magnetic sensor; one or more shaped or divided areas of metal foil applied to the package body which cause an inductive effect on movement of the package in the machine, which inductive effect can be sensed; or one or more electrically conductive areas formed on the body of the package which can be sensed electrically.

As mentioned above, the package of the present invention contains one or more beverage preparation ingredients, for example, roast and ground coffee or leaf tea and sugar and/or creamer, as desired. One machine which can readily be adapted for the preparation of a beverage from the preferred beverage package of the invention which includes a recognition means is described in our European Patent Application No. 89302708.6. The only modification required to be made to such a beverage preparation machine is to incorporate an appropriate sensor or sensors into it, the sensor or sensors being designed to read the particular coding on the capsule and to identify a recognition means provided on beverage packages intended for use therewith.

The present invention will be further described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of part of a beverage package of the invention;
Figure 2 is a top plan view of the beverage package of Figure 1;
Figure 3 is a section through the beverage package of Figure 1 along line A-A of Figure 2;
Figure 4 is a section through the beverage package of Figure 1 along line B-B of Figure 2; and
Figure 5 is a section along the line C-C of Figure 2;

Referring to the drawings a beverage package body is shown at 1. The body may be formed, for example, from a moulded plastics material. The body 1 has a compartment 2 in which the beverage preparation ingredient or ingredients are contained. The package body has an outlet nozzle 3 and an inlet 12 formed therein. The compartment 2 is separated from the area of the body in which the nozzle 3 is formed by means of a wall 4. The top 5 of the package 1 has four longitudinal ribs 6 moulded to the underside thereof which are shown as a plurality of dotted lines in Figure 2. The four ribs 6 are joined at either end by transverse ribs 7 which are also shown in dotted outline in Figure 2. The ribs 6 and 7 are strengthened at intervals by posts 8 which are also moulded to the underside of the top 5 of package 1. These posts 8 are also shown in dotted outline in Figure 2. A filter material 9 is heat sealed to ribs 6, ribs 7 and posts 8, the filter material 9 extends across a substantial part of the top of compartment 2.

Compartment 2 is separated from the outlet nozzle by a wall 4 and surrounded on its other three sides by a U-shaped wall 10. The wall 10 has a U-shaped channel 11 surrounding it, the channel 11 communicating with inlet 12. The wall 10 has a plurality of small slots 13 formed in the two longitudinal arms thereof.

In use of the beverage package as shown in the drawings, the bottom of the package 1 is sealed by means of an aluminium foil or a laminated foil which is heat sealed to the lower edges of walls 4 and 10 and to the lower edge 14 of the package. Water enters the package at a pressure of about 100 kPa via inlet 12 which is opened by piercing or cutting the material covering the said opening. The water enters the channel 11 surrounding three sides of the compartment 2 containing the beverage ingredients. The water, which is under pressure, is forced through the elongate slots 13 formed in the wall 10 which separates channel 11 from compartment 2. The water mixes with the beverage preparation ingredients contained in
The beverage package is forced upwardly through the beverage preparation ingredients. The beverage formed by passage of the water through the beverage preparation ingredients passes through filter material 9 into passages 15 which are formed between the ribs 6. The sensing arm operates a switch (not shown) which thereby transmits information concerning the presence or absence of the pegs on the package to the control mechanism for the beverage dispensing machine. The arrangement of pegs 31, 32, 33, 34 on the package thus identifies the type of package to the controller which then selects the appropriate beverage preparation conditions.

If one or more of pegs 31, 32, 33, 34 is not present the sensing arm will thereby identify a different type of beverage package. The sensing arm operates a switch (not shown) which thereby transmits information concerning the presence or absence of the pegs on the package to the control mechanism for the beverage dispensing machine. The arrangement of pegs 31, 32, 33, 34 on the package thus identifies the type of package to the controller which then selects the appropriate beverage preparation conditions.

The presence or absence of three pegs provides scope for the sensing arm to sense up to 8 different types of beverage packages. Thus, if the presence of a peg at a particular location is coded as 1 and the absence of a peg coded as 0, the following code combinations can be achieved:

- 000
- 001
- 010
- 011
- 100
- 101
- 110
- 111

The presence of the additional fourth peg formed in flange 28 provides an even larger number of code combinations.

When the beverage preparation machine has selected the appropriate beverage preparation conditions, the water inlet 12 of the package is pierced or cut, the outlet 3 is uncovered in the package and water caused to flow under pressure through the compartments containing the beverage ingredient(s). The chosen beverage then being collected in a cup or receptacle placed below the outlet 3 of the package.

It will be appreciated that for different types of packages the beverage or other ingredient may require significantly different treatment. Thus, some beverages will be prepared with hot water and some with cold water, whilst others, such as espresso coffee, will require a smaller amount of water for their preparation. Preparation times may require to be varied. Similarly water and/or air may be required either for preparing/dispensing the beverage/content of the package or for the purpose of pre-cleaning an inlet pipe or flushing out a used package. Furthermore, a user may require a particular beverage to be dispensed in combination with one or more ingredients from independent sources, e.g. powdered milk and/or sugar.

The present invention will be further illustrated with reference to the following non-limiting Example.
EXAMPLE

The following experiments were conducted in respect of the preparation of beverages from coffee capsules, adapted for upward or downward filtration, which had been subject to vibration during transport and distribution. The capsules were each tapped prior to the preparation of the beverages.

Downward Filtration

Sample 1
6.3g of roast and ground coffee contained in a capsule adapted for downward filtration gave 153cc of a coffee beverage at 0.8% solids with a yield of 19.4%.

Sample 2
6.3g of roast and ground coffee contained in a capsule adapted for downward filtration gave 153cc of a coffee beverage at 0.81% solids with a yield of 19.7%.

Upward Filtration

Sample 3
6.3g of roast and ground coffee contained in a capsule adapted for upward filtration, when brewed in the same manner as for samples 1 and 2, gave 156cc of a coffee beverage at 1.04% solids with a yield of 25.7%.

Sample 4
6.3g of roast and ground coffee contained in a capsule adapted for upward filtration, when brewed in the same manner as for samples 1 and 2, gave 158cc of a coffee beverage at 1.02% solids with a yield of 25.6%.

These results indicate an improvement of approximately 20% yield.

Claims

1. A beverage package containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment containing the beverage preparation ingredient(s), an inlet which communicates with the said compartment and an outlet, a filter being disposed between the compartment and at least a part of the under surface of the top of the package, one or more passages being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.

2. A package as claimed in claim 1 wherein the inlet and/or outlet is covered by a substantially air- and water-impermeable material prior to the formation, in use, of an outlet in the package.

3. A package as claimed in claim 1 wherein the inlet and/or outlet is closed by a plug prior to the formation, in use, of an outlet in the package.

4. A package as claimed in any one of the preceding claims wherein a channel communicates with the inlet for the entry of a liquid medium into the package, the channel being separated from the compartment by a wall which has a plurality of openings formed therein for the entry of the liquid medium into the compartment containing the beverage preparation ingredient(s).

5. A package as claimed in claim 4 wherein the channel extends along at least one side of the compartment containing the beverage preparation ingredient(s).

6. A package as claimed in claim 4 or claim 5 wherein the channel extends around three sides of the compartment containing the beverage preparation ingredient(s).

7. A package as claimed in any one of the claims 4 to 6 wherein the openings comprise a plurality of elongate slots.

8. A package as claimed in any one of the preceding claims wherein the filter is made from a water-permeable material.

9. A package as claimed in any one of the preceding claims wherein a plurality of passages are formed between the filter and the top of the package.

10. A package as claimed in any one of the preceding claims wherein the beverage preparation ingredient is leaf tea or roast and ground coffee.

11. A package as claimed in any one of the preceding claims which is provided with a recognition means whereby, in use, the package is identified by the machine into which it is placed for treatment therefrom and the identification of the package thereby causes it to be subjected to the correct treatment steps including the introduction of a fluid medium into the package.

12. A package as claimed in claim 11 wherein the recognition means comprises one or more surface features formed in the body of the package.

13. A package as claimed in claim 11 wherein the rec-
ognition means comprises a bar code.

14. A package as claimed in claim 11 wherein the recognition means comprises a pattern of holes formed in the body of the package.

15. A package as claimed in claim 11 wherein the recognition means comprises a pattern of contrasting tones or colours.

16. A package as claimed in claim 11 wherein the recognition means comprises one or more strips of a magnetic material.

17. A package as claimed in claim 11 wherein the recognition means comprises an inductive device.

18. A package as claimed in claim 11 wherein the recognition means comprises a plurality of electrically conductive means.

19. A method for the preparation of a beverage from a sealed package containing one or more beverage preparation ingredients located in a compartment in the package, which method comprises introducing a liquid medium suitable for the preparation of the beverage under pressure into the package through an inlet formed therein, causing the liquid medium to enter the compartment thereby forming the beverage, filtering the beverage in an upwardly direction through a filter, and collecting the beverage so formed from an outlet formed in the package.

20. A method as claimed in claim 19 wherein the inlet and/or outlet in the package is/are formed by means of a piercing and cutting tool.

21. A method as claimed in claim 19 or claim 20 wherein the liquid medium is water.

22. A method as claimed in any one of claims 19 to 21 wherein the flow of the liquid medium into the compartment containing the beverage preparation ingredients is achieved by causing the liquid to flow through one or more restricted openings into the said compartment.

23. A method as claimed in claim 22 wherein the restricted openings are elongate slots.
### EUROPEAN SEARCH REPORT

**Application Number**
EP 91 30 2538

**Documents Considered to Be Relevant**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>Classification of the Application (Int. Cl.s)</th>
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<tr>
<td>A</td>
<td>EP-A-334 573 (GENERAL FOOD LIMITED) * abstract; figure 4 *</td>
<td>1,4,11,19</td>
<td>B65D81/00</td>
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**Technical Fields Searched (Int. Cl.s)**
B65D

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**The present search report has been drawn up for all claims**

**Place of search**
THE HAGUE

**Date of completion of the search**
27 JUNE 1991

**Examiner**
ZANGHI AMEDEO

**Category of Cited Documents**

- **T**: theory or principle underlying the invention
- **E**: earlier patent document, but published on, or after the filing date
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- **L**: document cited for other reasons
- **A**: member of the same patent family, corresponding document
- **X**: particularly relevant if taken alone
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- **A**: technological background
- **O**: non-written disclosure
- **P**: intermediate document

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