



AU9644409

(12) PATENT ABRIDGMENT (11) Document No. AU-B-44409/96
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 701051

- (54) Title
METHOD AND DEVICE FOR PREPARING A BEVERAGE SUCH AS ESPRESSO COFFEE
- International Patent Classification(s)
(51)⁶ **A47J 031/36**
- (21) Application No. : **44409/96** (22) Application Date : **07.02.96**
- (30) Priority Data
- (31) Number (32) Date (33) Country
354/95-0 08.02.95 CH SWITZERLAND
- (43) Publication Date : **15.08.96**
- (44) Publication Date of Accepted Application : **21.01.99**
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- (57) Claim

1. A method for preparing a beverage such as espresso coffee, characterized in that it consists in: feeding pressurized hot water through a coffee powder tablet; blocking, downstream of said tablet, the extracted liquid that has passed through said tablet; producing a removable plug with solid particles of said extracted liquid; causing an increase in pressure downstream of said tablet to increase the hot water pressurization inside said tablet; and reaching a removal pressure adapted to remove said removable plug, with subsequent dispensing of the extracted liquid at a dispensing pressure that is lower than said removal pressure to cause a depressurization of the hot water inside said tablet.

5. A device for dispensing a beverage such as espresso coffee, comprising a body that can be coupled to a pressurized hot water dispensing unit and internally supports a filter container, provided with a perforated bottom, inside which it is possible to insert a coffee powder in tablet form, said coffee powder being interposed between a hot water feed duct, formed by said pressurized hot water dispensing unit, and a dispensing duct, wherein a stopper valve acts, the stopper of said stopper valve

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being pushed in abutting seal by calibrated elastic means, characterized in that said stopper in abutting seal defines a closed gap between the outer surface thereof and a stopper seat, said calibrated elastic means have a setting chosen such that said stopper is kept in abutting seal until a first portion of extracted liquid containing solid particles released by said coffee powder and constituting a removable plug gathers around said stopper in said gap.

AUSTRALIA
Patents Act 1990

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: METHOD AND DEVICE FOR PREPARING A
 BEVERAGE SUCH AS ESPRESSO COFFEE

The following statement is a full description of this invention, including
the best method of performing it known to us:

GH&CO REF: P24178-B:CAS:RK

METHOD AND DEVICE FOR PREPARING A BEVERAGE SUCH AS ESPRESSO COFFEE

The present invention relates to a method and device for preparing a beverage such as espresso coffee.

In the production of beverages such as espresso coffee, pressurized hot water is usually fed through a
5 tablet of coffee powder, so that the water penetrates in the interstices between the granules to imbibe the coffee granules. If the dispensing pressure of the espresso coffee is equal to the atmospheric pressure, a pressure capable of overcoming the resistance of the tablet to the passage of
10 water is generated automatically inside the tablet of coffee powder; the value of this pressure decreases from the uppermost layer of the tablet towards the lowermost layer, with consequent non-uniform imbibing of the various coffee granules and their insufficient utilization.

15 Systems are also known for dispensing espresso coffee at a higher pressure than atmospheric pressure, by providing a stopper valve or cock that in practice produces a counterpressure at the dispensing outlet.

In this manner it is possible to better utilize the
20 coffee powder tablet, the granules whereof become deeply imbibed with water over the entire thickness of the tablet.

Systems ensuring a constant flow-rate are also known, but in this case too the solution has been found far from being optimal.

25 In both of the above mentioned solutions, it has been observed that the coffee powder is not fully utilized in terms of its total content of precious principles.

A principal aim of the invention is indeed to solve or ameliorate the above described problem by providing a method for preparing a beverage such as espresso coffee and a device for performing said method, which allow to produce, between the coffee granules, conditions that facilitate the complete imbibing of the various granules with water, with subsequent extraction of all the precious principles contained in said granules.

It would be particularly advantageous if the invention could provide a device that allows to automatically perform a plurality of operating steps that provide optimum utilization of the coffee powder tablet.

Advantageously, the present invention should provide a device for preparing a beverage such as espresso coffee that despite being structurally simple is capable of giving the greatest assurances of reliability and safety in use.

Another advantage would be if the present invention could provide a device which can be easily obtained starting from commonly commercially available elements and materials and which is furthermore competitive from a purely economical point of view.

Accordingly, in one aspect thereof, the present invention concerns a method for preparing a beverage such as espresso coffee, characterized in that it consists in: feeding pressurized hot water through a coffee powder tablet; blocking, downstream of said tablet, the extracted liquid that has passed through said tablet; producing a removable plug with solid particles of said extracted liquid; causing an increase in pressure downstream of said tablet to increase the hot water pressurization inside said tablet; and reaching a removal pressure adapted to remove said removable plug, with subsequent dispensing of the extracted liquid at a dispensing pressure that is lower than said removal pressure to cause a depressurization of the hot water inside said tablet.

One preferred embodiment of the present invention will now be described by way of example only, with reference to the accompanying drawings, in which:



Figure 1 is a sectional view of the device for preparing an espresso coffee, according to the invention, during the initial step for forming the removable plug;

5 Figure 2 is an enlarged-scale view of the detail of the tip of the stem of the stopper in the position shown in Figure 1;

Figure 3 is a sectional view of the device during the dispensing step;

10 Figure 4 is an enlarged-scale view of the tip of the stem of the stopper during the dispensing step.

With reference to the above Figures, the device for preparing a beverage such as espresso coffee, generally designated by the reference numeral 1, comprises a body 2 which, in a per se known manner, can be coupled to a unit
15 3 for feeding pressurized hot water.

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The body 2 internally supports a filter container 4, provided with a perforated bottom 5, inside which it is possible to insert a tablet or pellet 10 of coffee powder, which is interposed between the hot water inlet duct 11, formed by the water feed unit 3, and a dispensing duct that is generally designated by the reference numeral 12 and is formed on the bottom of the body 2.

A stopper valve 20 is provided at the dispensing duct 12 and is constituted by a stopper 21 that acts on a stopper seat 22.

The stopper 21 is movable towards and away from the seat 22, so as to produce the opening and closure of said seat.

The seat 22 is formed at the bottom of the body 2 and has a shoulder 23, inside which a hole 24 is provided; said shoulder and said hole are blended together by means of a tight blending radius.

The stopper 21 ends with a stem 30 that has a conical shape and is long and narrow, i.e., it has a small apex angle, and merges with the stopper 21 by means of an abutment surface 31 which is frustum-shaped in the mentioned example but can assume in practice any configuration deemed appropriate.

The stopper 21 abuts against the seat 22, and more precisely against the shoulder 23 of the seat, by means of the abutment surface 31, whereas the conical stem 30 engages inside the hole 24, forming a gap 40 that is small when the stopper abuts against the seat 12 and increases as the stopper 21 moves away from the seat 22.

When the gap 40 is smallest, i.e., when the stopper is

in closed position, it has the purpose of preventing the passage, through the stopper, of the first portion of extracted liquid that has passed through the coffee tablet and contains solid particles, schematically designated by 5 the reference numeral 45 in figure 2, which have been released by the coffee powder 10 and have passed through the perforated bottom 5.

The taper angle of the stem 30, as mentioned earlier, has a sufficiently small value, so as to require a stroke 10 having a preset large value on the part of the stopper away from the seat before the gap 40 assumes a size that allows the passage of the solid particles 45, which in practice have formed a removable plug.

The stopper valve 20 furthermore comprises elastic 15 means, constituted by a folded elastic lamina 25, which act on a linkage 26 pivoted between an internal point of the body 2 and said stopper.

The setting of the elastic means is such that the stopper is kept engaged against the seat of the stopper up 20 to a certain pressure level, for example five atmospheres, whereas to achieve the initial dispensing of the coffee it is necessary to reach a removal pressure, for example of ten atmospheres, to push the stopper to the end of the stroke that allows the passage of the solid particles, 25 i.e., of the removable plug, through the open stopper valve.

After removing the removable plug, which in practice has produced an increase in pressure, downstream of the coffee tablet, which substantially produces a 30 counterpressure that increases the pressurization of the

hot water inside the tablet, when the removable plug is removed, the resulting dispensing pressure of the extracted liquid is lower than the removal pressure, so that depressurization of the hot water inside the tablet occurs, with subsequent complete extraction of the precious principles that are present inside the coffee.

In order to keep the stopper 21 in the maximum spacing position that it reaches to remove the removable plug, it is possible to provide a cam-shaped wedge, designated by the reference numeral 50, that is oscillatably mounted about an axis that is substantially parallel to the axis of the translatory motion of the stopper 21 and is pushed by a weak spring 51.

The cam-shaped wedge 50 is substantially semicircular and is pushed by the spring 51 so as to engage the linkage 26 to retain it in lowered position.

In practice, therefore, when the stopper moves downwards, by virtue of the downward oscillation of the linkage 26 the cam-shaped wedge becomes interposed above the linkage 26, retaining it in lowered position.

The cam-shaped wedge 50 is provided, at its pivoting region, with a lug 52 that can be engaged by a flap 53 which allows to return the cam-shaped wedge to the initial position when it is necessary to dispense another espresso coffee.

Conventional coffee dispensing spouts, designated by the reference numeral 60, are provided downstream of the region where the stopper valve 20 acts.

In practical operation, first of all pressurized water is introduced through the feed channel 11, achieving

imbibition of the various granules of the tablet with water and achieving an initial production of extracted liquid that contains the solid particles which protrude from the perforated bottom of the container 4 and enter the gap 40.

5 The initial flow-rate is in practice reduced to zero and substantially depends on the grinding size.

During this step, the imbibition of the granules continues and the pressure inside the coffee powder tablet continues to increase, since the stopper valve is closed by
10 the removable plug constituted by the solid particles that accumulate in the gap 40.

The water then enters all the interstices of the coffee tablet, even the remotest and most labyrinthine ones; when the removal pressure is reached, the dispenser
15 valve opens, and espresso coffee dispensing begins, with a simultaneous reduction of the pressure in the coffee powder tablet.

With a constant flow-rate value, the resulting water speed around the coffee powder granule is inversely
20 proportional to its grinding size. If the grinding is coarse, the water finds large passages between the granules, where the water speed would be too low to be able to affect, by inertia and by turbulence, the surfaces located in dead regions that constitute the vast majority
25 of the surface of the granules which compose a coffee tablet having a certain thickness.

Therefore, in order to achieve optimum utilization, the flow-rate must increase or decrease according to the size of the ground granules to allow a sufficient speed of
30 the water flowing through.

In the specific case, this is achieved because the dispensing pressure downstream of the tablet is determined by the spring acting on the stopper. Therefore, as the flow-rate determined by the grinding size increases or decreases, downstream of the tablet there is a consequent increase or a relative decrease in pressure, which affects the stopper valve, tending to open or close it and allowing an increase or decrease in flow-rate that is necessary in order to maintain an adapted speed for the flow of water through the passages in the coffee tablet.

The increase in flow speed can be further enhanced to the detriment of the pressure by interposing the cam-shaped wedge upon the return of the stopper valve, which has opened beyond its dynamic equilibrium position due to the expulsion of the plug of solid particles as indicated above.

In practice, therefore, when the removal pressure is reached, allowing to expel the removable plug, a dispensing pressure is produced downstream of the coffee powder tablet that is lower than the removal pressure, so that inside the coffee powder tablet, after the initial step for the pressurization of the hot water, a depressurization step further occurs which facilitates the extraction of the substances contained in the coffee.

After dispensing the coffee, it is sufficient to remove the used tablet and replace it with another one, resetting the cam-shaped wedge, if provided.

From the above description it is thus evident that the invention achieves the intended aim and objects, and in particular the fact is stressed that this process allows to

achieve extraction of most of the useful substances from the inside and from the outside of the coffee granules that constitute the powder tablet. This is achieved because the water penetrates deeply into the granules and solubilizes
5 the desired substances, then flows out of said granules and maintains a certain flow speed around said granule to remove and convey all the substances contained internally and externally.

It is evident that the penetration of the water inside
10 the microporosities of the granule will be achieved by pressurization, whereas its outward flow will be achieved during the depressurization step and the removal of the obtained solution occurs by virtue of an adapted flow speed.

: 15 With the device according to the invention it is
: therefore possible to obtain an espresso coffee of unusual
: quality, achieved by virtue of the optimum utilization of
: the precious substances contained in the coffee powder in
: their entirety.

: 20 Another advantage is constituted by the fact that at
: the end of the dispensing action, the coffee tablet remains
: substantially at atmospheric pressure, and therefore any
: residual liquid contained therein is automatically
: released.

25 The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

30 In practice, the materials employed, as well as the

contingent shapes and dimensions, may be any according to the requirements.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for preparing a beverage such as espresso coffee, characterized in that it consists in: feeding pressurized hot water through a coffee powder tablet; blocking, downstream of said tablet, the extracted liquid that has passed through said tablet; producing a removable plug with solid particles of said extracted liquid; causing an increase in pressure downstream of said tablet to increase the hot water pressurization inside said tablet; and reaching a removal pressure adapted to remove said removable plug, with subsequent dispensing of the extracted liquid at a dispensing pressure that is lower than said removal pressure to cause a depressurization of the hot water inside said tablet.

15 2. A method as claimed in claim 1, characterized in that said extracted liquid is blocked by a stopper valve with a stopper that has a conical stem the apex angle whereof is small, in order to provide a large stroke of said stopper to produce a gap that is sufficient for the passage of said removable plug.

20 3. A method as claimed in claim 2, characterized in that the pressurization of the hot water inside the coffee powder tablet is adapted to fully imbibe the coffee granules, with an outward flow that is determined by the depressurization produced upon the opening of said stopper valve, with removal of the solution obtained by virtue of a water flow speed that is adapted to affect said granules in their entirety.

25 4. A method as claimed in claim 3, characterized in that for an equal hot water supply flow-rate, the resulting speed of the water around a coffee powder granule is inversely proportional to its grinding size.



5. A device for dispensing a beverage such as espresso coffee, comprising a body that can be coupled to a pressurized hot water dispensing unit and internally supports a filter container, provided with a perforated bottom, inside which it is possible to insert a coffee powder in tablet form, said coffee powder being interposed between a hot water feed duct, formed by said pressurized hot water dispensing unit, and a dispensing duct, wherein a stopper valve acts, the stopper of said stopper valve being pushed in abutting seal by calibrated elastic means, characterized in that said stopper in abutting seal defines a closed gap between the outer surface thereof and a stopper seat, said calibrated elastic means have a setting chosen such that said stopper is kept in abutting seal until a first portion of extracted liquid containing solid particles released by said coffee powder and constituting a removable plug gathers around said stopper in said gap.

6. A device as claimed in claim 5, characterized in that said stopper acts on said stopper seat formed at the bottom of said body, said stopper having a stem that can be inserted in a hole formed on the bottom of said body, said stem having a conical shape with a small apex angle so as to produce a relatively long spacing stroke of the stopper to enlarge said gap so that passage of said removable plug produced by the initial fraction of the liquid extracted from the coffee powder tablet is allowed.

7. A device as claimed in claim 6, characterized in that said stem has a conical shape with a small apex angle.

8. A device as claimed in claim 6, characterized in that it comprises means for locking said stopper in the position in which it is spaced from said stopper seat.

9. A device as claimed in claim 8, characterized in that said stopper locking means are constituted by a cam-shaped wedge that is oscillatably mounted about an axis



that is substantially parallel to the translatory motion axis of said stopper and is pushed by a weak spring to engage the actuation linkage of said stopper.

10. A device as claimed in claim 9, characterized in
5 that it comprises, on said cam-shaped wedge, a lug that is engageable by a flap which is actuatable to return said wedge to the initial position.

11. A method for preparing a hot beverage
substantially as herein described with reference to the
10 accompanying drawings.

12. A device for dispensing a hot beverage
substantially as herein described with reference to the
accompanying drawings.

Dated this 28th day of October 1998

15 J LOUGH LIMITED
By their Patent Attorney
GRIFFITH HACK

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METHOD AND DEVICE FOR PREPARING A BEVERAGE SUCH AS ESPRESSO
COFFEE

ABSTRACT

The present invention relates to a method for preparing a beverage such as espresso coffee, which consists in: feeding pressurized hot water through a coffee powder tablet (10); blocking, downstream of the tablet
5 (10), the extracted liquid that has passed through the tablet; producing a removable plug by means of said extracted liquid; causing an increase in pressure downstream of the tablet to increase the hot water pressurization inside the tablet; and reaching a removal
10 pressure adapted to remove the removable plug, with subsequent dispensing of the extracted liquid at a dispensing pressure that is lower than the removal pressure to cause a decompression of the hot water inside the tablet (10).

(Figure 1)

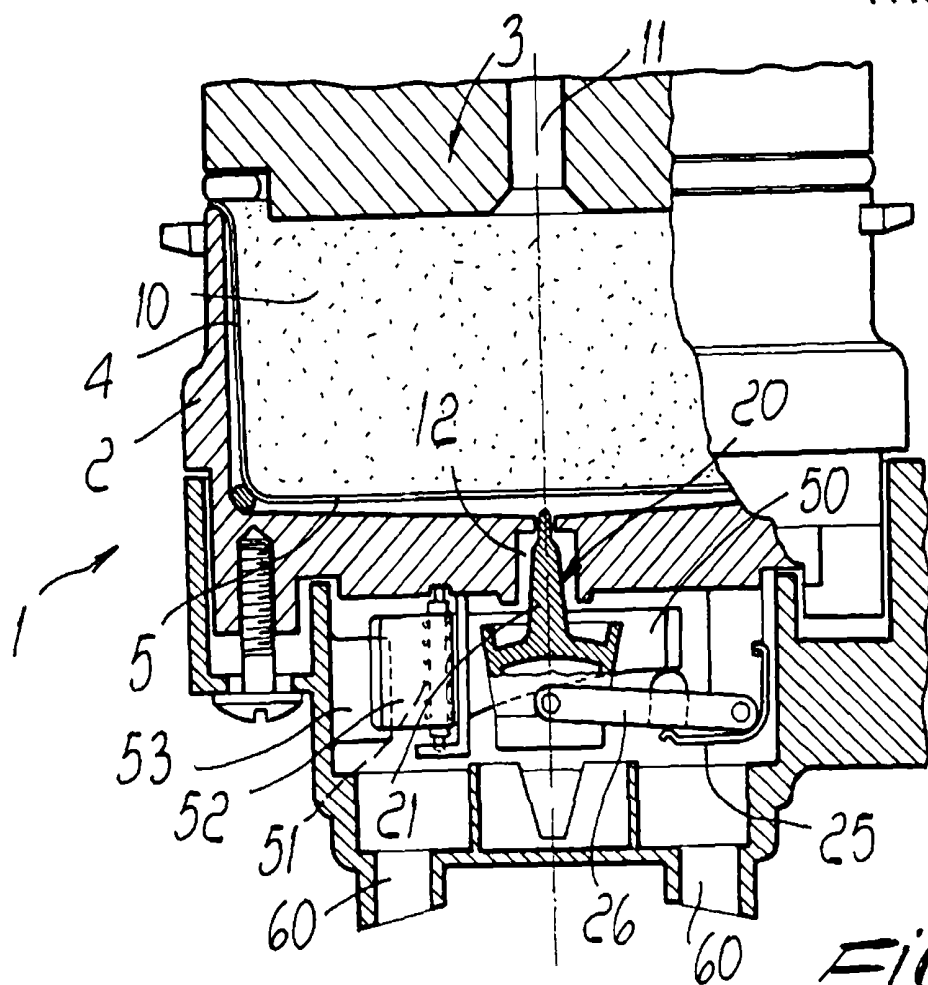


Fig. 1

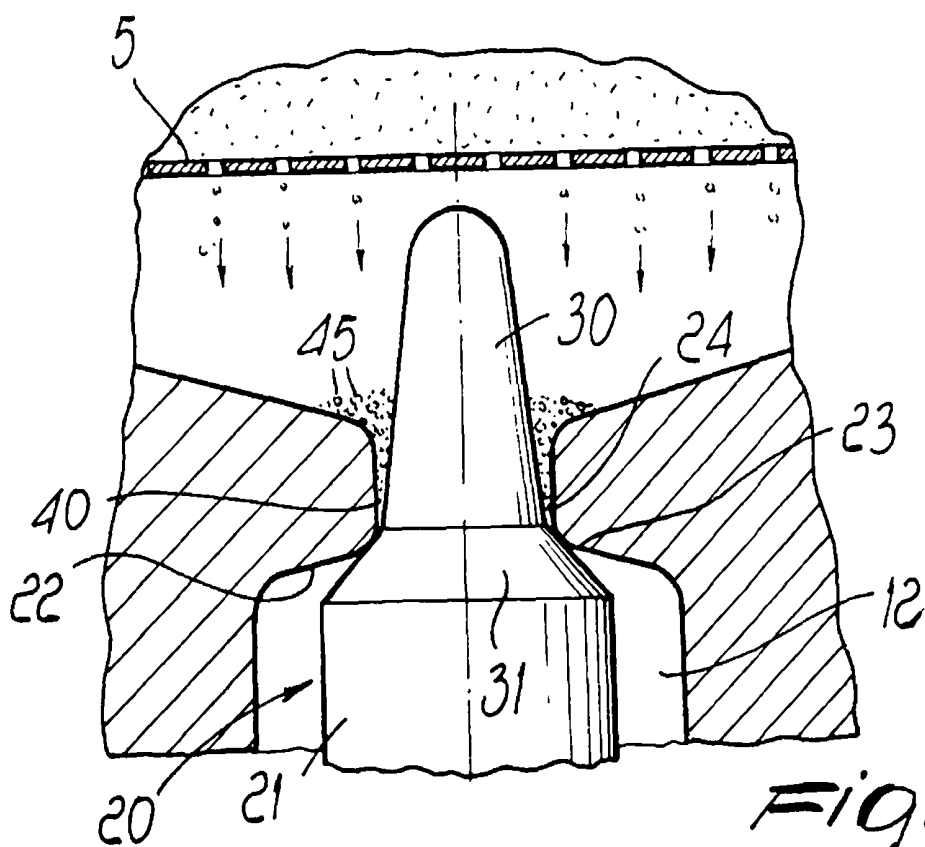


Fig. 2

