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54 Titre : Infuser for alcoholic beverages.

57 Abrégé :

The invention relates to an infuser for alcoholic beverages, comprising a container of ethyl alcohol and a water source, both of which are hydraulically connected to a volumetric mixing chamber, a water capsule holder located downstream of the volumetric chamber and intended to receive capsules containing single doses of essences, and means for extracting liquid from the volumetric chamber and injecting same into a capsule. The ethyl alcohol container and the water source are connected to the volumetric chamber by shut-off solenoid valves, and the volumetric chamber contains a main electrode and a plurality of secondary electrodes disposed above the main electrode at different levels.

INFUSER FOR ALCOHOLIC BEVERAGES**OBJECT OF THE INVENTION**

The object of the present invention application is to register an infuser for alcoholic
5 beverages which incorporates notable innovations and advantages with respect to the
techniques used hitherto.

More specifically, the invention proposes the development of an infuser for
alcoholic beverages which, due to the particular arrangement thereof, allow alcoholic
10 beverages with variable graduation to be obtained, suitable for human consumption,
automatically mixing ethyl alcohol diluted with a food essence.

BACKGROUND OF THE INVENTION

Fermented cereals, the juice of fruits and honey are known in the current state of
15 the art, which have been used for thousands of years to produce alcohol (ethyl alcohol or
ethanol).

Fermented beverages have existed since the dawn of Egyptian civilization and
there is evidence of a primitive alcoholic beverage in China around the year 7000 BC. In
20 India, an alcoholic beverage called sura, distilled from rice, was used between the years
3000 and 2000 BC.

Alcoholic beverages are beverages which contain ethanol (ethyl alcohol) in the
composition thereof. In terms of the preparation, a distinction can be made between the
25 beverages produced simply by alcoholic fermentation (wine, beer, cider, mead, sake) in
which the alcohol content does not always exceed 15 degrees of alcohol and those
produced by distillation, generally from a previous fermentation product. The latter are
called liquors and include beverages with very varied characteristics, beverages such as
cognac, whiskey, spirits, anises, vermouth, amongst others.

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The quantity of alcohol content in an alcoholic beverage is determined by the
volume thereof (ml of alcohol) or by the graduation thereof (degrees).

There are essences on the market suitable for human consumption with flavors of
35 the beverages previously mentioned and which can be infused with ethyl alcohol diluted

in water. It is therefore desirable to be able to prepare these alcoholic infusions with comfort and safety without running risks of ethylic intoxication.

By way of illustration, DE102012101157 discloses an essenced beverage preparing machine, wherein a dosed quantity of alcohol is suctioned from a reservoir into a pierceable essence capsule already containing an essence, said capsule presenting a significant internal chamber volume. During suctioning of said quantity of alcohol into the capsule internal chamber, internal pressure progressively increases, until a certain pressure level, at which the closure gives in, yielding the final mixture, which will flow downwards into the drinking vessel. However, no volume control seems to be carried out during the beverage preparation, and nothing is disclosed about the control of potential variability associated to the closure opening step, and its possible impact on the final composition.

On the other hand, US2001048958A1 describes a device for use with a mixed food dispensing apparatus, which includes a controllable concentrate dispenser, a controllable dilution substance dispenser, and a mixing chamber communicating both, wherein concentrate and dilution substances are mixed. Mixing is controlled by conductivity detection, more specifically, with a conductivity sensing circuit which includes two contacts or probes spaced apart by a non-conductive or dielectric portion. More specifically, one of the two contacts or probes is located in the lowest part of the mixing chamber, so that the dispensed mixed food substance is controlled "on the fly", *i.e.* in a continuous way.

The present invention helps to solve and address the present problem, since it allows alcoholic beverages with variable graduation to be obtained, suitable for human consumption, automatically mixing ethyl alcohol diluted with a food essence.

DESCRIPTION OF THE INVENTION

The present invention has been developed with the aim of providing an infuser for alcoholic beverages which comprises an ethyl alcohol and a water source which are hydraulically connected with a volumetric mixing chamber, a capsule holder downstream of the volumetric chamber for placement of monodose capsules of essences and injection and extraction means of the liquid from the volumetric chamber inside the capsule, characterized by the fact that the connection of the ethyl alcohol tank and the water

source with the volumetric chamber is implemented by way of shut-off solenoid valves and the volumetric chamber comprising, in the interior thereof, a main electrode and a plurality of secondary electrodes arranged above the first main electrode at different levels.

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Preferably, in the infuser for alcoholic beverages, the shut-off solenoid valves are individual.

Alternatively, in the infuser for alcoholic beverages, the shut-off solenoid valves are in a single block.

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Alternatively, in the infuser for alcoholic beverages, the shut-off solenoid valves are non-return valves hydraulically connected with the volumetric chamber.

Preferably, in the infuser for alcoholic beverages, the injection and extraction means comprise a pump with any type of drive and with electric actuation, hydraulically connected with the volumetric chamber and a plurality of injection and extraction needles hydraulically connected with the volumetric chamber.

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Preferably, in the infuser for alcoholic beverages, the pump is a peristaltic pump.

Preferably, in the infuser for alcoholic beverages, the water source comprises at least one water tank or an outlet for the supply of water from the public drinking water system.

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Alternatively, in the infuser for alcoholic beverages, the ethyl alcohol tank and/or the water tank incorporate automatic shut-off valves.

Additionally, in the infuser for alcoholic beverages, the ethyl alcohol tank and/or the water tank incorporate level sensors.

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Additionally, in the infuser for alcoholic beverages, the capsule holder comprises an indicator of the presence or absence of capsules.

Preferably, the infuser for alcoholic beverages comprises a locking means.

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Additionally, in the infuser for alcoholic beverages, the locking means is electronic.

Alternatively, in the infuser for alcoholic beverages, the volumetric chamber is connected to at least one flowmeter or any flow measuring device.

5 Preferably, the infuser for alcoholic beverages incorporates an electronic control unit.

Preferably, the infuser for alcoholic beverages incorporates a communication interface for the user to communicate with the control unit.

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Preferably, in the infuser for alcoholic beverages, the interface comprises a touch screen or wireless means.

15 Additionally, the infuser for alcoholic beverages incorporates an internal or external power source.

Additionally, the infuser for alcoholic beverages incorporates a single-use or rechargeable battery.

20 Owing to the present invention, alcoholic beverages with variable graduation suitable for human consumption are obtained, automatically mixing ethyl alcohol diluted with a food essence.

25 Other characteristics and advantages of the infuser for alcoholic beverages will be evident from the description of a preferred, but not exclusive, embodiment, which is illustrated by way of non-limiting example in the drawings, which are included, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

30 Figure 1- is a schematic view of a preferred embodiment of the infuser for alcoholic beverages of the present invention.

Figure 2- is a schematic view of the volumetric chamber of a preferred embodiment of the infuser for alcoholic beverages of the present invention.

35 Figure 3- is a schematic and perspective view of a preferred embodiment of the

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infuser for alcoholic beverages of the present invention, implemented for the operation and service thereof in the manner of a small domestic appliance such as for example a coffee maker.

5 DESCRIPTION OF A PREFERRED EMBODIMENT

As is schematically depicted in Figure 1, the infuser for alcoholic beverages of the present invention comprises an ethyl alcohol tank 1 and a water source which are hydraulically connected with a volumetric mixing chamber 3, a capsule holder 5 downstream of the volumetric chamber 3 for placement of monodose capsules of
10 essences and injection and extraction means of the liquid from the volumetric chamber 3 inside the capsule.

In this preferred embodiment, the water source comprises a water tank 1'. Various water tanks may be arranged, where appropriate, if it is desired to be able to apply
15 different types of water.

In other preferred embodiments not depicted in the drawings, the water source can be an outlet for the supply of water from the public drinking water system.

20 The connection of the ethyl alcohol tank 1 and the water tank 1' with the volumetric chamber 3 is implemented by way of shut-off solenoid valves 2, 2'.

The volumetric chamber 3 comprises, in the interior thereof, a main electrode 31 and a plurality of secondary electrodes 32 arranged above the first main electrode 31 at different levels (indicated by the dashed lines) as is schematically observed in Figure 2.
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In other variants not depicted in the drawings, the water tank 1' can be substituted by a pump and a connection which allows liquid to be pumped from a bottle or auxiliary tank. The infusions can thus be prepared with other elements (tonic, sparkling water...). Whereas, improved cleaning means would be required to avoid sugar deposits or other
30 substances.

In this preferred embodiment, the shut-off solenoid valves 2, 2' are individual. In other preferred embodiments, the shut-off solenoid valves 2, 2' can be in a single block or be non-return valves hydraulically connected with the volumetric chamber 3.
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Preferably, in the infuser for alcoholic beverages, the injection and extraction means of the liquid from the volumetric chamber 3 inside the capsule comprise a pump 4 which, in this preferred embodiment is peristaltic and electrically actuated, hydraulically connected with the volumetric chamber 3 and a plurality of injection and extraction
5 needles (not depicted in the drawings) for the capsules, hydraulically connected with the volumetric chamber 3.

The infuser for alcoholic beverages of the invention incorporates an electronic control unit 7, with the capacity to regulate the solenoid valves 2, 2' and the pump 4. It
10 also incorporates a communication interface 9 for the user to communicate with the control unit 7 which can comprise a touch screen or wireless means 8.

The alcohol and the water are respectively transferred to the volumetric chamber 3 from the alcohol tank 1 and the water tank 1' by means of the solenoid valves 2, 2' and
15 the pump 4 which is filled to a final established volume V_f .

During the operation of the infuser for alcoholic beverages of the invention, a minimum determined volume of alcohol of the alcohol tank 1 is assumed which can be diluted with water from the water tank 1' until the final volume V_f is reached with the
20 desired graduation in the volumetric chamber 3. The control unit 7 is responsible for calculating how much alcohol and how much water should be taken from each tank 1, 1' respectively and accordingly the same control unit 7 regulates the solenoid valves 2, 2'.

When the final volume V_f is obtained in the volumetric chamber 3, the mixture is
25 extracted from the volumetric chamber 3 by means of the pump 4 to the capsule holder 5, where it is infused in a monodose capsule which contains a food essence, from which the content is extracted to the final receptacle 6.

As has already been cited, the infuser for alcoholic beverages of the invention
30 incorporates a control unit 7 with the capacity to regulate the solenoid valves 2, 2' and the pump 4 which also calculates the quantities of alcohol and water to be extracted as a function of the information introduced by the user themselves into the interface.

Determining the required volumes of water and diluted alcohol can be controlled
35 by means of a volumetric chamber 3 schematically depicted in Figure 2 which has a main

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electrode 31 and a series of secondary electrodes 32 at different levels depicted by lines in Figure 2 and above the main electrode 31.

5 The secondary electrodes 32 are arranged vertically and separate downwards from the same level. Each secondary electrode 32 reaches a depth of interest inside the volumetric chamber 3.

10 The alcohol volume is determined by a secondary electrode 32 selected by the control unit 7 which has an electric connection by way of the liquid with the main electrode 31. The volumetric chamber 3 is filled from the bottom up, as the level of liquid rises. When the diluted alcohol reaches the selected secondary electrode 32, the filling of alcohol is interrupted by means of the solenoid valves 2, 2' and the filling with water begins until the final secondary electrode 32' is reached which marks the final volume Vf.

15 As the level of water rises, the different secondary electrodes 32 are also placed into contact with the main electrode 31 (the deepest one). Information is thus obtained of the different levels which the water reaches during the rise thereof in the volumetric chamber 3.

20 The arrangement of the principal 31 and secondary 32 electrodes allows a beverage to be obtained with as many different graduations as numbers of secondary electrodes 32 installed. For example, from a minimum of 20 % to the maximum of 40 %.

25 In other preferred embodiments, the volumetric chamber 3 can be connected to a flowmeter or any flow measuring device.

30 In the case of the flowmeter, this is a device which generates a determined number of pulses (counts) as a function of the quantity of milliliters of liquid which pass through a tube in one second, for example a lap counter of a vane, the rotation speed of which is a function of the speed of the liquid which passes by.

Using said flowmeter, as it is also connected to the control unit 7, and by means of software, these pulses are converted into milliliters per second to determine the volume of the liquid served.

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The capsule holder 5 incorporates an indicator, which communicates the presence or absence of capsules to the control unit 7, thus avoiding incorrect operation.

5 The monodose capsule located in the capsule holder 5 can have a frangible wall (for example made of aluminum foil) which is passed through by one or more injection or extraction needles of the liquid (not depicted in the drawings). Preferably, the extraction needle will not perforate the capsule until consumer gives the command, whether using a button or using a lever actuatable by the glass or final receptacle.

10 As a security measure, the infuser for alcoholic beverages of the invention will have a locking mode, for example with a password in order to avoid an unauthorized person (a minor, for example) accessing the preparation of beverages or the alcohol tank 1. To this end, the infuser for alcoholic beverages of the invention comprises a locking means, for example an electronic locking means.

15 The alcohol tank 1 and the water tank 1' of the preferred embodiment have automatic shut-off valves, actuated by springs which only allow the passage of liquid when they are placed in the operative position and they close by themselves when the alcohol tank 1 and the water tank 1' are disassembled for the cleaning or maintenance thereof. Similarly, they have level sensors to warn of the absence of sufficient alcohol or
20 water. An example of level sensors would be infrared means which utilize the refraction of the beam to know whether or not there is liquid at the desired level.

In order to reduce the required functions of the pump 4 or even dispense with it,
25 the volumetric chamber 3 can be installed at a level above the capsule holder 5.

In order to ensure the operation thereof, the infuser for alcoholic beverages of the present invention incorporates an internal or external power source or alternatively a single-use or rechargeable battery.

30 Owing to the infuser for alcoholic beverages of the present invention, the industrial method for producing distilled alcoholic beverages such as gins, vodka, etc., may be reproduced and this possibility provided at both a domestic level and in the HORECA sector, that is to say, to instantly produce the alcoholic beverage which the client wants to
35 consume, with the benefits of having produced it "instantly", taking into account that the

ethanol (alcoholic base of these beverages), however well packaged it is, may lose certain properties.

Therefore the infuser for alcoholic beverages of the present invention allows the industrial production phase of these types of alcoholic beverages to be reproduced in a domestic or HORECA device with reduced dimensions and easy use, similar to a small domestic appliance such as for example a coffee maker, amongst others, as is schematically depicted in Figure 3, wherein the visible elements of the infuser for alcoholic beverages of the present invention are indicated.

The details, the forms, the dimensions and the other accessory elements as well as the materials used in the manufacture of the infuser for alcoholic beverages of the invention may be conveniently substituted by others which are technically equivalent and do not depart from the essentiality of the invention nor from the scope defined by the claims which are included below.

The invention is not limited to the embodiment/s illustrated in the drawings. Accordingly it should be understood that where features mentioned in the appended claims are followed by reference signs, such signs are included solely for the purpose of enhancing the intelligibility of the claims and are in no way limiting on the scope of the claims.

CLAIMS

1. An infuser for variable graduation alcoholic beverages which comprises an ethyl alcohol tank (1) and at least one water tank (1') which are hydraulically connected with a volumetric mixing chamber (3), a capsule holder (5) downstream of the volumetric chamber (3) for placement of monodose capsules of essences, and injection and extraction means of the liquid from the volumetric chamber (3) inside the capsule, wherein :

the connection of the ethyl alcohol tank (1) and the water source with the volumetric chamber (3) is implemented by way of shut-off solenoid valves (2, 2'), , which can be individual, in a single block, or non-return valves hydraulically connected with the volumetric chamber (3),

the ethyl alcohol tank (1) and the water tank (1') incorporate level sensors,

said injection and extraction means of the liquid from the volumetric chamber (3) inside the capsule comprise a pump (4) with any type of drive and with electric actuation,

said infuser for alcoholic beverages incorporates an electronic control unit (7) with the capacity to regulate said solenoid valves (2, 2') and the pump (4),

said infuser for alcoholic beverages further comprises a communication interface (9) which allows communication between a user and electronic control unit (7), and

wherein said electronic control unit (7) calculates the quantities of alcohol and water to be extracted from each tank (1, 1') as a function of the information introduced by a user into said communication interface (9).

2. The infuser according to claim 1, wherein the pump (4) is peristaltic.

3. The infuser for alcoholic beverages according to claim 1 or 2, wherein the ethyl alcohol tank (1), the water tank (1') or both the ethyl alcohol tank (1) and the water tank (1') incorporate automatic shut-off valves.

4. The infuser according to any of claims 1 to 3, wherein the level sensors are infrared means.

5. The infuser according to any of claims 1 to 4, wherein the volumetric chamber (3) comprises, in the interior thereof, a main electrode (31) and a plurality of secondary electrodes (32) arranged above the main electrode (31) at different levels.

6. The infuser according to any of claims 1 to 4, wherein the volumetric chamber (3) is connected to at least one flowmeter or any flow measuring device.

7. The infuser according to any of claims 1 to 6, wherein the volumetric chamber (3) is installed at any level above capsule holder (5).

8. A method for operating an infuser for variable graduation alcoholic beverages according to claim 1, comprising the steps of:

(a) a control unit (7) calculates how much alcohol and how much water should be taken from alcohol tank (1) and water tank (1'), respectively, as a function of the information introduced by a user into communication interface (9), and accordingly regulates solenoid valves (2, 2'),

(b) an assumed minimum determined volume of alcohol of the alcohol tank (1) is transferred from the alcohol tank (1) to volumetric chamber (3), and then diluted with water from the water tank (1') until a final volume V_f is reached with a desired alcoholic graduation in the volumetric chamber (3),

(c) the obtained mixture with final volume V_f is extracted from the volumetric chamber (3) by means of the pump (4) to the capsule holder (5), and

(d) the mixture obtained is infused in a monodose capsule located in the capsule holder (5) which contains a food essence, and from which the content is extracted to the final receptacle (6).

9. The method according to claim 8, wherein said infusion of step (d) is carried out by perforating the capsule with an extraction needle, after the user gives the corresponding command.

10. The method according to claim 8 or 9, further comprising controlling the

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determination of the required volumes of water and alcohol transferred during step (b) by means selected from:

- (i) a main electrode (31) and a plurality of secondary electrodes (32) arranged above the main electrode (31) at different levels inside volumetric chamber (3), or
- (ii) connecting volumetric chamber (3) to at least one flowmeter or any flow measuring device.

11. The method according to claim 10, wherein the determination of the required volumes of water and alcohol transferred during step (b) is controlled with a main electrode (31) and a plurality of secondary electrodes (32) arranged above the main electrode (31) at different levels inside volumetric chamber (3), and wherein said method comprises the following steps:

- (a) filling of volumetric chamber (3) with an alcohol volume from the bottom up to a selected secondary electrode (32) level, wherein said alcohol volume is determined by said secondary electrode (32) selected by control unit (7), which has an electric connection by way of the liquid with main electrode (31),
- (b) interruption of alcohol filling of volumetric chamber (3) by means of solenoid valves (2, 2'),
- (c) further filling of volumetric chamber (3) with water, until a final secondary electrode (32') is reached, which marks a final volume V_f .