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(54) Multiple beverage dispensing unit

(57) A multiple beverage dispensing unit comprising a fluid line (2) for supplying a base fluid, one or more delivering devices (3) connectable to a constituent container (4) for introducing portions of one or more constituents into the base fluid so as to produce a mixed beverage, an outlet (5) for dispensing the mixed beverage, the multiple beverage dispensing unit comprises a plurality of delivering devices (3) and at least an actuator (6) reciprocally arranged in a movable manner so that the actuator (6) is adapted to operate each one of said plurality of delivering devices (3).

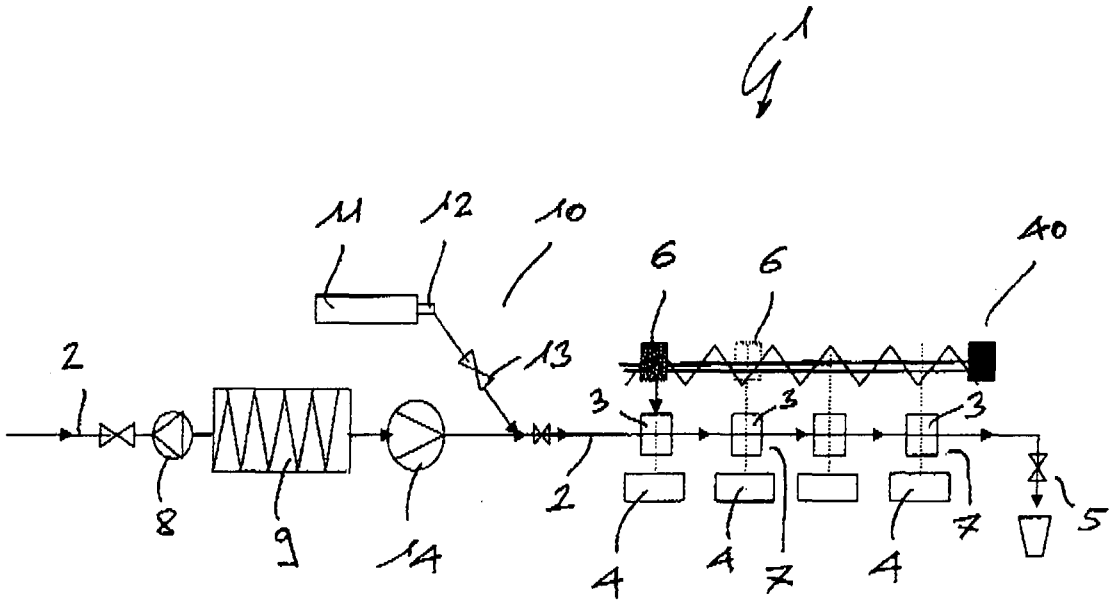

FIG. 1

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Description

[0001] The present invention refers to a multiple beverage post-mix dispenser wherein different constituent and a base fluid are mixed at the time of dispensing.

[0002] Post-mix beverage dispensers have long been used in numerous food service locales, including retail restaurants, juice bars, hospitals, nursing homes, schools, and the like. Such beverage dispensers often require the mixing of a base fluid, such as, water and a liquid or powdered constituent comprising flavouring agent or nutrients or vitamins (such as a soft drink flavouring syrup or juice, dairy, or isotonic concentrate), into a final product having a precise water to concentrate ratio to provide the consumer with the desired taste of the final product.

[0003] The known multiple beverages dispensing units includes a fluid line for supplying a base fluid and one or more delivering devices each one is connectable to a liquid or powdered constituent container and in communication with the fluid line for introducing portions of one or more constituent into the base fluid so as to produce a mixed beverage to be dispensed at an outlet of the fluid line.

[0004] For example the delivering device can be in the form of a valve in fluid communication with the fluid line and connected to a pressure tank with a beverage concentrate under gas pressure.

A need arises in the beverage dispenser field for selectively introducing more than one constituent into the based fluid so as to give the possibility to the user to select a broad variety of final mixed beverages.

For this purpose, usually, each one of the delivering devices includes a corresponding actuator adapted to operate the delivering device to which it is associated (the solenoid that operates the valve, for example). In other words, for each delivering device there is a corresponding dedicated actuator.

It is an object of the present invention to provide a simplified multiple beverages dispensing unit which is effective in introducing different constituents into the base liquid.

In connection with this object, the present invention provides a simplified multiple beverages dispensing unit with a simplified components system, a simplified hydraulic system and with minimized dimensions.

[0005] According to the present invention, this aim, along with further ones that will become apparent from the following disclosure, is reached in a multiple beverages dispensing unit incorporating the features and characteristics as defined and recited in the claims appended hereto.

[0006] Features and advantages of the present invention will anyway be more readily understood from the description that is given below by way of nonlimiting example with reference to the accompanying drawings, in which:

- Figure 1 is a schematic view of a multiple beverage dispensing unit according to the present invention;
- Figure 2 is a perspective view showing a drive mechanism and an actuator in a first operational position;
- Figure 3 is a perspective view of the multiple beverage dispensing unit of figure 2 showing the drive mechanism and the actuator in a second operational position;
- Figure 4 is a sectional side view in elevation showing a first embodiment of a delivering device;
- Figure 5 is a sectional side view in elevation showing a further embodiment of a delivering device;
- Figure 6 is a sectional side view in elevation showing a further embodiment of a delivering device;
- Figure 7 is a schematic view of a multiple beverages dispensing unit according to a further embodiment of the present invention;
- Figure 8 is a perspective view showing a drive mechanism and an actuator in a first operational position according to further embodiment of the present invention;
- Figure 9 is a perspective view of the multiple beverage dispensing unit of figure 8 showing the drive mechanism and the actuator in a second operational position.

[0007] With reference to the above-cited Figures, the multiple beverage dispensing unit, as generally indicated with the reference numeral 1, comprises a fluid line 2 for supplying a base fluid, one or more delivering devices 3 connectable to a constituent container 4 for introducing portions of one or more constituents into the base fluid so as to produce a mixed beverage, an outlet 5 for dispensing the mixed beverage.

The multiple beverage dispensing unit comprises a plurality of delivering devices 3 and at least an actuator 6 reciprocally arranged in a movable manner so that the actuator 6 is adapted to operate each one of the delivering devices 3.

The fluid line 2 provides for connecting a liquid source (particularly of water) to a plurality of beverage mixing points 7 where constituents are introduced into the base fluid by means of the delivering devices 3.

[0008] The fluid line 2 of the beverage dispenser can be connected to a tank, which can be pressurized or alternatively directly to the municipal water supply mains through a suitable connection. In the latter case a pressure reducer 8 can be provided which is adapted to reduce the water pressure to a specified working pressure value in order to have the same starting conditions for

the processing procedure independent of the pressure value of the municipal water supply mains.

Expediently, a cooling unit 9 can be provided in the fluid line 2, upstream the delivering device 3, to cool down the base fluid to be mixed with the constituent or, downstream the delivering device, 3 to cool down the mixed beverage to be dispended.

[0009] Further, the multiple beverages dispensing unit according to the present invention can, optionally, comprise a carbon dioxide supply line 10 for introducing carbon dioxide into the base fluid. The carbon dioxide supply line 9 extends from a pressurized CO_2 source 11 to a carbonation point where the base fluid and the gas are mixed and it comprises a CO_2 pressure reducer 12 for reducing the pressure of the gas flowing through the carbon dioxide supply line 10.

[0010] The carbon dioxide supply line 10 comprises an electro-valve 13 adapted to fluidly connects, selectively, the CO_2 pressurized source 10 to the carbonation point in order to produce carbonated liquid beverage when it is required.

[0011] The cooling unit 9 can be a compression cooling system operating in a known manner, namely with compressor, evaporator, and condenser. Alternatively a thermo-electric cooling system or other known cooling system can be used.

Optionally, a pressurizing pump 14 can be provided in the fluid line 2 to enhance the working pressure of the base fluid.

[0012] The multiple beverages dispensing unit comprises a plurality of delivering devices 3 each of one is fluidly connected to a container 4 adapted to contain a liquid or powdered constituent and fluidly connected to the fluid line 2 for introducing, at the time of dispensing the beverage, predetermined quantities of different constituents, which can be syrups, flavouring concentrates, nutrients, vitamins and the like, into the base fluid, which can be plain water, carbonated water or a generic liquid beverage in order to produced a final mixed beverage to be dispensed at the outlet 5.

[0013] It can however be most readily appreciated that the containers are removable from each delivering device 3 to be replace or re-fill according to the need of the user, whereas the delivering devices 3 can be provided as an integral component (part) of the multiple beverages dispensing unit or they can be provided as a separate element removable from multiple beverages dispensing unit.

[0014] The delivering device can comprise an airless dispensing pump of the same type usually mounted and connected to an opening part or neck of cosmetic, detergents, perfumes and other liquid containers and hand-operated by the user so as to discharge the contents in desired quantities, as disclose in EP 1 389 491, US 2007/0108234, WO 2005/ 105597 and US 4,489,890.

Such airless dispensing pump usually include, as shown in figure 4, a movable (or sliding) member 19 to be actuated, a discharge nozzle 20, a pumping chamber 21 provided with an intake aperture 22 and fluidly connected to the discharge nozzle 20 at least when the movable member 19 is driven into displacement, the actuator 6 being adapted to press (push) the movable member 19 for causing the compression of the liquid constituent contained in the pumping chamber 21, which is then ejected via the discharge nozzle 20, and simultaneously the closing of the intake aperture 22, the actuator 6 being adapted to release the movable member 19, which is biased to retract for causing the opening of the intake aperture 22 and the liquid constituent to flow into the pumping chamber 21 due to the reduced pressure inside the latter.

The discharge nozzle 20 is in fluidly communication with the fluid line 2 so that predetermined quantities of the liquid constituent are supplied to the fluid line 2 at a beverage mixing section point wherein the base fluid flowing through the fluid line 2 mixes with the liquid constituent issued by the discharge nozzle 20.

[0015] The movable member 19 can be partially actuated so that only a portion of the liquid constituent inside the pumping chamber is ejected.

[0016] Further, the delivering device 3 can comprise a valve (as shown in figure 5) fluidly connectable to a container 4, which contains pressurized liquid constituent, and having a discharge outlet 23 in fluid communication with the fluid line 2 for introducing the liquid constituent into the fluid line 2 where the base fluid and the dispensed portions of the liquid constituent mix together.

The shutter 24 of the valve, which controls the passage of the liquid constituent, is adapted to be operated by the actuator 6 from outside the valve via a suitable mechanism well known in the art.

For example, elastic means can bias the shutter in a valve closed position, whereas the actuator 6 is adapted to actuate a drive element 25 associated to the shutter 24 so as to urge the latter in a valve opened position, wherein the shutter can be completely or partially open to introduced a measured quantities of liquid constituent into the fluid line 2.

[0017] Further in another embodiment, the delivering device 3 can comprise a cap or plug 26 (as shown in figure 6) provided with a movable shutter 27 and connected to an opening part or neck of the liquid or powdered constituent container 4 for selectively opening and closing the opening part of the container in order to enable the constituent contained in the container to be dispensed under the force of gravity via an outlet port 28; the opening part of the container being arranged downwards.

For example, elastic means can bias the cap shutter 27 in a container closed position whereas the actuator 6 is adapted to displace the cap shutter 27 against the returning action of the elastic means so as to urge the cap shutter 27 in a container opened position, wherein the cap shutter 27 can be completely or partially opened to introduced a measured quantities of liquid or powdered constituent into the fluid line 2.

[0018] The actuator 6, which is a movable element, is

adapted to operate each one of the delivering device 3 so as to introduce a pre-established amount of a predetermined constituent into the base liquid.

[0019] Preferably the actuator 6 is adapted to operate each one of the delivering devices 3 separately, i.e. one by one.

[0020] The actuator 6 is adapted to drive (push, press) into displacement the movable member 19 of the airless displacement pump so that, as described above, the liquid constituent contained in the pumping chamber is sprayed through the discharge nozzle 20 to be introduced into the fluid line 2.

[0021] Alternatively, the actuator 6 is adapted to operate (actuate) the shutter 24 of the valve so as to fluidly connect the liquid constituent container 4 to the fluid line 2 and enabling portions of the liquid constituent to flow into the fluid line 2.

[0022] Further, alternatively, the actuator 6 is adapted to operate (actuate) the cap shutter 27 for opening the container and thus enabling the constituent contained in the container to flow into the fluid line 2 under the force of gravity.

In a preferred embodiment of the present invention the multiple beverages dispensing unit comprises a plurality of delivering device 3 (to introduce, for example, different type of liquid or powdered constituent into the base fluid) and a single actuator 6 reciprocally arranged so that the actuator 6 is adapted to actuate each one of various delivering devices 3 separately, i.e. one by one.

[0023] The multiple beverages dispensing unit comprises a drive mechanism 40, which is adapted to drive the single actuator 6 and/or the plurality of delivering device 3, enabling the single actuator 6 and the plurality of delivering device 3 to move (displace) one respect the other in order to position the single actuator 6 in proximity of the movable member 19 or the valve shutter 24 or the cap shutter 27 of each delivering device 3 to be operated.

[0024] A control device is adapted to control the drive mechanism so as to drive the actuator 6 in proximity to any one of the numerous delivering devices 3 in response to different beverage dispensing programs selectable by the user.

It can be fully appreciated that the single actuator 6 can be displaced more than once during or before dispensing the mixed beverage in order to separately operate more than one predetermined delivering device 3 according to the final mixed beverage selected by the user.

[0025] In a preferred arrangement, shown in figures 1 to 3, the various delivering devices 3 are series arranged along the fluid line 2, i.e. one after the other, so that a plurality of mixing point 7 are provided along the same fluid line upstream the outlet 4 and the drive mechanism 40 is adapted to drive into translational traverse (linear or rectilinear movement) the actuator 6 so as to move and position the latter toward and close to each one of various delivering devices 3 to be operated.

The plurality of delivering device 3 is stationary and arranged linearly.

[0026] Particularly a screw gearing is provided for coupling the drive mechanism 40 and the actuator 6.

[0027] In a further preferred arrangement, shown in figures 7 to 9, the drive mechanism 40 is adapted to drive into rotation the single actuator 6 around a central axis 41 so as to move and position the latter toward and close to each delivering device 3 of the plurality of delivering device 3, which are stationary an angularly arranged around the central axis 41.

[0028] It has to be stressed that each one of the various delivering devices 3 can be operated more than once during or before dispensing the final mixed beverage to introduce a predetermined quantity of a predetermined constituent into the base fluid at preset time intervals in order to produce a uniform mixed beverage and vary the concentration rate of the constituent in the final mixed beverage in a very accurate manner. In general, the time interval elapsing between, i.e. separating subsequent operation of the delivering device 3 from each other depends on the flow rate of the base fluid through the fluid line 2, which is normally kept constant due to the hydraulic characteristics of the fluid line 2 (for example the liquid pressure reducer 8) and it depends on the liquid constituent concentration rate of the final mixed beverage selected by the user.

[0029] Obviously, depending on the final concentration selected by the user, the actuator 6 is adapted to partially operate each delivering device 3 so as to effectively dose the liquid or powdered constituent to be mixed with the base fluid, and/or the time interval separating subsequent operation of each delivering device 3 can be varied, adjusted accordingly.

[0030] The control device is adapted to regulate the actuation of each delivering device 3 via the actuator 6 based on the final mixed beverage selected by the user.

[0031] The multiple beverages dispensing unit according to the present invention can comprise more than one fluid line 2 each of one is provided with a corresponding outlet 4 for dispensing a mixed beverage, an actuator 6 and a plurality of delivering device 3 (integral with o removable from multiple beverages dispensing unit) reciprocally arranged in a movable manner so that the actuator 6 is adapted to operate each delivering device 3 of such plurality of delivering device separately, i.e. one by one.

[0032] Further the multiple beverages dispensing unit can comprise a plurality of delivering device 3 and more than one actuator 6 adapted to operate each one of the plurality of delivering devices separately.

It should be specially stressed that the constituent to be introduced into the base fluid and contained in the container 4 can be either a pressurized liquid and in such a case a valve can be employed as delivering device 3 or a liquid (or powder) at atmospheric pressure and in such a case an airless dispensing pump or a cap shutter can be utilized as delivering device 3.

[0033] The multiple beverages dispensing unit according to the present invention can be used in any beverage dispensing apparatus and preferably in home applianc-

es, in particular refrigerators, built-in units, beverage centre as well as in free standing devices.

[0034] In particular, if used in a refrigerator, the outlet of the post-mix beverage dispenser be can provided on the refrigerator door and the dosing device can be arranged in a suitable compartment, externally accessible, provided inside the refrigerator casing so as to conveniently replace the liquid constituent container and the airless dispensing pump when required.

[0035] Conclusively, it can therefore be stated that present invention provides a multiple beverages dispensing unit with a simplified components system, a simplified hydraulic system and with minimized dimensions and which is effective and reliable in introducing different liquid constituents into the base liquid.

Claims

1. A multiple beverage dispensing unit comprising a fluid line (2) for supplying a base fluid, one or more delivering devices (3) connectable to a constituent container (4) for introducing portions of one or more constituents into the base fluid so as to produce a mixed beverage, an outlet (5) for dispensing the mixed beverage, **characterized in that** the multiple beverage dispensing unit comprises a plurality of delivering devices (3) and at least an actuator (6) reciprocally arranged in a movable manner so that the actuator (6) is adapted to operate each one of said plurality of delivering devices (3).

2. A multiple beverage dispensing unit according to claim 1, comprising a drive mechanism (40) for driving at least one between the actuator (6) and the plurality of delivering devices (3) so as to enable said actuator (6) and said plurality of delivering devices (3) to move one respect to the other in order to position the actuator (6) in proximity of each delivering device (3) to be operated.

3. A multiple beverage dispensing unit according to claim 2, wherein the drive mechanism (40) is adapted to drive into translational traverse the actuator (6) so as to move and position the latter toward and close to each delivering device (3) to be operated.

4. A multiple beverage dispensing unit according to claim 2, wherein the drive mechanism (40) is adapted to drive into rotation the actuator (6) around a central axis (41) so as to move and position the latter toward and close to each delivering device (3) to be operated, the plurality of delivering devices (3) being angularly arranged around the central axis (41).

5. A multiple beverage dispensing unit according to any of the preceding claims, wherein a control device is adapted to control the drive mechanism so as to drive the actuator (6) in proximity to any one of the various delivering devices (3) in response to different beverage dispensing programs selectable by the user.

6. A multiple beverage dispensing unit according to any of the preceding claims, wherein said delivering device (3) comprise an airless dispensing pump comprising a movable member (19) adapted to be operated by said actuator so as to discharge the constituent in desired quantities.

7. A multiple beverage dispensing unit according to any of the preceding claims, wherein said delivering device (3) comprises a valve having a discharge outlet (23) in fluid communication with the fluid line (2) for introducing the constituent into the latter.

8. A multiple beverage dispensing unit according to any of the preceding claims, wherein said delivering device (3) comprises a cap (26) provided with a movable shutter (27) and connected to an opening part of the constituent container (4) for selectively opening and closing the opening part of the container in order to enable the constituent contained in the container to be dispensed into the fluid line (2) under the force of gravity.

9. A refrigerator comprising a multiple beverage dispensing unit according to any of the preceding claims.

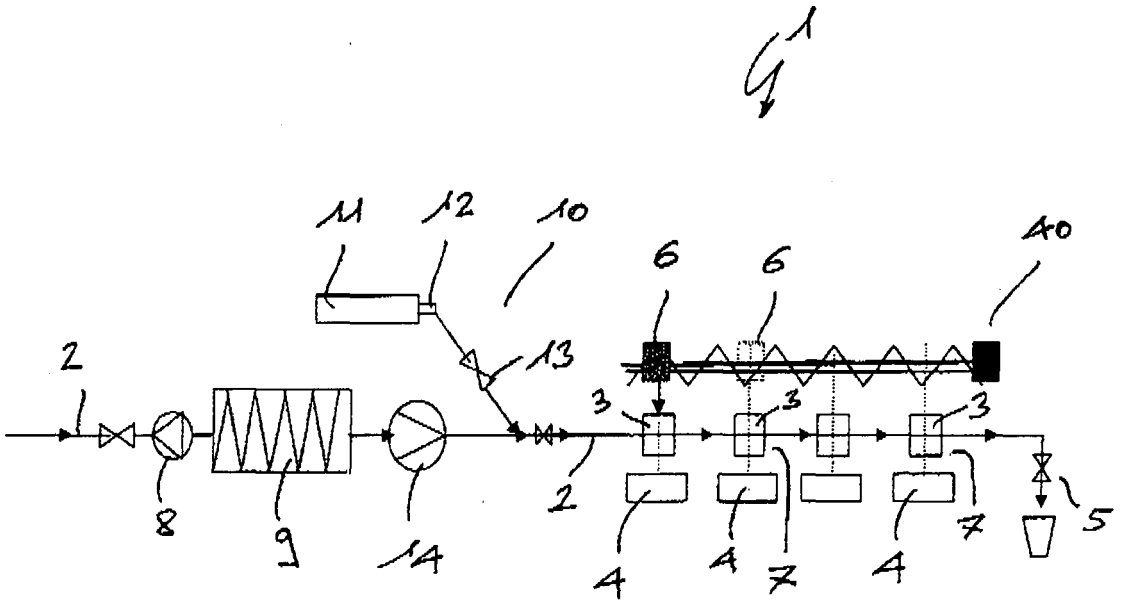

FIG. 1

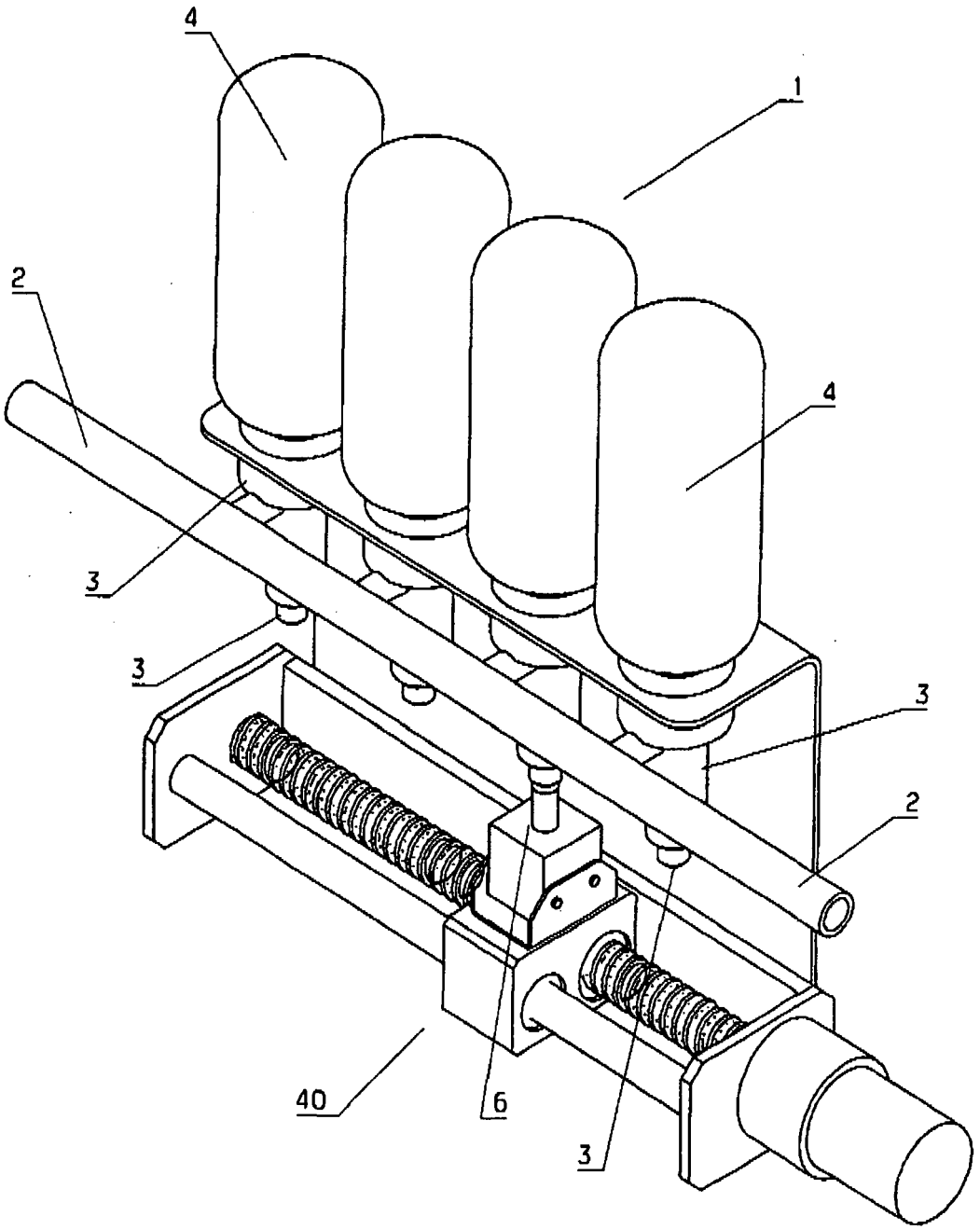

FIG. 2

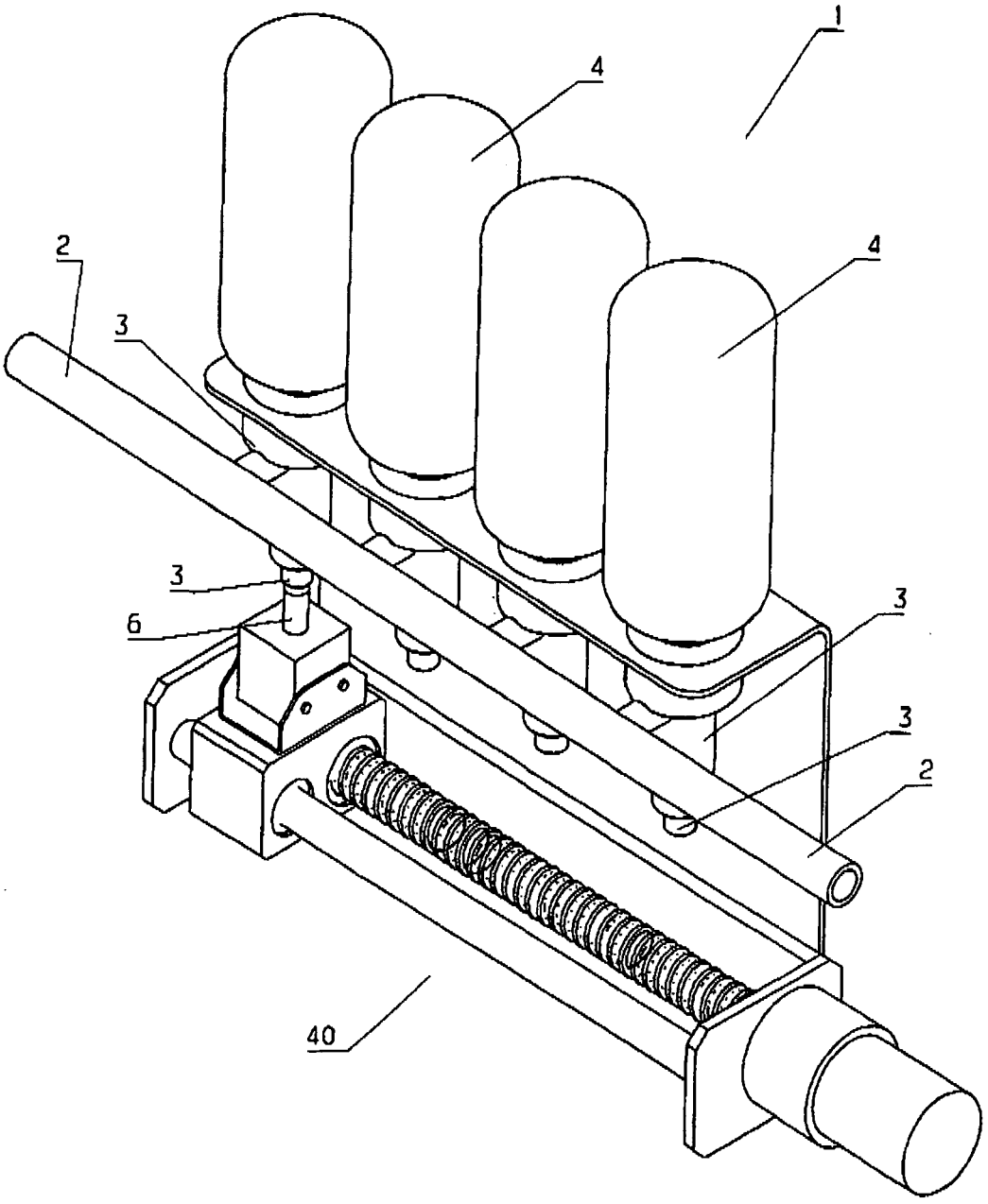

FIG. 3

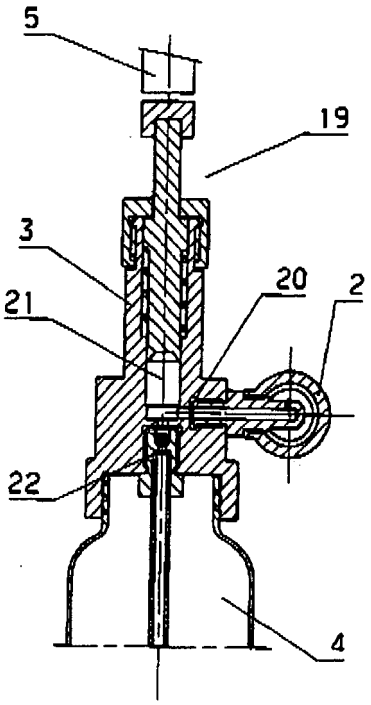

FIG. 4

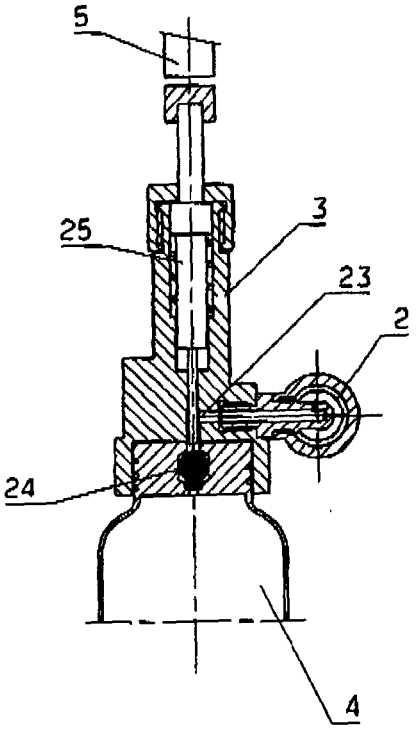

FIG. 5

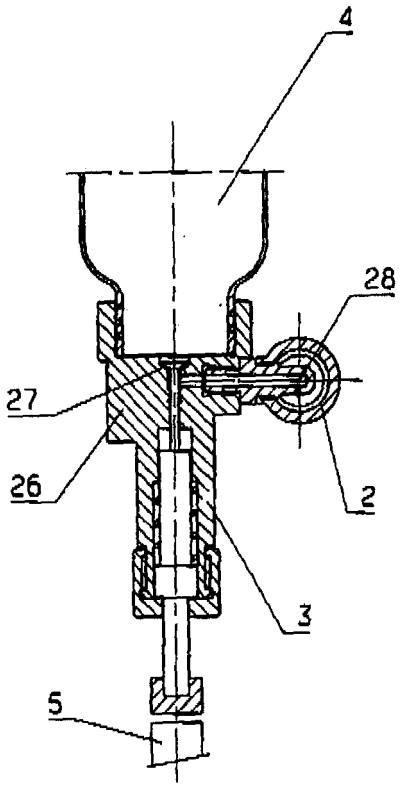

FIG. 6

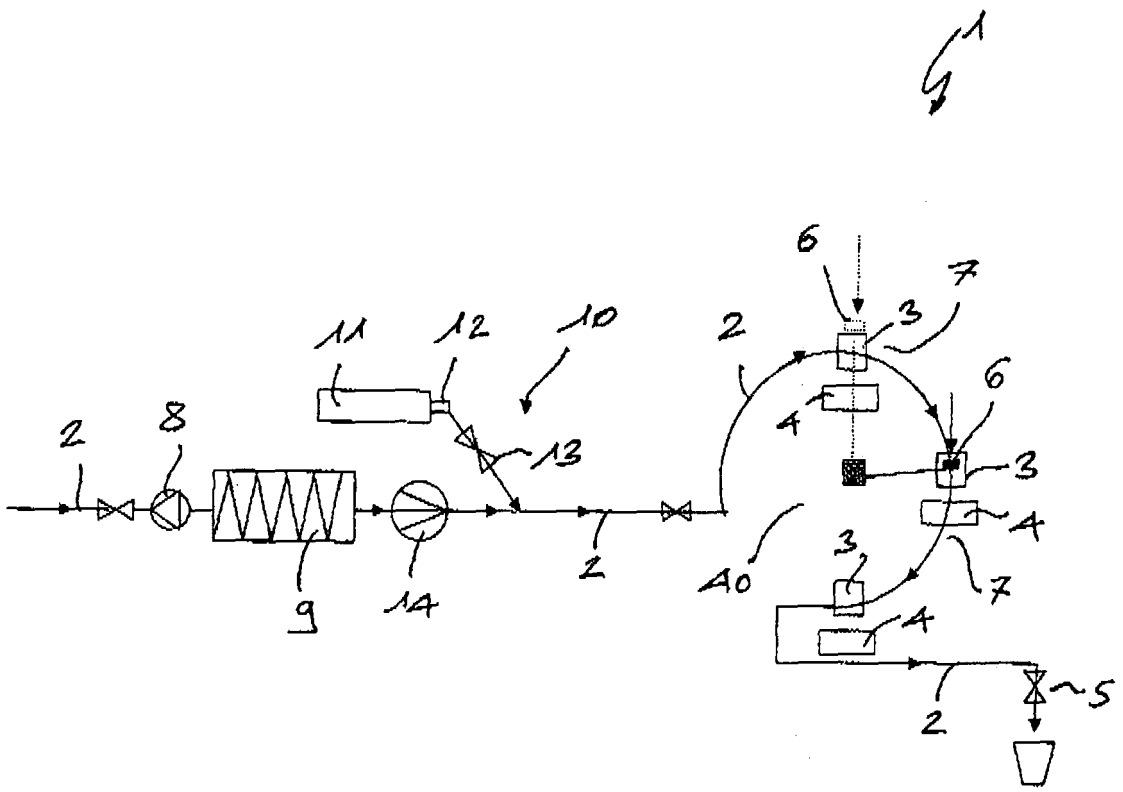

FIG. 7

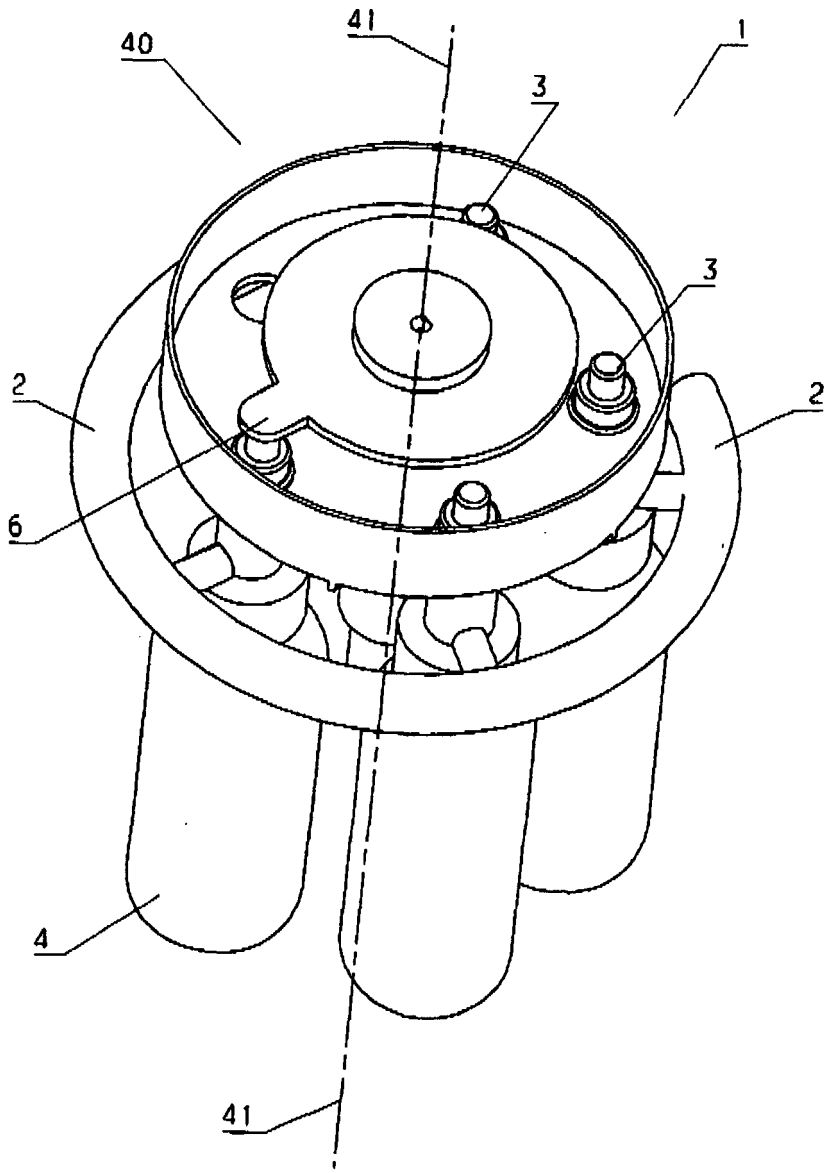

FIG. 8

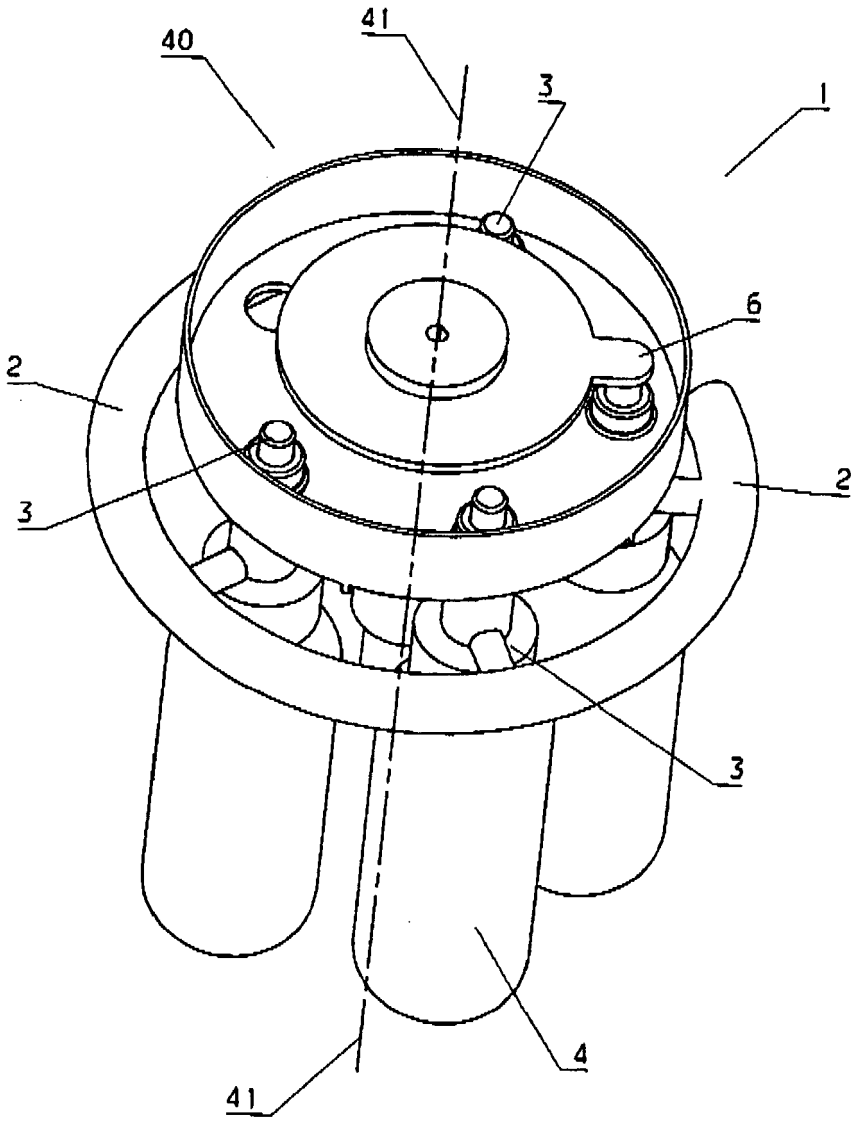

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 07 01 8434

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 0 212 467 A (FEHN WALDEMAR) 4 March 1987 (1987-03-04) * page 7, line 5 - line 18 * * page 7, line 30 - line 34 * * page 8, line 15 - line 18 * -----	1,2,5-8	INV. B67D1/00 B67D3/00
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TECHNICAL FIELDS SEARCHED (IPC)

B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 February 2008	Desittere, Michiel

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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