United States Patent [19]

Rimini

[11] **3,865,277**

[45] **Feb. 11, 1975**

[54] **BEVERAGE-DISPENSING MACHINE**

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[22] Filed: **Dec. 3, 1973**

[21] Appl. No.: **420,855**

[30] **Foreign Application Priority Data**

Dec. 5, 1972 Italy 32516/72

Sept. 27, 1973 Italy 29484/73

[52] **U.S. Cl.** ..... **222/146 HE,** 219/314, 222/453

[51] **Int. Cl.** **B67d 5/62**

[58] **Field of Search** ... 222/146 HS, 146 HE, 146 H, 222/146 R, 146 C, 442, 453, 425; 219/314; 126/380, 377; 99/300, 301

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Primary Examiner—Stanley H. Tollberg

Assistant Examiner—Hadd Lane

[57] **ABSTRACT**

A hot beverage dispensing machine is disclosed which comprises a reservoir, communicating through a port with a liquid-metering chamber, the latter communicating through a second port with a heating chamber which, in turn, has a third port, or dispensing port, three valve means being provided, each for one of the three ports, the valve means being so actuable that, as the first and the third ports are open, the second is closed, and vice versa. The desired beverage can thus be dispensed at the desired temperature and in a reliably determined quantity for each dispensing operation.

11 Claims, 9 Drawing Figures

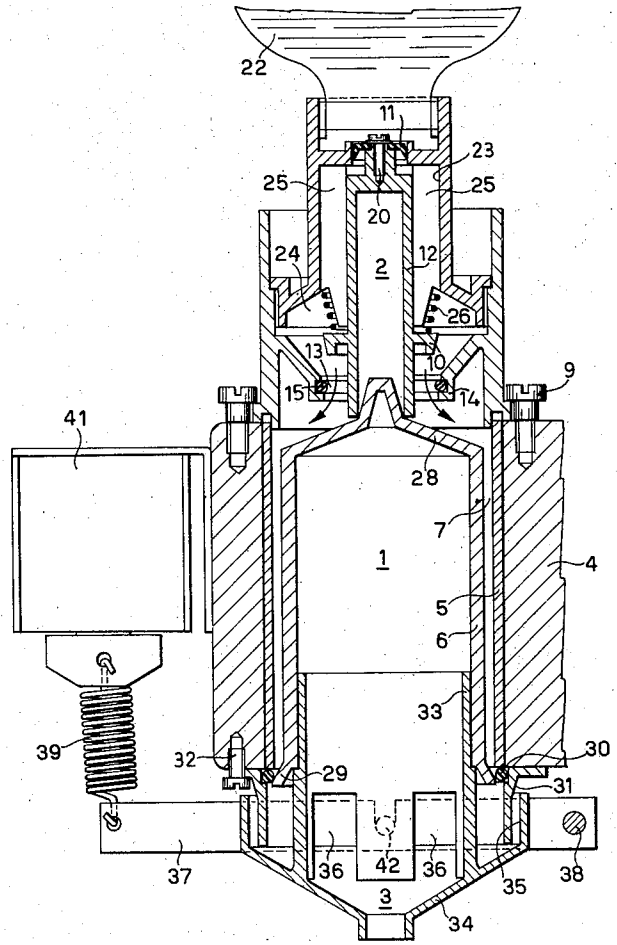

Fig. 1

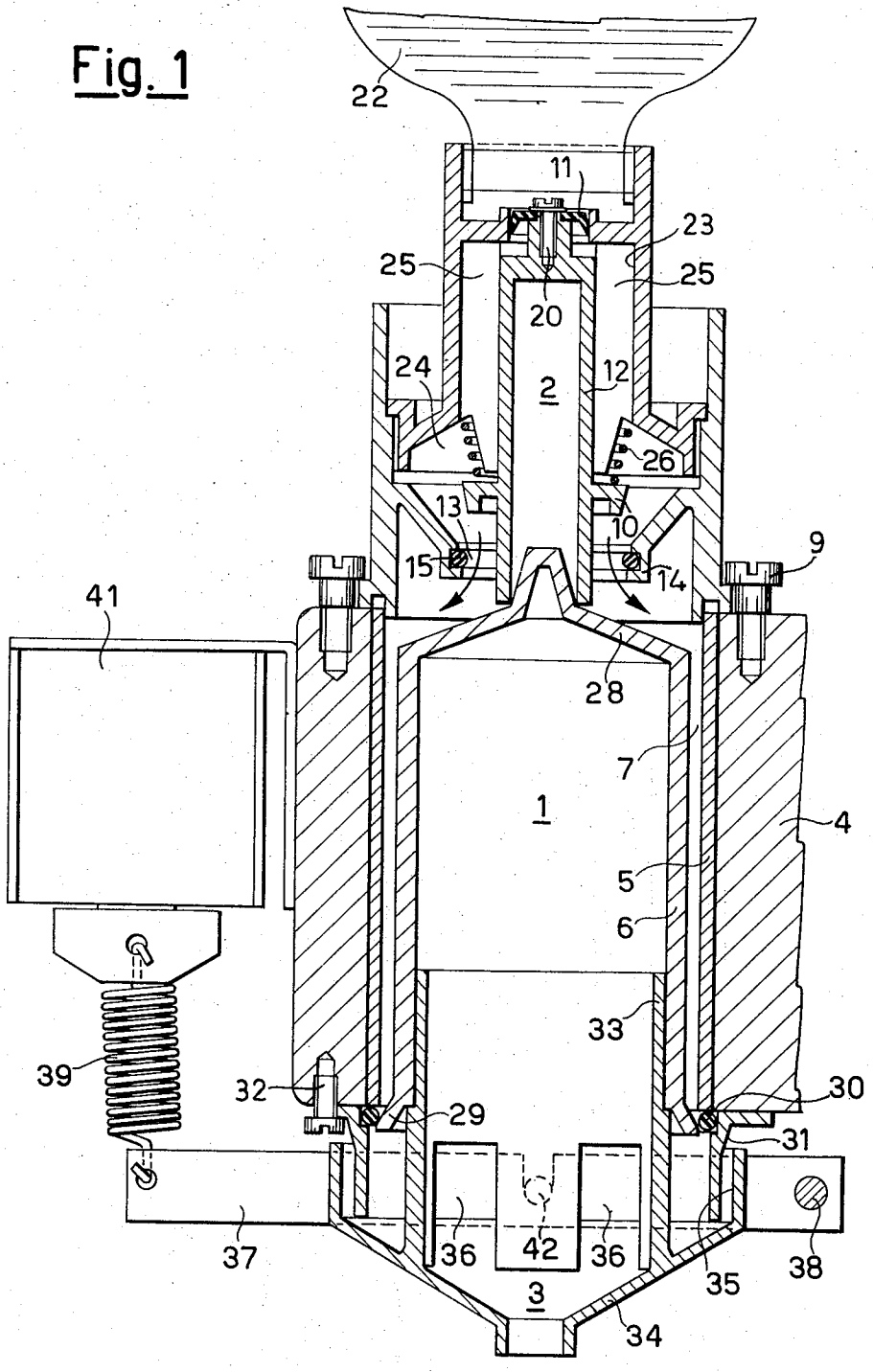
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Fig. 2

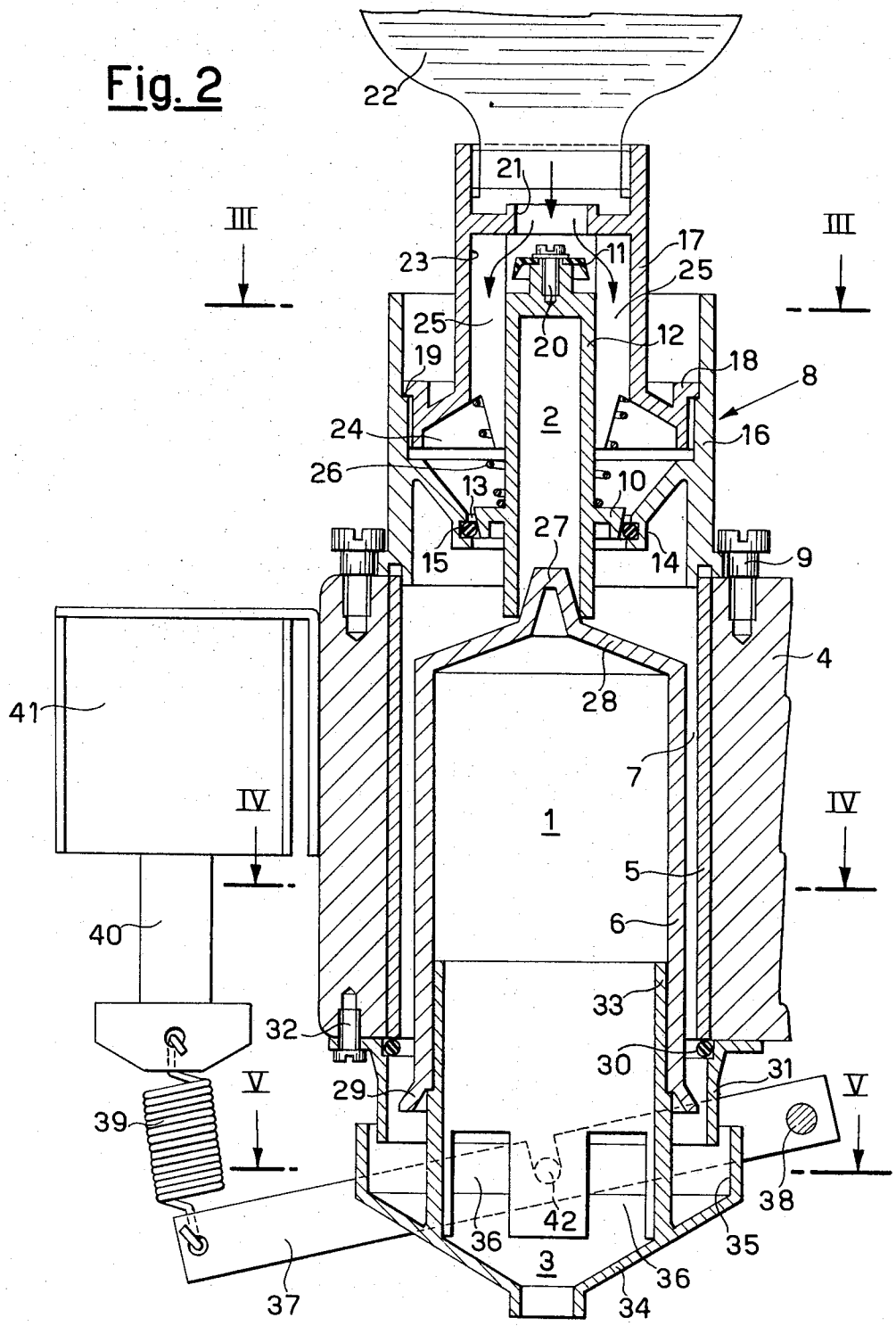
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Fig. 3

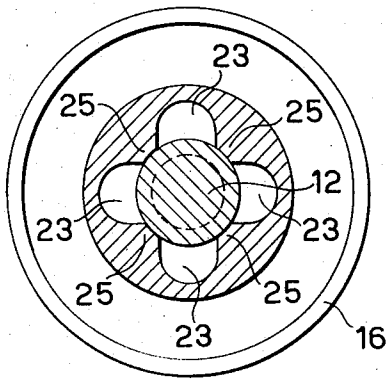

Fig. 4

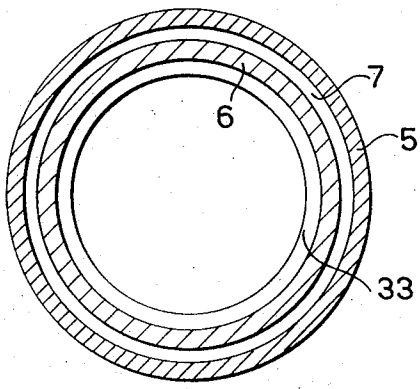

Fig. 5

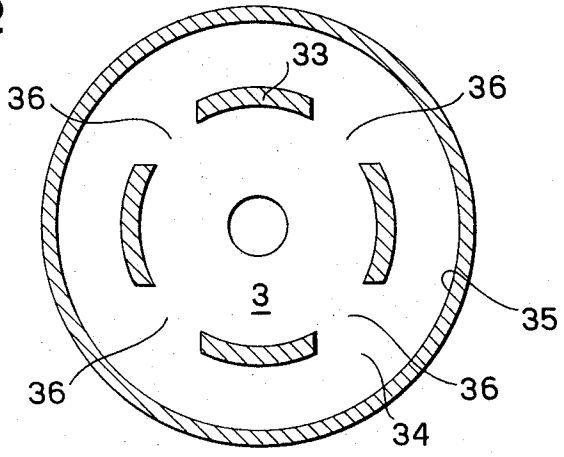

Fig.6

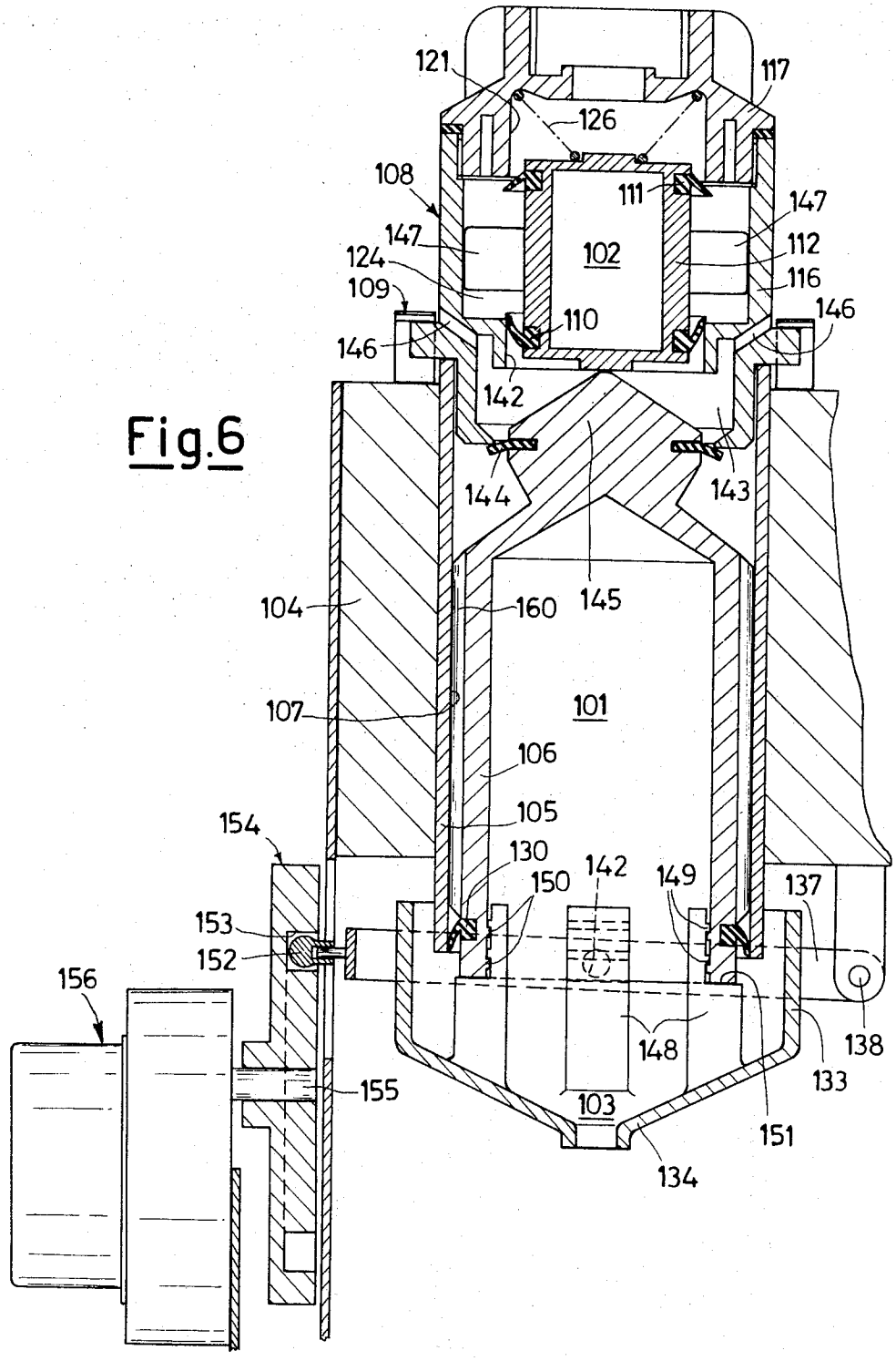
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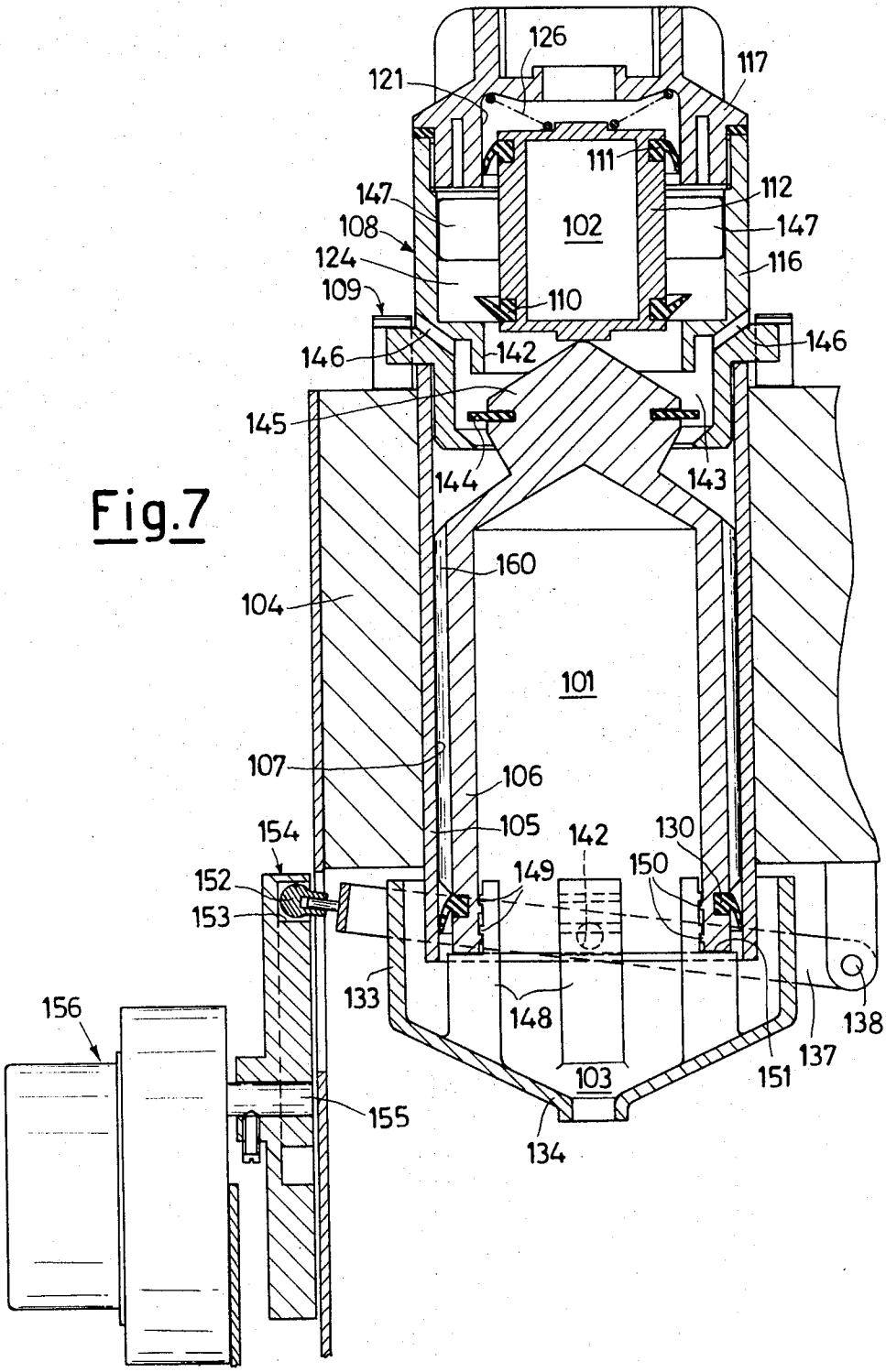
Fig.7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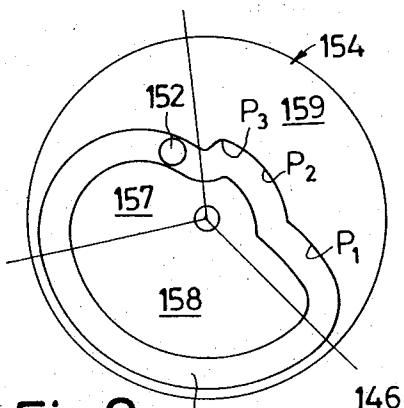
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Fig.9

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Fig.8

BEVERAGE-DISPENSING MACHINE

This invention relates to a device for dispensing hot beverages by preselected dosage units, which is intended in particular for being used in premises open to the public.

Heretofore, beverages such as "punches," "Peruvian bark wine" and the like were poured in a glass or a cup by preselected dosage units but in an approximate manner by the bartender or attendant and heated by steam as usually drawn from the steam cock of a coffee-brewing machine.

This procedure has given rise to not negligible troubles.

In the first place, the dosage of the beverage is entrusted only to the personal appreciation which is rather rough, of the person pouring the beverage; in the second place, the temperature at which the beverage is heated is a function of the time of stay in it of the steam cock of the coffee machine, a time which, also in this case, is evaluated in a rough manner only by an operator; consequently the beverage can be either too cold or too hot, that which could also have a negative bearing on its taste. It may also occur that the steam as drawn, instead of being fairly dry, as it should be, is comparatively moist so that the beverage becomes undesirably diluted.

The principal object of the invention is to do away with the defects as enumerated above by obtaining a device adapted to dispense or to deliver an exactly preselected dosage unit of heated beverage at a temperature which has also been preselected and constant for all of the dosage units.

Another object of the invention is to provide such a device which is of simple, cheap and speedy construction and whose upkeep can be made also by untrained operators.

With these objects in view, according to the invention, it has been envisaged to provide a beverage dispensing device which is characterized by comprising a reservoir communicating through a first port with a metering chamber which, in turn, communicates through a second port with a heating chamber, the latter being equipped with a third, dispensing port, a first, a second and a third valve means controlling said first, second and third port and being mechanical connected to be axially transferred between a first and a second end positions wherein, respectively, the first and the third port are open while the second port is closed, and vice versa.

The transfer of said valve means can be controlled, for example, either by an electromagnet or by a motor-reducing gear unit, which are operatively connected thereto by a linkage.

In order that the features of the invention may be better understood, an exemplary description will be given hereinafter of two preferred embodiments thereof, with reference to the accompanying drawings, wherein:

FIG. 1 is a cross-sectional vertical view showing the device in its operative position.

FIG. 2 is a vertical cross-sectional view showing the device in its inoperative position.

FIG. 3 is a cross-sectional view taken along the line III—III of FIG. 2.

FIG. 4 is a cross-sectional view taken along the line IV—IV of FIG. 2.

FIG. 5 is a cross-sectional view taken along the line V—V of FIG. 2.

FIG. 6 is a vertical cross-sectional view showing another embodiment of the device in its inoperative position.

FIGS. 7 and 8 are two vertical cross-sectional views showing the operative stages of the device, and

FIG. 9 is a close-up view of the cam which controls the appropriate sequence of the operative stages.

Referring now to FIGS. 1 – 5 of the drawings, the beverage metering and heating device according to the invention in a first embodiment thereof is structurally composed by a central boiler, 1, an upper metering unit, 2, and a lower dispensing unit, 3.

The boiler 1 is embedded in an annular heating block 4, made of a material which is a good heat-conductor and is electrically heated through a heating circuit (not shown), which can be of any appropriate kind for maintaining the block 4 at a preselected temperature. Said boiler comprises two cylinders 5 and 6, having different diameters, arranged the one in the interior of the other, so as to define an annular jacket or heating chamber 7 therebetween. The outer cylinder 5 is stably secured to the block 4, whereas the inner cylinder 6 can be axially translated, as will become apparent hereinafter.

The metering unit 2 is formed by a valve comprising a valve body 8 which is divided into two tubular pieces 16 and 17: the piece 16, having the larger diameter, is affixed to the block 4 by screws such as 9, whereas the piece 17, having the lesser diameter, is freely slipped into the piece 16 and abuts with its annular flange 18 an annular ledge 19 of the piece 16 itself.

Within the body 8 there are slidably and axially mounted a first and second valve members 10, 11 borne by a single valve-stem 12. The valve member 10 is formed as an entity in the stem 12 near the lower end thereof and has the shape of an annular projection having a tapered outline 13 adapted to cooperate with a valve seat 14 of the piece 16, equipped with a sealing ring 15. The valve member 11 has the form of a comparatively resiliently yieldable shutter affixed by a screw 20 to the other end of the stem 12. The shutter 11 is adapted to close in a sealtight manner a port 21 of the piece 17: the port 21 serves to establish a communication between the interior of a bottle 22, screwed onto the piece 17, and circumferentially formed passageways 23 (FIG. 3) in the piece 17 itself, which open into a metering chamber 24 as defined by the flange 18 and the valve seat 14. These passageways 23, in addition, define ribs 25, which are diametrically opposite, and guide the axial sliding of the stem 12. A compression spring 26, acting between the ribs 25 and the valve means 10, keeps the stem 12, and consequently the valve members 10, 11, in the position shown in FIG. 2. As clearly shown in the drawings, the stem 12 is hollow in its interior and has its lower end freely slipped into a frustoconical tip 27 which is extended axially of the top wall 28 of the cylinder 6. The cylinder 6 is open at its bottom end and, in correspondence with this end has an edge 29 which is flared towards the outside and is adapted to cooperate with an annular sealing gasket 30 housed in a seating of a tubular piece 31, the latter being affixed with screws 32 to the bottom end of the block 4. Thus the cylinder 6, in addition to defining with its body the chamber of annular jacket 7, fulfils, with its flared edge 29, also the function of a third valve.

The dispensing unit 3 is operatively connected to the cylinder 6 and comprises a tubular piece 33, which is terminated by a funnel 34 and has an outer annular chamber 35 which encompasses the piece 31 and is in communication with the funnel 34 through circumferentially formed openings 36 (FIG. 5), formed through the piece 33.

The cylinder 6 along with the dispensing unit 3 connected thereto via the piece 33, as clearly shown in the drawings, is borne by a lever 37 which controls also its axial sliding motion. The lever 37 is fulcrumed at either end at 38 to a framing (not shown) for supporting the device and, at the opposite end it is connected, through a spring 39, to the armature 40 of an electromagnet symbolically indicated at 41. The lever 37 is fulcrumed at an intermediate point 42, to the cylinder 6.

The operation of the device as described above is as follows. On starting an operative cycle the device is in the position shown in FIG. 2. With the device in such a position, the beverage, following the path indicated by the arrows, emerges from the bottle 22 until completely filling the chamber 24 and the four passageways 23; the amount of beverage occupying the chamber 24 and the passageways 23 is a unit dosage of beverage ready to be heated and delivered, whose fall is prevented by the sealtight engagement of the valve member 10 with the gasket 15.

To heat such a unit dosage an operator causes the electromagnet 41 to be energized through an energization circuitry of conventional make (not shown); thus the armature 40 is drawn into the position shown in FIG. 1 so as to rotate in the clockwise direction the lever 37, which, through the point 42, lifts the cylinder 6 with its edge 29 in a sealtight engagement against the annular gasket 30. As clearly shown in the drawings, the lifting of the cylinder 6 causes, through the tip 27, the sliding upwards of the valve stem 12 so as to bring the valve member or shutter 11 to close in a sealtight manner the port 21 and to disengage the valve member 10 from its valve seat. Consequently the beverage unit dosage passes into the annular chamber or jacket 7 of the boiler 1 and the beverage is prevented from being poured from the bottle 22 by the shutter 11. The beverage unit dosage in the chamber 7 is heated by the block 4 to a preselected temperature within a preselected time.

At this stage the hot beverage unit dosage is ready to be delivered and its delivery takes place by causing the electromagnet 41 to be de-energized to restore the device to the position shown in FIG. 2. With the device in this position the sealing edge 29 of the cylinder 6 is disengaged from the gasket 30 so as to establish a communication between the chamber 7 of the boiler 1 and the chamber 35 of the dispensing unit 3. The beverage unit dosage thus passes from the chamber 7 into the chamber 35 and therefrom, through the ports 36, into the funnel 34 which provides to dispense it, along an axial flux path, into a glass or a cup (not shown).

It is apparent that, simultaneously with the dispensing of a dosage of preheated beverage, a fresh unit dosage passes from the bottle 22 into the passageways 23 and into the chamber 24.

The boiler 1 and the units 2 and 3 can be made, with advantage, of a plastics material, whereas the heating block 4 is made of a metallic material.

Having now reference to FIGS. 6 to 9 of the drawings, another possible practical embodiment of the invention will be described hereinafter.

This embodiment comprises, similarly to the former, a central boiler 101, a top metering unit 102, and a bottom dispensing unit 103.

The boiler 101 is embedded in an annular heating block 104, made of a material which has a good heat conductance and electrically heated through a heating circuit (not shown), which can be of any kind adapted to keep the block 104 at a preselected temperature. The boiler comprises two cylinders 105 and 106, having different diameters and arranged the one within the other so as to define an annular jacket or chamber therebetween, 107, for heating purposes. The outer cylinder 105 is permanently secured to the block 104, whereas the inner cylinder 106 can be translated axially, as will become apparent hereinafter. The translation of the cylinder 106 is guided by a plurality of ribs 160.

The metering unit 102 can be formed by a valve comprising a valve body 108 in two tubular pieces 116, 117 screwed onto one another. The body 108 is removably mounted on the block 104 by a bayonet coupling 109.

Within the body 108 there is axially slidable a valve member 112 equipped at its ends with two annular sealing gaskets 110 and 111; these gaskets are of the liplike type and are made of an appropriate resiliently yielding material. The gasket 110 is adapted to close in a sealtight way a chamber 121. The chamber 121 serves to establish a communication between the interior of a reservoir, for example a bottle (not shown) screwed onto the piece 117 with a metering chamber as defined by the valve member 112 and the piece 116. The passageway 142 serves to establish a communication between the metering chamber 124 and a chamber 143, through which the liquid is fed into the heating chamber 107. A gasket 144 mounted on a header 145 at the top of the cylinder 106 is adapted to close in a sealtight manner the top portion of the chamber 107: a plurality of passageways 146 put in communication the chamber 143 with the outside atmosphere. A compression spring 126 urges the valve element 112 towards the position of FIG. 8 and the translative motion of the element 112 is guided by radial webs 147.

The cylinder 106 is open at the bottom end, in correspondence with which it has an annular gasket 130 shaped in a liplike fashion: this gasket 130 is adapted to close in a sealtight manner the chamber 107 by cooperating with the end portion of the inner wall of the cylinder 105. Thus the cylinder 106, in addition to defining the space of the chamber 107, also fulfils a valve function as will become apparent hereinafter.

The dispensing unit 103 comprises a tubular piece 133 which is terminated by a funnel 134; the piece 133 is secured to the cylinder 106 by a plurality of uprights 148 having crenellations 149 which snappingly engage circumferential ribs 150 on the inner wall of the cylinder 106; in addition, for a correct match between the crenellations 149 and the ribs 150, the uprights 148 have a shoulder 151 which abuts the edge of the cylinder 106.

The cylinder 106 and the dispensing unit 103 connected thereto is borne by means of a lever 137 which also controls the axial displacement thereof. The lever 137 is fulcrumed at either end at 138 to the block 104, at an intermediate point 142 to the cylinder 106 and

carries at the other end a cam follower **152.** The follower **152** is coupled to a desmodromic cam **153** as formed in a disc **154.** The disc **154** is keyed to the output shaft **155** of a motor-reducing gear **155** as diagrammatically shown at **156.**

As clearly shown in FIG. **9,** the cam **153** has operative portions comprised in the sectors **157, 158** and **159.**

The operation of the above described device is as follows. Upon starting an operative cycle, the device is in the position shown in FIG. **6,** wherein the chamber **124** is filled with the beverage, as will be seen hereinafter, and the gaskets **130** and **144** simultaneously engage their respective seatings and isolate the heating chamber **107.**

By so doing, the formation is avoided of possible sugary incrustations on the walls of the chamber **107,** which could occur were the chamber **107** to stay a long time in contact with the outside atmosphere.

As the motor-reducing gear **156** is set on, the cam follower **152** goes along the ascending ramp comprised in the sector **157;** consequently, the lever **137** is lifted and, in turn, causes the cylinder **106** to slide upwards and the valve member **112** is urged towards the position of FIG. **7.** In this position, the dosage unit of beverage falls from the chamber **124,** passing through the chamber **145,** into the heating chamber **107.** In the chamber **107,** the beverage dosage remains for the time which is necessary to heat it, this time being preselected by the length of the constant-radius portion of the cam, as confined by the sector **158.**

As the follower **152** begins to go along the first descending portion P_1 of the sector **159,** the lever **137** and therewith the cylinder **106** and the valve **102,** are depressed towards the position shown in FIG. **8.** At this stage, due to the bias of the spring **126,** the displacement of the valve **102** takes place at first to the position of FIG. **8** so as to cut the communication between the chambers **124** and **107** and to open the passageway **121** for the introduction of a fresh dosage unit into the chamber **124.** Thereafter the delivery of the heated beverage takes place through the funnel **134.** It should be noticed that the cam portions P_1, P_2 and P_3 comprised in the sector **159** originate a progressive and controlled delivery of the beverage by gradually opening the annular passageway for communication between the chamber **107** and the funnel **134.**

The arrangement of sealing gaskets as suggested in this embodiment is such as to ensure that, as the valve members are in their end positions, the first and the third port are open only after the sealtight closure of the second port, and vice versa. In this way undesirable liquid seepings between the reservoir, the metering chamber and the heating chamber are prevented during the operation of the device.

These gaskets, during the translational motion of the valve members carry out a continuous and effective scraping of a portion of the inner walls of the chambers, thus preventing the formation of detrimental incrustations of material thereon.

The arrangement of these sealing gaskets and the operative sequence of the valve members are such, moreover, that, in the inoperative position of the device, the reservoir, the metering chamber and the heating chambers are all closed in a sealtight manner.

It is apparent from the drawings that the subject device can easily be dismembered for upkeep, for example for washing, even by untrained persons, that which is a great advantage for the user. The device, in addition, easy to wash also automatically by feeding it during one or more cycles with an appropriate washing liquor.

Although two embodiments of the invention have been illustrated and described, those skilled in the art will realize that modifications and changes can be introduced therein without thereby departing from the scope of the invention. For example a battery or set of distributors could be provided, embedded in a single heating block and containing, each, a different kind of beverage.

What is claimed is:

1. A hot beverage dispensing machine for delivering individual preselected dosage units of the beverage, characterized by comprising a reservoir in communication through a first port with a metering chamber which, in turn, communicates through a second port with a heating chamber equipped with a third dispensing port, a first, a second and a third valve means controlling said first, second and third port and being mechanically linked to be axially translated between a first and a second end position in which the first and the third ports are open while the second port is closed, respectively, and vice versa.

2. A device according to claim **1,** characterized in that said first and said second valve means are integral with the ends of a common valve stem.

3. A device according to claim **1,** characterized in that said heating chamber is an annular jacket as defined by two cylinders having different diameters and arranged the one in the interior of the other.

4. A device according to claim **1,** characterized in that said third valve means is the inner cylinder having the lesser diameter of said two cylinders, said inner cylinder having at its top end a tip which can be freely inserted into the hollow bottom end portion of said valve stem and at the bottom end an edge flared towards the outside adapted to provide a tight seal on a gasket housed in correspondence with the lower edge of the outer cylinder.

5. A device according to claim **1,** characterized in that the translation movement of said valve means is obtained by a leverage connected to the armature of an electromagnet.

6. A device according to claim **1,** characterized in that it comprises a motor-reducing gear unit for controlling the translational movement of the valve members connected therewith by a cam and a leverage.

7. A device according to claim **1,** characterized in that said cam is of the desmodromic type.

8. A beverage dispensing machine according to claim **1,** characterized in that the valve members comprise an arrangement of sealing gaskets and are so constructed that the first and the third ports are open only upon closing the second port in a sealtight manner and vice versa.

9. A beverage dispensing machine according to claim **8,** characterized in that the third valve member carries at its ends sealing gaskets which in their at rest position isolate the heating chamber in contact with the atmosphere.

10. A beverage dispensing machine according to claim **1,** characterized in that it comprises an intermediate chamber for providing a communication between the metering chamber and the heating chamber, air vent holes being provided in said communication chamber.

11. A device according to claim **1,** characterized in that said heating chamber is embedded in a block of a heat-conductive material.

* * * * *