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[54] **DISPENSING MACHINES WITH MULTIPLE SELECTION**
6 Claims, 2 Drawing Figs.

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[50] **Field of Search** 222/504, 129.4, 129.3, 129.1, 108, 144.5, 545; 137/637, 637.1

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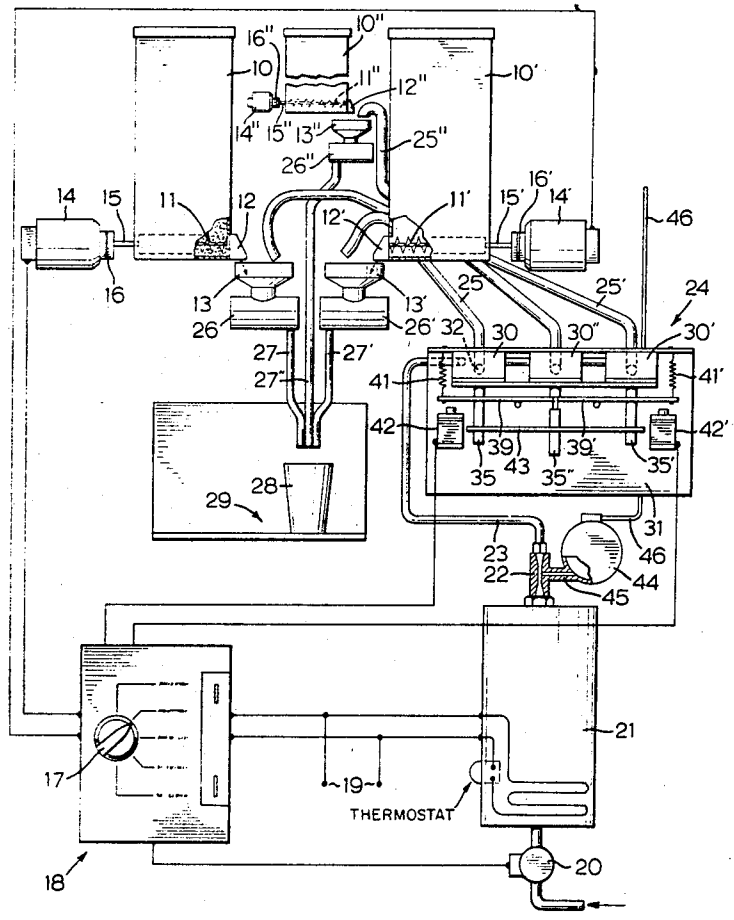
ABSTRACT: In a hot drink dispensing machine with multiple selection the valve means for selectively feeding not water from a source thereof to a mixing station where the hot water is mixed with a drink component preferably is arranged so that one of the valves is always in open condition to maintain a constant characteristic from the hot water supply onwards, so that a constant quantity of hot water is dispensed each time; the system also includes a venturi and a reservoir to maintain the hot water level constant.



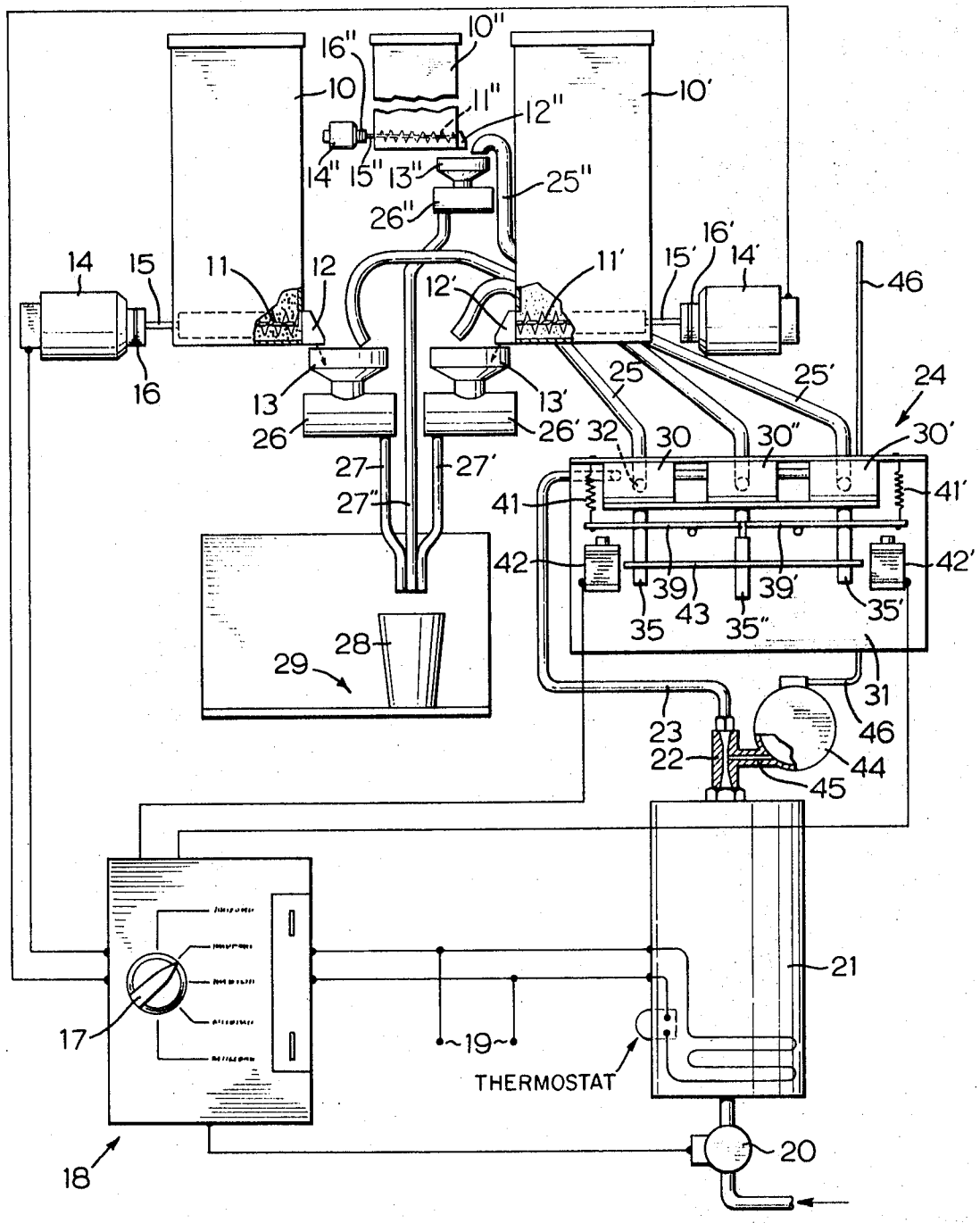


FIG. 1

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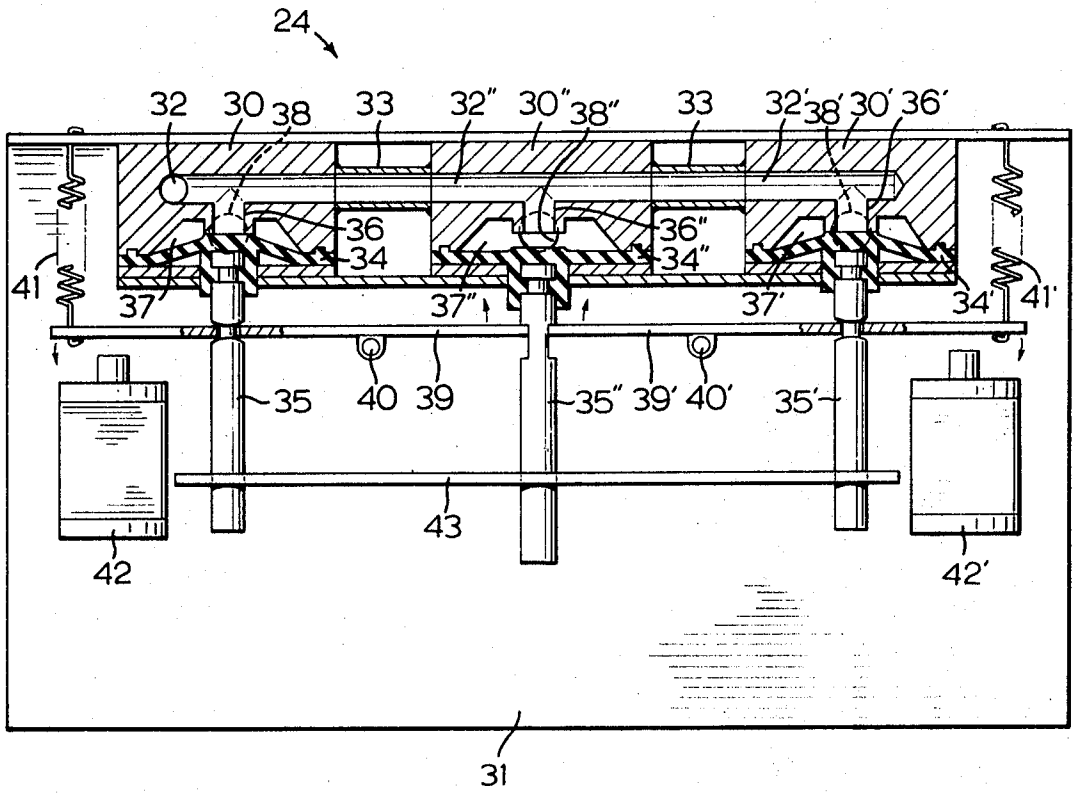

FIG. 2

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DISPENSING MACHINES WITH MULTIPLE SELECTION

FIELD OF THE INVENTION

This invention is concerned with improvements in or relating to dispensing machines with multiple selection, and especially to such machines of the type wherein solid drink constituents are mixed with hot water before delivery to a drink dispensing station.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a new dispensing machine of the type providing multiple selection.

It is another object of the invention to provide a new valve assembly for use in the dispensing machine of the type specified.

In accordance with the present invention there is provided a drink-dispensing machine with multiple selection comprising a drink-dispensing station, a source of water, a mixing station for each drink discharging to the said dispensing station, means for selectively feeding through the respective mixing station the drink component of a selected drink, a respective valve for each mixing station and for selectively feeding water from the said source to the respective mixing station, main pipe means for supplying water to the inlets of the said valves in parallel with one another, separate pipe means for each valve for feeding water from the outlet of the respective valve to the respective mixing station, and valve operating means for selectively operating said valve so that one of the valves is always in open condition.

Also in accordance with the invention there is provided a drink-dispensing machine comprising a drink-dispensing station, a source of water, at least one mixing station for a drink discharging to the said dispensing station, means for feeding drink component to the mixing station, valve means for selectively feeding water from the source to the mixing station, first pipe means for feeding water from the said source to the valve means, second pipe means for feeding water from the valve means to the mixing station, a venturi unit in the said first pipe means, and a reservoir connected to the venturi float and adapted to receive water from the venturi unit upon the level rising above the venturi throat and to supply water to the venturi unit upon the level falling below the venturi throat.

DESCRIPTION OF THE DRAWINGS

A particular preferred embodiment will now be described, by way of example, with reference to the accompanying diagrammatic drawings, wherein

FIG. 1 is a general schematic view of a dispensing machine in accordance with the invention, and

FIG. 2 shows to a larger scale a detail of a valve arrangement of the machine of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now especially to FIG. 1, there are shown three containers 10, 10', and 10'' each containing a respective drink constituent powder, for example, a chocolate mixture, a soup mixture or instant coffee. A respective screw conveyor 11, 11' or 11'' is mounted at the bottom of each container and is arranged to discharge a predetermined quantity of the respective powder through a respective outlet 12, 12' or 12'' into a respective funnel 13, 13' or 13''. The screw conveyor is rotated as required by means of a respective electric motor 14, 14', or 14'', which is connected to the respective conveyor shaft 15, 15' or 15'' through a suitable clutch 16, 16' or 16''; the conveyor being rotated when required to discharge sufficient powder for a single drink, Each motor 14 is operated as required in response to the operation of a selector switch 17, mounted in a suitable coin-operated selector mechanism of any suitable type, as known to those skilled in the art, and indicated generally by reference 18. The power to operate the motors and any other electrically operated part of the machine is obtained from a suitable power source applied to terminals 19.

Upon the selection of a drink by rotating the selector switch 17, and after the payment therefor, a measured quantity of hot water must be supplied to mix with the powder constituent. In this embodiment such supply is achieved by the timed opening of a solenoid valve 20 under the control of the selector 18, the valve being interposed between the main supply of cold water under pressure and the interior of an insulated tank 21 containing a conventional thermostatically controlled heating unit, supplied from the terminals 19, the said unit maintaining the contents of the tank 21 at a predetermined temperature. The timed opening of the valve 20 introduces a predetermined quantity of cold water into the bottom of the tank, thereby displacing a corresponding amount of hot water from the top of the tank, which passes via a venturi unit 22, a pipe 23, a valve unit 24 (to be described in greater detail below) and a selected one of pipes 25, 25' or 25'' to a corresponding mixing funnel 13, 13' or 13''. The water and powder enter respective funnel 13 together and pass into a respective mixing chamber 26, 26' or 26'', the arrangement being such that the hot water rinses the powder into the mixing chamber and the two constituents are mixed therein as thoroughly as possible. The mixture passes from the chamber 26, 26', or 26'' via a respective pipe 27, 27' or 27'' to a cup 28, which has previously been fed automatically by a conventional cup-feeding mechanism (not shown) to a dispensing station 29.

For convenience of illustration only three containers 10 and their corresponding drink-dispensing mechanism are illustrated herein, and in each case the drink produced consists of a single powder constituent mixed with water, such as hot chocolate or soup. The drink most commonly dispensed in such machines is coffee, and a somewhat more complicated arrangement is required, because of the necessity of supplying black or white coffee, with or without sugar. In an arrangement of the above-described machine suitable for this purpose containers of instant coffee powder, synthetic cream powder and sugar are arranged to discharge into a single large funnel 13'', and the conveyor motors 14 associated therewith are operated selectively in accordance with the type of coffee required; hot water is supplied to the corresponding funnel from the pipe 25'' and is arranged to mix and rinse the selected powders, the resultant mixture being discharged via the pipe 27'' to the cup 28.

A number of problems are encountered in the construction and operation of dispensing machines intended for multiple choice selection as described above. One major problem is to provide a simple and economical valve system that will deliver an accurately measured quantity of hot water at all times to the selected funnel, so that the purchaser will receive a satisfactory drink. This desired result can be achieved with the valve system described and illustrated herein and shown particularly in FIG. 2.

Since there are three possible destinations for the hot water the valve assembly 24 comprises three valves 30, 30' and 30'', mounted on a suitable baseplate 31. The pipe 23 is connected to inlet bore 32 of valve 30, while the inlet bores 32, 32'' and 32' of all three valves are permanently connected together by connecting pipes 33, as will be seen most clearly in FIG. 2. Each valve is of the diaphragm type and comprises a resilient diaphragm 34, 34' or 34'', which is pressed upwards as seen in FIG. 2 by means of a respective operating rod 35 until it engages and closes a respective port 36. With the port 36 open the water entering the inlet bore 32 passes freely through the port to a chamber 37 and thence to an outlet port 38 to which the respective pipe 25 is connected.

FIG. 2 shows what can be considered the normal condition of the valve assembly, and it will be seen that the centrally disposed valve 30'' is normally in open position, while the two other valves 30 and 30' are normally in closed position. A lever 39 pivoted to the baseplate 31 on a pivot 40 engages the valve rods 35 and 35'', and is urged to rotate in a clockwise direction (as seen in FIG. 2) by a helical tension spring 41 connected between the baseplate and the corresponding free end of the lever. Similarly, another lever 39' engages the valve rods 35'' and 35', is pivoted on a pivot 40' to the baseplate,

and is urged to rotate in anticlockwise direction about the pivot 40' by a respective tension spring 41'. Respective electromagnets 42 and 42' are mounted on the baseplate adjacent the free ends of the levers and are controllable selectively by supplying actuating current thereto from the selector mechanism 18 under the control of the switch 17 thereof. A perforated plate 43 receives the free ends of the rods 35 and guides them for rectilinear motion.

In the absence of an actuating current to either of the electromagnets the valves take the position shown in FIG. 2, and the hot water fed to the valve assembly from the pipe 23 passes to the outlet 38'' of the central funnel 13''. It will be appreciated by those skilled in the art that a usual arrangement will be for the central valve 30'' and pipe 25'' to supply the most popular drink, which in the selection described above is usually coffee. If the electromagnet 42 is now actuated, upon rotation of the switch 17 to select the corresponding drink, the lever 39 is rotated in anticlockwise direction, pulling down the operating rod 35 and opening the valve 30, and pushing upward on the operating rod 35'' and closing the valve 30''. The hot water now passes via the valve 30 and the pipe 25 to the respective funnel 13. Similarly, if the other electromagnet is actuated, the lever 39' is rotated clockwise, closing the central valve 30'' and opening the other valve 30' to supply the hot water to the pipe 25' and the funnel 13'. The connection of the two levers 39 and 39' with the central rod 35'' is provided with a suitable lost motion to ensure that the movement of this rod does not produce a corresponding movement of the valve rod which is not intended to be actuated.

Since at all times one of the valves 30, 30' or 30'' is open the system from the top of the tank 21 to the ends of the tubes 25 has a constant characteristic, which is not changed as the valves are operated, so that substantially the same quantity of liquid will be supplied to the dispensing station, no matter which of the valves is operated. Although in this embodiment the bodies of the valves are shown as separate units connected to one another, in other embodiments these bodies may be formed together as a single integral unit. It will also be apparent that in machines requiring only two selections two valves would be used, while in machines requiring more than three selections the appropriate number of valves would be used, the inlets of the valves being in free communication with one another, as described above.

Another problem encountered in multiple choice equipment of this type results from the fact that cold water enters the reservoir 21 and displaces a corresponding quantity of hot water. The entering cold water mixes with the water in the tank, quickly reaches the same temperature as the water therein and thereby assumes a greater volume. Also, the quantity of water admitted by the valve 20 is not precisely constant, with the result that the level of the water in the reservoir may vary very considerably. If the level rises unduly, for example, until the pipe 23 is full, some of the water delivered to the dispensing station 29 may have been in the pipe for a considerable length of time where it is unheated, so that the first drink delivered from the machine is too cold for the purchaser's taste. Another situation may arise when the machine is used for a relatively large number of drinks over a short period of time, whereupon the general level of liquid in the reservoir tends to fall; if a drink is now dispensed before the whole of the liquid in the tank has heated there is the possibility that the next drink is given a short measure of water.

These disadvantages may be avoided with a machine in accordance with the invention by the provision of the venturi unit 22 and an associated reservoir 44 having its inlet connected to the throat of the venturi via a capillary tube 45 and having an outlet 46 to the ambient atmosphere.

As the water in the tank 21 expands it moves slowly through the venturi unit and passes through the capillary tube 45 into the reservoir 44, the entry of a relatively large quantity of water into the reservoir causing relatively little change in the effective water level. Any excess water in the pipe 23 will run back and also pass into the reservoir. If after a number of drinks have been dispensed the level of the water in the tank is below the level of the throat of the venturi, water will flow from the reservoir 44 through the capillary tube 45, so that a relatively constant level of water is obtained. When the valve 20 opens to dispense a drink the water moves relatively quickly through the venturi unit generating a low vacuum at the venturi throat, so that there is no tendency for the water passing quickly in the pipe 23 to enter the reservoir 44. Because of the existence of the said slight negative pressure, there is a tendency for water to move from the reservoir 44 to the pipe 23, but a negligible amount can flow through the capillary tube 45 during the relatively short time that the valve 20 is open.

It will be understood that a particular preferred embodiment of the invention has been described herein, and that various modifications thereof are possible within the scope of the appended claims.

What I claim is:

1. A drink-dispensing machine with multiple selection comprising a drink-dispensing station, a controllable source of water, a mixing station for each drink discharging to the said dispensing station, means for selectively feeding to the respective mixing station the flavor component of a selected drink a respective valve for each mixing station and for selectively feeding water from the said source to the respective mixing station, main pipe means for supplying water to the inlets of the said valves in parallel with one another, separate pipe means for each valve for feeding water from the outlet of the respective valve to the respective mixing station, and valve-operating means for delivering water from said source and for selectivity operating said valves so that one of the valves is always in open condition.

2. A drink-dispensing machine as claimed in claim 1, comprising a venturi unit in the said main pipe means, and a reservoir connected to the venturi throat and adapted to receive water from the venturi unit upon the level rising above the venturi throat and to supply water to the venturi unit upon the level falling below the venturi throat.

3. A drink-dispensing machine as claimed in claim 1, comprising a heated thermostatically controlled water reservoir for supplying hot water and a supply valve connected between the interior of the reservoir and a source of cold water under pressure, and wherein the quantity of hot water supplied to the said valve means is determined by a timed opening of the said supply valve.

4. A drink-dispensing machine as claimed in claim 1, wherein said valve means comprises three valves, a first differential operating means for closing one of the valves and simultaneously opening another of the valves, and a second differential operating means for closing said one valve and simultaneously opening the third valve.

5. A drink-dispensing machine as claimed in claim 1, wherein the said valve means comprises three valves, a first differential operating means for closing one of the valves and simultaneously opening another of the valves, and a second differential operating means for closing said one valve and simultaneously opening the third valve, and wherein each differential operating means comprises a respective pivoted lever and means for rotating the lever about its pivot, the lever being engaged with respective control members of the two associated valves to open one valve and close the other upon said rotation.

6. A drink-dispensing machine comprising a drink-dispensing station, a controllable source of water, at least one mixing station for a drink discharging to the said dispensing station, means for feeding flavor component to the mixing station, valve means for selectively feeding water from the source to the mixing station, first pipe means for feeding water from the said source to the valve means, second pipe means for feeding water from the valve means to the mixing station, a venturi unit in the said first pipe means, and a reservoir connected to the venturi throat and adapted to receive water from the venturi unit upon the level rising above the venturi throat and to supply water to the venturi unit upon the level falling below the venturi throat.