United States Patent

[11] 3,540,629

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[21] Appl. No. **791,338**
[22] Filed **Jan. 15, 1969**
[45] Patented **Nov. 17, 1970**
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[54] **BEVERAGE DISPENSING SYSTEM**
7 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **222/146,** 222/424
[51] **Int. Cl.** **B67d 5/62**
[50] **Field of Search** 222/146, 424, 318

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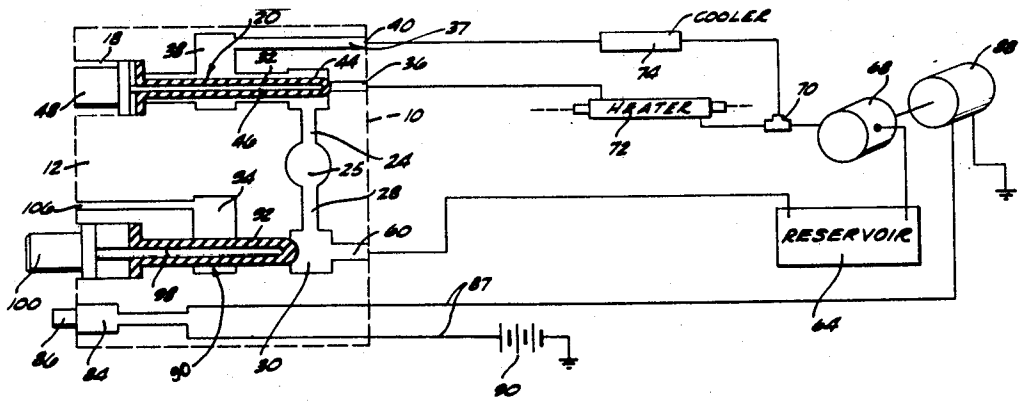
ABSTRACT: A beverage dispensing system is described which is particularly adapted for use in a vehicle such as an automobile. A separate dispensing head is provided which includes all of the various controls that are necessary to dispense beverages. All other parts of the system are remotely located, and are coupled to the dispensing head by means of flexible conduits and cable, hence the dispensing head may be conveniently stored inside the glove compartment of the automobile and removed for use without disturbing its connections to the remainder of the apparatus. Provision is made for either heating or cooling the liquid before it is dispensed; and the liquid may be recirculated to the reservoir through a temperature sensing device which is felt by the operator to determine that the liquid is at the desired temperature before he starts to dispense it.



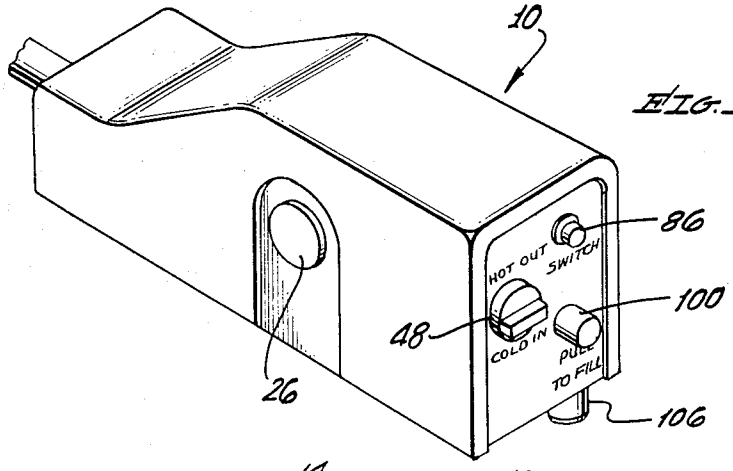


FIG. 1.

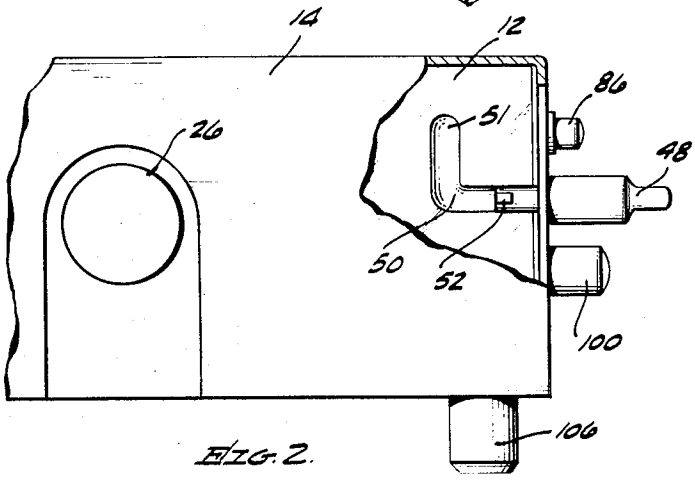


FIG. 2.

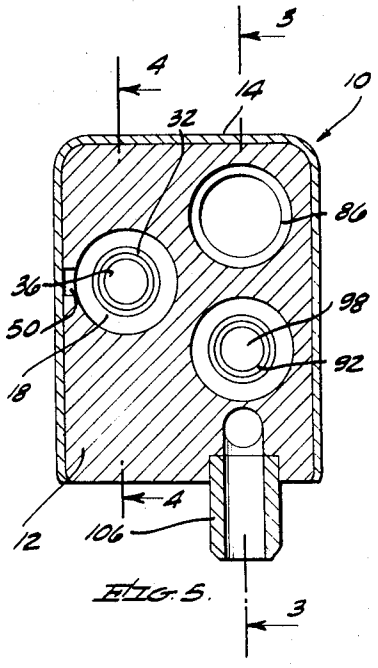


FIG. 5.

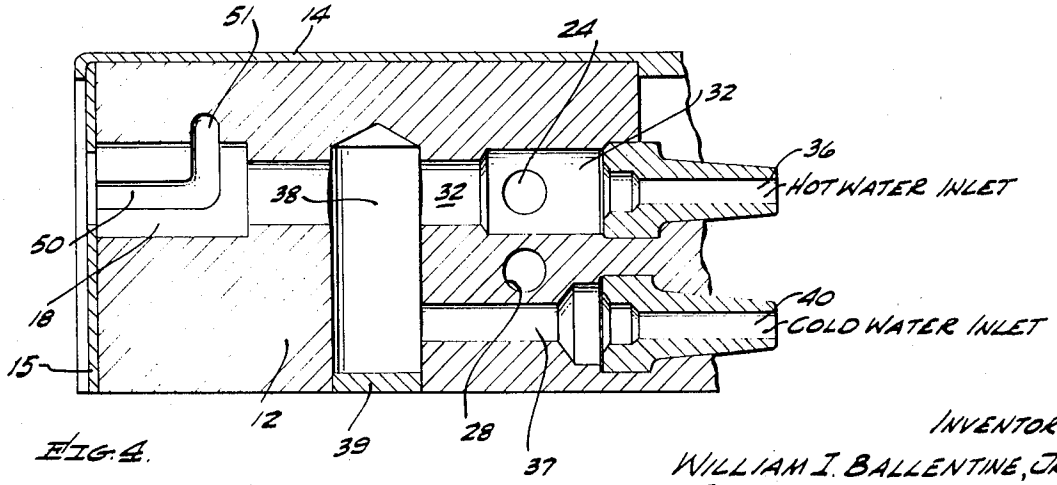


FIG. 4.

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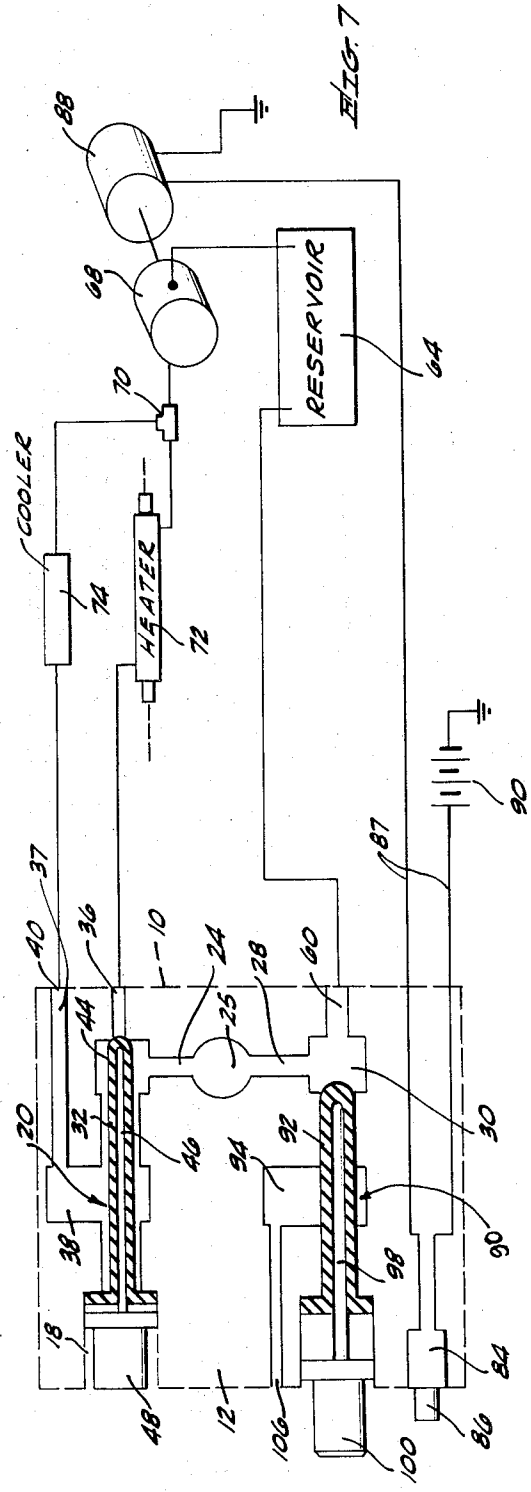

FIG. 7

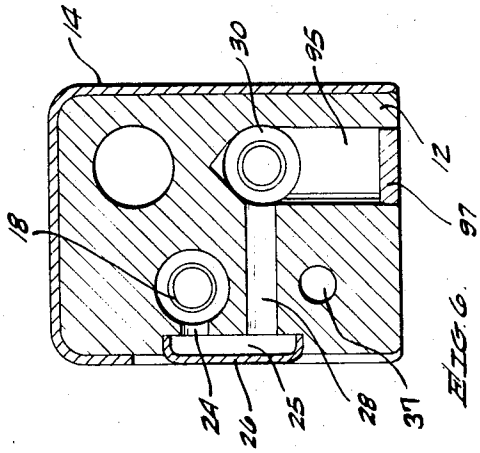

FIG. 6.

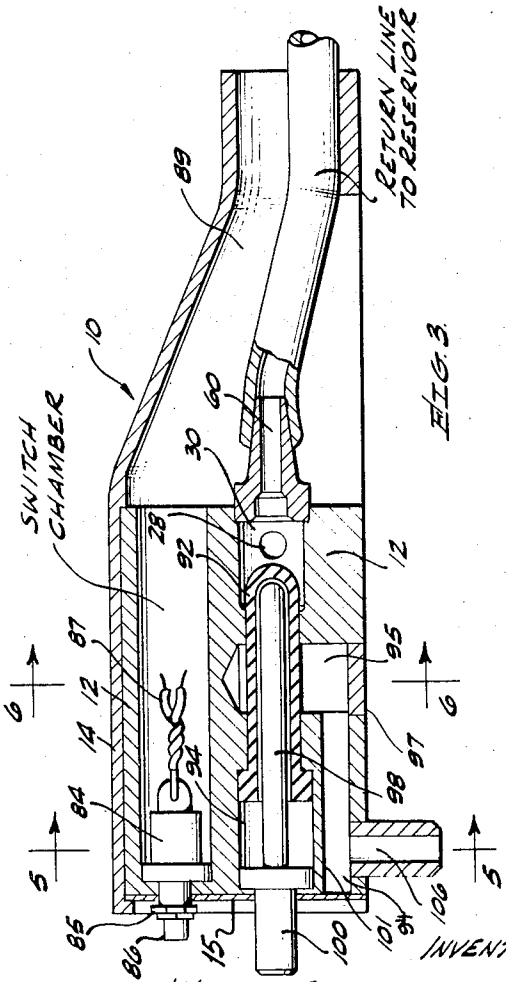

FIG. 3.

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BEVERAGE DISPENSING SYSTEM

BACKGROUND OF THE INVENTION

Many systems have heretofore been devised for dispensing beverages to a passenger in an automobile, and some of these systems have included provision for heating or cooling the beverage, or both. Such prior systems of apparatus have, however, had many disadvantages, including high cost, unreliability, and lack of convenience to the user.

A number of prior beverage dispensing systems have utilized the automobile vacuum system for their energization, however, the present invention provides a feasible means for utilizing electrical energization which is believed to be superior and more desirable.

An important convenience feature of the present invention is that a separate dispensing head is provided, which may be stored in the automobile glove compartment or elsewhere in the passenger compartment and removed only when it is to be used. According to the present invention all of the operating controls for dispensing beverages are incorporated into the dispensing head, where they are readily accessible and easily used.

Another advantage of the invention is the ease with which it may be manufactured, and resulting low cost. For example, the dispensing head utilizes an integral solid body having various passageways cut therein for housing the valve mechanisms and also for providing liquid conduits.

SUMMARY OF THE INVENTION

According to its system concept the present invention includes a liquid reservoir, a pump and associated electric motor which drives it, at least one temperature conditioning device, a dispensing head, and conduits which couple the other elements of the system into a closed-loop recirculating path. The dispensing head includes a touch type of temperature sensing device, and the liquid may be circulated around the closed-loop path until the lines have been purged to provide the desired temperature level for the liquid. The dispensing head also includes a dispensing valve mechanism which may be actuated, after the desired liquid temperature has been achieved, for dispensing the liquid into a container.

In the presently preferred form of the beverage dispensing system there is included both a heater and a cooler. Consequently, a selection valve mechanism is also incorporated in the dispensing head, and may be utilized for selecting either "hot" or "cold" for the temperature of the liquid to be dispensed.

In addition to the novel system concept outlined above the present invention also provides a novel subcombination of apparatus, namely, a dispensing head having various controls incorporated within it. In the presently preferred form of the invention the dispensing head includes an integral body of material having various passageways cut therein; one of these passageways contains a pushbutton switch and wires for pump motor control; another passageway contains a selection valve mechanism for selecting either hot or cold liquid, together with an operating button for the valve mechanism; a further passageway contains a dispensing valve mechanism for dispensing the liquid; another passageway contains a touch type of temperature sensing device; still another passageway contains a dispensing spigot; and additional passageways provide interconnecting fluid duct ways.

Thus one specific advantage of the invention is that the dispensing head provides a compact and economical unit incorporating all of the system controls, and which can conveniently be stored out of the way such as inside the glove compartment of the automobile.

Another advantage of the invention is that the operator must use both hands to dispense beverage, thus assuring that the driver cannot attempt to dispense beverage while driving but must first bring the vehicle to a complete stop, or that a passenger must operate the device.

A further advantage of the invention is that beverage can be drawn out at exactly the right temperature and the waste and inconvenience of drawing beverage at the wrong temperature are thereby avoided.

DRAWING SUMMARY

FIG. 1 is a perspective view of the dispensing head used in the system of the present invention;

FIG. 2 is a side elevational view of the dispensing head, partially broken away in cross section;

FIG. 3 is a longitudinal cross-sectional view of the dispensing head taken along the line 3–3 of FIG. 5;

FIG. 4 is a longitudinal cross-sectional view of the dispensing head with the valve mechanisms omitted, taken along the line 4–4 of FIG. 5;

FIG. 5 is a transverse cross-sectional view of the dispensing head with the valve mechanisms omitted, taken along the line 5–5 of FIG. 3;

FIG. 6 is a transverse cross-sectional view of the dispensing head with the valve mechanisms omitted, taken along the line 6–6 of FIG. 3; and

FIG. 7 is a schematic diagram of the complete beverage dispensing system of the invention in its presently preferred embodiment.

The beverage dispensing system of the present invention includes a dispensing head 10 (FIGS. 1 to 6, inclusive) which incorporates all of the system controls, and which at the same time is small enough to be conveniently handled by the user with either one or two hands, and when not used to be stored away in a place such as the glove compartment of the automobile. All of the other component parts of the complete system are kept out of sight and are preferably located in more remote portions of the vehicle.

Referring to FIG. 7, the complete beverage dispensing system includes a reservoir 64 which typically contains water but which may if desired contain coffee, tea, fruit juice, or the like. The purpose of the entire system is to permit the user to draw some of the beverage from the reservoir out through the dispensing head, at the time and in the quantity which he desires; and furthermore, to make sure that the beverage has been either heated or cooled to a desired temperature level before it is drawn out into the drinking container. Obtaining the desired temperature level is achieved by circulating the beverage in a closed-loop path from the reservoir to the dispensing head and back, and at the same time sensing the temperature level of the beverage until the desired temperature is reached. It is preferred to maintain the liquid in the reservoir 64 at a medium or neutral temperature, hence the heater 72 and cooler 74 are each preferably designed for instantaneously changing the temperature of the liquid as it flows through those devices. Consequently, the recirculation of the beverage is continued only long enough to flush out the line from either the heater or the cooler to the outlet spigot.

Thus as best seen in FIG. 7 the dispensing head 10 has an inlet 40 for cold water or beverage and an inlet 36 for hot water or beverage. The dispensing head also has a return outlet 60 through which the water or beverage is recirculated to the reservoir 64. A dispensing outlet 94 is coupled to an outlet spigot 106 (FIG. 1) and a button 100 is pushed when it is desired to fill a container that is placed under the spigot.

In the system of FIG. 7 a series path for the recirculating beverage is provided from return outlet 60 of the dispensing head to the reservoir 64, hence from reservoir 64 to pump 68, and from pump 68 to branch fitting 70. Heater 72 is coupled between one output of the branch fitting 70 and the hot inlet 36 of the dispensing head, while cooler unit 74 is connected between the other output of fitting 70 and the cold inlet 40 of the dispensing head. A first valve means 20 located within the dispensing head 10 is utilized for coupling a selected one of the inlets 36, 40 to the return outlet 60. Pump 68 is driven by an electric motor 88, coupled through wires 87 to a switch 84 that is also located in the outer face of the dispensing head. An

energizing battery 90 (typically the vehicle battery) is connected in a closed-loop with the motor 88 and cable 87. A pushbutton 86 is associated with the switch 84, for controlling energization of the motor from the dispensing head, and while not specifically shown the pushbutton and switch arrangement are such that the pushbutton is spring loaded and normally tends to remain in its outwardly extended position where the switch is open. Thus the recirculation of the beverage or water continues only so long as the operator holds his finger on the pushbutton 86. During recirculation of the beverage it flows from the reservoir 64 through the pump 68 to fitting 70, hence through one or the other of heater 72 and cooler 74 to the corresponding inlet 36 or 40 of the dispensing head, and out of the return outlet 60 of the dispensing head back to the reservoir 64.

In dispensing head 10 the operation of first valve means 20 is shown diagrammatically in FIG. 7. If the incoming beverage is cold it passes through cold inlet 40, chamber 37, chamber 38, chamber 32, and hence around the resilient valve member 44 to chamber 24. From chamber 24 the beverage passes through temperature sensing chamber 25, then through chamber 28 and chamber 30 to the return outlet 60.

If the beverage flowing into the dispensing head is hot water, then it enters through the hot inlet 36 and flows through the end portion of chamber 32 into chamber 24. From there on the flow is the same.

The construction of the dispensing head 10 will now be described with particular reference to FIGS. 1 to 6, inclusive, of the drawings. The dispensing head 10 comprises a body 12 that is preferably formed of a molded plastic material such as acrylic, and has a generally rectangular configuration with its height being somewhat greater than its width and its length being somewhat greater than its height. On the rearward end of the body 12 (FIGS. 3 and 4) separate openings receive respective fittings for the hot water inlet 36, the cold water inlet 40, and the return outlet 60. These couplings together with their respective conduits, and the electrical cable 87, are housed in a tapered housing 89 which becomes of smaller dimension as it extends rearwardly (FIGS. 1 and 3). Where the housing is wrapped around the body 12 it is designated by numeral 14.

The dispensing head 10 as seen from the front (FIG. 1) has three separate controls which are visible and exposed for use. In the upper left hand corner is the hot and cold selection switch 48, which controls the action of valve mechanism 20. In the upper right hand corner is the pushbutton switch 86 for controlling energization of the pump motor 88. In the lower right hand corner is the pushbutton 100 which is pushed for filling a drinking container with beverage through the pouring spout 106.

The motor circuit 87, switch 84, and pushbutton 86 are adequately illustrated in FIGS. 3 and 7 and need no additional description beyond that previously given.

The dispensing head contains two valve mechanisms, both schematically illustrated in FIG. 7, one being the valve mechanism 20 controlled by button 48 and the other being valve mechanism 90 controlled by button 100. While these two valve mechanisms are basically identical in structure, they differ from each other insofar as method of operation and purpose or function are concerned.

Thus the valve mechanism 20 includes an elongated rubber tube 44 which is closed at its inner end and open at its outer end. An elongated actuator rod 46 which occupies the interior of rubber tube 44 has its outer end directly connected to the operating button 48. When button 48 is pushed to its inward position the inner or rearward end of rubber tube 44 closes off the hot water inlet 36. At the same time the tube 44 has a relatively thin dimension throughout its length because of being stretched, hence cold water can flow freely from chamber 38 through the chamber 32 about the surface of rubber tube 44, and hence to the chamber 24. When operating button 48 is retracted to its outer position, the rubber tube 44 contracts and becomes thicker at its longitudinal center, thereby closing off the chamber 38 so it does not communicate with chamber 32 within which the rubber tube 44 is located. At the same time the hot water inlet 36 is opened and hot water flows from inlet 36 into the chamber 24.

Thus it will be seen that the purpose or function of valve mechanism 20 is to selectively provide fluid communication between either the cold water inlet 40 and the return outlet 60, or between the hot water inlet 36 and return outlet 60. In the first instance the recirculating beverage is driven by pump 68 through the cooler unit 74, and in the second instance it is instead driven through the heater 72.

Valve mechanism 90 (FIGS. 3 and 7) is shown in the drawings in the retracted position of the operating button 100, such as to permit the continued recirculation of beverage from the reservoir 64 to the dispensing head and hence back to the reservoir. Accordingly, rubber tube 92 is in its relaxed position, closing off access to the dispensing outlet chamber 94. Operating button 100 is retracted to its outer position and the actuator rod 98 which is rigidly connected to the button 100 is also retracted. But when the operating button 100 is pushed forward (not specifically shown in the drawings) the resulting operation is that the rearward or inner end of rubber tube 92 closes the return outlet 60, thus making it impossible for the beverage to return to the reservoir 64. The beverage instead flows from chamber 28 to chamber 30, and thence through chambers 95 and 94 to spigot 106. The operation of valve 90 is preferably such that the valve automatically releases to the position shown in the drawings, in which beverage is continuously recirculated.

Due to the function of valve means 20 it is desirable to be able to lock the valve in one or the other of its two positions. Accordingly, as shown in FIG. 2 a lug 52 is provided on the base of control button 48 within the interior of the dispensing head, and chamber 18 which receives the operating button 48 is enlarged by means of a longitudinal groove 50 and a transversely extending groove 51 into which the lug 52 may be moved and then rotated for locking. FIG. 2 shows the unlocked position of valve mechanism 20 while FIG. 7 shows the locked position. In the locked or inner position of operating button 48 the beverage is cooled, while in the released or outer position of the button the beverage is heated. The nameplate 15 (see FIG. 4) retains the valve actuators and carries the operating legend.

A thermal sensing device 26 is provided in the form of a small aluminum dish, and this dish 26 is incorporated in the left hand side of dispensing head 10 (as viewed in FIG. 1) in an appropriate opening thereof. See FIGS. 2 and 6. Beverage flows from chamber 18 (also designated in FIG. 7 as chamber 32) into chamber 24, and thence into a chamber 25 which happens to be the interior of the dish 26. From chamber 25 the beverage flows into chamber 28 and hence into chamber 30, which is coupled either to the return outlet 60 or to the dispensing outlet chamber 94, depending upon the then existing position of the dispensing valve mechanism 90 (see FIGS. 3, 6 and 7).

The fabrication of solid body 12 of the dispensing head 10 is rather simple and economical. The body is simply molded from a suitable plastic material. The switch chamber is molded in from one end and a somewhat smaller joining opening from the other end to receive the pushbutton 86 (see FIG. 3). Beneath it a parallel chamber is molded to receive the valve means 90, this chamber being enlarged at one end to form the chamber 30 and further enlarged to receive the return outlet fitting 60, and being enlarged at the other end to receive the pushbutton 100 (FIG. 3). At a still lower position an opening is molded from the front for the chamber 94, but extends only somewhat more than half the length of the body 12; an upwards opening is molded at the longitudinal center of the body to provide chamber 95, and another near the front to provide an opening for spigot 106 (FIG. 3). On the left hand side of the body 12 (as seen in FIG. 1) the chamber 18 is molded from the front end to receive valve mechanism 20, being enlarged at the front end to accept the control button 48 and

further having the grooves **50** and **51** formed therein (FIGS. **4** and **5**), and being enlarged at its other end to form the chamber **32** and then further enlarged to accept the hot water inlet coupling **36** (FIG. **4**). A vertical opening is molded from the longitudinal center of the body **14**, from its underside, to provide the chamber **38** which intercepts the chamber **18**, the lower end of chamber **38** being capped by a cap **39** which is located closely adjacent to the cap **97** of chamber **95**. A further opening is molded from the rearward end of body **14** to provide chamber **37** communicating with chamber **38** at its lower end, the outer end of chamber **37** being enlarged to accept the cold water inlet coupling **40**. From the left hand side of the body **14** (as seen in FIG. **1**) an opening **24** is molded at a relatively high level so as to connect with the chamber **18**, while an opening **28** is molded at a lower level to connect with chamber **30**. Then a larger opening is made at the outer ends of chambers **24** and **28** so as to accept the temperature sensing dish **26** in an inverted position. The sensing dish **26** is glued into the housing. Couplings **36**, **40** and **60** are glued into the housing.

METHOD OF OPERATION

In order to use the beverage dispensing system of the present invention the user must first take the dispensing head from the automobile glove compartment or other position of storage. Then he decides on either hot or cold beverage and sets the position of pushbutton **48** accordingly. If button **48** is being changed from its prior setting, then it will be necessary to utilize the thumb and finger depressions for rotating the button either to lock it or to unlock it, as the case may be. Next the user pushes the motor switch button **86** so as to start the motor and pump and thereby recirculate the liquid through the dispensing head. He then places his finger or hand in contact with the external surface of temperature sensing device **26** in order to determine what the temperature of the liquid is. During this time he continues to hold switch button **86** in a depressed position. When a satisfactory temperature level is reached he places a drinking container under the spigot **106**, and depresses pushbutton **100** so as to interrupt the recirculation of the liquid and divert its flow through the spigot. When the container is filled he releases both buttons **86** and **100**, and returns the dispensing head to its storage position.

ALTERNATE FORMS

The invention as illustrated has including both a cooler and a heater, and valve means **20** for selecting which one is to be used. It will be appreciated, however, that either the cooler or the heater may be omitted, thus rendering valve means **20** superfluous so that it may also be omitted. In that modified form of the invention the temperature sensing device **26**, motor switch pushbutton **86**, and dispensing valve pushbutton **100** operate in the same manner and for the same purposes as previously described.

I claim:

1. A beverage dispensing system comprising, in combination:

a beverage reservoir;

a pump;

a heater;

a cooler unit;

a dispensing head including a pair of inlets adapted to receive beverage from said reservoir, a return outlet adapted to return the beverage to the reservoir, and a dispensing outlet adapted to dispense beverage;

conduit means intercoupling said dispensing head return outlet, said reservoir, and said pump into a series path for circulating beverage returned from the dispensing head;

additional conduit means coupling each of said cooler unit and said heater to a respective one of said dispensing head inlets, and at the same time in parallel with each other and in series with said series path, so that beverage from said reservoir may be continuously circulated in a closed-loop path through said dispensing head;

selection valve means disposed within said dispensing head for coupling a selected one of said inlets to said return outlet; and

dispensing valve means disposed within said dispensing head adapted to divert the circulating beverage from said return outlet to flow instead through said dispensing outlet.

2. The beverage dispensing system defined in claim **1** which further includes a thermal sensor disposed in said head in thermal communication with the circulating beverage and having an external surface adapted for touch sensing of the beverage temperature.

3. The beverage dispensing system claimed in claim **1** which additionally includes an electric motor drivingly coupled to said pump, a motor switch disposed within said dispensing head, and circuit means intercoupling said switch and motor.

4. The beverage dispensing system defined in claim **1** wherein said dispensing head includes an integral solid body having a number of passageways formed therein to provide receptacles for said selection valve means and said dispensing valve means, said passageways also providing said pair of inlets, said return outlet, said dispensing outlet, and duct ways communicating therebetween.

5. The beverage dispensing system defined in claim **4** which further includes a thermal sensor disposed in said head in thermal communication with the circulating beverage and having an external surface adapted for touch sensing of the beverage temperature.

6. The beverage dispensing system claimed in claim **4** which additionally includes an electric motor drivingly coupled to said pump, a motor switch disposed within said dispensing head, and circuit means intercoupling said switch and motor.

7. The beverage dispensing system claimed in claim **5** which additionally includes an electric motor drivingly coupled to said pump, a motor switch disposed within said dispensing head, and circuit means intercoupling said switch and motor.