

BEVERAGE DISPENSING APPARATUS

5 This invention relates to a beverage dispensing apparatus, e.g. for a beverage vending machine, which dispenses selectively hot drinks and cold drinks whilst utilising flavouring ingredients and, preferably, carbonated and non-carbonated water.

10 Various types of beverage dispensing apparatus are known and used. In one of these, the cold beverages, which is produced from non-carbonated water, is brewed like a hot beverage, and then cooled. One way to cool down the hot beverage to produce the cold beverage is to add ice or cooled
15 water, but the taste of the dispensed cold beverage is diluted by the ice or water. Another way to cool down the hot beverage is to provide a refrigeration unit which chills the duct down which the hot beverage is conducted to a cup. However, since the
20 apparatus has to be provided with a refrigeration unit used solely for cooling the hot beverage, the size and cost of the machine is increased.

It is an object of this invention to provide a beverage dispensing apparatus which will selectively
25 dispense hot and cold beverages produced from hot water and cold, possibly carbonated, water; in which cooled brewed beverages are not diluted by any other water, thereby improving the taste of the dispensed beverage; and which involve only minor modification
30 to known machines.

In accordance with the invention, in a beverage dispensing apparatus including a hot beverage serving device and a cold beverage serving device for selectively dispensing hot and cold beverages, the
35 hot beverage serving device comprising a hot water supply means and a brewing element and the cold beverage serving device comprising a first cooling

5 tank, a refrigeration unit for cooling water, in use,
in the first cooling tank, a water supply line
passing through the first tank and extending, in use,
from a source of water to a cup filling station, and
a raw material supply line extending, in use, from a
source of raw material to the cup filling station,
the hot beverage serving device also comprises two
selectively usable discharge ducts, one of which is
10 arranged to conduct hot beverage from the brewing
device to a or the cup filling station, and the
second of which passes through a second cooling tank
through which, in use, water is circulated after
being cooled by passing through the first tank, the
15 second duct being arranged to conduct beverage from
the brewing element to a, the or one of the cup
filling station(s) after cooling of the beverage by
heat exchange with the water in the second cooling
tank.

20 An example, and a modification of this example,
of a beverage vending apparatus constructed in
accordance with the present invention will now be
described with reference to the accompanying
drawings, in which:-

Figure 1 is a schematic view;

25 Figure 2 is an enlarged schematic view of the
second tank; and,

Figure 3 is a schematic view of a modification to
part of the apparatus shown in Figure 1.

30 Referring to Figure 1, the dispensing apparatus
includes, all within one machine, a hot beverage
brewing serving device H and a cold beverage serving
device C for dispensing beverages selected by the
customer.

35 The hot beverage brewing device H comprises a hot
water supply tank 11 provided with an electrical
heater 111 for heating water within the tank 11 and
connectable to a water source through a magnetic

valve 12. The device H also includes a hot beverage brewing element such as, for example, a coffee brewing element 13. The hot water in the tank 11 is supplied to a cylinder 131 of the brewing element 13 containing ground coffee supplied from a coffee mill 14 to thereby extract the coffee flavour whilst it passes therethrough. A magnetic valve 15 controls the supply of the hot water, and the resulting coffee beverage is channeled into a first outlet conduit 16 for mixing with a suitable amount of sugar and/or cream, which are supplied from canisters 17 and 18, respectively. Two second outlet conduits 19, 20 are positioned below a discharge opening of the first outlet conduit 16 so that either may be selected to receive the coffee beverage. A discharge duct 191 of the conduit 19 guides the coffee beverage into a cup 21 placed at a hot beverage dispensing station, and a discharge duct 201 is the other conduit 20 passes through a cooled water tank 30 prior to guiding the coffee beverage into a cup 22 placed at a cold beverage dispensing station. The selection of to which dispensing station coffee beverage is guided leaving the first outlet conduit 16 is controlled by a magnetic solenoid 23.

The cold beverage serving device C includes a water cooling tank 40 filled with water. A cooling coil 411, which is connected to a refrigeration unit 41 to form a refrigeration circuit, is immersed in the water of the water cooling tank 40. A plain water supply line 42 has a coiled portion immersed in the cooling water tank 40 and connected to a reserve tank 43 through a pump 44. The other end of line 42 is connected, through a solenoid valve 46, to a carbonator 45 into which plain water from the reserve tank 43 is supplied by the pumping action of the pump 44. The amount of water stored in the reserve tank 43 is controlled by a solenoid valve 47.

The carbonator 45 is almost totally immersed in the water of water cooling tank 40 and is charged through a pipe line 50 with carbon dioxide gas from a cylinder 48 containing compressed carbon dioxide gas. Therefore, the plain water supplied into the carbonator 45 from reserve tank 43 is carbonated to provide highly carbonated water. The highly carbonated water exits from the carbonator 45 through a carbonated water supply line 51 which extends to a cup 22 positioned at the cold beverage dispensing station. Syrup, which is contained in a container 49, is supplied to the cup 22 through a syrup supply line 52 to produce the carbonated drink. The carbon dioxide gas contained in cylinder 48 is also introduced into the syrup container 49 through a branch line in order to pressurize the syrup. Solenoid valves 53 and 54 are located in the carbonated water supply line 51 and the syrup supply line 52 respectively, to control the supply of carbonated water and syrup into the cup 22.

The cold beverage serving device C is also provided with an ice making device 55. Plain water is supplied into this ice making device 55 from the reserve tank 43 through a supply line 56, and the ice making device 55 has an ice discharge conduit 57 for introducing ice into the cup 22.

The water in the cooled water tank 30 is supplied from the reserve tank 43 via the plain water supply line 42 and a water line 31 connected to the part of the plain water supply line 42 downstream of the coiled portion but before the solenoid valve 46. The cooled water tank 30 is also connected to the reserve tank 43 through a water return line 32 to form the heat exchanger water return circuit. The circulation of cooled water through the water line 31 is controlled by a solenoid valve 33. As is clearly shown in Figure 2, the discharge duct 201 of the

second conduit 20 has a coiled portion 202 within the cooled water tank 30 which is provided with a plurality of heat exchange fins 203 to assist the exchange of heat across the outer peripheral surface of the portion 202. In this example, the reserve tank 43 is a component of the cooling water circulating loop. Alternatively, a check valve 60 may take the place of the reserve tank, as shown in Figure 3. In this modification, the water return line 32 is connected to the plain water supply line 42 between the check valve 60 and the pump 44, to thereby complete the cooling water circulating loop for the cooled water tank 30.

If the user wants a hot beverage such as, for example, hot coffee, the hot coffee is produced by the hot beverage serving device H. The coffee beverage produced by the coffee brewing element 13 is introduced into the first conduit 16 for mixing with the desired quantities of sugar and cream. Then the coffee beverage is channeled into the cup 21 through the second conduit 19 selected by the solenoid valve 23. On the other hand, if the user wants a non-carbonated cold beverage such as, for example, cold coffee, the coffee beverage is channeled into the first conduit 16 and then on into the second conduit 20 which has been selected by the solenoid valve 23. The beverage passes through the coiled portion 202 of the discharge line 201 where it is cooled by the cold water in the cooled water tank 30. Therefore, when the coffee reaches the cup 22 is placed at the cold beverage dispensing station, it has been sufficiently cooled down.

Also, if the user wants a carbonated cold beverage, this may be produced by the cold beverage serving device C in the known manner.

As mentioned above, the non-carbonated beverage is cooled down by the cooling water within the cooled

water tank, this water being supplied from the water source and cooled down by the cold beverage serving device. Therefore, the non-carbonated beverage can be cooled down without any special cooling device having to be provided or the taste being diluted. Thus a vending machine which includes a hot beverage serving device, and a carbonated and non-carbonated cold beverage serving device may be of small size.

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CLAIMS

1. A beverage dispensing apparatus including a hot beverage serving device and a cold beverage serving device for selectively dispensing hot and cold beverages, the hot beverage serving device comprising a hot water supply means and a brewing element and the cold beverage serving device comprising a first cooling tank, a refrigeration unit for cooling water, in use, in the cooling tank, a water supply line passing through the first tank and extending, in use, from a source of water to a cup filling station, and a raw material supply line extending, in use, from a source of raw material to the cup filling station; wherein the hot beverage serving device also comprises two selectively usable discharge ducts, one of which is arranged to conduct hot beverage from the brewing device to a or the cup filling station, and the second of which passes through a second cooling tank through which, in use, water is circulated after being cooled by passing through the first tank, the second duct being arranged to conduct beverage from the brewing element to a, the or one of the cup filling station(s) after cooling of the beverage by heat exchange with the water in the second cooling tank.
2. An apparatus according to claim 1, wherein the water supply line is branched downstream of a part which passes through the first tank, one branch leading to the second tank and the other leading to the cup filling station for the cold beverage serving device.
3. An apparatus according to claim 2, wherein a return line from the second tank leads to a reserve tank which provides the water source for the water supply line.



4. An apparatus according to claim 2, wherein a return line from the second tank leads to the water supply line downstream of a check valve in the water supply line.
- 5 5. An apparatus according to any one of the preceding claims, wherein the second discharge duct has a coiled portion in the second cooling tank.
- 10 6. An apparatus according to claim 5, wherein the coiled portion of the second discharge duct is provided with a plurality of fins at its outer peripheral surface.
- 15 7. An apparatus according to any one of the preceding claims, wherein the refrigeration unit has a refrigerated coil immersed in the first tank.
- 20 8. An apparatus according to any one of the preceding claims, wherein a carbonator is positioned in the first tank and connected in the water supply line.
- 25 9. An apparatus according to any one of the preceding claims, wherein the cold beverage serving device comprises an ice making device which is arranged to supply ice to the respective cup filling station.
- 30 10. A beverage dispensing apparatus substantially as described with reference to Figures 1 and 2, or to Figures 1 and 2 as modified in accordance with Figure 3, of the accompanying drawings.