



An intelligent thermostatic tea-making machine and a method of making tea

Technical Field

The present invention relates to an intelligent thermostatic tea-making machine and a method of making tea.

Background Art

Tea is a part of Chinese traditional culture. Proper consumption of tea may facilitate body metabolism and refresh the mind. There are many kinds of tea leaves, for example green tea, white tea, yellow tea, oolong tea, black tea, red tea, blooming tea etc. in China and Sencha (simmered Japanese green tea), flavored tea, Matcha (fine powdered Japanese green tea), powdered tea, scented tea, fried tea and Genmaicha (brown rice tea) etc. in Japan. Red tea may also be classified by geographical origin, for example, Darjeeling tea and Sri Lanka tea etc. Different brewing water temperatures are required for different kinds of tea. Brewing water temperature of tea should be controlled in accordance with the characteristics of the tea to be brewed so as to fully demonstrate the color, aroma and flavor of the tea. For example, the suitable water temperature for brewing green tea is around 75 °C - 80 °C in order to prevent quick volatilization of aromatic substances in the green tea due to high temperature. The suitable water temperature for brewing white tea and yellow tea is around 80 °C - 85 °C. The suitable water temperature for brewing oolong tea is around 90 °C - 95 °C. The suitable water temperature for brewing blooming tea is around 85 °C. The suitable water temperature for brewing red tea and black tea is around 95 °C - 100 °C. If water temperature is not controlled properly, an obvious loss of taste and aroma of the tea will be resulted. Therefore, brewing water temperature of tea should be controlled in accordance with the characteristics of the tea to be brewed so as to fully demonstrate the color, aroma and flavor of the tea. In general, traditional tea-making method uses a ceramic pot in which tea leaves are put inside and hot water is then added in for brewing for a period of time to release tea color, aroma and flavor before the tea is poured out from the pot for drinking. However, the traditional method requires considerable time for brewing during which time will be wasted and brewing water temperature will vary between an overly large range. It is therefore difficult for those inexperienced in brewing tea to brew a pot of good quality tea. Although a kind of automatic tea making machine is also available in the market, this kind of machine is still not good enough in terms of temperature control and brewing method. The present invention is developed under the background as mentioned above.

Brief Description of Drawings

In view of the aforesaid disadvantages now present in the prior art, the present invention provides an intelligent thermostatic tea-making machine and a method of making tea. By using showering and steeping procedures in tea-making and maintaining the tea at a static temperature during tea-making in combination with reasonable tea-making steps, the present invention can effectively enhance tea-making efficiency. The tea brewed according to the present invention can fully demonstrate its color, aroma and flavor.

The present invention is attained as follows:



An intelligent thermostatic tea-making machine comprises a hot water tank, a brewing tank and a storage tank sequentially connected via pipes wherein the storage tank is connected with a tea drinking outlet via a first outlet pipe. The tea-making machine also comprises a controller which is provided with an operation panel. The tea-making machine is characterized in that heating plates are provided at outer bottom sides of the hot water tank, the brewing tank and the storage tank respectively for heating up the tanks. Inner bottom sides of the three tanks are provided with temperature sensors for detecting water temperature. The outer bottom side of the brewing tank is provided with a recirculation pipe to recirculate tea back to upper part of the brewing tank for re-brewing. A pump is provided on a path of recirculation. The pump, the three heating plates and the three temperature sensors are all operationally connected with the controller. The brewing tank is provided with a separation panel for separating the brewing tank into an upper cavity and a lower cavity. The separation panel is provided with a pore for communication between the upper cavity and the lower cavity. A suction end of the pump is communicated with the lower cavity of the brewing tank. A discharge end of the pump is connected with the recirculation pipe. Further, the hot water tank is provided with a water inlet pipe and a first solenoid valve for controlling open/close operation of the water inlet pipe. The outer bottom side of the hot water tank is connected with a second water outlet pipe which connects with the brewing tank and a second solenoid valve for controlling open/close operation of the second water outlet pipe. A third solenoid valve and a first suction pump are sequentially disposed along a connection pipe line from the brewing tank to the storage tank. An inlet end of the first outlet pipe is connected with a section of the connection pipe line between the third solenoid valve and the first suction pump. A fourth solenoid valve and a second suction pump are sequentially disposed in between a section from the inlet end of the first outlet pipe to the tea drinking outlet. The four solenoid valves and the two suction pumps are operationally connected with the controller. Further, on an upper inner side of the hot water tank, a water detection sensor for detecting water level is provided. The water detection sensor is operationally connected with the controller. Further, the hot water tank is also provided with an overflow pipe for safe water level control. Further, the brewing tank opens at its top side. A filter bag for holding tea leaves are mounted along top edges of top end of the brewing tank.

Further, the filter bag is a disposable cloth bag.

A method of making tea by using the intelligent thermostatic tea-making machine as disclosed by Claim 1, wherein the method comprises seven stages, namely, heating stage, showering stage, boiling stage, transporting stage, seating stage, discharging stage and drinking stage, and each stage will be specified in detail below.

a) Heating stage: Connect the tea-making machine with a power supply; the temperature sensor detects water temperature inside the hot water tank and sends data back to the controller; when the water inside the hot water tank is lower than a predetermined temperature; start heating; when the water inside the hot water tank is higher than the predetermined temperature, stop heating.

b) Showering stage: hot water heated up to the predetermined level of temperature inside the hot water tank flows into the brewing tank via the second water outlet pipe and shower onto the tea leaves; when water supply from the hot water tank reaches a predetermined duration of time, the water supply from the hot water tank stops; the showering stage is then completed.

c) Boiling stage: When the showering stage is completed, the brewing tank will start heating up; under steam pressure effect, tea rises through the pore of the separation panel and steeps the tea leaves to perform tea boiling during which the brewing tank will start heating up when temperature of the tea inside the brewing tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

d) Transporting stage: When tea boiling reaches a predetermined duration of time, the pump will start to operate; when the pump operates, the tea will be transported up to the upper part of the brewing tank from bottom part of the brewing tank via the recirculation pipe and then shower down onto the tea leaves again; repeat the above transportation procedure during which the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

e) Seating stage: When the transporting stage reaches a predetermined duration of time, the pump stops operating; the seating stage begins to seat the tea in the brewing tank; during the seating stage, the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

f) Discharging stage: When the seating stage reaches a predetermined duration of time, the brewing tank will stop heating up; the tea flows into the storage tank via the connection pipe line and being stored inside; the storage tank will start heating up when the temperature of the tea inside the storage tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the storage tank rises above the predetermined level.

g) Drinking stage: press a tea-pouring switch to pour the tea out from the storage tank via the tea drinking outlet for drinking.

The present invention has the following advantages: By using a heating plate disposed at the outer bottom side of each tank, a temperature sensor disposed at each tank to detect water temperature and give data feedback, and a controller provided to determine whether the tanks are to be heated up, a static temperature can be maintained according to predetermined temperature settings. By using a recirculation pipe and a pump, brewing procedure can be repeated. By using a separation panel in the brewing tank and disposing a pore on the separation panel, tea can be boiled and sufficiently brewed to release better flavor due to high pressure steam effect in the course of brewing tea which causes the tea to rise above to an upper cavity of the brewing tank via the pore.

The present invention is further described in detail below with reference to an embodiment and the accompanying drawings.

FIG. 1 illustrates the structure of the present invention.

FIG. 2 illustrates the operating principle of the present invention.

Best Mode for Carrying out the Invention

As shown in FIGs. 1-2, an intelligent thermostatic tea-making machine comprises a hot water tank 1, a brewing tank 2 and a storage tank 3 sequentially connected via pipes wherein the storage tank 3 is connected with a tea drinking outlet 20 via a first outlet pipe 24. The tea-making machine also comprises a controller 21 which is provided with an operation panel (not shown in the figures). Preferably, the operation panel is an assembly of control switches and LED display. Heating plates 6, 12, 17 are provided at outer bottom sides of the hot water tank 1, the brewing tank 2 and the storage tank 3 respectively for heating up the tanks. Operation of the three heating plates is controlled by relays. Inner bottom sides of the three tanks are provided with temperature sensors 15, 11, 18 for detecting water temperature. The three temperature sensors are thermal resistors encased by stainless steel. The outer bottom side of the brewing tank 2 is provided with a recirculation pipe 22 to recirculate the tea back to the upper part of the brewing tank 2 for re-brewing. A pump 9 is provided on a path of recirculation. The pump 9, the three heating plates 6, 12, 17 and the three temperature sensors 15, 11, 18 are all operationally connected with a port 21a of the controller 21. The brewing tank 2 is provided with a separation panel 10 for separating the brewing tank into an upper cavity and a lower cavity. The separation panel 10 is provided with a pore 10a for communication between the upper cavity and the lower cavity. A suction end of the pump 9 is communicated with the lower cavity of the brewing tank 2. A discharge end of the pump 9 is connected with the recirculation pipe 22.

The hot water tank 1 is provided with a water inlet pipe 4 and a first solenoid valve 5 for controlling open/close operation of the water inlet pipe. The water inlet pipe 4 can introduce tap water. The outer bottom side of the hot water tank 1 is connected with a second water outlet pipe 23 which connects with the brewing tank 2 and a second solenoid valve 7 for controlling open/close operation of the second water outlet pipe. A third solenoid valve 13 and a first suction pump 16 are sequentially disposed along a connection pipe line from the brewing tank 2 to the storage tank 3. An inlet end of the first outlet pipe 24 is connected with a section of the connection pipe line between the third solenoid valve 13 and the first suction pump 16. A fourth solenoid valve 14 and a second suction pump 19 are sequentially disposed in between a section from the inlet end of the first outlet pipe 24 to the tea drinking outlet 20. The four solenoid valves 5, 7, 13, 14 and the two suction pumps 16, 19 are operationally connected with the port 21a of the controller 21. On an upper inner side of the hot water tank 1, a water detection sensor 8 for detecting water level is provided. The water detection sensor 8 is operationally connected with the controller 21. The water detection sensor 8 determines presence of water by detecting electrical resistance between the tank and the water detection sensor. The hot water tank 1 is also provided with an overflow pipe 25 for maintaining a safe pressure level of the hot water tank by automatic overflow of water to reduce pressure when water reaches a predetermined water level. The brewing tank 2 opens at its top side for convenient

input of tea leaves. A filter bag 11 for holding tea leaves are mounted along the top edges of the top end of the brewing tank 2. The filter bag 11 can be a disposable cloth bag.

Operation of the present invention can be divided into seven stages, namely, heating stage, showering stage, boiling stage, transporting stage, seating stage, discharging stage and drinking stage. Each stage will be specified in detail below.

Heating stage: Connect the tea-making machine with a power supply to activate the tea-making machine so that the water detection sensor 8 is ready for detection; when it is detected that water is present, the temperature sensor 15 will get ready for detection and at the same time the hot water tank 1 will start heating up; the controller 21 will receive real time data feedback from the temperature sensor 15; when water inside the hot water tank is higher than a predetermined temperature, stop heating; when the water inside the hot water tank is lower than the predetermined temperature; start heating; when the water detection sensor 8 does not detect any presence of water, the first solenoid valve 5 will open and allow inlet of water into the hot water tank 1; when the water detection sensor 8 detects the presence of water; the first solenoid valve 5 will close and the temperature sensor 15 will get ready for detection while the hot water tank 1 will start heating up at the same time; the controller 21 will receive real time data feedback from the temperature sensor 15; when the water inside the hot water tank is higher than the predetermined temperature, stop heating; when the water inside the hot water tank is lower than the predetermined temperature; start heating.

Showering stage: Open the second solenoid valve 7; hot water heated up to the predetermined level of temperature will then flow into the brewing tank 2 from the hot water tank 1 via the second water outlet pipe 23 and shower onto the tea leaves; when water supply from the hot water tank 1 reaches a predetermined duration of time, stop the water supply; the showering stage is then completed.

Boiling stage: When the showering stage is completed, the brewing tank 2 will start heating up; under steam pressure effect, tea rises through the pore 10a of the separation panel 10 and steeps the tea leaves to perform tea boiling during which the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

Transporting stage: When tea boiling reaches a predetermined duration of time, the pump 9 will start to operate; when the pump 9 operates, tea will be transported up to the upper part of the brewing tank 2 from the lower cavity of the brewing tank 2 via the recirculation pipe 22 and then shower down onto the tea leaves again; the tea that has showered down onto the tea leaves will then flow back to lower cavity of the brewing tank 2 via the pore 10a of the separation panel 10; repeat the above transportation procedure during which the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

Seating stage: When the transporting stage reaches a predetermined duration of time, the pump 9 stops operating; the seating stage begins to seat the tea in the brewing tank; during the seating stage, the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level.

Discharging stage: When the seating stage reaches a predetermined duration of time, the brewing tank 2 will stop heating up; the third solenoid valve 13 and the first suction pump 16 will then open; the tea flows into the storage tank via the connection pipe line; the storage tank will start heating up when the temperature of the tea inside the storage tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the storage tank rises above the predetermined level.

Drinking stage: press a tea-pouring switch on the operation panel; the fourth solenoid valve 14 will open; the second suction pump 19 will also open at a predetermined time delay; the tea will then flow out for drinking from the storage tank 3 via the first outlet pipe 24 and the tea drinking outlet 20.

When all the tea inside the storage tank 3 is discharged, the operation of the tea-making machine goes back to the heating stage and the stages thereafter will then be repeated again.

The intelligent thermostatic tea-making machine may be an integral structure which is conveniently moveable, or it may be a tea supplying system fixedly mounted on a specific place.

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CLAIMS

1. An intelligent thermostatic tea-making machine comprises a hot water tank (1), a brewing tank (2) and a storage tank (3) sequentially connected via pipes wherein the storage tank (3) is connected with a tea drinking outlet (20) via a first outlet pipe (24); the tea-making machine also comprises a controller (21) which is provided with an operation panel; the tea-making machine is characterized in that heating plates (6, 12, 17) are provided at outer bottom sides of the hot water tank (1), the brewing tank (2) and the storage tank (3) respectively for heating up the tanks; inner bottom sides of the three tanks are provided with temperature sensors (15, 11, 18) for detecting water temperature; the outer bottom side of the brewing tank (2) is provided with a recirculation pipe (22) to recirculate tea back to upper part of the brewing tank (2) for re-brewing; a pump (9) is provided on a path of recirculation; the pump (9), the three heating plates (6, 12, 17) and the three temperature sensors (15, 11, 18) are all operationally connected with the controller (21); the brewing tank (2) is provided with a separation panel (10) for separating the brewing tank into an upper cavity and a lower cavity; the separation panel (10) is provided with a pore (10a) for communication between the upper cavity and the lower cavity; a suction end of the pump (9) is communicated with the lower cavity of the brewing tank (2); a discharge end of the pump (9) is connected with the recirculation pipe (22).
2. The intelligent thermostatic tea-making machine as in Claim 1, wherein the hot water tank (1) is provided with a water inlet pipe (4) and a first solenoid valve (5) for controlling open/close operation of the water inlet pipe; the outer bottom side of the hot water tank (1) is connected with a second water outlet pipe (23) which connects with the brewing tank (2) and a second solenoid valve (7) for controlling open/close operation of the second water outlet pipe; a third solenoid valve (13) and a first suction pump (16) are sequentially disposed along a connection pipe line from the brewing tank (2) to the storage tank (3); an inlet end of the first outlet pipe (24) is connected with a section of the connection pipe line between the third solenoid valve (13) and the first suction pump (16); a fourth solenoid valve (14) and a second suction pump (19) are sequentially disposed in between a section from the inlet end of the first outlet pipe (24) to the tea drinking outlet (20); the four solenoid valves (5, 7, 13, 14) and the two suction pumps (16, 19) are operationally connected with the controller (21).
3. The intelligent thermostatic tea-making machine as in Claim 1 or 2, wherein on an upper inner side of the hot water tank (1), a water detection sensor (8) for detecting water level is provided; the water detection sensor (8) is operationally connected with the controller (21).
4. The intelligent thermostatic tea-making machine as in Claim 1 or 2, wherein the hot water tank (1) is also provided with an overflow pipe (25) for safe water level control.
5. The intelligent thermostatic tea-making machine as in Claim 1 or 2, wherein the brewing tank (2) opens at its top side; a filter bag (11) for holding tea leaves are mounted along top edges of top end of the brewing tank (2).
6. The intelligent thermostatic tea-making machine as in Claim 4, wherein the filter bag (11) is a disposable cloth bag
7. A method of making tea by using the intelligent thermostatic tea-making machine as in Claim 1, wherein the method comprises seven stages, namely, heating stage, showering stage, boiling stage,

transporting stage, seating stage, discharging stage and drinking stage, and each stage is specified as follows:

- a) Heating stage: Connect the tea-making machine with a power supply; the temperature sensor detects water temperature inside the hot water tank and sends data back to the controller; when the water inside the hot water tank is lower than a predetermined temperature; start heating; when the water inside the hot water tank is higher than the predetermined temperature, stop heating;
- b) Showering stage: hot water heated up to the predetermined level of temperature inside the hot water tank flows into the brewing tank via the second water outlet pipe and shower onto the tea leaves; when water supply from the hot water tank reaches a predetermined duration of time, the water supply from the hot water tank stops; the showering stage is then completed;
- c) Boiling stage: When the showering stage is completed, the brewing tank will start heating up; under steam pressure effect, tea rises through the pore of the separation panel and steeps the tea leaves to perform tea boiling during which the brewing tank will start heating up when temperature of the tea inside the brewing tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level;
- d) Transporting stage: When tea boiling reaches a predetermined duration of time, the pump will start to operate; when the pump operates, the tea will be transported up to the upper part of the brewing tank from bottom part of the brewing tank via the recirculation pipe and then shower down onto the tea leaves again; repeat the above transportation procedure during which the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level;
- e) Seating stage: When the transporting stage reaches a predetermined duration of time, the pump stops operating; the seating stage begins to seat the tea in the brewing tank; during the seating stage, the brewing tank will start heating up when the temperature of the tea inside the brewing tank drops below the predetermined level and will stop heating up when the temperature of the tea inside the brewing tank rises above the predetermined level;
- f) Discharging stage: When the seating stage reaches a predetermined duration of time, the brewing tank will stop heating up; the tea flows into the storage tank via the connection pipe line and being stored inside; the storage tank will start heating up when the temperature of the tea inside the storage tank drops below a predetermined level and will stop heating up when the temperature of the tea inside the storage tank rises above the predetermined level;
- g) Drinking stage: press a tea-pouring switch to pour the tea out from the storage tank via the tea drinking outlet for drinking.