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(54) **HIGH-TEMPERATURE BOILING METHOD FOR DOUBLE-TUBE WASHING MACHINE, AND COMPUTER-READABLE STORAGE MEDIUM, CONTROL DEVICE AND LAUNDRY EQUIPMENT**

(57) A high-temperature boiling method, a computer-readable storage medium and a control device, which aim to solve the problem of excessive amounts of steam escaping when two washing tubes of an existing double-tube washing machine simultaneously perform high-temperature boiling for disinfection. By means of the high-temperature boiling method, when the temperature of washing water in a first washing tube (1) is extremely high and a large amount of steam is generated, a valve port corresponding to the first washing tube can be blocked by means of a three-way valve (3); and when the temperature of the washing water in the first washing tube (1) is reduced and an extremely small amount of steam or no steam is generated, a valve port corresponding to a second washing tube (2) in which the temperature of washing water continues to rise is blocked in time, thereby preventing, when the temperature of the washing water in the second washing tube (2) is extremely high and a large amount of steam is generated, the steam in the washing tube from escaping randomly. Therefore, the amount of escaping steam is effectively reduced when both washing tubes of a double-tube washing machine perform a high-temperature boiling procedure, thereby preventing adverse effects from occurring in a decorative environment and a visual environment of the house of a user caused by the amount of steam escaping from the double-tube washing machine.

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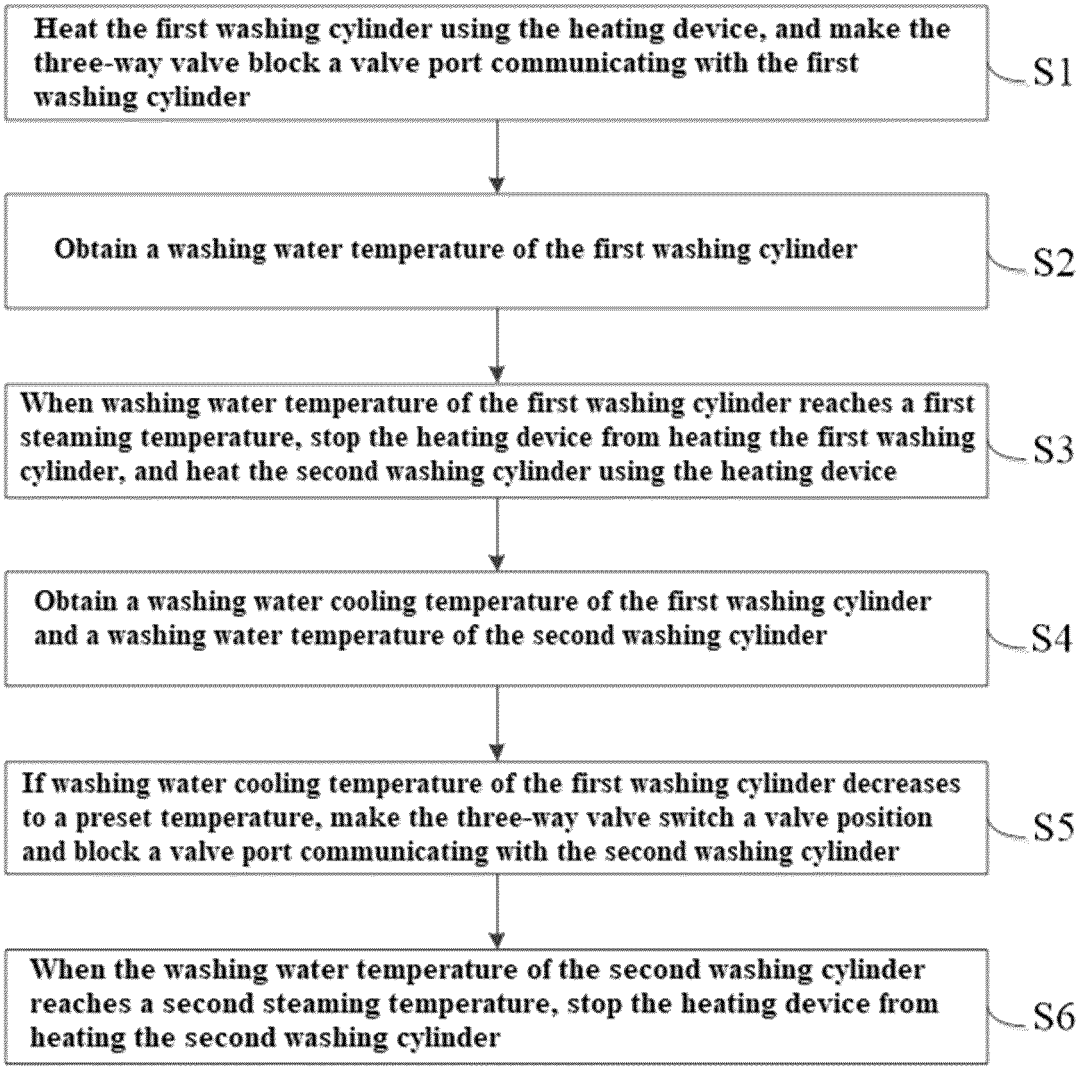
Heat the first washing cylinder using the heating device, and make the three-way valve block a valve port communicating with the first washing cylinder
S1
Obtain a washing water temperature of the first washing cylinder
S2
When washing water temperature of the first washing cylinder reaches a first steaming temperature, stop the heating device from heating the first washing cylinder, and heat the second washing cylinder using the heating device
S3
Obtain a washing water cooling temperature of the first washing cylinder and a washing water temperature of the second washing cylinder
S4
If washing water cooling temperature of the first washing cylinder decreases to a preset temperature, make the three-way valve switch a valve position and block a valve port communicating with the second washing cylinder
S5
When the washing water temperature of the second washing cylinder reaches a second steaming temperature, stop the heating device from heating the second washing cylinder
S6

FIG.2

Description

FIELD OF THE INVENTION

[0001] The present disclosure belongs to the technical field of clothing treatment apparatus, and specifically relates to a high-temperature steaming method for a dual-cylinder washing machine, a computer-readable storage medium, a control device, and a clothing washing apparatus.

BACKGROUND OF THE INVENTION

[0002] In order to meet classified washing needs and large washing capacity needs of users, some washing machines are provided with two washing cylinders, both of which can hold washing water and objects to be washed to achieve the purpose of dual-cylinder washing. When the washing machine has the function of high-temperature steaming and disinfection, the washing water in the two washing cylinders of the washing machine is usually heated to a higher temperature to achieve the purpose of steaming and disinfecting the objects to be washed. When both washing cylinders need to execute the high-temperature steaming program, in order to prevent a working power of the washing machine from being too large, which will make it difficult to adapt to safety current limiting conditions of most users' homes, the washing water in the two washing cylinders is usually heated in turn for high-temperature steaming. However, due to the high heating temperature of the washing water set in the high-temperature steaming program, the dual-cylinder washing machine will spray a large amount of water vapor for a long time when executing the high-temperature steaming program, which can very easily cause damage to walls, furniture and other household apparatuses at a position where the dual-cylinder washing machine is placed in the user's home due to long-time exposure to moisture. Moreover, if an arrangement space of the dual-cylinder washing machine is relatively closed, a large amount of water vapor will also reduce a visibility of the arrangement space, thus reducing the visibility for users in the arrangement space, which poses a hidden safety hazard.

[0003] Accordingly, there is a need for a new high-temperature steaming method for a dual-cylinder washing machine, a computer-readable storage medium and a control device in the art to solve the above problem.

[0004] Existing washing machines typically have multiple functions, such as washing, high-temperature steaming and disinfection, drying, etc., so as to meet various clothing treatment needs. Since this type of multi-functional washing machine has both an air duct assembly for drying clothing and a washing and heating assembly for washing, steaming, and disinfecting clothing, and an air supply channel of the air duct assembly needs to be communicated with a washing cylinder of the washing and heating assembly to achieve air supply, steam or foam generated when washing clothing in the washing cylinder or steaming clothing at high temperature can very easily diffuse along the air supply channel to a fan position of the air duct assembly, thus eroding the fan and affecting a service life of the fan.

[0005] Existing washing machines are usually provided with an exhaust channel or a foam overflow channel to guide the steam or foam overflowing from the washing cylinder and discharge the steam or form to the outside of the washing machine. However, on one hand, the steam has uncertainty during flowing, and it is impossible to ensure that all the steam can flow only along the exhaust channel; on the other hand, when there is a large amount of foam overflowing, some foam may not be discharged through the foam overflow channel in time; therefore, the arrangement of the exhaust channel and/or the foam overflow channel cannot reliably ensure that the steam or foam will not flow to the fan position.

[0006] Accordingly, there is a need for a new clothing washing apparatus in the art to solve the above problem.

SUMMARY OF THE INVENTION

First technical solution

[0007] In order to solve the above problem in the prior art, that is, to solve the problem of excessive water vapor escaping from the existing dual-cylinder washing machines when two washing cylinders are performing high-temperature steaming and disinfecting simultaneously, the present disclosure provides a high-temperature steaming method for a dual-cylinder washing machine; the dual-cylinder washing machine includes a first washing cylinder, a second washing cylinder, a three-way valve, an air duct, and a heating device capable of heating washing water in the first washing cylinder and the second washing cylinder; the first washing cylinder and the second washing cylinder are respectively communicated with the air duct through the three-way valve; and the high-temperature steaming method includes: heating the first washing cylinder using the heating device, and making the three-way valve block a valve port communicating with the first washing cylinder; obtaining a washing water temperature of the first washing cylinder; when the washing water temperature of the first washing cylinder reaches a first steaming temperature, stopping the heating device from heating the first washing cylinder, and heating the second washing cylinder using the heating device; obtaining a washing water cooling temperature of the first washing cylinder and a washing water temperature of the second washing cylinder; if the washing water cooling temperature of the first washing cylinder decreases to a preset temperature, then making the three-way valve switch a valve position and block a valve port communicating with the second washing cylinder; and when the washing water temperature of the second washing cylinder reaches a second steaming temperature, stopping the heating device from heating the second washing cyl-

inder.

[0008] In a preferred technical solution of the high-temperature steaming method described above, the high-temperature steaming method further includes: if the washing water cooling temperature of the first washing cylinder is higher than the preset temperature and the washing water temperature of the second washing cylinder is within a set temperature range, then temporarily stopping the heating device from heating the second washing cylinder; obtaining the washing water cooling temperature of the first washing cylinder again; and in a case where the washing water cooling temperature of the first washing cylinder decreases to the preset temperature, continuing to heat the second washing cylinder using the heating device, where a largest temperature value in the set temperature range is smaller than or equal to the preset temperature.

[0009] In a preferred technical solution of the high-temperature steaming method described above, the preset temperature is any temperature between 50°C and 60°C.

[0010] In a preferred technical solution of the high-temperature steaming method described above, the set temperature range is 40°C to 50°C.

[0011] In a preferred technical solution of the high-temperature steaming method described above, the high-temperature steaming method further includes: in a case where the washing water cooling temperature of the first washing cylinder is higher than the preset temperature and the washing water temperature of the second washing cylinder increases to the preset temperature, if the washing water cooling temperature of the first washing cylinder decreases to be lower than or equal to the washing water temperature of the second washing cylinder, then making the three-way valve switch the valve position and block the valve port communicating with the second washing cylinder.

[0012] In a preferred technical solution of the high-temperature steaming method described above, the step of "making the three-way valve block a valve port communicating with the first washing cylinder" includes: in a case where the washing water of the first washing cylinder is heated by the heating device and the valve port communicating with the second washing cylinder is blocked by the three-way valve, if the washing water temperature of the first washing cylinder reaches the preset temperature, then making the three-way valve block the valve port communicating with the first washing cylinder; and in a case where the washing water of the first washing cylinder is heated by the heating device and the valve port communicating with the first washing cylinder is blocked by the three-way valve, making the three-way valve maintain the state of blocking the valve port communicating with the first washing cylinder.

[0013] In a preferred technical solution of the high-temperature steaming method described above, the first steaming temperature is higher than 90°C.

[0014] In a preferred technical solution of the high-temperature steaming method described above, the second steaming temperature is equal to the first steaming temperature.

[0015] The present disclosure also provides a computer-readable storage medium on which a plurality of program codes are stored, and the program codes are suitable for being loaded and run by a processor to execute any of the above high-temperature steaming methods.

[0016] The present disclosure also provides a control device which includes a processor and a storage device; the storage device is suitable for storing a plurality of program codes, and the program codes are suitable for being loaded and run by the processor to execute any of the above high-temperature steaming methods.

[0017] It can be understood by those skilled in the art that in the high-temperature steaming method of the present disclosure, during the process of heating the first washing cylinder and the second washing cylinder in turn, through the cooperation with switching the blocking position of the valve ports of the three-way valve, an overall steam escape amount of the two washing cylinders can be reduced. When the washing water temperature of the first washing cylinder is extremely high and a large amount of steam is generated, the corresponding valve port is blocked by the three-way valve; when the washing water temperature of the first washing cylinder decreases, and there is very little or no steam generated, the valve port corresponding to the second washing cylinder where the washing water temperature rises continuously is blocked in time, so that when the washing water temperature of the second washing cylinder is extremely high and a large amount of steam can be generated, the steam in the washing cylinder can be prevented from escaping randomly, thus greatly reducing the overall amount of steam escaping from the dual-cylinder washing machine when both washing cylinders are performing the high-temperature steaming program, and effectively eliminating the adverse effects of the steam escaping from the dual-cylinder washing machine on the decoration environment and visual environment of users' homes.

Second technical solution

[0018] In order to solve the above problem in the prior art, that is, to solve the problem that existing washing machines are not able to completely prevent steam or foam from flowing to the fan position by providing an exhaust channel or a foam overflow channel, the present disclosure provides a clothing washing apparatus, which includes a cylinder assembly, an air inflow pipe, an air outflow assembly and a steam and foam overflow pipe; the air inflow pipe and the air outflow assembly are both communicated with the cylinder assembly, and a fan is arranged in the air inflow pipe; an overflow port is formed on the air inflow pipe between the fan and the cylinder assembly, and the overflow port is communicated with the outside through the steam and foam overflow pipe; a rotary damper assembly is arranged in the air inflow pipe at a position near the overflow port, and the damper

assembly is arranged such that in a ventilation situation, the damper assembly is in a position that closes the overflow port so as to allow the air inflow pipe to supply air to the cylinder assembly, and that in a non-ventilation situation, the damper assembly is in a position that blocks the air inflow pipe.

[0019] In a preferred technical solution of the clothing washing apparatus described above, the damper assembly includes a baffle pivotally connected to an inner wall of the air inflow pipe and located on an upstream side of the overflow port; the baffle can be closed in the non-ventilation situation so as to block the air inflow pipe and open the overflow port, and can be blown open and rotated by an airflow in the ventilation situation so as to shield the overflow port.

[0020] In a preferred technical solution of the clothing washing apparatus described above, a free end of the baffle is provided with a counterweight block, which enables the baffle to be closed under the action of gravity in the non-ventilation situation, so as to block the air inflow pipe.

[0021] In a preferred technical solution of the clothing washing apparatus described above, the damper assembly further includes a limiting structure arranged on the inner wall of the air inflow pipe, and the baffle abuts against a leeward side of the limiting structure in a closed state.

[0022] In a preferred technical solution of the clothing washing apparatus described above, the limiting structure is a first magnetic attraction member, a free end of the baffle is provided with a second magnetic attraction member, and a magnetic attraction action between the first magnetic attraction member and the second magnetic attraction member can urge the baffle to be closed in the non-ventilation situation.

[0023] In a preferred technical solution of the clothing washing apparatus described above, the damper assembly further includes a torsion spring and a rotating shaft; the baffle is pivotally connected to the inner wall of the air inflow pipe through the rotating shaft, and the torsion spring is arranged on the rotating shaft; the torsion spring can urge the baffle to be closed in the non-ventilation situation under the action of its own elastic force, and can be elastically twisted by an airflow during ventilation so as to open and rotate the baffle to shield the overflow port.

[0024] In a preferred technical solution of the clothing washing apparatus described above, the air outflow assembly includes a siphon pipe, as well as a clothing treatment agent dispenser and a water inflow pipe of the clothing washing apparatus; an inlet of the water inflow pipe is communicated with the clothing treatment agent dispenser, an outlet of the water inflow pipe is communicated with the cylinder assembly, and the siphon pipe is arranged to be capable of discharging water from the water inflow pipe in the ventilation situation, so that the water inflow pipe is communicated with the outside.

[0025] In a preferred technical solution of the clothing washing apparatus described above, the water inflow pipe is a U-shaped water inflow pipe, and the siphon pipe is communicated with a bottom of a transverse section of the U-shaped water inflow pipe.

[0026] In a preferred technical solution of the clothing washing apparatus described above, the steam and foam overflow pipe is communicated with the outside through the siphon pipe.

[0027] In a preferred technical solution of the clothing washing apparatus described above, the cylinder assembly includes a first washing cylinder and a second washing cylinder, an air outflow end of the air inflow pipe is provided with a three-way valve, a first air inflow branch, and a second air inflow branch, and the three-way valve is arranged downstream of the overflow port; the first air inflow branch communicates a first outlet of the three-way valve with the first washing cylinder, and the second air inflow branch communicates a second outlet of the three-way valve with the second washing cylinder; the first washing cylinder and the second washing cylinder are each communicated with the air outflow assembly and the steam and foam overflow pipe respectively.

[0028] It can be understood by those skilled in the art that the air inflow pipe of the clothing washing apparatus of the present disclosure is provided with an overflow port between the fan and the cylinder assembly, and a damper assembly located upstream of the overflow port; the overflow port is communicated with the outside through the steam and foam overflow pipe, and the damper assembly can close the overflow port in the ventilation situation and allow the air inflow pipe to supply air to the cylinder assembly, and can block a position between the overflow port that is closed inside the air inflow pipe and the fan in the non-ventilation situation. Through the above arrangement, the damper assembly can isolate the fan from the overflow port and cylinder assembly downstream of the air inflow pipe when the clothing washing apparatus generates steam and/or foam. Even if there is steam and/or foam flowing toward the fan, it will be blocked by the damper assembly and discharged through the steam and foam overflow pipe. At the same time, air supply into the cylinder assembly will not be affected when the clothing washing apparatus is in the ventilation situation and does not generate steam and/or foam.

[0029] Preferably, the damper assembly includes a baffle pivotally connected to an inner wall of the air inflow pipe and located on an upstream side of the overflow port; the baffle can be closed in the non-ventilation situation so as to block the air inflow pipe, and can be blown open and rotated by an airflow in the ventilation situation so as to shield the overflow port, so that during ventilation of the clothing washing apparatus, the wind blown out when the fan operates can be used as a driving force for the rotation of the baffle; in this way, there is no need to additionally provide a driving device in the clothing washing apparatus to drive the rotation of the baffle, and the air duct structure of the clothing washing apparatus itself is combined with the rotation requirement of the baffle to

achieve the purpose of switching the position of the baffle. The design is clever and can avoid increasing the complexity of the internal structure and control logic of the clothing washing apparatus.

[0030] Further, the free end of the baffle is provided with a counterweight block, which can urge the baffle to rotate under the action of gravity when the clothing washing apparatus enters the non-ventilation state, so that the baffle reaches a position that can block the air inflow pipe.

[0031] Further, the damper assembly further includes a limiting structure arranged on the inner wall of the air inflow pipe, and the baffle abuts against a leeward side of the limiting structure in a closed state. By providing this limiting structure, on one hand, the baffle can be quickly reset to the position that blocks the air inflow pipe when the clothing washing apparatus enters the non-ventilation situation, thus preventing the baffle from swinging left and right when it rotates and avoiding the long time required for resetting; on the other hand, the limiting structure can also prevent the baffle from rotating upstream when the steam pressure forces the baffle or the foam pushes the baffle, and prevent the baffle from rotating excessively due to the steam pressure or foam pushing, which would otherwise make it impossible to completely block the air inflow pipe, thus ensuring the reliability of the baffle blocking the air inflow pipe.

[0032] Further, the limiting structure is a first magnetic attraction member, the free end of the baffle is provided with a second magnetic attraction member, and a magnetic attraction action between the first magnetic attraction member and the second magnetic attraction member can urge the baffle to maintain the state of blocking the air inflow pipe, so that the reliability of the baffle when closing the air inflow pipe is improved.

[0033] Alternatively, the damper assembly further includes a torsion spring and a rotating shaft; the baffle is pivotally connected to the inner wall of the air inflow pipe through the rotating shaft, and the torsion spring is arranged on the rotating shaft; the torsion spring can urge the baffle to be closed in the non-ventilation situation under the action of its own elastic force, and can be elastically twisted by the airflow during ventilation so as to open and rotate the baffle to shield the overflow port, so that the resetting efficiency of the baffle when blocking the air inflow pipe and the reliability of the baffle maintaining the state of closing the air inflow pipe can be improved.

[0034] Preferably, the air outflow assembly includes a siphon pipe, as well as a clothing treatment agent dispenser and a water inflow pipe of the clothing washing apparatus. By providing the air inflow pipe and the siphon pipe, water of a water seal formed by injecting water into the cylinder assembly in the water inflow pipe can be discharged through the siphon pipe, so that when the clothing washing apparatus is in the ventilation situation after completion of washing, the cylinder assembly is communicated with the outside through the clothing treatment agent dispenser, and the water inflow pipe and the clothing treatment agent dispenser are used to discharge air. By combining the air outflow assembly with the clothing washing apparatus's own pipe structure, a pipeline system structure inside the clothing washing apparatus can be simplified and a footprint of the clothing washing apparatus can be reduced.

[0035] Further, the above water inflow pipe is a U-shaped water inflow pipe, and the siphon pipe is communicated with a bottom of a transverse section of the U-shaped water inflow pipe, so that the siphon pipe can completely drain the water from the U-shaped water inflow pipe when the clothing washing apparatus is in the ventilation situation, thus avoiding water residue in the U-shaped water inflow pipe.

BRIEF DESCRIPTION OF DRAWINGS

First technical solution

[0036] Preferred embodiments of the first technical solution of the present disclosure will be described below with reference to the accompanying drawings. In the drawings:

FIG. 1 is a schematic view of an internal structure of a dual-cylinder washing machine according to the first technical solution of the present disclosure; and

FIG. 2 is a flowchart illustrating steps of a high-temperature steaming method for the dual-cylinder washing machine according to the first technical solution of the present disclosure.

[0037] List of reference signs in the first technical solution of the present disclosure: 1: first washing cylinder; 2: second washing cylinder; 3: three-way valve; 4: air duct; 5: fan.

Second technical solution

[0038] FIG. 3 is a route view when a clothing washing apparatus according to the second technical solution of the present disclosure discharges overflowing steam and/or foam in a non-ventilation situation;

[0039] FIG. 4 is a schematic view of an airflow of the clothing washing apparatus according to the second technical solution of the present disclosure in a ventilation situation;

[0040] FIG. 5 is a state view when a water seal is formed in a water inflow pipe of the clothing washing apparatus according to the second technical solution of the present disclosure;

[0041] FIG. 6 is a state view when water in the water seal position is discharged from the water inflow pipe of the clothing washing apparatus according to the second technical solution of the present disclosure; and

[0042] FIG. 7 is a state view when the water inflow pipe of the clothing washing apparatus according to the second technical solution of the present disclosure is venti-

lated.

[0043] List of reference signs in the second technical solution of the present disclosure: 1: cylinder assembly; 11: first washing cylinder; 12: second washing cylinder; 2: air inflow pipe; 21: fan; 22: overflow port; 23: three-way valve; 24: first air inflow branch; 25: second air inflow branch; 3: air outflow assembly; 31: water inflow pipe; 32: clothing treatment agent dispenser; 33: siphon pipe; 4: steam and foam overflow pipe; 5: damper assembly.

DETAILED DESCRIPTION OF EMBODIMENT(S) OF THE INVENTION

First technical solution

[0044] It should be understood by those skilled in the art that in the description of the present disclosure, although various steps of the control method of the present disclosure are described in specific orders in the present application, these orders are not restrictive. Without deviating from the basic principles of the present disclosure, those skilled in the art can execute the steps in different orders.

[0045] In view of the problem pointed out in the "BACKGROUND OF THE INVENTION" that excessive water vapor escapes from the existing dual-cylinder washing machines when two washing cylinders are performing the high-temperature steaming program simultaneously, the present disclosure provides a high-temperature steaming method for a dual-cylinder washing machine, which aims to reduce the overall amount of steam escaping from the dual-cylinder washing machine when both washing cylinders are performing the high-temperature steaming program, and eliminate the adverse effects of the steam escaping from the dual-cylinder washing machine on the decoration environment and visual environment of users' homes.

[0046] First, reference is made to FIG. 1, which is a schematic view of an internal structure of a dual-cylinder washing machine of the present disclosure. As shown in FIG. 1, the dual-cylinder washing machine of the present disclosure includes a shell, as well as a first washing cylinder 1, a second washing cylinder 2, a three-way valve 3, an air duct 4 and a heating device (not shown in the figure) that are arranged inside the shell. A fan 5 is arranged inside the air duct 4, and an air outlet of the air duct 4 is communicated with a valve port of the three-way valve 3 for air inflow. A first valve port of the three-way valve 3 for air outflow is communicated with the first washing cylinder 1 (hereinafter, the valve port of the three-way valve 3 that is communicated with the first washing cylinder 1 is collectively referred to as the first valve port), and a second valve port of the three-way valve 3 for air outflow is communicated with the second washing cylinder 2 (hereinafter, the valve port of the three-way valve 3 that is communicated with the second washing cylinder 2 is collectively referred to as the second valve port). A valve spool of the three-way valve 3 can switch between a blocking position of the first valve port and a blocking position of the second valve port, so that an airflow in the air duct 4 can selectively enter the first washing cylinder 1 and the second washing cylinder 2 for ventilation or drying. The heating device includes a first heating unit capable of heating washing water in the first washing cylinder 1 and a second heating unit capable of heating washing water in the second washing cylinder 2. The above-mentioned three-way valve 3 is any valve device that can selectively block any of the first valve port and the second valve port, such as a wax motor three-way valve. The first heating unit and the second heating unit mentioned above can be any type of heating apparatus that can meet the heating needs of washing water. The first heating unit includes a heating module and a temperature control module, the heating module achieves the purpose of heating the washing water in the first washing cylinder 1, and the temperature control module can at least control the heating module to be turned off when the washing water in the first washing cylinder 1 is heated to an expected temperature. A basic structure of the second heating unit is the same as that of the first heating unit, but considering that the first washing cylinder 1 and the second washing cylinder 2 do not need to be heated simultaneously, the temperature control module of the second heating unit and the temperature control module of the first heating unit are preferably configured into one piece. Specifically, the first heating unit or the second heating unit can heat the water in the first washing cylinder 1 or the second washing cylinder 2 by heating the first washing cylinder 1 or the second washing cylinder 2; for example, the heating module of the first heating unit or the second heating unit can be an electromagnetic heating device, and at least part of the structure of the first washing cylinder 1 or the second washing cylinder 2 is made of a metal material, so that a cylinder body of the first washing cylinder 1 or the second washing cylinder 2 can be subjected to a magnetic field generated by the electromagnetic heating device, thus generating an eddy current effect and producing heat, and transferring the heating energy to the water in the first washing cylinder 1 or the second washing cylinder 2, thereby achieving the effect of heating the washing water. Alternatively, the first heating unit or the second heating unit can protrude into the first washing cylinder 1 or the second washing cylinder 2 in a way that does not affect the rotation of the first washing cylinder 1 or the second washing cylinder 2 so as to heat the washing water in the first washing cylinder 1 or the second washing cylinder 2; for example, the heating module of the first heating unit or the second heating unit is an electric wire heating device that protrudes into the interior of the first washing cylinder 1 or the second washing cylinder 2 in a way that does not affect the rotation of the first washing cylinder 1 or the second washing cylinder 2, so that the electric wire heating device directly enters the washing water in the first washing cylinder 1 or the second washing cylinder 2 and heats the washing water. The specific structures and ar-

rangement positions of the first heating unit and the second heating unit can be the same or different, as long as the first heating unit and the second heating unit can meet the washing water heating needs of the first washing cylinder 1 and the second washing cylinder 2 correspondingly.

[0047] The high-temperature steaming method of the present disclosure will be described below in connection with the above dual-cylinder washing machine.

[0048] Next, reference is made to FIG. 2, which is a flowchart illustrating steps of the high-temperature steaming method for the dual-cylinder washing machine of the present disclosure. As shown in FIG. 2, the high-temperature steaming method for the dual-cylinder washing machine of the present disclosure includes:

[0049] Step S 1: heating the first washing cylinder 1 using the first heating unit of the heating device, and making the three-way valve 3 block the first valve port;

[0050] Step S2: obtaining a washing water temperature of the first washing cylinder 1;

[0051] Step S3: when the washing water temperature of the first washing cylinder 1 reaches a first steaming temperature, stopping the first heating unit from heating the first washing cylinder 1, and heating the second washing cylinder 2 using the second heating unit;

[0052] Step S4: obtaining a washing water cooling temperature of the first washing cylinder 1 and a washing water temperature of the second washing cylinder 2;

[0053] Step S5: if the washing water cooling temperature of the first washing cylinder 1 decreases to a preset temperature, then making the three-way valve 3 switch a valve position and block the valve port that communicates with the second washing cylinder 2; and

[0054] Step S6: when the washing water temperature of the second washing cylinder 2 reaches a second steaming temperature, stopping the second heating unit from heating the second washing cylinder 2.

[0055] In the above steps, the "washing water temperature of the first washing cylinder 1" is the temperature of the washing water in the first washing cylinder 1 when being heated, and the "washing water temperature of the second washing cylinder 2" is the temperature of the washing water in the second washing cylinder 2 when being heated. The "first steaming temperature" is a highest temperature to which the washing water inside the first washing cylinder 1 can increase after being heated during the high-temperature steaming program, and the "second steaming temperature" is a highest temperature to which the washing water inside the second washing cylinder 2 can increase after being heated during the high-temperature steaming program. The set values of the first steaming temperature and the second steaming temperature can be the same or different. Those skilled in the art can set the specific temperature values of the first steaming temperature and the second steaming temperature according to the steaming and disinfection needs. Exemplarily, the first steaming temperature is a temperature value larger than 90°C, and the second steaming temperature is the same as the first steaming temperature. For example, the first steaming temperature and the second steaming temperature are both 95°C. The first heating unit stops working when the washing water in the first washing cylinder 1 is heated to 95°C, and at the same time, the second heating unit starts heating the washing water in the second washing cylinder 2 until the washing water in the second washing cylinder 2 is heated to 95°C, thus completing the heating work in the high-temperature steaming program. The "washing water cooling temperature of the first washing cylinder 1" is the temperature of the washing water in a cooling process of the first washing cylinder 1 after heating is completed. The "preset temperature" is an expected reduced temperature value set for the washing water cooling temperature of the first washing cylinder 1. When the washing water cooling temperature of the first washing cylinder 1 decreases to this expected reduced temperature value, the amount of steam generated by the washing water in the first washing cylinder 1 is relatively small, and a small amount of steam escapes from the first washing cylinder 1, and then condenses and evaporates to disappear during the process of escaping from the interior of the dual-cylinder washing machine to the outside. Even if a very small amount of steam can escape from the dual-cylinder washing machine, the escaping steam will dissipate into the air very quickly, and the influence on the decoration environment and visual environment can be negligible. Preferably, the above preset temperature is any temperature value between 50°C and 60°C (including 50°C and 60°C), such as 60°C. The temperature parameters required to be obtained, such as the above first washing water temperature, the second washing water temperature, and the washing water cooling temperature of the first washing cylinder 1, can all be obtained through temperature acquisition devices such as temperature sensors arranged inside the corresponding washing cylinders.

[0056] Through the above steps, the time when the washing water in the first washing cylinder 1 decreases to the preset temperature can be used as the timing for the three-way valve 3 to switch the blocking position of the valve spool, so that when the washing water temperature of the first washing cylinder 1 is relatively high and there is a large amount of steam generated, the steam escaping from the washing cylinder is blocked, thus preventing a large amount of steam from escaping from the first washing cylinder 1 to the outside of the dual-cylinder washing machine; and when the washing water temperature of the first washing cylinder 1 decreases and the amount of steam generated is low so that it is almost impossible for the steam to escape to the outside of the dual-cylinder washing machine, a valve spool position switch operation of the three-way valve 3 is performed so that the second valve port is blocked by the valve spool; in this way, before the washing water temperature of the second washing cylinder 2 rises to a higher temperature and the amount of steam generated increases

sharply, the channel of the washing cylinder from which the steam can escape is blocked. By switching the three-way valve 3 at the set timing, a large amount of steam escaping from the first washing cylinder 1 and a large amount of steam escaping from the second washing cylinder 2 are sequentially blocked, thereby maximally reducing the total amount of steam escaping from the first washing cylinder 1 and the second washing cylinder 2 during the process of executing the entire high-temperature steaming program.

[0057] In a possible embodiment, a temperature rising rate of the washing water in the second washing cylinder 2 can be controlled by adjusting a heating power for the washing water in the second washing cylinder 2. In the high-temperature steaming program, an output power of the second heating unit can be appropriately increased or decreased according to a decreasing rate of the washing water cooling temperature of the first washing cylinder 1, thereby increasing or decreasing an increasing rate of the washing water temperature of the second washing cylinder 2, so that when the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, the washing water in the second washing cylinder 2 is controlled to be heated to a temperature not exceeding the preset temperature. In a preferred situation, when the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, the washing water temperature of the second washing cylinder 2 just increases to the preset temperature, which can not only ensure an overall heating efficiency of the first washing cylinder 1 and the second washing cylinder 2, but also can control the three-way valve 3 to timely switch the valve spool from the first valve port to the second valve port when there is no steam obviously escaping from the washing water in the first washing cylinder 1 and a large amount of steam is about to escape from the washing water in the second washing cylinder 2, so that the valve ports corresponding to each washing cylinder can be in a closed state when a large amount of steam is generated in both washing cylinders, thus effectively reducing the overall amount of escaping steam. Of course, in addition to controlling the heating power of the second heating unit, those skilled in the art can also estimate or control the temperature rising rate of the washing water in the second washing cylinder 2 based on the volume of the washing water in the second washing cylinder 2.

[0058] In another possible embodiment, the high-temperature steaming method for the dual-cylinder washing machine of the present disclosure further includes:

if the washing water cooling temperature of the first washing cylinder 1 is higher than the preset temperature and the washing water temperature of the second washing cylinder 2 is within a set temperature range, then temporarily stopping the second heating unit from heating the second washing cylinder 2;

obtaining the washing water cooling temperature of the first washing cylinder 1 again; and

in a case where the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, continuing to heat the second washing cylinder 2 using the second heating unit, where a largest temperature value in the set temperature range is smaller than or equal to the preset temperature.

[0059] In the above steps, the temperature values within the set temperature range are all close to and smaller than the preset temperature. Before the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, once the washing water temperature of the second washing cylinder 2 increases to be within the set temperature range, by controlling the second heating unit to stop working temporarily, the washing water temperature of the second washing cylinder 2 can be temporarily stopped from continuing to rise, so as to prevent a large amount of steam from beginning to escape from the second washing cylinder 2 to the outside before the three-way valve 3 switches the valve spool to the blocking position of the second valve port. When the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, the three-way valve 3 controls the valve spool to block the second valve port; at this time, the second heating unit continues to heat the washing water in the second washing cylinder 2. After this, even if the washing water temperature of the second washing cylinder 2 increases beyond the set temperature range very quickly or even exceeds the preset temperature, the large amount of steam gradually increasing in the second washing cylinder 2 will be blocked by the valve spool and cannot escape to the outside. The above set temperature range is preferably 40°C to 50°C.

[0060] In further another possible embodiment, the high-temperature steaming method for the dual-cylinder washing machine of the present disclosure further includes:

in a case where the washing water cooling temperature of the first washing cylinder 1 is higher than the preset temperature and the washing water temperature of the second washing cylinder 2 increases to the preset temperature, if the washing water cooling temperature of the first washing cylinder 1 decreases to be lower than or equal to the washing water temperature of the second washing cylinder 2, then making the three-way valve 3 switch the valve position and block the valve port communicating with the second washing cylinder 2.

[0061] In the above steps, if the washing water temperature of the second washing cylinder 2 has already increased to the preset temperature before the washing water cooling temperature of the first washing cylinder 1 decreases to the preset temperature, a large amount of steam can each escape from the washing water in the

first washing cylinder 1 and the washing water in the second washing cylinder 2. In this case, if the washing water cooling temperature of the first washing cylinder 1 decreases to be lower than or equal to the washing water temperature of the second washing cylinder 2, it indicates that the washing water temperature of the second washing cylinder 2 is higher and more steam is generated. At this time, there is no need to wait for the washing water cooling temperature of the first washing cylinder 1 to decrease to the preset temperature; instead, the three-way valve 3 is directly controlled to switch the valve spool from the blocking position of the first valve port to the blocking position of the second valve port, thereby blocking the second washing cylinder 2 from which more steam can escape. If the washing water cooling temperature of the first washing cylinder 1 is higher than the washing water temperature of the second washing cylinder 2, then the state in which the three-way valve 3 blocks the first valve port is maintained, thereby blocking the first washing cylinder 1 from which more steam can escape.

[0062] Based on any of the above embodiments, the step of "making the three-way valve 3 block the first valve port" includes:

in a case where the washing water of the first washing cylinder 1 is heated by the first heating unit and the second valve port is blocked by the three-way valve 3 (i.e., when heating the washing water of the first washing cylinder 1, the valve spool of the three-way valve 3 is not in the blocking position of the first valve port), if the washing water temperature of the first washing cylinder 1 reaches the preset temperature, then making the three-way valve 3 switch the blocking position of the valve spool from the second valve port to the first valve port; and

in a case where the washing water of the first washing cylinder 1 is heated by the first heating unit and the first valve port is blocked by the three-way valve 3 (i.e., when heating the washing water of the first washing cylinder 1, the valve spool of the three-way valve 3 is already in the blocking position of the first valve port), making the three-way valve 3 maintain the state of blocking the first valve port.

[0063] Of course, in the first case mentioned above, the time when the washing water temperature of the first washing cylinder 1 reaches the preset temperature is only the latest timing for the three-way valve 3 to switch the blocking position of the valve spool to the first valve port. In actual operation, before the washing water temperature of the first washing cylinder 1 does not exceed the preset temperature, the three-way valve 3 can also switch the valve spool to the position of blocking the first valve port at any time.

[0064] Further, the present disclosure also provides a computer-readable storage medium.

[0065] In an embodiment of the computer-readable storage medium according to the present disclosure, the computer-readable storage medium can be configured to store a program for executing the high-temperature steaming method for a dual-cylinder washing machine according to the above method embodiment, and the program can be loaded and run by a processor to implement the above high-temperature steaming method. For facilitating description, only the parts related to the embodiments of the present disclosure are shown. As to specific technical details that are not disclosed, reference may be made to the method embodiment of the present disclosure. The computer-readable storage medium can be a storage medium formed by various electronic devices; optionally, the storage medium in the embodiments of the present disclosure is a non-temporary computer-readable storage medium.

[0066] Further, the present disclosure also provides a control device.

[0067] In an embodiment of the control device according to the present disclosure, the control device includes a processor and a storage device; the storage device can be configured to store a program for executing the high-temperature steaming method for a dual-cylinder washing machine according to the above method embodiment, the processor can be configured to execute the program in the storage device, and the program includes but is not limited to a program for executing the high-temperature steaming method according to the above method embodiment. For facilitating description, only the parts related to the embodiments of the present disclosure are shown. As to specific technical details that are not disclosed, reference may be made to the method embodiment of the present disclosure. The control device may be a control device including various electronic devices.

Second technical solution

[0068] It should be understood by those skilled in the art that these embodiments are only used to explain the technical principles of the present disclosure, and are not intended to limit the scope of protection of the present disclosure. Those skilled in the art can make adjustments to the embodiments as needed so as to adapt to specific application scenes. For example, although the present disclosure is described in connection with the structure of a dual-cylinder clothing washing apparatus, this is not restrictive. The clothing washing apparatus of the present disclosure can be any kind of clothing washing apparatus with fan isolation need and steam/foam overflow need, such as a single-cylinder clothing washing apparatus, an integrated clothing and shoe washing apparatus, etc.

[0069] It should be noted that in the description of the present disclosure, terms indicating directional or positional relationships, such as "upper", "lower", "inner", "outer" and the like, are based on the directional or positional relationships shown in the accompanying drawings. They are only used for ease of description, and do

not indicate or imply that the device or element must have a specific orientation, or be constructed or operated in a specific orientation; therefore, they should not be considered as limitations to the present disclosure. In addition, terms "first" and "second" are only used for descriptive purposes, and should not be interpreted as indicating or implying relative importance.

[0070] In addition, it should also be noted that in the description of the present disclosure, unless otherwise clearly specified and defined, terms "install", "connect" and "connection" should be understood in a broad sense; for example, the connection may be a fixed connection, or may also be a detachable connection, or an integral connection; it may be a mechanical connection, or an electrical connection; it may be a direct connection, or an indirect connection implemented through an intermediate medium, or it may be internal communication between two elements. For those skilled in the art, the specific meaning of the above terms in the present disclosure can be interpreted according to specific situations.

[0071] As shown in FIGS. 3 to 7, arrows in FIG. 3 indicate a route of steam and/or foam flowing out of the clothing washing apparatus, and arrows in FIG. 4 indicate air inflow and outflow routes of the clothing washing apparatus. The clothing washing apparatus of the present disclosure includes a shell, as well as a cylinder assembly 1, a water inflow pipe 31 and clothing treatment agent dispensers 32 that are arranged inside the shell. The cylinder assembly 1 includes a first washing cylinder 11 and a second washing cylinder 12. The water inflow pipe 31 is connected between the clothing treatment agent dispensers 32 and the first washing cylinder 11, the second washing cylinder 12. For example, the water inflow pipe 31 includes a first water inflow branch and a second water inflow branch, each of which is connected between one of the clothing treatment agent dispensers 32 and one of the washing cylinders respectively; alternatively, an inlet of the first water inflow branch and an inlet of the second water inflow branch are respectively communicated with the same clothing treatment agent dispenser 32, an outlet of the first water inflow branch is communicated with the first washing cylinder 11, and an outlet of the second water inflow branch is communicated with the second washing cylinder 12, so that external water can flow into the first washing cylinder 11 and the second washing cylinder 12 respectively through the first water inflow branch and the second water inflow branch after flowing through the clothing treatment agent dispenser 32 to mix with the clothing treatment agent (in order to ensure a straightforward display of an internal pipeline arrangement of the clothing washing apparatus, the water inflow pipe 31 is only represented as one pipeline structure and only one clothing treatment agent dispenser 32 is shown in FIGS. 3 and 4; however, the water inflow pipe 31 in FIGS. 3 and 4 is actually connected between the first washing cylinder 11, the second washing cylinder 12 and the clothing treatment agent dispensers 32, and can inject water into the first washing cylinder 11 and the second washing cylinder 12 respectively). The clothing washing apparatus of the present disclosure further includes an air inflow pipe 2, a steam and foam overflow pipe 4, and a siphon pipe 33. A main pipe body of the air inflow pipe 2 is provided therein with a fan 21. At an air outflow end of the air inflow pipe 2, a three-way valve 23, a first air inflow branch 24 and a second air inflow branch 25 are arranged downstream of the fan 21. An inlet of the three-way valve 23 is communicated with the main pipe body of the air inflow pipe 2, a first outlet of the three-way valve 23 is communicated with the first washing cylinder 11 through the first air inflow branch 24, and a second outlet of the three-way valve 23 is communicated with the second washing cylinder 12 through the second air inflow branch 25, so that the fan 21 can cooperate with a valve switching action of the three-way valve 23 to supply air to the first washing cylinder 11 or the second washing cylinder 12. An overflow port 22 is arranged between the fan 21 on the air inflow pipe 2 and the three-way valve 23. The overflow port 22 is communicated with the outside through the steam and foam overflow pipe 4, so that the steam and foam in the first washing cylinder 11 and/or the second washing cylinder 12 can flow to the outside through the steam and foam overflow pipe 4 after overflowing to the air inflow pipe 2. A main pipeline of the above water inflow pipe 31 is substantially arranged in a transverse direction. After injecting water into the first washing cylinder 11 or the second washing cylinder 12, the water inflow pipe 31 can form a water seal inside the pipe through the residual water during injection. The siphon pipe 33 is connected with the water inflow pipe 31 and is arranged to be capable of discharging the water at the water seal position of the water inflow pipe 31 in a ventilation situation, so that the water inflow pipe 31 is communicated with the outside. In this way, the airflow inside the first washing cylinder 11 and the second washing cylinder 12 can be discharged to the outside through the water inflow pipe 31 and the clothing treatment agent dispensers 32. Specifically, when the number of the clothing treatment agent dispensers 32 is one, the water inflow ends of the first water inflow branch and the second water inflow branch are both communicated with the clothing treatment agent dispenser 32 through a section of main water inflow pipe. The water seal is formed at the position of the main water inflow pipe, and the siphon pipe 33 is communicated with the main water inflow pipe. When the number of the clothing treatment agent dispensers 32 is two, the first water inflow branch and the second water inflow branch are respectively communicated with one of the clothing treatment agent dispensers 32. Water seals are formed in the first water inflow branch and the second water inflow branch respectively. In order to adapt to the structure of the two water inflow branches, two branch pipes that can suction water can be arranged at a suction end of the siphon pipe 33 so as to achieve its connection with the two water inflow branches. On this basis, a rotary damper assembly 5 is arranged inside the air inflow pipe 2 at a position near the overflow port 22.

The damper assembly 5 is arranged such that in the ventilation situation, the damper assembly 5 is in a position that closes the overflow port 22 so as to allow the air inflow pipe 2 to supply air to the cylinder assembly 1, and that in the non-ventilation situation, the damper assembly 5 is in a position that blocks the air inflow pipe 2.

[0072] The effects achieved by the above structure will be further described below using an example in which only one clothing treatment agent dispenser 32 is arranged as described above: when the clothing washing apparatus is in the non-ventilation situation, for example, when the clothing washing apparatus is in a working condition in which there is no need to supply air to the first washing cylinder 11 and the second washing cylinder 12 such as washing, rinsing and high-temperature steaming, the water inflow pipe 31 (mainly at the main water inflow pipe position) will form a water seal due to the injection of water into the first washing cylinder 11 and the second washing cylinder 12. The water inflow pipe 31 is not communicated with the outside, and the damper assembly 5 is in a position that blocks the air inflow pipe 2, thus isolating the fan 21 from the overflow port 22. At this time, the overflow port 22 is in an unclosed state. In a case where the three-way valve 23 blocks the first outlet or the second outlet, if the washing cylinder corresponding to the other unclosed outlet of the three-way valve 23 generates steam and foam in the washing/high-temperature steaming working condition, the steam and the foam that is not defoamed will enter the air inflow pipe 2 through the air inflow branch corresponding to this washing cylinder. At this time, the blocking effect of the damper assembly 5 prevents the steam and foam from flowing to the position of the fan 21 to contact the fan 21. The arrangement of the overflow port 22 allows the steam and foam to flow out to the outside from the steam and foam overflow pipe 4, while the position of the clothing treatment agent dispenser 32 will not allow the steam and foam to flow out through the clothing treatment agent dispenser 32 due to the blocking effect of the water seal in the water inflow pipe, thus preventing the steam and foam from increasing a fouling state of the clothing treatment agent dispenser 32.

[0073] When the clothing washing apparatus is in the ventilation situation, for example, when the clothing washing apparatus is in a working condition in which it is required to supply air to the first washing cylinder 11 or the second washing cylinder 12 such as cylinder drying or clothing drying, the fan 21 operates to introduce external air into the first washing cylinder 11 or the second washing cylinder 12 through the air inflow pipe 2. The air in the first washing cylinder 11 or the second washing cylinder 12 enters the first water inflow branch or the second water inflow branch, and causes a water level at the water seal position to rise through the action of air pressure until the water level rises to a siphoning trigger position of the siphon pipe 33 to induce a siphoning phenomenon. The siphon pipe 33 discharges the water from the water inflow pipe 31, so that the water seal in the water inflow pipe 31 is released. The air in the first washing cylinder 11 or the second washing cylinder 12 can be discharged to the outside through the water inflow pipe 31 and the clothing treatment agent dispenser 32. After the fan starts working, the damper assembly 5 rotates from the position that blocks the air inflow pipe 2 and is in the position that closes the overflow port 22, so that a passage is formed inside the air inflow pipe 2, thus allowing the air inflow pipe 2 to supply air to the cylinder assembly 1, while also preventing the airflow from directly escaping to the outside through the overflow port 22.

[0074] In the above embodiment, the arrangement of the damper assembly 5 can prevent the steam and foam from flowing along the air inflow pipe 2 to the position of the fan 21 to erode a motor, so that the clothing washing apparatus can export the steam and foam flowing out from the first washing cylinder 11 or the second washing cylinder 12 through the cooperation of the damper assembly 5 and the steam and foam overflow pipe 4. At the same time, the first washing cylinder 11 or the second washing cylinder 12 can be selectively communicated with the outside through the water seals at the positions of the siphon pipe 33 and the water inflow pipe 31. At the same time of blocking the steam and foam from overflowing from the clothing treatment agent dispenser 32 through the water seals, the first washing cylinder 11 and the second washing cylinder 12 can also be communicated with the outside through the clothing treatment agent dispenser 32 in the ventilation situation so as to discharge air. The air discharge need and steam and foam diversion need of the clothing washing apparatus under different working conditions are met by using one pipe for multiple purposes and switching the blocking position of the damper assembly 5. The pipeline system has low complexity and strong practicability.

[0075] As to the above, it should be noted that although the air outflow assembly 3 of the above clothing washing apparatus is described in connection with the siphon pipe 33, the water inflow pipe 31 and the clothing treatment agent dispenser 32, this is not restrictive. In a case of allowing an increase in the number of pipelines inside the clothing washing apparatus, the air outflow assembly 3 can also be an air outflow pipe arranged independently of the water inflow pipe 31 and connected between the first washing cylinder 11, the second washing cylinder 12 and the outside. In this case, there is no need to provide the siphon pipe 33 for the clothing washing apparatus. In addition, the number of the washing cylinders of the above cylinder assembly 1 is not limited to two. When the number of the cylinder assembly 1 is one or more than two, the arrangement of branch structures of the water inflow pipe 31 and the air inflow pipe 2 near the position of the cylinder assembly 1 can be changed accordingly.

[0076] In a possible case, the above damper assembly 5 includes a baffle arranged inside the air inflow pipe 2. The baffle is connected with a driving device so that under a driving action of the driving device, the baffle rotates

between a position of blocking the air inflow pipe 2 and a position of closing the overflow port 22. The driving device can include a driving member such as a motor, and transmission members that meet the power transmission need, such as rack-and-pinion.

[0077] In a preferred case, according to the orientations of FIGS. 3 and 4, the above damper assembly 5 includes a baffle pivotally connected to an inner wall of the air inflow pipe 2 and located on an upstream side of the overflow port 22 (i.e., on a left side of the overflow port 22 in FIGS. 3 and 4). In the non-ventilation situation, the baffle naturally falls down under the action of gravity and is in a closed state to block the air inflow pipe 2. In the ventilation situation, the baffle is blown open by an airflow blown out of the fan 21 and rotates counterclockwise to the right to shield the overflow port 22, thereby opening the air inflow pipe 2 and allowing air to be introduced into the air inflow pipe 2 for ventilation. After the fan 21 finishes working, the baffle is reset under the action of gravity without the need for additional driving device to drive it rotate and switch position. The switching of the baffle between two closed positions can be achieved merely by relying on the airflow blown out when the fan 21 is working and the natural falling-back effect when there is no airflow.

[0078] Preferably, a counterweight block is provided at a free end of the baffle. The counterweight block can enhance the gravity effect of the baffle, reduce the difficulty of resetting the baffle to the position of blocking the air inflow pipe 2, and can urge the baffle to be quickly closed under the action of gravity in the non-ventilation situation so as to timely block the air inflow pipe 2. The above counterweight block can be a block structure independently arranged on the baffle, or can be integrated with the baffle, such as by increasing a thickness of the free end of the baffle (which is opposite to the pivotal connection end of the baffle).

[0079] More preferably, the above damper assembly 5 further includes a limiting structure arranged on the inner wall of the air inflow pipe 2; the limiting structure is arranged on an upstream side of the baffle, and the baffle can abut against a leeward side of the limiting structure (i.e., the side away from the fan 21) in the closed state, so as to prevent the baffle from failing to be reset timely due to excessive back-rotating under inertial action and long swing time when the baffle is reset to the position of blocking the air inflow pipe 2, and prevent the baffle from rotating clockwise to the left under the action of air pressure or the pushing of foam when the steam and foam enter the air inflow pipe 2, which would otherwise lead to loose blocking of the air inflow pipe 2, thereby improving the resetting efficiency of the baffle and the reliability of the baffle when blocking the air inflow pipe 2.

[0080] In a preferred embodiment, the limiting structure is a first magnetic attraction member, the free end of the baffle is provided with a second magnetic attraction member, and a magnetic attraction action between the first magnetic attraction member and the second magnetic attraction member can urge the baffle to be closed in the non-ventilation situation. In this case, the above embodiment in which the counterweight block is provided can also be replaced with this set of magnetic attraction members. The first magnetic attraction member and the second magnetic attraction member can be any combination of magnetic members that can attract each other through the magnetic attraction effect, such as magnet and magnetic metal, magnet and magnet, etc.

[0081] Alternatively, the above damper assembly 5 further includes a torsion spring and a rotating shaft; the baffle is pivotally connected to the inner wall of the air inflow pipe 2 through the rotating shaft, and the torsion spring is arranged on the rotating shaft; the torsion spring can urge the baffle to be closed in the non-ventilation situation under the action of its own elastic force, and can be elastically twisted by the airflow during ventilation so as to open and rotate the baffle to shield the overflow port 22.

[0082] It can be understood by those skilled in the art that the specific structural form of the above damper assembly 5 is not limited, as long as the arrangement of the damper assembly 5 can meet the blocking requirement of the air inflow pipe 2, the closing requirement of the overflow port 22, and the rotation switching requirement of the baffle between the position of blocking the air inflow pipe 2 and the position of closing the overflow port 22.

[0083] Preferably, the above water inflow pipe 31 can be arranged in the following way: a part of the pipe body of the water inflow pipe 31 near the clothing treatment agent dispenser 32 is provided as a U-shaped water inflow pipe 31, and the siphoning trigger position of the siphon pipe 33 is higher than an outlet of the U-shaped water inflow pipe 31. When the clothing washing apparatus is washing normally, water is first injected into the first washing cylinder 11 and the second washing cylinder 12. External water (usually coming from tap water) enters the clothing treatment agent dispenser 32, and then enters the U-shaped water inflow pipe 31 through an inlet of the U-shaped water inflow pipe 31. A water level in the U-shaped water inflow pipe 31 continuously rises, and water enters the first washing cylinder 11 and the second washing cylinder 12 through the outlet of the U-shaped water inflow pipe 31, a first water outflow branch, and a second water outflow branch. Since the siphoning trigger position of the siphon pipe 33 is higher than the outlet of the U-shaped water inflow pipe 31, based on the principle of the communicating vessels, the water in the U-shaped water inflow pipe 31 can only enter the first washing cylinder 11 and the second washing cylinder 12 without causing the siphon pipe 33 to trigger the siphoning phenomenon; after the water injection is completed, water is stored in the U-shaped water inflow pipe 31 and completely closes a transverse section and at least part of a vertical section of the U-shaped water inflow pipe 31, that is, the U-shaped water inflow pipe 31 is water sealed (as shown in FIG. 5). When the clothing washing apparatus

is in the ventilation situation, the fan 21 is turned on, and external air is introduced into the air inflow pipe 2 by the fan 21. Then, the air enters the first washing cylinder 11 or the second washing cylinder 12. The air in the first washing cylinder 11 or the second washing cylinder 12 will enter the U-shaped water inflow pipe 31 through the outlet of the U-shaped water inflow pipe 31, and under the action of air pressure, the air will exert a downward pressure to the water in the U-shaped water inflow pipe 31, so that the water level in the siphon pipe 33 rises (as shown in FIG. 6) until it reaches the siphoning trigger position. The siphon pipe 33 discharges the water from the U-shaped water inflow pipe 31, thus releasing the water seal in the U-shaped water inflow pipe 31, so that the air can enter the clothing treatment agent dispenser 32 through the inlet of the U-shaped water inflow pipe 31, and finally be discharged to the outside (as shown in FIG. 7).

[0084] In a preferred case, the siphon pipe 33 is communicated with a bottom of the transverse section of the U-shaped water inflow pipe 31, so that when the clothing washing apparatus is ventilated, the water in the U-shaped water inflow pipe 31 can be completely drained, thus avoiding residue.

[0085] Preferably, the steam and foam overflow pipe 4 is connected to a water outflow section of the siphon pipe 33, so that the steam and foam can be discharged to the outside through the siphon pipe, and there is no need to additionally arrange a pipe to independently discharge the steam and foam, thus further reducing the layout complexity of the pipeline system.

[0086] In the above embodiments, alternatively, the U-shaped water inflow pipe 31 can also be replaced with a V-shaped water inflow pipe or other structures. Those skilled in the art can flexibly set the shape and structural form of the water inflow pipe 31 in practical applications based on an internal layout space of the drum washing machine. Such adjustments and changes to the shape and structural form of the water inflow pipe 31 do not constitute limitations to the present disclosure, and they should all be defined within the scope of protection of the present disclosure.

[0087] Hitherto, the technical solutions of the present disclosure have been described in connection with the preferred embodiments shown in the accompanying drawings, but it is easily understood by those skilled in the art that the scope of protection of the present disclosure is obviously not limited to these specific embodiments. Without departing from the principles of the present disclosure, those skilled in the art can make equivalent changes or replacements to relevant technical features, and all the technical solutions after these changes or replacements will fall within the scope of protection of the present disclosure.

Claims

1. A high-temperature steaming method for a dual-cylinder washing machine, wherein the dual-cylinder washing machine comprises a first washing cylinder, a second washing cylinder, a three-way valve, an air duct, and a heating device capable of heating washing water in the first washing cylinder and the second washing cylinder, and the first washing cylinder and the second washing cylinder are respectively communicated with the air duct through the three-way valve;
   the high-temperature steaming method comprises:

   heating the first washing cylinder using the heating device, and making the three-way valve block a valve port communicating with the first washing cylinder;
   obtaining a washing water temperature of the first washing cylinder;
   when the washing water temperature of the first washing cylinder reaches a first steaming temperature, stopping the heating device from heating the first washing cylinder, and heating the second washing cylinder using the heating device;
   obtaining a washing water cooling temperature of the first washing cylinder and a washing water temperature of the second washing cylinder;
   if the washing water cooling temperature of the first washing cylinder decreases to a preset temperature, then making the three-way valve switch a valve position and block a valve port communicating with the second washing cylinder; and
   when the washing water temperature of the second washing cylinder reaches a second steaming temperature, stopping the heating device from heating the second washing cylinder.

2. The high-temperature steaming method according to claim 1, further comprising:

   if the washing water cooling temperature of the first washing cylinder is higher than the preset temperature and the washing water temperature of the second washing cylinder is within a set temperature range, then temporarily stopping the heating device from heating the second washing cylinder;
   obtaining the washing water cooling temperature of the first washing cylinder again; and
   in a case where the washing water cooling temperature of the first washing cylinder decreases to the preset temperature, continuing to heat the second washing cylinder using the heating device, wherein
   a largest temperature value in the set tempera-

ture range is smaller than or equal to the preset temperature.

3. The high-temperature steaming method according to claim 2, wherein the preset temperature is any temperature between 50°C and 60°C.

4. The high-temperature steaming method according to claim 2, wherein the set temperature range is 40°C to 50°C.

5. The high-temperature steaming method according to claim 1, further comprising:
in a case where the washing water cooling temperature of the first washing cylinder is higher than the preset temperature and the washing water temperature of the second washing cylinder increases to the preset temperature, if the washing water cooling temperature of the first washing cylinder decreases to be lower than or equal to the washing water temperature of the second washing cylinder, then making the three-way valve switch the valve position and block the valve port communicating with the second washing cylinder.

6. The high-temperature steaming method according to claim 1, wherein the step of "making the three-way valve block a valve port communicating with the first washing cylinder" comprises:

in a case where the washing water of the first washing cylinder is heated by the heating device and the valve port communicating with the second washing cylinder is blocked by the three-way valve, if the washing water temperature of the first washing cylinder reaches the preset temperature, then making the three-way valve block the valve port communicating with the first washing cylinder; and
in a case where the washing water of the first washing cylinder is heated by the heating device and the valve port communicating with the first washing cylinder is blocked by the three-way valve, making the three-way valve maintain the state of blocking the valve port communicating with the first washing cylinder.

7. The high-temperature steaming method according to claim 1, wherein the first steaming temperature is higher than 90°C.

8. The high-temperature steaming method according to claim 7, wherein the second steaming temperature is equal to the first steaming temperature.

9. A computer-readable storage medium, on which a plurality of program codes are stored, wherein the program codes are suitable for being loaded and run by a processor to execute the high-temperature steaming method according to any one of claims 1 to 8.

10. A control device, which comprises a processor, and a storage device suitable for storing a plurality of program codes, wherein the program codes are suitable for being loaded and run by the processor to execute the high-temperature steaming method according to any one of claims 1 to 8.

11. A clothing washing apparatus, wherein the clothing washing apparatus comprises a cylinder assembly, an air inflow pipe, an air outflow assembly and a steam and foam overflow pipe;

the air inflow pipe and the air outflow assembly are both communicated with the cylinder assembly, and a fan is arranged in the air inflow pipe; an overflow port is formed on the air inflow pipe between the fan and the cylinder assembly, and the overflow port is communicated with the outside through the steam and foam overflow pipe; a rotary damper assembly is arranged in the air inflow pipe at a position near the overflow port, and the damper assembly is arranged such that in a ventilation situation, the damper assembly is in a position that closes the overflow port so as to allow the air inflow pipe to supply air to the cylinder assembly, and that in a non-ventilation situation, the damper assembly is in a position that blocks the air inflow pipe.

12. The clothing washing apparatus according to claim 11, wherein the damper assembly comprises a baffle pivotally connected to an inner wall of the air inflow pipe and located on an upstream side of the overflow port; the baffle can be closed in the non-ventilation situation so as to block the air inflow pipe and open the overflow port, and can be blown open and rotated by an airflow in the ventilation situation so as to shield the overflow port.

13. The clothing washing apparatus according to claim 12, wherein a free end of the baffle is provided with a counterweight block, which enables the baffle to be closed under the action of gravity in the non-ventilation situation, so as to block the air inflow pipe.

14. The clothing washing apparatus according to claim 12, wherein the damper assembly further comprises a limiting structure arranged on the inner wall of the air inflow pipe, and the baffle abuts against a leeward side of the limiting structure in a closed state.

15. The clothing washing apparatus according to claim 14, wherein the limiting structure is a first magnetic attraction member, a free end of the baffle is provided

with a second magnetic attraction member, and a magnetic attraction action between the first magnetic attraction member and the second magnetic attraction member can urge the baffle to be closed in the non-ventilation situation.

16. The clothing washing apparatus according to claim 14, wherein the damper assembly further comprises a torsion spring and a rotating shaft; the baffle is pivotally connected to the inner wall of the air inflow pipe through the rotating shaft, and the torsion spring is arranged on the rotating shaft; the torsion spring can urge the baffle to be closed in the non-ventilation situation under the action of its own elastic force, and can be elastically twisted by an airflow during ventilation so as to open and rotate the baffle to shield the overflow port.

17. The clothing washing apparatus according to any one of claims 11 to 16, wherein the air outflow assembly comprises a siphon pipe, as well as a clothing treatment agent dispenser and a water inflow pipe of the clothing washing apparatus; an inlet of the water inflow pipe is communicated with the clothing treatment agent dispenser, an outlet of the water inflow pipe is communicated with the cylinder assembly, and the siphon pipe is arranged to be capable of discharging water from the water inflow pipe in the ventilation situation, so that the water inflow pipe is communicated with the outside.

18. The clothing washing apparatus according to claim 17, wherein the water inflow pipe is a U-shaped water inflow pipe, and the siphon pipe is communicated with a bottom of a transverse section of the U-shaped water inflow pipe.

19. The clothing washing apparatus according to claim 17, wherein the steam and foam overflow pipe is communicated with the outside through the siphon pipe.

20. The clothing washing apparatus according to any one of claims 11 to 16, wherein the cylinder assembly comprises a first washing cylinder and a second washing cylinder, an air outflow end of the air inflow pipe is provided with a three-way valve, a first air inflow branch, and a second air inflow branch, and the three-way valve is arranged downstream of the overflow port; the first air inflow branch communicates a first outlet of the three-way valve with the first washing cylinder, and the second air inflow branch communicates a second outlet of the three-way valve with the second washing cylinder; the first washing cylinder and the second washing cylinder are each communicated with the air outflow assembly and the steam and foam overflow pipe respectively.

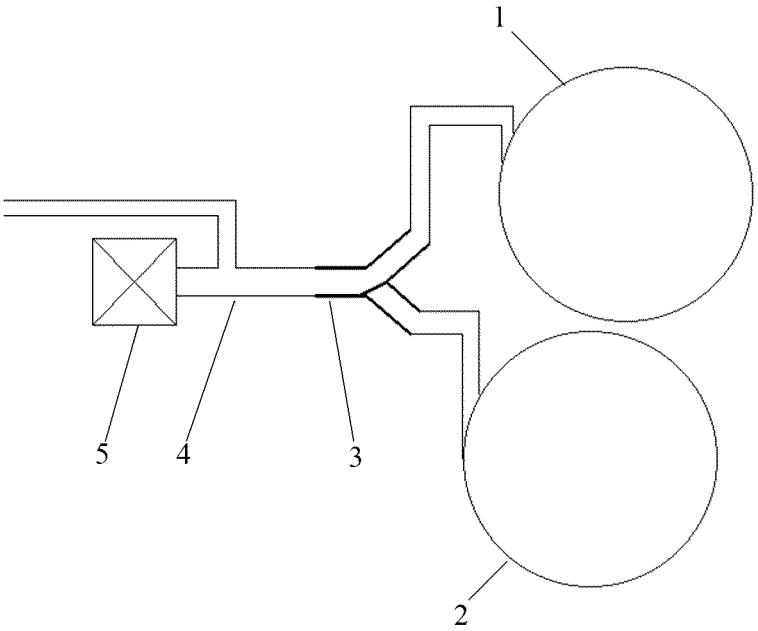

FIG.1

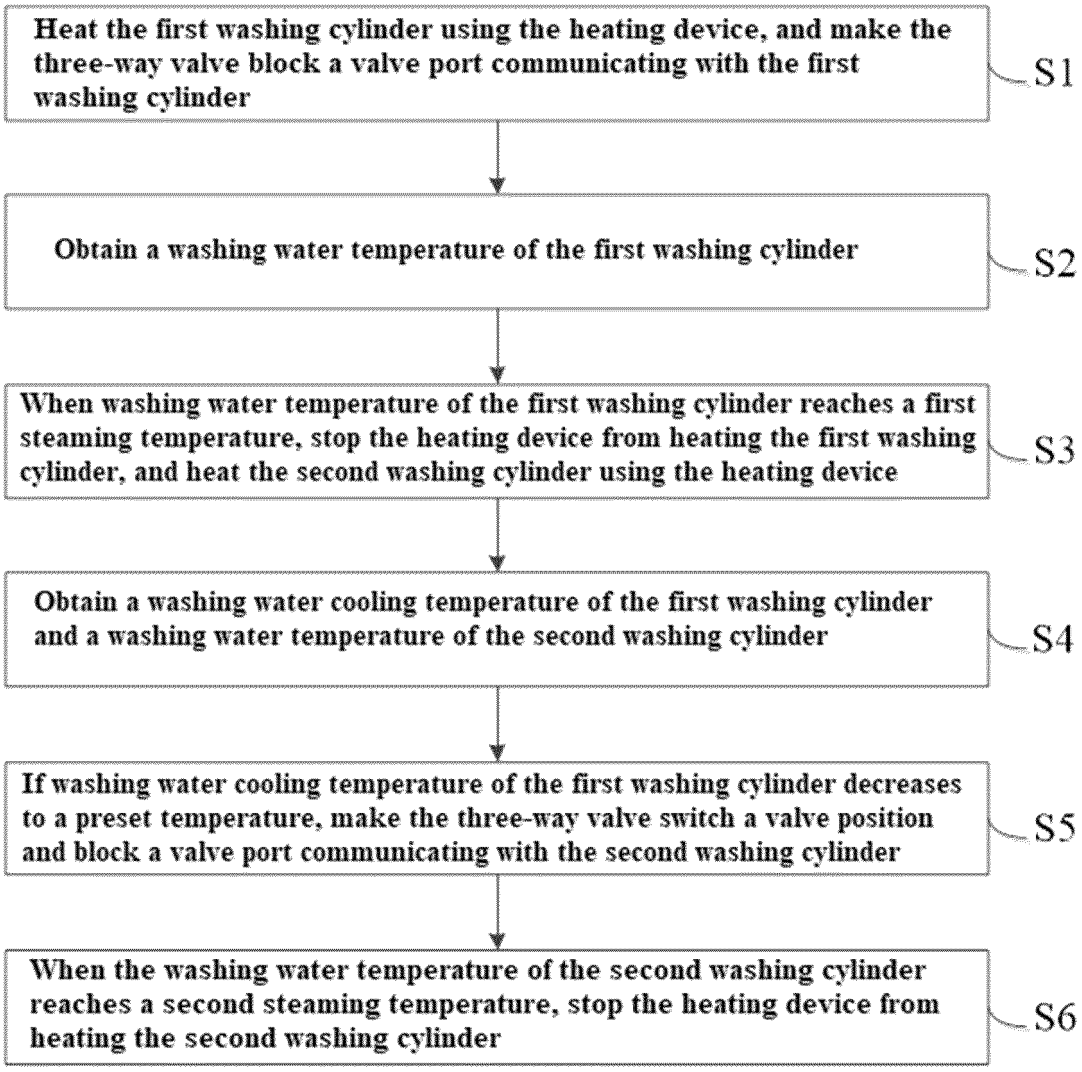
Heat the first washing cylinder using the heating device, and make the three-way valve block a valve port communicating with the first washing cylinder
S1
Obtain a washing water temperature of the first washing cylinder
S2
When washing water temperature of the first washing cylinder reaches a first steaming temperature, stop the heating device from heating the first washing cylinder, and heat the second washing cylinder using the heating device
S3
Obtain a washing water cooling temperature of the first washing cylinder and a washing water temperature of the second washing cylinder
S4
If washing water cooling temperature of the first washing cylinder decreases to a preset temperature, make the three-way valve switch a valve position and block a valve port communicating with the second washing cylinder
S5
When the washing water temperature of the second washing cylinder reaches a second steaming temperature, stop the heating device from heating the second washing cylinder
S6

FIG.2

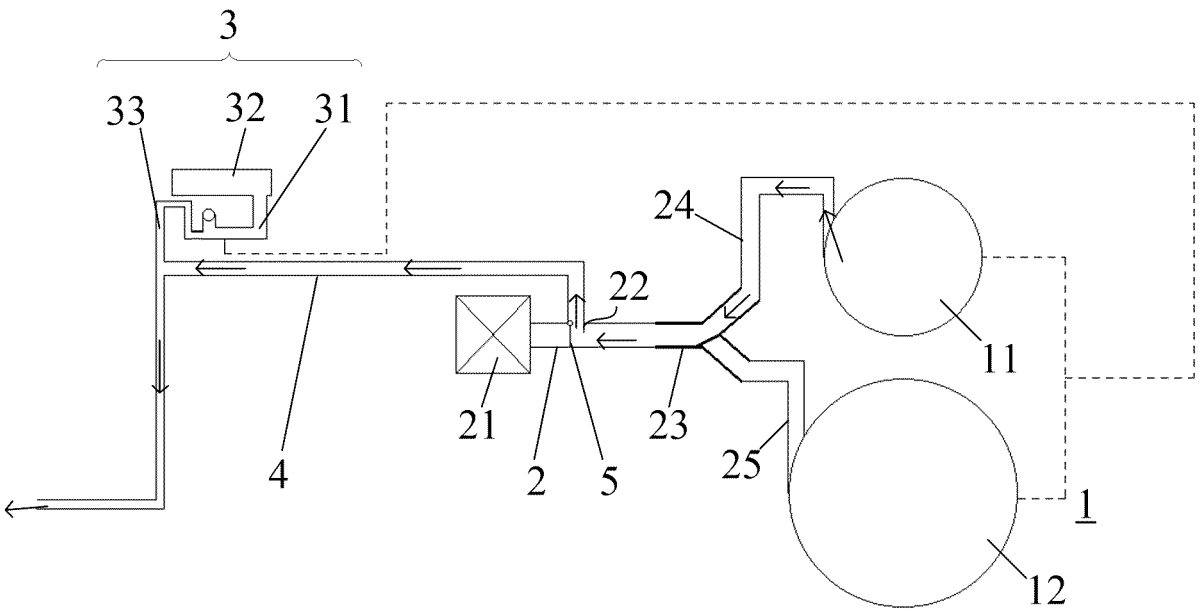
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FIG.3

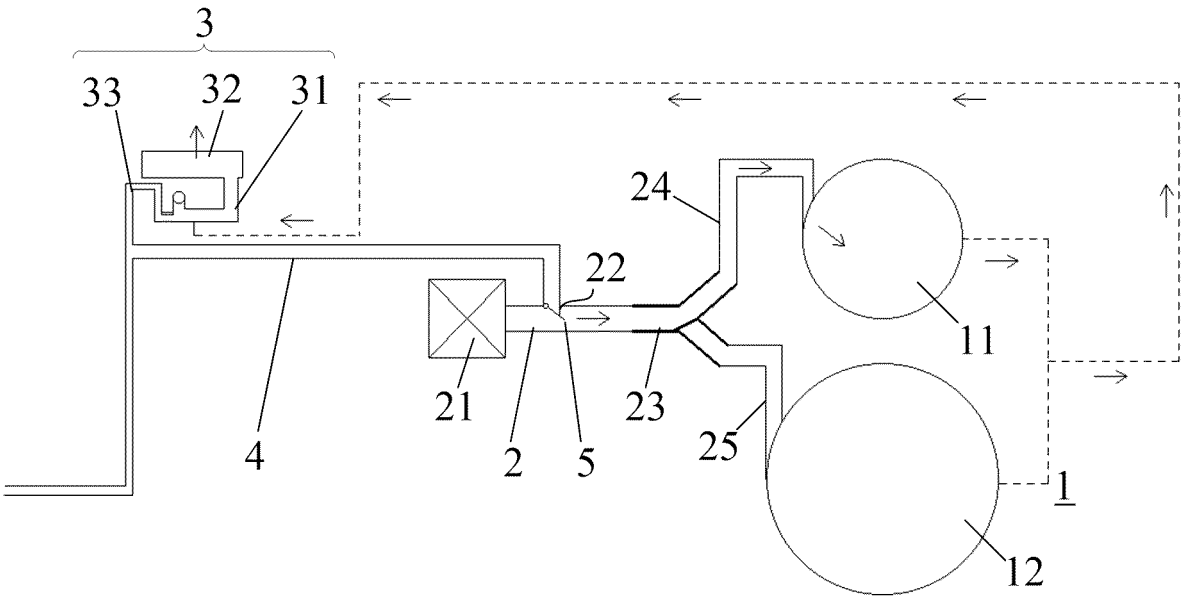
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FIG.4

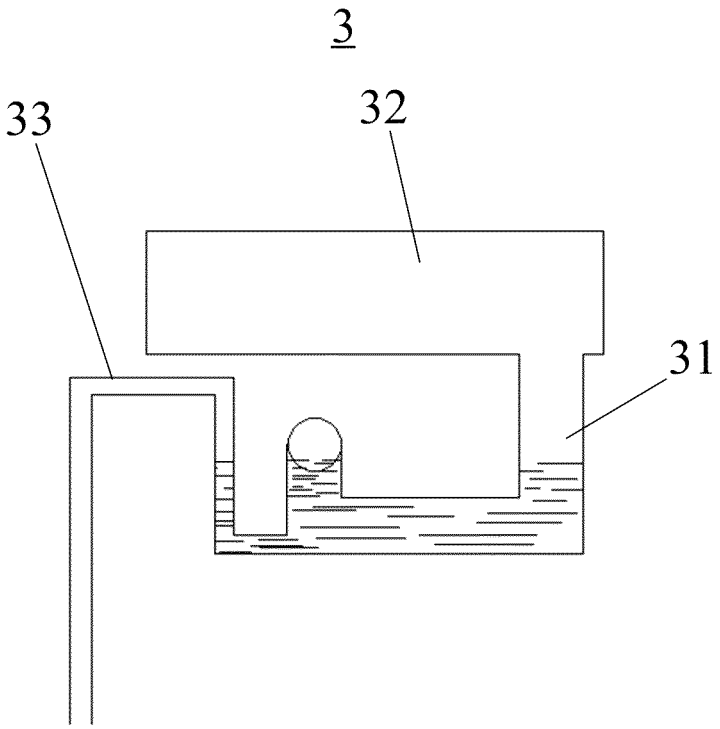

FIG.5

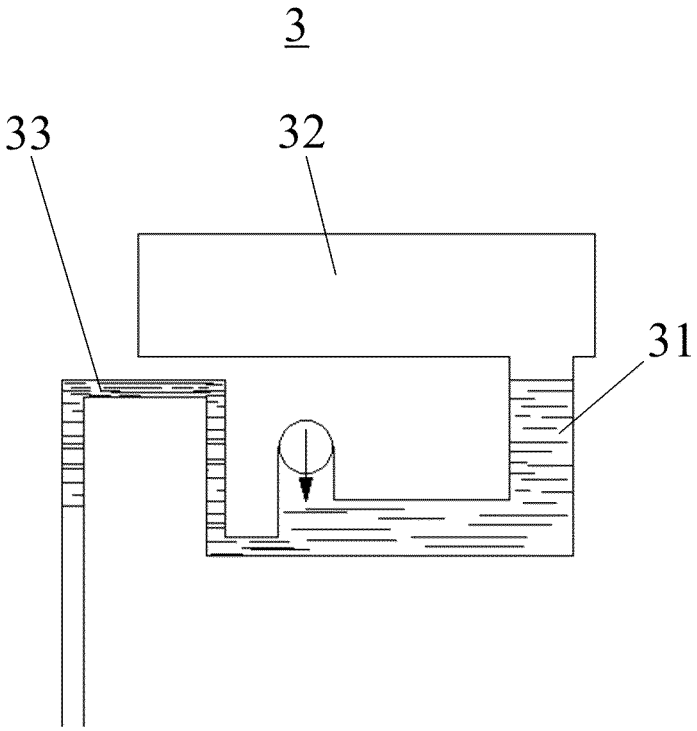

FIG.6

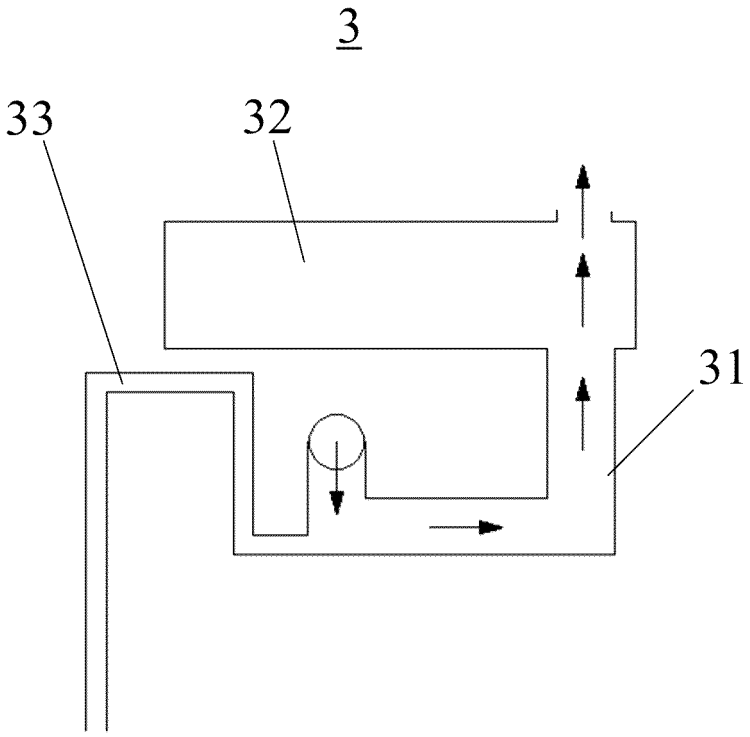

FIG.7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/128866

A. CLASSIFICATION OF SUBJECT MATTER

D06F 58/50(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNKI; CNABS; CNTXT; DWPI; SIPOABS: 双桶, 双筒, 双滚筒, 双滚桶, 双内筒, 双内桶, 多桶, 多筒, 蒸汽, 蒸气, 双, 多, 二, 两, 桶, 筒, 温, 加热, 蒸煮, 高温, 阀, 三通, 溢, 风门, 蒸汽, 泡沫, 扇, 风机, drum, tub, steam, vapour, vapor, second+, heat???, temp+, foam, bubble, overflow???, spill+, air w door, ventilation w door, damper

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 213896423 U (YUNMI INTERNET TECHNOLOGY (GUANGDONG) CO., LTD.) 06 August 2021 (2021-08-06) description, paragraphs [0006]-[0020], and figures 1-6	11-20
PX	CN 213896422 U (YUNMI INTERNET TECHNOLOGY (GUANGDONG) CO., LTD.) 06 August 2021 (2021-08-06) description, paragraphs [0006]-[0020], and figures 1-6	11-20
X	CN 208250734 U (WUXI LITTLE SWAN COMPANY LIMITED) 18 December 2018 (2018-12-18) description, paragraphs [0007]-[0027], and figures 1-3	11-20
X	CN 208250679 U (WUXI LITTLE SWAN COMPANY LIMITED) 18 December 2018 (2018-12-18) description, paragraphs [0007]-[0027], and figures 1-3	11-20
X	CN 208250731 U (WUXI LITTLE SWAN COMPANY LIMITED) 18 December 2018 (2018-12-18) description, paragraphs [0007]-[0027], and figures 1-3	11-20

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 January 2022	**08 February 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/128866

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 105734915 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 06 July 2016 (2016-07-06) description, paragraphs [0009]-[0025], and figures 1-5	1-20
A	CN 105734892 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 06 July 2016 (2016-07-06) entire document	1-20
A	KR 20060124224 A (LG ELECTRONICS INC.) 05 December 2006 (2006-12-05) entire document	1-20

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/128866

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	213896423	U	06 August 2021	None			
CN	213896422	U	06 August 2021	None			
CN	208250734	U	18 December 2018	None			
CN	208250679	U	18 December 2018	None			
CN	208250731	U	18 December 2018	None			
CN	105734915	A	06 July 2016	EP	3231920	A1	18 October 2017
				EP	3231920	A4	15 August 2018
				US	2017342638	A1	30 November 2017
				US	10648123	B2	12 May 2020
				KR	20170094360	A	17 August 2017
				WO	2016090968	A1	16 June 2016
				JP	2017536901	A	14 December 2017
				JP	6579404	B2	25 September 2019
CN	105734892	A	06 July 2016	EP	3231921	A1	18 October 2017
				JP	2017537697	A	21 December 2017
				JP	6551707	B2	31 July 2019
				US	2017342625	A1	30 November 2017
				US	10947656	B2	16 March 2021
				WO	2016090966	A1	16 June 2016
				KR	20170098855	A	30 August 2017
KR	20060124224	A	05 December 2006	KR	100698215	B1	22 March 2007

Form PCT/ISA/210 (patent family annex) (January 2015)