HEATING SYSTEM USING A FIREPLACE

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ABSTRACT
The present invention relates to a heating system using a fireplace which includes a combustion room having a discharge hole installed at the wall body of a dwelling house comprises a water tank installed within the combustion room of the fireplace and having water therein; and a pipe with a predetermined length flatly placed with a zigzag type under the bottom surface with a constant area at the neighborhood of the fireplace, the inlet and outlet of the pipe communicated with a side of the water tank, which the water discharged from the water tank through the inlet is circulated along the pipe with a predetermined length, then returned to the water tank through the outlet of the pipe, whereby the warmth at the bottom surface of the room is maintained by the circulated warm water.
FIG. 5

START

There is a temperature sensor signal?

YES

ST-2

NO

ST-4

The sensed temperature exceeds the reference temperature?

YES

ST-6

NO

ST-12

There is a water level sensor signal?

YES

ST-14

The sensed height to below the reference height?

YES

ST-16

NO

ST-22

There is a water discharge signal?

YES

ST-24

NO

VALVE AND PUMP CONTROL SIGNALS CS1, CS2 AND CS5 OUTPUT

VALVE CONTROL SIGNAL CS4 OUTPUT

VALVE CONTROL SIGNAL CS3 OUTPUT
HEATING SYSTEM USING A FIREPLACE

FIELD OF THE INVENTION

[0001] The present invention relates to a heating system using a fireplace, and more particularly, to a heating system using a fireplace in which a water tank is installed within a combustion room of the fireplace, a pipe is extended, installed and embedded under the bottom surface with a constant area in the neighborhood of the fireplace so that the water within the water tank is heated through the fireplace and then the warm water is supplied to the bottom surface through the pipe and the bottom surface is heated, thereby maximizing the efficiency of heat of the fireplace and discharging the warm water to the outside for use.

DESCRIPTION OF THE RELATED ART

[0002] Generally, a fireplace is used for heating as a main gist, has an ornamental effect and installed on a sidewall in the interior of a room as a built-in type. Referring to FIGS. 1 and 2, the fireplace 1 comprises a combustion room 2 for burning wood or coal and the like formed at a sidewall in a dwelling house as a built-in type and a discharging hole 3 connected with a chimney 4 at the upper portion of the combustion room and for discharging smoke.

[0003] In addition, the heating efficiency in the conventional fireplace 1 is very low. As shown in FIG. 2, the most heat energy generated by the combustion of fuel is emitted through the discharging hole 3 and the chimney 4 to the outside and only a portion of the hot air is introduced to the interior of the room. Accordingly, there is a problem that the conventional fireplace has been used only as an ornamental effect.

[0004] There is another disadvantage in the conventional fireplace 1 that an amount of air introduced to the combustion room 2 cannot be controlled. Hence, the heating temperature is controlled by controlling only the amount of combustion of the injected fuel such as wood or coal and the like is controlled, so that it is difficult to perform the heating in order to meet the desired indoor temperature.

[0005] And, in the conventional fireplace, the heat efficiency is low and the warmth at the circumference of the fireplace is maintained and furthermore, the warmth cannot feel at the bottom of the room.

SUMMARY OF THE INVENTION

[0006] It is, therefore, an object of the present invention to provide a heating system using a fireplace in which the water stored in a water tank is heated and the heated water is circulated through a pipe so that the warmth is offered to not only the circumference of the fireplace but also the bottom surface at the circumference of the fireplace and the heat efficiency is maximized.

[0007] It is another object of the present invention to provide a heating system using a fireplace in which the temperature of water stored in a water tank is controlled so that the temperature of the interior of a room is controlled.

[0008] It is another object of the present invention to provide a heating system using a fireplace in which the water stored in a water tank is discharged into the outside so that the hot water can be used by a user.

[0009] To achieve the above object, there is provided a heating system using a fireplace which includes a combustion room having a discharge hole installed at the wall body of a dwelling house comprising: a water tank installed within the combustion room of the fireplace and having water therein; and a pipe with a predetermined length flatly placed with a zigzag type under the bottom surface with a constant area at the neighborhood of the fireplace, the inlet and outlet of the pipe communicated with a side of the water tank, which the water discharged from the water tank through the inlet is circulated along the pipe with a predetermined length, then returned to the water tank through the outlet of the pipe, whereby the warmth at the bottom surface of the room is maintained by the circulated warm water.

[0010] Preferably, the heating system further comprises an air tank installed at the upper surface of the water tank by the medium of a connection tube in order to discharge air within the water tank to the outside.

[0011] More preferably, the heating system further comprises a water supply pipe communicated at a side of the water tank in order to supply water from an outside water supply resource into the water tank.

[0012] More preferably, a valve is installed at an end of the pipe in the vicinity of the water tank.

[0013] More preferably, the heating system further comprises a circulation pump installed at a side of the pipe in order to make the water within the water tank circulate.

[0014] More preferably, the heating system further comprises a water height sensing sensor installed at least a portion of the water tank and for sensing the height of water filled in the water tank and for transmitting the sensing signal.

[0015] More preferably, the heating system further comprises a water temperature sensing sensor installed within at least a portion of the water tank and for sensing the temperature of water filled in the water tank and for transmitting the sensing signal.

[0016] More preferably, the valve is a solenoid valve.

[0017] More preferably, the water tank has an arch shape and at least a surface of the water tank is enveloped with flames, so that the water within the water tank is heated.

[0018] Another aspect of the present invention, there is provided a heating system using a fireplace which includes a combustion room having a discharge hole installed at the wall body of a dwelling house comprising: a water tank installed within the combustion room of the fireplace and having water therein; a water supply pipe a water supply pipe communicated at a side of the water tank in order to supply water from an outside water supply resource into the water tank; a pipe with a predetermined length flatly placed with a zigzag type under the bottom surface with a constant area at the neighborhood of the fireplace, the inlet and outlet of the pipe communicated with a side of the water tank, which the water discharged from the water tank through the inlet is circulated along the pipe with a predetermined length, then returned to the water tank through the outlet of the pipe; valves installed at ends of the pipes in the vicinity of the water tank; a circulation pump installed at a side of the pipe in order to make the water within the water tank circulate; a water height sensing sensor installed at least a portion of the water tank and for sensing the height of water filled in the water tank and for transmitting the sensing signal; and a control member electrically connected with the water height sensing sensor, valves and the circulation pump in order to transmit and receive control signals and sensing signals, whereby the warmth at the bottom surface of the room is maintained by the circulated warm water.

[0019] Preferably, the heating system further comprises a water temperature sensing sensor installed within at least a
portion of the water tank and for sensing the temperature of water filled in the water tank and for transmitting the sensing signal to the control member.

[0020] More preferably, the valves are solenoid valves.

[0021] More preferably, the water tank has an arch shape and at least a surface of the water tank is enveloped with flames, so that the water within the water tank is heated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The above objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings, in which:

[0023] FIG. 1 is a perspective view illustrating a construction of a fireplace according to a conventional art;
[0024] FIG. 2 is a cross-section view illustrating a construction of a fireplace according to conventional art;
[0025] FIG. 3 is an outline construction view of a heating system using a fireplace according to the present invention;
[0026] FIG. 4 is an enlarged perspective view of a water tank of FIG. 3; and
[0027] FIG. 5 is an operational flow chart of a heating system using a fireplace according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0028] A preferred embodiment of the present invention will now be described with reference to the accompanying drawings.

[0029] FIG. 1 is a perspective view illustrating a construction of a fireplace according to a conventional art. FIG. 2 is a cross-section view illustrating a construction of a fireplace according to a conventional art. FIG. 3 is an outline construction view of a heating system using a fireplace according to the present invention. FIG. 4 is an enlarged perspective view of a water tank of FIG. 3 and FIG. 5 is an operational flow chart of a heating system using a fireplace according to the present invention.

[0030] Referring to FIGS. 3 and 4, in a construction of a heating system 100 using a fireplace according to a preferred embodiment of the present invention, a combustion room 20 is formed at a side wall body of a dwelling house as a built-in type and a discharge hole 23 is formed at the upper portion of the combustion room and connected with a chimney 24 so that smoke is discharged to the outside. A water tank 110 with an arch shape made of metal is installed within the combustion room and an air tank 120 is connected on the upper surface of the water tank through a connection tube 121.

[0031] Water is stored in the water tank 110.

[0032] A pipe P2 with a predetermined length is flatly placed with a zigzag type under the bottom surface with a constant area A at the neighborhood of the fireplace, the inlet and outlet of the pipe communicated with a side of the water tank. The water discharged from the water tank 110 through the inlet is circulated along the pipe P2 with a predetermined length and then returned to the water tank 110 through the outlet of the pipe P2, whereby the warmth at the bottom surface of the room is maintained by the circulated warm water.

[0033] An air tank 120 is installed at the upper surface of the water tank 110 by the medium of the connection tube 121 in order to discharge air within the water tank 110 to the outside.

[0034] A reference numeral 1 denotes a water supply pipe which is communicated at a side of the water tank 110 in order to supply water from an outside water supply resource into the water tank 110.

[0035] Valves are combined with ends of the pipes P1 and P2 in the vicinity of the water tank 110. The valves may be constructed by solenoid valves and are controlled by a control member which will be described hereinafter. The valve V1 is a hot water discharge valve, the valve V2 is a cold water returning valve. The valve V3 connected with another water tank (not shown) is a discharge valve for discharging the hot water to the another water tank. The valve V4 is an original water supply valve for supplying the water from an outside water supply resource into the water tank 110.

[0036] Although the two pipes P1 are installed at the lower side portion of the water tank 110, only one pipe P1 may be installed at the upper side portion of the water tank 110 or the upper surface of the water tank 110.

[0037] A reference numeral 130 denotes a circulation pump which is installed at a side of the pipe P1 in order to make the water in the water tank 110 circulate and controlled by the control member which will be described hereinafter.

[0038] Reference numerals 152 denote water height sensing sensors which are installed at the upper portions of the water tank 110. Although two water height sensing sensors 152 are disclosed, the number of the water height sensing sensors is not limited. The two water height sensing sensors are installed with the same height. Sensing signals sensed from the two water height sensing sensors can be used individually. The water height sensing sensor is a kind of a contact sensor and contacted with the water filled in the water tank 110, so that the height of the water is sensed and then the sensed signal is transmitted to the control member which will be described hereinafter.

[0039] Reference numerals 141, 142 and 143 denote water temperature sensing sensors which are installed at upper and both side portions of the water tank 110 and senses the temperature of water filled in the water tank 110 and then transmit the sensed signal. Although three water temperature sensing sensors 141, 142 and 143 are disclosed, the number of the water temperature sensing sensors is not limited. The water temperature sensing sensor is a kind of a contact sensor and contacted with the water filled in the water tank 110, so that the temperature of the water is sensed, the sensed signal is changed according to the temperature change of the water and the sensed signal is transmitted to the control member which will be described hereinafter. Sensing signals sensed from the three water temperature sensing sensors can be used individually. The control member 160 receives the water temperature sensing signals C1, C2 and C3 from the water temperature sensing sensors 141, 142 and 143 and the water height sensing signal H1 and H2 from the water height sensing sensors 152 and transmits valve control signals CS1, CS2, CS3 and CS4 and a pump driving control signal CS5 to each device.

[0040] The water height and temperature sensing sensors 141, 142, 143 and 152 output sensing signals to the control member 160 whenever the height and the temperature of the water are changed.

[0041] The control member 160 controls entirely the system, especially, is connected electrically to the water height sensing sensors 152, the water temperature sensing sensors 141, 142 and 143, valves V1, V2, V3 and V4 and the circulation pump 130, receives the sensing signals and transmits controls signals.
A reference numeral 161 denotes an alarm driving member which outputs an alarm signal through a speaker 164 when the height and temperature of water are below the reference height and temperature.

A reference numeral 162 denotes a display driving member which displays the height and temperature of the water through a display member 163.

A reference numeral 165 denotes a function input member in which a user inputs functions such as the setting function of the height and temperature of the water or an on/off function of the system and the like.

A reference numeral 131 denotes a pump driving member which is driven by the control signal CS5 of the control member 160, so that the pump 130 is driven.

A reference numeral 132 denotes a power supply member for supplying power to each part including the pump driving member.

An operation of a heating system using a fireplace according to a preferred embodiment of the present invention will be described in detail with reference to FIG. 5.

Referring to FIG. 5, firstly, when a user generates flames F by means of a heating member such as wood or gas and the like within the combustion room 20 in a fireplace, the three surfaces 111, 112 and 113 of the water tank 110 installed within the combustion room are enveloped with flames, so that the water within the water tank 110 is heated.

Thereafter, the control member 160 discriminates whether there is a water temperature sensing signal (a step of ST-2). As a result of the step ST-2, if there is a water temperature sensing signal, the control member 160 discriminates whether the temperature of the water within the water tank 110 sensed by the water temperature sensing sensors 141, 142 and 143 exceeds a reference temperature (a step of ST-4) through the comparison of the sensed temperature with the reference temperature. Thereafter, if the temperature of the water exceeds the reference temperature, the control member 160 outputs valve control signals CS1 and CS2 and the pump driving control signal CS5.

As the result of the step ST-2, if there is no water temperature sensing signal, the control member 160 discriminates whether there is a water height sensing signal (a step of ST-12). As a result of the step ST-12, if there is a water height sensing signal, the control member 160 discriminates whether the height of the water within the water tank 110 sensed by the water height sensing sensors 152 is below a reference height (a step of ST-14) through the comparison of the sensed height with the reference height. Thereafter, if the height of the water is below the reference temperature, the control member 160 outputs the valve control signal CS4 so that the water is supplied from the outside water supply resource into the water tank 110.

As the result of the step ST-12, if there is no a water height sensing signal, the control member 160 discriminates whether there is a water discharge signal (a step of ST-22). As a result of the step ST-22, if there is a water discharge signal, the control member 160 outputs the valve control signal CS3 so that the warm water supplied from the water tank is discharged to another water tank through a pipe P3.

The heat system using a fireplace according to an embodiment of the present invention has several advantages that not only the circumference of the fireplace and but also the temperature of the bottom surface of a house are maintained warmly through the heating system of the fireplace and the hot water can be separately discharged and used.

While the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A heating system using a fireplace which includes a combustion room having a discharge hole installed at the wall body of a dwelling house comprising:
   a water tank installed within the combustion room of the fireplace and having water therein; and
   a pipe with a predetermined length flatly placed with a zigzag type under the bottom surface with a constant area at the neighborhood of the fireplace, the inlet and outlet of the pipe communicated with a side of the water tank, which the water discharged from the water tank through the inlet is circulated along the pipe with a predetermined length, then returned to the water tank through the outlet of the pipe, whereby the warmth at the bottom surface of the room is maintained by the circulated warm water.

2. The heating system using a fireplace according to claim 1 wherein the heating system further comprises an air tank installed at the upper surface of the water tank by the medium of a connection tube in order to discharge air within the water tank to the outside.

3. The heating system using a fireplace according to claim 1 wherein the heating system further comprises a water supply pipe communicated at a side of the water tank in order to supply water from an outside water supply resource into the water tank.

4. The heating system using a fireplace according to claim 1 wherein a valve is installed at an end of the pipe in the vicinity of the water tank.

5. The heating system using a fireplace according to claim 3 wherein a valve is installed at an end of the pipe in the vicinity of the water tank.

6. The heating system using a fireplace according to claim 1 wherein the heating system further comprises a circulation pump installed at a side of the pipe in order to make the water within the water tank circulate.

7. The heating system using a fireplace according to claim 1 wherein the heating system further comprises a water height sensing sensor installed at least a portion of the water tank and for sensing the height of water filled in the water tank and for transmitting the sensing signal.

8. The heating system using a fireplace according to claim 1 wherein the heating system further comprises a water temperature sensing sensor installed within at least a portion of the water tank and for sensing the temperature of water filled in the water tank and for transmitting the sensing signal.

9. The heating system using a fireplace according to claim 1 wherein the heating system further comprises a solenoid valve.

10. The heating system using a fireplace according to claim 5 wherein the valve is a solenoid valve.

11. The heating system using a fireplace according to claim 1 wherein the water tank has an arch shape and at least a surface of the water tank is enveloped with flames, so that the water within the water tank is heated.

12. A heating system using a fireplace which includes a combustion room having a discharge hole installed at the wall body of a dwelling house comprising:
a water tank installed within the combustion room of the
fireplace and having water therein;
a water supply pipe a water supply pipe communicated at a
side of the water tank in order to supply water from an
outside water supply resource into the water tank;
a pipe with a predetermined length flatly placed with a
zigzag type under the bottom surface with a constant
area at the neighborhood of the fireplace, the inlet and
outlet of the pipe communicated with a side of the water
tank, which the water discharged from the water tank
through the inlet is circulated along the pipe with a
predetermined length, then returned to the water tank
through the outlet of the pipe;
valves installed at ends of the pipes in the vicinity of the
water tank;
a circulation pump installed at a side of the pipe in order to
make the water within the water tank circulate;
a water height sensing sensor installed at least a portion of
the water tank and for sensing the height of water filled
in the water tank and for transmitting the sensing signal;
and
da control member electrically connected with the water
height sensing sensor, valves and the circulation pump in
order to transmit and receive control signals and sensing
signals,
whereby the warmth at the bottom surface of the room is
maintained by the circulated warm water.

13. The heating system using a fireplace according to claim
12, wherein the heating system further comprises a water
temperature sensing sensor installed within at least a portion
of the water tank and for sensing the temperature of water
filled in the water tank and for transmitting the sensing signal
to the control member.

14. The heating system using a fireplace according to claim
12, wherein the valves are solenoid valves.

15. The heating system using a fireplace according to claim
12, wherein the water tank has an arch shape and at least a
surface of the water tank is enveloped with flames, so that the
water within the water tank is heated.

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