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(54) **INTELLIGENT IGNITION SYSTEM OF WATER HEATER**

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(57) **ABSTRACT**

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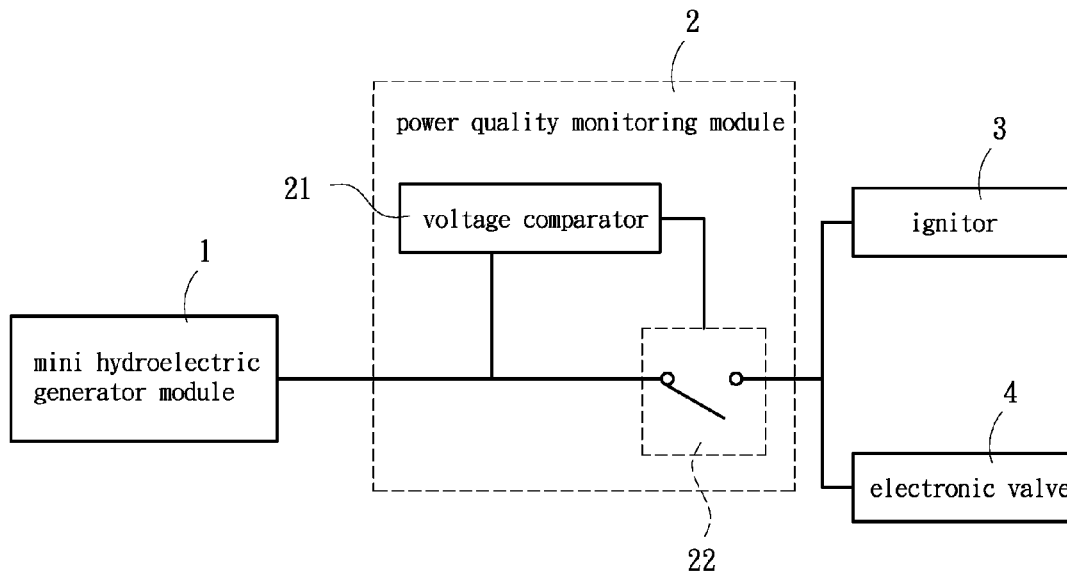
The ignition system includes a mini hydroelectric generator module connecting an inlet pipe for generating electricity by water flow passing through the inlet pipe and it; a power quality monitoring module electrically connecting the mini hydroelectric generator module for monitoring output electricity quality of the mini hydroelectric generator module and switching on/off the electricity; an ignitor electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to ignite; and an electronic valve electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to switch on/off a gas pipe.

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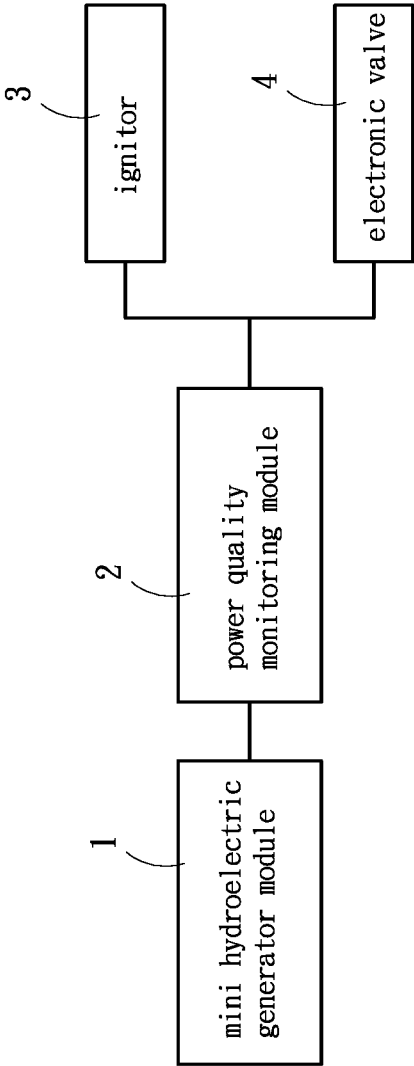


FIG. 1

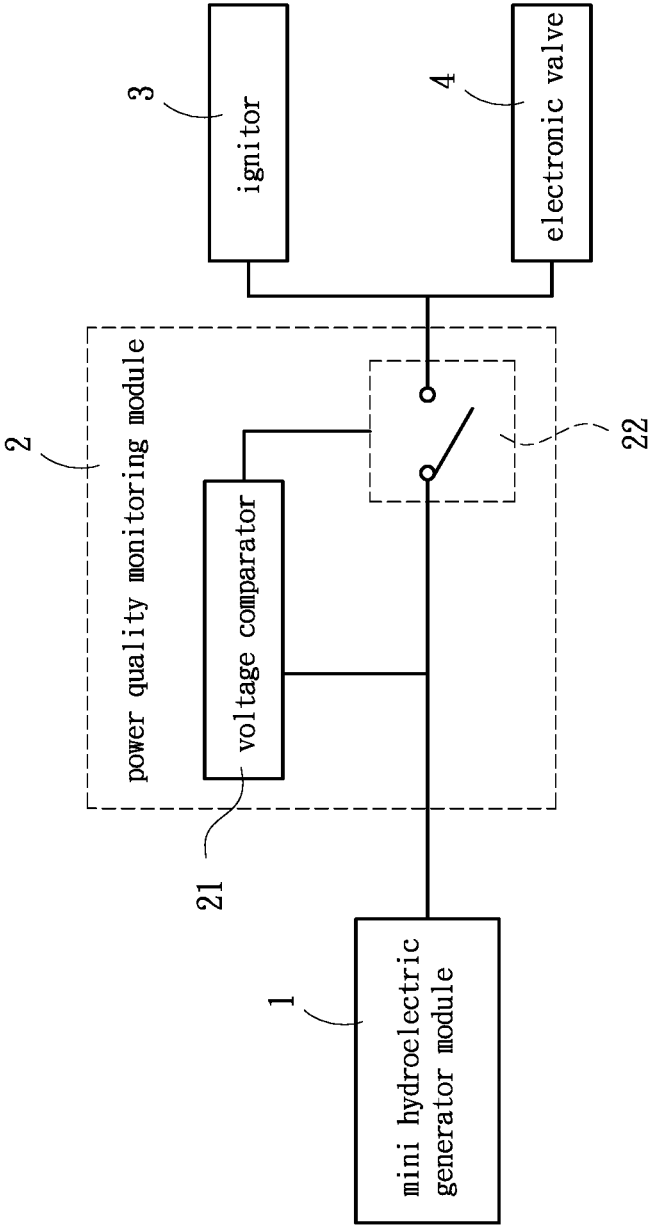


FIG. 2

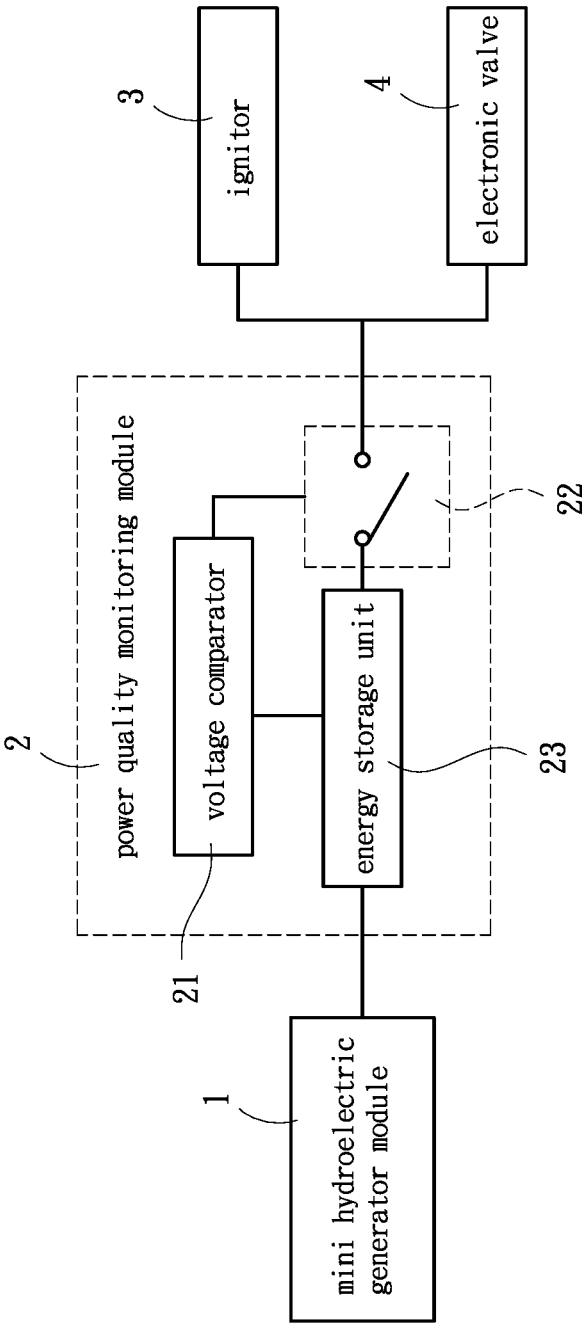


FIG. 3

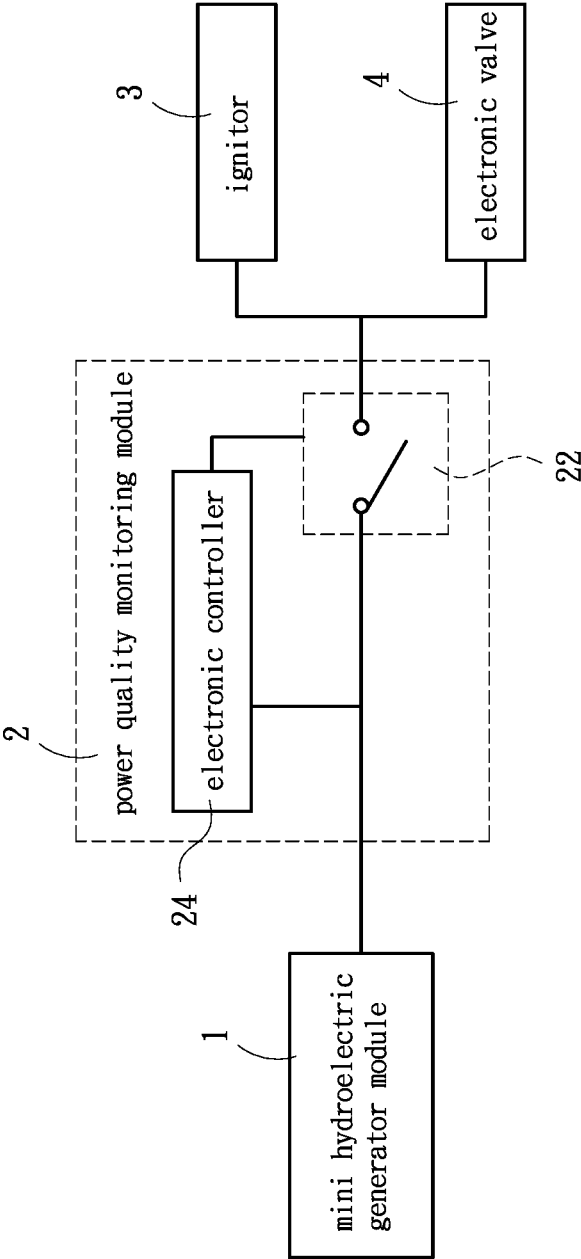


FIG. 4

## INTELLIGENT IGNITION SYSTEM OF WATER HEATER

### BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] The invention relates heat waters, particularly to an ignition of water heater.

[0003] 2. Related Art

[0004] A water heater is a necessary for all families. Gas water heaters are a mainstream kind among all water heaters.

[0005] A conventional water heater utilizes an ignition to spark and open a gas valve to let gas in so as to heat up water. Such an ignition and gas valve are powered by a battery.

[0006] However, power of batteries will be exhausted someday and users cannot foreknow when the battery will be exhausted. Users cannot be aware of exhausting of battery until the ignition does not work. At this time, there is a risk of gas leakage.

[0007] Although some battery-powered gas water heaters provide a battery power indicator, users still need near and pay attention to the water heater to read the battery status. Batteries must be replaced when they are exhausted. Thus it is still inconvenient for users. Additionally, repeatedly purchasing batteries is a cost burden for all users.

### SUMMARY OF THE INVENTION

[0008] An object of the invention is to provide an ignition of water heater, which can generate electricity by water flow to ignite so as to avoid a problem of power exhausting of batteries.

[0009] Another object of the invention is to provide an ignition of water heater, which does not need a battery any more so as to save cost of purchasing batteries.

[0010] To accomplish the above object, the ignition system of the invention includes a mini hydroelectric generator module connecting an inlet pipe for generating electricity by water flow passing through the inlet pipe and it; a power quality monitoring module electrically connecting the mini hydroelectric generator module for monitoring electricity quality of the mini hydroelectric generator module and switching on/off the electricity; an ignitor electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to ignite; and an electronic valve electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to switch on/off a gas pipe.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a block diagram of the invention;

[0012] FIG. 2 is a block diagram of the first embodiment of the invention;

[0013] FIG. 3 is a block diagram of the second embodiment of the invention; and

[0014] FIG. 4 is a block diagram of the third embodiment of the invention.

### DETAILED DESCRIPTION OF THE INVENTION

[0015] Please refer to FIG. 1. The ignition system of the invention is connected to an inlet pipe of a water heater. The ignition system includes a mini hydroelectric generator module 1, a power quality monitoring module 2, an ignitor

3 and an electronic valve 4. The mini hydroelectric generator module 1 connects an inlet pipe of the water heater for generating electricity by water flow passing through the inlet pipe and it. The power quality monitoring module 2 electrically connects the mini hydroelectric generator module 1 for monitoring an output power generating status of the mini hydroelectric generator module 1 to guarantee the output power is enough to supply the system. The power quality monitoring module 2 will close the circuit depending upon if the output power has reached a threshold. The ignitor 3 and electronic valve 4 electrically separately connect the power quality monitoring module 2 for receiving electricity from the power quality monitoring module 2 to ignite and for receiving electricity from the power quality monitoring module 2 to switch on/off a gas pipe, respectively.

[0016] Please refer to FIG. 2, which shows the first embodiment of the invention. As above-mentioned, the power quality monitoring module 2 is used for monitoring an output power status of the mini hydroelectric generator module 1 to guarantee the output power is enough to supply the system. As a result, the ignitor 3 and electronic valve 3 can be activated by the mini hydroelectric generator and do not need a battery to power them. In this embodiment, the power quality monitoring module 2 further includes a voltage comparator 21 and a switch 22. The voltage comparator 21 electrically connects the switch 22. The voltage comparator 21 will detect voltage of electricity from the mini hydroelectric generator module 2 and send a driving signal to make the switch open or close the circuit if the voltage lowers or exceeds a threshold. The threshold means a voltage value which is enough to drive the ignitor 3.

[0017] Please refer to FIG. 3, which shows the second embodiment of the invention. In this embodiment, the power quality monitoring module 2 further includes a voltage comparator 21, a switch 22 and energy storage unit 23. The energy storage unit 23 may be a capacitor and is electrically connected to the mini hydroelectric generator module 1, the voltage comparator 21, and the switch 22. The voltage comparator 21 electrically connects the switch 22. The power generated by the mini hydroelectric generator module 1 is stored in the energy storage unit 23. The voltage comparator 21 will detect voltage of the energy storage unit 23 and send a driving signal to make the switch open or close the circuit if the voltage lowers or exceeds a threshold. The electricity will be stored in the energy storage unit 23 when the voltage is less than the threshold.

[0018] Please refer to FIG. 4, which shows the third embodiment of the invention. In this embodiment, the power quality monitoring module 2 further includes an electronic controller unit 24 and a switch 22. The electronic controller unit 21 electrically connects the switch 22 and the mini hydroelectric generator module 1. The electronic controller 24 will detect voltage of electricity from the mini hydroelectric generator module 2 and send a driving signal to make the switch open or close the circuit if the voltage lowers or exceeds a threshold.

[0019] It will be appreciated by persons skilled in the art that the above embodiments have been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

What is claimed is:

1. An ignition system of a water heater, comprising:
  - a mini hydroelectric generator module, connecting an inlet pipe for generating electricity by water flow in the inlet pipe and it;
  - a power quality monitoring module, electrically connecting the mini hydroelectric generator module for monitoring electricity quality of the mini hydroelectric generator module and switching on/off the electricity;
  - an ignitor, electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to ignite; and
  - an electronic valve, electrically connecting the power quality monitoring module for receiving electricity from the power quality monitoring module to switch on/off a gas pipe.
2. The ignition system of claim 1, wherein the power quality monitoring module further comprises a voltage com-

parator and a switch, the voltage comparator electrically connects the switch for detecting voltage of the mini hydroelectric generator module and sending a driving signal to make the switch open or close a circuit.

3. The ignition system of claim 2, wherein the power quality monitoring module further comprises an energy storage unit connecting both the mini hydroelectric generator module and the voltage comparator.

4. The ignition system of claim 3, wherein the energy storage unit is a capacitor.

5. The ignition system of claim 1, wherein the power quality monitoring module further comprises an electronic controller unit and a switch, the electronic controller unit electrically connects the switch for detecting voltage of the mini hydroelectric generator module and sending a driving signal to make the switch open or close a circuit.

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