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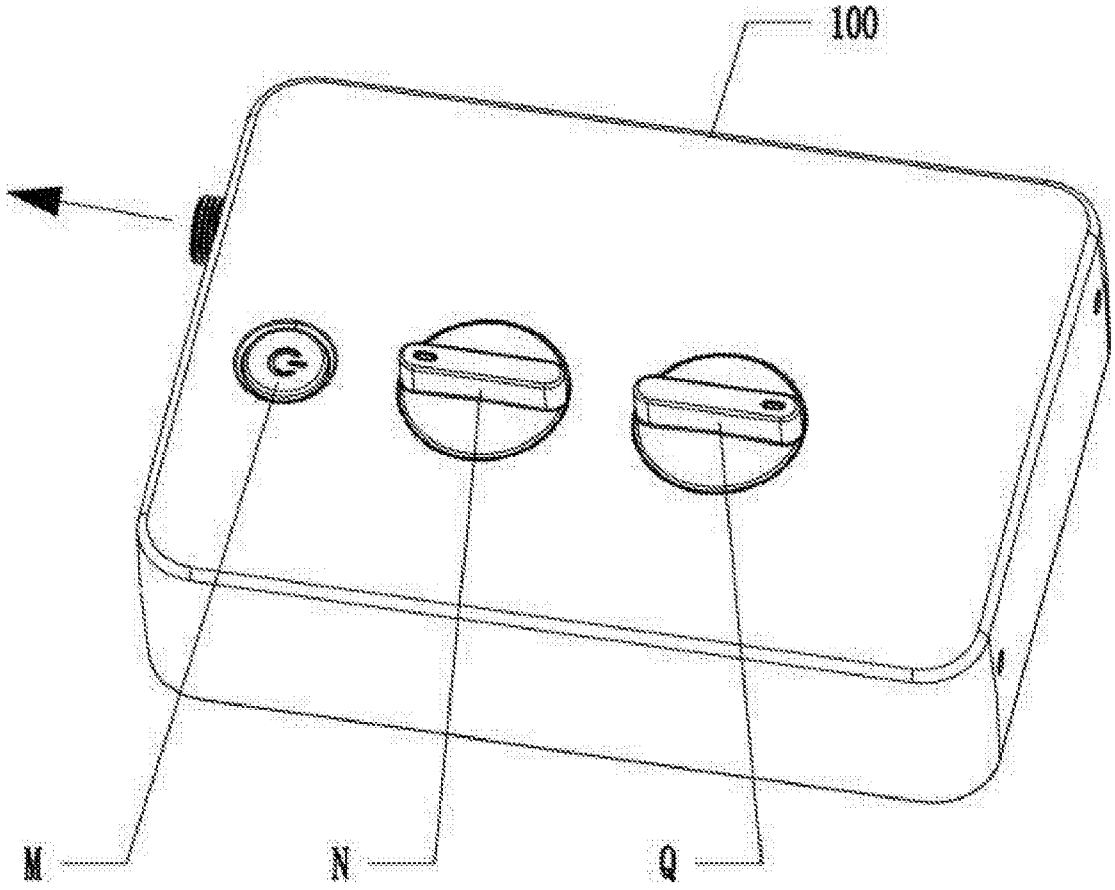


FIG. 1

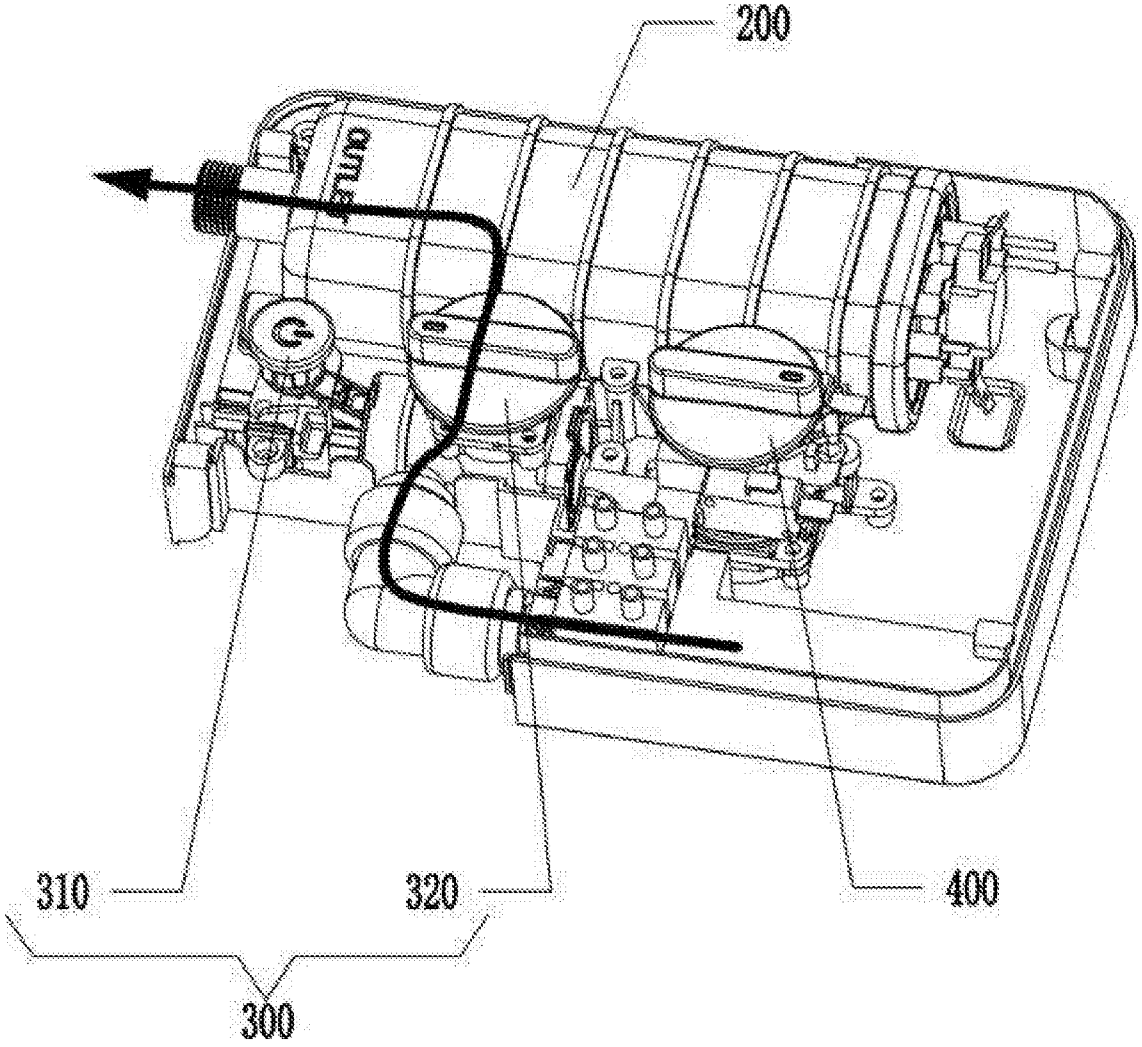


FIG. 2

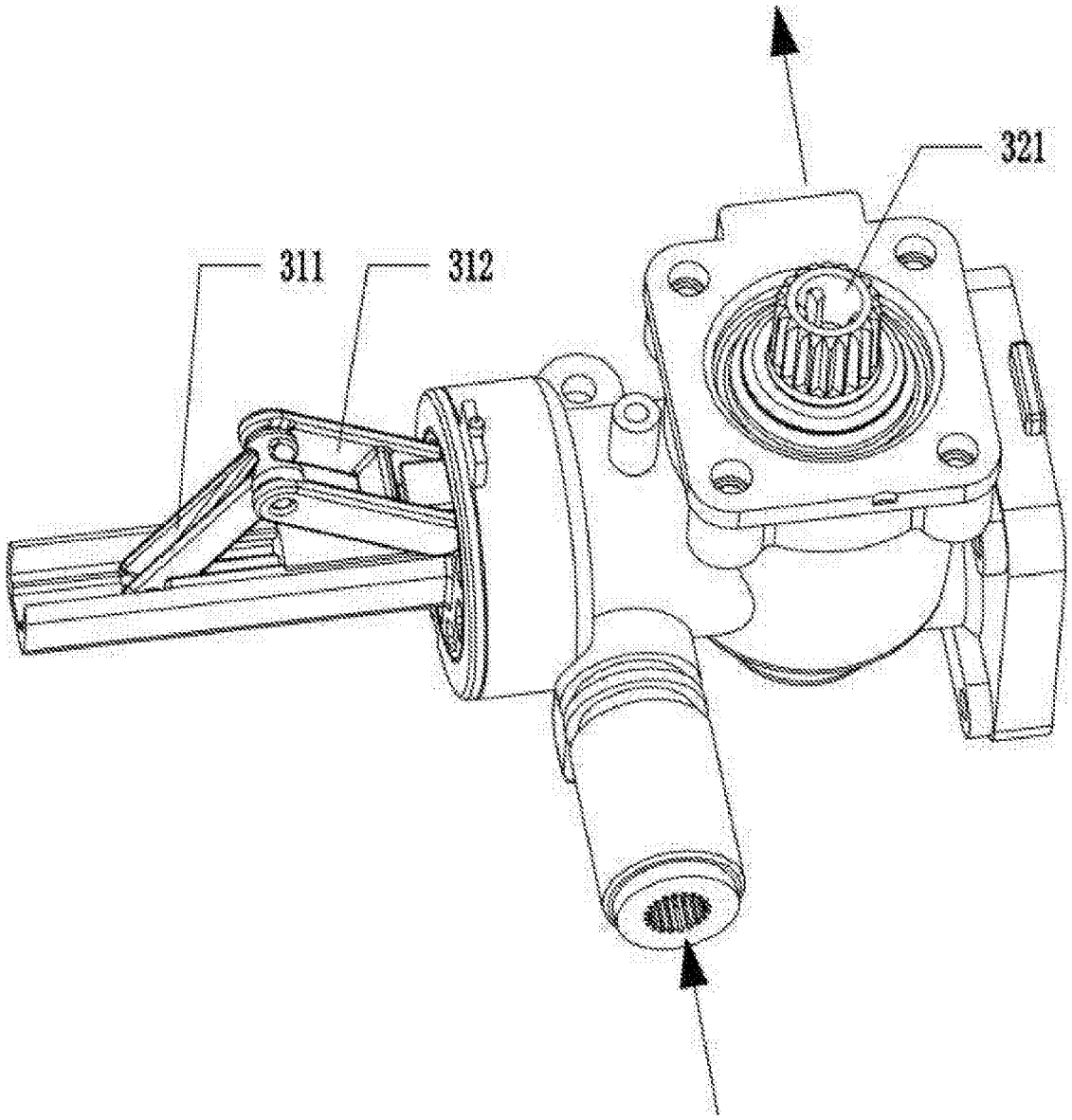


FIG. 3

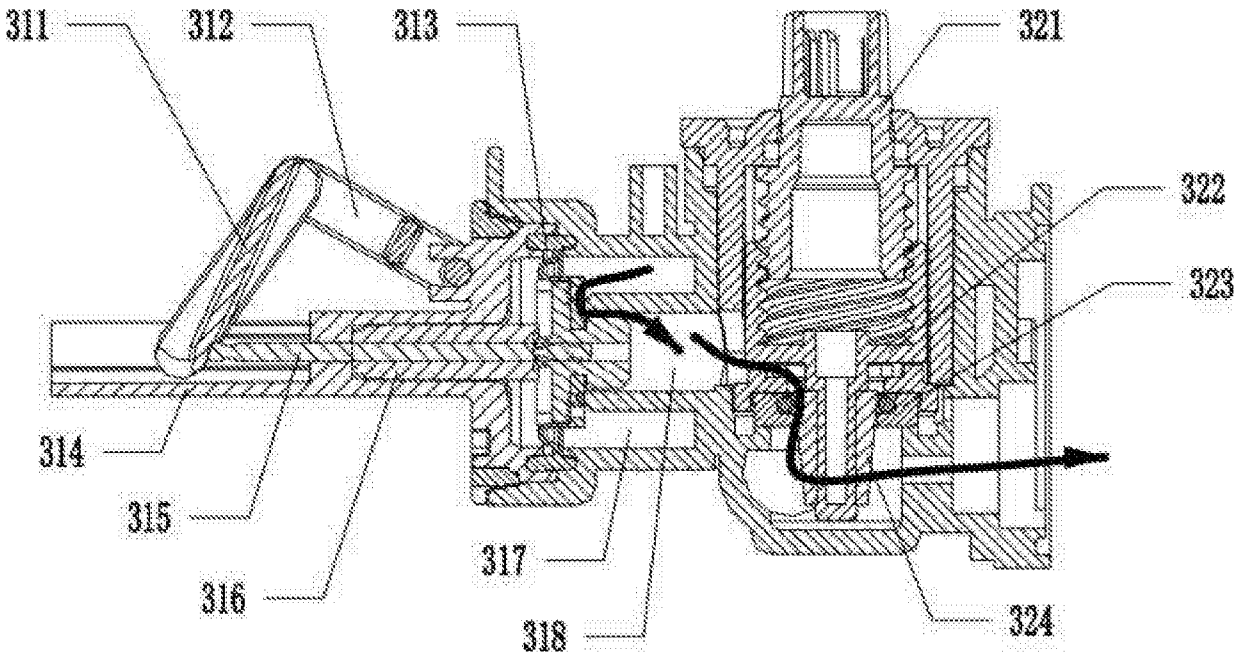


FIG. 4

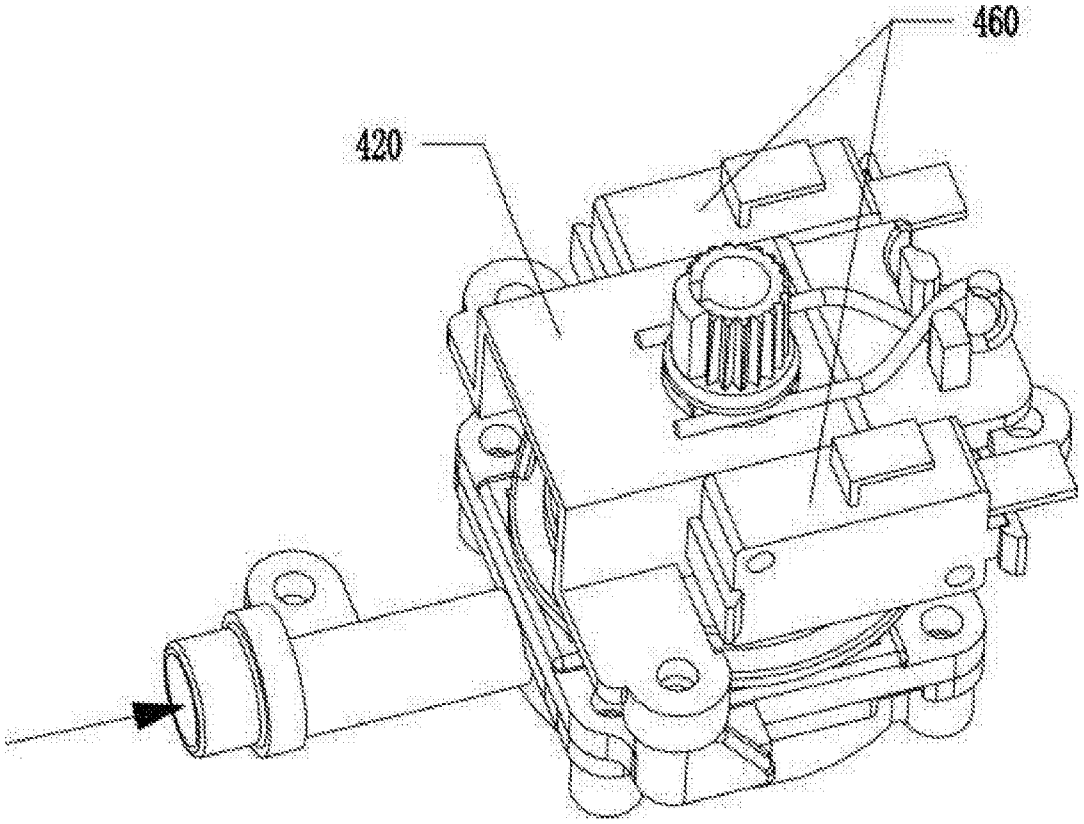


FIG. 5

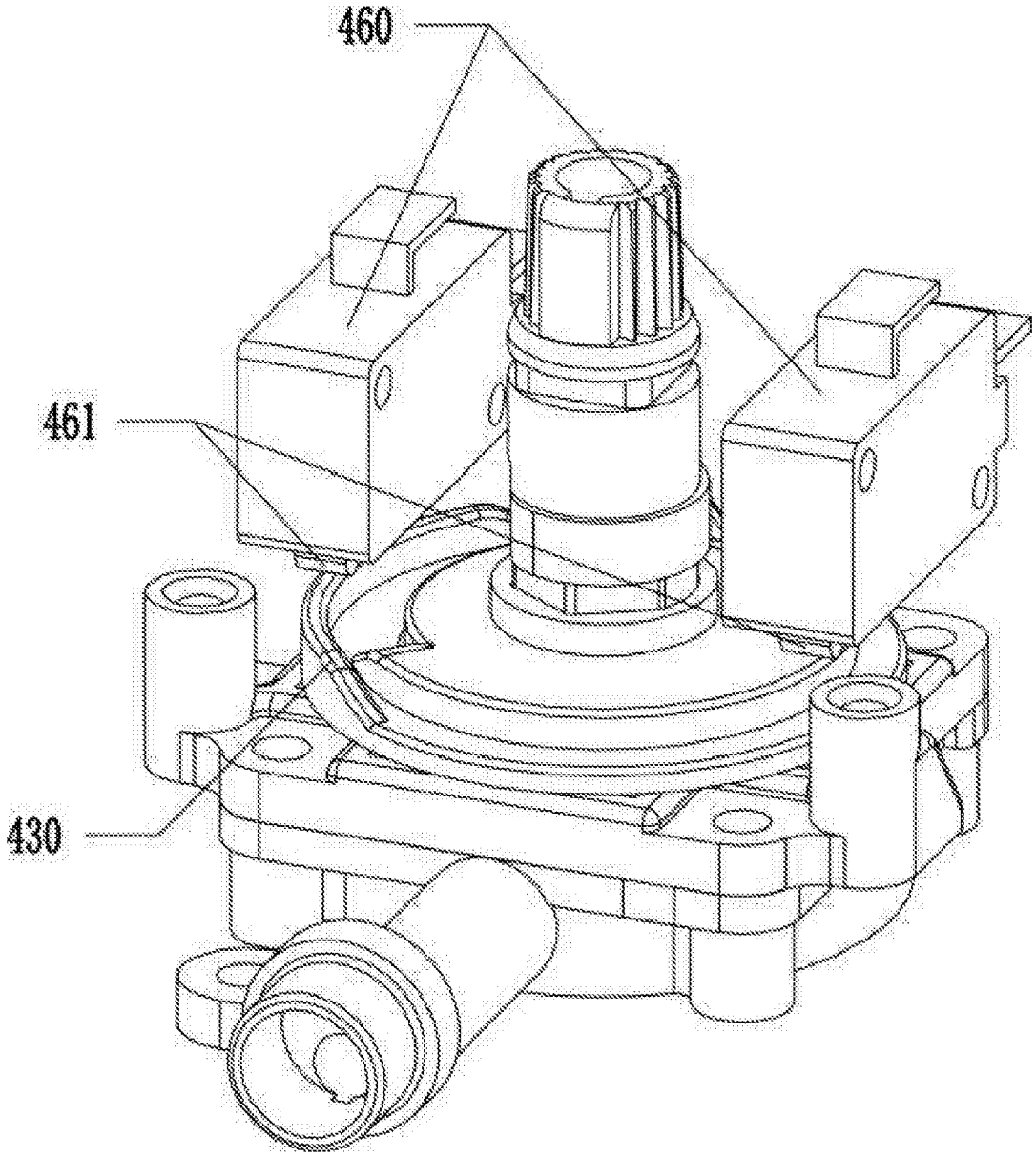


FIG. 6

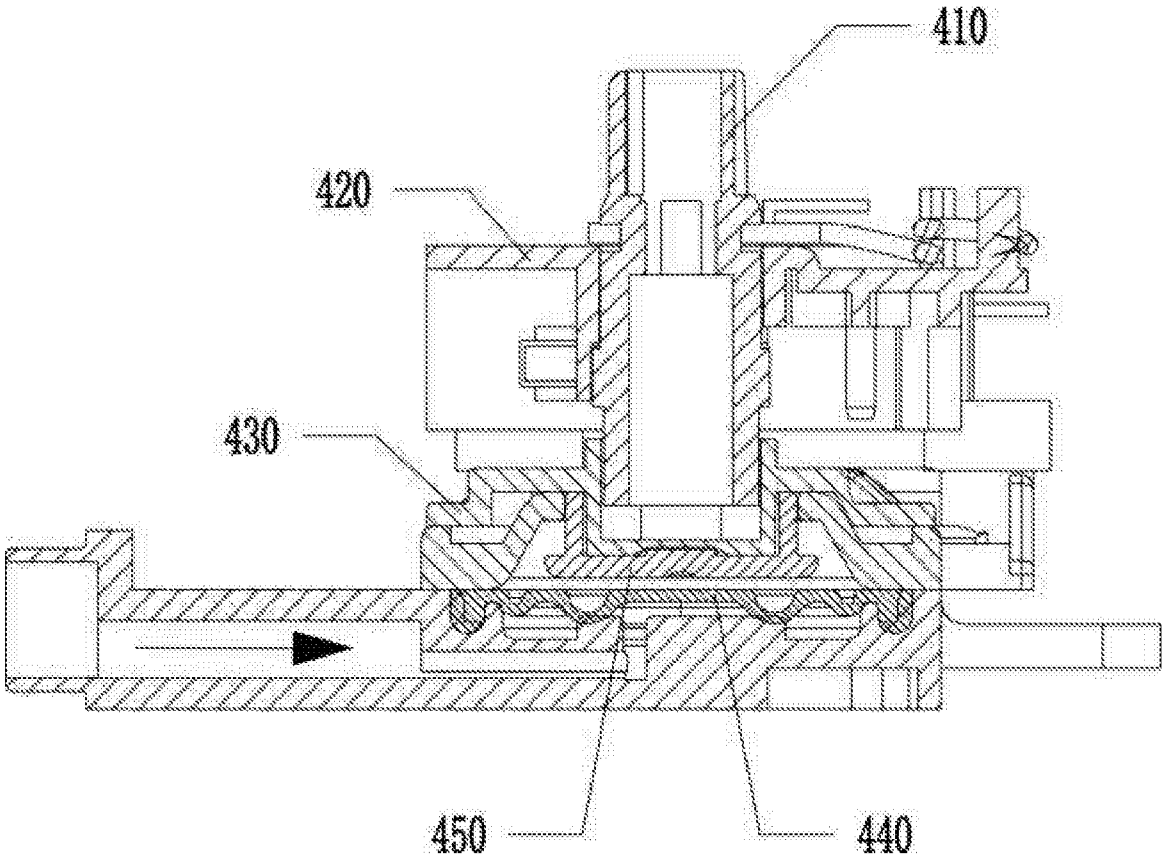


FIG. 7

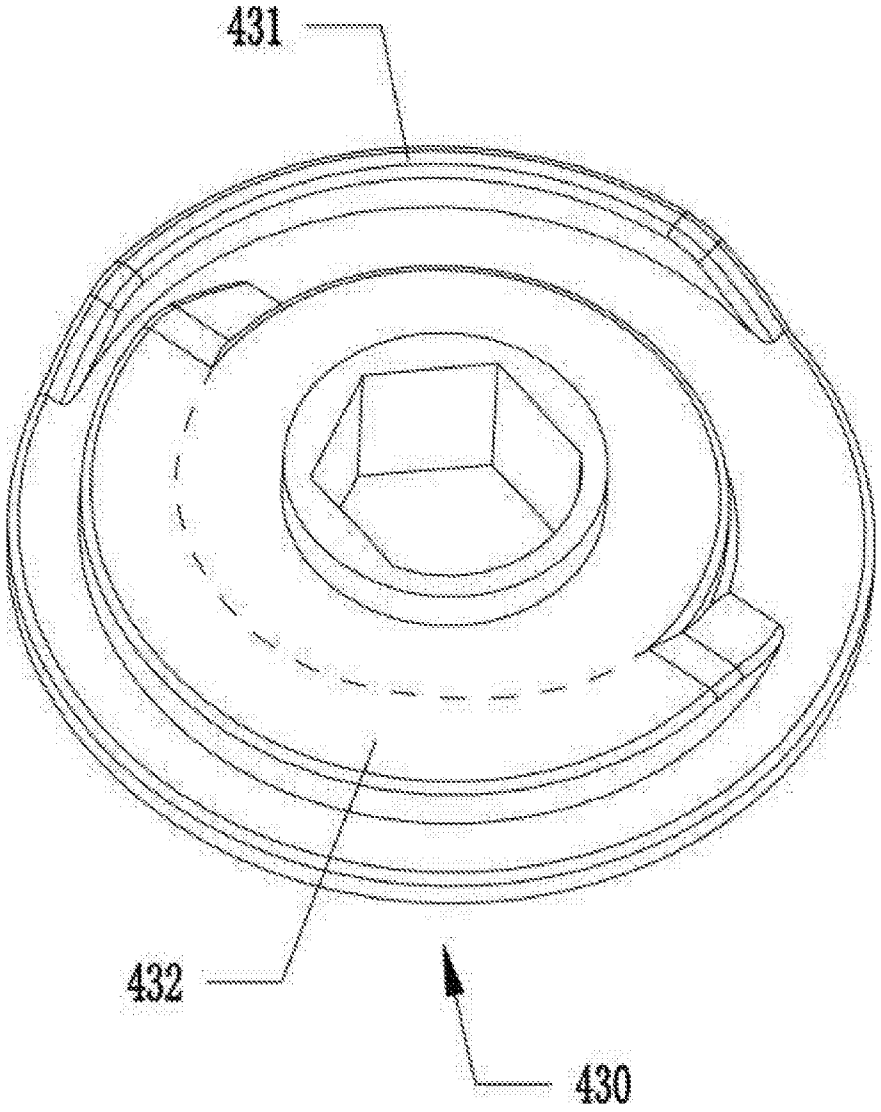


FIG. 8

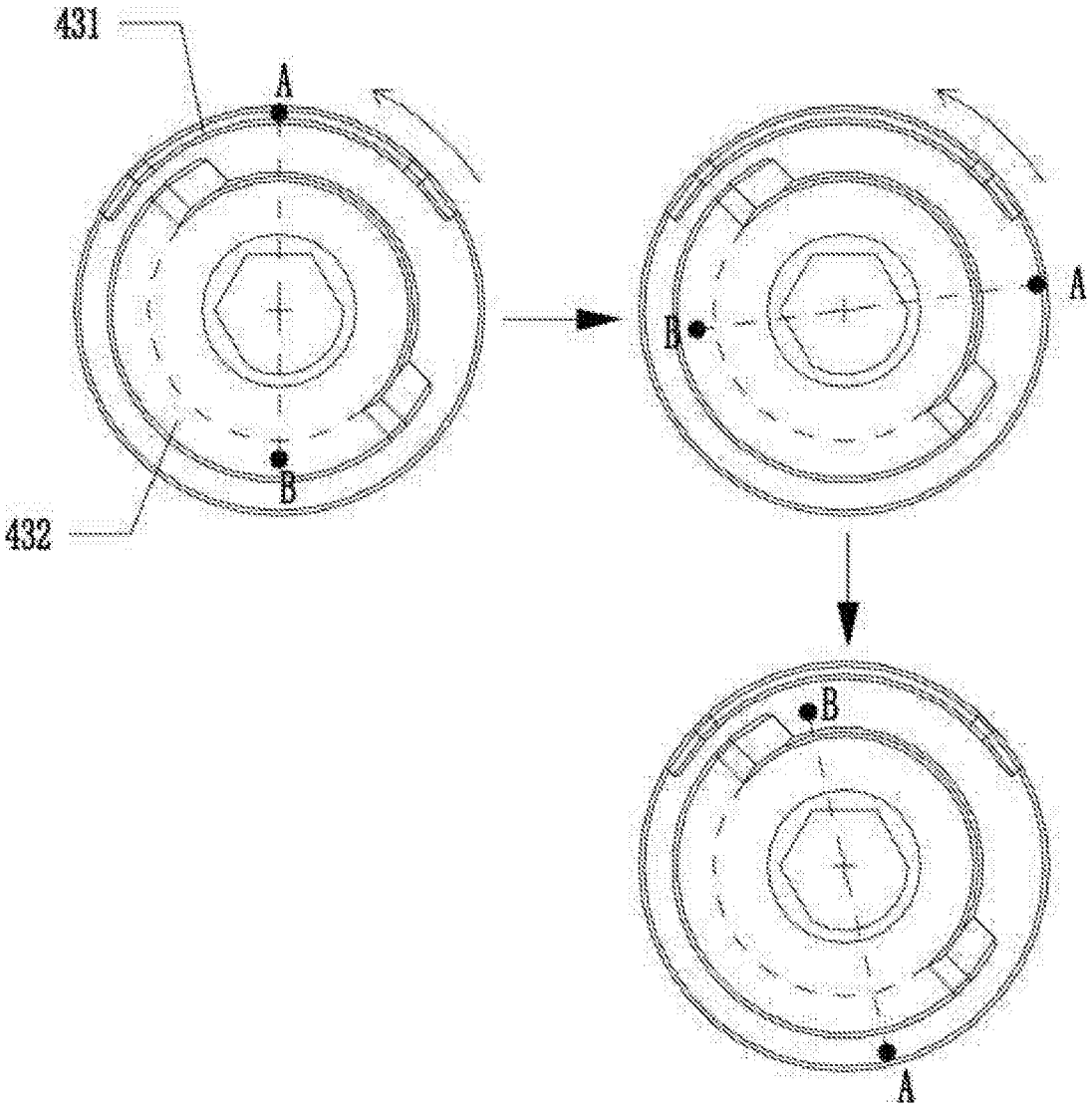


FIG. 9

MECHANICAL-SWITCH-TYPE INSTANT WATER HEATER

TECHICAL FIELD

[0001] The present invention relates to the field of water heater technologies, and more particularly to a mechanical-switch-type instant water heater.

BACKGROUND

[0002] Instant water heaters refer to water heaters that heat running water quickly and output the running water through electronic heating components and parts.

[0003] At present, most of these instant water heaters have a function of automatically regulating a heating efficiency to adapt to different inflow and outflow water flows. However, most of modules for automatically controlling the heating efficiency can only be used in a case of being electrified. Since the instant water heater is an electrical appliance that needs to be supplied with water, the instant water heater is often mounted in a humid place, which will cause related electronic components and parts to be easily damaged. Therefore, it is urgent to provide an instant water heater, which can automatically regulate the heating efficiency by mechanical means. In view of this, the inventor puts forward the present application after researching the prior art.

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[0004] UK patent application No. 9202694.7 disclosed an instantaneous electric water heater comprising an on/off water flow control valve and a water flow regulator mechanically controlled by independent user operable control knobs, whereby the knob may be left in an adjusted position when the water flow is turned off and on by the valve. However, UK patent application No. 9202694.7 fails to discloses

[0005] UK patent application No. 9407119.8 discloses an instantaneous electric water heater having an inlet for connection to a supply of cold water, an outlet for heated water and, between the inlet and the outlet, a pump, an on/off valve, a flow regulator and a heat exchanger. The on/off valve and flow regulator are operable independently with the pump being operable on

opening the valve to boost the water pressure and the heat exchanger being operable on opening the valve when the water pressure reaches a pre-determined value.

SUMMARY OF THIS INVENTION

[0006] A technical problem to be solved by the present invention is to overcome the defects in the prior art, and provides a mechanical-switch-type instant water heater.

[0007] A mechanical-switch-type instant water heater includes:

[0008] a heating mechanism including a water tank for heating water;

[0009] a water channel regulating mechanism including a water channel opening-closing assembly and a flow regulating assembly, wherein the water channel opening-closing assembly is used for controlling the water heater to flow in or not flow in water, and the flow regulating assembly is used for regulating a flow of water flowing into the water tank; and

[0010] a power regulating mechanism communicated with the water channel regulating mechanism and including a first diaphragm, a power regulating plate, a first regulating member, and a microswitch, wherein the first diaphragm is capable of bulging upwardly and being reset, the power regulating plate is provided with trigger portions, and the microswitch is provided with a contact.

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[0011] The first regulating member is capable of driving the power regulating plate to rotate, so that the trigger portions are located below the contact; and water from the water channel regulating mechanism is capable of driving the first diaphragm to bulge upwardly and drive the power regulating plate to move upwardly, so that the trigger portions trigger the contact.

[0012] As a further optimization, the power regulating mechanism further includes a stress base located between the power regulating plate and the first diaphragm, and the stress base is capable of driving the power regulating plate to move upwardly under the driving of the first diaphragm.

[0013] As a further optimization, the power regulating mechanism includes a pair of microswitches, and the power regulating plate is provided with the first trigger portion and the second trigger portion; and the power regulating plate moves upwardly and is capable of triggering one or two contacts.

[0014] As a further optimization, the first trigger portion and the second trigger portion are both arc-shaped bulges arranged on the power regulating plate.

[0015] As a further optimization, the water channel opening-closing assembly is provided with a first cavity and a second cavity, the first cavity is capable of being communicated with an external water source, and the second cavity is communicated with the flow regulating assembly;

[0016] the water channel opening-closing assembly includes a connecting base, a sealing needle, an elastic member, a second diaphragm, a first hinge rod and a second hinge rod; two ends of the second hinge rod are respectively hinged with one end of the first hinge rod and the connecting base, and the other end of the first hinge rod is connected with the sealing needle and is capable of being slidably supported on the connecting base back and forth; the first hinge rod is capable of driving the sealing needle to move outwardly, and compresses the elastic member and pulls the second diaphragm to bulge forwardly, so that the first cavity is communicated with the second cavity.

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[0017] As a further optimization, the connecting base is provided with a sliding groove matched with the first hinge rod.

[0018] As a further optimization, the first cavity is arranged around the second cavity, an end face of the second cavity is provided with an end opening communicated with the first cavity, and the second diaphragm is capable of pressing and closing the end opening of the second cavity.

[0019] As a further optimization, the flow regulating assembly includes a second regulating member, a water-passing base, and a movable member; the water-passing base is provided with a water-passing opening, and the movable member is inserted into the water-passing opening; and the second regulating member is capable of driving the movable member to move up and down, so as to regulate a gap between the movable member and the water-passing opening.

[0020] As a further optimization, the movable member is a rotating body with an isosceles trapezoid cross section.

[0021] As a further optimization, the flow regulating assembly further includes a connecting member, the second regulating member is in threaded connection with the connecting member, and the movable member is arranged on the connecting member.

[0022] By adopting the above technical solutions, the present invention can implement the following technical effects:

[0023] According to the instant water heater of the DISCLOSURE, the power regulating mechanism thereof can automatically regulate a heating power of the heating mechanism by being provided with the first diaphragm, the power regulating plate, and the microswitch. Specifically, when the water channel regulating mechanism is opened to flow in water, the first diaphragm bulges upwardly under an action of a water pressure, and drives the power regulating plate to trigger the contact of the microswitch, so that the heating mechanism performs heating. In specific operation, a position of the power regulating plate is regulated to make the power regulating plate trigger different numbers of contacts, thus implementing different heating powers.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0024] To illustrate the technical solutions of the embodiments of the present invention more clearly, the drawings needing to be used in the embodiments will be briefly introduced hereinafter. It is to be understood that the following drawings only show some embodiments of the present invention, so that the drawings should not be regarded as limiting the scope. Those of ordinary skills in the art can further obtain other related drawings according to these drawings without going through any creative work.

[0025] FIG. 1 is a schematic diagram illustrating a first axial side structure of an instant water heater according to an embodiment of the present invention;

[0026] FIG. 2 is a schematic diagram illustrating the first axial side structure of the instant water heater according to the embodiment of the present invention (with a part of a shell hidden);

[0027] FIG. 3 is a schematic diagram illustrating a side structure of a water channel regulating mechanism according to an embodiment of the present invention;

[0028] FIG. 4 is a schematic diagram illustrating a cross-sectional structure of the water channel regulating mechanism according to the embodiment of the present invention;

[0029] FIG. 5 is a schematic diagram illustrating a first side structure of a power regulating mechanism according to an embodiment of the present invention;

[0030] FIG. 6 is a schematic diagram illustrating a second side structure of the power regulating mechanism according to the embodiment of the present invention (with a mounting base hidden);

[0031] FIG. 7 is a schematic diagram illustrating a cross-sectional structure of the power regulating mechanism according to the embodiment of the present invention;

[0032] FIG. 8 is a schematic diagram illustrating an axial side structure of the power regulating mechanism according to the embodiment of the present invention; and

[0033] FIG. 9 is a schematic diagram illustrating a position principle of a power regulating plate and a contact according to an embodiment of the present invention.

[0034] Reference numerals in the drawings:

[0035] 100 refers to shell mechanism;

[0036] 200 refers to heating mechanism;

[0037] 300 refers to water channel regulating mechanism; 310 refers to water channel opening-closing assembly; 320 refers to flow regulating assembly; 311 refers to first hinge rod; 312 refers to second hinge rod; 313 refers to second diaphragm; 314 refers to connecting base; 315 refers to sealing needle; 316 refers to elastic member; 317 refers to first cavity; 318 refers to second cavity; 321 refers to second regulating member; 322 refers to connecting member; 323 refers to water-passing base; and 324 refers to movable member;

[0038] 400 refers to power regulating mechanism; 410 refers to first regulating member; 420 refers to mounting base; 430 refers to power regulating plate; 440 refers to first diaphragm; 450 refers to stress base; 460 refers to microswitch; 431 refers to first trigger portion; 432 refers to second trigger portion; and 461 refers to contact; and

[0039] M refers to first switch; N refers to second switch; and Q refers to third switch.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0040] To make the objectives, technical solutions and advantages of the embodiments of the present invention clearer, the technical solutions in the embodiments of the present invention

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will be described clearly and completely with reference to the drawings in the embodiments of the present invention.

[0041] The invention will be further described in detail with reference to the drawings and specific embodiments.

[0042] As shown in FIG. 1 and FIG. 2, this embodiment provides a mechanical-switch-type instant water heater, which includes a shell mechanism 100, a heating mechanism 200, a water channel regulating mechanism 300, and a power regulating mechanism 400. The heating mechanism 200 is used for heating inflow water, the water channel regulating mechanism 300 is used for controlling whether to flow in water and a flow of the inflow water, and the power regulating mechanism 400 is used for controlling a heating power of the heating mechanism 200. Details are as follows.

[0043] As shown in FIG. 2, FIG. 3, and FIG. 4, in this embodiment, the heating mechanism 200 includes a water tank and a heating assembly, and the heating assembly is used for heating water flowing into the water tank. The water channel regulating mechanism 300 includes a water channel opening-closing assembly 310 and a flow regulating assembly 320. The water channel opening-closing assembly 310 and the flow regulating assembly 320 are respectively provided with a first switch M and a second switch N which are exposed from the shell mechanism 100. The water channel opening-closing assembly 310 is used for controlling the water heater to flow in or not flow in water, and the flow regulating assembly 320 is used for regulating the flow of the water flowing into the water tank.

[0044] Specifically, as shown in FIG. 3 and FIG. 4, the water channel opening-closing assembly 310 is provided with a first cavity 317 and a second cavity 318, the shell mechanism 100 is provided with a port for communicating the first cavity 317 with an external water source, and the second cavity 318 is communicated with the flow regulating assembly 320. The water channel opening-closing assembly 310 includes a connecting base 314, a sealing needle 315, an elastic member 316, a second diaphragm 313, a first hinge rod 311, and a second hinge rod 312. Two ends of the second hinge rod 312 are respectively hinged with one end of the first hinge rod 311 and the connecting base 314, and the other end of the first hinge rod 311 is connected with the sealing needle 315 and is capable of being slidably supported on the connecting base 314 back and forth. When the first switch M is pressed, the first hinge rod 311 is capable of driving

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the sealing needle 315 to move outwardly, the elastic member 316 is compressed while pulling the second diaphragm 313 to bulge forwardly, so that the first cavity 317 is communicated with the second cavity 318. At the moment, external water is capable of flowing from the first cavity 317 into the second cavity 318, and then flowing from the second cavity 318 into the flow regulating assembly 320.

[0045] It is to be noted that, as shown in FIG. 4, the connecting base 314 is provided with a sliding groove matched with the first hinge rod 311, so that the first hinge rod 311 can drive the sealing needle 315 to move back and forth. Moreover, in this embodiment, the first cavity 317 is arranged around the second cavity 318, an end face of the second cavity 318 is provided with an end opening communicated with the first cavity 317, and the second diaphragm 313 is capable of pressing and closing the end opening of the second cavity 318. When no external force acts on the first switch M, the second diaphragm 313 can separate the first cavity 317 from the second cavity 318, so that the external water cannot flow into the second cavity 318.

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[0046] As shown in FIG. 3 and FIG. 4, the flow regulating assembly 320 includes a second regulating member 321, a water-passing base 323, a connecting member 322, and a movable member 324. The water-passing base 323 is provided with a water-passing opening, and the movable member 324 is a rotating body with an isosceles trapezoid cross-section. The movable member 324 is sleeved on the connecting member 322 with a big end facing upwardly, and the connecting member 322 is in threaded connection with the second regulating member 321. In specific operation, the second switch N is rotated to drive the second regulating member 321 to rotate together, so that the connecting member 322 drives the movable member 324 to move up and down. When the connecting member 322 drives the movable member 324 to move upwardly, a gap between the movable member 324 and the water-passing opening is increased, so that a water-passing flow of the flow regulating assembly 320 is increased. When the connecting member 322 drives the movable member 324 to move downwardly, the gap between the movable member 324 and the water-passing opening is reduced, so that the water-passing flow of the flow regulating assembly 320 is reduced. Water passing through the gap between the movable member 324 and the water-passing opening is communicated with the heating mechanism 200 and the power regulating mechanism 400 respectively.

[0047] As shown in FIG. 5 to FIG. 8, in this embodiment, the power regulating mechanism 400 is communicated with the flow regulating assembly 320. The power regulating mechanism 400 includes a first diaphragm 440, a stress base 450, a power regulating plate 430, a first regulating member 410, a mounting base 420, and a pair of microswitches 460. In addition, the power regulating mechanism 400 is also provided with a third switch Q exposed from the shell mechanism 100. The pair of microswitches 460 are respectively supported on the mounting base 420. A bottom of the first diaphragm 440 is capable of bulging upwardly when an upward force is applied, and the first diaphragm 440 can be reset when the external force is removed. The power regulating plate 430 is provided with a first trigger portion 431 and a second trigger portion 432, and the pair of microswitches 460 are provided with a contact A and a contact B respectively. The third switch Q is rotated to allow different numbers of contacts 461 to be located above the first trigger portion 431 and the second trigger portion 432.

[0048] Specifically, as shown in FIG. 8, the power regulating plate 430 is a plate-shaped member with a circular outline, and the first trigger portion 431 and the second trigger portion 432 are arc-shaped bulges respectively arranged on the power regulating plate 430. When the water channel opening-closing assembly 310 is opened, water flows into the power regulating mechanism 400 from the flow regulating assembly 320 to make the first diaphragm 440 bulge upwardly and drive the stress base 450 to move upwardly, so that the first trigger portion 431 and the second trigger portion 432 trigger zero, one, or two contacts 461, and the heating power of the heating mechanism 200 is greater when more contacts 461 are triggered. When the water channel opening-closing assembly 310 is closed, the first diaphragm 440 and the stress base 450 fall back, so that neither the first trigger portion 431 nor the second trigger portion 432 can trigger the contact 461.

[0049] FIG. 9 shows three states between the contact A and the contact B, and the first trigger portion 431 and the second trigger portion 432. In the first state, the contact A is located above the first trigger portion 431, and the contact B is located above the second trigger portion 432. In the second state, only the contact B is located above the second trigger portion 432, and the contact A is not located above the first trigger portion 431. In the third state, the contact A and the contact B are not located above the first trigger portion 431 and the second trigger portion

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432. Therefore, three heating powers of the heating mechanism 200 can be implemented only by rotating the third switch Q.

[0050] In addition, as shown in FIG. 8 and FIG. 9, in this embodiment, two ends of the first trigger portion 431 and the second trigger portion 432 are uniformly transitioned with an upper surface of the power regulating plate 430, thus being convenient for the power regulating mechanism 400 to be switched among the different states.

[0051] Through the above solutions of this embodiment, the water channel opening-closing assembly 310, the flow regulating assembly 320, and the power regulating mechanism 400 of the instant water heater of the present invention are all mechanical switches, which greatly reduce use of electronic components and parts, and improve a use reliability of the instant water heater in a humid environment. In particular, the power regulating mechanism 400 relies on a water pressure to automatically trigger the heating power, and has a good practicability.

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We claim:

1. 1. A mechanical-switch-type instant water heater, comprising:

a heating mechanism (200) comprising a water tank for heating water;

a water channel regulating mechanism (300) comprising a water channel opening-closing assembly (310) and a flow regulating assembly (320), wherein the water channel opening-closing assembly (310) is used for controlling the water heater to flow in or not flow in water, and the flow regulating assembly (320) is used for regulating a flow of water flowing into the water tank; and

a power regulating mechanism (400) communicated with the water channel regulating mechanism (300) and comprising a first diaphragm (440), a power regulating plate (430), a first regulating member (410), and a microswitch (460), wherein the first diaphragm (440) is capable of bulging upwardly and being reset, the power regulating plate (430) is provided with trigger portions (431; 432), and the microswitch (460) is provided with a contact (461);

the first regulating member (410) is capable of driving the power regulating plate (430) to rotate, so that the trigger portions (431; 432) are located below the contact (461); and water from the water channel regulating mechanism (300) is capable of driving the first diaphragm (440) to bulge upwardly and drive the power regulating plate (430) to move upwardly, so that the trigger portions (431; 432) trigger the contact (461);

wherein the water channel opening-closing assembly (310) is provided with a first cavity (317) and a second cavity (318), the first cavity (317) is capable of being communicated with an external water source, and the second cavity (318) is communicated with the flow regulating assembly (320);

the water channel opening-closing assembly (310) comprises a connecting base (314), a sealing needle (315), an elastic member (316), a second diaphragm (313), a first hinge rod (311) and a second hinge rod (312); two ends of the second hinge rod (312) are respectively hinged with one end of the first hinge rod (311) and the connecting base (314), and the other end of the first hinge rod (311) is connected with the sealing needle (315) and is capable of being slidably supported on the connecting base (314) back and forth; the first hinge rod (311) is capable of driving the sealing needle (315) to move outwardly, and compresses the elastic member (316) and pulls the second diaphragm (313) to bulge forwardly, so that the first cavity (317) is

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communicated with the second cavity (318).

2. The mechanical-switch-type instant water heater according to claim 1, wherein the power regulating mechanism (400) further comprises a stress base (450) located between the power regulating plate (430) and the first diaphragm (440), and the stress base (450) is capable of driving the power regulating plate (430) to move upwardly under the driving of the first diaphragm (440).

3. The mechanical-switch-type instant water heater according to claim 1, wherein the power regulating mechanism (400) comprises a pair of microswitches (460), and the power regulating plate (430) is provided with the first trigger portion (431) and the second trigger portion (432); and the power regulating plate (430) moves upwardly and is capable of triggering one or two contacts (461).

4. The mechanical-switch-type instant water heater according to claim 3, wherein the first trigger portion (431) and the second trigger portion (432) are both arc-shaped bulges arranged on the power regulating plate (430).

5. The mechanical-switch-type instant water heater according to claim 1, wherein the connecting base (314) is provided with a sliding groove matched with the first hinge rod (311).

6. The mechanical-switch-type instant water heater according to claim 1, wherein the first cavity (317) is arranged around the second cavity (318), an end face of the second cavity (318) is provided with an end opening communicated with the first cavity (317), and the second diaphragm (313) is capable of pressing and closing the end opening of the second cavity (318).

7. The mechanical-switch-type instant water heater according to claim 1, wherein the flow regulating assembly (320) comprises a second regulating member (321), a water-passing base (323), and a movable member (324); the water-passing base (323) is provided with a water-passing opening, and the movable member (324) is inserted into the water-passing opening; and the second regulating member (321) is capable of driving the movable member (324) to move up and down, so as to regulate a gap between the movable member (324) and the water-passing opening.

8. The mechanical-switch-type instant water heater according to claim 7, wherein the movable member (324) is a rotating body with an isosceles trapezoid cross section.

9. The mechanical-switch-type instant water heater according to claim 7, wherein the flow regulating assembly (320) further comprises a connecting member (322), the second regulating member (321) is in threaded connection with the

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connecting member (322), and the movable member (324) is arranged on the connecting member (322).

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