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(54) **WATER-COOLING PUMP STRUCTURE WITH CHECK VALVES AND WATER-COOLING MODULE THEREOF**

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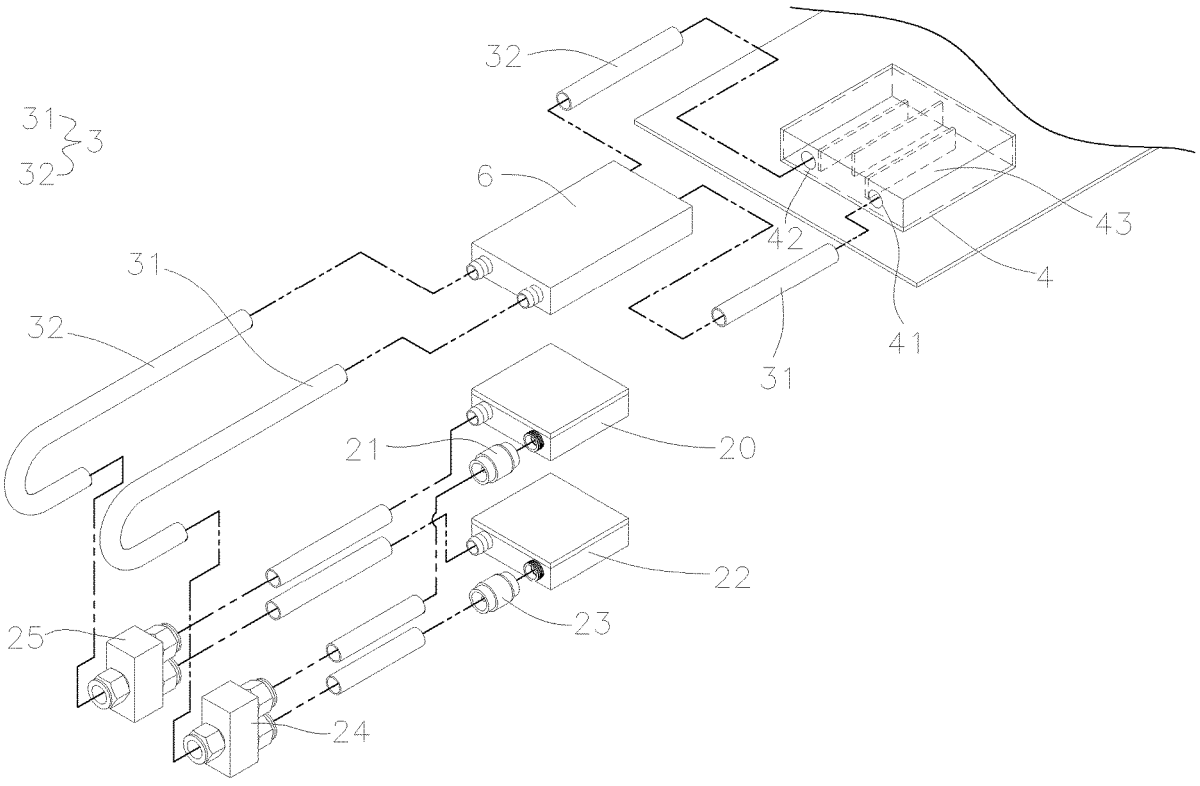
(57) **ABSTRACT**

A water-cooling pump structure with check valves and a water-cooling module thereof including a first pump unit, a first check valve, a second pump unit, a second check valve, a first connector assembly, a second connector assembly, a pipe body assembly and a heat dissipation unit. The first and second check valves are respectively mounted at the first and second water outlets of the first and second pump units. By means of the arrangement of a first sealing member inside the first check valve, the cooling liquid is prevented from flowing back to the first pump chamber. Therefore, the problem of the backflow of the cooling liquid can be totally solved. Moreover, the heat dissipation efficiency can be greatly enhanced.



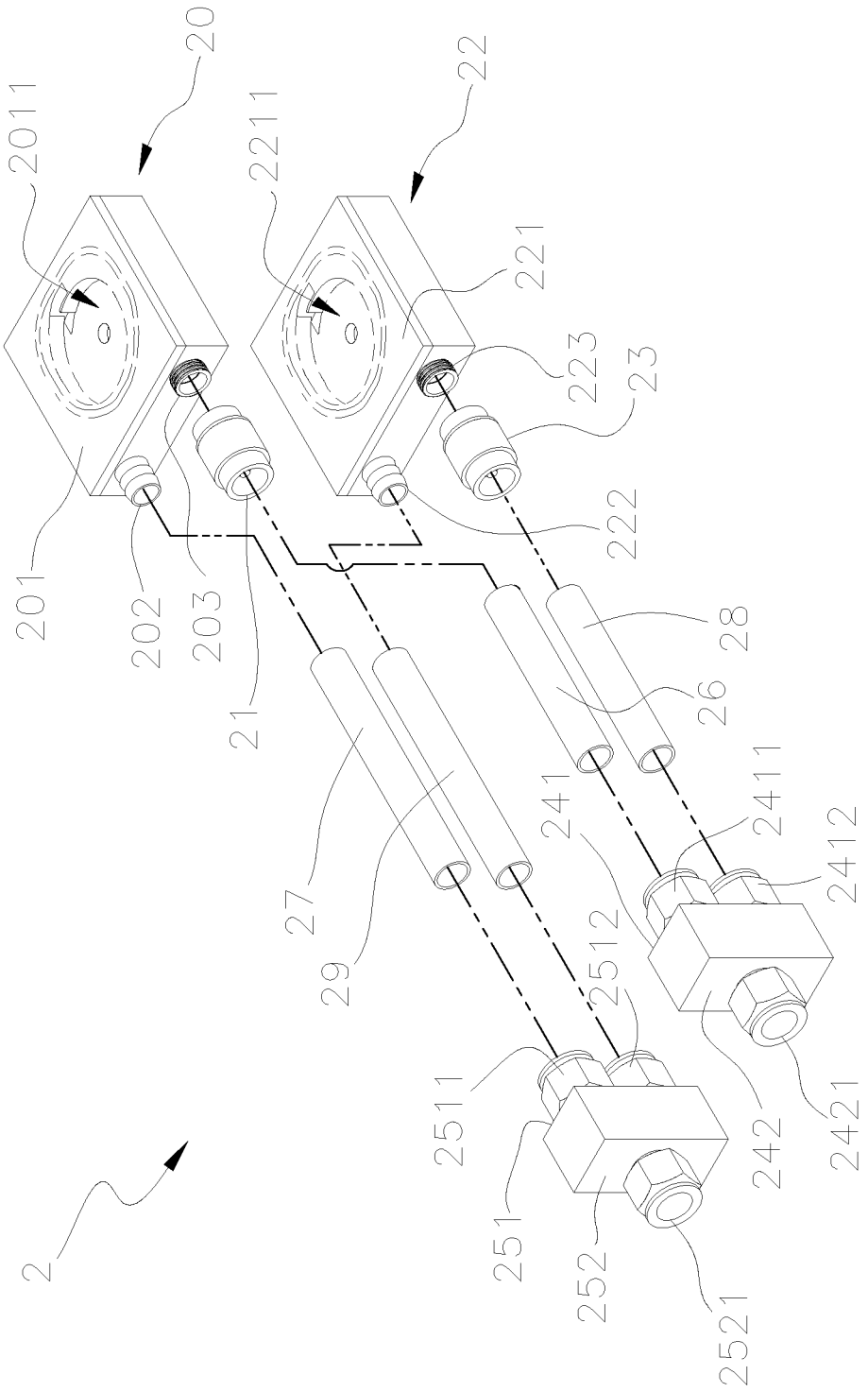

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Fig. 1A

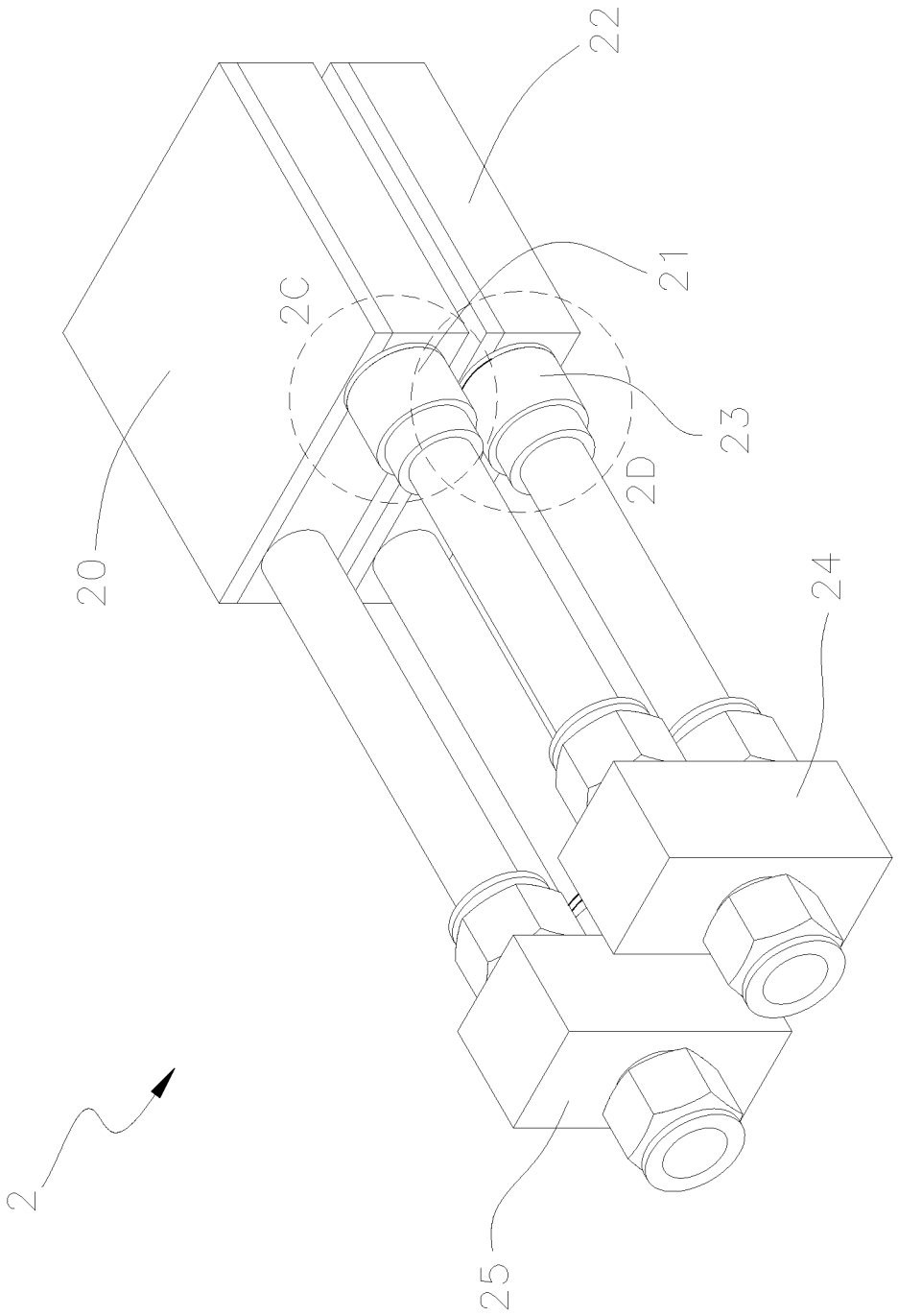

Fig. 1B

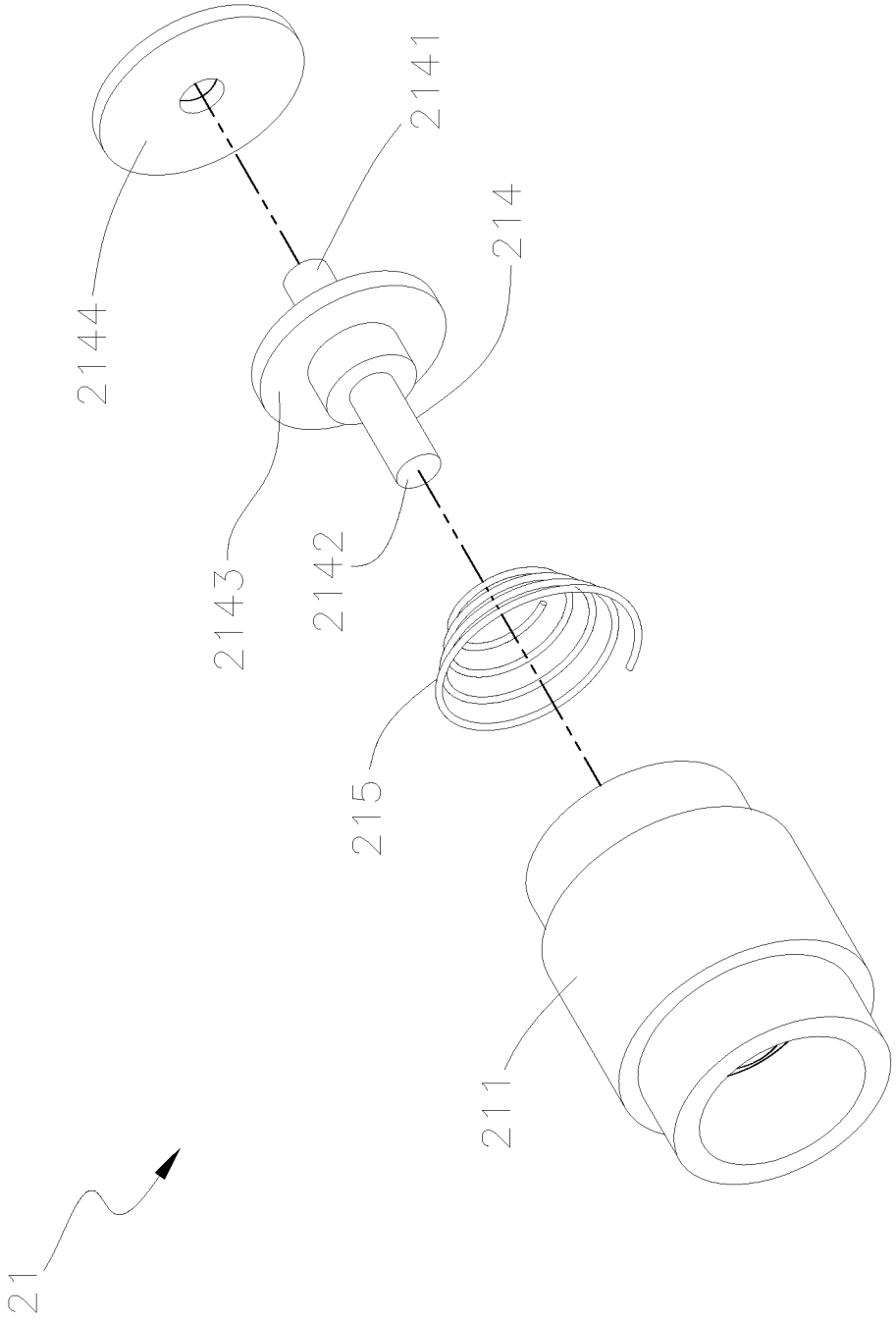

Fig. 2A

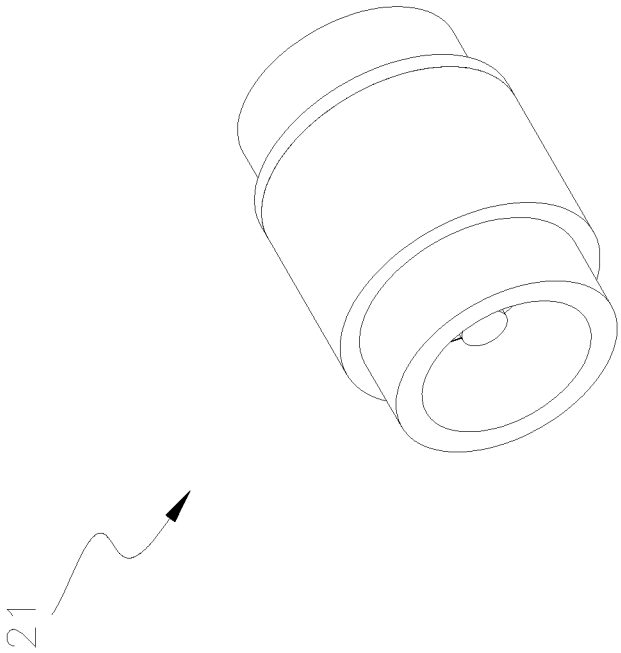

Fig. 2B

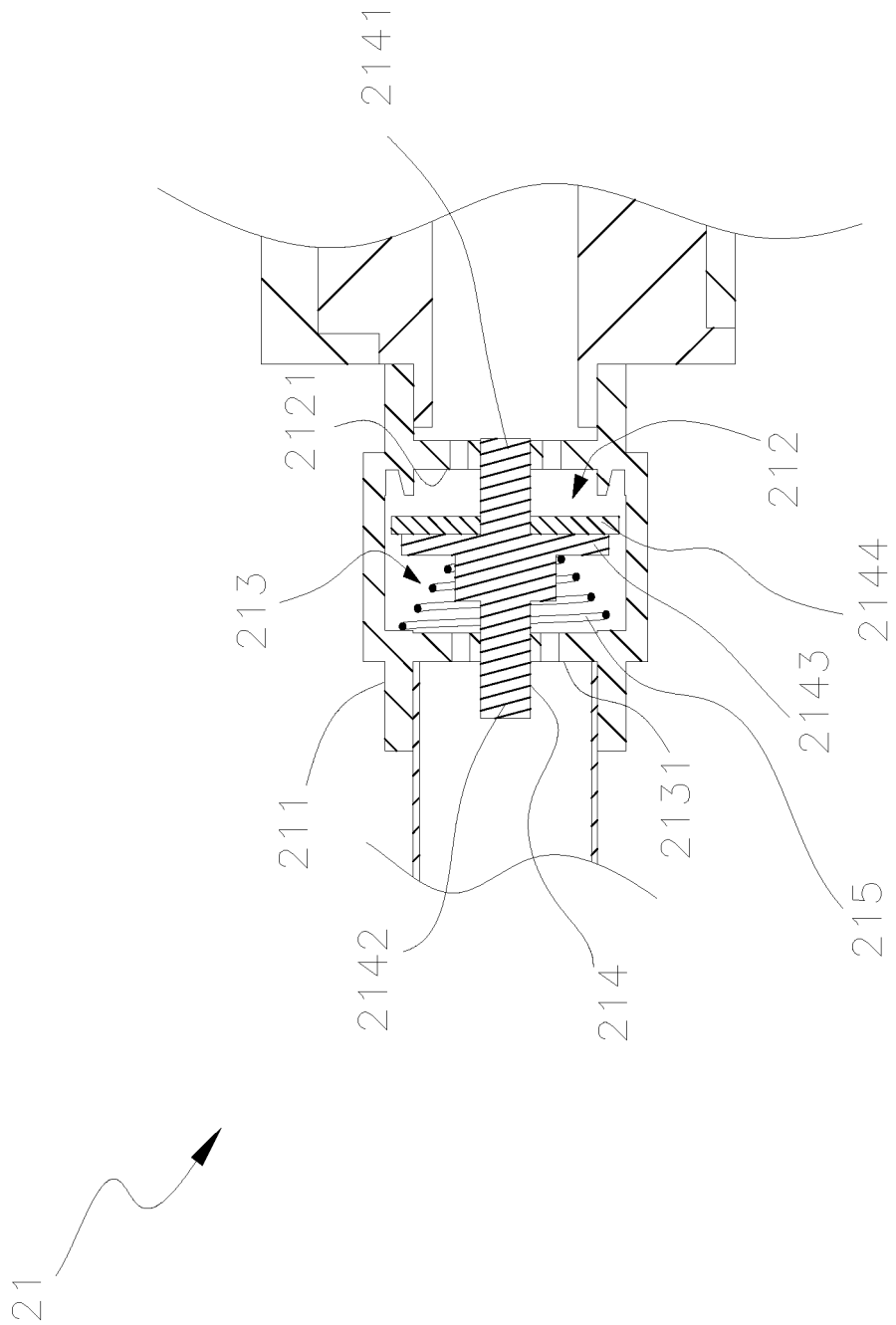

Fig. 2C

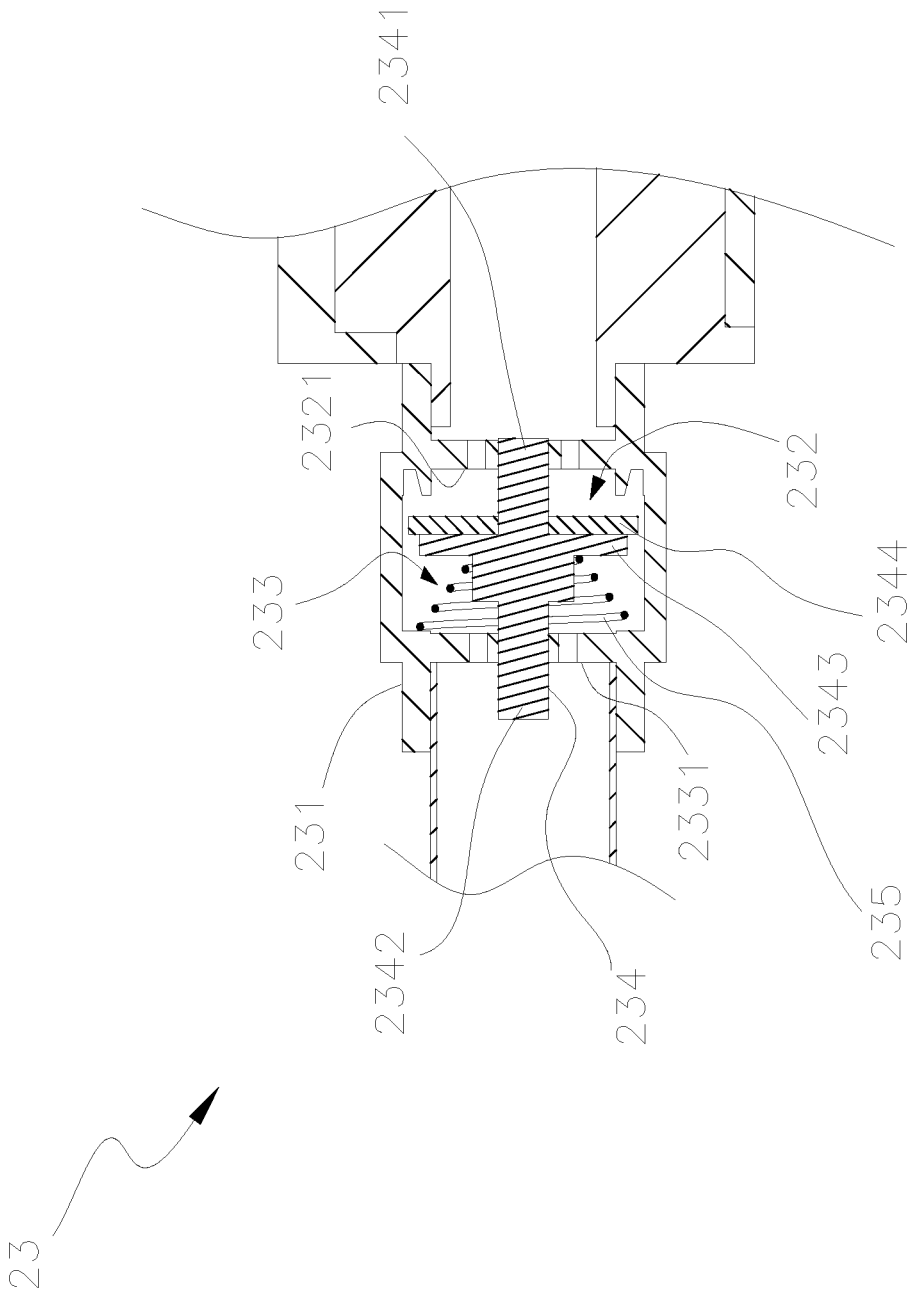

Fig. 2D

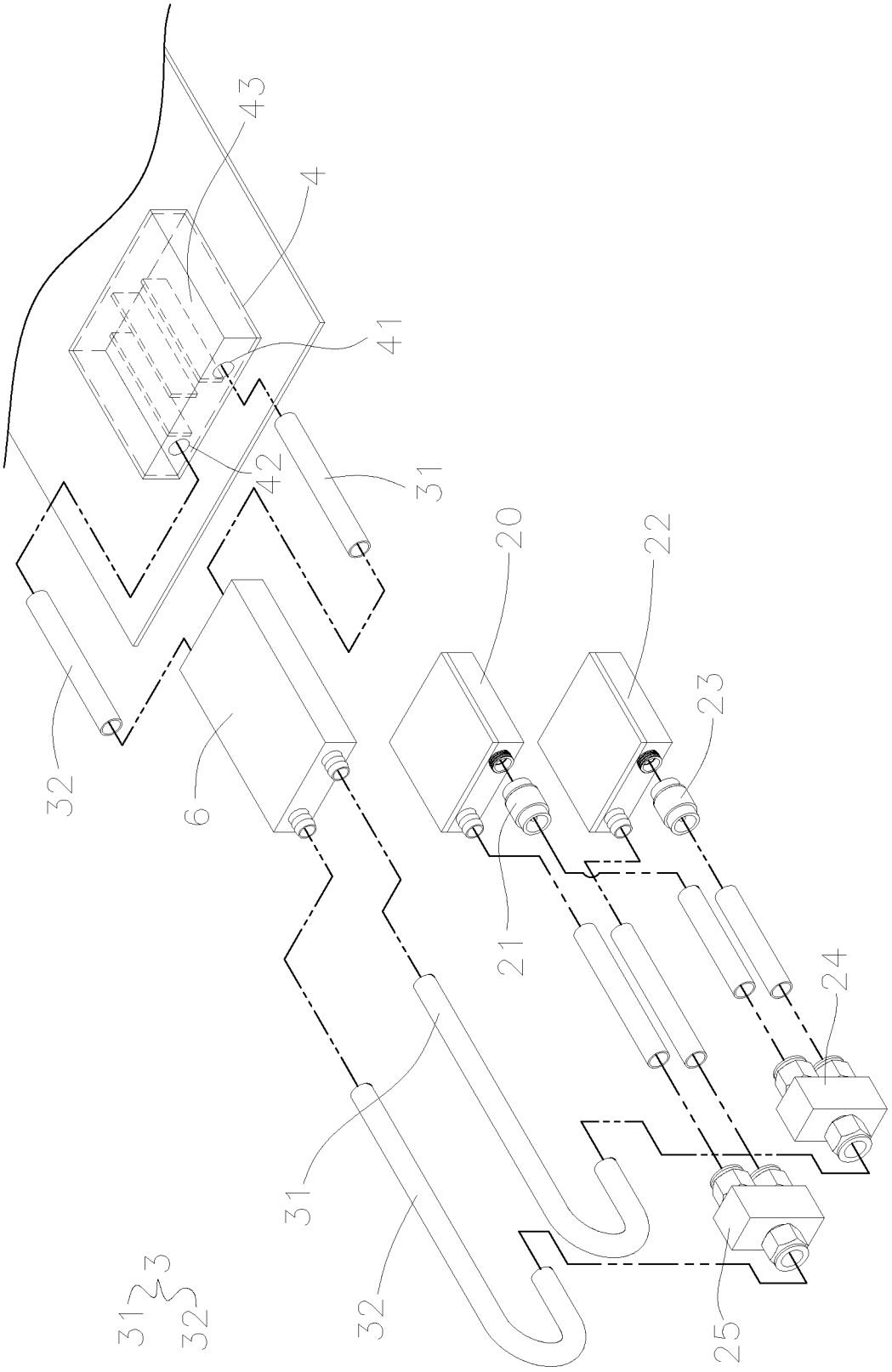

Fig. 3A

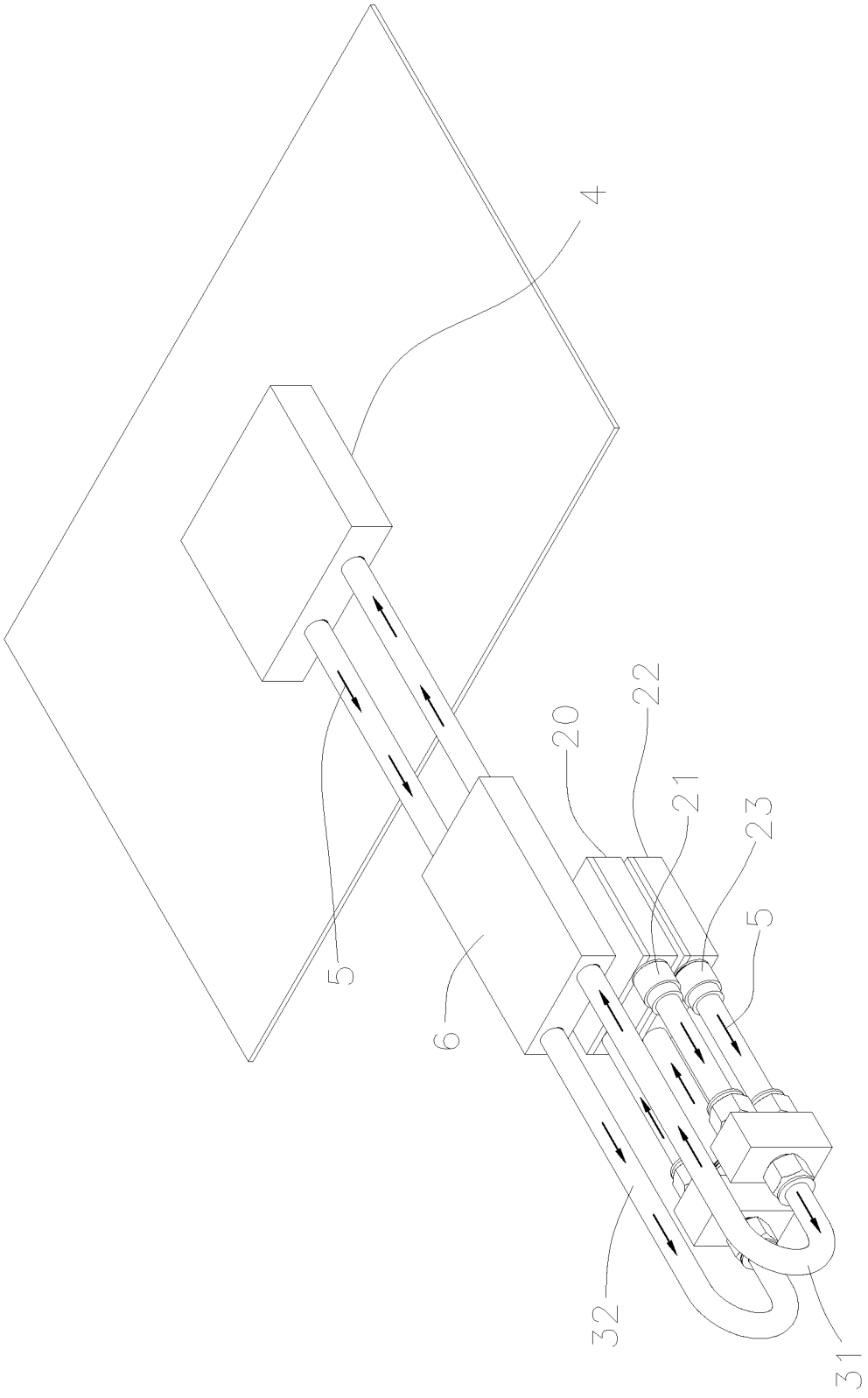

Fig. 3B

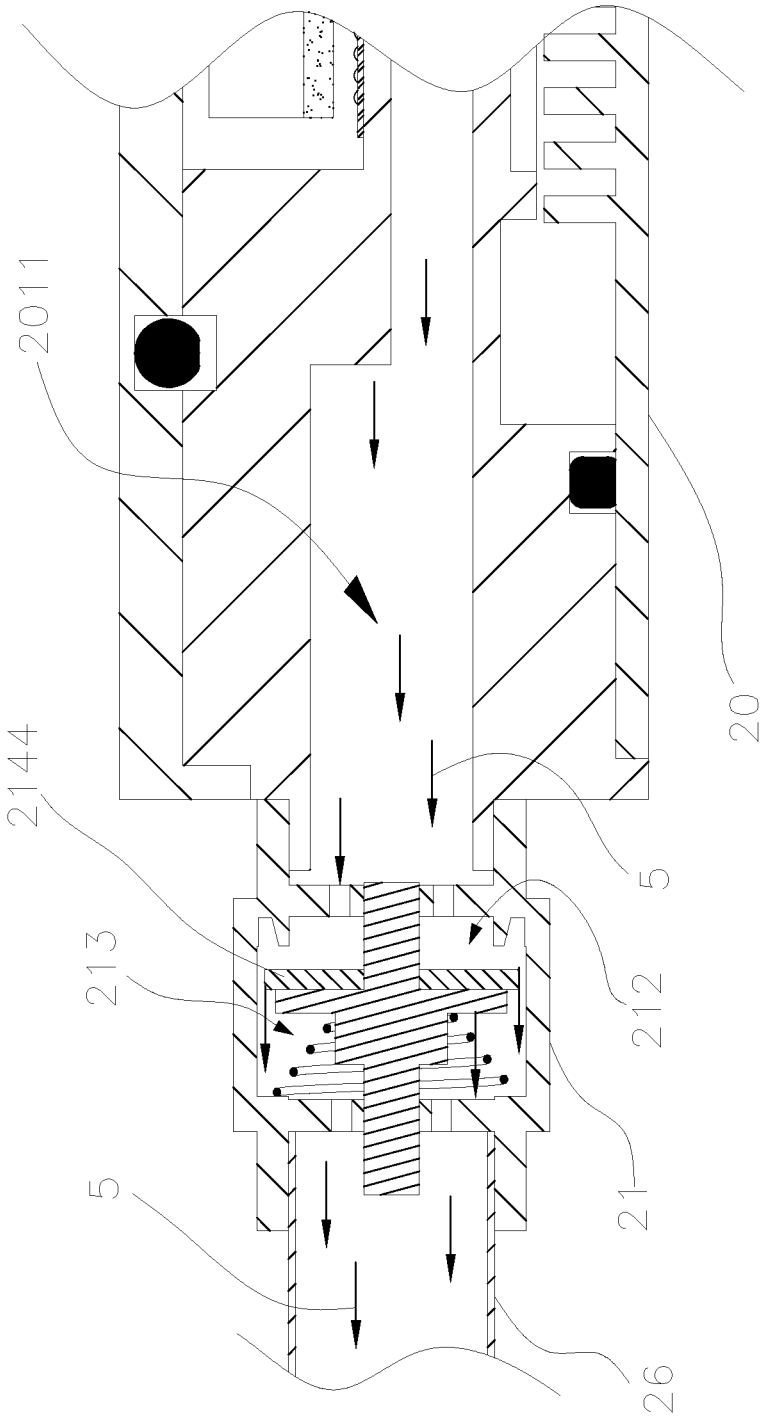

Fig. 3C

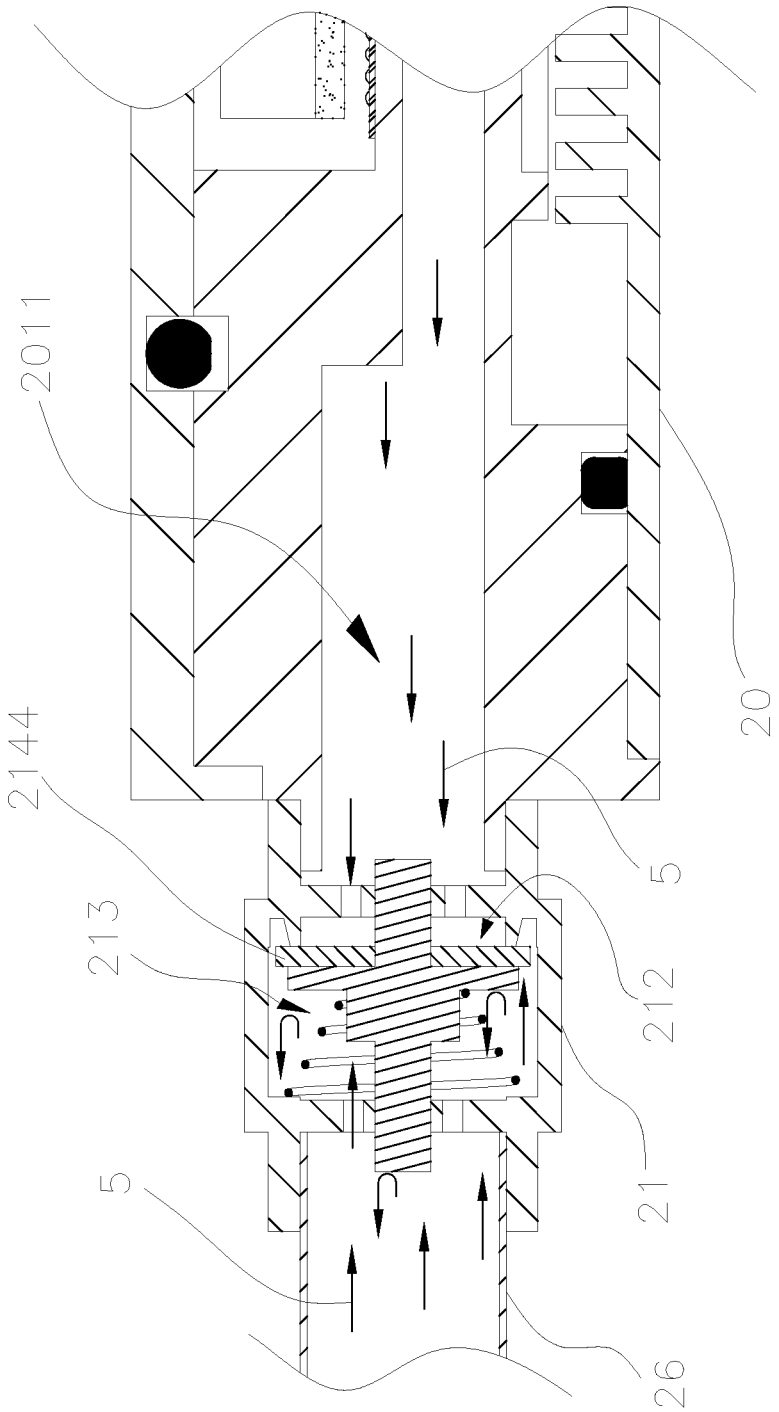

Fig. 3D

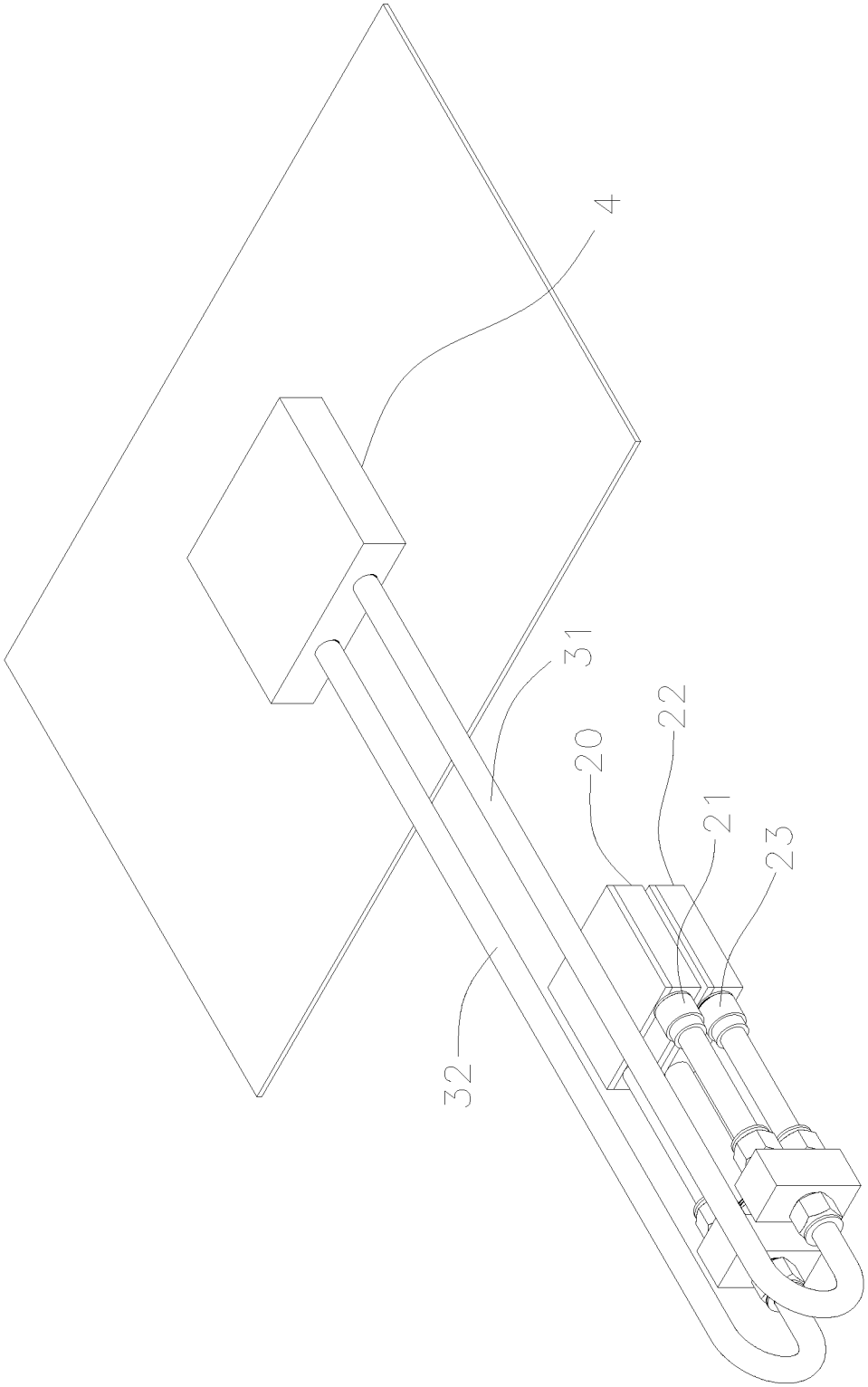

Fig. 4

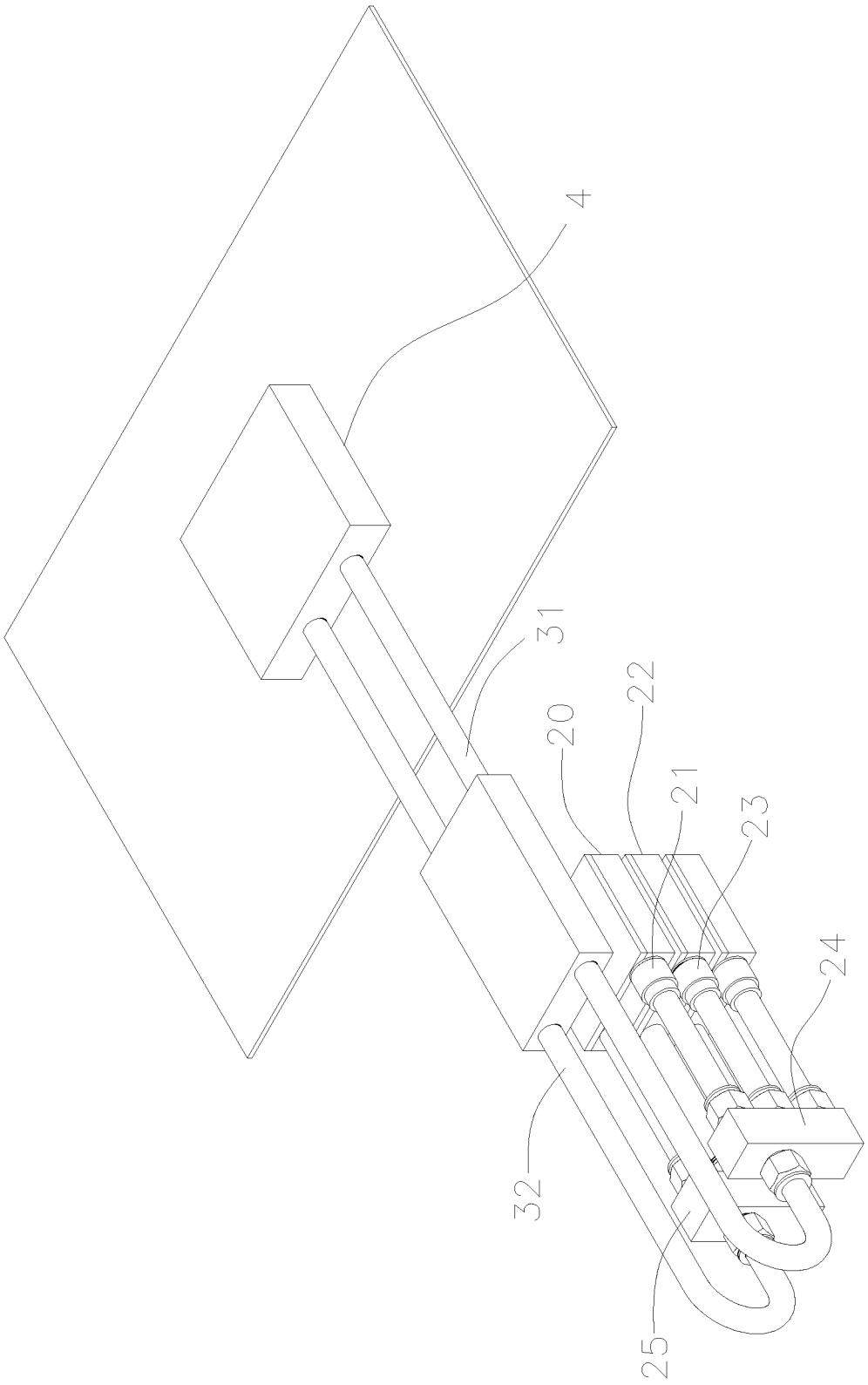

Fig. 5

WATER-COOLING PUMP STRUCTURE WITH CHECK VALVES AND WATER-COOLING MODULE THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a water-cooling pump structure with check valves and a water-cooling module thereof, and more particularly to a water-cooling pump structure with check valves and a water-cooling module thereof, which can prevent the cooling liquid from flowing back.

2. Description of the Related Art

[0002] It is known that a great amount of various chips such as central processing unit, graphics chip and Northbridge/Southbridge chipset are used in the current computer or electronic industries. The arrangement density of these chips has become higher and higher and the operation frequency has become faster and faster. As a result, in operation, the heat generated by these chips as heat generation components has become higher and higher. In operation, in the case that the temperature is too high, the heat generation components will malfunction or even burn down. Therefore, in order to effectively reduce the heat, various heat dissipation devices are provided on the market. The heat dissipation devices are tightly attached to the heating surfaces of the heat generation components so as to dissipate the heat by way of conduction, convection or radiation and keep the heat generation components operating at normal working temperature.

[0003] The most often seen heat dissipation device is made of thermo-conductive metal (such as aluminum or copper) by means of various processing procedures. The heat dissipation device is composed of a base seat, multiple radiating fins and a cooling fan. The base seat is in tight contact with the heat generation component to directly conduct the heat to the radiating fins. Heat convection takes place between the surface of the radiating fins and the ambient air so as to dissipate the heat to outer side. Alternatively, a heat pipe can be combined with the heat dissipation device to enhance the heat dissipation effect. The heat pipe has a closed tubular body, in which a liquid cooling medium is filled. The main composition of the cooling medium is water. The rest of the cooling medium is composed of special compositions capable of enhancing the heat transfer ability of the liquid. One end of the heat pipe is an evaporation end in contact with the heat generation component to absorb the heat thereof. After the cooling medium absorbs the heat, the cooling medium is evaporated into vapor phase and moves to the other end of the heat pipe, that is, the condensation end to dissipate the heat. Accordingly, the heat pipe provides a closed heat dissipation circulation travel. The cooling medium serves to carry away a great amount of heat at one time to enhance the heat dissipation efficiency.

[0004] In addition, there is a water-cooling thermal module simply employing liquid circulation to dissipate the heat. The water-cooling thermal module employs a circulating pump to drive a cooling liquid with large specific heat to absorb heat, (which is generally water). When the cooling liquid flows through the heat generation component, the cooling liquid can absorb the heat. Then the cooling liquid flows away to carry away the heat from the heat generation component. When the cooling liquid flows through a pipeline or a water reservoir, the cooling liquid releases the heat to achieve the object of heat dissipation. In order to enhance the heat dissipation efficiency, some manufacturers develop a water-cooling thermal module in which multiple pumps are up and down stacked to dissipate the heat. The cooling liquid in the respective pumps is collected and then flows out through the pipe bodies. Accordingly, the cooling liquid is continuously circulated to dissipate the heat. However, according to such arrangement, in case one of the pumps is damaged and fails to drive the internal cooling liquid to flow, this will lead to the problem of backflow of the cooling liquid. Therefore, the cooling liquid can hardly smoothly circulate to dissipate the heat. As a result, the heat dissipation efficiency will be deteriorated.

SUMMARY OF THE INVENTION

[0005] It is therefore a primary object of the present invention to provide a water-cooling pump structure with check valves, which can prevent the cooling liquid from flowing back.

[0006] It is a further object of the present invention to provide the above water-cooling pump structure with check valves, which can greatly enhance the heat dissipation efficiency.

[0007] It is still a further object of the present invention to provide a water-cooling module, which can prevent the cooling liquid from flowing back.

[0008] It is still a further object of the present invention to provide the above water-cooling module, which can greatly enhance the heat dissipation efficiency.

[0009] To achieve the above and other objects, the water-cooling pump structure with check valves of the present invention includes a first pump unit, a first check valve, a second pump unit, a second check valve, a first connector assembly and a second connector assembly. The first pump unit has a first pump case forming a first pump chamber. A first water inlet and a first water outlet are formed on the first pump case. The first pump chamber communicates with the first water inlet and the first water outlet. The first check valve is correspondingly connected with the first water outlet. The second pump unit has a second pump case forming a second pump chamber. A second water inlet and a second water outlet are formed on the second pump case. The second pump chamber communicates with the second water inlet and the second water outlet. The second check valve is correspondingly connected with the second water outlet. The first connector assembly has a first water incoming section, a second water incoming section and a first water outgoing section. The first water incoming section is correspondingly connected with the first check valve. The second water incoming section is correspondingly connected with the second check valve. The second connector assembly has a third water incoming section, a second water outgoing section and a third water outgoing section. The second water outgoing section is correspondingly connected with the first water inlet. The third water outgoing section is correspondingly connected with the second water inlet.

[0010] To achieve the above and other objects, the water-cooling module of the present invention includes a first pump unit, a first check valve, a second pump unit, a second check valve, a first connector assembly, a second connector

assembly, a pipe body assembly and a heat dissipation unit. The first pump unit has a first pump case forming a first pump chamber. A first water inlet and a first water outlet are formed on the first pump case. The first pump chamber communicates with the first water inlet and the first water outlet. The first check valve is correspondingly connected with the first water outlet. The second pump unit has a second pump case forming a second pump chamber. A second water inlet and a second water outlet are formed on the second pump case. The second pump chamber communicates with the second water inlet and the second water outlet. The second check valve is correspondingly connected with the second water outlet. The first connector assembly has a first water incoming section, a second water incoming section and a first water outgoing section. The first water incoming section is correspondingly connected with the first check valve. The second water incoming section is correspondingly connected with the second check valve. The second connector assembly has a third water incoming section, a second water outgoing section and a third water outgoing section. The second water outgoing section is correspondingly connected with the first water inlet. The third water outgoing section is correspondingly connected with the second water inlet. The pipe body assembly includes a first pipe body and a second pipe body. One end of the first pipe body correspondingly communicates with the first water outgoing section. One end of the second pipe body correspondingly communicates with the third water incoming section. The heat dissipation unit has an inlet and an outlet. The inlet correspondingly communicates with the other end of the first pipe body. The outlet correspondingly communicates with the other end of the second pipe body. The heat dissipation unit is formed with an internal communication chamber for a cooling liquid to flow through. The communication chamber communicates with the inlet and the outlet.

[0011] According to the structural design of the present invention, when the water-cooling module starts to operate, the cooling liquid in the heat dissipation unit will flow through the outlet into the second pipe body and then flow into the third water incoming section. After flowing through the third water incoming section of the second connector assembly, the flow of the cooling liquid is divided. Part of the liquid will flow from the second water outgoing section to the second communication pipe and then flow into the first pump chamber of the first pump unit from the first water inlet. Then, the cooling liquid in the first pump chamber will pass through the first water outlet to flow into the first space of the first check valve. Due to the pressure of the cooling liquid, the first sealing member disposed in the first space will be pushed and opened forward. Accordingly, the cooling liquid can smoothly flow into the second space and then flow into the first communication pipe and then flow into the first water incoming section of the first connector assembly.

[0012] The other part of the divided cooling liquid will flow from the third water outgoing section to the fourth communication pipe and then flow into the second pump chamber of the second pump unit from the second water inlet. Then, the cooling liquid in the second pump chamber will pass through the second water outlet to flow into the third space of the second check valve. Due to the pressure of the cooling liquid, the second sealing member disposed in the third space will be pushed and opened forward.

[0013] Accordingly, the cooling liquid can smoothly flow into the fourth space and then flow into the third communication pipe and then flow into the second water incoming section of the first connector assembly. The cooling liquid flowing into the second water incoming section and the cooling liquid flowing into the first water incoming section are collected and then together exhausted to the first water outgoing section. Then, the cooling liquid passes through the first pipe body to flow back to the communication chamber of the heat dissipation unit. Accordingly, the cooling liquid is continuously circulated to complete the liquid-cooling circulation of the water-cooling module.

[0014] The first and second check valves are respectively mounted at the first and second water outlets. Accordingly, in case any of the pump units is damaged and fails to drive the cooling liquid to flow, the first sealing member (or the second sealing member) inside the first check valve (or the second check valve) can prevent the cooling liquid from flowing back to the first pump chamber (or the second pump chamber). Therefore, the backflow of the cooling liquid can be avoided and the heat dissipation efficiency can be greatly enhanced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

[0016] FIG. **1**A is a perspective exploded view of a first embodiment of the water-cooling pump structure with check valves of the present invention;

[0017] FIG. **1**B is a perspective assembled view of the first embodiment of the water-cooling pump structure with check valves of the present invention;

[0018] FIG. **2**A is a perspective exploded view of the first check valve of the present invention;

[0019] FIG. **2**B is a perspective assembled view of the first check valve of the present invention;

[0020] FIG. **2**C is a sectional view of the first check valve of the present invention;

[0021] FIG. **2**D is a sectional view of the second check valve of the present invention;

[0022] FIG. **3**A is a perspective exploded view of a first embodiment of the water-cooling module of the present invention;

[0023] FIG. **3**B is a perspective assembled view of the first embodiment of the water-cooling module of the present invention, showing the operation thereof;

[0024] FIG. **3**C is a sectional view of the first embodiment of the water-cooling module of the present invention;

[0025] FIG. **3**D is another sectional view of the first embodiment of the water-cooling module of the present invention;

[0026] FIG. **4** is a perspective assembled view of a second embodiment of the water-cooling module of the present invention; and

[0027] FIG. **5** is a perspective assembled view of a third embodiment of the water-cooling module of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028] Please refer to FIGS. **1**A and **1**B. FIG. **1**A is a perspective exploded view of a first embodiment of the water-cooling pump structure with check valves of the present invention. FIG. **1**B is a perspective assembled view of the first embodiment of the water-cooling pump structure with check valves of the present invention. According to the first embodiment, the water-cooling pump structure **2** with check valves of the present invention includes a first pump unit **20**, a first check valve **21**, a second pump unit **22**, a second check valve **23**, a first connector assembly **24** and a second connector assembly **25**. The first pump unit **20** has a first pump case **201** forming a first pump chamber **2011**. A first water inlet **202** and a first water outlet **203** are formed on the first pump case **201**. The first pump chamber **2011** communicates with the first water inlet **202** and the first water outlet **203**. The first water outlet **203** is correspondingly connected with the first check valve **21**.

[0029] Please now refer to FIGS. **2**A, **2**B and **2**C, which show the internal structure of the first check valve **21**. The first check valve **21** has a first valve body **211** formed with a first space **212** and a second space **213** inside. The first space **212** has a first seat section **2121** and the second space **213** has a second seat section **2131**. A first rod body **214** has a first base section **2143** and a first sealing member **2144**. Two ends of the first rod body **214** extend to form a first extension end **2141** and a second extension end **2142**. The first and second extension ends **2141**, **2142** are axially movably inserted in the first and second seat sections **2121**, **2131** respectively. The first sealing member **2144** is disposed on one side of the first base section **2143** proximal to the first space **212**. Two ends of a first elastic member **215** respectively abut against the first base section **2143** of the first rod body **214** and the inner wall face of the first valve body **211**. The first water outlet **203** of the first pump unit **20** correspondingly communicates with the first space **212**.

[0030] The second pump unit **22** has a second pump case **221** forming a second pump chamber **2211**. A second water inlet **222** and a second water outlet **223** are formed on the second pump case **221**. The second pump chamber **2211** communicates with the second water inlet **222** and the second water outlet **223**. The second water outlet **223** is correspondingly connected with the second check valve **23**.

[0031] Please further refer to FIG. **2**D, which is a sectional view directly showing the second check valve **23**. The second check valve **23** has an appearance identical to that of the first check valve **21** (with reference to FIGS. **2**A and **2**B) and thus will not be shown with any drawing. The second check valve **23** has a second valve body **231** formed with a third space **232** and a fourth space **233** inside. The third space **232** has a third seat section **2321** and the fourth space **233** has a fourth seat section **2331**. A second rod body **234** has a second base section **2343** and a second sealing member **2344**. Two ends of the second rod body **234** extend to form a third extension end **2341** and a fourth extension end **2342**. The third and fourth extension ends **2341**, **2342** are axially movably inserted in the third and fourth seat sections **2321**, **2331** respectively. The second sealing member **2344** is disposed on one side of the second base section **2343** proximal to the third space **232**. Two ends of a second elastic member **235** respectively abut against the second base section **2343** of the second rod body **234** and the inner wall face of the second valve body **231**. The second water outlet **223** of the second pump unit **22** correspondingly communicates with the third space **232**.

[0032] The first pump unit **20** has a first communication pipe **26** and a second communication pipe **27**. One end of the first communication pipe **26** is correspondingly connected with the second space **213** of the first check valve **21**. One end of the second communication pipe **27** is correspondingly connected with the first water inlet **202** of the first pump unit **20**.

[0033] The second pump unit **22** has a third communication pipe **28** and a fourth communication pipe **29**. One end of the third communication pipe **28** is correspondingly connected with the fourth space **233** of the second check valve **23**. One end of the fourth communication pipe **29** is correspondingly connected with the second water inlet **222** of the second pump unit **22**.

[0034] The first connector assembly **24** has a first side **241** and a second side **242**. The first side **241** is formed with a first water incoming section **2411** and a second water incoming section **2412**. The second side **242** is formed with a first water outgoing section **2421**. The first water outgoing section **2421** communicates with the first and second water incoming sections **2411**, **2412**. The first water incoming section **2411** is connected with the other end of the first communication pipe **26** opposite to the end connected with the first check valve **21**. The second water incoming section **2412** is connected with the other end of the third communication pipe **28** opposite to the end connected with the second check valve **23**.

[0035] The second connector assembly **25** has a third side **251** and a fourth side **252**. The third side **251** is formed with a second water outgoing section **2511** and a third water outgoing section **2512**. The fourth side **252** is formed with a third water incoming section **2521**. The third water incoming section **2521** communicates with the second and third water outgoing sections **2511**, **2512**. The second water outgoing section **2511** is connected with the other end of the second communication pipe **27** opposite to the end connected with the first water inlet **202**. The third water incoming section **2521** is connected with the other end of the fourth communication pipe **29** opposite to the end connected with the second water inlet **222**.

[0036] In this embodiment, the first and second connector assemblies **24**, **25** are, but not limited to, three-way connectors for illustration purposes. Alternatively, the first and second connector assemblies **24**, **25** can be four-way or multi-way connectors in accordance with the number of the water-cooling pump structures of the user. In other words, in the present invention, the first and second pump units **20**, **22**, (that is, two pump units) are exemplified for illustration purposes. By means of the structures and principles of the three-way connectors, when the internal cooling liquid **5** passes through the first and second connector assemblies **24**, **25**, the flow of the cooling liquid **5** can be divided or collected.

[0037] Please now refer to FIGS. **3**A, **3**B, **3**C and **3**D. FIG. **3**A is a perspective exploded view of a first embodiment of the water-cooling module of the present invention. FIG. **3**B is a perspective assembled view of the first embodiment of the water-cooling module of the present invention, showing the operation thereof. FIG. **3**C is a sectional view of the first embodiment of the water-cooling module of the present invention. FIG. **3**D is another sectional view of the first embodiment of the water-cooling module of the present

invention. In the first embodiment, the water-cooling module is partially identical to the above water-cooling pump structure **2** with check valves of the present invention in component and component relationship and thus will not be redundantly described hereinafter. In addition to the above water-cooling pump structure **2** with check valves, the water-cooling module further includes a pipe body assembly **3** and a heat dissipation unit **4**. The pipe body assembly **3** includes a first pipe body **31** and a second pipe body **32**. One end of the first pipe body **31** correspondingly communicates with the first water outgoing section **2421** of the first connector assembly **24**. One end of the second pipe body **32** correspondingly communicates with the third water incoming section **2521** of the second connector assembly **25**.

[0038] The heat dissipation unit **4** has an inlet **41** and an outlet **42**. The inlet **41** communicates with the other end of the first pipe body **31** opposite to the end connected with the first water outgoing section **2421** of the first connector assembly **24**. The outlet **42** communicates with the other end of the second pipe body **32** opposite to the end connected with the third water incoming section **2521** of the second connector assembly **25**.

[0039] In addition, in this embodiment, the thermal module further has a water reservoir **6**. One side of the water reservoir **6** is correspondingly connected with the pipe body assembly **3**. The other side of the water reservoir **6** correspondingly communicates with the inlet **41** and the outlet **42** of the heat dissipation unit **4**. It should be noted that the water reservoir **6** can be omitted (as shown in FIG. **4**) to achieve the same effect of the present invention.

[0040] Moreover, in this embodiment, the water-cooling module of the present invention has, but not limited to, the first and second pump units **20**, **22**, (that is, two pump units) for illustration purposes. In practice, three (or more) pump units can be stacked (as shown in FIG. **5**) in accordance with the designed arrangement of the user. Certainly, it can be further understood that according to the number of the arranged pump units, the three-way connectors can be replaced with four-way connectors (or multi-way connectors). In this case, the numbers of the corresponding communication pipes and check valves should be also increased to form a complete water-cooling module.

[0041] According to the structural design of the water-cooling module, when one side of the heat dissipation unit **4** of the water-cooling module contacts a heat generation component (not shown) to operate, the cooling liquid **5** in the heat dissipation unit **4** will first flow through the outlet **42** into the water reservoir **6** and then flow into the second pipe body **32** and then flow into the third water incoming section **2521**. After flowing through the third water incoming section **2521** of the second connector assembly **25**, the flow of the cooling liquid **5** is divided. Part of the liquid will flow from the second water outgoing section **2511** to the second communication pipe **27** and then flow into the first pump chamber **2011** of the first pump unit **20** from the first water inlet **202**. Then, the cooling liquid **5** in the first pump chamber **2011** will pass through the first water outlet **203** to flow into the first space **212** of the first check valve **21**. Due to the pressure of the cooling liquid **5**, the first sealing member **2144** disposed in the first space **212** will be pushed and opened toward the second space **213**. Accordingly, the cooling liquid **5** can smoothly flow into the second space **213** and then flow into the first communication pipe **26** and then flow into the first water incoming section **2411** of the first connector assembly **24**.

[0042] The other part of the divided cooling liquid **5** will flow from the third water outgoing section **2512** to the fourth communication pipe **29** and then flow into the second pump chamber **2211** of the second pump unit **22** from the second water inlet **222**. Then, the cooling liquid **5** in the second pump chamber **2211** will pass through the second water outlet **223** to flow into the third space **232** of the second check valve **23**. Due to the pressure of the cooling liquid **5**, the second sealing member **2344** disposed in the third space **232** will be pushed and opened toward the fourth space **233**. Accordingly, the cooling liquid **5** can smoothly flow into the fourth space **233** and then flow into the third communication pipe **28** and then flow into the second water incoming section **2412** of the first connector assembly **24**. The cooling liquid **5** flowing into the second water incoming section **2412** and the cooling liquid **5** flowing into the first water incoming section **2411** are collected in the first connector assembly **24** and then together exhausted to the first water outgoing section **2421**. Then, the cooling liquid **5** sequentially passes through the first pipe body **31** and the water reservoir **6** to flow back to a communication chamber **43** of the heat dissipation unit **4**, which is composed of multiple flow ways). Accordingly, the cooling liquid **5** is continuously circulated to complete the liquid-cooling circulation of the water-cooling module.

[0043] The first and second check valves **21**, **23** are respectively mounted at the first and second water outlets **203**, **223** of the first and second pump units **20**, **22**. Accordingly, in case any of the pump units, that is, any of the first and second pump units **20**, **22** is damaged and fails to drive the cooling liquid **5** to flow, (in FIGS. **3**C and **3**D, the first pump unit **20** is exemplified for illustration purposes), the cooling liquid **5** will flow back. When the cooling liquid **5** flows back, it will be impossible to smoothly carry out the circulation of the cooling liquid **5** within the water-cooling module. However, by means of the arrangement of the first sealing member **2144** (or the second sealing member **2344**) inside the first check valve **21** (or the second check valve **23**), the cooling liquid **5** is prevented from flowing back to the first pump chamber **2011** (or the second pump chamber **2211**). Therefore, the problem of the backflow of the cooling liquid **5** can be totally solved (as clearly shown in FIG. **3**D). Moreover, the heat dissipation efficiency can be greatly enhanced.

[0044] In addition, in order to achieve better heat dissipation effect, at least one heat dissipation component (such as radiating fins and cooling radiator) can be added to the thermal module so as to heat-exchange with the cooling liquid **5**.

[0045] In conclusion, in comparison with the conventional water-cooling module, the present invention has the following advantages:

[0046] 1. The cooling liquid is prevented from flowing back.

[0047] 2. The heat dissipation efficiency is greatly enhanced.

[0048] The present invention has been described with the above embodiments thereof and it is understood that many changes and modifications in such as the form or layout pattern or practicing step of the above embodiments can be

carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A water-cooling pump structure with check valves, comprising:

a first pump unit having a first pump case forming a first pump chamber, a first water inlet and a first water outlet being formed on the first pump case, the first pump chamber communicating with the first water inlet and the first water outlet;

a first check valve correspondingly connected with the first water outlet;

a second pump unit having a second pump case forming a second pump chamber, a second water inlet and a second water outlet being formed on the second pump case, the second pump chamber communicating with the second water inlet and the second water outlet;

a second check valve correspondingly connected with the second water outlet;

a first connector assembly having a first water incoming section, a second water incoming section and a first water outgoing section, the first water incoming section being correspondingly connected with the first check valve, the second water incoming section being correspondingly connected with the second check valve; and

a second connector assembly having a third water incoming section, a second water outgoing section and a third water outgoing section, the second water outgoing section being correspondingly connected with the first water inlet, the third water outgoing section being correspondingly connected with the second water inlet.

2. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the first pump unit has a first communication pipe and a second communication pipe, two ends of the first communication pipe being respectively connected with the first check valve and the first water incoming section, two ends of the second communication pipe being respectively connected with the first water inlet and the second water outgoing section.

3. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the second pump unit has a third communication pipe and a fourth communication pipe, two ends of the third communication pipe being respectively connected with the second check valve and the second water incoming section, two ends of the fourth communication pipe being respectively connected with the second water inlet and the third water outgoing section.

4. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the first connector assembly has a first side and a second side, the first side being formed with the first water incoming section and the second water incoming section, the second side being formed with the first water outgoing section, the first and second water incoming sections communicating with the first water outgoing section.

5. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the second connector assembly has a third side and a fourth side, the third side being formed with the second water outgoing section and the third water outgoing section, the fourth side being formed with the third water incoming section, the second and third water outgoing sections communicating with the third water incoming section.

6. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the first check valve has a first valve body formed with a first space and a second space inside, the first space having a first seat section, the second space having a second seat section, a first rod body having a first base section and a first sealing member, two ends of the first rod body extending to form a first extension end and a second extension end, the first and second extension ends being axially movably inserted in the first and second seat sections respectively, the first sealing member being disposed on one side of the first base section proximal to the first space, two ends of a first elastic member respectively abutting against the first base section of the first rod body and an inner wall face of the first valve body.

7. The water-cooling pump structure with check valves as claimed in claim **6**, wherein the first water outlet of the first pump unit correspondingly communicates with the first space and the first water incoming section correspondingly communicates with the second space.

8. The water-cooling pump structure with check valves as claimed in claim **1**, wherein the second check valve has a second valve body formed with a third space and a fourth space inside, the third space having a third seat section, the fourth space having a fourth seat section, a second rod body having a second base section and a second sealing member, two ends of the second rod body extending to form a third extension end and a fourth extension end, the third and fourth extension ends being axially movably inserted in the third and fourth seat sections respectively, the second sealing member being disposed on one side of the second base section proximal to the third space, two ends of a second elastic member respectively abutting against the second base section of the second rod body and an inner wall face of the second valve body.

9. The water-cooling pump structure with check valves as claimed in claim **8**, wherein the second water outlet of the second pump unit correspondingly communicates with the third space and the second water incoming section correspondingly communicates with the fourth space.

10. A water-cooling module comprising:

a first pump unit having a first pump case forming a first pump chamber, a first water inlet and a first water outlet being formed on the first pump case, the first pump chamber communicating with the first water inlet and the first water outlet;

a first check valve correspondingly connected with the first water outlet;

a second pump unit having a second pump case forming a second pump chamber, a second water inlet and a second water outlet being formed on the second pump case, the second pump chamber communicating with the second water inlet and the second water outlet;

a second check valve correspondingly connected with the second water outlet;

a first connector assembly having a first water incoming section, a second water incoming section and a first water outgoing section, the first water incoming section being correspondingly connected with the first check valve, the second water incoming section being correspondingly connected with the second check valve;

a second connector assembly having a third water incoming section, a second water outgoing section and a third water outgoing section, the second water outgoing section being correspondingly connected with the first

water inlet, the third water outgoing section being correspondingly connected with the second water inlet;

a pipe body assembly including a first pipe body and a second pipe body, one end of the first pipe body correspondingly communicating with the first water outgoing section, one end of the second pipe body correspondingly communicating with the third water incoming section; and

a heat dissipation unit having an inlet and an outlet, the inlet correspondingly communicating with the other end of the first pipe body, the outlet correspondingly communicating with the other end of the second pipe body, the heat dissipation unit being formed with an internal communication chamber for a cooling liquid to flow through, the communication chamber communicating with the inlet and the outlet.

11. The water-cooling module as claimed in claim **10**, wherein the first pump unit has a first communication pipe and a second communication pipe, two ends of the first communication pipe being respectively connected with the first check valve and the first water incoming section, two ends of the second communication pipe being respectively connected with the first water inlet and the second water outgoing section.

12. The water-cooling module as claimed in claim **10**, wherein the second pump unit has a third communication pipe and a fourth communication pipe, two ends of the third communication pipe being respectively connected with the second check valve and the second water incoming section, two ends of the fourth communication pipe being respectively connected with the second water inlet and the third water outgoing section.

13. The water-cooling module as claimed in claim **10**, wherein the first check valve has a first valve body formed with a first space and a second space inside, the first space having a first seat section, the second space having a second seat section, a first rod body having a first base section and a first sealing member, two ends of the first rod body extending to form a first extension end and a second extension end, the first and second extension ends being axially movably inserted in the first and second seat sections respectively, the first sealing member being disposed on one side of the first base section proximal to the first space, two ends of a first elastic member respectively abutting against the first base section of the first rod body and an inner wall face of the first valve body.

14. The water-cooling module as claimed in claim **13**, wherein the first water outlet of the first pump unit correspondingly communicates with the first space and the first water incoming section correspondingly communicates with the second space.

15. The water-cooling module as claimed in claim **10**, wherein the second check valve has a second valve body formed with a third space and a fourth space inside, the third space having a third seat section, the fourth space having a fourth seat section, a second rod body having a second base section and a second sealing member, two ends of the second rod body extending to form a third extension end and a fourth extension end, the third and fourth extension ends being axially movably inserted in the third and fourth seat sections respectively, the second sealing member being disposed on one side of the second base section proximal to the third space, two ends of a second elastic member respectively abutting against the second base section of the second rod body and an inner wall face of the second valve body.

16. The water-cooling module as claimed in claim **15**, wherein the second water outlet of the second pump unit correspondingly communicates with the third space and the second water incoming section correspondingly communicates with the fourth space.

17. The water-cooling module as claimed in claim **10**, further comprising a water reservoir, one side of the water reservoir correspondingly communicating with the pipe body assembly, the other side of the water reservoir correspondingly communicating with the inlet and the outlet of the heat dissipation unit.

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