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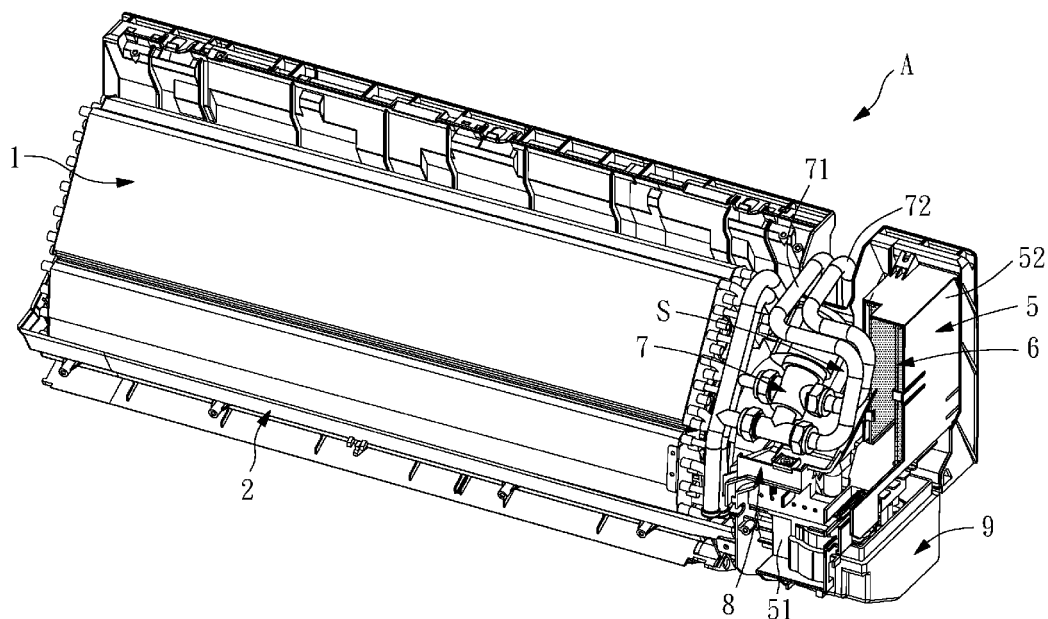
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(57) A wall-mounted chilled water air conditioner having the electrical control panel (5) thereof arranged at one lateral side inside the machine body thereof and an accommodation space (S) defined in the upper front side of the electrical control panel (5) for accommodating

a water valve device (7) that is electrically coupled to the circuit board unit (6) in the electrical control panel (5) and has a water intake tube (71) and a water outlet tube (72) respectively connected to the evaporator (1). Thus, the cooling capacity of the evaporator (1) can be maximized without increasing the dimension of the machine body.

**FIG. 5****EP 2 559 949 A2**

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

[0001] The present invention relates to air conditioning technology and more particularly, to a wall-mounted chilled water air conditioner, which has the water valve device accommodated in the electrical control panel.

2. Description of the Related Art:

[0002] A conventional wall-mounted chilled water air conditioner generally uses a water valve device for controlling the delivery of chilled water from the chiller unit toward the evaporator subject to the control of a controller. The controller detects the indoor temperature, and turns off the water valve device to stop chilled water from entering the evaporator when the indoor temperature is below a predetermined temperature value, or turns on the water valve device when the indoor temperature surpasses the predetermined temperature value for enabling chilled water to enter the evaporator for lowering the indoor temperature. This is the working principle of a chilled water air conditioner.

[0003] A conventional wall-mounted chilled water air conditioner has component parts closely arranged inside the housing. The electrical control panel, referenced by **20** is arranged at the right side relative to the evaporator, referenced by **10**. A water intake tube **301** and a water outlet tube **302** are arranged in the gap between the evaporator **10** and the electrical control panel **20**, and respectively connected to the water valve device (not shown). Thus, there is no room in the gap between the evaporator **10** and the electrical control panel **20** for accommodating the water valve device. The water valve device must be mounted at the back side of the housing or in the adjacent wall. It is a complicated work to make a hole in the wall for accommodating the water valve device and the related drip tray. This installation method is not acceptable for home use.

[0004] Taiwan Patent I 283286, equivalent to China Patent ZL 200510069154.7, issued to the present inventor, teaches a measure to solve the problem of the afore-said prior art design. According to this design, as shown in FIG. 2, the length of the evaporator **10** is minimized so that a space **b** is left in the housing at one lateral side of the evaporator **10** for accommodating a water valve device **40**. This design facilitates installation and is practical for home application. However, shortening the length of the evaporator **10** relatively lowers the cooling capacity. To obtain a relatively higher cooling capacity, the size of the air conditioner must be relatively increased. Thus, for the sake of economic considerations, an improvement is necessary.

SUMMARY OF THE INVENTION

[0005] The present invention has been accomplished under the circumstances in view. It is therefore the main object of the present invention to provide a wall-mounted chilled water air conditioner, which has the water valve device accommodated in the electrical control panel so that the size of the cooling capacity of the evaporator can be maximized without increasing the dimension of the machine body.

[0006] To achieve this and other objects of the present invention a wall-mounted chilled water air conditioner comprises an evaporator, a drip tray arranged beneath the evaporator, a fan disposed between the evaporator and the drip tray, a fan motor and an electrical control panel arranged at one lateral side relative to the evaporator, and a circuit board unit installed in the electrical control panel and electrically coupled with the fan motor. The electrical control panel defines an accommodation space in an upper front side thereof for accommodating a water valve device that is electrically coupled to the circuit board unit and has a water intake tube and a water outlet tube respectively connected to the evaporator.

[0007] Further, the electrical control panel comprises a housing consisting of a front shell member and a rear shell member. The front shell member is disposed at the bottom side relative to the water valve device. The rear shell member is disposed at the rear side relative to the water valve device.

[0008] Further, a water guide set is arranged at the bottom side relative to the water valve device, and adapted for guiding condensed water drops from the water valve device to the drip tray.

[0009] Further, the drip tray comprises a backwardly extended water-guide hole, and a side hole connected to a water collection box at the bottom side of the electrical control panel by a connection tube. The water collection box has a water pump and a water level sensor arranged therein and electrically coupled to the circuit board unit.

[0010] Further, the fan motor is a DC motor controllable by the circuit board unit to achieve thermostat control, saving energy consumption.

[0011] Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a perspective view of a wall-mounted chilled water air conditioner according to the prior art.

FIG. 2 is a perspective view of another prior art design of wall-mounted chilled water air conditioner.

FIG. 3 is an exploded view of a wall-mounted chilled water air conditioner in accordance with the present

invention.

FIG. 4 is an assembly view of FIG. 3 before installation of the water valve device.

FIG. 5 is an assembly view of FIG. 4.

FIG. 6 is a schematic drawing illustrating the functioning of the water guide set in accordance with the present invention.

FIG. 7 is a perspective front side view of a part of the present invention, illustrating the arrangement of the drip tray in the wall-mounted chilled water air conditioner.

FIG. 8 is a perspective rear side view of a part of the present invention, illustrating the arrangement of the drip tray in the wall-mounted chilled water air conditioner.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Referring to FIG. 3, a wall-mounted chilled water air conditioner in accordance with the present invention is shown comprising an evaporator 1, a drip tray 2, a fan 3, a fan motor 4 and an electrical control panel 5.

[0014] The drip tray 2 is arranged beneath the evaporator 1. The fan 3 is disposed between the evaporator 1 and the drip tray 2. The fan motor 4 and the electrical control panel 5 are arranged at one lateral side relative to the evaporator 1. Further, the electrical control panel 5 comprises a housing consisting of a relatively shorter front shell member 51 and a relatively taller rear shell member 52, and a circuit board unit 6 installed in, for example, the rear shell member 52 (see FIG. 3, FIG. 4 and FIG. 5). The fan motor 4 is electrically coupled to the circuit board unit 6. Further, the electrical control panel 5 defines an accommodation space S in an upper front side thereof, i.e., in the upper side relative to the front shell member 51 and front side relative to the rear shell member 52 for accommodating a water valve device 7 (see FIG. 4 and FIG. 5). Thus, the front shell member 51 is disposed at the bottom side of the water valve device 7; the rear shell member 52 is disposed at the front side of the water valve device 7. The water valve device 7 electrically coupled to the circuit board unit 6, comprising a water intake tube 71 and a water outlet tube 72 respectively connected to the evaporator 1. Subject to control signal from the circuit board unit 6, the water valve device 7 is controlled to close or open the water intake tube 71 and the water outlet tube 72.

[0015] Further, a water guide set 8 (for example, a two-component water guide set, as shown in FIG. 3 and FIG. 4) is arranged at the bottom side of the water valve device 7. The water guide set 8 is arranged at the top side of the front shell member 51 of the electrical control panel 5 and adapted for guiding condensed water drops from the water valve device 7 to the drip tray 2 (with respect to condensed water flowing direction, please refer to FIG. 6).

[0016] Further, the drip tray 2 comprises a backwardly

extended water-guide hole 21, and a side hole 22 (see FIG. 7) connected to a water collection box 9 by a connection tube 23 (see FIG. 8). The water collection box 9 is arranged at the bottom side of the electrical control panel 5 inside the body of the air conditioner (see FIGS. 3, 4 and 5). Further, the water collection box 9 has a water pump 91 and a water level sensor 92 arranged therein (see FIG. 3) and electrically coupled to the circuit board unit 6, constituting a second water discharge path. Further, the fan motor 4 is a DC motor controlled by the circuit board unit 6, enabling the air conditioner can achieve thermostat control and save energy consumption. Of course, the fan motor 4 can be an AC motor without thermostat control and energy saving functions.

[0017] Subject to the aforesaid structural design, the water valve device 7 can be accommodated inside the machine body of the air conditioner and disposed in the electrical control panel 5 without occupying any evaporator space. Thus, the length of the evaporator 1 can be maximized to provide enhanced cooling capacity. Further, the water guide set 8 guides condensed water drops from the water valve device 7 to the drip tray 2, avoiding water leakage and meeting the requirements for wall mount application. Further, collected water can be selectively discharged through the backwardly extended water-guide hole 21 of the drip tray 2 (the first water discharge path) or through the side hole 22 and the water collection box 9 (the second water discharge path) subject to the conditions of the installation place or the consumer's preference.

[0018] In conclusion, the invention has the water valve device 7 mounted in the electrical control panel 5 inside the machine body of the air conditioner without lowering the cooling capacity of the evaporator 1. Thus, the invention greatly improves the effects of the wall-mounted chilled water air conditioner.

[0019] Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A wall-mounted chilled water air conditioner, comprising an evaporator (1), a drip tray (2) arranged beneath said evaporator (1), a fan (3) disposed between said evaporator (1) and said drip tray (2), a fan motor (4) and an electrical control panel (5) arranged at one lateral side relative to said evaporator (1), and a circuit board unit (6) installed in said electrical control panel (5) and electrically coupled with said fan motor (4), wherein said electrical control panel (5) defines an accommodation space (S) in an upper front side thereof and a water valve device (7) is accommodated in said accommodation space (S)

and electrically coupled to said circuit board unit **(6)**,
said water valve device **(7)** comprising a water intake
tube **(71)** and a water outlet tube **(72)** respectively
connected to said evaporator **(1)**.

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2. The wall-mounted chilled water air conditioner as
claimed in claim 1, wherein said electrical control
panel **(5)** comprises a housing consisting of a front
shell member **(51)** and a rear shell member **(52)**,
said front shell member **(51)** being disposed at a bot-
tom side relative to said water valve device **(7)**, said
rear shell member **(52)** being disposed at a rear side
relative to said water valve device **(7)**. 10
3. The wall-mounted chilled water air conditioner as 15
claimed in claim 1, further comprising a water guide
set **(8)** arranged at a bottom side relative to said wa-
ter valve device **(7)** and adapted for guiding con-
densed water drops from said water valve device **(7)**
to said drip tray **(2)**. 20
4. The wall-mounted chilled water air conditioner as
claimed in claim 1, wherein said drip tray **(2)** com-
prises a backwardly extended water-guide hole **(21)**,
and a side hole **(22)** connected to a water collection 25
box **(9)** at a bottom side of said electrical control pan-
el **(5)** by a connection tube **(23)**, said water collection
box **(9)** having a water pump **(91)** and a water level
sensor **(92)** arranged therein and electrically coupled
to said circuit board unit **(6)**. 30
5. The wall-mounted chilled water air conditioner as
claimed in claim 1, wherein said fan motor **(4)** is a
DC motor. 35

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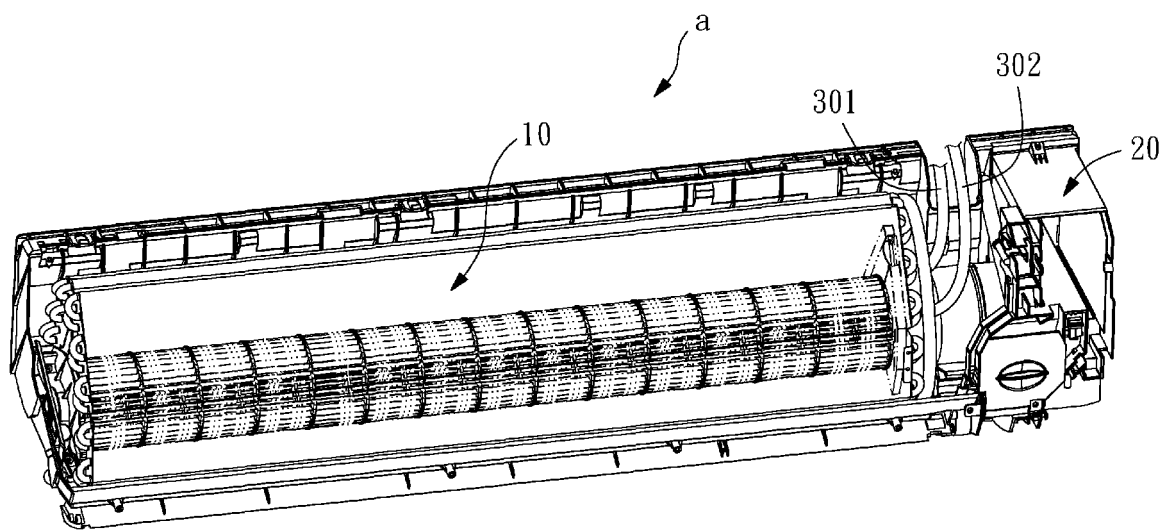


FIG. 1 (PRIOR ART)

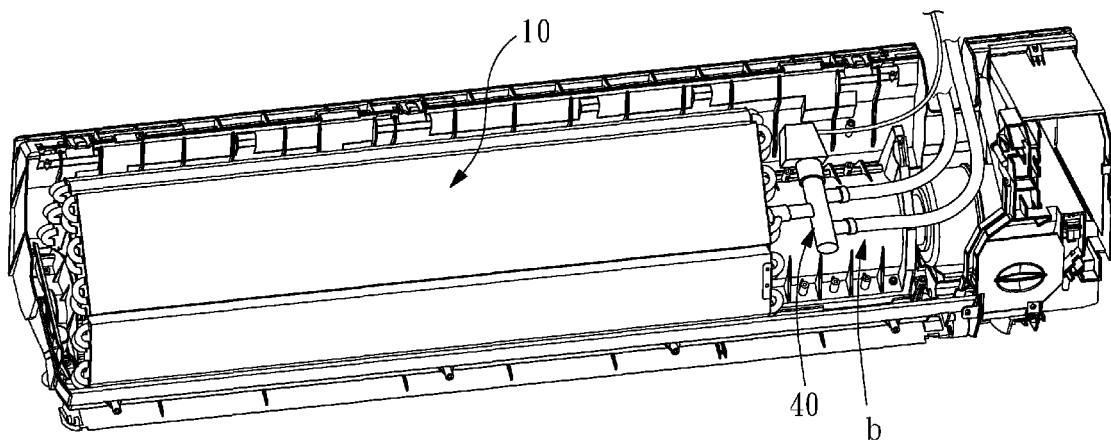


FIG. 2(PRIOR ART)

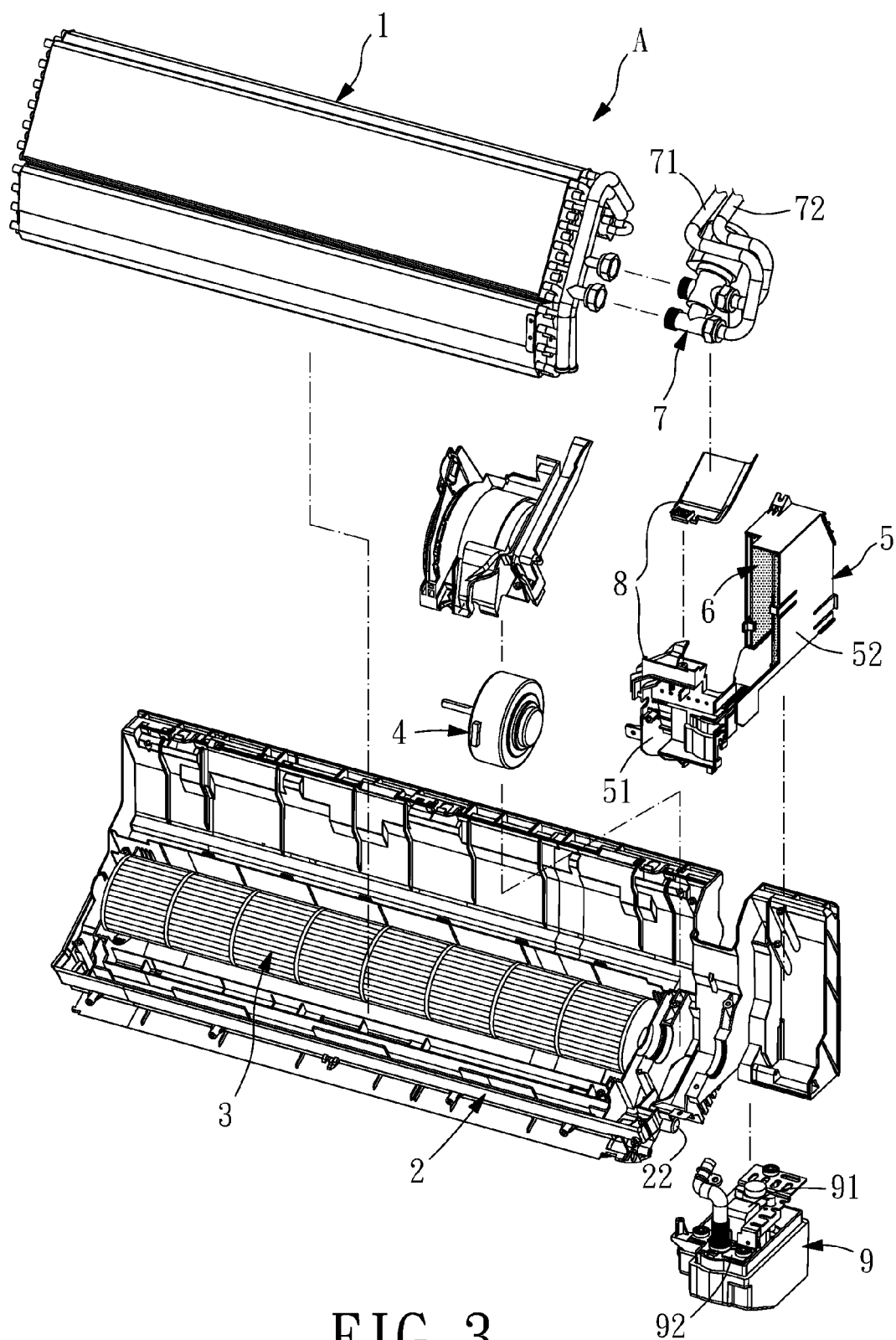


FIG. 3

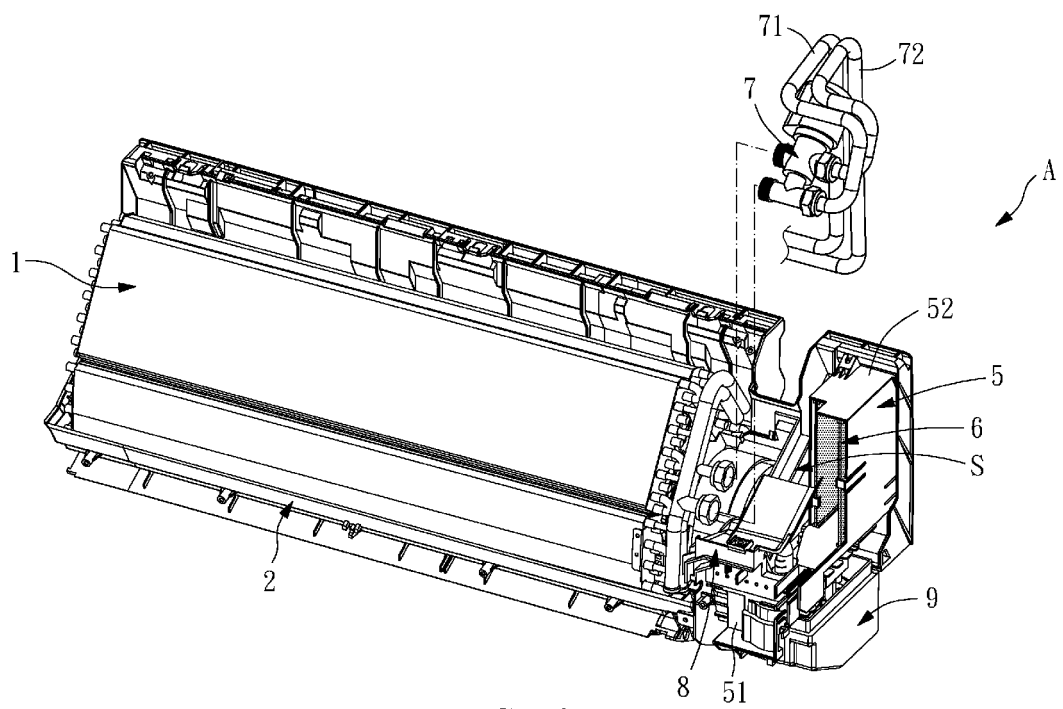


FIG. 4

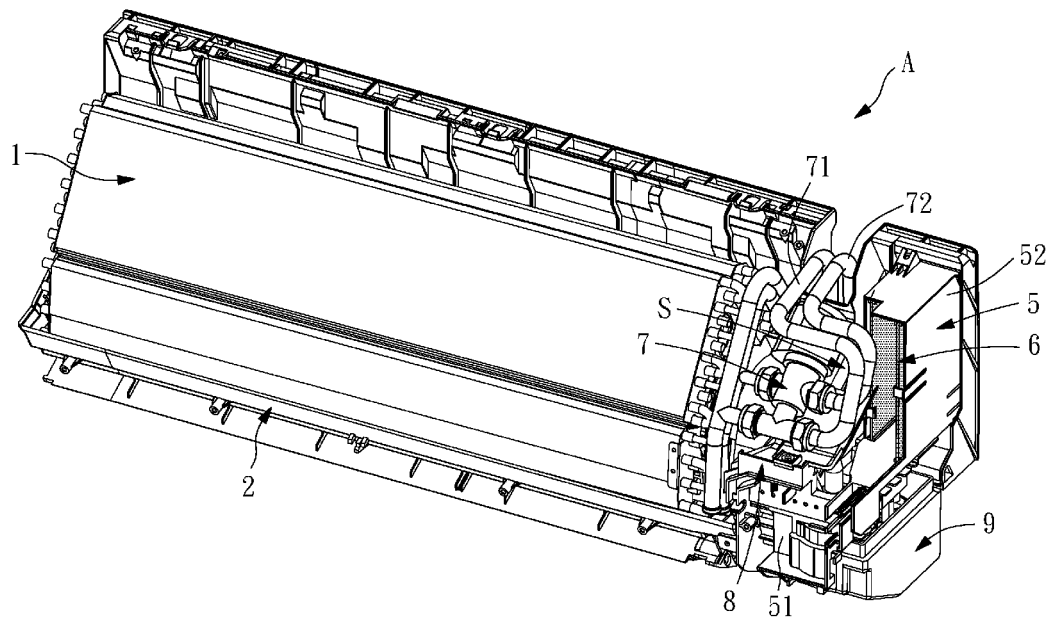


FIG. 5

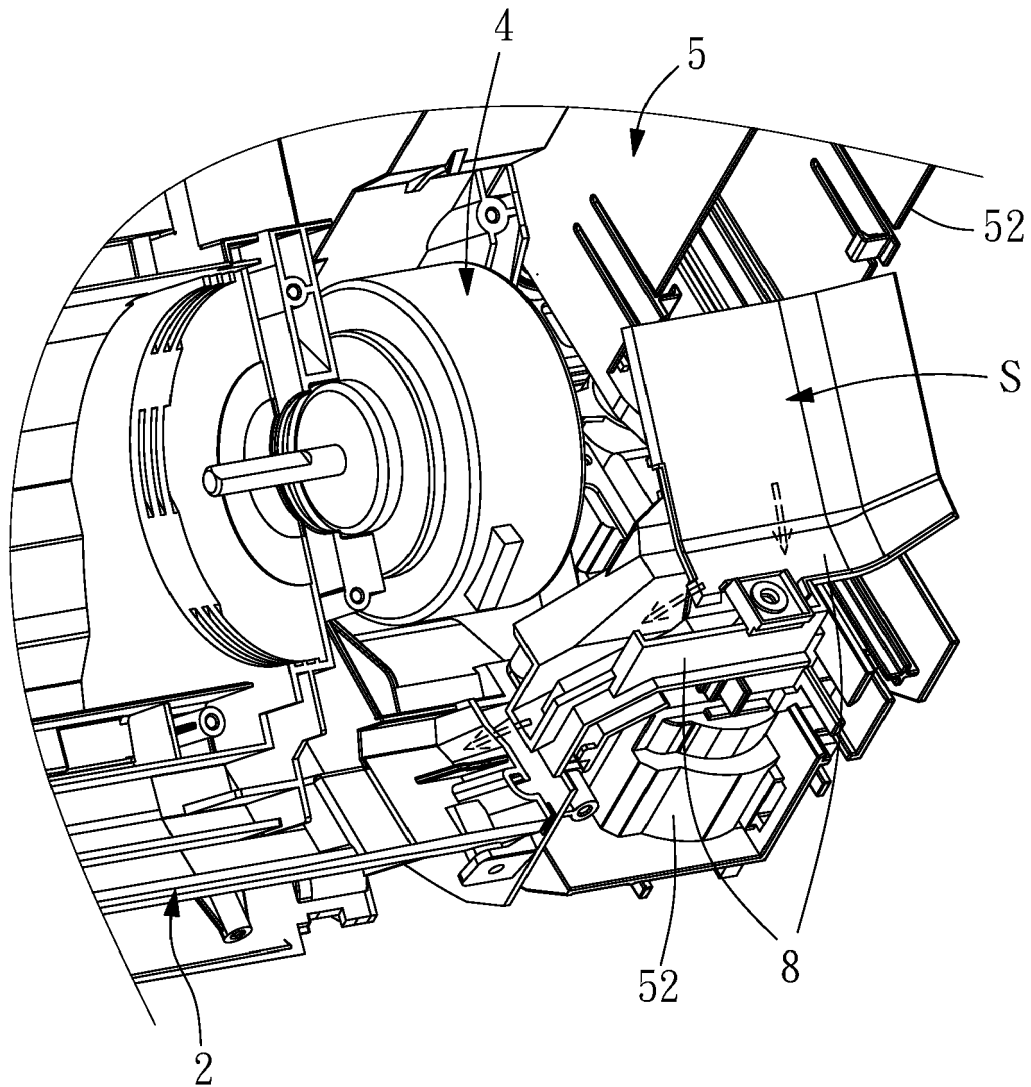


FIG. 6

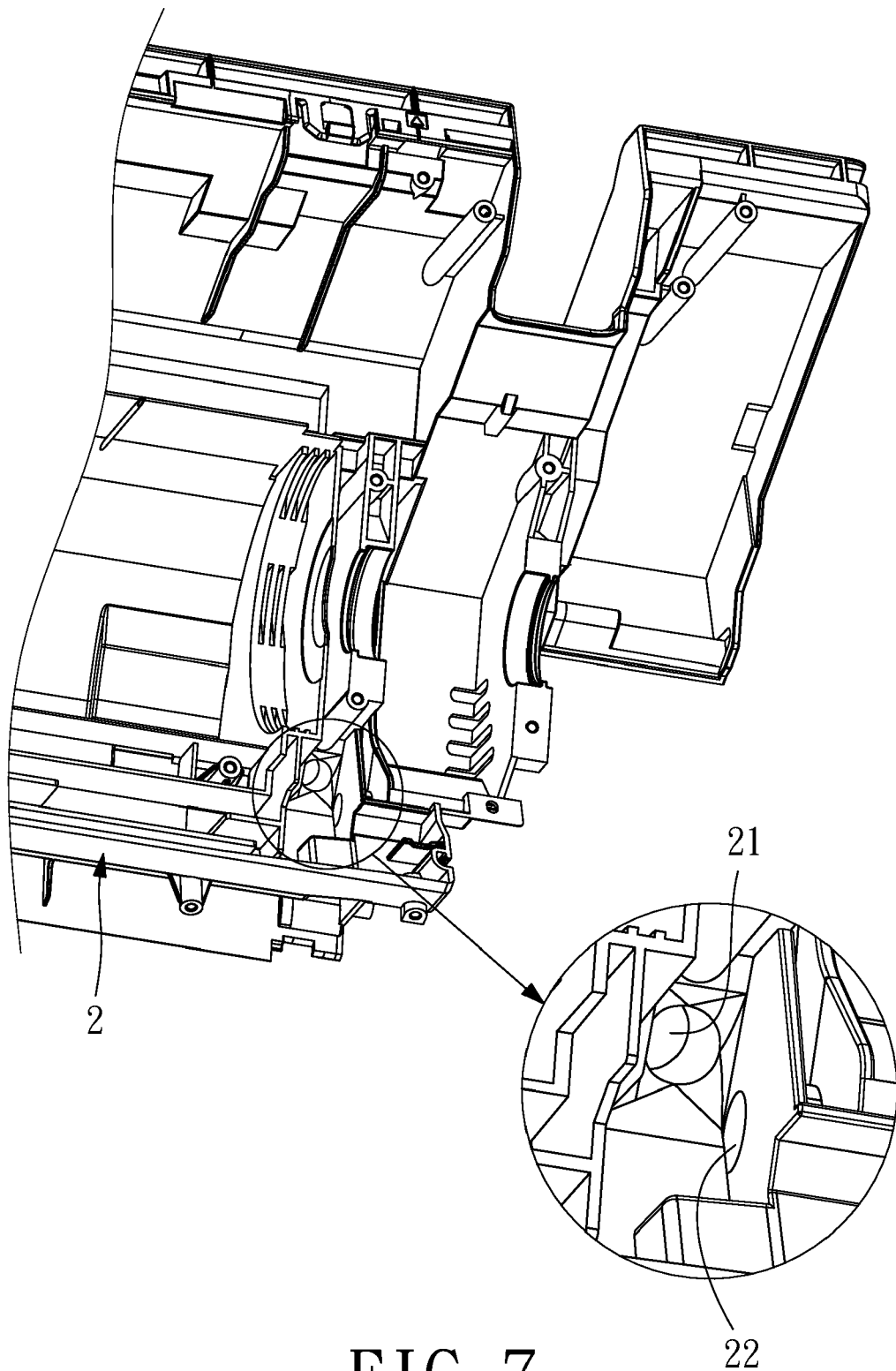


FIG. 7

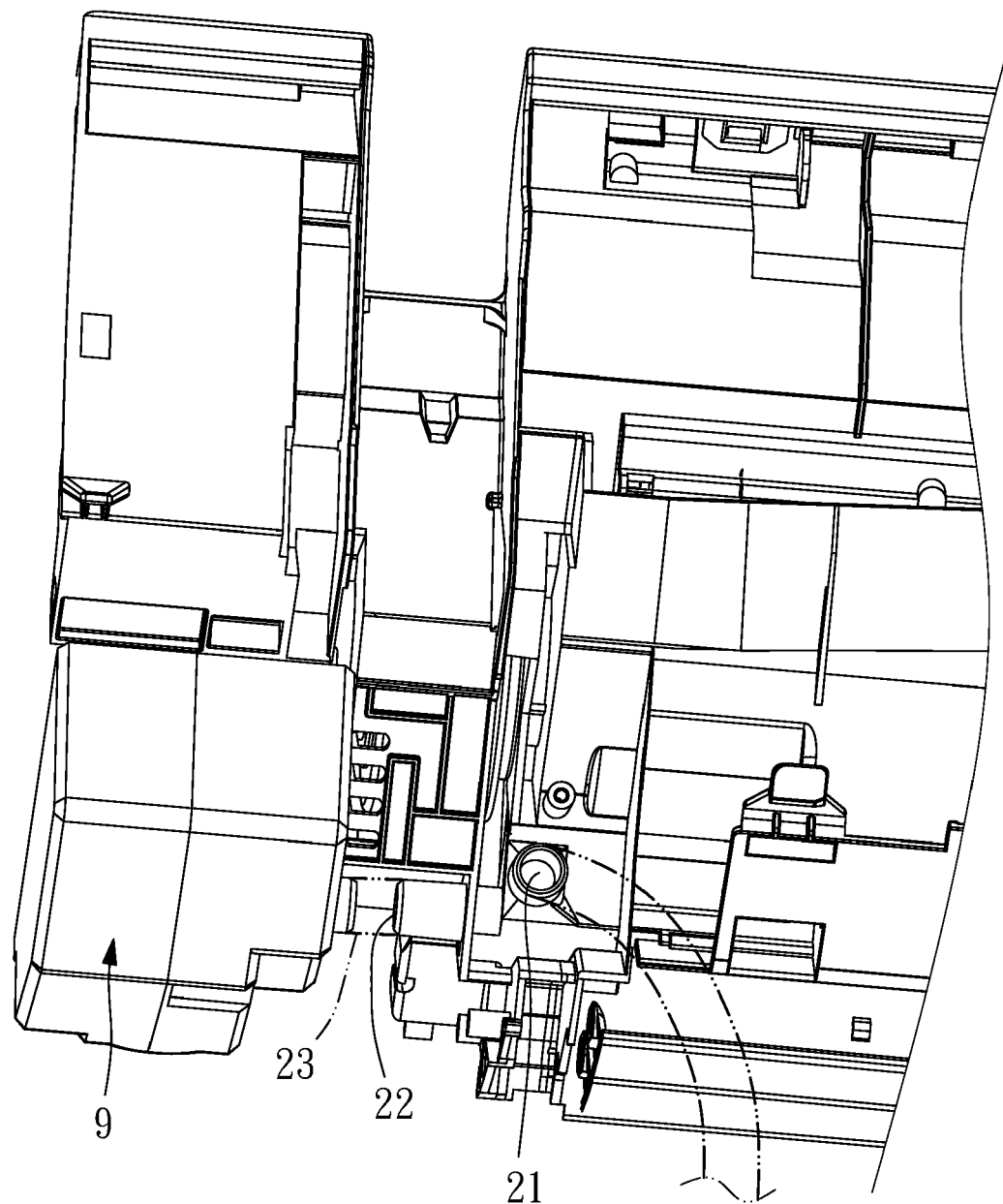


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- TW 283286 [0004]
- CN ZL200510069154 [0004]