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(72) Inventors:

- **Mou, Hao-Jan**
Hsinchu (TW)
- **Wu, Chin-Chuan**
Hsinchu (TW)
- **Huang, Chi-Feng**
Hsinchu (TW)

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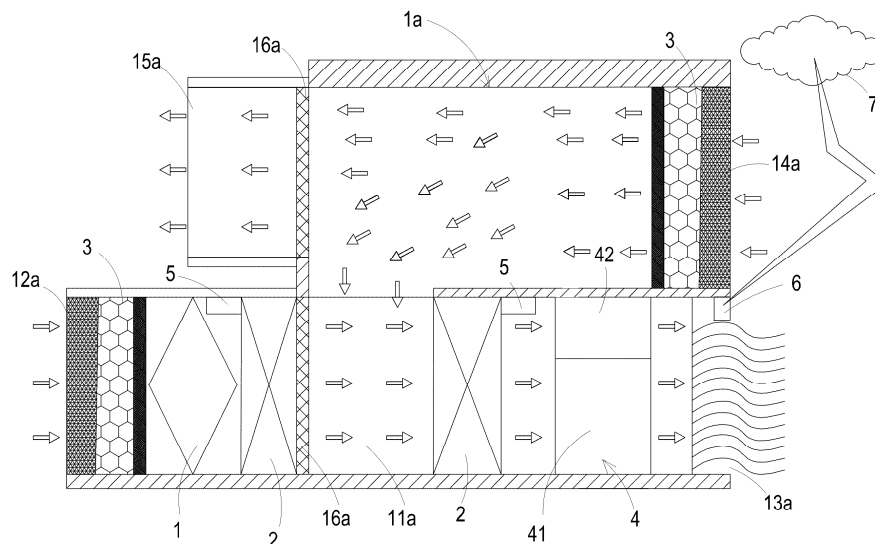
(74) Representative: **Uexküll & Stolberg**
Partnerschaft von
Patent- und Rechtsanwälten mbB
Beselerstraße 4
22607 Hamburg (DE)

(71) Applicant: **Microjet Technology Co., Ltd.**
Hsinchu (TW)

(54) INTELLIGENT NETWORKED AIR CONDITIONER

(57) An intelligent networked air conditioner is disclosed and includes a main body (1a), at least one heat exchanging core (1), a plurality of guiding fans (2), a plurality of filtration and purification components (3), a temperature adjustment module (4), at least one host driving controller (5) and at least one gas detection module (6). The gas detection module (6) built in the main body (1a) monitors environment data in real-time and is equipped with cloud connection capability for users to remotely control environmental conditions and

devices. Through IoT communication, a networked cloud computing service device (7) is utilized for analyzing and controlling based on the air quality detection data of temperature, humidity and air pollution. The operating status of the air conditioner can be automatically adjusted according to the requirements, so as to achieve the automatic adjustment of the temperature, the humidity and air exchange, and provide the fresh, comfortable air and the energy-efficient indoor temperature control.

**FIG. 1B****EP 4 772 804 A1**

Description

FIELD OF THE INVENTION

[0001] The present disclosure relates to an air conditioning technology, and more particularly to an intelligent networked air conditioner capable of combining the functions of a total heat exchanger to achieve air exchange, humidity control and temperature control.

BACKGROUND OF THE INVENTION

[0002] With the development of smart homes, the users' demand for home appliances has shifted from simply improving performance to being more intelligent and energy-efficient. However, the conventional air conditioners cannot automatically adjust the temperature and the humidity according to real-time changes in the indoor environment, and most lack the air exchange function, which leads to a decline in the indoor air quality. Especially in the enclosed environments, the conventional air conditioners that run for extended periods may cause an increase in carbon dioxide concentration and an accumulation of air pollutants, thus posing a potential threat to health.

[0003] In addition, the users' demand for remote operation and data visualization is also increasing. The conventional air conditioning products lack intelligent management and networking capabilities, thus failing to meet the users' higher expectations for environmental control. In view of this, it is necessary to provide an intelligent networked air conditioner capable of monitoring the environmental data in real time, intelligently adjusting the indoor air quality and the temperature and humidity, and being remotely controlled.

SUMMARY OF THE INVENTION

[0004] One object of the present disclosure is to provide an intelligent networked air conditioner, which includes a built-in gas detection module for detecting air pollution in real time. In addition, the gas detection module has cloud connection capabilities, which facilitates remote monitoring and operation by users. Moreover, the air quality monitoring data, including the temperature, the humidity and the air pollution, are collected through IoT communication (wireless communication or wired communication), the cloud computing is utilized for analysis and control, and it allows to automatically adjust the operating status of the air conditioner according to the requirements, so as to achieve the automatic adjustment of the temperature, the humidity and air exchange, and provide the fresh, comfortable air and the energy-efficient indoor temperature control.

[0005] In accordance with an aspect of the present disclosure, an intelligent networked air conditioner is provided and includes a main body, at least one heat exchanging core, a plurality of guiding fans, a plurality of

filtration and purification components, a temperature adjustment module, at least one host driving controller and at least one gas detection module. The main body includes a flow guide channel, an air inlet, an air outlet, a circulating air inlet and an air exchange pipe, wherein the flow guide channel is in communication with the air inlet, the air outlet, the circulating air inlet and the air exchange pipe for controlling an airflow direction, and the air inlet and the air exchange pipe are in communication with an outdoor field and each provided with a valve to control communication between the outdoor field and the flow guide channel. The at least one heat exchanging core is disposed in the air inlet and allows a gas to be introduced into the flow guide channel to form heat exchange. The plurality of guiding fans are mounted in the air inlet and the flow guide channel respectively for guiding the gas to be output from the air outlet. The plurality of filtration and purification components are disposed at entrances of the air inlet and the circulating air inlet respectively for filtering air pollution contained in the gas introduced into the flow guide channel through the air inlet, and filtering circulating air pollution contained in the gas of an indoor field introduced into the flow guide channel through the circulating air inlet. The temperature adjustment module is disposed in the flow guide channel to provide temperature exchange for cooling or heating air, and then output from the air outlet for regulating a temperature and humidity of the indoor field. The at least one host driving controller controls an actuation operation of the guiding fan and dynamically adjusts an operating frequency and an output air volume of the guiding fan, and controls an operating mode of the temperature adjustment module for the temperature exchange of cooling or heating. The at least one gas detection module is electrically connected to the host driving controller, wherein the gas detection module detects a temperature, a humidity and air pollution in air, outputs detection data, and transmits the detection data to a networked cloud computing service device through Internet of Things (IoT) communication, wherein the networked cloud computing service device collects and analyzes the detection data, monitors the detection data in real time, and intelligently selects a control command to transmit to the gas detection module, so that the host driving controller controls the actuation operation of the guiding fan and dynamically adjusts the operating frequency and the output air volume of the guiding fan, and controls the operating mode of the temperature adjustment module for the temperature exchange of cooling or heating.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The above contents of the present disclosure will become more readily apparent to those ordinarily skilled in the art after reviewing the following detailed description and accompanying drawings, in which:

FIG. 1A is a schematic view illustrating an intelligent

networked air conditioner according to an embodiment of the present disclosure;

FIG. 1B is a schematic cross-sectional view illustrating the intelligent networked air conditioner according to the embodiment of the present disclosure;

FIG. 2 is a schematic diagram illustrating the control architecture of the gas detection module of the intelligent networked air conditioner according to the embodiment of the present disclosure;

FIG. 3 is a schematic cross-sectional view illustrating the filtration and purification components according to the embodiment of the present disclosure;

FIG. 4A is a schematic perspective view (1) illustrating the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 4B is another schematic perspective view (2) illustrating the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 5 is an exploded view illustrating the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 6A is a schematic perspective view (1) illustrating the base of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 6B is another schematic perspective view (2) illustrating the base of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 6C is a schematic view (3) illustrating the base combined with the laser component and the piezoelectric actuator separated from the base of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 7 is a schematic perspective view illustrating the combination of the piezoelectric actuator and the base of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 8A is a schematic exploded view (1) illustrating the piezoelectric actuator of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 8B is another schematic exploded view (2) illustrating the piezoelectric actuator of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 9A is a schematic cross-sectional view (1) illustrating an action of the piezoelectric actuator of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 9B is a schematic cross-sectional view (2) illustrating an action of the piezoelectric actuator of the gas detection main part of the gas detection

module according to the embodiment of the present disclosure;

FIG. 9C is a schematic cross-sectional view (3) illustrating an action of the piezoelectric actuator of the gas detection main part of the gas detection module according to the embodiment of the present disclosure;

FIG. 10A is a schematic cross-sectional view (1) illustrating the gas detection main part of the gas detection module introducing gas according to the embodiment of the present disclosure;

FIG. 10B is a schematic cross-sectional view (2) illustrating the gas detection main part of the gas detection module detecting gas according to the embodiment of the present disclosure;

FIG. 10C is a schematic cross-sectional view (3) illustrating the gas detection main part of the gas detection module exhausting gas according to the embodiment of the present disclosure; and

FIG. 11 is a schematic diagram illustrating the architecture of the networked cloud computing service device according to the embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0007] The present disclosure will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this invention are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

[0008] Please refer to FIG. 1A and FIG. 1B. The present disclosure provides an intelligent networked air conditioner includes a main body 1a, at least one heat exchanging core 1, a plurality of guiding fans 2, a plurality of filtration and purification components 3, at least one temperature adjustment module 4, at least one host driving controller 5 and at least one gas detection module 6. Notably, in the embodiment of the present disclosure, there are two guiding fans 2, two filtration and purification components 3, one temperature adjustment module 4, one host driving controller 5 and one gas detection module 6, but the present disclosure is not limited thereto. The number is adjustable according to the practical requirements.

[0009] In the embodiment, the main body 1a includes a flow guide channel 11a, an air inlet 12a, an air outlet 13a, a circulating air inlet 14a and an air exchange pipe 15a. Preferably but not exclusively, the flow guide channel 11a is in communication with the air inlet 12a, the air outlet 13a, the circulating air inlet 14a and the air exchange pipe 15a for controlling an airflow direction. Moreover, the air inlet 12a and the air exchange pipe 15a are in communication with an outdoor field and each provided with a valve 16a to control communication thereof with the flow

guide channel 11a. In the embodiment, the at least one heat exchanging core 1 is disposed in the air inlet 12a and allows a gas to be introduced into the flow guide channel 11a to form heat exchange. In the embodiment, the plurality of guiding fans 2 are mounted in the flow guide channel 11a and the air inlet 12a respectively for guiding the gas to be output from the air outlet 13a. In the embodiment, the plurality of filtration and purification components 3 are disposed at entrances of the air inlet 12a and the circulating air inlet 14a respectively for filtering air pollution contained in the gas introduced into the flow guide channel 11a through the air inlet 12a, and filtering circulating air pollution contained in the gas of an indoor field introduced into the flow guide channel 11a through the circulating air inlet 14a. In the embodiment, the temperature adjustment module 4 is disposed in the flow guide channel 11a to provide temperature exchange for cooling or heating air, and then output from the air outlet 13a for regulating a temperature and humidity of the indoor field. In the embodiment, the host driving controller 5 controls an actuation operation of the guiding fan 2 and dynamically adjusts an operating frequency and an output air volume of the guiding fan 2. Moreover, the host driving controller 5 controls an operating mode of the temperature adjustment module 4 for the temperature exchange of cooling or heating. In the embodiment, the at least one gas detection module 6 is electrically connected to the host driving controller 5. Preferably but not exclusively, the gas detection module 6 detects a temperature, a humidity and air pollution in air, outputs detection data, and transmits the detection data to a networked cloud computing service device 7 through Internet of Things (IoT) communication. In the embodiment, the networked cloud computing service device 7 collects and analyzes the detection data, monitors the detection data in real time, and intelligently selects a control command to transmit to the gas detection module 6. In that, the host driving controller 5 controls the actuation operation of the guiding fan 2 and dynamically adjusts the operating frequency and the output air volume of the guiding fan 2, and controls the operating mode of the temperature adjustment module 4 for the temperature exchange of cooling or heating.

[0010] In the above embodiment, the air pollution is at least one selected from the group consisting of particulate matter, carbon monoxide, carbon dioxide, ozone, sulfur dioxide, nitrogen dioxide, lead, total volatile organic compounds (TVOC), formaldehyde, bacteria, fungi, virus and a combination thereof. Notably, in the embodiments of the present disclosure, the gas detection module 6 can output the detection data such as particulate matter (PM1, PM2.5, PM10), carbon dioxide (CO₂) concentration, the temperature and the humidity.

[0011] In the embodiment, the temperature adjustment module 4 includes a cooling exchanger 41, which provides the temperature exchange for cooling air and allows removing heat per hour equal to an area of one ping (3.305785 m²) × 600 BTU (cooling capacity). Moreover,

the temperature adjustment module 4 includes a heating exchanger 42, which provides the temperature exchange for heating air. Notably, in the embodiment, the guiding fan 2 has a noise level of 35~50 dB (decibels) during operation. Moreover, the host driving controller 5 controls the operating mode for the temperature exchange of cooling or heating, so that the temperature adjustment module 4 adjusts the gas temperature and the humidity in the indoor field to maintain an optimal comfort level at the temperature of 25°C±3°C and the humidity of 50%±10%.

[0012] Please refer to FIG. 2. In the embodiment, the gas detection module 6 includes a controlling circuit board 61 and a gas detection main part 62. The gas detection main part 62 detects the air pollution, the carbon dioxide (CO₂) concentration, the temperature and the humidity, and outputs the detection data. The controlling circuit board 61 collects, calculates, analyzes and outputs the detection data to form a serial communication (IIC) signal for input, and the networked cloud computing service device 7 receives and analyzes the detection data in real time to output a Universal Asynchronous Transceiver and Transceiver (UART) signal and a General Purpose Input and Output (GP I/O) signal for the host driving controller 5.

[0013] In the embodiment, the controlling circuit board 61 includes a power conversion component 611, at least one connection interface 612, a microcontroller (MCU) 613 and wireless communicator 614. Preferably but not exclusively, the power conversion component 611 provides DC voltage division modulation to output a required DC voltage. The required DC voltage is transmitted through the at least one connection interface 612 to the gas detection main part 62 for actuation operation and to the host driving controller 5 for actuation operation. The microcontroller (MCU) 613 is connected to the gas detection main part 62 through the at least one connection interface 612 to form the serial communication (IIC) signal for input, so that the detection data is calculated and analyzed, and connected through another connection interface 612 to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation. The wireless communicator 614 receives the detection data and transmits to the networked cloud computing service device 7 through external wireless communication. The networked cloud computing service device 7 collects, analyzes and monitors the detection data in real time and intelligently selects the control command, and the control command is received through the wireless communicator 614 and transmitted to the microcontroller (MCU) 613 to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation of the host driving controller 5, so that the host driving controller 5 controls the actuation operation of the guiding fan 2 and dynamically adjusts the operating frequency and the output air volume of the guiding fan 2, and

controls the operating mode of the temperature adjustment module 4 for the temperature exchange of cooling or heating.

[0014] In the embodiment, the controlling circuit board 6 further includes a wired communication port 615. The wired communication port 615 is electrically connected to the controlling circuit board 61 through the connection interface 612 for external connection to a wired communication transmission. In the embodiment, the detection data is received and transmitted to the networked cloud computing service device 7 through external wireless communication, the networked cloud computing service device 7 collects, analyzes and monitors the detection data in real time and intelligently selects the control command, and the control command is received through the wired communication port 615 and transmitted to the microcontroller (MCU) 613 to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation of the host driving controller 5, so that the host driving controller 5 controls the actuation operation of the guiding fan 2 and dynamically adjusts the operating frequency and the output air volume of the guiding fan 2, and controls the operating mode of the temperature adjustment module 4 for the temperature exchange of cooling or heating. Notably, in the embodiment, the wired communication port 615 is an RS485 port that communicates with the networked cloud computing service device 7 through a wired line connection.

[0015] As shown in FIG. 11, the networked cloud computing service device 7 includes a wireless network cloud computing service module 71, a cloud control service unit 72, a device management unit 73, an application program unit 574 and an AI intelligent computing platform 75. In the embodiment, the wireless network cloud computing service module 71 receives the air quality detection data of the outdoor field and the indoor field, receives the communication information from the gas detection module 6 of the intelligent networked air conditioner, and transmits the control command. Moreover, the wireless network cloud computing service module 71 receives the information of the detection data about the air quality in the indoor field, and transmits the information to the cloud control service unit 72 to store and form the big data database of the air pollution data. An artificial intelligence calculation is implemented to determine the location of the air pollution through the air pollution database comparison, so that the control command is transmitted to the wireless network cloud computing service module 71, and then transmitted to the gas detection module 6 of the intelligent networked air conditioner to control the actuation operation through the wireless network cloud computing service module 71. The device management unit 73 receives the communication information of the gas detection module 6 of the intelligent networked air conditioner through the wireless network cloud computing service module 71 to manage the user login and device binding. It can also provide maintenance, management,

automatic abnormal point detection, analysis, processing and improvement of intelligent networked air conditioner. Management information, such as controlling inspection and measurement compliance with cleanliness requirements, customer demand feedback, and correction mechanisms for software and hardware technology improvements, is provided to the application program unit 74 for system control and management. Furthermore, the device management information can be provided to the application program unit 74 for system control and management, and the application program unit 74 can also display and inform the information of the detection data about the air quality obtained by the cloud control service unit 72. The user can know the real-time status of the intelligent networked air conditioner through the mobile phone or the communication device. Moreover, the user can control the operation of the intelligent networked air conditioner through the application program unit 74 of the mobile phone or the communication device. In addition, the AI intelligent control platform 75 receives and analyzes the air quality detection data from the gas detection module 6 of the intelligent networked air conditioner through IoT technology, and generates the control command based on the analysis results to achieve automated control and optimization of the intelligent networked air conditioner, thereby automatically adjusting the operating mode of the intelligent networked air conditioner.

[0016] Notably, in the embodiment, the Internet of Things communication refers to a collective network connecting various devices and the technology that helps devices communicate with the cloud and between the devices. In an embodiment, the IoT communication is a wired communication for connecting and communicating with the networked cloud computing service device 7 through a wired line connection. In another embodiment, the IoT communication is a wireless communication for communicating with the networked cloud computing service device 7 through a wireless connection. Preferably but not exclusively, the wireless communication is one selected from the group consisting of a Wi-Fi communication, a Bluetooth communication, a radio frequency identification communication and a near field communication (NFC).

[0017] In the specific implementation of the intelligent networked air conditioner of the present disclosure, when the AI intelligent computing platform 75 of the networked cloud computing service device 7 monitors the detection data of carbon dioxide (CO₂) in real time as being greater a safety detection value, the control command is immediately and intelligently selected to transmit to the gas detection module 6 to control the host driving controller 5. The guiding fans 2 in the air inlet 12a and the flow guide channel 11a are activated, and the valves 16a in the air inlet 12a and the air exchange pipe 15a are opened. In that, the gas in the outdoor field is introduced by suction of the guiding fan 2 in the air inlet 12a to flow through the filtration and purification components 3 for filtering, the

gas flowing through the heat exchanging core 1 is introduced into the flow guide channel 11a to form the heat exchange, and then the gas is guided by the guiding fan 2 in the flow guide channel 11a to enter the indoor field through the air outlet 13a. Furthermore, the circulating gas in the indoor field is then introduced into the flow guide channel 11a through the circulating air inlet 14a, filtered by the filtration and purification component 3, introduced into the flow guide channel 11a, and then discharged to the outdoor field through the air exchange pipe 15a. In the embodiment, a part of the gas flows through the flow guide channel 11a to form the heat exchange, and is then guided by the guiding fan 2 in the flow guide channel 11a to enter the indoor field through the air outlet 13a, so that an air exchange is formed between the outdoor field and the indoor field. When the AI intelligent computing platform 75 of the networked cloud computing service device 7 monitors the detection data of carbon dioxide (CO₂) in real time and reaches the balance of carbon dioxide (CO₂) in the outdoor field and the indoor field, the control command is immediately and intelligently selected and transmitted to the gas detection module 6 to control the host driving controller 5 to enable the valve 16a at the air inlet 12a and the air exchange pipe 15a to open or close. The intelligent networked air conditioner continuously monitors the indoor environment, including the temperature, the humidity, the carbon dioxide (CO₂) concentration and the air pollution, and it allows the AI intelligent computing platform 75 of the networked cloud computing service device 7 to receive, analyze, and process the data. In this way, the AI intelligent control, the environmental data analysis, the automated operation and the real-time monitoring of indoor air quality are realized, so as to continuously adjust the temperature, the humidity and air exchange, and provide the fresh, comfortable air and the energy-efficient indoor temperature control.

[0018] From the above, the present disclosure provides an intelligent networked air conditioner. The gas detection module 6 is utilized to continuously monitor the environment, including the temperature, the humidity, carbon dioxide (CO₂) concentration and the air pollution. The AI intelligent computing platform 75 of the networked cloud computing service device 7 receives, analyzes, and calculates the data, enabling AI intelligent control of environmental data analysis to achieve automated operation and real-time monitoring of indoor air quality. When the indoor carbon dioxide (CO₂) concentration is too high, it can introduce fresh outdoor air and filter the air to achieve the air exchange. It allows to adjust the indoor temperature and the humidity to provide fresh and comfortable air, and provide efficient and energy-saving indoor temperature control. It enables the indoor environment to respond quickly to real-time environmental changes, optimize the system energy efficiency, and maintain the optimal air quality.

[0019] Please refer to FIG. 4A to FIG. 9A. After understanding the overall structure and the architecture of the

intelligent networked air conditioner of the present disclosure, the detailed structure of the gas detection main body 62 of the gas detection module 6 will be described in detail below.

[0020] Please refer to FIG. 4A, FIG. 4B, FIG. 5, FIG. 6A to FIG. 6C and FIG. 7. In the embodiment, the gas detection main part 62 includes a base 621, a piezoelectric actuator 622, a driving circuit board 623, a laser component 624, a particulate sensor 625, an outer cover 626 and a gas sensor 627.

[0021] In the embodiment, the base 621 includes a laser loading region 6211, a gas-inlet groove 6212, a gas-guiding-component loading region 6213 and a gas-outlet groove 6214. The gas-inlet groove 6212 includes a gas-inlet 6215 and two lateral walls, the gas-inlet 6215 is in communication with an environment outside the base, and a transparent window 6216 is opened on the two lateral walls and is in communication with the laser loading region 6211. The gas-guiding-component loading region 6213 is in communication with the gas-inlet groove 6212, and a ventilation hole 6217 penetrates a bottom surface of the gas-guiding-component loading region 6213. The gas-outlet groove 6214 is in communication with the ventilation hole 6217, and a gas-outlet 6218 is disposed in the gas-outlet groove 6214. In the embodiment, the outer cover 626 covers the base 621, and includes a side plate 6261. The side plate 6261 has an inlet opening 6262 and an outlet opening 6263. The inlet opening 6262 is spatially corresponding to the gas-inlet 6215 of the base 621, and the outlet opening 6263 is spatially corresponding to the gas-outlet 6218 of the base 621.

[0022] In the embodiment, the laser component 624, the particulate sensor 625 and the gas sensor 627 are disposed on and electrically connected to the driving circuit board 623 and located within the base 621. In order to clearly describe and illustrate the positions of the laser component 624 and the particulate sensor 625 in the base 621, the driving circuit board 623 is intentionally omitted. The laser component 624 is accommodated in the laser loading region 6211 of the base 621, and the particulate sensor 625 is accommodated in the gas-inlet groove 6212 of the base 621 and is aligned to the laser component 624. In addition, the laser component 624 is spatially corresponding to the transparent window 6216, therefore, a light beam emitted by the laser component 624 passes through the transparent window 6216 and is irradiated into the gas-inlet groove 6212. A light beam path emitted from the laser component 624 passes through the transparent window 6216 and extends in an orthogonal direction perpendicular to the gas-inlet groove 6212. In the embodiment, a projecting light beam emitted from the laser component 624 passes through the transparent window 6216 and enters the gas-inlet groove 6212 to irradiate the suspended particles contained in the gas passing through the gas-inlet groove 6212. When the suspended particles contained in the gas are irradiated and generate scattered light spots, the

scattered light spots are received and calculated by the particulate sensor 625 in the orthogonal direction to obtain the gas detection data. Notably, the laser component 624 emits a parallel light source, and the parallel light source passes through the transparent window 6216.

[0023] In the embodiment, the gas sensor 627 is positioned and accommodated in the gas-outlet groove 6214, so as to detect the air pollution introduced into the gas-outlet groove 6214. Preferably but not exclusively, the particulate sensor 625 detects suspended particulate and outputs the detection data. Moreover, the gas sensor 627 includes a volatile-organic-compound sensor, and the volatile-organic-compound sensor detects gas of carbon dioxide (CO₂) or volatile organic compounds (TVOC) to output the detection data. In an embodiment, the gas sensor 627 is a formaldehyde sensor, and the formaldehyde sensor detects gas of formaldehyde (HCHO) to output the detection data. In an embodiment, the gas sensor 627 is a bacteria sensor, and the bacteria sensor detects gas information of bacteria or fungi to output the detection data. In an embodiment, the gas sensor 627 is a virus sensor, and the virus sensor detects gas of virus to output the detection data. In an embodiment, the gas sensor 627 is a temperature and humidity sensor, and the temperature and humidity sensor detects the temperature and humidity in air to output the detection data.

[0024] Please refer to FIG. 7. In the embodiment, the piezoelectric actuator 622 is accommodated in the gas-guiding-component loading region 6213 of the base 621. In addition, the gas-guiding-component loading region 6213 of the base 621 is in fluid communication with the gas-inlet groove 6212. When the driving circuit board 623 is covered inside the base 621 and the outer cover 626 is covered outside the base 621, the inlet opening 6262 corresponds to the gas-inlet 6215 of the base 621 to collaboratively define an inlet path, and the outlet opening 6263 corresponds to the gas-outlet 6218 of the base 621 to collaboratively define an air outlet path. When the piezoelectric actuator 622 is enabled, the gas in the gas-inlet groove 6212 is inhaled by the piezoelectric actuator 622, so that the gas flows into the piezoelectric actuator 622, and is transported into the gas-outlet groove 6214 through the ventilation hole 6217 of the gas-guiding-component loading region 6213. Finally, when the gas enters the gas-outlet groove 6214, the piezoelectric actuator 622 continuously transports the gas from the gas inlet path into the gas-outlet groove 6214, and the gas in the gas-outlet groove 6214 is pushed to the gas outlet path and through the gas-outlet 6218 and the outlet opening 6263 to discharge to the outside, to achieve the gas transportation at high speed and in large quantities.

[0025] After understanding the above structural description of the gas detection main part 62, the detailed structure of the piezoelectric actuator 622 will be described in detail below.

[0026] Please refer to FIG. 8A and FIG. 8B. In the embodiment, the piezoelectric actuator 622 includes a gas-injection plate 6221, a chamber frame 6222, an actuator element 6223, an insulation frame 6224 and a conductive frame 6225. In the embodiment, the gas-injection plate 6221 is made by a flexible material and includes a suspension plate 6221a and a hollow aperture 6221b. The suspension plate 6221a is a sheet structure and is permitted to undergo a bending deformation. Preferably but not exclusively, the shape and the size of the suspension plate 6221a are accommodated in the inner edge of the gas-guiding-component loading region 6215, but not limited thereto. The hollow aperture 6221b passes through a center of the suspension plate 6221a, so as to allow the gas to flow therethrough. Preferably but not exclusively, in the embodiment, the shape of the suspension plate 6221a is selected from the group consisting of a square, a circle, an ellipse, a triangle and a polygon, but not limited thereto.

[0027] In the embodiment, the chamber frame 6222 is carried and stacked on the gas-injection plate 6221. In addition, the shape of the chamber frame 6222 is corresponding to the gas-injection plate 6221. The actuator element 6223 is carried and stacked on the chamber frame 6222. A resonance chamber 6226 is collaboratively defined by the actuator element 6223, the chamber frame 6222 and the suspension plate 6221a and is formed between the actuator element 6223, the chamber frame 6222 and the suspension plate 6221a. The insulation frame 6224 is carried and stacked on the actuator element 6223 and the appearance of the insulation frame 6224 is similar to that of the chamber frame 6222. The conductive frame 6225 is carried and stacked on the insulation frame 6224, and the appearance of the conductive frame 6225 is similar to that of the insulation frame 6224. In addition, the conductive frame 6225 includes a conducting pin 6225a and a conducting electrode 6225b. The conducting pin 6225a is extended outwardly from an outer edge of the conductive frame 6225, and the conducting electrode 6225b is extended inwardly from an inner edge of the conductive frame 6225.

[0028] Moreover, the actuator element 6223 further includes a piezoelectric carrying plate 6223a, an adjusting resonance plate 6223b and a piezoelectric plate 6223c. The piezoelectric carrying plate 6223a is carried and stacked on the chamber frame 6222. The adjusting resonance plate 6223b is carried and stacked on the piezoelectric carrying plate 6223a. The piezoelectric plate 6223c is carried and stacked on the adjusting resonance plate 6223b. The adjusting resonance plate 6223b and the piezoelectric plate 6223c are accommodated in the insulation frame 6224. The conducting electrode 6225b of the conductive frame 6225 is electrically connected to the piezoelectric plate 6223c. In the embodiment, the piezoelectric carrying plate 6223a and the adjusting resonance plate 6223b are made by a conductive material. The piezoelectric carrying plate 6223a includes a piezoelectric pin 6223d. The piezoelectric pin

6223d and the conducting pin 6225a are electrically connected to a driving circuit (not shown) of the driving circuit board 623, so as to receive a driving signal, such as a driving frequency and a driving voltage. Through this structure, a circuit is formed by the piezoelectric pin 6223d, the piezoelectric carrying plate 6223a, the adjusting resonance plate 6223b, the piezoelectric plate 6223c, the conducting electrode 6225b, the conductive frame 6225 and the conducting pin 6225a for transmitting the driving signal. Moreover, the insulation frame 6224 is insulated between the conductive frame 6225 and the actuator element 6223, so as to avoid the occurrence of a short circuit. Thereby, the driving signal is transmitted to the piezoelectric plate 6223c. After receiving the driving signal such as the driving frequency and the driving voltage, the piezoelectric plate 6223c deforms due to the piezoelectric effect, and the piezoelectric carrying plate 6223a and the adjusting resonance plate 6223b are further driven to generate the bending deformation in the reciprocating manner.

[0029] Furthermore, in the embodiment, the adjusting resonance plate 6223b is located between the piezoelectric plate 6223c and the piezoelectric carrying plate 6223a and served as a cushion between the piezoelectric plate 6223c and the piezoelectric carrying plate 6223a. Thereby, the vibration frequency of the piezoelectric carrying plate 6223a is adjustable. Basically, the thickness of the adjusting resonance plate 6223b is greater than the thickness of the piezoelectric carrying plate 6223a, and the vibration frequency of the actuator element 6223 can be adjusted by adjusting the thickness of the adjusting resonance plate 6223b. In the embodiment, the gas-injection plate 6221, the chamber frame 6222, the actuator element 6223, the insulation frame 6224 and the conductive frame 6225 are stacked and positioned in the gas-guiding-component loading region 6213 sequentially, so that the piezoelectric actuator 622 is supported and positioned in the gas-guiding-component loading region 6213. A plurality of clearances 6221c are defined between the suspension plate 6221a of the gas-injection plate 6221 and an inner edge of the gas-guiding-component loading region 6213 for gas flowing therethrough.

[0030] In the embodiment, a flowing chamber 6227 is formed between the gas-injection plate 6221 and the bottom surface of the gas-guiding-component loading region 6213. The flowing chamber 6227 is in communication with the resonance chamber 6226 between the actuator element 6223, the chamber frame 6222 and the suspension plate 6221a. By controlling the vibration frequency of the gas in the resonance chamber 6226 to be close to the vibration frequency of the suspension plate 6221a, the Helmholtz resonance effect is generated between the resonance chamber 6226 and the suspension plate 6221a, so as to improve the efficiency of gas transportation. When the piezoelectric plate 6223c is moved away from the bottom surface of the gas-guiding-component loading region 6213, the suspension plate 6221a of the gas-injection plate 6221 is driven to

move away from the bottom surface of the gas-guiding-component loading region 6213 by the piezoelectric plate 6223c. In that, the volume of the flowing chamber 6227 is expanded rapidly, the internal pressure of the flowing chamber 6227 is decreased to form a negative pressure, and the gas outside the piezoelectric actuator 622 is inhaled through the clearances 6221c and enters the resonance chamber 6226 through the hollow aperture 6221b. Consequently, the pressure in the resonance chamber 6226 is increased to generate a pressure gradient. When the suspension plate 6221a of the gas-injection plate 6221 is driven by the piezoelectric plate 6223c to move toward the bottom surface of the gas-guiding-component loading region 6213, the gas in the resonance chamber 6226 is discharged out rapidly through the hollow aperture 6221b, and the gas in the flowing chamber 6227 is compressed, thereby the converged gas is quickly and massively ejected out of the flowing chamber 6227 under the condition close to an ideal gas state of the Benulli's law, and transported to the ventilation hole 6217 of the gas-guiding-component loading region 6213.

[0031] By repeating the above operation steps shown in FIG. 9B and FIG. 9C, the piezoelectric plate 6223c is driven to generate the bending deformation in a reciprocating manner. According to the principle of inertia, since the gas pressure inside the resonance chamber 6226 is lower than the equilibrium gas pressure after the converged gas is ejected out, the gas is introduced into the resonance chamber 6226 again. Moreover, the vibration frequency of the gas in the resonance chamber 6226 is controlled to be close to the vibration frequency of the piezoelectric plate 6223c, so as to generate the Helmholtz resonance effect to achieve the gas transportation at high speed and in large quantities.

[0032] Please refer to FIG. 10A to FIG. 10C. The gas is inhaled through the gas-inlet 6262 on the outer cover 626, flows into the gas-inlet groove 6212 of the base 621 through the gas-inlet 6215, and is transported to the position of the particulate sensor 625. In addition, the piezoelectric actuator 622 is enabled continuously to inhale the gas into the inlet path, and facilitate the gas outside the gas detection module to be introduced rapidly, flow stably, and transported above the particulate sensor 625. At this time, a projecting light beam emitted from the laser component 624 passes through the transparent window 6216 to irritate the suspended particles contained in the gas flowing above the particulate sensor 625 in the gas-inlet groove 6212. When the suspended particles contained in the gas are irradiated and generate scattered light spots, the scattered light spots are received and calculated by the particulate sensor 625 for obtaining related information about the sizes and the concentration of the suspended particles contained in the gas. Moreover, the gas above the particulate sensor 625 is continuously driven and transported by the piezoelectric actuator 622, flows into the ventilation hole 6217 of the gas-guiding-component loading region 6213, and

is transported to the gas-outlet groove 6214. At last, after the gas flows into the gas outlet groove 6214, the gas is continuously transported into the gas-outlet groove 6214 by the piezoelectric actuator 622, and thus the gas in the gas-outlet groove 6214 is pushed to discharge through the gas-outlet 6218a and the outlet opening 6263, to achieve the gas transportation at high speed and in large quantities.

[0033] Please refer to FIG. 3. The filtration and purification component 3 of the present disclosure can be a combination of various implementation forms. Preferably but not exclusively, in an embodiment, the filtration and purification component 3 is a filter screen 3a, and the filter screen 3a is a filter screen with a minimum filtration efficiency value (MREV) equal to or greater than level 8. In an embodiment, the filtration and purification component 3 is a filter screen 3a, and the filter screen 3a is a high-efficiency particulate air (HEPA) filter screen grade, which is configured to absorb the chemical smoke, the bacteria, the dust particles and the pollen contained in the air pollution, so that the air pollution introduced is filtered and purified to achieve the effect of filtering and purification. Notably, in the present disclosure, the high-efficiency particulate air (HEPA) filter screen is equal to or greater than a high-efficiency particulate air filter (HEPA) grade 10, with a dust holding capacity greater than 12,000mg. Alternatively, the filter screen 3a is a ULPA14 filter screen grade, so as to improve filtration efficiency and meet higher cleanliness requirements. In some specific embodiments, the filtration and purification component 3 is further combined with physical or chemical materials to provide a sterilization effect for air pollution passing therethrough, and the airflow direction of the guiding fan 2 is the direction shown by the arrow. In an embodiment, the filtration and purification component 3 is combined with a decomposition layer coated thereon to clean the air pollution through a chemical method of sterilization. Preferably but not exclusively, the decomposition layer is an activated carbon 3b for cleaning organic and inorganic substances in air pollution, and removing colored and odorous substances. Notably, the activated carbon 3b has a formaldehyde absorption capacity greater than 1500 mg. Moreover, in some embodiments, the filtration and purification component 3 is combined with a light irradiation element to clean the air pollution through a chemical method of sterilization. Preferably but not exclusively, the light irradiation element is a photo-catalyst unit including a photo catalyst 3c and an ultraviolet lamp 3d for further improving the removal efficiency of pollutants and allergens in the air. When the photo catalyst 3c is irradiated by the ultraviolet lamp 3d, the light energy is converted into the chemical energy, thereby decomposes harmful gases and disinfects bacteria contained in the air pollution, so as to achieve the effects of filtering and purifying. Notably, in the present disclosure, the ultraviolet lamp 3d has a power greater than 120mW. In an embodiment, the light irradiation element is a photo-plasma unit including a

nanometer irradiation tube 3e. When the introduced air pollution is irradiated by the nanometer irradiation tube 3e, the oxygen molecules and water molecules contained in the air pollution are decomposed into high oxidizing photo-plasma, and an ion flow capable of destroying organic molecules is generated. In that, volatile formaldehyde, volatile toluene and volatile organic compounds (VOC) contained in the air pollution are decomposed into water and carbon dioxide, so as to improve the removal efficiency of pollutants and allergens in the air, and achieve the effects of filtering and purifying. In some embodiments, the filtration and purification component 3 is combined with a decomposition unit to clean the air pollution through a chemical method of sterilization. Preferably but not exclusively, the decomposition unit is a negative ion unit 3f with a dust collecting plate. It makes the suspended particles in the air pollution to carry with positive charge and adhered to the dust collecting plate carry with negative charges, so as to improve the removal efficiency of pollutants and allergens in the air, and achieve the effects of filtering and purifying. Preferably but not exclusively, the decomposition unit is a plasma ion unit 3g. The oxygen molecules and water molecules contained in the air pollution are decomposed into positive hydrogen ions (H^+) and negative oxygen ions (O^{2-}) by the plasma ion. The substances attached with water around the ions are adhered on the surface of viruses and bacteria and converted into OH radicals with extremely strong oxidizing power, thereby removing hydrogen (H) from the protein on the surface of viruses and bacteria, and thus decomposing (oxidizing) the protein, so as to improve the removal efficiency of pollutants and allergens in the air, and achieve the effects of filtering and purifying. Preferably but not exclusively, the decomposition unit is an electrostatic filtering unit 3h. The electrostatic force is used to capture and remove suspended particles (such as dust, pollen, bacteria and other pollutants) in the air.

[0034] From the above descriptions, the intelligent networked air conditioner of the present disclosure offers the following benefits of the air exchange, the intelligent monitoring and control, the multifunctional operation modes and the network and remote control. In the air exchange, the total heat exchange technology is introduced to achieve the introduction of fresh outdoor air and the exhaust of indoor air, while simultaneously recovering the heat energy, thus improving energy efficiency. In the intelligent monitoring and control, the built-in gas detection module can monitor the temperature, the humidity, and the air pollution index in real time, and combine with the cloud computing platform for intelligent analysis and control, achieving the automatic adjustment of the indoor environment. In the multifunctional operation modes, the intelligent networked air conditioner has rapid cooling, rapid heating, energy-saving mode, and automatic mode, and can automatically switch the operation modes according to environmental changes. In the network and remote control, the users can remotely monitor and op-

erate the equipment using a mobile phone or computer through IoT technology, improving the convenience and the flexibility.

[0035] In summary, the present disclosure provides an intelligent networked air conditioner, which includes a built-in gas detection module for detecting air pollution in real time. In addition, the gas detection module has cloud connection capabilities, which facilitates remote monitoring and operation by users. Moreover, the air quality monitoring data, including the temperature, the humidity and the air pollution, are collected through IoT communication, the cloud computing is utilized for analysis and control, and it allows to automatically adjust the operating status of the air conditioner according to the requirements, so as to achieve the automatic adjustment of the temperature, the humidity and air exchange, and provide the fresh, comfortable air and the energy-efficient indoor temperature control.

Claims

1. An intelligent networked air conditioner, **characterized by** comprising:

a main body (1a), comprising a flow guide channel (11a), an air inlet (12a), an air outlet (13a), a circulating air inlet (14a) and an air exchange pipe (15a), wherein the flow guide channel (11a) is in communication with the air inlet (12a), the air outlet (13a), the circulating air inlet (14a) and the air exchange pipe (15a) for controlling an airflow direction, and the air inlet (12a) and the air exchange pipe (14a) are in communication with an outdoor field and each provided with a valve (16a) to control communication between the outdoor field and the flow guide channel (11a);

at least one heat exchanging core (1), disposed in the air inlet (12a) and allowing a gas to be introduced into the flow guide channel (11a) to form heat exchange;

a plurality of guiding fans (2), mounted in the air inlet (12a) and the flow guide channel (11a) respectively for guiding the gas to be output from the air outlet (13a);

a plurality of filtration and purification components (3), disposed at entrances of the air inlet (12a) and the circulating air inlet (14a) respectively for filtering air pollution contained in the gas introduced into the flow guide channel (11a) through the air inlet (12a), and filtering circulating air pollution contained in the gas of an indoor field introduced into the flow guide channel (11a) through the circulating air inlet (14a);

a temperature adjustment module (4), disposed in the flow guide channel (11a) to provide temperature exchange for cooling or heating air, and

then output from the air outlet (13a) for regulating a temperature and humidity of the indoor field;

at least one host driving controller (5), controlling an actuation operation of the guiding fan (2) and dynamically adjusting an operating frequency and an output air volume of the guiding fan (2), and controlling an operating mode of the temperature adjustment module (4) for the temperature exchange of cooling or heating; and at least one gas detection module (6), electrically connected to the host driving controller (5), wherein the gas detection module (6) detects a temperature, a humidity and air pollution in air, outputs detection data, and transmits the detection data to a networked cloud computing service device (7) through Internet of Things (IoT) communication, wherein the networked cloud computing service device (7) collects and analyzes the detection data, monitors the detection data in real time, and intelligently selects a control command to transmit to the gas detection module (6), so that the host driving controller (5) controls the actuation operation of the guiding fan (2) and dynamically adjusts the operating frequency and the output air volume of the guiding fan (2), and controls the operating mode of the temperature adjustment module (4) for the temperature exchange of cooling or heating.

2. The intelligent networked air conditioner according to claim 1, wherein the networked cloud computing service device (7) comprises an AI intelligent computing platform (75), and the AI intelligent control platform (75) collects, analyzes and monitors the detection data in real time, intelligently selects and generates the control command, and transmits the control command to the at least one gas detection module (6), so that the host driving controller (5) controls the actuation operation of the guiding fan (2) and dynamically adjusts the operating frequency and the output air volume of the guiding fan (2), and controls the operating mode of the temperature adjustment module (4) for the temperature exchange of cooling or heating.

3. The intelligent networked air conditioner according to claim 1, wherein the gas detection module (6) comprises a gas detection main part (62) and a controlling circuit board (61), the gas detection main part (62) detects the humidity, the temperature and the air pollution to generate the detection data, the controlling circuit board (61) collects, calculates, analyzes and outputs the detection data to form a serial communication (IIC) signal for input, and the networked cloud computing service device (7) receives and analyzes the detection data in real time to output a Universal Asynchronous Transceiver and

Transceiver (UART) signal and a General Purpose Input and Output (GP I/O) signal for the host driving controller (5).

4. The intelligent networked air conditioner according to claim 3, wherein the controlling circuit board (61) comprises:

at least one connection interface (612);
 a power conversion component (611), providing DC voltage division modulation to output a required DC voltage, wherein the required DC voltage is transmitted through the at least one connection interface (612) to the gas detection main part (62) for actuation operation and to the host driving controller (5) for actuation operation;
 a microcontroller (MCU) (613), connected to the gas detection main part (62) through the at least one connection interface (612) to form the serial communication (IIC) signal for input, so that the detection data is calculated and analyzed, and connected through the at least one connection interface (612) to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation; and
 a wireless communicator (614), receiving the detection data and transmitting to the networked cloud computing service device (7) through external wireless communication, wherein the networked cloud computing service device (7) collects, analyzes and monitors the detection data in real time and intelligently selects the control command, and the control command is received through the wireless communicator (614) and transmitted to the microcontroller (MCU) (613) to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation of the host driving controller (5), so that the host driving controller (5) controls the actuation operation of the guiding fan (2) and dynamically adjusts the operating frequency and the output air volume of the guiding fan (2), and controls the operating mode of the temperature adjustment module (4) for the temperature exchange of cooling or heating.

5. The intelligent networked air conditioner according to claim 4, wherein the controlling circuit board (61) further comprises a wired communication port (615), wherein the wired communication port (615) is electrically connected to the controlling circuit board (61) through the connection interface (612) for external connection to a wired communication transmission, wherein the detection data is received and transmitted to the networked cloud computing service

device (7) through external wireless communication, the networked cloud computing service device (7) collects, analyzes and monitors the detection data in real time and intelligently selects the control command, and the control command is received through the wired communication port (615) and transmitted to the microcontroller (MCU) (613) to output the Universal Asynchronous Transceiver and Transceiver (UART) signal and the General Purpose Input and Output (GP I/O) signal for regulation of the host driving controller (5), so that the host driving controller (5) controls the actuation operation of the guiding fan (2) and dynamically adjusts the operating frequency and the output air volume of the guiding fan (2), and controls the operating mode of the temperature adjustment module (4) for the temperature exchange of cooling or heating.

6. The intelligent networked air conditioner according to claim 1, wherein the guiding fan (2) has a noise level of 35~50 dB (decibels) during operation, wherein the temperature adjustment module (4) adjusts the gas temperature and the humidity in the indoor field to maintain an optimal comfort level at the temperature of $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and the humidity of 50% $\pm 10\%$.
7. The intelligent networked air conditioner according to claim 1, wherein the temperature adjustment module (4) comprises a cooling exchanger (41) or heating exchanger (42), the cooling exchanger (41) provides the temperature exchange for cooling air and allows removing heat per hour equal to an area of one ping (3.305785 m^2) $\times$ 600 BTU (cooling capacity), and the heating exchanger (42) provides the temperature exchange for heating air.
8. The intelligent networked air conditioner according to claim 1, wherein the IoT communication is a wireless communication or a wired communication, wherein the wireless communication is configured to communicate with the networked cloud computing service device (7) through a wired connection, and is one selected from the group consisting of a Wi-Fi communication, a Bluetooth communication, a radio frequency identification communication and a near field communication (NFC), wherein the wired communication is configured to communicate with the networked cloud computing service device (7) through a wireless connection.
9. The intelligent networked air conditioner according to claim 2, wherein when the AI intelligent computing platform (75_ of the networked cloud computing service device (7) monitors the detection data of carbon dioxide (CO_2) in real time as being greater a safety detection value, the control command is immediately and intelligently selected to transmit

to the gas detection module (6) to control the host driving controller (5), the guiding fans (2) in the air inlet (12a) and the flow guide channel (11a) are activated, and the valves (16a) in the air inlet (12a) and the air exchange pipe (15a) are opened, so that the gas in the outdoor field is introduced by suction of the guiding fan (2) in the air inlet (12a) to flow through the filtration and purification components (3), the gas flowing through the heat exchanging core (1) is introduced into the flow guide channel (11a) to form the heat exchange, and then the gas is guided by the guiding fan (2) in the flow guide channel (11a) to enter the indoor field through the air outlet (13a), wherein the circulating gas in the indoor field is then introduced into the flow guide channel (11a) through the circulating air inlet (14a), filtered by the filtration and purification components (3), introduced into the flow guide channel, and then discharged to the outdoor field through the air exchange pipe (15a), wherein a part of the gas flows through the flow guide channel (11a) to form the heat exchange, and is then guided by the guiding fan (2) in the flow guide channel (11a) to enter the indoor field through the air outlet (13a), so that an air exchange is formed between the outdoor field and the indoor field.

10. The intelligent networked air conditioner according to claim 1, wherein the filtration and purification component (3) is a filter screen (3a), and the filter screen (3a) is a filter screen (3a) with a minimum filtration efficiency value (MREV) equal to or greater than level 8.

11. The intelligent networked air conditioner according to claim 1, wherein the filtration and purification component (3) is a filter screen (3a), and the filter screen (3a) is a high-efficiency particulate air (HEPA) filter screen grade, wherein the high-efficiency particulate air (HEPA) filter screen is equal to or greater than a high-efficiency particulate air filter (HEPA) grade 10, with a dust holding capacity greater than 12,000mg.

12. The intelligent networked air conditioner according to claim 1, wherein the filtration and purification component (3) is a filter screen (3a), and the filter screen (3a) is a ULPA14 filter screen grade.

13. The intelligent networked air conditioner according to claim 1, wherein the filtration and purification component (3) is combined with a decomposition layer coated thereon to clean the air pollution through a chemical method of sterilization, wherein the decomposition layer is an activated carbon (3b), and the activated carbon (3b) has a formaldehyde absorption capacity greater than 1500 mg.

14. The intelligent networked air conditioner according

to claim 1, wherein the filtration and purification component (3) is combined with a light irradiation element to clean the air pollution through a chemical method of sterilization, wherein the light irradiation element is a photo-catalyst unit including a photo catalyst (3c) and an ultraviolet lamp (3d), wherein the ultraviolet lamp (3d) has a power greater than 120 mW.

15. The intelligent networked air conditioner according to claim 1, wherein the filtration and purification component (3) is combined with a decomposition unit to clean the air pollution through a chemical method of sterilization, wherein the decomposition unit is a negative ion unit (3f), a plasma ion unit (3g) or an electrostatic filtering unit (3h).

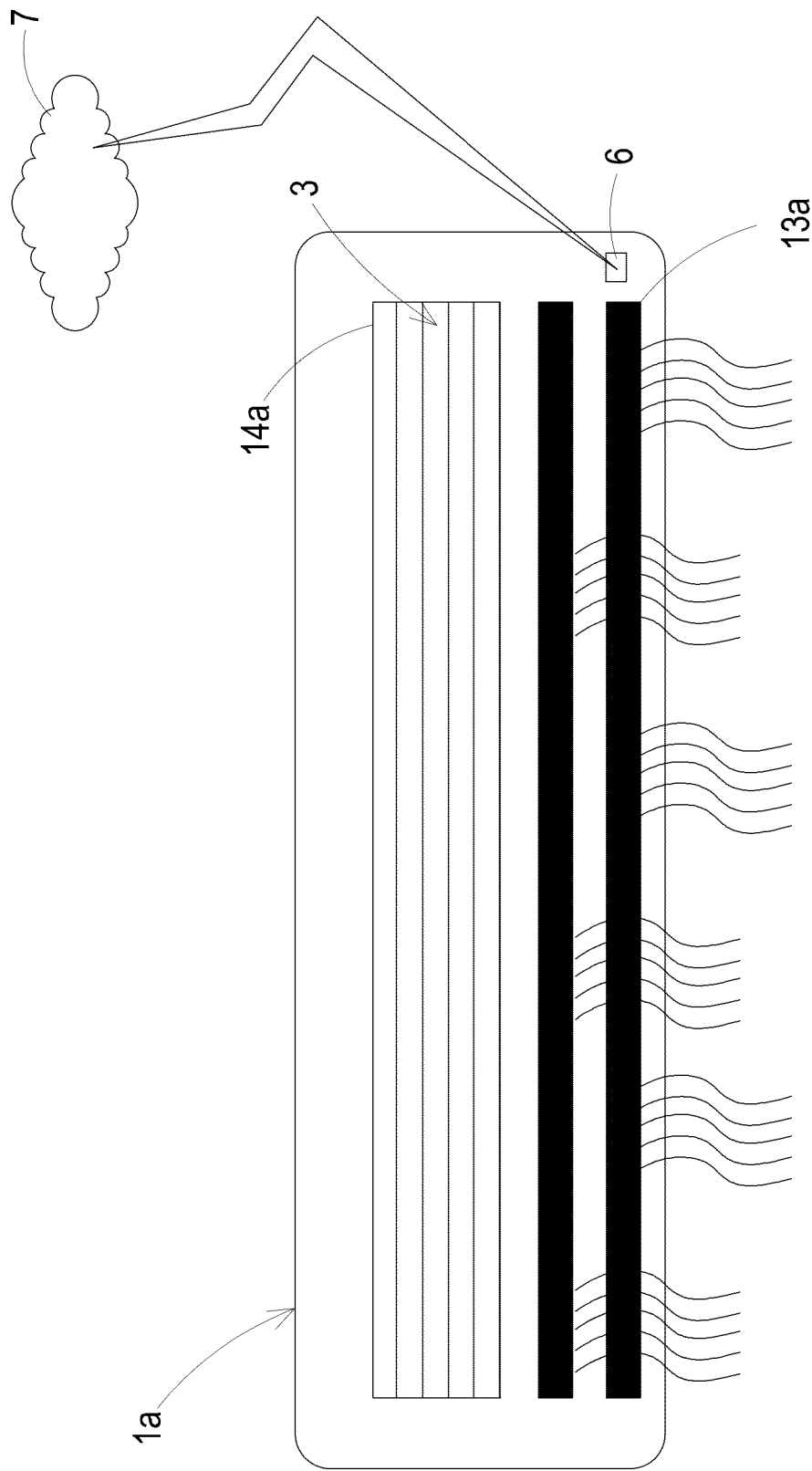


FIG. 1A

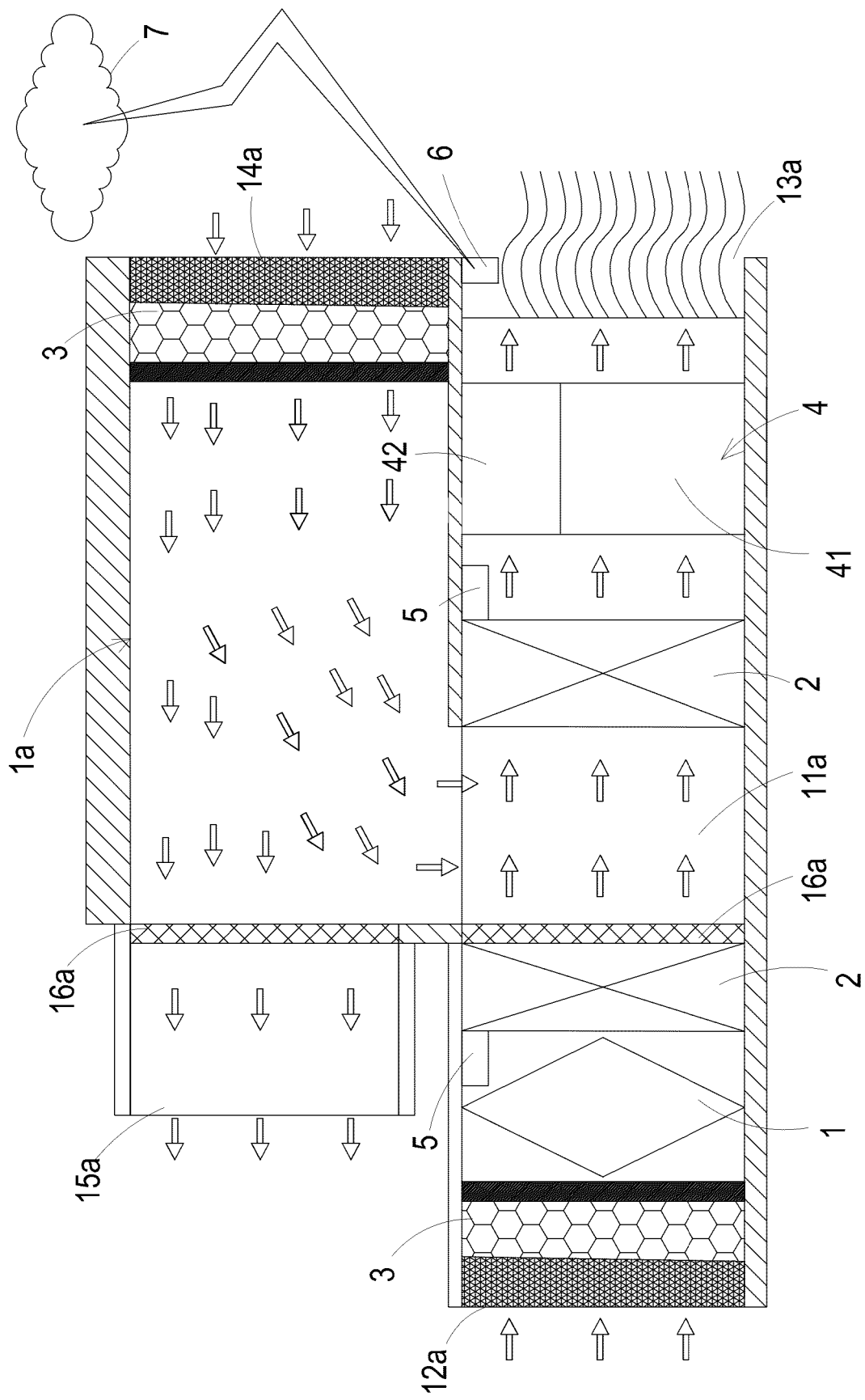


FIG. 1B

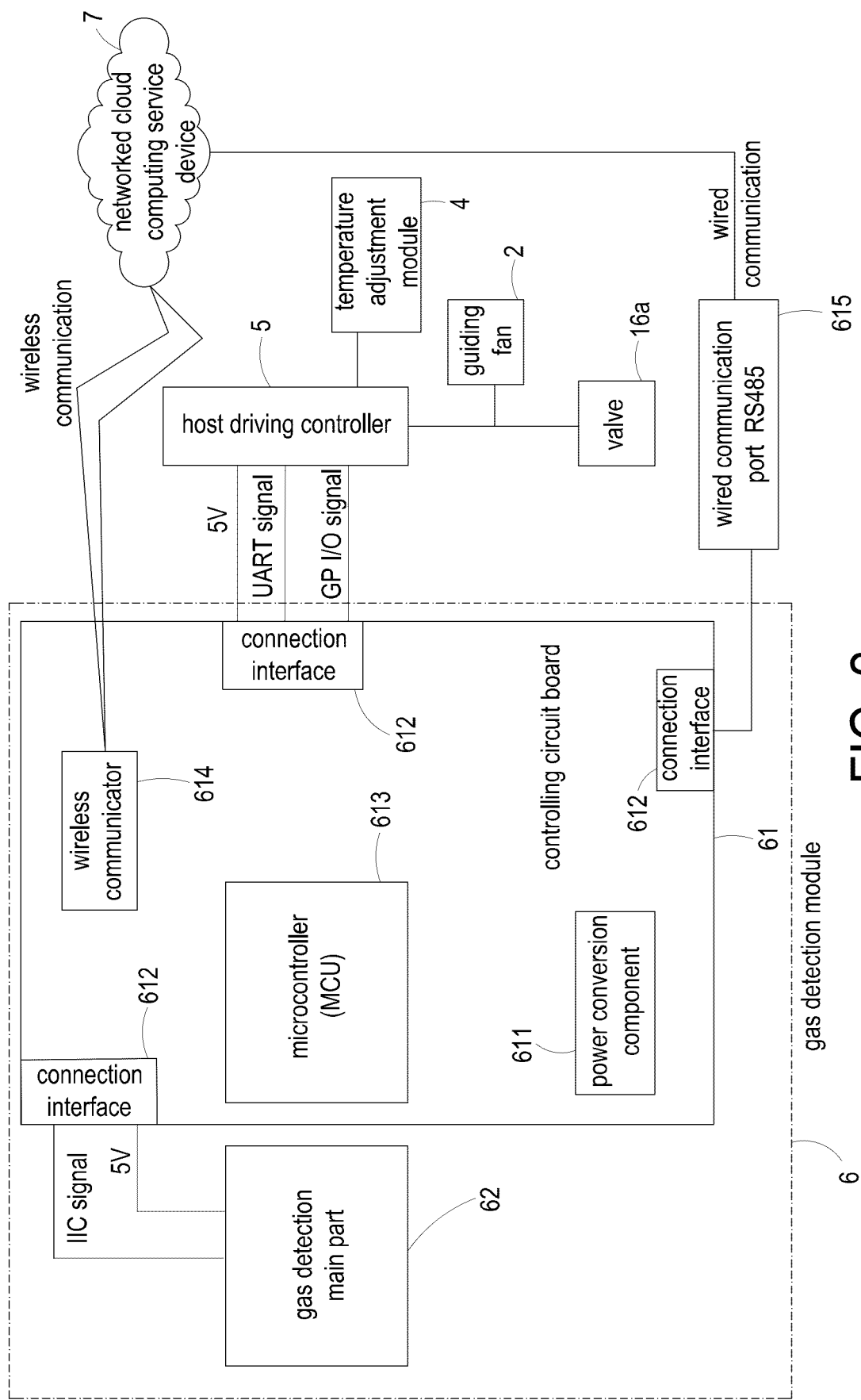


FIG. 2

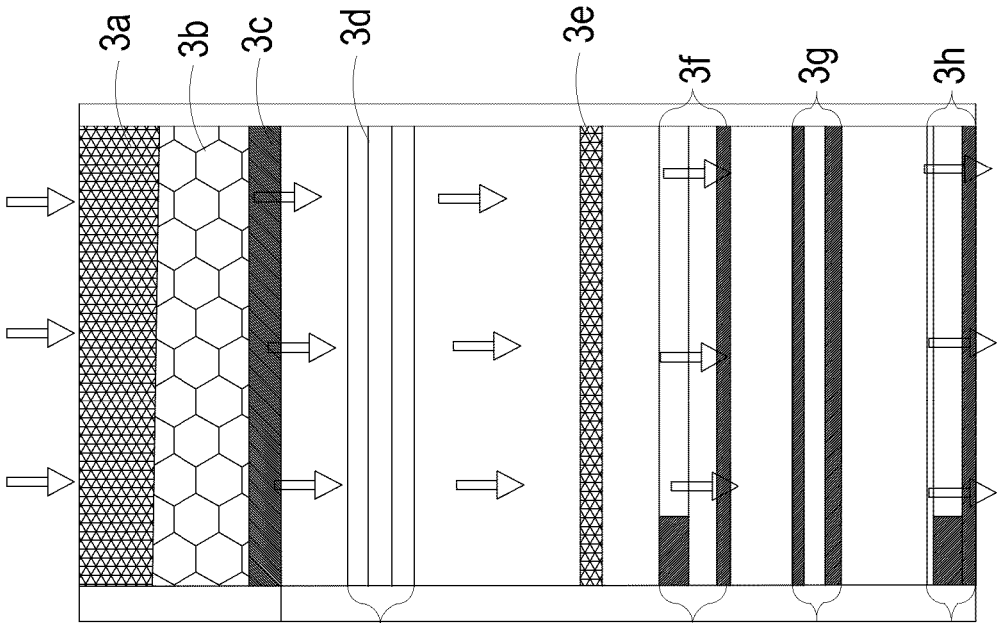


FIG. 3

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62

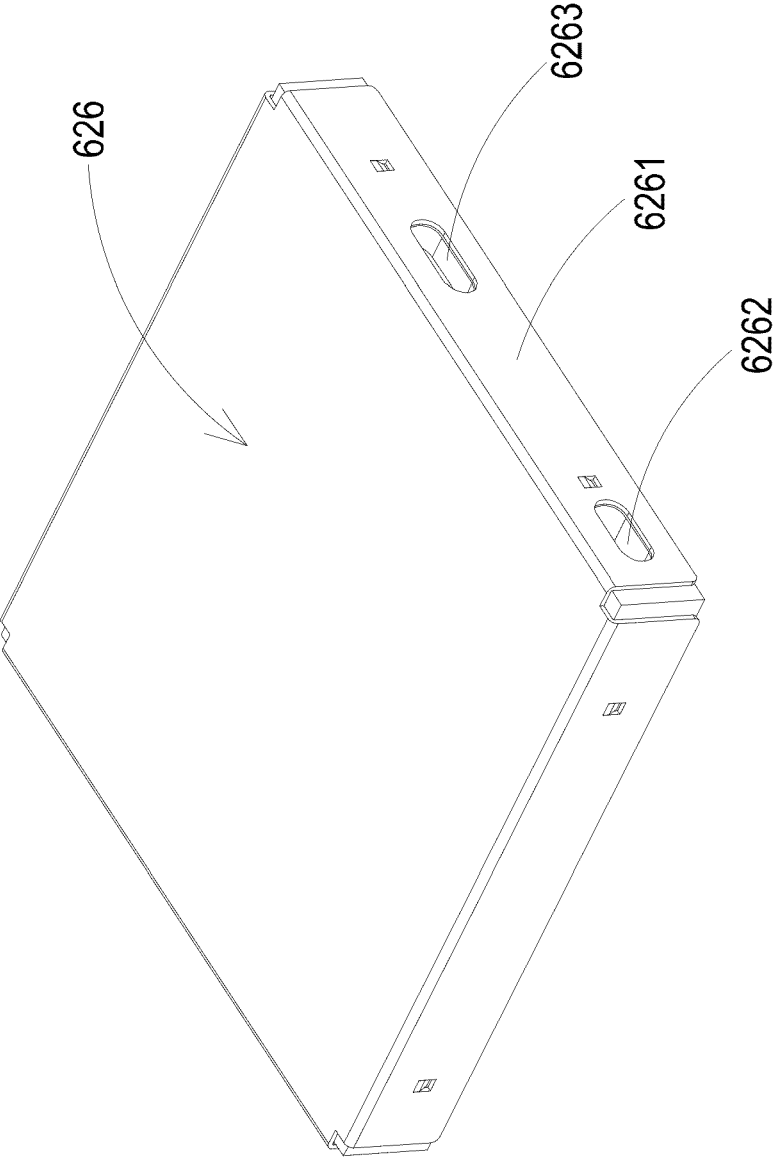


FIG. 4A

62

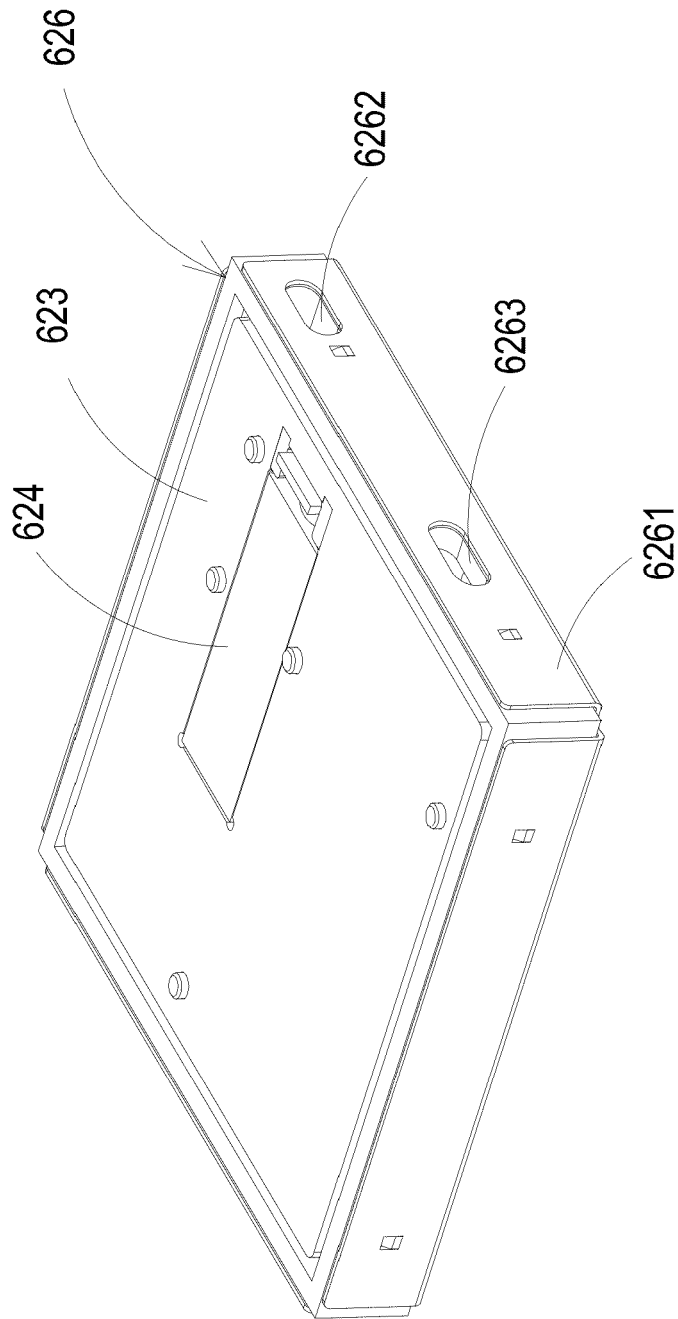


FIG. 4B

62

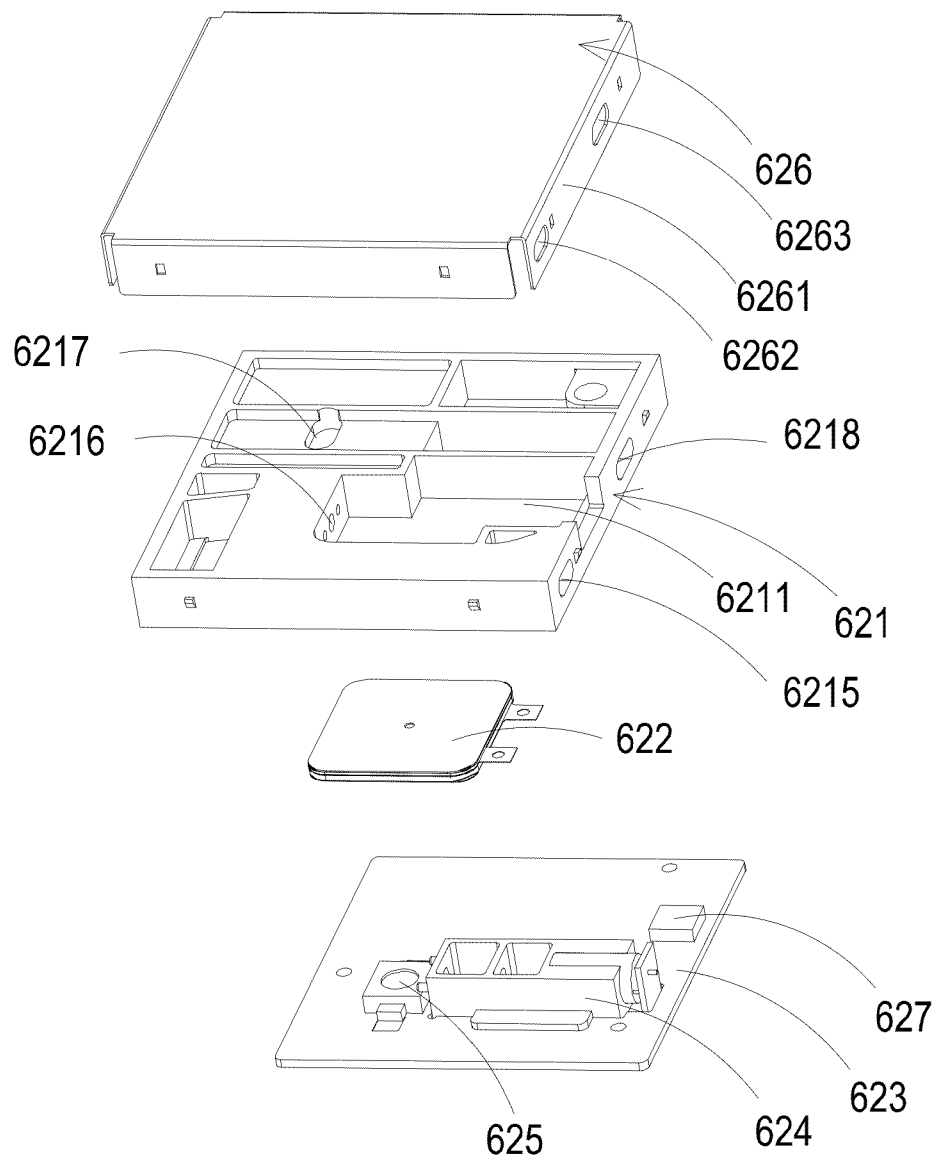


FIG. 5

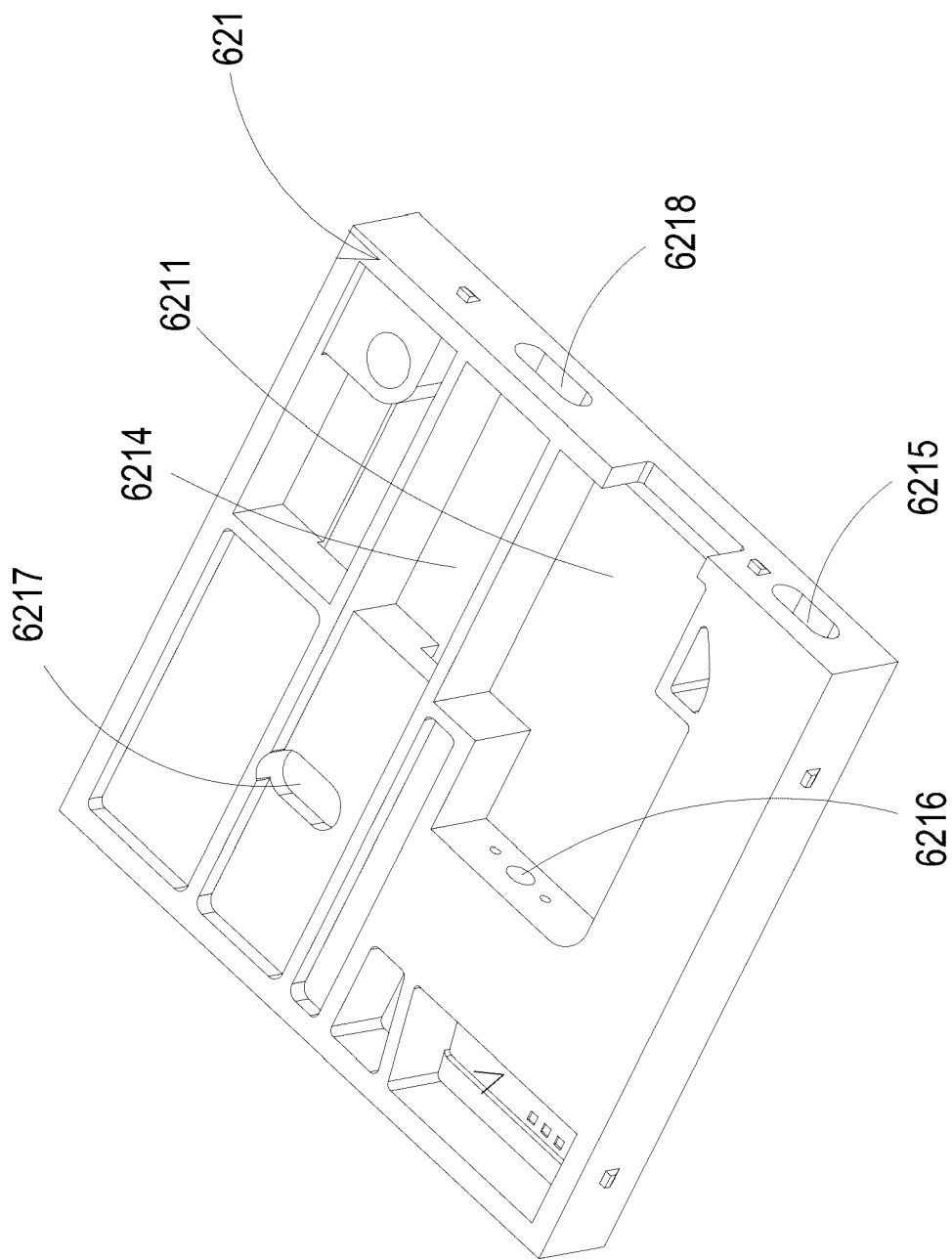


FIG. 6A

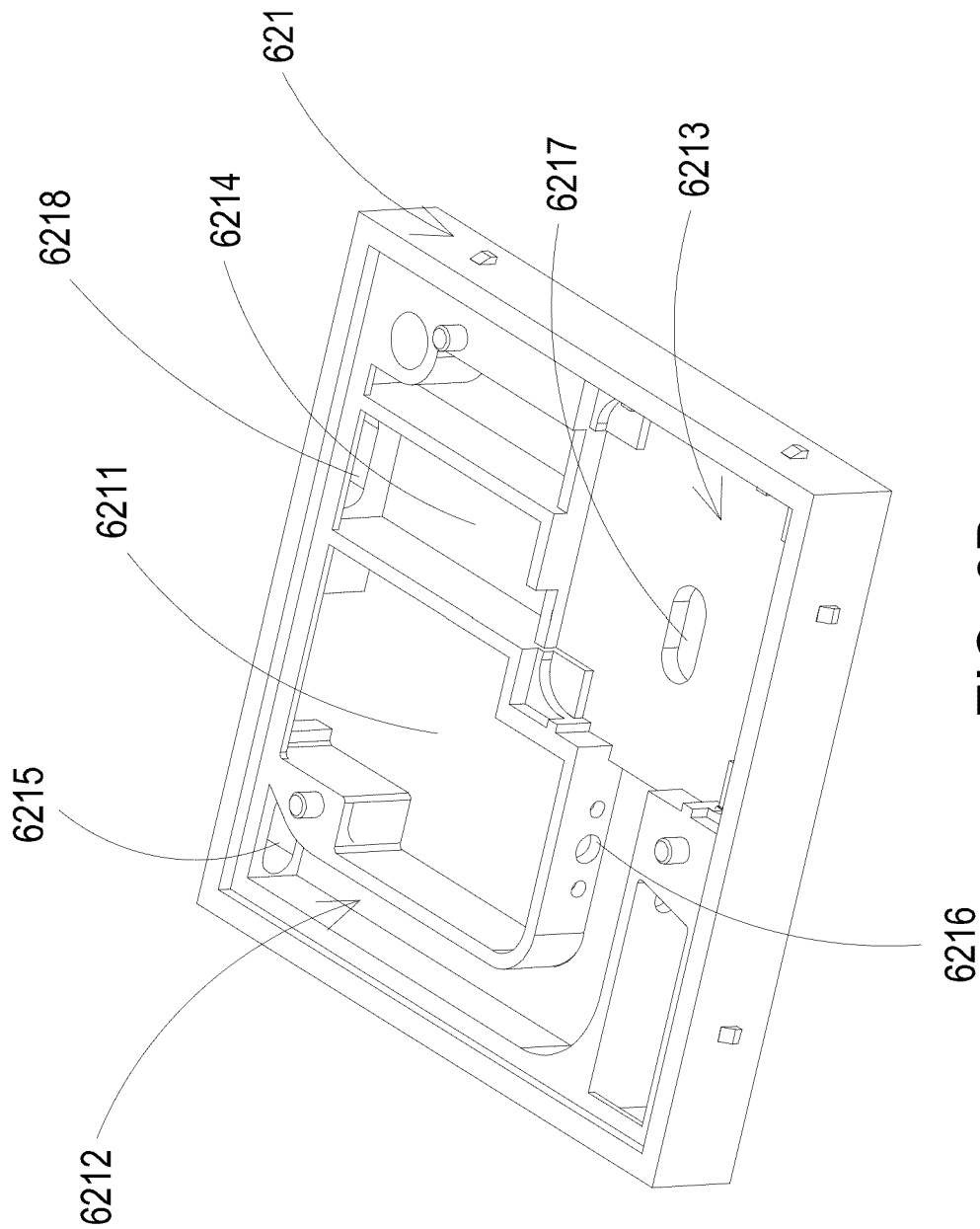


FIG. 6B

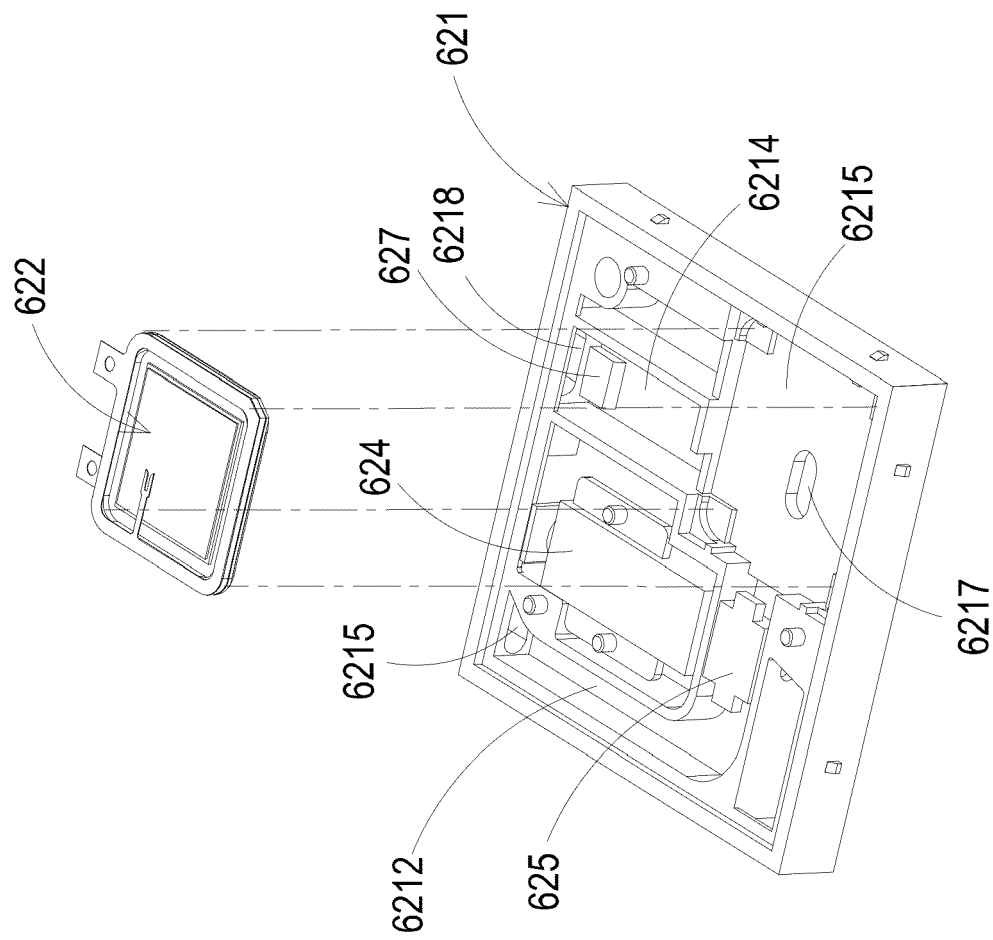


FIG. 6C

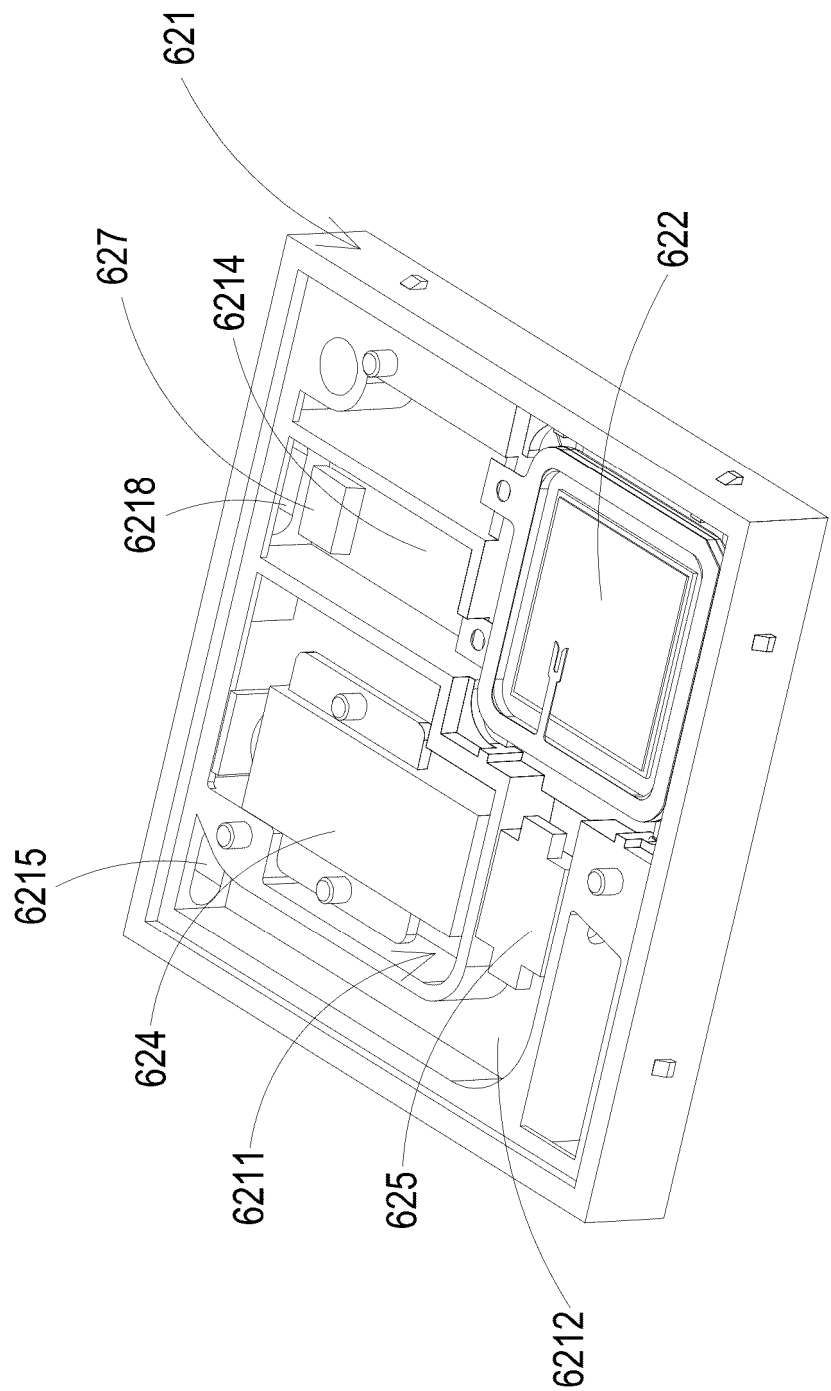


FIG. 7

622

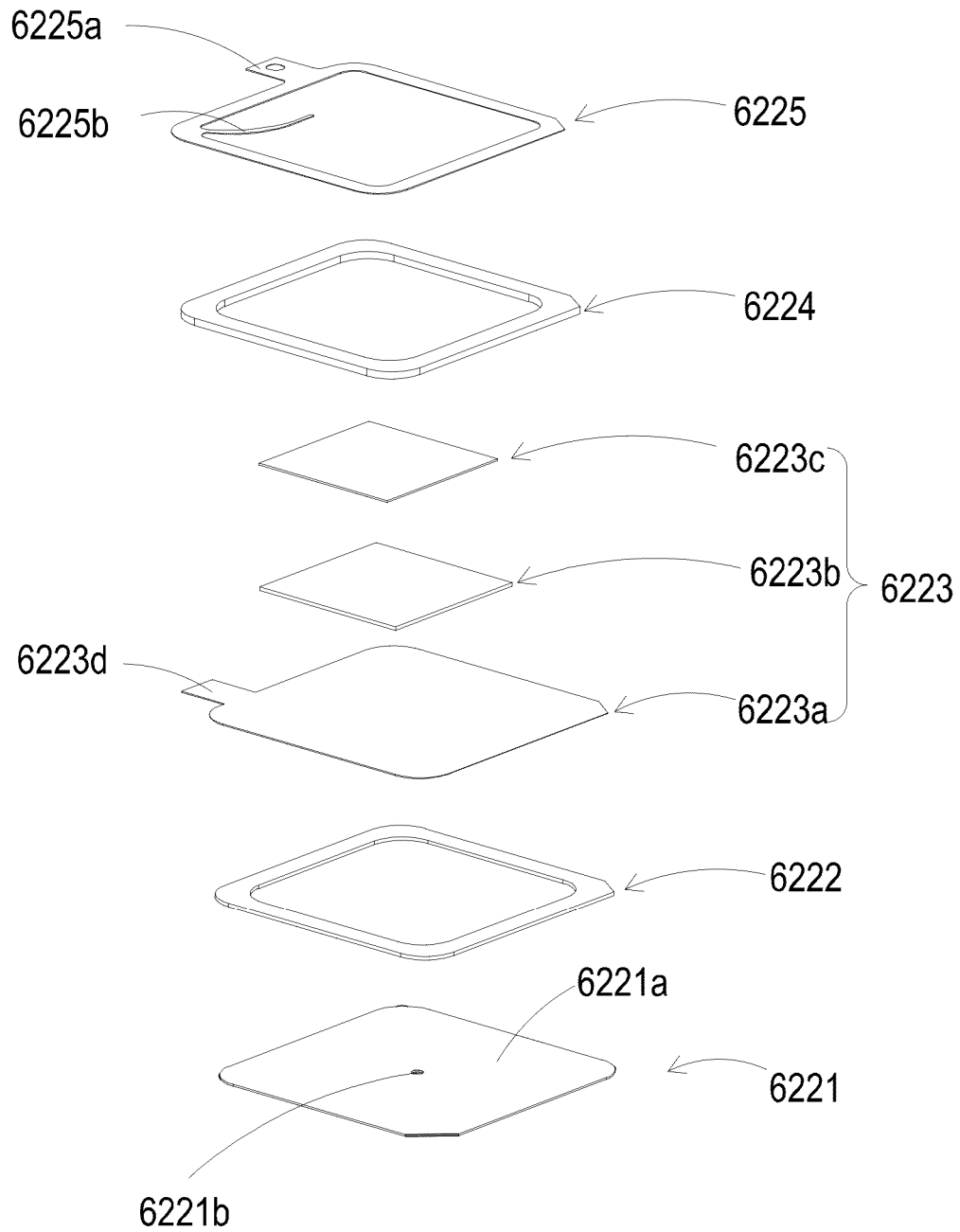


FIG. 8A

622

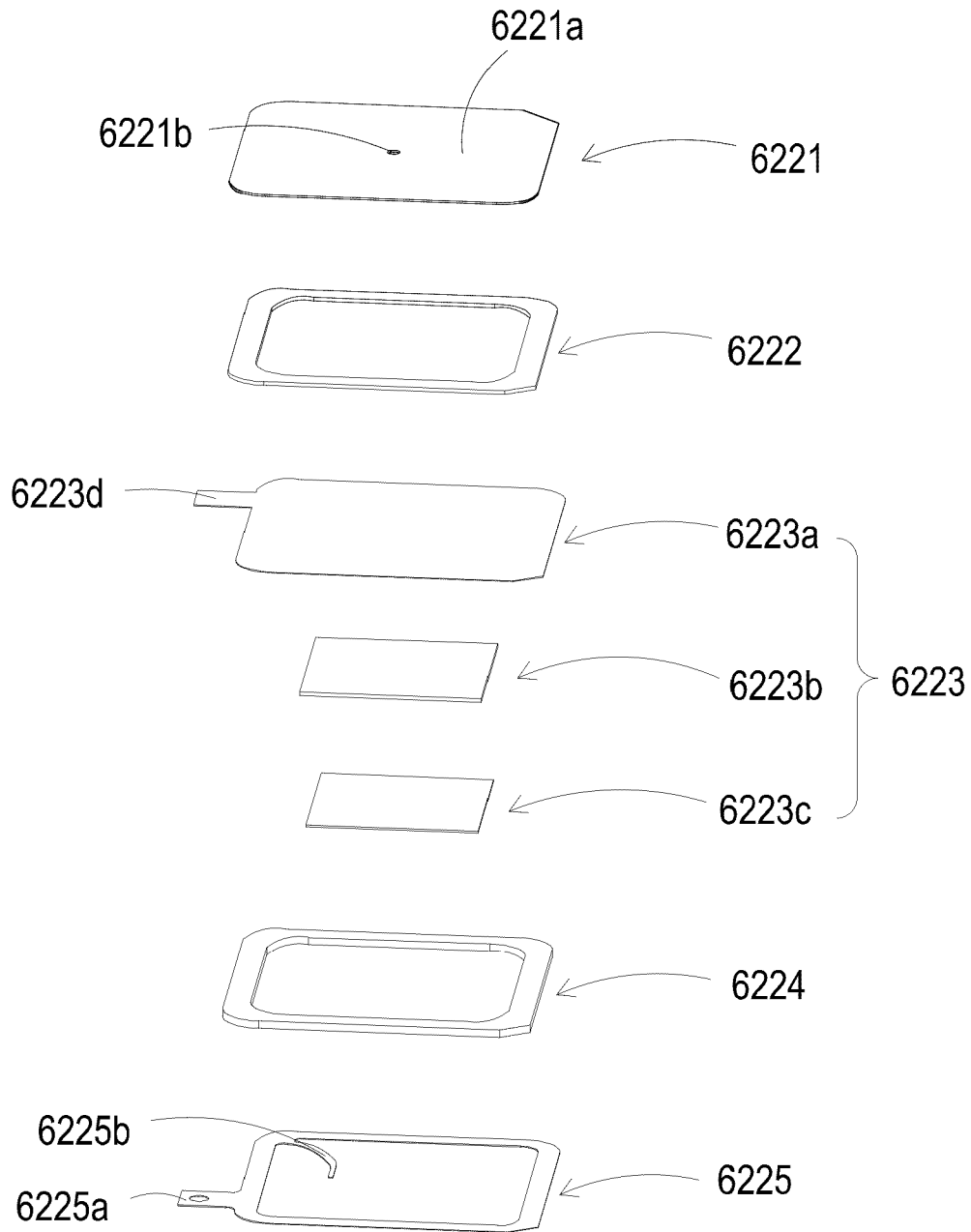


FIG. 8B

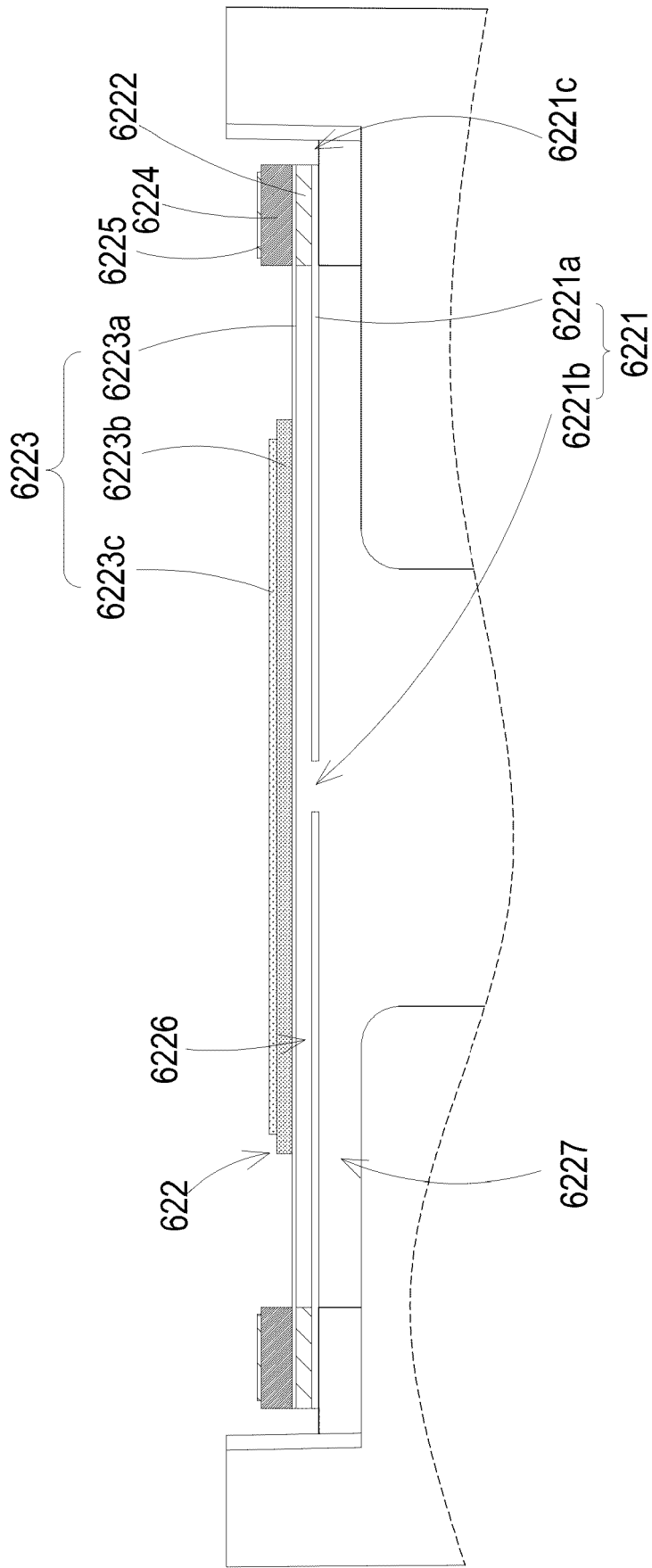


FIG. 9A

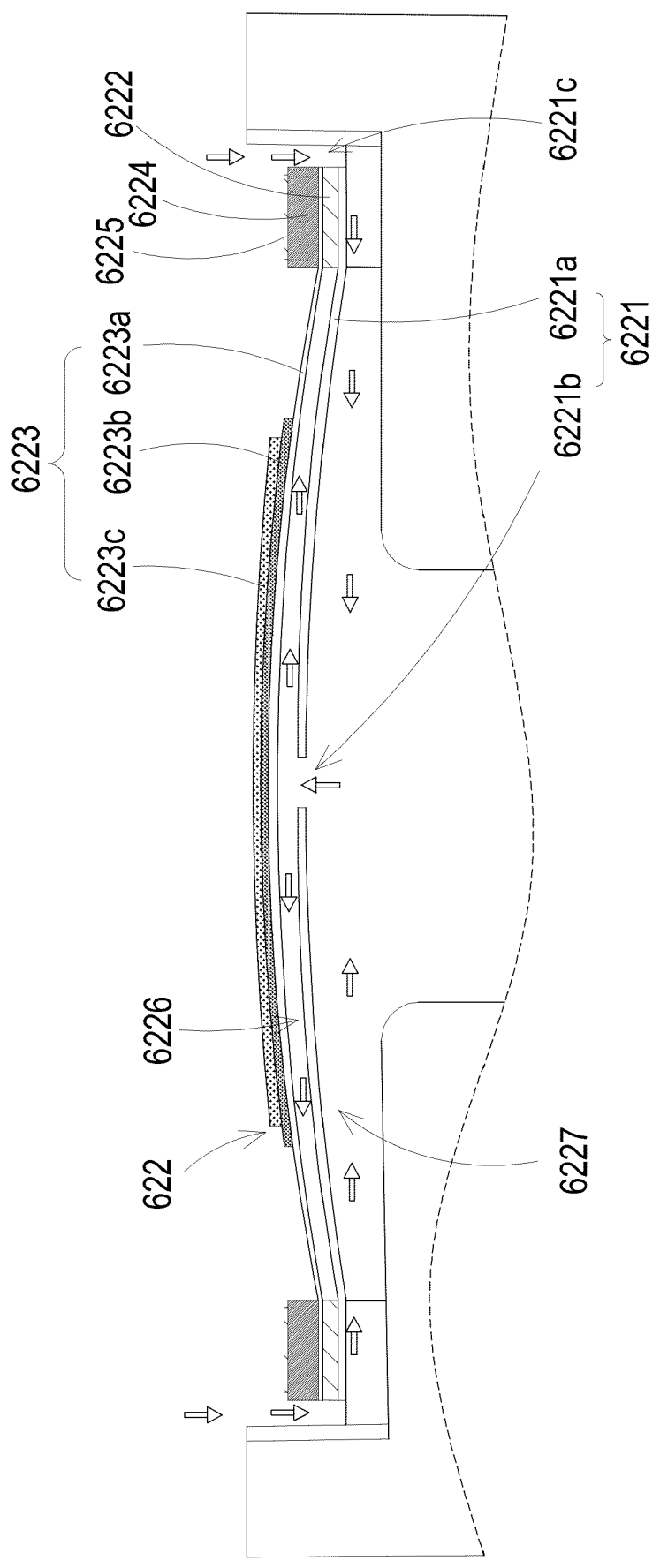


FIG. 9B

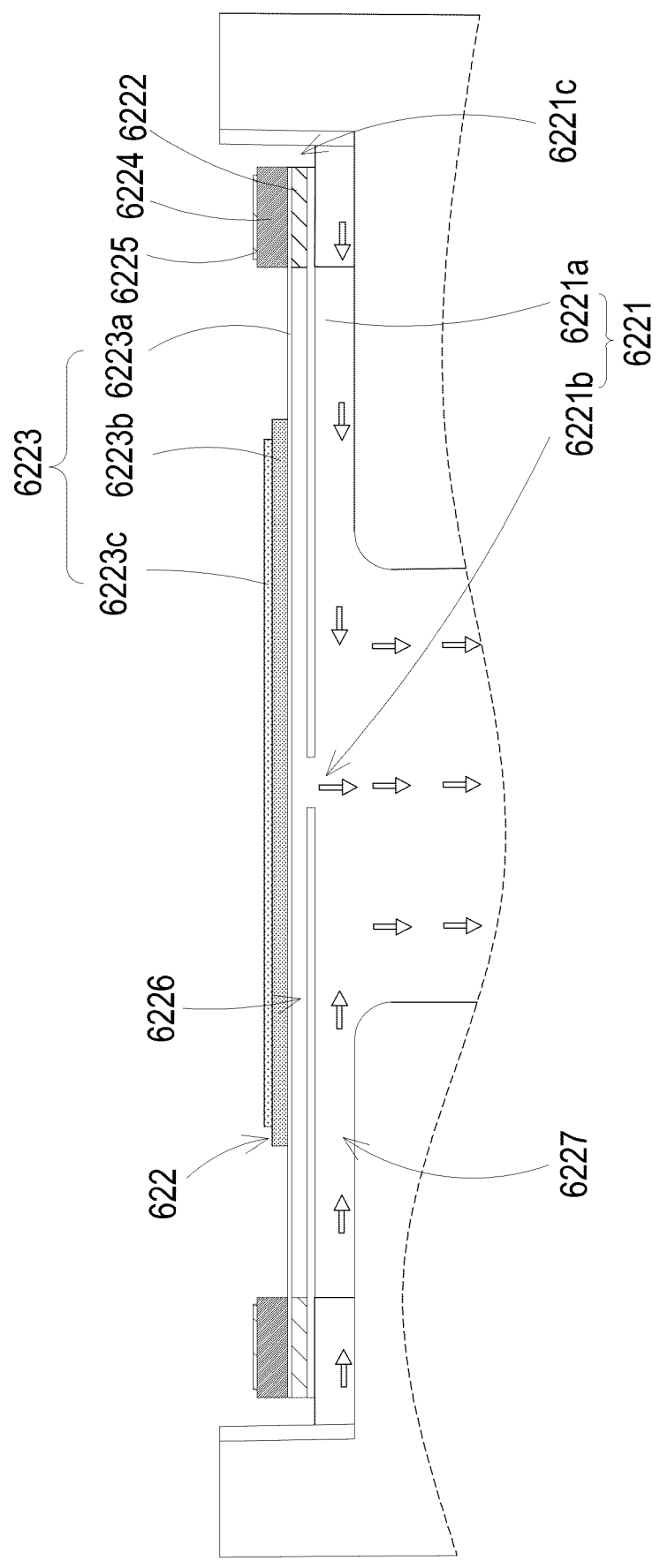


FIG. 9C

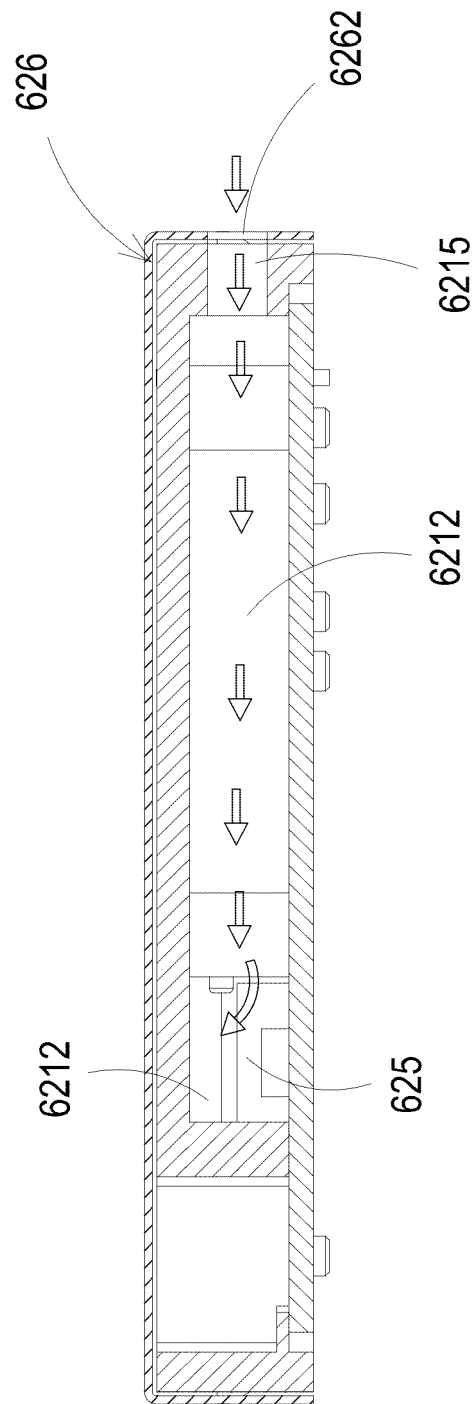


FIG. 10A

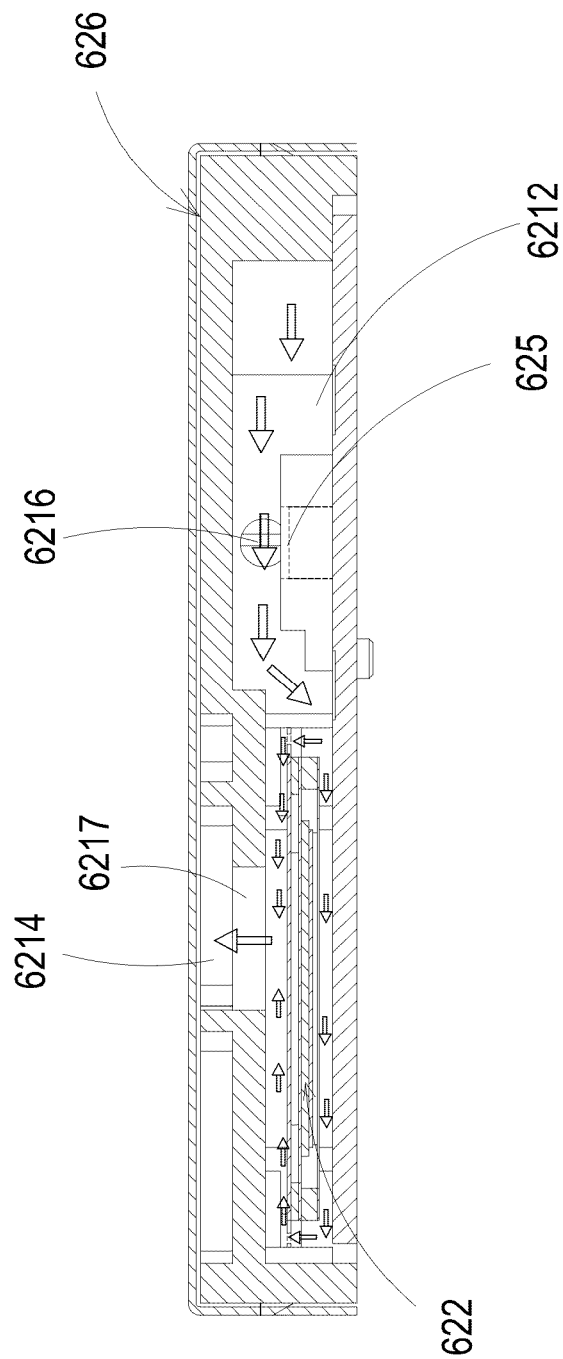


FIG. 10B

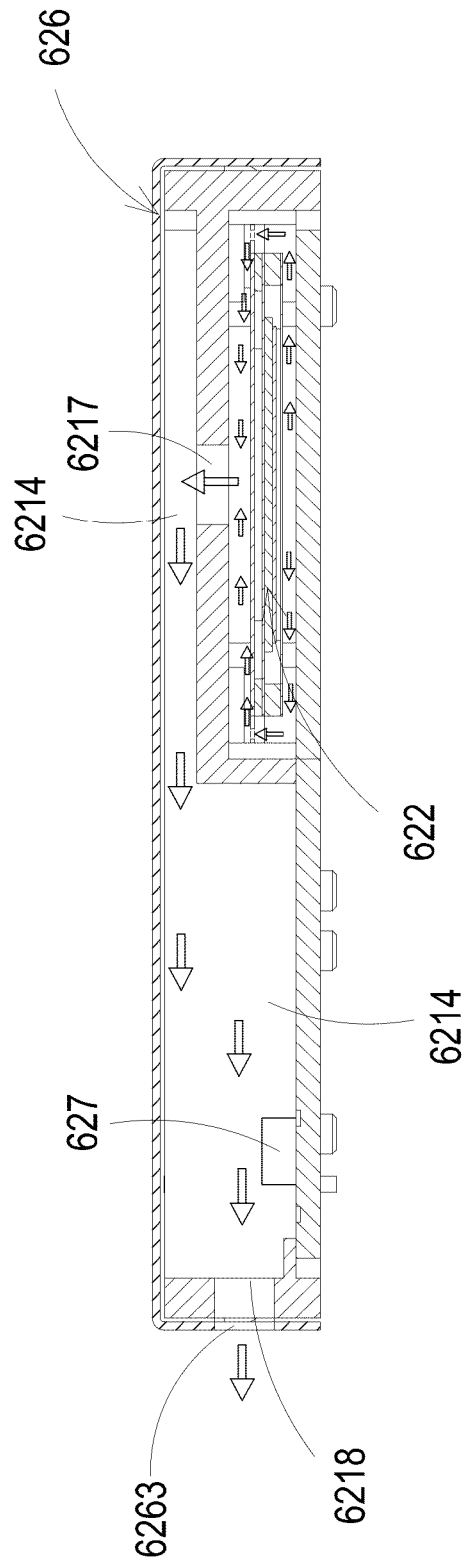


FIG. 10C

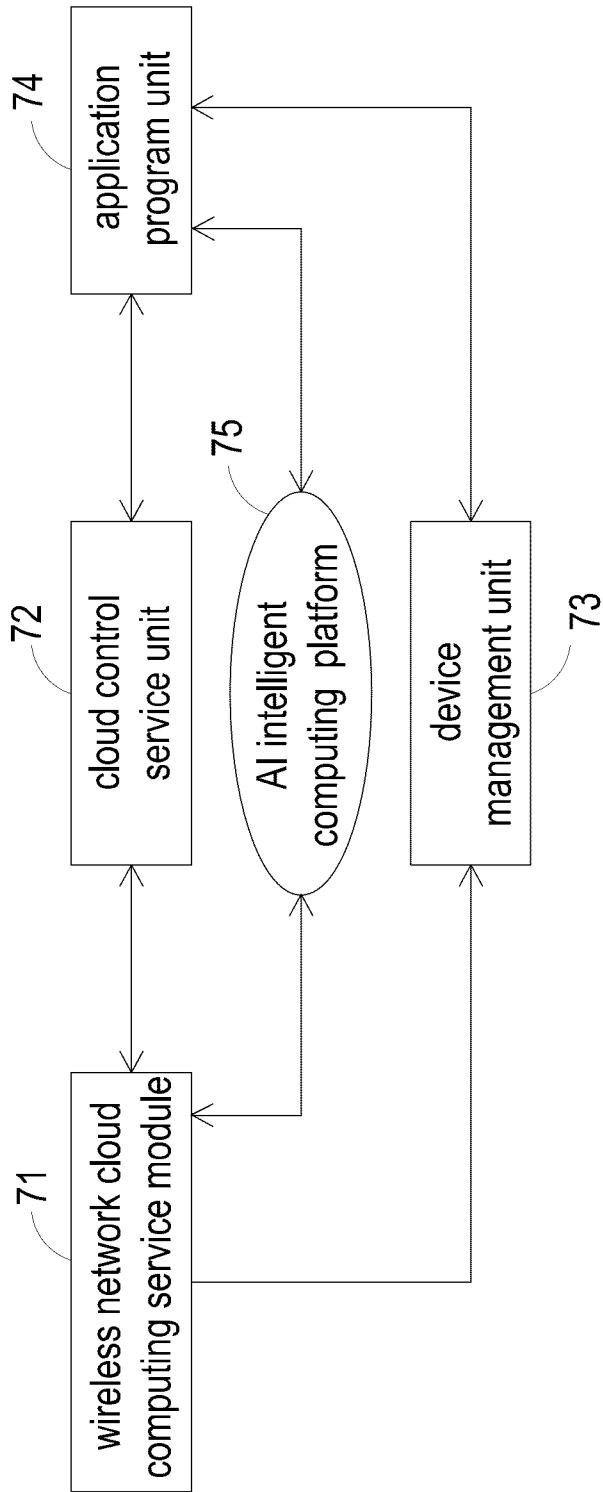


FIG. 11



EUROPEAN SEARCH REPORT

Application Number

EP 26 15 0363

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2023/009166 A1 (XU KE [US] ET AL) 12 January 2023 (2023-01-12) * paragraphs [0004] - [0056]; figures 1-4 *	1-15	INV. F24F11/58 F24F11/74
A	US 2024/344725 A1 (MOU HAO-JAN [TW] ET AL) 17 October 2024 (2024-10-17) * paragraphs [0006] - [0058]; figures 1-11 *	1-15	
A	US 2023/233976 A1 (MICROJET TECHNOLOGY CO LTD) 27 July 2023 (2023-07-27) * paragraphs [0005] - [0066]; figures 1-10 *	1-15	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) F24F
Place of search Munich		Date of completion of the search 10 February 2026	Examiner Ismail, Youssef
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 26 15 0363

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-02-2026

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