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(54) **FAN, HUMIDIFIER AND AIR CONDITIONING SYSTEM**

(57) A fan, a humidifier, and an air conditioning system, the fan comprising a fan base, a transmission wire coil, and a control circuit. An accommodating space is formed at an inner part of the fan base, and a receiving area for placing a wireless power receiving device is formed at an upper surface of the fan base. The transmission wire coil and the control circuit are disposed in the accommodating space, and the transmission wire coil is located below the receiving area. The control circuit is used to control the transmission wire coil to send wireless power transmission signals to the wireless power receiving device. By means of disposing the transmission wire coil and the control circuit at the fan base, the wireless power transmission signals may be sent to the wireless power receiving device placed on the fan base for the wireless power receiving device to operate, thereby expanding the application range of wireless power transmission technology, so that the power supply of the wireless power receiving device is more convenient and safe.

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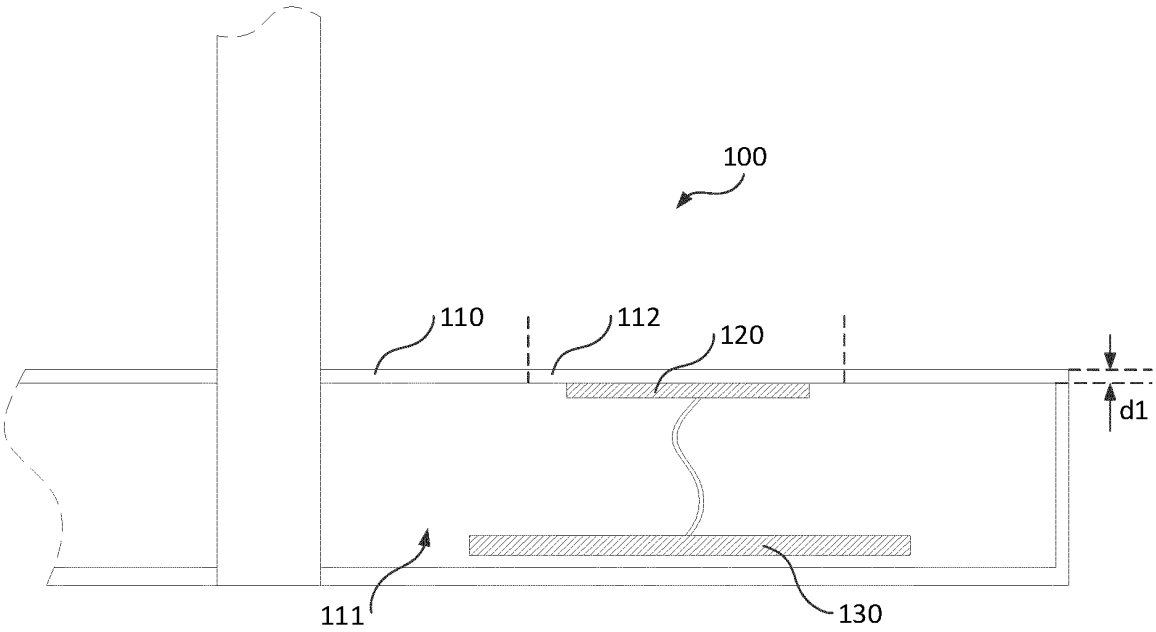

FIG. 1

Description

[0001] The present disclosure claims priority of Chinese Patent Application No. 201811584241.X and application name of "FAN, HUMIDIFIER AND AIR CONDITIONING SYSTEM", filed on December 24, 2018 in the State Intellectual Property Office of China, the contents of all of which are hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of electrical device technology, and in particular, to a fan, a humidifier and an air conditioning system.

BACKGROUND

[0003] Wireless power transmission transmits electric energy through magnetic field generated between cable trays, thus abandoning a traditional way of wire connection, making electrical devices more convenient for storage, and also avoiding situation of wire entanglement and interface leakage, and making transmission process safer.

[0004] In long-term research and development, inventors of the present disclosure found that the wireless power transmission technology is currently mainly used in fields of electric vehicles and mobile phones, and is mainly used to realize a battery charging function, but is rare in other electrical fields, and is limited in power supply for operations of electrical appliances.

SUMMARY

[0005] The present disclosure provides a fan, a humidifier and an air conditioning system to solve technical problems of limited application of a wireless power transmission function in prior art. In order to solve the above technical problems, a technical solution adopted by the present disclosure is to provide a fan. The fan includes a fan base, a transmitting wire coil and a control circuit. An accommodating space is defined inside the fan base, and an upper surface of the fan base is provided with a receiving area configured to place a wireless power receiving device. The transmitting wire coil and the control circuit are arranged in the accommodating space. The transmitting wire coil is arranged below the receiving area. The control circuit is configured to control the transmitting wire coil to transmit wireless power transmission signals to the wireless power receiving device.

[0006] Alternatively, an area of the transmitting wire coil is set to be greater than or equal to an area of a receiving wire coil of the wireless power receiving device for receiving the wireless power transmission signals.

[0007] Alternatively, a thickness of the receiving area is set such that a distance between the transmitting wire coil and the receiving wire coil is less than or equal to 10 mm.

[0008] Alternatively, the receiving area is provided with a positioning clip for positioning the wireless power receiving device.

[0009] Alternatively, the wireless power receiving device is a humidifier, the fan further includes a humidity sensor, the humidity sensor is configured to detect an ambient humidity value, and the control circuit further adjusts power of the wireless power transmission signals according to the ambient humidity value.

[0010] Alternatively, the control circuit is configured to compare the ambient humidity value with a preset humidity threshold, and supply power to the transmitting wire coil in response to the ambient humidity value being less than or equal to the preset humidity threshold.

[0011] Alternatively, the fan further includes a receiving circuit configured to receive, from the wireless power receiving device, state parameters of the wireless power receiving device or a power adjustment instruction generated by the wireless power receiving device according to the state parameters. The control circuit is further configured to generate the power adjustment instruction according to state parameters received by the receiving circuit, and adjust the power of the wireless power transmission signals according to the power adjustment instruction, or directly adjust the power of the wireless power transmission signals according to a power adjustment instruction received by the receiving circuit.

[0012] Alternatively, the state parameters received by the receiving circuit includes a current working voltage, a current working current of the wireless power receiving device and target power of the wireless power receiving device, or the state parameters received by the receiving circuit includes the current working voltage and the current working current of the wireless power receiving device, and a target voltage and a target current generated according to the target power. The control circuit is further configured to generate a target voltage and a target current according to target power received by the receiving circuit, and then generate the power adjustment instruction according to a current working voltage, a current working current, the target voltage and the target current, or generate the power adjustment instruction according to a current working voltage, a current working current, a target voltage and a target current received by the receiving circuit.

[0013] Alternatively, the receiving circuit is further configured to receive a protection instruction, and the state parameters received by the receiving circuit includes at least one or a combination of the current working voltage, the current working current and current working temperature of the wireless power receiving device. The control circuit is further configured to reduce the power of the wireless power transmission signals or stop power supply to the transmitting wire coil according to a protection instruction received by the receiving circuit, or compare the at least one or the combination with a corresponding protection threshold, and reduce the power of the wireless power transmission signals or stop the power supply

to the transmitting wire coil in response to the at least one or the combination being greater than the corresponding protection threshold.

[0014] Alternatively, the fan further includes a state detection circuit. The state detection circuit is configured to detect at least one or a combination of a current working voltage, a current working current and current working temperature of the fan. The control circuit is further configured to compare the at least one or the combination with a corresponding protection threshold, and reduce power of the wireless power transmission signals or stop power supply to the transmitting wire coil in response to the at least one or the combination being greater than the corresponding protection threshold.

[0015] Alternatively, the fan further includes a state detection circuit configured to detect a current working voltage of the fan and a receiving circuit configured to receive a current working voltage of the wireless power receiving device from the wireless power receiving device. The control circuit is further configured to compare the current working voltage of the fan with the current working voltage of the wireless power receiving device, and generate a prompt signal for repositioning the wireless power receiving device in response to difference between the current working voltage of the fan and the current working voltage of the wireless power receiving device being greater than a preset difference threshold.

[0016] In order to solve the above technical problems, another technical solution adopted by the present disclosure is to provide a humidifier. The humidifier includes a humidifier shell, a receiving wire coil and a control circuit. An accommodating space is defined inside the humidifier shell. The receiving wire coil and the control circuit are arranged in the accommodating space. The receiving wire coil is arranged above a bottom of the humidifier shell. The control circuit is configured to control the receiving wire coil to receive wireless power transmission signals from a wireless power transmission device.

[0017] Alternatively, the humidifier further includes a state detection circuit and a transmitting circuit. The state detection circuit is configured to detect state parameters of the humidifier. The control circuit is further configured to generate a power adjustment instruction according to the state parameters. The transmitting circuit is configured to transmit the state parameters or the power adjustment instruction to the wireless power transmission device.

[0018] Alternatively, the state parameters include at least one or a combination of a current working voltage, a current working current and current working temperature of the humidifier, and the control circuit is further configured to compare the at least one or the combination with a corresponding protection threshold, and generate a protection instruction in response to the at least one or the combination being greater than the corresponding protection threshold.

[0019] In order to solve the above technical problems, another technical solution adopted by the present disclosure is to provide an air conditioning system. The air conditioning system includes the fan as described above and the humidifier as described above as a wireless power receiving device.

[0020] The present disclosure can transmit wireless power transmission signals to the wireless power receiving device placed on the fan base for operation of the wireless power receiving device by setting the transmitting wire coil and a control circuit on the fan base, thus expanding application scope of wireless power transmission technology and making power supply of the wireless power receiving device more convenient and safe.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] In order to make the technical solution described in the embodiments of the present disclosure more clearly, the drawings used for the description of the embodiments will be briefly described. Apparently, the drawings described below are only for illustration, but not for limitation. It should be understood that, one skilled in the art may acquire other drawings based on these drawings, without making any inventive work.

FIG. 1 is a schematic structural view of a fan provided by one embodiment of the present disclosure.

FIG. 2 is a schematic structural view of a fan provided by one embodiment of the present disclosure.

FIG. 3 is a schematic structural view of an air conditioning system of provided by one embodiment the present disclosure.

FIG. 4 is a schematic structural view of a humidifier in an air conditioning system provided by one embodiment of the present disclosure.

FIG. 5 is a schematic structural view of a fan provided by another embodiment of the present disclosure.

FIG. 6 is a schematic structural view of an air conditioning system provided by another embodiment of the present disclosure.

FIG. 7 is a schematic structural view of a humidifier provided by one embodiment of the present invention.

DETAILED DESCRIPTION

[0022] Technical solutions in embodiments of the present disclosure will now be described clearly and completely with reference to accompanying drawings of the embodiments of the present disclosure. Apparently, the described embodiments are only a part of the embodiments of the present disclosure, not all of the embodiments. All other embodiments obtained by a person of

ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present disclosure.

[0023] Referring to FIG. 1, a fan 100 of one embodiment of the present disclosure includes a fan base 110, a transmitting wire coil 120 and a first control circuit 130. A first accommodating space 111 is defined inside the fan base 110. The fan base 110 is provided with a receiving area 112. The receiving area 112 is formed on an upper surface for placing a wireless power receiving device. The transmitting wire coil 120 and the first control circuit 130 are arranged in the first accommodating space 111. The transmitting wire coil 120 is arranged below the receiving area 112, and the first control circuit 130 is configured to control the transmitting wire coil 120 to transmit wireless power transmission signals to the wireless power receiving device.

[0024] The embodiment of the present disclosure can transmit the wireless power transmission signals to the wireless power receiving device placed on the fan base for operation of the wireless power receiving device by setting the transmitting wire coil and a control circuit on the fan base, thus expanding application scope of a wireless power transmission technology and making power supply of the wireless power receiving device more convenient and safe.

[0025] In other embodiments, the transmitting wire coil and the control circuit can also be arranged in a desk, a bedside table or a desk lamp and other devices which are easy to place the wireless power receiving device.

[0026] In the embodiment, a thickness of the receiving area 112 can be set such that a distance between the transmitting wire coil 120 and a receiving wire coil is less than or equal to 10 mm.

[0027] Referring to FIG. 2 and FIG. 3 together, in the embodiment, the wireless power receiving device 200 can be a humidifier, the fan 100 may further include a humidity sensor 140. The humidity sensor 140 may be configured to detect an ambient humidity value. The first control circuit 130 may further adjust power of the wireless power transmission signals according to the ambient humidity value to change the ambient humidity value by controlling the humidifier.

[0028] Specifically, the first control circuit 130 may compare the ambient humidity value with a preset humidity threshold, and supply power to the transmitting wire coil 120 in response to the ambient humidity value being less than or equal to the preset humidity threshold. The greater absolute difference between the preset humidity threshold and the ambient humidity value, the greater a power supply voltage of the first control circuit 130 to the transmitting wire coil 120. Thus the ambient humidity value can reach the present humidity threshold as soon as possible. For example, if the present humidity threshold is 50%, and the humidity sensor 140 detects that the ambient humidity value is 45%, the first control circuit 130 is configured to supply power to the transmitting wire coil 120 to make the humidifier start to work. When the humidity sensor 140 detects that the ambient humidity value exceeds 50%, the first control circuit 130 stops supplying power to the transmitting wire coil 120, and the humidifier stops working.

[0029] In the embodiment, the humidifier may include a humidifier shell 210, a receiving wire coil 220 and a second control circuit 230. A second accommodating space 211 is defined inside the humidifier shell 210. The receiving wire coil 220 and the second control circuit 230 are arranged in the second accommodating space 211. The receiving wire coil 220 is arranged above a bottom of the humidifier shell 210. The second control circuit 230 is configured to control the receiving wire coil 220 to receive the wireless power transmission signals from the fan 100.

[0030] In the embodiment, the fan base 110 and the humidifier shell 210 can be made from acrylonitrile butadiene styrene (ABS) plastic. The ABS plastic can avoid interference and shielding effect on magnetic field generated by the transmitting wire coil 120 and the receiving wire coil 220 while ensuring insulation.

[0031] The fan 100 may further include a receiving circuit 150. The receiving circuit 150 is configured to receive state parameters of the wireless power receiving device 200 from the wireless power receiving device 200. The first control circuit 130 may further generate a power adjustment instruction according to state parameters received by the receiving circuit 150, and adjust the power of the wireless power transmission signals according to the power adjustment instruction.

[0032] Specifically, the state parameters received by the receiving circuit 150 may include a current working voltage, a current working current and target power of the wireless power receiving device 200, or the state parameters received by the receiving circuit 150 may include the current working voltage, the current working current of the wireless power receiving device 200 and a target voltage and a target current generated according to the target power. The first control circuit 130 may further generate the target voltage and the target current according to target power received by the receiving circuit 150, and then generate the power adjustment instruction according to a current working voltage, a current working current, the target voltage and the target current, or generate the power adjustment instruction according to a current working voltage, a current working current, a target voltage and a target current received by the receiving circuit 150.

[0033] For example, referring to FIG. 4 together, in the embodiment, the humidifier may further include a first state detection circuit 240 and a transmitting circuit 250. The first state detection circuit 240 is configured to detect state parameters of the humidifier. The second control circuit 230 is further configured to generate the power adjustment instruction according to the state parameters. The transmitting circuit 250 is configured to transmit the state parameters or the power adjustment instruction to the fan 100.

[0034] Specifically, a first state detection circuit 240 of the humidifier detects that a current working voltage of the humidifier is V1 and a current working current of the humidifier is 11. The second control circuit 230 is configured to generate the target voltage VA1 and the target current IA1 according to target power of the humidifier. A transmitting circuit 250 of the humidifier transmits the current working voltage V1 and the current working current 11 of the humidifier, the target voltage VA1 and the target current IA1 of the humidifier to a receiving circuit 150 of the fan 100. The first control circuit 130 calculates values of V1-VA1 and I1-IA1 respectively. If the values are positive, the power adjustment instruction is generated to reduce the power of the wireless power transmission signals. If the values are negative, the power adjustment instruction is generated to increase the power of the wireless power transmission signals. If the values are 0, there is no need to generate the power adjustment instruction.

[0035] In other embodiments, the receiving circuit 150 of the fan 100 can also be configured to receive a power adjustment instruction generated by the wireless power receiving device 200 according to the state parameters from the wireless power receiving device 200. The first control circuit 130 may further directly adjust the power of the wireless power transmission signals according to a power adjustment instruction received by the receiving circuit 150.

[0036] For example, the first state detection circuit 240 of the humidifier detects that the current working voltage of the humidifier is V1 and the current working current of the humidifier is 11. The second control circuit 230 is configured to generate the target voltage VA1 and the target current IA1 according to the target power of the humidifier, and further calculate the values of V1-VA1 and I1-IA1 to generate the power adjustment instruction. The transmitting circuit 250 of the humidifier transmits the power adjustment instruction to the receiving circuit 150 of the fan 100.

[0037] In the embodiment, state parameters detected by the first state detection circuit 240 may also include at least one or a combination of the current working voltage, the current working current and current working temperature of the humidifier. The second control circuit 230 is further configured to compare the at least one or the combination with a corresponding protection threshold, and generate a protection instruction in response to the at least one or the combination being greater than the corresponding protection threshold. The transmitting circuit 250 of the humidifier transmits the protection instruction to the receiving circuit 150 of the fan 100, and the first control circuit 130 further reduces the power of the wireless power transmission signals or stops the power supply to the transmitting wire coil 120 according to the protection instruction.

[0038] For example, the first state detection circuit 240 detects that the current working voltage of the humidifier is VI, the current working current is 11, the current working temperature is T1, a preset protection voltage is VH1, a protection current is IH1, and protection temperature is TH1. The second control circuit 230 is configured to generate the protection instruction when any one of V1 > VH1, 11 > IH1, T1 > TH1 is established.

[0039] In other embodiments, the state parameters received by the receiving circuit 150 may also include at least one or a combination of the current working voltage, the current working current and the current working temperature of the wireless power receiving device 200. The first control circuit 130 is further configured to compare the at least one or the combination with a corresponding protection threshold and reduce the power of the wireless power transmission signals or stop power supply to the transmitting wire coil 120 in response to the protection threshold being greater than the corresponding protection threshold.

[0040] In the embodiment, the fan 100 may further include a second state detection circuit 160. The second state detection circuit 160 can also be configured to detect at least one or a combination of a current working voltage, a current working current and current working temperature of the fan 100. The first control circuit 130 is further configured to compare the at least one or the combination with a corresponding protection threshold, and reduce the power of the wireless power transmission signal or stop power supply to the transmitting wire coil 120 in response to the at least one or the combination being greater than the corresponding protection threshold.

[0041] For example, the second state detection circuit 160 detects that current working voltage of the fan 100 is V2, the current working current of the fan 100 is 12, the current working temperature of the fan 100 is T2, a preset protection voltage is VH2, a protection current is IH2, protection temperature is TH2. The first control circuit 130 reduces the power of wireless power transmission signals or stop power supply to the transmitting wire coil 120 in response to any one of V2 > VH2, I2 > IH2, T2 > TH2 being established.

[0042] In the embodiment, the thickness of the receiving area 112 is d1, a bottom thickness of the humidifier shell 210 is d2, a sum of d1 and d2 is the distance between the transmitting wire coil 120 and the receiving wire coil 220, and the sum of d1 and d2 is set to be less than or equal to 10 mm to make the distance between the transmitting wire coil 120 and the receiving wire coil 220 less than or equal to 10 mm, such as 7mm, 9mm or 10mm.

[0043] In the embodiment, the upper surface of the fan base 110 may also be provided with an identification (not shown in the figure). The identification is configured to identify the receiving area 112 to avoid excessive offset of a position of the receiving wire coil 220 of the wireless power receiving device 200 relative to a position of the transmitting wire coil 120 of the fan 100. An area of the transmitting wire coil 120 is set to be greater than or equal to an area of the receiving wire coil 220. Thus when the receiving wire coil 220 is offset from the transmitting wire

coil 120, the power and efficiency of the wireless power transmission signals can still be guaranteed.

[0044] In the embodiment, the second state detection circuit 160 detects the current working voltage of the fan 100, and the receiving circuit 150 receives the current working voltage of the wireless power receiving device 200 from the wireless power receiving device 200. The first control circuit 130 is further configured to compare the current working voltage of the fan 100 with the current working voltage of the wireless power receiving device 200, and generate a prompt signal for repositioning the wireless power receiving device 200 in response to difference between the current working voltage of the fan 100 and the current working voltage of the wireless power receiving device 200 being greater than a preset difference threshold. Thus in response to offset of the position of the receiving wire coil 220 of the wireless power receiving device 200 relative to the position of the transmitting wire coil 120 of the fan 100 being excessive, the prompt signal can remind users in time and reduce invalid output of the wireless power transmission signals.

[0045] In other embodiments, the wireless power receiving device 200 can also be an electrical appliance such as a mobile phone, an electric toothbrush, and the like. The wireless power receiving device 200 is provided with the receiving wire coil to receive the wireless power transmission signals from the fan 100 to realize the power supply to the wireless power receiving device 200.

[0046] Referring to FIG. 5 and FIG. 6, in another embodiment, the receiving area 112 of the fan base 110 can also be provided with a positioning clip 113 configured to position the wireless power receiving device 200. A bottom of the wireless power receiving device 200 can also be provided with a groove 212 corresponding to the positioning clip 113. Positioning the wireless power receiving device 200 through the positioning clip 113 can more effectively avoid the excessive offset of the position of the receiving wire coil 220 of the wireless power receiving device 200 relative to the position of the transmitting wire coil 120 of the fan 100.

[0047] Referring to FIG. 7, the humidifier of the embodiment of the present disclosure includes the humidifier shell 210, the receiving wire coil 220 and the control circuit 230. For structures of the humidifier shell 210, the receiving wire coil 220 and the control circuit 230, please refer to the humidifier shell 210, the receiving wire coil 220 and the second control circuit 230 in the fan embodiment, which will not be repeated here.

[0048] In other embodiments, the humidifier can also receive the wireless power transmission signals from other wireless power transmission devices, such as a wireless charging stand, and the like.

[0049] The embodiment of the present disclosure can receive the wireless power transmission signals of the wireless power transmission device at a bottom of the humidifier for operation, thus expanding the application scope of the wireless transmission technology and making power supply of the humidifier more convenient and safe.

[0050] Referring to FIG. 3, an air conditioning system of one embodiment of the present disclosure includes the fan 100 and the humidifier as the wireless power receiving device 200. For structures of the fan 100 and the humidifier, please refer to the fan of the above embodiment, which will not be repeated here.

[0051] The embodiment of the present disclosure can realize the wireless power transmission of the fan to the humidifier by setting wire coils and the control circuits respectively in the fan and the humidifier, and can realize linkage between the fan and the humidifier, effectively adjust humidity and temperature of air, thus expanding the application scope of the wireless power transmission technology, and making the power supply of the humidifier more convenient and safe.

[0052] The above description merely depicts some exemplary embodiments of the present disclosure, but is not intended to limit the scope of the present disclosure. Any equivalent structural variations or equivalent process flow variations of the described embodiments and the accompanying drawings, or direct or indirect applications in other relevant technical fields, shall all be covered within the scope of protection of the present disclosure.

Claims

1. A fan, comprising:

   a fan base, wherein an accommodating space is defined inside the fan base, and an upper surface of the fan base is provided with a receiving area configured to place a wireless power receiving device;

   a transmitting wire coil and a control circuit, arranged in the accommodating space, wherein the transmitting wire coil is arranged below the receiving area, and the control circuit is configured to control the transmitting wire coil to transmit wireless power transmission signals to the wireless power receiving device.

2. The fan according to claim 1, wherein an area of the transmitting wire coil is set to be greater than or equal to an area of a receiving wire coil of the wireless power receiving device for receiving the wireless power transmission signals.

3. The fan according to claim 1, wherein a thickness of the receiving area is set such that a distance between the transmitting wire coil and the receiving wire coil is less than or equal to 10 mm.

4. The fan according to claim 1, wherein the receiving area is provided with a positioning clip for positioning the wireless power receiving device.

5. The fan according to claim 1, wherein the wireless power receiving device is a humidifier, the fan further comprises a humidity sensor, the humidity sensor is configured to detect an ambient humidity value, and the control circuit further adjusts power of the wireless power transmission signals according to the ambient humidity value.

6. The fan according to claim 5, wherein the control circuit is configured to compare the ambient humidity value with a preset humidity threshold, and supply power to the transmitting wire coil in response to the ambient humidity value being less than or equal to the preset humidity threshold.

7. The fan according to claim 1, further comprising:

a receiving circuit configured to receive, from the wireless power receiving device, state parameters of the wireless power receiving device or a power adjustment instruction generated by the wireless power receiving device according to the state parameters;
wherein the control circuit is further configured to generate the power adjustment instruction according to state parameters received by the receiving circuit, and adjust the power of the wireless power transmission signals according to the power adjustment instruction, or directly adjust the power of the wireless power transmission signals according to a power adjustment instruction received by the receiving circuit.

8. The fan according to claim 7, wherein the state parameters received by the receiving circuit comprises a current working voltage, a current working current of the wireless power receiving device and target power of the wireless power receiving device, or the state parameters received by the receiving circuit comprises the current working voltage and the current working current of the wireless power receiving device, and a target voltage and a target current generated according to the target power;
the control circuit is further configured to generate a target voltage and a target current according to target power received by the receiving circuit, and then generate the power adjustment instruction according to a current working voltage, a current working current, the target voltage and the target current, or generate the power adjustment instruction according to a current working voltage, a current working current, a target voltage and a target current received by the receiving circuit.

9. The fan according to claim 7, wherein the receiving circuit is further configured to receive a protection instruction, and the state parameters received by the receiving circuit comprises at least one or a combination of the current working voltage, the current working current and current working temperature of the wireless power receiving device; and
the control circuit is further configured to reduce the power of the wireless power transmission signals or stop power supply to the transmitting wire coil according to a protection instruction received by the receiving circuit, or compare the at least one or the combination with a corresponding protection threshold, and reduce the power of the wireless power transmission signals or stop the power supply to the transmitting wire coil in response to the at least one or the combination being greater than the corresponding protection threshold.

10. The fan according to claim 1, wherein the fan further comprises a state detection circuit, the state detection circuit is configured to detect at least one or a combination of a current working voltage, a current working current and current working temperature of the fan, and the control circuit is further configured to compare the at least one or the combination with a corresponding protection threshold, and reduce power of the wireless power transmission signals or stop power supply to the transmitting wire coil in response to the at least one or the combination being greater than the corresponding protection threshold.

11. The fan according to claim 1, further comprising:

a state detection circuit configured to detect a current working voltage of the fan;
a receiving circuit configured to receive a current working voltage of the wireless power receiving device from the wireless power receiving device;
the control circuit is further configured to compare the current working voltage of the fan with the current working voltage of the wireless power receiving device, and generate a prompt signal for repositioning the wireless power receiving device in response to difference between the current working voltage of the fan and the current working voltage of the wireless power receiving device being greater than a preset difference threshold.

12. A humidifier, comprising:

a humidifier shell, wherein an accommodating space is defined inside the humidifier shell;
a receiving wire coil and a control circuit arranged in the accommodating space, wherein the receiving wire coil is arranged above a bottom of the humidifier shell, and the control circuit is configured to control the receiving wire coil to receive wireless power transmission signals from a wireless power transmission device.

13. The humidifier according to claim 12, wherein the humidifier further comprises a state detection circuit and a transmitting circuit, the state detection circuit is configured to detect state parameters of the humidifier, and the control circuit is further configured to generate a power adjustment instruction according to state parameters, the transmitting circuit is configured to transmit the state parameters or the power adjustment instruction to the wireless power transmission device.

14. The humidifier according to claim 13, wherein the state parameters comprise at least one or a combination of a current working voltage, a current working current and current working temperature of the humidifier, and the control circuit is further configured to compare the at least one or the combination with a corresponding protection threshold, and generate a protection instruction in response to the at least one or the combination being greater than the corresponding protection threshold.

15. An air conditioning system, comprising the fan according to any one of claims 1 to 11 and the humidifier according to any one of claims 12 to 14 as the wireless power receiving device.

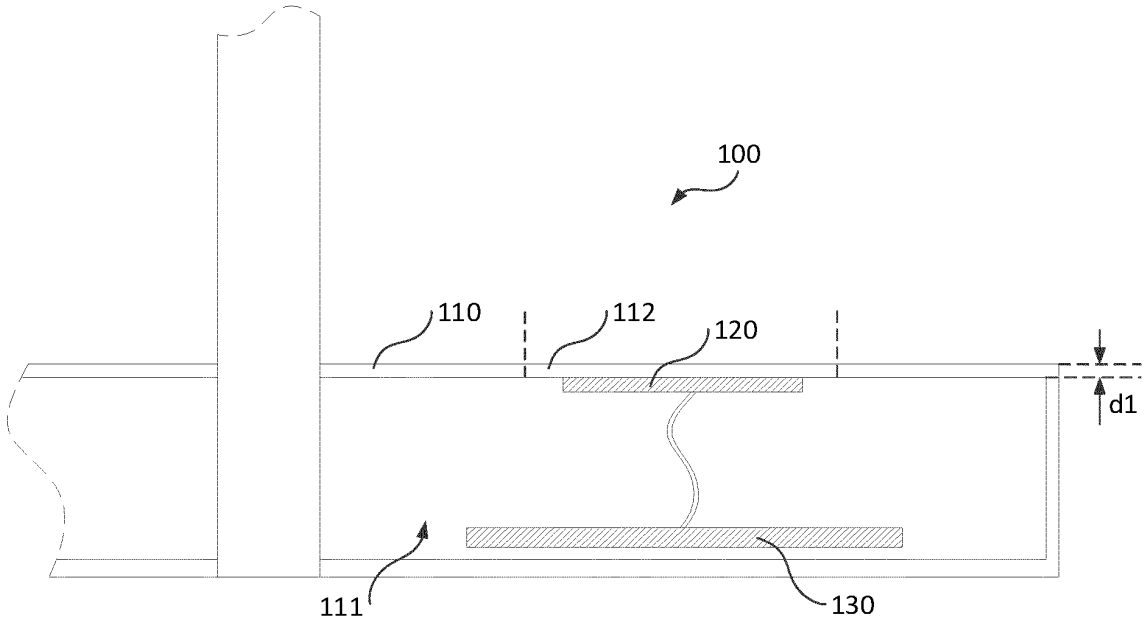
100
110
112
120
d1
111
130

FIG. 1

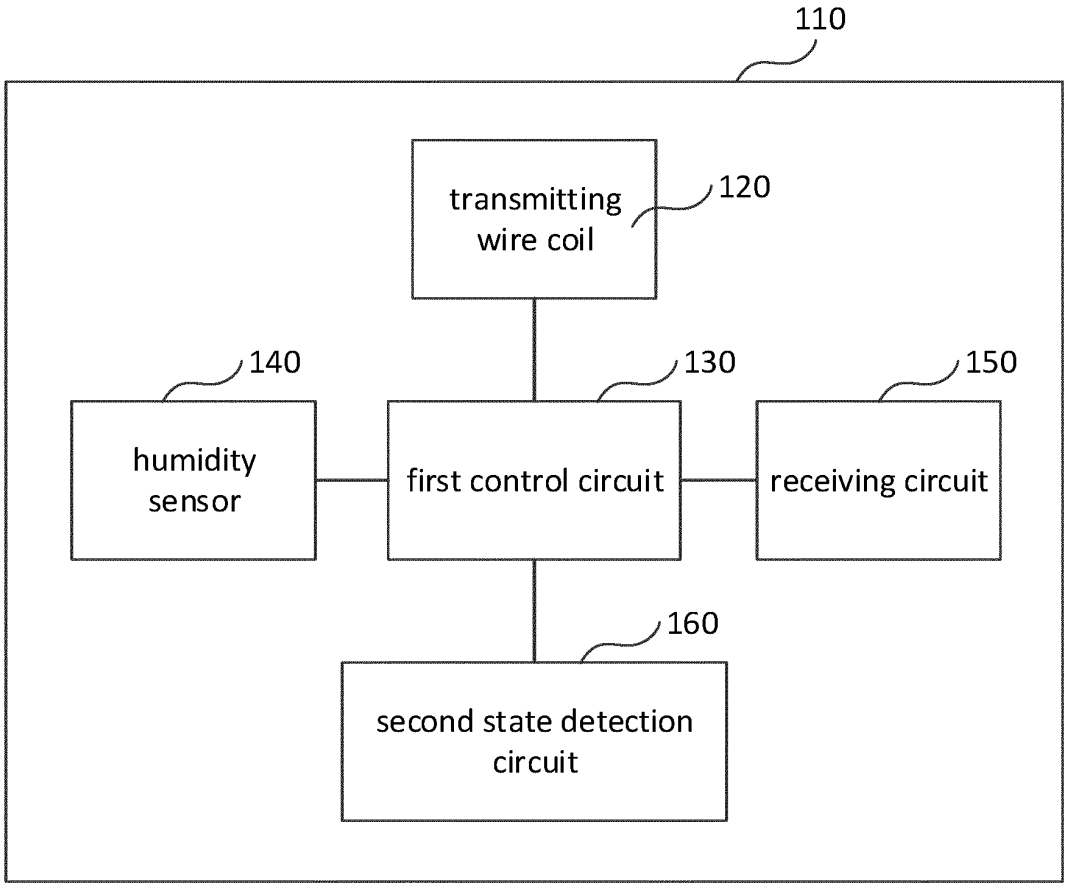
110
transmitting wire coil
120
140
130
150
humidity sensor
first control circuit
receiving circuit
160
second state detection circuit

FIG. 2

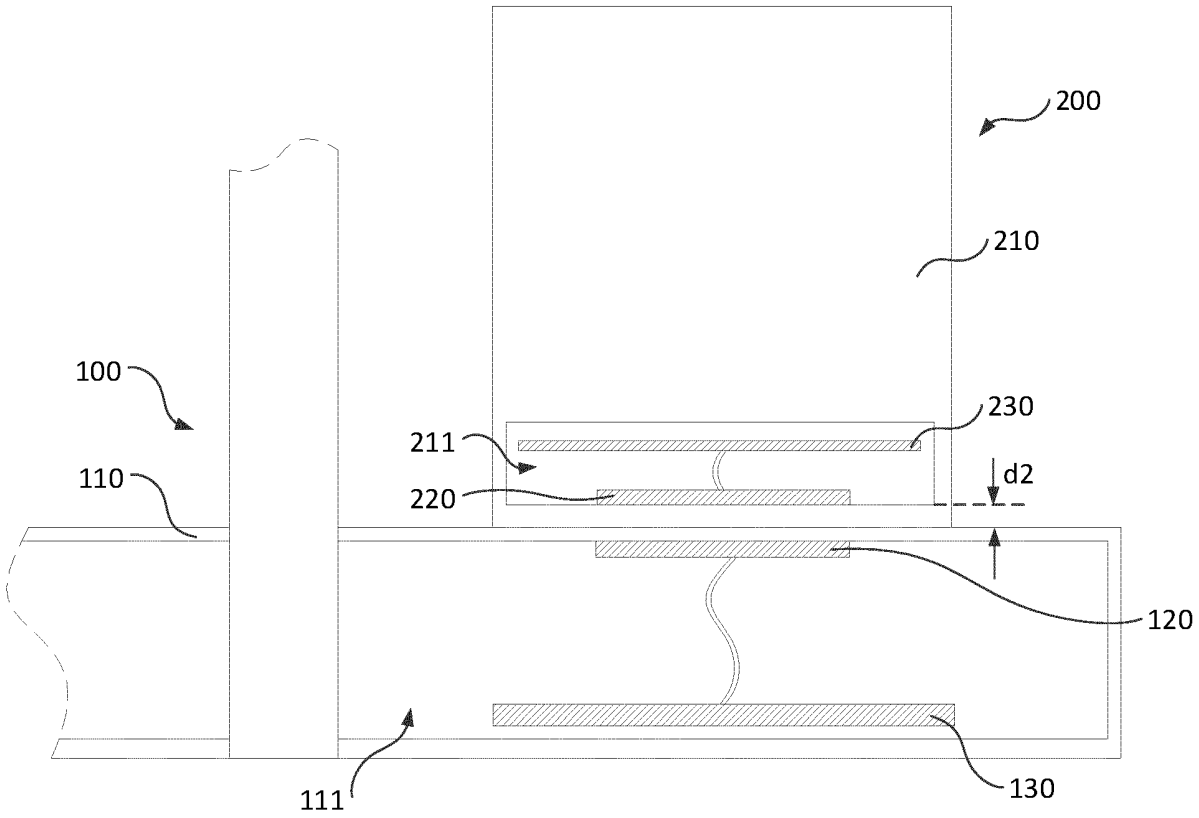
200
210
100
230
211
d2
110
220
120
111
130

FIG. 3

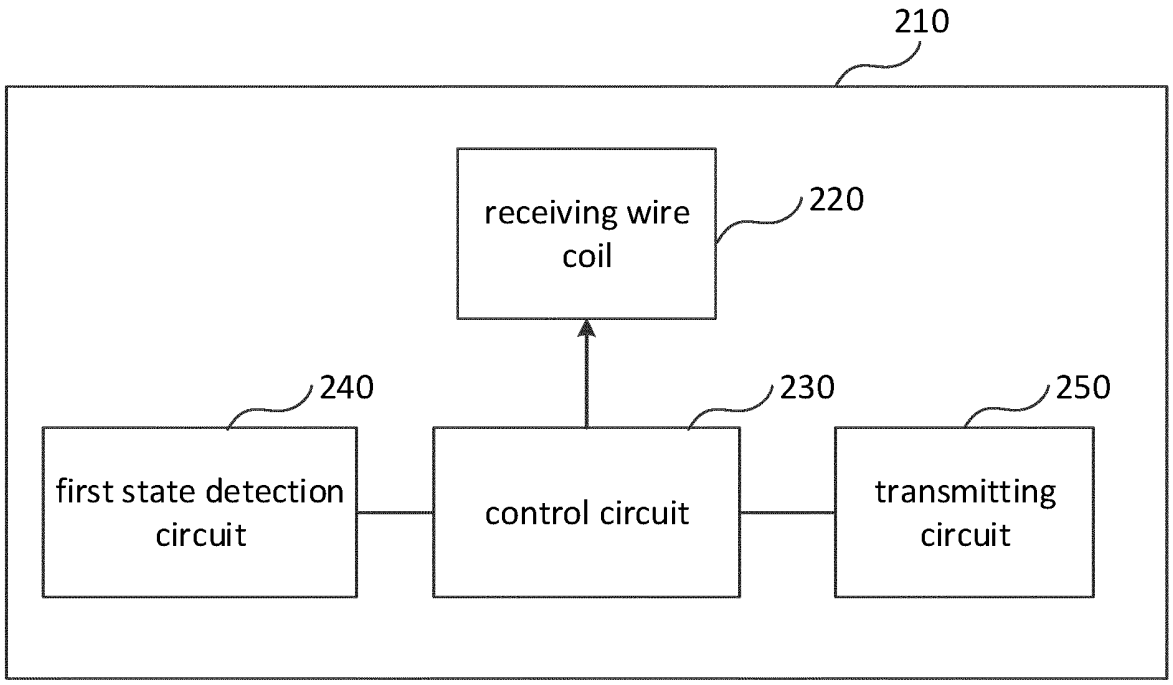
210
receiving wire coil
220
240
230
250
first state detection circuit
control circuit
transmitting circuit

FIG. 4

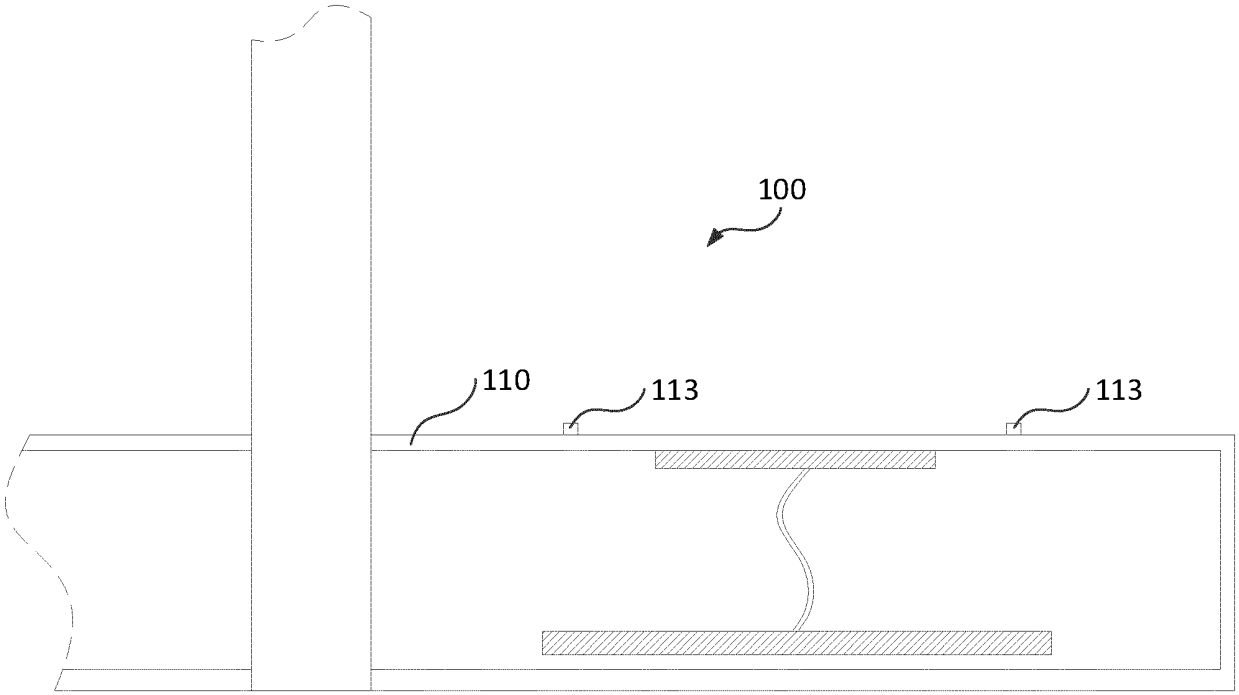

FIG. 5

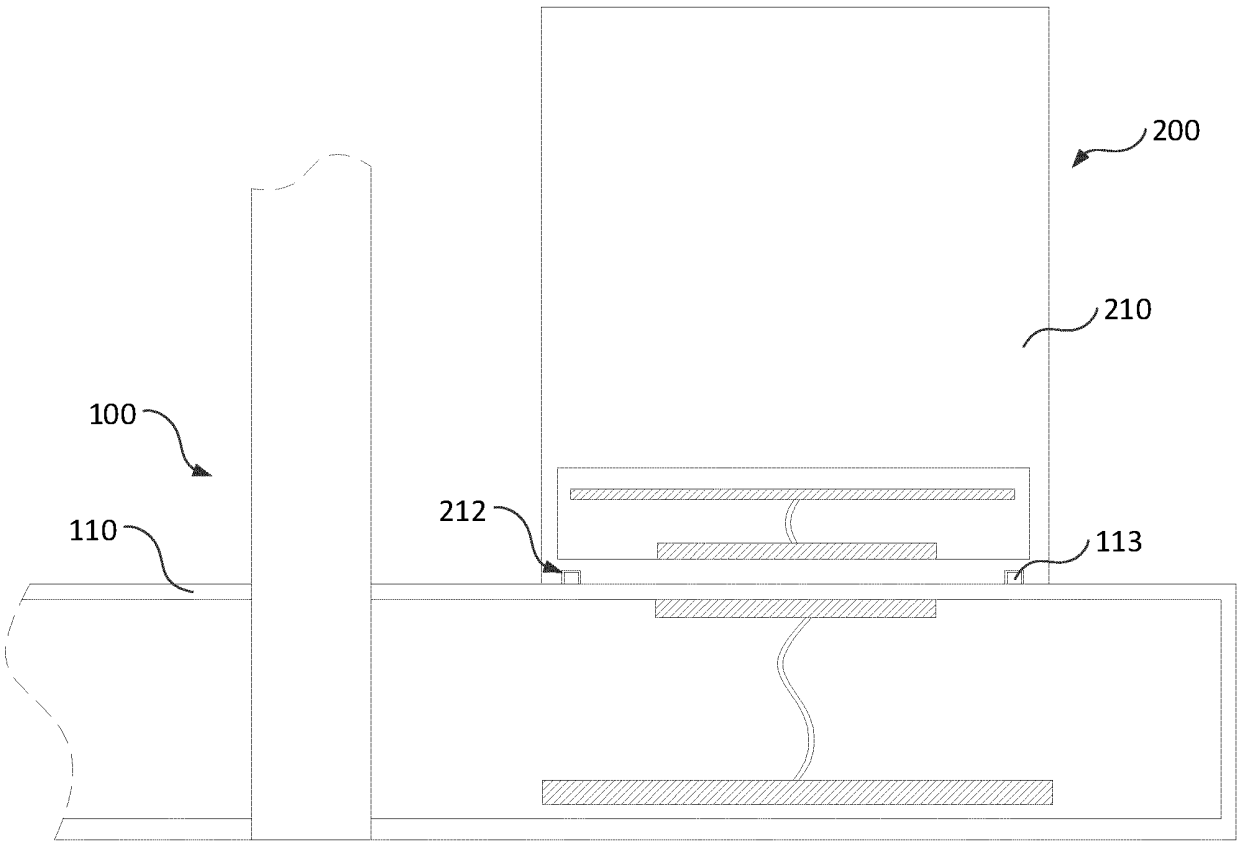

FIG. 6

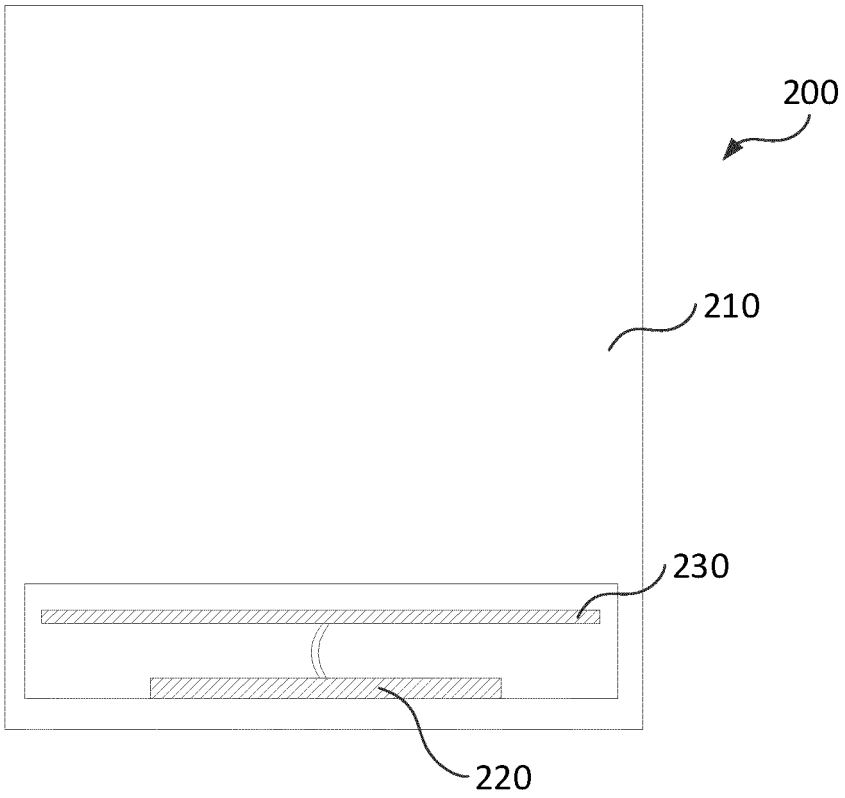

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/123813

A. CLASSIFICATION OF SUBJECT MATTER

F24F 11/64(2018.01)i; F24F 11/56(2018.01)i; F04D 27/00(2006.01)i; F24F 110/20(2018.01)n

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F; F04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS; CNTXT; VEN; USTXT; WOTXT; EPTXT; CNKI; 美的; 风扇; 加湿器; 空气调节; 系统; 底座; 无线; 线圈; 线盘; 发射; 接收; 充电; 供电; 受电; 湿度; 传感; 感应; 检测; 监测; 预设; 预定; 预置; 功率; fan; humid+; wireless; charg+; sensor?; dectect+; air condition+; system; base

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109631261 A (GUANGDONG MIDEA WHITE HOUSEHOLD APPLIANCE TECHNOLOGY INNOVATION CENTER CO., LTD. et al.) 16 April 2019 (2019-04-16) claims 1-15	1-15
X	CN 207195227 U (CAI, Junru) 06 April 2018 (2018-04-06) description, paragraphs 74-84, and figures 1-9	1-11
X	CN 203554079 U (CHINA UNIVERSITY OF MINING AND TECHNOLOGY) 16 April 2014 (2014-04-16) description, paragraphs 16-20, and figures 1-3	12-14
Y	CN 207195227 U (CAI, Junru) 06 April 2018 (2018-04-06) description, paragraphs 74-84, and figures 1-9	15
Y	CN 203554079 U (CHINA UNIVERSITY OF MINING AND TECHNOLOGY) 16 April 2014 (2014-04-16) description, paragraphs 16-20, and figures 1-3	15
A	CN 203272074 U (HEFEI KESON MICROELECTRONIC SCIENCE & TECHNOLOGY CO., LTD.) 06 November 2013 (2013-11-06) entire document	1-15

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 January 2020	**11 March 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/123813

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 204858756 U (XIAMEN NEWYEA SCIENCE AND TECHNOLOGY CO., LTD.) 09 December 2015 (2015-12-09) entire document	1-15
A	CN 204165144 U (HANGZHOU ANSOR TECHNOLOGY CO., LTD.) 18 February 2015 (2015-02-18) entire document	1-15
A	CN 207381999 U (HANGZHOU YULONG SCIENCE & TECHNOLOGY CO., LTD.) 18 May 2018 (2018-05-18) entire document	1-15
A	KR 20180003001 A (CHUNG, H. J.) 09 January 2018 (2018-01-09) entire document	1-15

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/123813

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 109631261 A	16 April 2019	None	
CN 207195227 U	06 April 2018	TW M533131 U	01 December 2016
CN 203554079 U	16 April 2014	None	
CN 203272074 U	06 November 2013	None	
CN 204858756 U	09 December 2015	None	
CN 204165144 U	18 February 2015	None	
CN 207381999 U	18 May 2018	None	
KR 20180003001 A	09 January 2018	KR 101867084 B1	12 June 2018

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201811584241 X **[0001]**