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(54) **DRYING DEVICE, HUMIDITY MEASUREMENT METHOD AND DRYING CONTROL METHOD THEREFOR**

(57) Provided are a drying device, a humidity measurement method and a drying control method thereof. The drying device comprises a treatment chamber (20) configured to place and treat clothes, at least two first electrode plates (A1, A2), at least two second electrode plates (B1, B2), and a control unit, where the treatment chamber (20) is rotatable; the at least two first electrode plates (A1, A2) are horizontally and fixedly mounted on one side of the treatment chamber (20) and spaced apart and insulated from the treatment chamber (20); the at least two second electrode plates (B1, B2) are mounted on the treatment chamber (20) in an insulating manner and rotatable along with the treatment chamber (20), a plurality of capacitors are formed among the second electrode plates (B1, B2) and the first electrode plates (A1, A2); and the control unit is configured to acquire capacitance values of the plurality of capacitors and determine, based on the capacitance values of the plurality of capacitors, a position with the maximum humidity of the clothes.

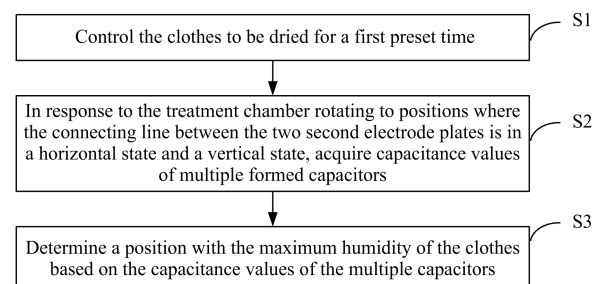


FIG. 2

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Description

[0001] This application claims priority to Chinese Patent Application No. 202310312529.6 filed Mar. 28, 2023, the disclosure of which is incorporated herein by reference in its entirety.

Technical field

[0002] The present disclosure relates to the technical field of smart home appliances, for example, to a drying device, a humidity measurement method of the drying device and a drying control method of the drying device.

Background

[0003] In a clothes treatment procedure, especially in a drying procedure, whether clothes are dried properly is generally determined based on the humidity of the clothes. In the related art, a resistance sensor is typically used for detecting the humidity of the clothes. Specifically, the sensor contacts the clothes to measure resistance of the clothes surface, and the humidity value of the clothes surface is calculated based on the resistance value of the clothes surface. Moreover, the humidity value is used to determine whether the clothes are dried. However, in a case where the clothes are dried unevenly, the accuracy of measuring the humidity of the clothes by the above method is poor. Particularly, in a case where the humidity of the clothes varies at different positions inside the clothes, the above method cannot perform accurate and effective measurement, resulting in ineffective drying of the clothes.

Summary

[0004] The present disclosure provides a drying device, a humidity measurement method of the drying device and a drying control method of the drying device, which can measure the position with the maximum humidity of clothes, thereby improving the drying effect.

[0005] The drying device includes a treatment chamber configured to place and treat the clothes, at least two first electrode plates, at least two second electrode plates, and a control unit.

[0006] The treatment chamber is rotatable. The at least two first electrode plates are horizontally and fixedly mounted on one side of the treatment chamber, and the at least two first electrode plates are spaced apart from the treatment chamber in an insulating manner. The at least two second electrode plates are mounted on the treatment chamber in an insulating manner and rotatable along with the treatment chamber. Multiple capacitors are formed between the second electrode plates and the first electrode plates. The control unit is configured to acquire capacitance values of the multiple capacitors and determine a position with the maximum humidity of the clothes based on the capacitance values of the multiple capaci-

tors.

[0007] An embodiment of the present disclosure further provides a humidity measurement method of the preceding drying device, and the method includes the following: the clothes are dried for a first preset time after drying begins; in response to the treatment chamber rotating to positions where a connecting line between the two second electrode plates is in a horizontal state and a vertical state, capacitance values of multiple formed capacitors are acquired; and the position with the maximum humidity of the clothes is determined based on the capacitance values of the multiple capacitors.

[0008] An embodiment of the disclosure further provides a drying control method of the preceding drying device, and the method includes the following: the clothes are dried for the first preset time; in response to the treatment chamber rotating to positions where the connecting line between the two second electrode plates is in a horizontal state and a vertical state, capacitance values of multiple formed capacitors are acquired; the position with the maximum humidity of the clothes is determined based on capacitance values of the multiple capacitors; and an angle of an air outlet is adjusted such that hot air flowing out of the air outlet blows toward the position with the maximum humidity of the clothes.

Brief Description of Drawings

[0009]

FIG. 1 is a schematic diagram of a drying device provided by an embodiment of the present disclosure.

FIG. 2 is a flowchart of a humidity measurement method of a drying device provided by an embodiment of the present disclosure.

FIG. 3 is a flowchart of a drying control method of a drying device provided by an embodiment of the present disclosure.

FIG. 4 is a schematic diagram of a case of a drying device provided by an embodiment of the present disclosure.

Detailed Description

[0010] In the description of the present disclosure, terms "mounted", "joined" and "connected" are to be understood in a broad sense unless otherwise expressly specified and limited. For example, the term "connected" may refer to "securely connected", "detachably connected" or "integrated", may refer to "mechanically connected" or "electrically connected" or may refer to "connected directly", "connected indirectly through an intermediary" or "connected inside two components" or "the interaction between two components". For those of or-

dinary skill in the art, specific meanings of the preceding terms in the present disclosure may be understood based on specific situations.

[0011] In the present disclosure, unless otherwise specified and limited, a first feature being "above" or "below" a second feature may include the first and second features being in direct contact, or may include that the first and second features are in contact indirectly but through an additional feature between them. Moreover, the first feature being "above", "upper" and "over" the second feature may include the first feature being directly above and obliquely above the second feature, or may simply indicate that the first feature is higher in level than the second feature. The first feature being "below", "lower" and "under" the second feature may include the first feature being directly below and obliquely below the second feature, or may simply indicate that the first feature is lower in level than the second feature.

[0012] In the description of this embodiment, orientations or position relations indicated by terms such as "upper", "lower", and "right" are based on the drawings. These orientations or position relations are intended only to facilitate and simplify the description of the present disclosure and not to indicate or imply that a device or element referred to must have such particular orientations or must be configured or operated in such particular orientations. Thus, these orientations or position relations are not to be construed as limiting the present disclosure. Moreover, terms such as "first" and "second" are used only for the purpose of distinguishing the description and are not to be construed as special meaning.

[0013] To better realize the humidity measurement and drying control of clothes, the present disclosure provides a drying device including a case 10 and a treatment chamber 20 rotatably disposed inside the case 10. The treatment chamber 20 is configured to place clothes and can be driven to rotate by a motor or other components to treat the clothes. Treatment procedures of the treatment chamber 20 for the clothes include, but are not limited to washing, spinning and drying the clothes. The present disclosure simply describes the drying device with a drying function. It should be noted that the treatment chamber 20 of the present embodiment is configured in a cylindrical structure and grounded, thereby effectively protecting the human body to avoid the risk of electric shock.

[0014] As shown in FIG. 1, the drying device further includes at least two first electrode plates and at least two second electrode plates. The at least two first electrode plates (shown as first electrode plates A1 and A2 in FIG. 1) are horizontally and fixedly mounted on one side of the treatment chamber 20, for example, on an observation window corresponding to an entrance of the treatment chamber 20 or on the case 10. The at least two first electrode plates are spaced apart and insulated. Furthermore, the at least two first electrode plates are also spaced apart and insulated from the treatment chamber 20. The two second electrode plates (shown as second

electrode plates B1 and B2 in FIG. 1) are mounted on the treatment chamber 20 in an insulated manner and are rotatable along with the treatment chamber 20. In an embodiment, the second electrode plates are installed on a rear end wall of the treatment chamber 20.

[0015] Multiple capacitors may be formed between the at least two first electrode plates and the at least two second electrode plates, that is, each first electrode plate may form a capacitor with a different second electrode plate, and similarly, each second electrode plate may form a capacitor with a different first electrode plate. Moreover, since the at least two first electrode plates and the at least two second electrode plates are in different positions, dielectric constants between formed capacitors may or may not be identical, so capacitance values measured from multiple formed capacitors may or may not be identical. In addition, since the at least two second electrode plates are rotatable along with the treatment chamber 20, the second electrode plates and the first electrode plates may form two states. One state is that a connecting line between the two second electrode plates is parallel to a connecting line between the at least two first electrode plates, and the other state is that after a 90-degree rotation, the connecting line between the two second electrode plates is perpendicular to the connecting line between the at least two first electrode plates. As a result, when these two states exist, the capacitance values measured from the multiple capacitors are different.

[0016] Taking two first electrode plates and two second electrode plates shown in FIG. 1 as an example, the two first electrode plates A1 and A2 are horizontally mounted on the observation window or the case 10 at intervals, and the two second electrode plates B1 and B2 are mounted on the rear end wall of the treatment chamber 20. In this case, four capacitors are formed, namely, A1B1, A1B2, A2B1, and A2B2. In response to the treatment chamber 20 rotating to a position where the connecting line between B1 and B2 is parallel to the connecting line between A1 and A2, four capacitance values are generated, and based on the four capacitance values, a position with the maximum humidity of the clothes in the left-right direction and the front-rear direction may be determined. In response to the treatment chamber 20 rotating to the position where the connecting line between B1 and B2 is perpendicular to the connecting line between A1 and A2, four capacitance values may also be generated, and based on these four capacitance values, a position with the maximum humidity of the clothes in the vertical direction may be determined. Therefore, the position with the maximum humidity of the clothes can be finally determined by rotation of the treatment chamber 20.

[0017] In the present embodiment, two first electrode plates are provided. The two first electrode plates are located on a left side and a right side of an axis of the treatment chamber 20. Thus, the two first electrode plates are also approximately located on the left side

and the right side of the clothes inside the treatment chamber 20 in terms of space. Preferably, two second electrode plates are provided, also located on two sides of the axis of the treatment chamber 20.

[0018] The drying device further includes a control unit configured to acquire the capacitance values of the multiple capacitors and determine the position with the maximum humidity of the clothes based on the capacitance values of the multiple capacitors.

[0019] Through the drying device, in response to the treatment chamber 20 rotating to the positions where the connecting line between the two second electrode plates is in a horizontal state and a vertical state, the capacitance values of the multiple formed capacitors are acquired, and then the position with the maximum humidity of the clothes is determined based on the capacitance values of the multiple capacitors. Moreover, the position with the maximum humidity of the clothes is dried in a targeted manner (for example, an angle of an air outlet is adjusted such that hot air flowing out of the air outlet blows toward the position with the maximum humidity of the clothes), and the drying effect can be effectively improved.

[0020] The present disclosure further provides a humidity measurement method of the drying device. As shown in FIG. 2, the humidity measurement method includes the following steps:

In S1, the clothes are dried for a first preset time after drying begins.

[0021] At the beginning of drying the clothes, since the overall humidity of the clothes is high, it is not necessary to detect the position with the maximum humidity. In this case, the drying process is performed for the first preset time. When the first preset time is reached, the humidity of the clothes surface is lower, and the non-uniformity of the humidity of the clothes becomes distinct. At this point, S2 is executed.

[0022] In S2, in response to the treatment chamber rotating to the positions where the connecting line between the two second electrode plates is in the horizontal state and the vertical state, capacitance values of multiple formed capacitors are acquired.

[0023] After the clothes are dried for the first preset time in S1, the position with the maximum humidity of the clothes is detected. The detection in this step involves measuring the capacitance values of the multiple formed capacitors when the treatment chamber rotates to the two positions where the connecting line between the two second electrode plates is in the horizontal state and the vertical state, that is, the capacitance values of the multiple formed capacitors are measured when the treatment chamber rotates to the positions where the connecting line between the two second electrode plates is parallel to the connecting line between the at least two first electrode plates and perpendicular to the connecting line between the at least two first electrode plates.

[0024] In S2, the capacitance values are acquired through the following steps:

In S21, when the treatment chamber rotates to the position where the connecting line between the two second electrode plates is in the horizontal state, a first horizontal state capacitance value of the capacitor formed by a first electrode plate and a second electrode plate which are disposed oppositely on the left side and the right side is acquired, and a second horizontal state capacitance value of the capacitor formed by a first electrode plate and a second electrode plate which are disposed obliquely is acquired.

[0025] In S22, in response to the treatment chamber rotating to the position where the connecting line between the two second electrode plates is in the horizontal state, vertical capacitance values of the multiple capacitors are acquired.

[0026] Through the above two steps, the first horizontal state capacitance value, the second horizontal state capacitance value and the vertical state capacitance value may be acquired.

[0027] In S3, the position with the maximum humidity of the clothes is determined based on the capacitance values of the multiple capacitors.

[0028] In this step, after the first horizontal state capacitance value, the second horizontal state capacitance value and the vertical state capacitance value are acquired in S2, the position with the maximum humidity of the clothes may be determined based on the first horizontal state capacitance value, the second horizontal state capacitance value and the vertical state capacitance value.

[0029] In S3, the position with the maximum humidity of the clothes is determined in the following manner:

In S31, a position corresponding to a capacitor with the largest first horizontal state capacitance value is determined as a first position, and the first position is the left side or right side of the clothes.

[0030] Taking the two first electrode plates and the two second electrode plates shown in FIG. 1 as an example, two first horizontal state capacitance values may be measured based on A1B1 (on the left side of the clothes) and A2B2 (on the right side of the clothes) at this time. The two first horizontal state capacitance values are compared, and the largest first horizontal state capacitance value is selected. The position corresponding to the capacitor with the first horizontal state capacitance value is the first position, and the first position is the left side or right side of the clothes.

[0031] In S32, a second position is determined based on the first position and a position corresponding to the capacitor with the largest second horizontal state capacitance value, and the second position is a left front position, a left rear position, a right front position or a right rear position of the clothes.

[0032] Taking the two first electrode plates and the two second electrode plates shown in FIG. 1 as an example, two second horizontal state capacitance values are measured based on A1B2 and A2B1 at this time. Since the first position is determined to be the left side or right side

of the clothes in S31, on this basis, after the two second horizontal state capacitance values are measured, the largest second horizontal state capacitance value is selected. The capacitor with the second horizontal state capacitance value overlaps or is close to the first position. In this case, the second position may be determined, and the second position is the left front position, the left rear position, the right front position or the right rear position of the clothes. For example, after the first position is determined as the left side of the clothes, and the measured second horizontal state capacitance value of A1B2 is the largest, the second position is the left front position of the clothes. Moreover, when the measured second horizontal state capacitance value of A2B1 is the largest, the second position is the left rear position of the clothes. If the first position is determined as the right side of the clothes, when the measured second horizontal state capacitance value of A1B2 is the largest, the second position is the right rear position of the clothes. When the measured second horizontal state capacitance value of A2B1 is the largest, the second position is the right front position of the clothes.

[0033] In S33, a third position is determined based on the second position and a position corresponding to a capacitor with a largest vertical state capacitance value, and the third position is a left front upper position, a left front lower position, a left rear upper position, a left rear lower position, a right front upper position, a right front lower position, a right rear upper position or a right rear lower position of the clothes.

[0034] Taking the two first electrode plates and two second electrode plates shown in FIG. 1 as an example, after the second position is determined, the third position may be determined by determining the position corresponding to the capacitor with the largest vertical state capacitance value, and the third position is specifically the left front upper position, left front lower position, left rear upper position, left rear lower position, right front upper position, right front lower position, right rear upper position or right rear lower position of the clothes. For example, when the second position is the left front position and the position corresponding to the capacitor with the largest capacitance in the vertical state is an upper position of the clothes, the third position is the left front upper position. The others are similar and will not be repeated here.

[0035] In the present embodiment, the third position is the position with the maximum humidity of the clothes.

[0036] The humidity measurement method can effectively detect the position with the maximum humidity of the clothes, thus providing a basis for subsequent drying control.

[0037] The present embodiment further provides a drying control method of the drying device, including the following steps:

In S10, the clothes are controlled to be dried for a first preset time.

[0038] This step is similar to step S1 of the humidity

measurement method described above, and will not be repeated here.

[0039] In S20, in response to the treatment chamber rotating to the positions where the connecting line between the two second electrode plates is in the horizontal state and the vertical state, the capacitance values of a plurality of formed capacitors are acquired.

[0040] S20 includes the following steps:

In S201, in response to the treatment chamber rotating to the position where the connecting line between the two second electrode plates is in the horizontal state, a first horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are oppositely disposed on the left side and the right side is acquired, and a second horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are obliquely disposed is acquired.

[0041] In S202, in response to the treatment chamber rotating to the position where the connecting line between the two second electrode plates is in the vertical state, the vertical capacitance values of the multiple capacitors are acquired.

[0042] The preceding S201 and S202 are similar to S21 and S22 of the humidity measurement method, and will not be repeated here.

[0043] In S30, the position with the maximum humidity of the clothes is determined based on the capacitance values of the multiple capacitors.

[0044] S30 includes the following steps:

In S301, the position corresponding to the capacitor with the largest first horizontal state capacitance value is determined as a first position, and the first position is the left side or the right side of the clothes.

[0045] In S302, a second position is determined based on the first position and the position corresponding to the capacitor with the largest second horizontal state capacitance value, and the second position is the left front position, the left rear position, the right front position or the right rear position of the clothes.

[0046] In S303, a third position is determined based on the second position and the position corresponding to the capacitor with the largest vertical state capacitance value, and the third position is the left front upper position, the left front lower position, the left rear upper position, the left rear lower position, the right front upper position, the right front lower position, the right rear upper position or the right rear lower position of the clothes.

[0047] The preceding S301 to S303 are similar to S31-S33 of the humidity measurement method, and will not be repeated here.

[0048] In S40, an angle of an air outlet is adjusted such that hot air flowing out of the air outlet blows toward the position with the maximum humidity of the clothes.

[0049] After the third position is acquired, a targeted drying operation may be performed at the third position. In an embodiment, the angle of the air outlet may be adjusted such that the hot air flowing out of the air outlet

blows directly toward the third position. It is applicable when the third position is a position of the clothes where the air flowing out of the air outlet can directly blow.

[0050] When the air flowing out of the air outlet cannot directly blow toward the third position, the angle of air outlet may be controlled so that the hot air flowing out of the air outlet blows toward a side wall of the treatment chamber and is refracted to blow toward the third position, thereby realizing the drying at the position with the maximum humidity of the clothes.

[0051] The drying control method allows targeted drying the position with the maximum humidity of the clothes, effectively improving the drying effect.

Claims

1. A drying device, comprising:

a treatment chamber configured to place and treat clothes, wherein the treatment chamber is rotatable;

at least two first electrode plates, wherein the at least two first electrode plates are horizontally and fixedly mounted on one side of the treatment chamber, and the at least two first electrode plates are spaced apart from the treatment chamber in an insulating manner;

at least two second electrode plates, wherein the at least two second electrode plates are mounted on the treatment chamber in an insulating manner and rotatable along with the treatment chamber, and a plurality of capacitors are formed between the at least two second electrode plates and the at least two first electrode plates; and

a control unit configured to acquire capacitance values of the plurality of capacitors and determine, based on the capacitance values of the plurality of capacitors, a position with a maximum humidity of the clothes.

2. The drying device according to claim 1, wherein two first electrode plates are provided, and the two first electrode plates are located on a left side and a right side of an axis of the treatment chamber.

3. The drying device according to claim 2, wherein two second electrode plates are provided, and the two second electrode plates are mounted on a rear end of the treatment chamber and located at two sides of the axis of the treatment chamber.

4. A humidity measurement method of the drying device according to any one of claims 1 to 3, comprising:

drying the clothes for a first preset time after

drying begins;

in response to the treatment chamber rotating to positions where a connecting line between the two second electrode plates is in a horizontal state and a vertical state, acquiring capacitance values of a plurality of formed capacitors; and determining, based on the capacitance values of the plurality of capacitors, the position with the maximum humidity of the clothes.

5. The humidity measurement method according to claim 4, wherein in response to the treatment chamber rotating to the positions where the connecting line between the two second electrode plates is in the horizontal state and the vertical state, acquiring the capacitance values of the plurality of formed capacitors comprises:

in response to the treatment chamber rotating to a position where the connecting line between the two second electrode plates is in the horizontal state, acquiring a first horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are disposed oppositely on the left side and the right side, and acquiring a second horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are disposed obliquely; and

in response to the treatment chamber rotating to a position where the connecting line between the two second electrode plates is in the vertical state, acquiring vertical state capacitance values of a plurality of capacitors.

6. The humidity measurement method according to claim 5, wherein determining, based on the capacitance values of the plurality of capacitors, the position with the maximum humidity of the clothes comprises:

determining a position corresponding to a capacitor with a largest first horizontal state capacitance value as a first position, wherein the first position is a left side or a right side of the clothes; determining a second position based on the first position and a position corresponding to a capacitor with a largest second horizontal state capacitance value, wherein the second position is a left front position, a left rear position, a right front position or a right rear position of the clothes; and

determining a third position based on the second position and a position corresponding to a capacitor with a largest vertical state capacitance value, wherein the third position is a left front upper position, a left front lower position, a left

rear upper position, a left rear lower position, a right front upper position, a right front lower position, a right rear upper position or a right rear lower position of the clothes.

7. A drying control method of the drying device according to any one of claims 1 to 3, comprising:

drying the clothes for a first preset time;
in response to the treatment chamber rotating to positions where a connecting line between the two second electrode plates is in a horizontal state and a vertical state, acquiring capacitance values of a plurality of formed capacitors;
determining, based on the capacitance values of the plurality of capacitors, the position with the maximum humidity of the clothes; and
adjusting an angle of an air outlet such that hot air flowing out of the air outlet blows to the position with the maximum humidity of the clothes.

8. The drying control method according to claim 7, wherein in response to the treatment chamber rotating to the positions where the connecting line between the two second electrode plates is in the horizontal state and the vertical state, acquiring the capacitance values of the plurality of formed capacitors comprises:

in response to the treatment chamber rotating to a position where the connecting line between the two second electrode plates is in the horizontal state, acquiring a first horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are disposed oppositely on the left side and the right side, and acquiring a second horizontal state capacitance value of a capacitor formed by a first electrode plate and a second electrode plate which are disposed obliquely; and
in response to the treatment chamber rotating to a position where the connecting line between the two second electrode plates is in the vertical state, acquiring vertical state capacitance values of a plurality of capacitors.

9. The drying control method according to claim 8, wherein determining, based on the capacitance values of the plurality of capacitors, the position with the maximum humidity of the clothes comprises:

determining a position corresponding to a capacitor with a largest first horizontal state capacitance value as a first position, wherein the first position is a left side or a right side of the clothes; determining a second position based on the first

position and a position corresponding to a capacitor with a largest second horizontal state capacitance value, wherein the second position is a left front position, a left rear position, a right front position or a right rear position of the clothes; and

determining a third position based on the second position and a position corresponding to a capacitor with a largest vertical state capacitance value, wherein the third position is a left front upper position, a left front lower position, a left rear upper position, a left rear lower position, a right front upper position, a right front lower position, a right rear upper position or a right rear lower position of the clothes.

10. The drying control method according to claim 9, wherein adjusting the angle of the air outlet such that the hot air flowing out of the air outlet blows to the position with the maximum humidity of the clothes comprises at least one of the following steps:

adjusting the angle of the air outlet such that the hot air flowing out of the air outlet blows directly toward the third position; or
adjusting the angle of the air outlet such that the hot air flowing out of the air outlet blows toward a side wall of the treatment chamber and is refracted to blow toward the third position.

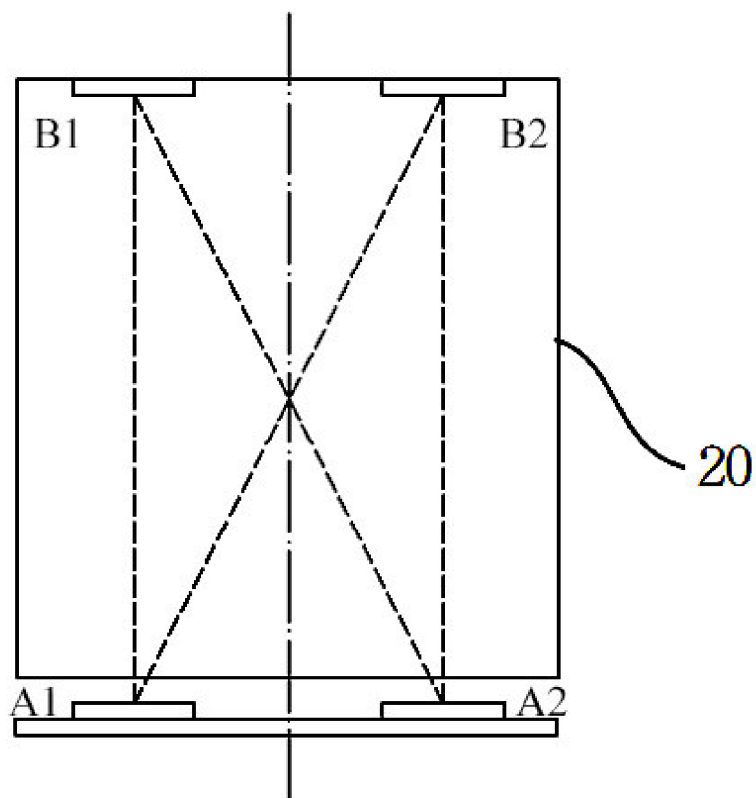


FIG. 1

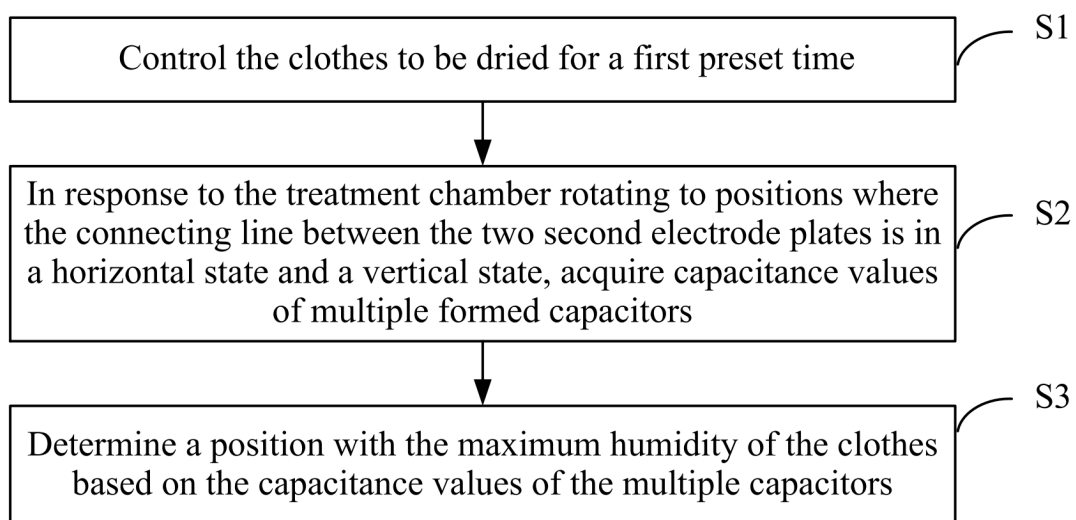


FIG. 2

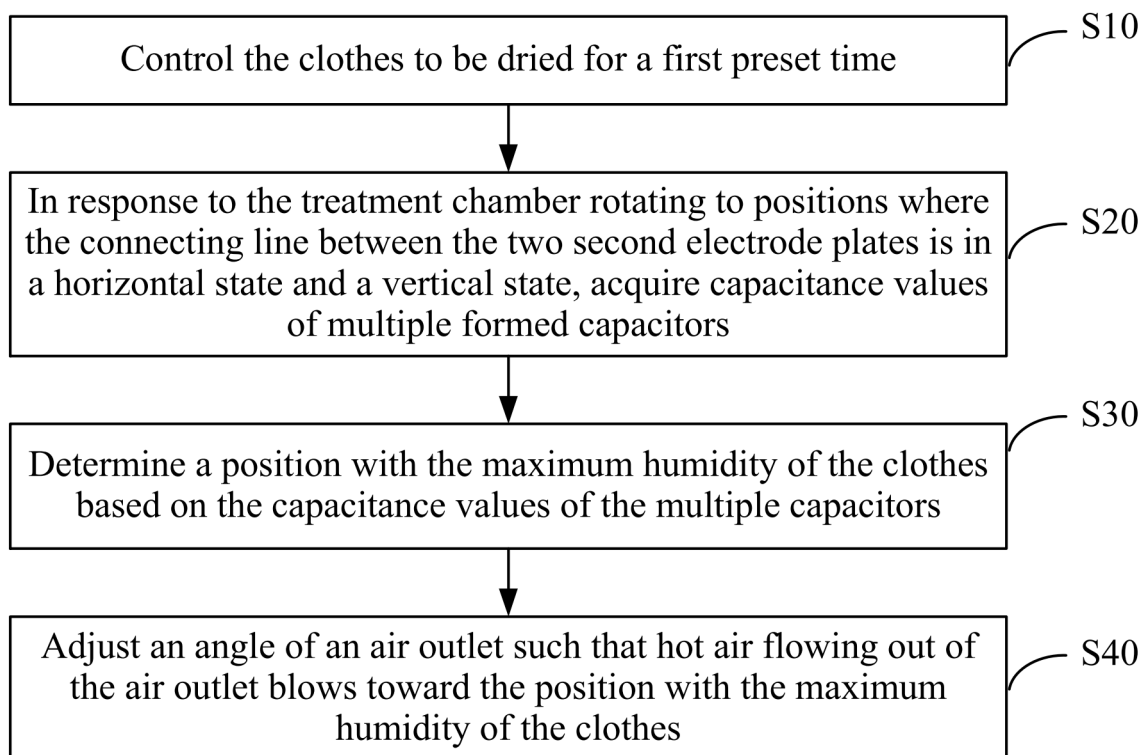


FIG. 3

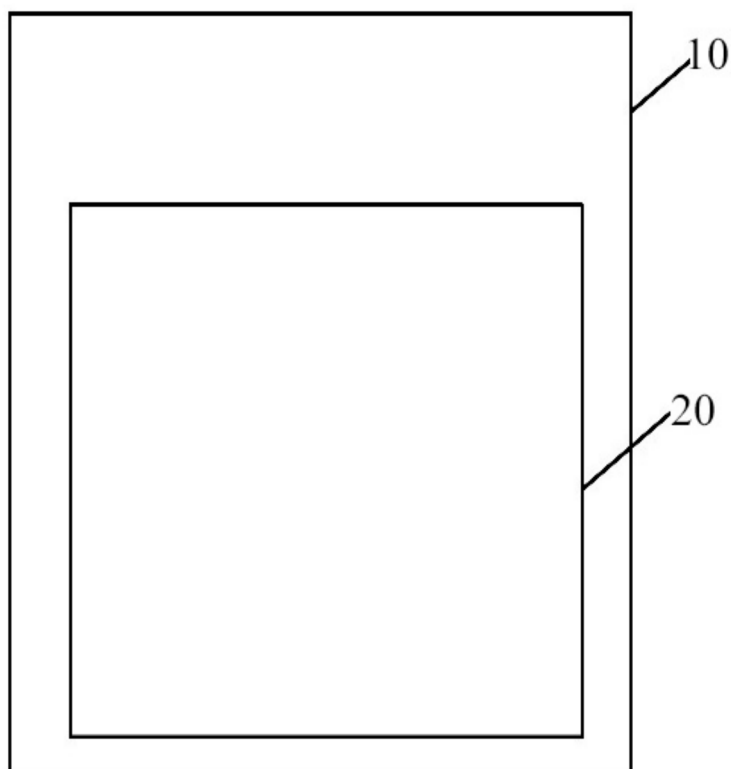


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/082971

A. CLASSIFICATION OF SUBJECT MATTER

D06F58/12(2006.01)i; D06F58/38(2020.01)i

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)

IPC:D06F

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)

CNTXT, ENTXT, ENTXTC, VEN, DWPI, CJFD, CNKI: 烘干, 湿度, 监测, 检测, 测量, 多个, 电容, 电极, 风, 吹, 调节, 调整, 方向, 区域, 位置, 衣服, 衣物, 最大, detect+, measur+, capacitance, humidity, angle?, dry+, adjust+, wind+, clothing?, blow+, area, district, region, place, position, most+.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 110528228 A (DIEHL AKO STIFTUNG GMBH & CO.) 03 December 2019 (2019-12-03) description, paragraphs 28-50, and figures 1-7	1-4, 7
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A	JP 2013085790 A (PANASONIC CORP.) 13 May 2013 (2013-05-13) entire document	1-10
A	CN 112442875 A (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 05 March 2021 (2021-03-05) entire document	1-10

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

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Date of the actual completion of the international search

27 May 2024

Date of mailing of the international search report

14 June 2024

Name and mailing address of the ISA/CN

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/082971

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 2839333 A1 (MIELE & CIE) 27 March 1980 (1980-03-27) entire document	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2024/082971

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REFERENCES CITED IN THE DESCRIPTION

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