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(54) **SMART HEATING CLOTHES, SYSTEM AND METHOD FOR CONTROLLING HEATING THEREOF**

(57) Disclosed are smart heating clothes, a system and a method for controlling heating thereof. The smart heating clothes includes: a clothing member; a heating unit including a heating electrically conductive yarn pattern and installed at the clothing member to generate heat; and a heating control device for switching supply of power to the heating unit according to a control signal received from a user terminal through near field wireless communication to control internal temperature and humidity of clothes. The heating control device includes: a power supply unit configured to supply the power to the heating electrically conductive yarn pattern; a switch unit

configured to switch the power supply of the power supply unit; a measuring unit configured to measure the internal temperature and humidity of the clothes; a communication unit configured to perform data transmission/reception between the user terminal and the heating control device; and a control unit configured to receive the control signal from the user terminal through the communication unit to control the switch unit, and to control to transmit temperature and humidity information received from the measuring unit to the user terminal through the communication unit.

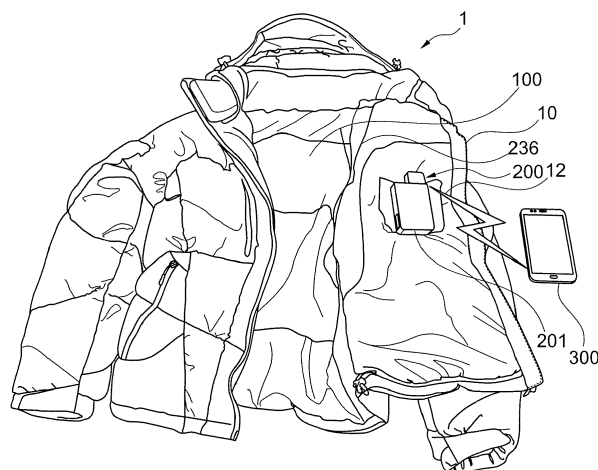


Fig. 1

Description

BACKGROUND OF THE INVENTION

Field of the invention

[0001] The present invention relates to smart heating clothes. More particularly, the present invention relates to smart heating clothes capable of automatically controlling a temperature and a humidity of the heating clothes through near field wireless communication using an application of a smart phone, a system and a method for controlling heating thereof.

Related Art

[0002] In general, since smart clothes use a new signal transfer fiber technology in a fiber product and includes various digital devices therein, the smart clothes have been studied and developed to use a digital function regardless of time and location. There have been proposed various clothes such as a wearable computer, health care clothes having a remote diagnosis function, and digital military clothes.

[0003] Further, the smart clothes having a heating function by providing a heating line therein and conducting electricity through the heating line have been commonly used as a most representative example. Since the above heating clothes are made of a copper wire or a carbon fiber having no flexibility, when a user wears the heating clothes, it is heavy and inconvenient so that the activity and wearing sensations cannot be sufficient ensured.

[0004] Accordingly, in recent years, heating clothes being smart clothes capable of conducting electricity and generating heat without a separate heating line by depositing a conductive polymer being a conductive material into a raw material have been studied and developed.

[0005] In addition, as an example of a product such as the heating clothes manufactured by depositing the conductive polymer into the raw material, various products such as a seat, gloves or a cushion may be manufactured.

[0006] Moreover, since the user wears the heating clothes on a body, a function of controlling a temperature is significantly important. In general, a temperature control device capable of increasing or reducing a temperature by supplying electricity to the heating clothes is installed at a part or a bag of the heating clothes.

[0007] Furthermore, an existing temperature control device includes an input button on which a user may push or a remote controller connected to the temperature control device in a wired scheme or a wireless scheme to increase or reduce a temperature of the heating clothes.

[0008] Meanwhile, as described above, when the temperature control device includes the input button, the user wearing the heating clothes should very inconveniently find and push the input button.

[0009] In addition, when the temperature control device includes the remote controller connected to the temperature control device, the user wearing the heating clothes should inconveniently carry the remote controller. Since the remote controller is provided therein with a battery for supplying power, a weight becomes heavy.

[0010] Further, since the existing temperature control device cannot indicate a current temperature of the heating clothes for the user wearing the heating clothes or cannot provide various information such as information on a failure state in the temperature control device, but can provide only a simple function of increasing or reducing the temperature, the temperature control device cannot satisfy various requirements of the user.

[0011] As a related art of the heating clothes, a heated handle and a method of forming the same are disclosed in U.S. Patent No. 6,727,467.

SUMMARY OF THE INVENTION

[0012] The present invention has been made in an effort to provide smart heating clothes capable of complementing various problems due to the limitations and disadvantages of the related art, and a system and a method for controlling heating thereof.

[0013] The present invention further provides smart heating clothes capable of minimizing short circuit and difference at a connection region between a wire and a heat generation part, and a system and a method for controlling heating thereof.

[0014] According to a first aspect of the present invention, there is a provided smart heating clothes including: a clothing member; a heating unit including a heating electrically conductive yarn pattern and installed at the clothing member to generate heat; and a heating control device for switching supply of power to the heating unit according to a control signal received from a user terminal through near field wireless communication to control internal temperature and humidity of clothes, wherein the heating control device includes: a power supply unit configured to supply the power to the heating electrically conductive yarn pattern; a switch unit configured to switch the power supply of the power supply unit; a measuring unit configured to measure the internal temperature and humidity of the clothes; a communication unit configured to perform data transmission/reception between the user terminal and the heating control device; and a control unit configured to receive the control signal from the user terminal through the communication unit to control the switch unit, and to control to transmit temperature and humidity information received from the measuring unit to the user terminal through the communication unit.

[0015] The heating electrically conductive yarn pattern may include: a base raw material having a plane shape; a conductive pattern formed on at least one surface of the base raw material, the conductive pattern including a heating pattern configured to generate heat upon the supply of the power, and a power line pattern configured

to transfer the power to the heating pattern, and the heating pattern and the power line pattern being continuously formed in a form of a sewing line or an embroidery by a strip of an electrically conductive yarn; and an insulation protecting layer provided on the base raw material to cover the conductive pattern and to expose an electric connection part between the power line pattern and the power supply unit.

[0016] The power line pattern may have a rectangular shape with a predetermined area by sewing the electrically conductive yarn a plurality of times, and the power line pattern may be sewed in a zig-zag pattern so that the electrically conductive yarn is continuously formed without interruption.

[0017] The conductive pattern may be formed at a front surface and a rear surface of the base raw material, and the insulation protecting layer may be formed at each of a top surface and a bottom surface of the base raw material to cover the conductive pattern which is formed at the top surface and the bottom surface of the base raw material.

[0018] The insulation protecting layer may include a seam tape.

[0019] The heating control device may be integrally configured in a housing having a box shape, and the housing may be inserted into an inner bag of the clothes.

[0020] The heating control device may include a first temperature sensor provided in the housing and a second temperature sensor around a lateral armpit of the clothing member.

[0021] According to a second aspect of the present invention, there is provided a system for controlling heating of smart heating clothes, the system including: heating clothes including a clothing member; a heating unit including a heating electrically conductive yarn pattern and installed at the clothing member to generate heat; and a heating control device for switching supply of power to the heating unit according to a control signal received from a user terminal through near field wireless communication to control internal temperature and humidity of clothes; and a user terminal configured to execute a heating control application for controlling the heating control device, to receive and display temperature and humidity relation information from the heating clothes through near field wireless communication, and to transmit a control signal to switch the supply of the power to the heating unit to the heating control device so that the temperature and humidity of the heating clothes become a preset range.

[0022] The heating control device may include a first temperature sensor and a second temperature sensor configured to measure temperatures at different points of the heating clothes, and the heating control application may generate the control signal based on an average of a measured value of the first temperature sensor and a measured value of the second temperature sensor or based on a higher value or a lower value of the measured value of the first temperature sensor and the measured

value of the second temperature sensor.

[0023] The heating electrically conductive yarn pattern may include: a base raw material having a plane shape; a conductive pattern formed on at least one surface of the base raw material, the conductive pattern including a heating pattern configured to generate heat upon the supply of the power, and a power line pattern configured to transfer the power to the heating pattern, and the heating pattern and the power line pattern being continuously formed in a form of a sewing line or an embroidery by a strip of an electrically conductive yarn; and an insulation protecting layer provided on the base raw material to cover the conductive pattern and to expose an electric connection part between the power line pattern and the power supply unit.

[0024] According to a third aspect of the present invention, there is provided a heating control method of controlling temperature and humidity of heating clothes using a user terminal connected to a heating control device for measuring and controlling the temperature and the humidity of the heating clothes through near field wireless communication, the heating control method including: executing a heating control application in the user terminal to perform a user authentication procedure; receiving current temperature and humidity information from the heating control device to display the received current temperature and humidity information on a screen by the user terminal; receiving and comparing user setting temperature and humidity with the current temperature and humidity by the user terminal; generating a control signal according to the comparison result to transmit the control signal to the heating control device by the user terminal; and receiving the control signal to control temperature and humidity by switching supply of power to a heating unit according to the control signal.

[0025] The user terminal may receive temperature information in at least two points when receiving current temperature and humidity from the heating control device, and generates the control signal based on an average value or specific temperature information of a plurality of received temperature information.

[Advantageous Effects]

[0026] In accordance with the smart heating clothes, and a system and a method for controlling heating thereof according to the present invention, a temperature and a humidity of the heating clothes may be automatically controlled using a smart phone of a smart watch of a user wearing the heating clothes so that convenience for the user is increased.

[0027] In addition, since temperatures of a plurality of parts in a body of the user wearing the heating clothes may be measured using a plurality of temperature sensors, a body temperature of the user wearing the heating clothes is more exactly measured so that the temperature and the humidity can be optimally controlled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028]

Fig. 1 is a diagram illustrating a configuration of a smart heating control system according to an embodiment of the present invention.

Fig. 2 is a cross-sectional view illustrating a configuration of a heating unit according to an embodiment of the present invention.

Fig. 3 is an exploded perspective view illustrating a configuration of a heating unit according to an embodiment of the present invention.

Fig. 4 is a plan view illustrating a configuration of a conductive pattern according to an embodiment of the present invention.

Fig. 5 is an enlarged view illustrating a part A of Fig. 4.

Fig. 6 is a view showing a configuration of a conductive pattern according to another embodiment of the present invention.

Fig. 7 is a real photograph illustrating a plane heater realized according to Fig. 6.

Fig. 8 is a block diagram illustrating a configuration of a heating control device according to an embodiment of the present invention.

Fig. 9A and Fig. 9B are real photographs illustrating the heating control device according to an embodiment of the present invention.

FIG. 10 is a diagram illustrating an example of a screen configuration of a user terminal for controlling a temperature according to an embodiment of the present invention.

Fig. 11 is a flowchart illustrating a heating control method using a smart heating control system according to an embodiment of the present invention.

Fig. 12A to Fig. 12E are diagrams illustrating examples of a display screen in respective steps shown in Fig. 11.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0029] Exemplary embodiments of the present disclosure are described with reference to the accompanying drawings in detail.

[0030] Detailed descriptions of well-known functions and structures incorporated herein may be omitted to avoid obscuring the subject matter of the present disclosure. Terminologies used in this specification are selected from general terminologies by taking the functions thereof into consideration and they may vary depending on the intentions of operators having ordinary skill in the art, customers and appearance of new technologies. In specific cases, the terminologies may be arbitrarily selected by applicant. In this case, the meaning of the terminologies will be described in corresponding parts of the specification. Accordingly, the terminologies used in this specification should be defined based on the substantial meanings thereof and the whole context through-

out the present specification.

[0031] Fig. 1 is a view illustrating a configuration of a smart heating control system according to an embodiment of the present invention.

[0032] Referring to Fig. 1, the smart heating control system according to the present embodiment includes clothes 1 and a user terminal 300.

[0033] An internal temperature and humidity of the heating clothes 1 are automatically controlled according to a control signal received from the user terminal 300. The heating clothes 1 include a clothing member 10, a heating unit 100, and a heating control device 200.

[0034] The heating clothes 1 are clothes for generating heat. The heating of the heating clothes 1 is automatically controlled so that the internal temperature and humidity of the heating clothes 1 are controlled to a preset value by a user.

[0035] The clothing member 10 may include general clothes such as mountain clothes, windbreaks, jumpers, cardigans, and vests, and may include various products such as cushions and seats.

[0036] The heating unit 100 is installed at the clothing member 10 and generates heat. It is preferable that the heating member 100 is provided inside the clothing member 10.

[0037] Fig. 2 and Fig. 3 are views illustrating a configuration of a heating unit according to an embodiment of the present invention. Fig. 2 shows a cross-sectional view of the heating unit and Fig. 3 shows an exploded perspective view of the heating unit.

[0038] Referring to Fig. 2 and Fig. 3, the heating unit 100 according to the present embodiment includes a base raw material 111 having a plane shape, a conductive pattern 120 formed on the base raw material 110, and an insulation protecting layer 130 provided on the base raw material 110 to cover the conductive pattern 120.

[0039] The base raw material 110 is a raw material serving as a base formed thereon with the conductive pattern. The base raw material 110 is applicable without being limited to materials such as a synthetic fiber, a regenerated fiber, and a natural fiber or a manufacturing method thereof.

[0040] The conductive pattern 120 is formed at a top surface and a bottom surface of the base raw material 110 using an electrically conductive yarn 101 in the form of a sewing line or embroidery. The conductive pattern 120 receives power from a battery unit 140 to generate heat around the conductive pattern 120.

[0041] The conductive pattern 120 includes a heating pattern 120H and a power line 120E. A conductive pattern having a preset shape is formed in the form of a sewing line or embroidery so that the heating pattern 120H generates the heat upon supply of the power to keep the periphery warm. The power line 120E long extends from both ends of the heating pattern 120H to be directly connected to the battery unit 140 and transfers power from the battery unit 140 to the heating pattern 120H.

[0042] Fig. 4 and Fig. 5 are views illustrating a configuration of a conductive pattern according to an embodiment of the present invention. Fig. 4 is a plan view, and Fig. 5 is an enlarged view illustrating a part A of Fig. 4.

[0043] Referring to Fig. 4 and Fig. 5, the conductive pattern 120 configures the heating pattern 120H and the power line 120E in a continuous pattern using a strip of the electrically conductive yarn 101. In detail, a pattern of an outer edge 121 of the heating pattern 120H is formed in the form of a sewing line or an embroidery by starting from a one side end of the power line 120E, that is, a start point S. Next, the electrically conductive yarn 101 is repeated in a straight line several times to overlap with each other at the power line 120E part so that a reciprocating sewing line pattern is formed. Sewing is performed on the reciprocating sewing line pattern in a zig-zag pattern (or wave pattern) so that a first power line pattern 122 having a predetermined area is formed. After that, the sewing is performed from the first power line pattern 122 so that an inner edge 123 pattern of the heating pattern 120H is formed. The electrically conductive yarn 101 overlaps in a straight line several times to overlap with each other at the power line 120E part so that a reciprocating sewing line pattern is formed. Sewing is performed on the reciprocating sewing line pattern in a zig-zag pattern (or wave pattern) so that a second power line pattern 124 having a predetermined area is formed.

[0044] That is, the heating pattern 120H and the power line 120E are physically separated from each other or have a continuous pattern that are not connected through a separate connection configuration but is configured by a strip of an electrically conductive yarn. In this case, the term 'a strip' is not limited to a layer. For example, the above 'a strip' may include a case where an electrically conductive yarn with a plurality of layers forms one bundle or is twisted to configure one line.

[0045] Meanwhile, the heating unit and the power line may form a pattern in various forms. When the pattern of the heating unit is formed, after an inner edge is firstly formed, an outer edge may be formed.

[0046] Fig. 6 and Fig. 7 are views showing a configuration of a conductive pattern according to another embodiment of the present invention. Fig. 6 is a view illustrating a power line part, and Fig. 7 is a real photograph illustrating a plane heater.

[0047] Referring to Fig. 6, in the present embodiment, when a pattern of the power line is formed, the electrically conductive yarn overlaps in a straight line several times to overlap with each other at the power line part so that a reciprocating sewing line pattern is formed. Sewing is performed on the reciprocating sewing line pattern in a zig-zag pattern so that a power line pattern 124 having a predetermined area is formed.

[0048] As shown in Fig. 7, in the above configured power line, a plurality of layers of the electrically conductive yarn overlap with each other to form a predetermined area so that an area of the power line is greater than a cross

section of one strip of the electrically conductive yarn. Accordingly, a resistance value of the power line is reduced so that power supplied from the battery unit may be efficiently transferred to the heating unit.

[0049] Referring back to Fig. 1 to Fig. 3, the electrically conductive yarn 101 includes a conductive plied yarn. For example, a silver (Ag) drawing thread is applied to put a center polyester wadding yarn. Six to eight strips of a silver thread having 30 μm are provided around the center polyester wadding thread to be plied to configure the plied yarn covered with a polyester thread.

[0050] The insulation protecting layer 130 is formed at each of a top surface (130F) and a bottom surface (130R) of the base raw material 110 to cover the whole conductive pattern 120 formed at the top surface and the bottom surface of the base raw material 110 for the purpose of preventing electric problems such as short circuit or electric shock by shielding the conductive pattern 120 from an external environment.

[0051] For example, the insulation protecting layer 130 may include at least one insulation material selected from the group consisting of an acryl-based resin, a polyurethane-based resin, a polyester-based resin, a silicon-based resin, a PVC-based resin.

[0052] Further, the insulation protecting layer 130 includes a wear-resistance raw material. It is preferable to waterproof and water-repel a surface of the insulation protecting layer 130.

[0053] The insulation protecting layer 130 may be formed by a seam tape or in a laminating scheme.

[0054] Referring back to Fig. 1, the heating control device 200 switches supply of power to the heating unit 100 according to a control signal received from the user terminal 300 through near field wireless communication to control internal temperature and humidity of clothes.

[0055] Fig. 8 is a block diagram illustrating an example of a configuration of a heating control device according to an embodiment of the present invention, and Fig. 9A and Fig. 9B are real photographs illustrating the heating control device.

[0056] Referring to Fig. 1, Fig. 8, and Fig. 9, the heating control device 200 includes a power supply unit 210, a switch unit 220, a measuring unit 230, a communication unit 240, and a control unit 250. The power supply unit 210 supplies power to the heating electrically conductive yarn pattern. The switch unit 220 switches power supply of the power supply unit 210. The measuring unit 230 includes a first temperature sensor 232 and a humidity sensor 234 and measures internal temperature and humidity of clothes. The communication unit 240 performs data transmission/reception between the user terminal and the heating control device. The control unit 250 receives a control signal from the user terminal 300 through the communication unit 240 to control the switch unit 220. The control unit 250 controls to transmit temperature and humidity information received from the measuring unit 230 to the user terminal 300 through the communication unit 240.

[0057] It is preferable that the heating control device 200 is modularized in a housing 201 having a box shape and is inserted into an inner bag 120 of the clothing member 10. The heating control device 200 is electrically connected to the heating unit 100 at an end of a conductive unit 120E. The heating control device 200 may be directly connected to the heating unit 100 through a snap.

[0058] Further, the heating control device 200 may further include a second temperature sensor 236. In this case, the second temperature sensor 236 exactly measures a body temperature of a user wearing the heating clothes. The second temperature sensor 236 is not provided inside the housing 201 having a box shape, but may be provided at a side of the clothing member 10, for example, around the armpit. In addition, the second temperature sensor 236 may be located at a direction (generally left side) of the bag 12 of the heating control device 200 into which the housing 210 is inserted to minimize a length of a signal line.

[0059] As described above, when two or more temperature sensors are provided, the control unit 250 transmits a value (measured value) detected from the first temperature sensor 232 and the second temperature sensor 236 to the user terminal 300 through the communication unit 240. The user terminal 300 may generate the control signal using the measured value of the first temperature sensor 232 and the measured value of the second temperature sensor 236. In this case, the user terminal 300 may generate the control signal based on an average of the measured value of the first temperature sensor 232 and the measured value of the second temperature sensor 236 or based on a higher value terminal or a lower value terminal of the measured value terminal of the first temperature sensor 232 and the measured value terminal of the second temperature sensor 236 using a heating control application.

[0060] Referring back to Fig. 1, the user terminal 300 may receive temperature and humidity relation information from the heating clothes 1 through near field wireless communication, for example, Bluetooth communication, and may transmit a control signal for turning on/off the supply of the power to the heating unit 100 to the heating control device 200 so that the temperature and humidity of the heating clothes 1 are control as preset temperature and humidity by the user.

[0061] In addition, the user terminal 300 may control the temperature and humidity of the heating clothes 1 by executing a heating control application program for controlling the heating control device 200. The user terminal 300 may be configured by a smart phone in which a user wearing the heating clothes 1 may easily carry.

[0062] In addition, the user terminal 300 displays the temperature and humidity relation information received from the heating clothes 1 on a screen so that the user may confirm the temperature and the humidity.

[0063] Moreover, the user terminal 300 allows the user to input a user command for controlling the temperature and the humidity. When the user terminal 300 is the smart

phone, the user may input the user command on the touch screen.

[0064] FIG. 10 is a diagram illustrating an example of a screen configuration of the user terminal for controlling a temperature according to an embodiment of the present invention. A current temperature is displayed on a display screen, and a temperature setting window for controlling the temperature as a desired temperature is provided.

[0065] The following is a description of an operation of the smart heating control system having the above configuration.

[0066] Fig. 11 is a flowchart illustrating a heating control method using a smart heating control system according to an embodiment of the present invention. Fig. 12A to Fig. 12E are diagrams illustrating examples of a display screen in respective steps shown in Fig. 11.

[0067] Referring to Fig. 11 and Fig. 12A to Fig. 12E, a user executes a heating control application using the user terminal (S1002) (Fig. 12A). In this case, the user may perform a fundamental procedure for controlling the heating control device using the heating control application. The fundamental procedure may include log-in, registration of the heating control device or a clothing code, and an authentication step. A specific user is qualified to control a specific heating control device through the above fundamental procedure.

[0068] Next, a menu selection screen is provided to a display window of the user terminal so that the user may select the menu selection screen. If a specific menu is selected from the menu selection screen, selected information is displayed (S1004). Fig. 12B illustrates a case where the user selects 'control' and 'temperature'. Accordingly, a current temperature and a preset temperature are displayed on the display window of the user terminal 300 (S1004) (Fig. 12C). In this case, the current temperature is measured by a first temperature sensor of the heating control device. The preset temperature may be a temperature previously set by the user.

[0069] After that, when the user touches a preset temperature for changing the preset temperature, a preset temperature change window as shown in Fig. 12D is provided so that the user inputs a desired temperature (preset temperature) (Fig. 12D) and the heating control device receives the input setting value (S1006). Fig. 12E illustrates a screen after the desired temperature is input. In this case, the user may select the desired temperature by touching '+' or '-'.

[0070] Next, the user terminal 300 generates a control signal by comparing an input setting value with the current temperature to transmit the generated control signal to the heating control device (S1008). The user terminal 300 generates the control signal for controlling the switch unit 220 so that power is supplied to the heating unit when the current temperature is lower than the preset temperature but the power is not supplied to the heating unit when the current temperature is higher than the preset temperature.

[0071] Thereafter, if the heating control device 200 re-

ceives the control signal from the user terminal, the heating control device 200 controls the switch unit to turn-on/off the supply of the power to the heating unit 100 (S1010).

[0072] Next, the user terminal compares the current temperature received from the heating control device with the preset temperature set by the user (S1012). When the current temperature is the same as the preset temperature, the user terminal transmits the control signal to change a power supply state to the heating unit by reversing (switching) a switch unit 220 (S1014).

[0073] As the determination result in step S1012, when the current temperature differs from the preset temperature, the user terminal maintains a previous state (S1010). That is, if the power is supplied to the heating unit 100, the user terminal continuously supplies power by maintaining the above state. If the power is block without being supplied to the heating unit, the user terminal continuously blocks the power by maintaining the above state.

[0074] Meanwhile, in order to more exactly measure a body temperature of a user wearing the heating clothes, two or more temperature sensors may be included. In this case, the user terminal compares respective temperatures received from a plurality of temperature sensors. The user terminal may determine an average of the compared temperatures as the current temperature, or may determine the lowest value or the highest value of the compared temperatures as the current temperature. As another method, the user terminal may determine a value measured from a thermometer around the armpit of the heating clothes.

[0075] Embodiments of the present invention as described above may be implemented in an executable program command form by various computer means and be recorded in a computer readable recording medium. In this case, the computer readable recording medium may include a program command, a data file, and a data structure individually or a combination thereof. In the meantime, the program command recorded in a recording medium may be specially designed or configured for the present invention or be known to a person having ordinary skill in a computer software field to be used. The computer readable recording medium includes Magnetic Media such as hard disk, floppy disk, or magnetic tape, Optical Media such as Compact Disc Read Only Memory (CD-ROM) or Digital Versatile Disc (DVD), Magneto-Optical Media such as floptical disk, and a hardware device such as ROM, RAM, flash memory storing and executing program commands. Further, the program command includes a machine language code created by a compiler and a high-level language code executable by a computer using an interpreter. The foregoing hardware device may be configured to be operated as at least one software module to perform an operation of the present invention, and a reverse operation thereof is the same.

[0076] An exemplary embodiment of the present invention is disclosed herein, but the present invention is

not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the appended claims and the detailed description and the accompanying drawing of the present invention.

Claims

1. Smart heating clothes comprising:

a clothing member;
a heating unit including a heating electrically conductive yarn pattern and installed at the clothing member to generate heat; and
a heating control device for switching supply of power to the heating unit according to a control signal received from a user terminal through near field wireless communication to control internal temperature and humidity of clothes, wherein the heating control device comprises:

a power supply unit configured to supply the power to the heating electrically conductive yarn pattern;
a switch unit configured to switch the power supply of the power supply unit;
a measuring unit configured to measure the internal temperature and humidity of the clothes;
a communication unit configured to perform data transmission/reception between the user terminal and the heating control device; and
a control unit configured to receive the control signal from the user terminal through the communication unit to control the switch unit, and to control to transmit temperature and humidity information received from the measuring unit to the user terminal through the communication unit.

2. The smart heating clothes of claim 1, wherein the heating electrically conductive yarn pattern comprises:

a base raw material having a plane shape;
a conductive pattern formed on at least one surface of the base raw material, the conductive pattern including a heating pattern configured to generate heat upon the supply of the power, and a power line pattern configured to transfer the power to the heating pattern, and the heating pattern and the power line pattern being continuously formed in a form of a sewing line or an embroidery by a strip of an electrically conductive yarn; and
an insulation protecting layer provided on the

base raw material to cover the conductive pattern and to expose an electric connection part between the power line pattern and the power supply unit.

3. The smart heating clothes of claim 2, wherein the power line pattern has a rectangular shape with a predetermined area by sewing the electrically conductive yarn a plurality of times, and the power line pattern is sewed in a zig-zag pattern so that the electrically conductive yarn is continuously formed without interruption.
4. The smart heating clothes of claim 3, wherein the conductive pattern is formed at a front surface and a rear surface of the base raw material, and the insulation protecting layer is formed at each of a top surface and a bottom surface of the base raw material to cover the conductive pattern which is formed at the top surface and the bottom surface of the base raw material.
5. The smart heating clothes of claim 4, wherein the insulation protecting layer comprises a seam tape.
6. The smart heating clothes of claim 1, wherein the heating control device is integrally configured in a housing having a box shape, and the housing is inserted into an inner bag of the clothes.
7. The smart heating clothes of claim 6, wherein the heating control device comprises a first temperature sensor provided in the housing and a second temperature sensor around a lateral armpit of the clothing member.
8. A system for controlling heating of smart heating clothes, the system comprising:

heating clothes including a clothing member; a heating unit including a heating electrically conductive yarn pattern and installed at the clothing member to generate heat; and a heating control device for switching supply of power to the heating unit according to a control signal received from a user terminal through near field wireless communication to control internal temperature and humidity of clothes; and a user terminal configured to execute a heating control application for controlling the heating control device, to receive and display temperature and humidity relation information from the heating clothes through near field wireless communication, and to transmit a control signal to switch the supply of the power to the heating unit to the heating control device so that the temperature and humidity of the heating clothes be-

come a preset range.

9. The system of claim 8, wherein the heating control device comprises a first temperature sensor and a second temperature sensor configured to measure temperatures at different points of the heating clothes, and the heating control application generates the control signal based on an average of a measured value of the first temperature sensor and a measured value of the second temperature sensor or based on a higher value or a lower value of the measured value of the first temperature sensor and the measured value of the second temperature sensor.

10. The system of claim 8, wherein the heating electrically conductive yarn pattern comprises:

a base raw material having a plane shape; a conductive pattern formed on at least one surface of the base raw material, the conductive pattern including a heating pattern configured to generate heat upon the supply of the power, and a power line pattern configured to transfer the power to the heating pattern, and the heating pattern and the power line pattern being continuously formed in a form of a sewing line or an embroidery by a strip of an electrically conductive yarn; and an insulation protecting layer provided on the base raw material to cover the conductive pattern and to expose an electric connection part between the power line pattern and the power supply unit.

11. A heating control method of controlling temperature and humidity of heating clothes using a user terminal connected to a heating control device for measuring and controlling the temperature and the humidity of the heating clothes through near field wireless communication, the heating control method comprising:

executing a heating control application in the user terminal to perform a user authentication procedure; receiving current temperature and humidity information from the heating control device to display the received current temperature and humidity information on a screen by the user terminal; receiving and comparing user setting temperature and humidity with the current temperature and humidity by the user terminal; generating a control signal according to the comparison result to transmit the control signal to the heating control device by the user terminal; and receiving the control signal to control tempera-

ture and humidity by switching supply of power to a heating unit according to the control signal.

12. The heating control method of claim 11, wherein the user terminal receives temperature information in at least two points when receiving current temperature and humidity from the heating control device, and generates the control signal based on an average value or specific temperature information of a plurality of received temperature information.

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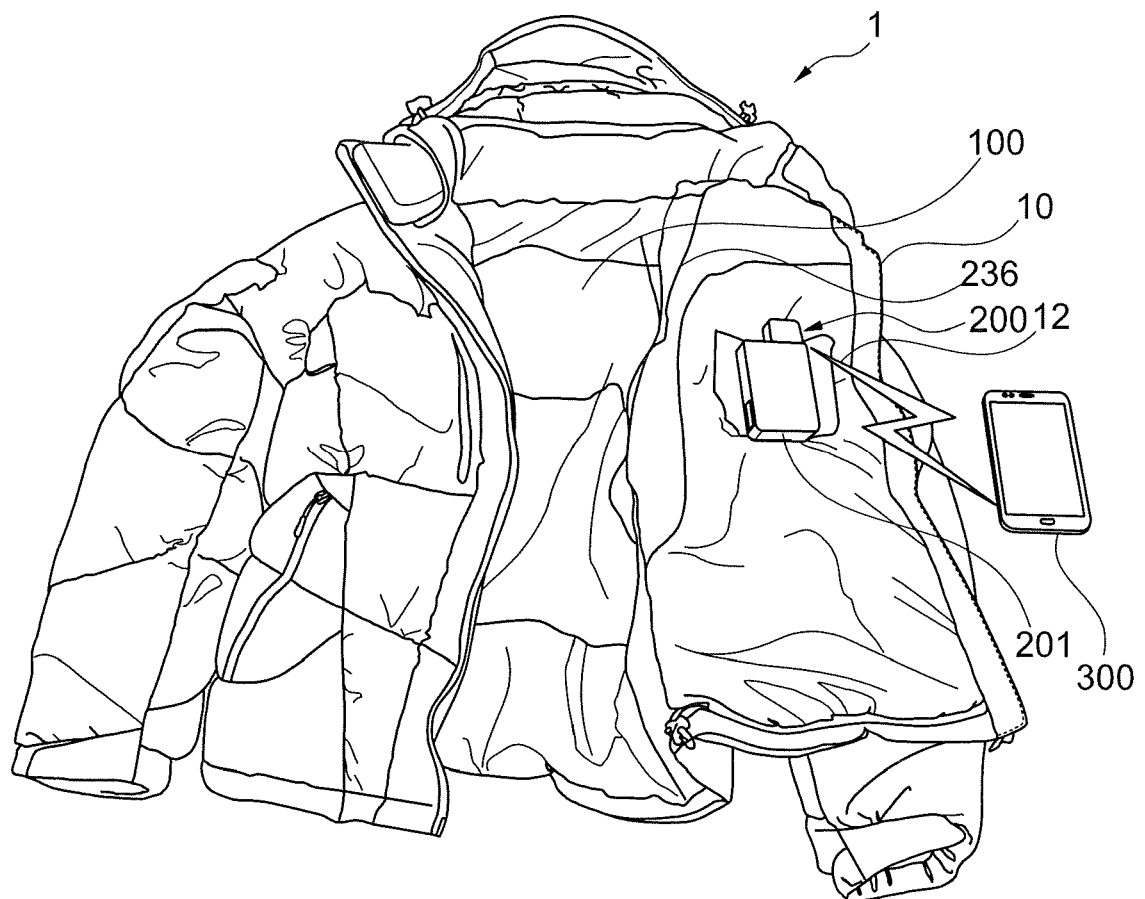


Fig. 1

FIG. 2

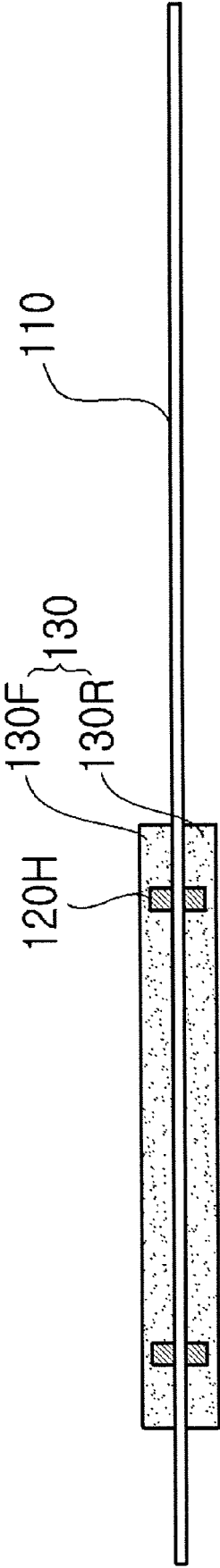
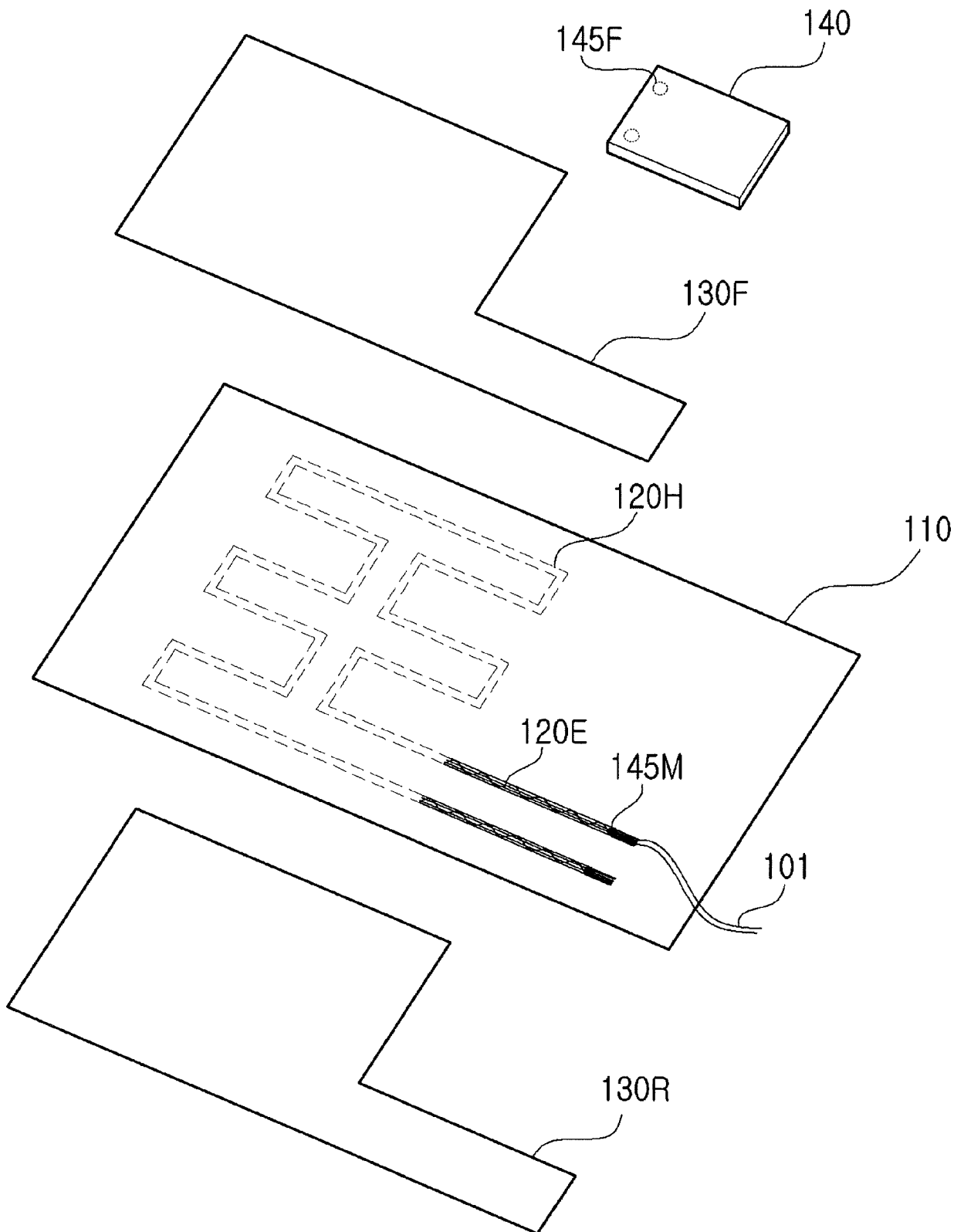


FIG. 3



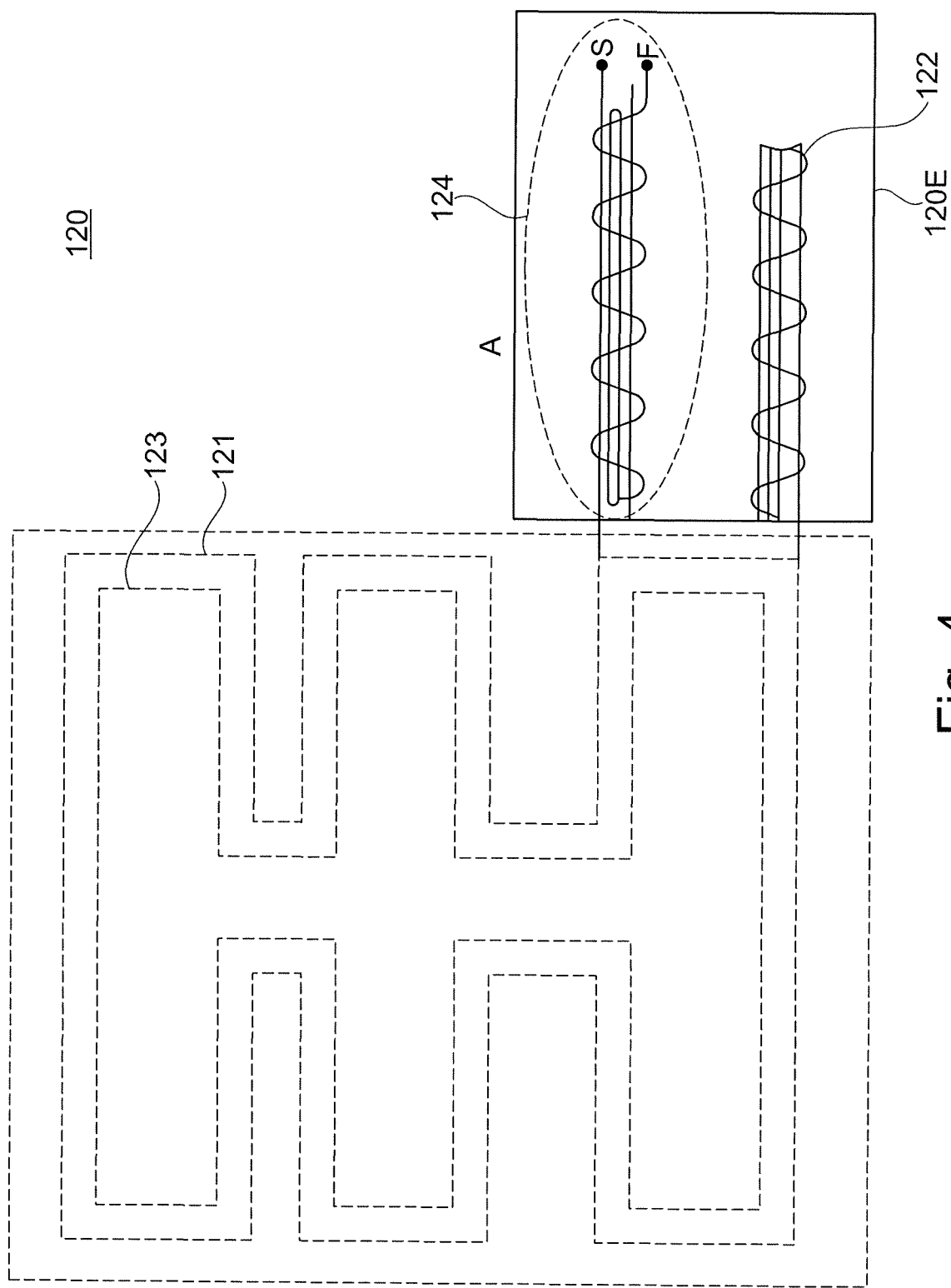


Fig. 4

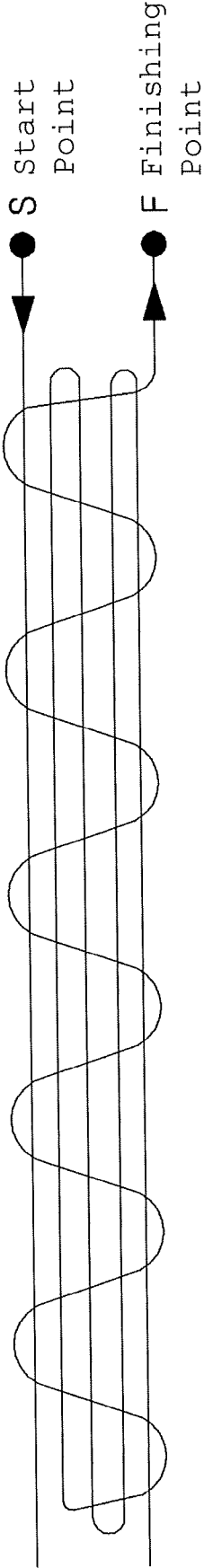


FIG. 5

FIG. 6

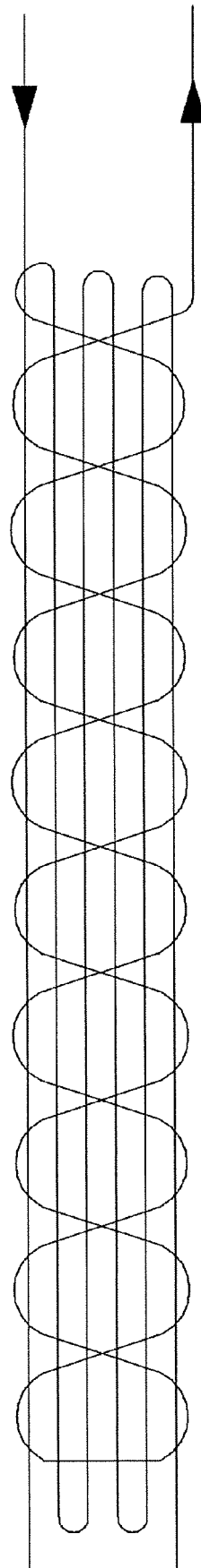
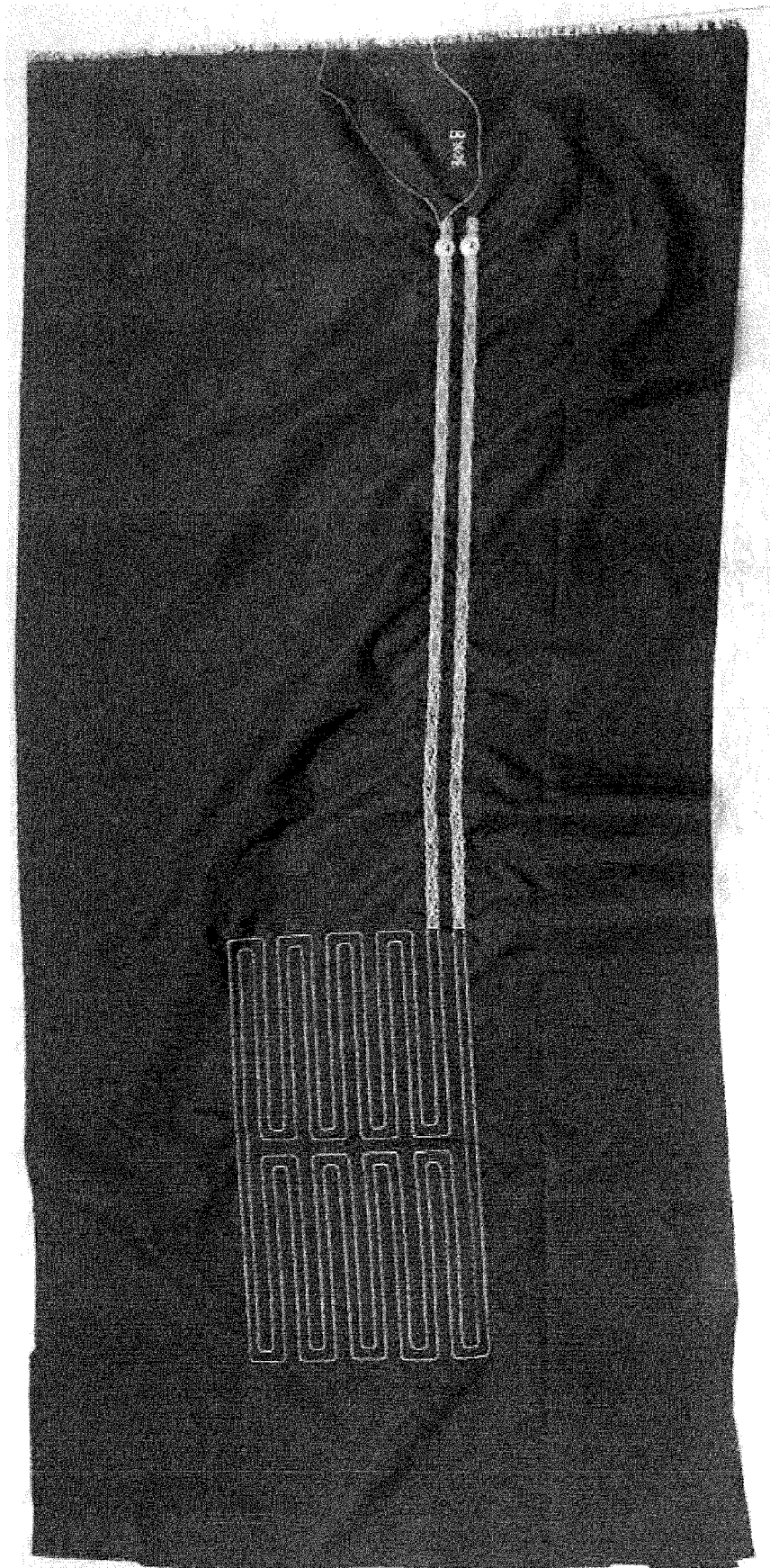


FIG. 7



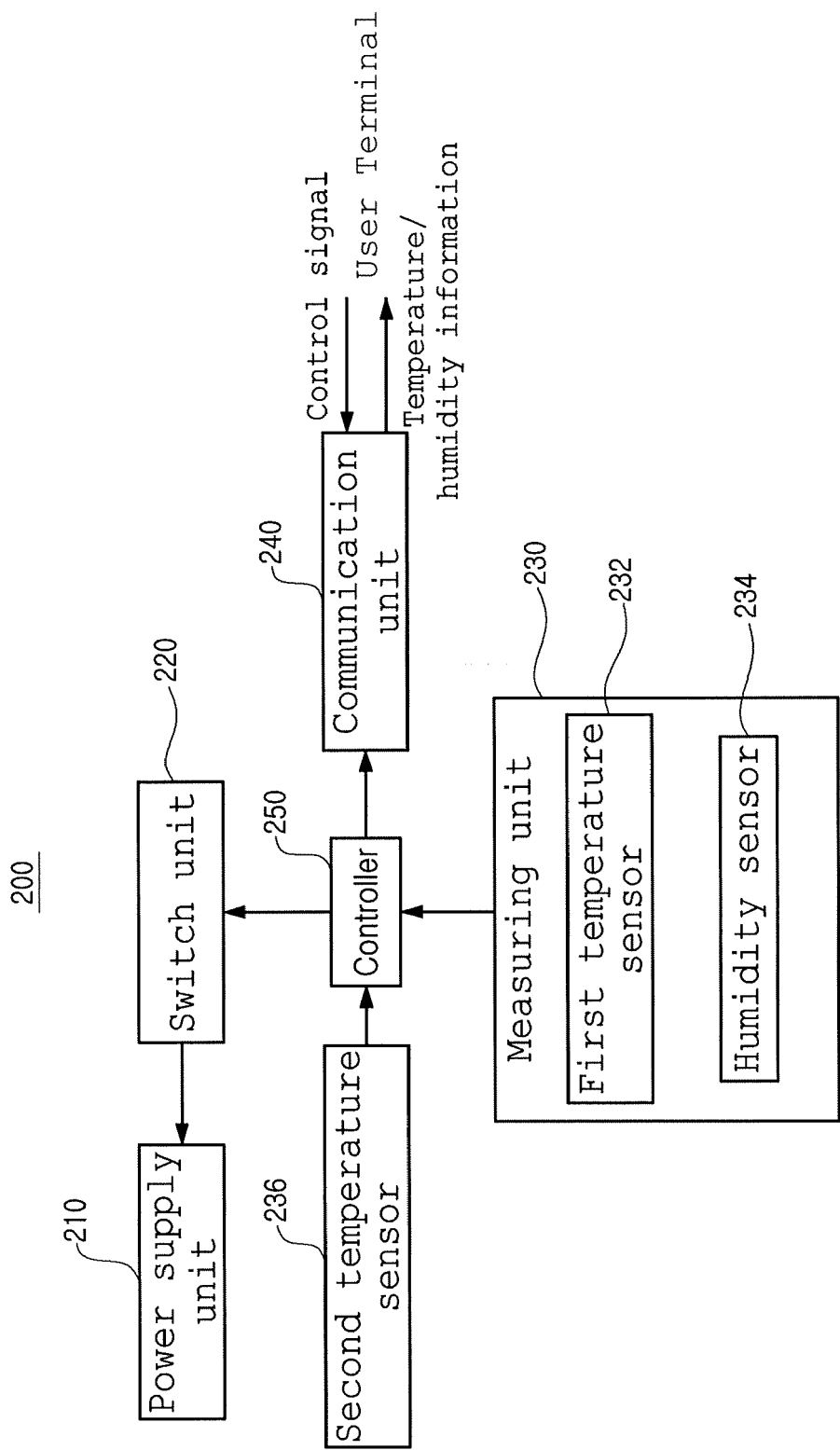


FIG. 8

FIG.
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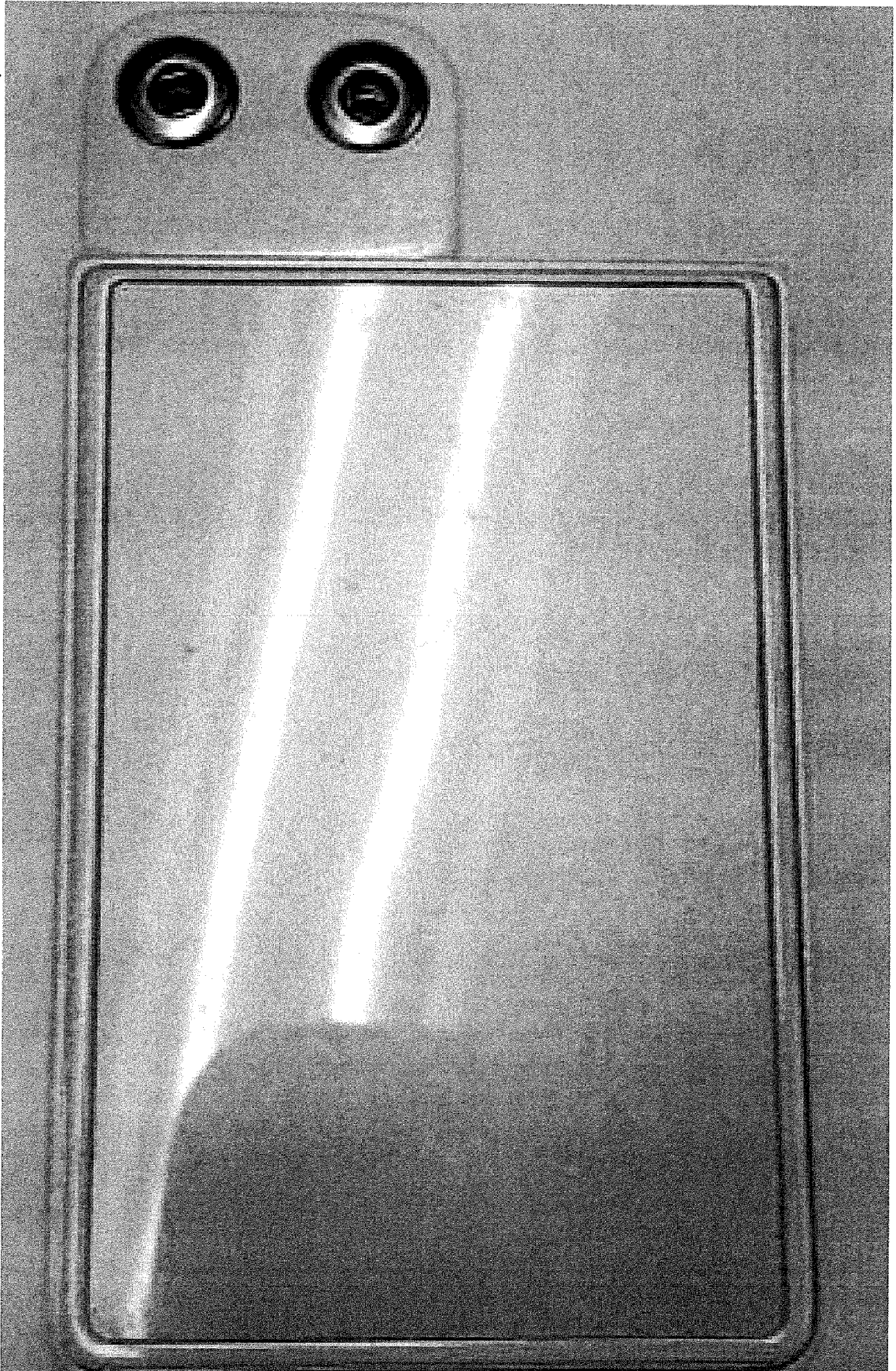
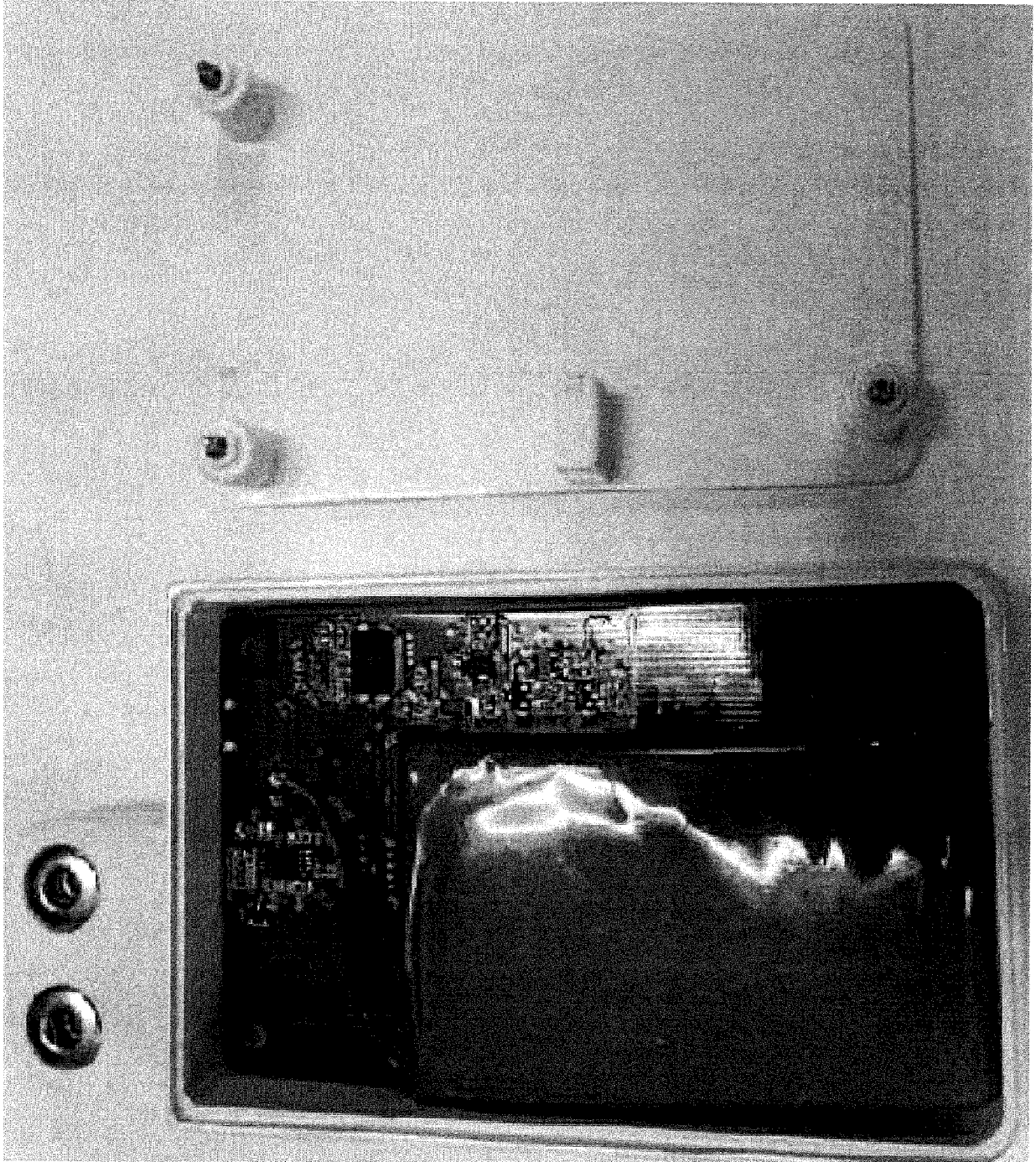


FIG. 9b



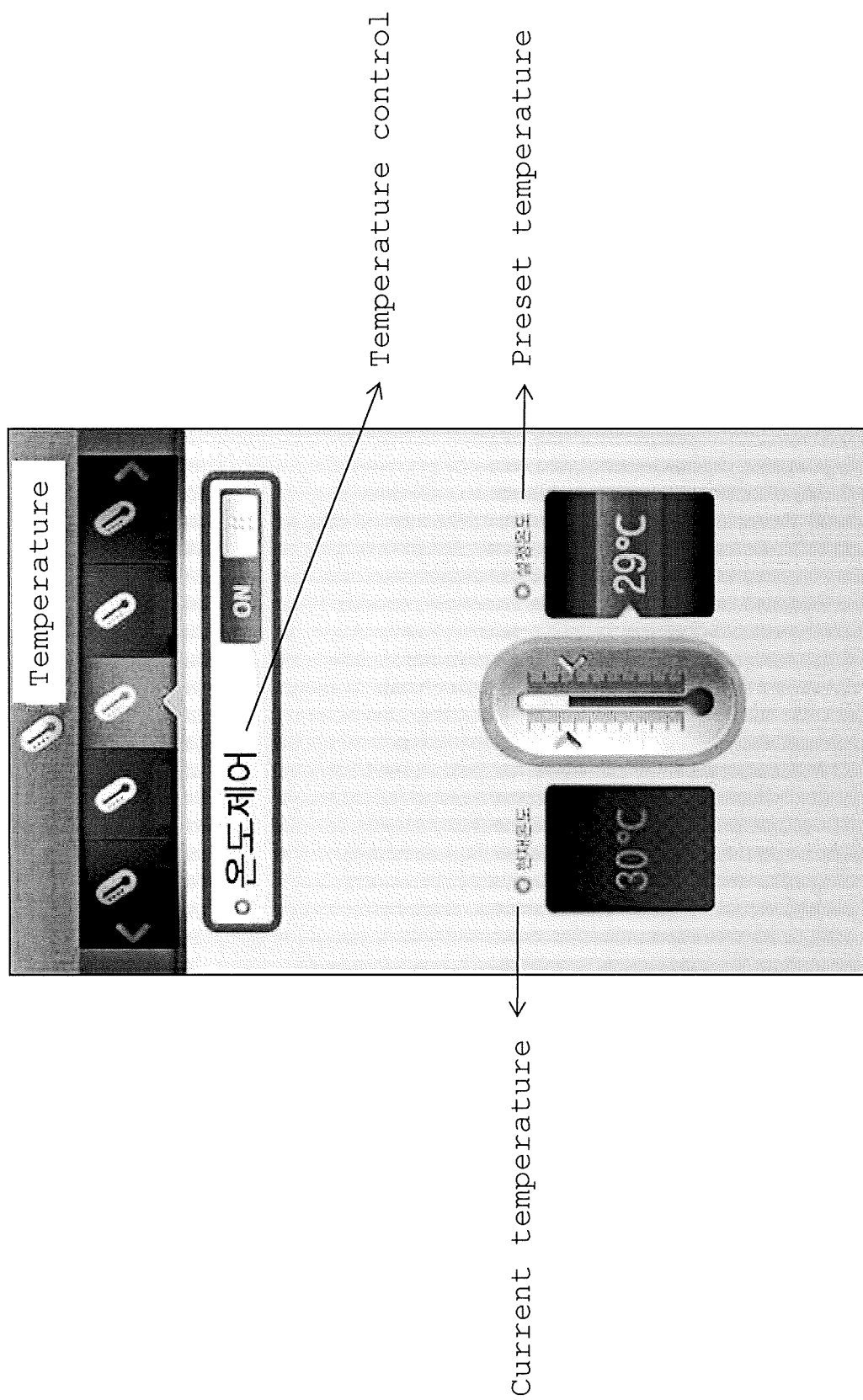
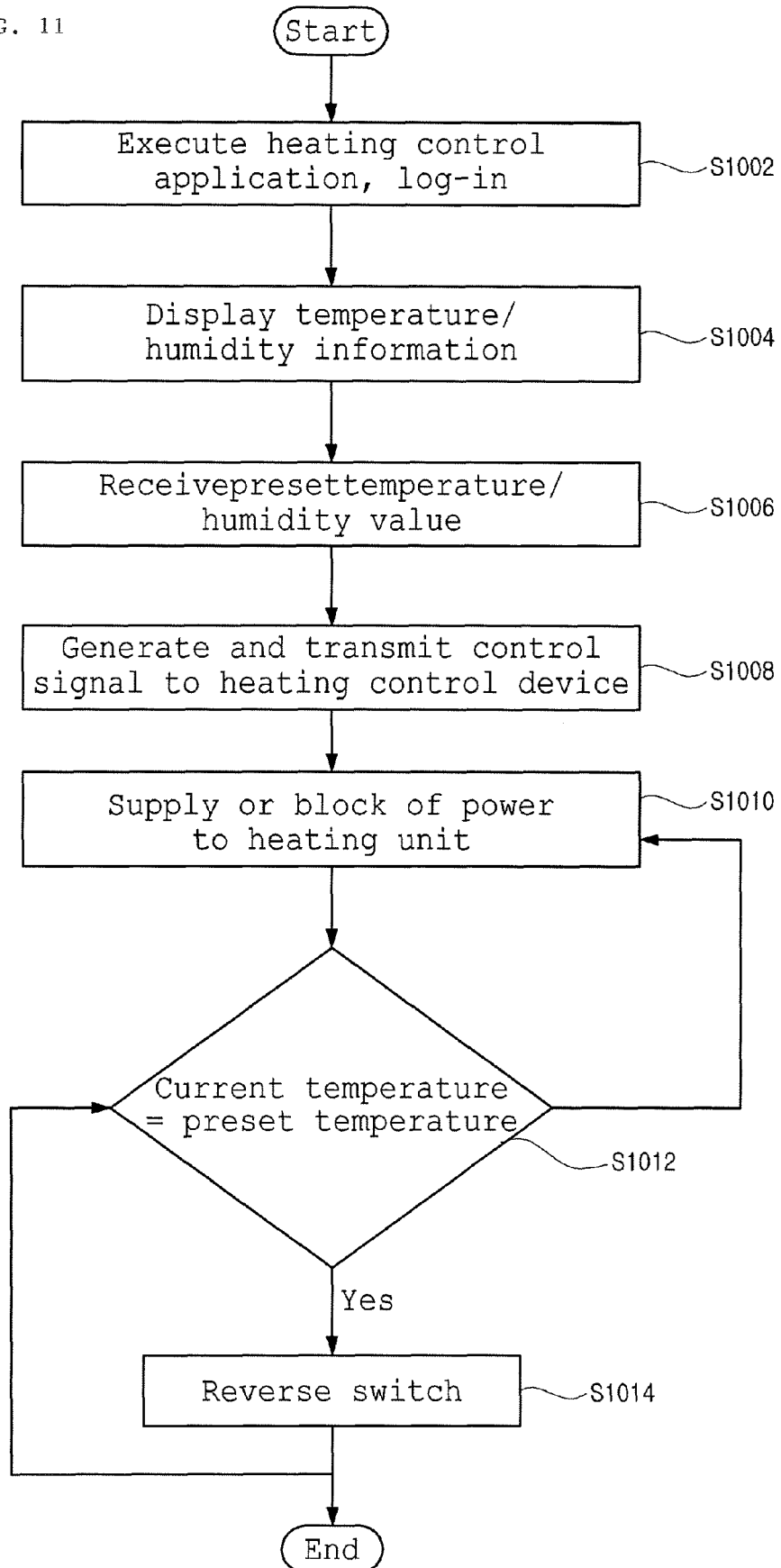


FIG. 10

FIG. 11





BLACK YAK

Clothing code

Data

Password

Log-in

Fig. 12a

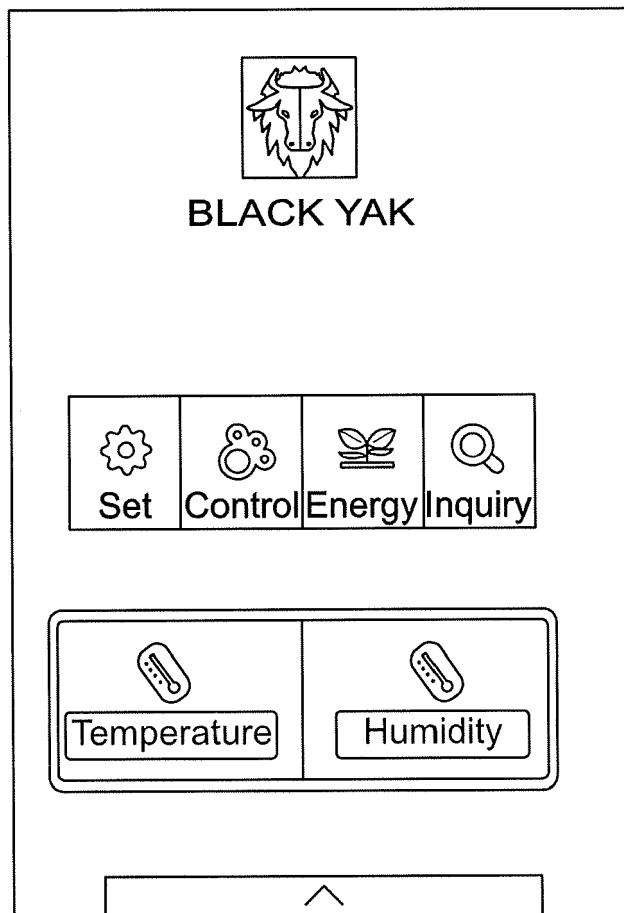


Fig. 12b

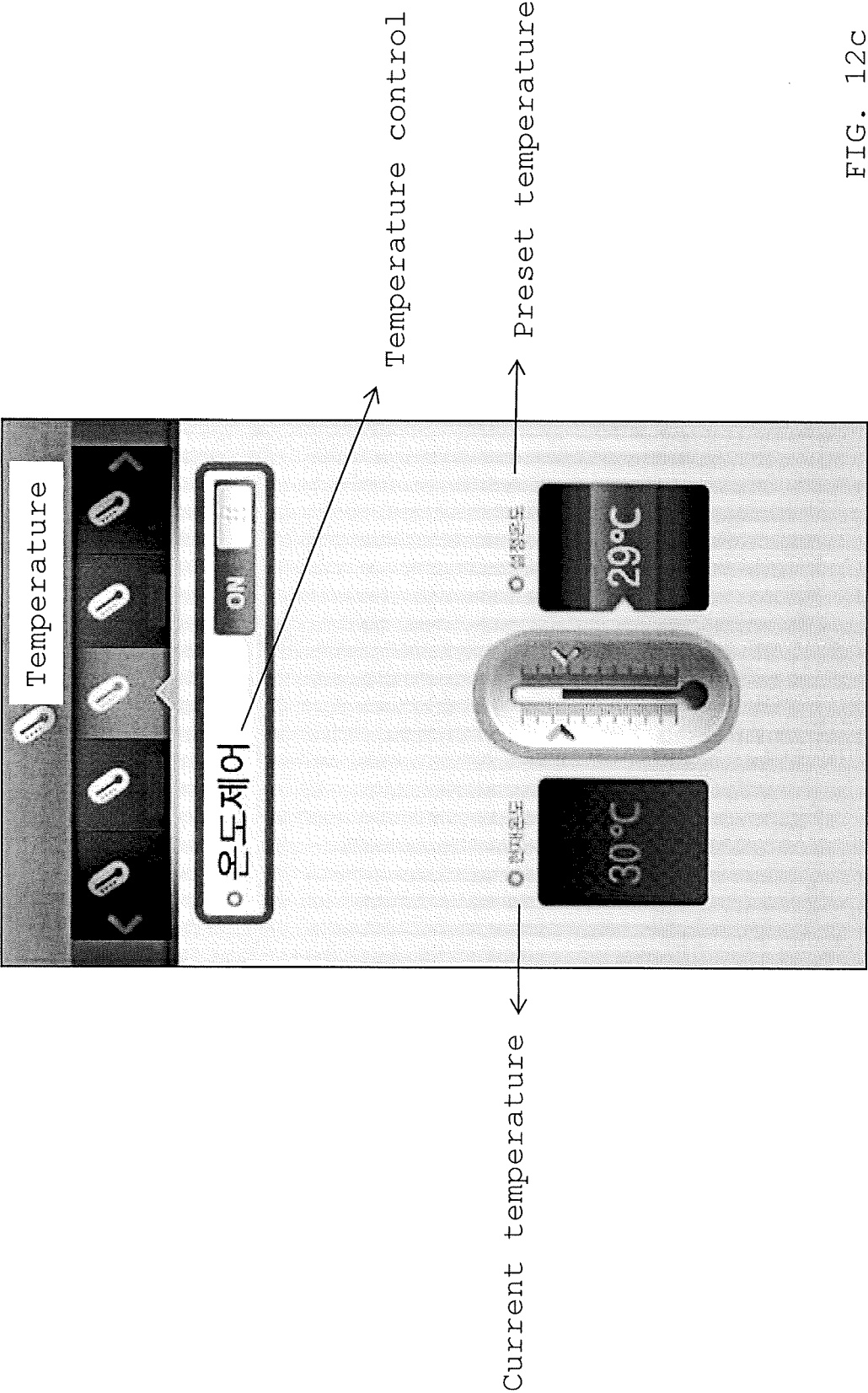


FIG. 12c

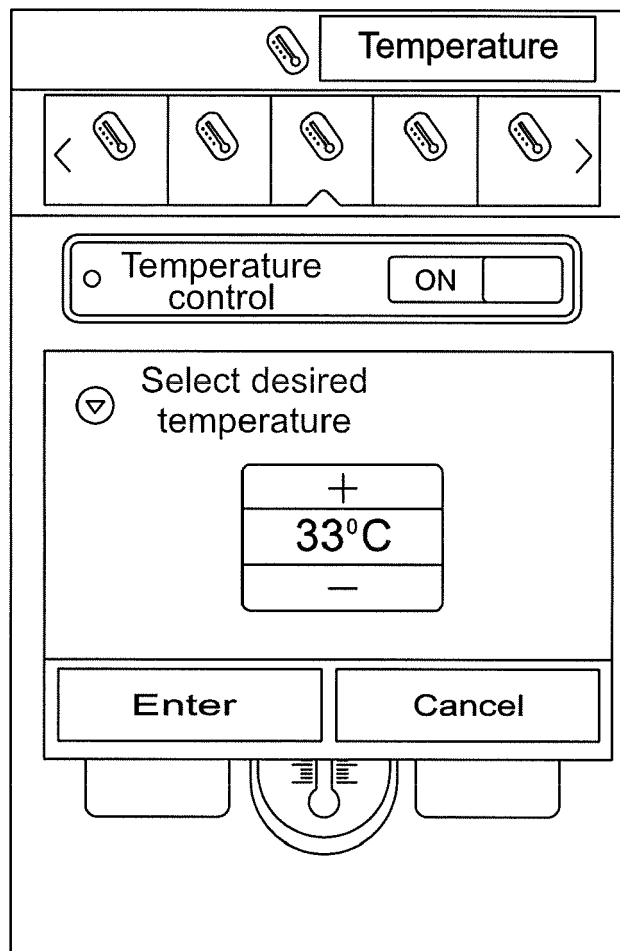


Fig. 12d

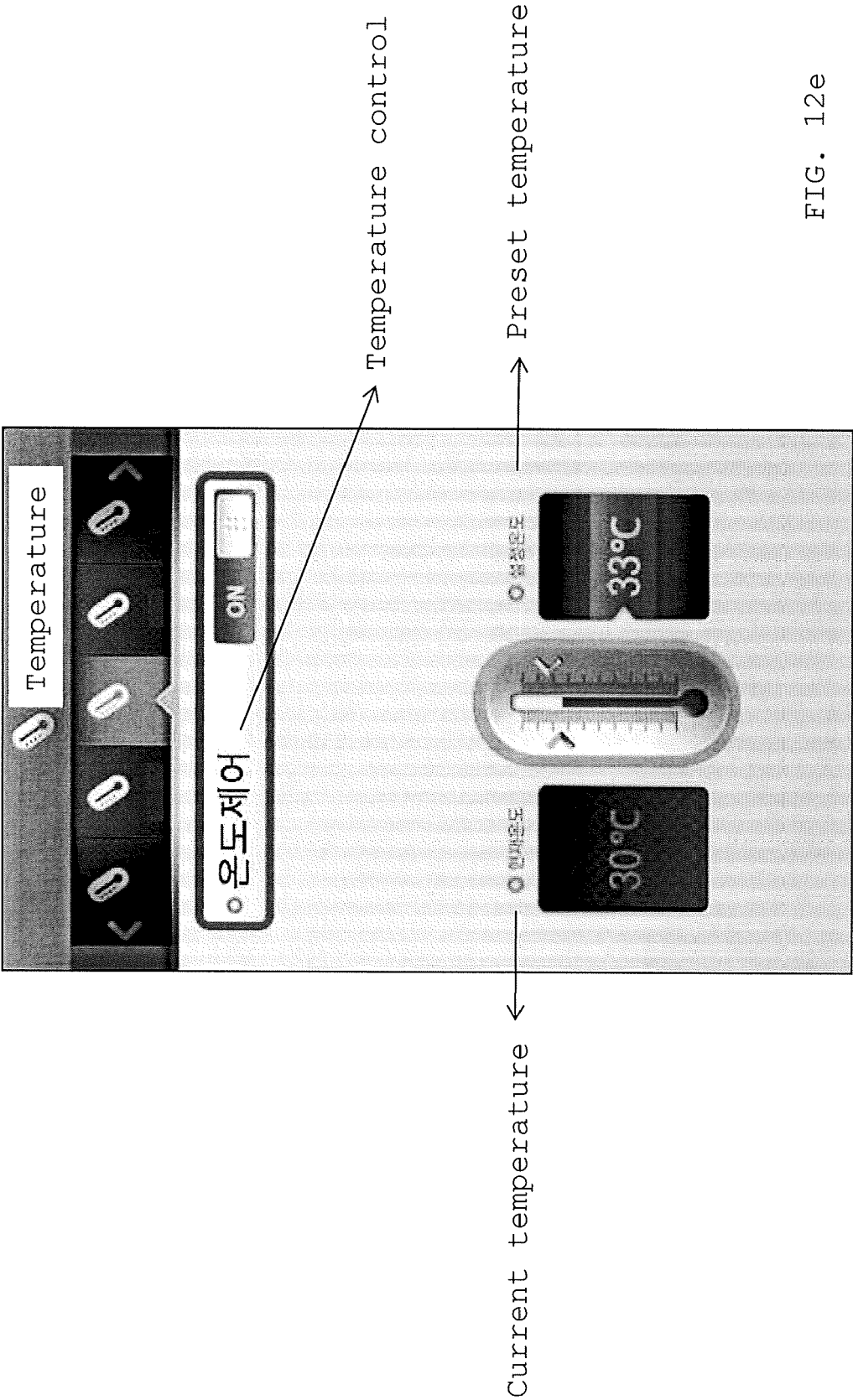


FIG. 12e



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Application Number
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X	CN 204 169 106 U (YU HUANGKUN) 25 February 2015 (2015-02-25) * the whole document *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			H05B A41D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2016	Examiner Gea Haupt, Martin
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