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(71) Applicant: **Panasonic Corporation**
Kadoma-shi
Osaka 571-8501 (JP)

(72) Inventors:
• **Matsui, Yasunori**
Chuo-ku, Osaka 540-6207 (JP)

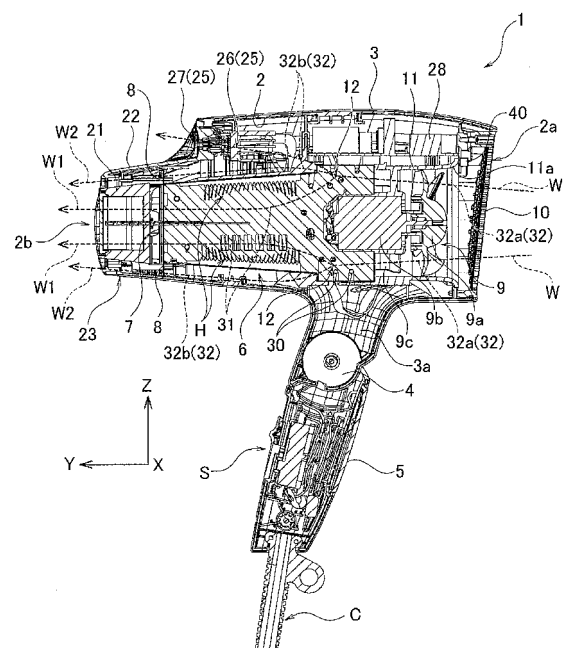
- **Miyata, Hiromitsu**
Chuo-ku, Osaka 540-6207 (JP)
- **Ishikawa, Tomoya**
Chuo-ku, Osaka 540-6207 (JP)
- **Sohmura, Takuji**
Chuo-ku, Osaka 540-6207 (JP)
- **Shiba, Takeshi**
Chuo-ku, Osaka 540-6207 (JP)
- **Yamane, Yuji**
Chuo-ku, Osaka 540-6207 (JP)

(74) Representative: **Appelt, Christian W.**
Boehmert & Boehmert
Pettenkoferstrasse 20-22
80336 München (DE)

(54) **Heated air blower**

(57) A heated air blower includes: a housing (3) with- in which an air blower unit (9) that discharges from an air blower port (2b) air sucked from an air inlet port (2a), a heating unit (H) for heating the air blown by the air blower unit (9), a hot air flow passage (31) through which the heated air passes in an event of driving the heating unit (H), and a cold air flow passage (32) through which orig- inal air passes, are provided; a temperature sensing unit (40) for sensing an ambient temperature; and a control unit (35) for controlling the heating unit (H) in response to a detected temperature of the temperature sensing unit (40). The temperature sensing unit (40) is provided in the cold air flow passage (32) in the housing (3).

FIG. 1



Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a heated air blower capable of discharging hot air and cold air.

[0002] As a conventional heated air blower, for example, a hair dryer disclosed in Japanese Patent Laid-Open Publication No. H03-195506 (published in 1991) is known. The disclosed hair dryer is configured so as to provide therein a temperature sensing unit that senses an ambient temperature, and to control a temperature of hot air in response to the ambient temperature detected by this temperature sensing unit.

[0003] With such a configuration, for example, in the case where the ambient temperature is high in summer and the like, it is made possible to suppress overdrying of hair by lowering the temperature of the hot air more than in winter, and on the contrary, in the case where the ambient temperature is low in winter and the like, it is made possible to suppress insufficient drying of the hair by increasing the temperature of the hot air more than in summer.

SUMMARY OF THE INVENTION

[0004] However, in the above-described conventional heated air blower, the temperature sensing unit is provided on a recessed portion formed on an outer side surface of a housing while being covered with a protection cover. Therefore, it has been apprehended that responsiveness of the temperature sensing unit to such a change of the ambient temperature is deteriorated. As an example, in the case of using the heated air blower, for example, after moving the heated air blower concerned from a place where the ambient temperature is high to a place where the ambient temperature is low, it takes some time for the temperature sensing unit to detect a new ambient temperature. Hence, it has been apprehended that hot air at an optimum temperature cannot be supplied for such a while.

[0005] In this connection, it is an object of the present invention to obtain a heated air blower capable of further enhancing the responsiveness of the temperature sensing unit to the change of the ambient temperature.

[0006] In order to achieve the foregoing object, a first feature of the present invention is a heated air blower summarized in including: a housing within which an air blower unit that discharges from an air blower port air sucked from an air inlet port, a heating unit for heating the air blown by the air blower unit, a hot air flow passage through which the heated air passes in an event of driving the heating unit, and a cold air flow passage through which original air passes, are provided; a temperature sensing unit for sensing an ambient temperature; and a control unit for controlling the heating unit in response to a detected temperature of the temperature sensing unit, wherein the temperature sensing unit is provided in the

cold air flow passage in the housing.

[0007] A second feature of the present invention is summarized in that the cold air flow passage includes: a first cold air flow passage that serves as a flow passage from the air inlet port to a flow diverting portion formed in the housing; and a second cold air flow passage that serves as a flow passage where the air flows from the flow diverting portion, detours around the heating unit, and is then discharged from the air blower port, wherein the temperature sensing unit is provided in the second cold air flow passage.

[0008] A third feature of the present invention is summarized in that a voltage dropping heating element for driving the air blower unit is provided on the air inlet port side of the temperature sensing unit or at a position substantially same as a position of the temperature sensing unit, and the temperature sensing unit is arranged to be shifted with respect to the heating element in an axial direction of the housing.

[0009] A fourth feature of the present invention is summarized in that the heating element is arranged in a polygonal shape when the air inlet port is viewed from front.

[0010] A fifth feature of the present invention is summarized in that the temperature sensing unit is provided on a circuit board.

[0011] A sixth feature of the present invention is summarized in that the temperature sensing unit is provided on a flow passage surface side of the circuit board, the flow passage surface side being a side at which the air passes.

[0012] A seventh feature of the present invention is summarized in that the control unit controls the heating unit such that an operating mode of the heating unit automatically switches alternately between a hot air mode and a cold air mode.

[0013] An eighth feature of the present invention is summarized in that the control unit controls the heating unit to change an operating time of the hot air mode and an operating time of the cold air mode in response to the detected temperature of the temperature sensing unit.

[0014] A ninth feature of the present invention is summarized in that the control unit controls by setting a threshold value in an event where the detected temperature by the temperature sensing unit rises to be higher than a threshold value in an event where the detected temperature drops.

[0015] In accordance with the present invention, the temperature sensing unit is provided in the cold air flow passage in the housing, and accordingly, responsiveness of the temperature sensing unit to the change of the ambient temperature can be further enhanced. That is to say, even in such a case of using the heated air blower after moving the heated air blower from a place where the ambient temperature is high to a place where the ambient temperature is low, air in such a new environment can be captured into the housing and can be applied to the temperature sensing unit provided in the cold air flow passage. Hence, the temperature sensing

unit becomes capable of detecting a temperature of the new environment more quickly, and as a result, becomes capable of supplying hot air of an optimum temperature more rapidly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a cross-sectional view of a hair dryer as a heated air blower according to a first embodiment of the present invention.

Fig. 2 is a cross-sectional view of a hair dryer as a heated air blower according to a second embodiment of the present invention.

Fig. 3 is a cross-sectional view showing arrangement of a heat generator of a hair dryer as a heated air blower according to a third embodiment of the present invention.

Fig. 4 is a cross-sectional view of a hair dryer as a heated air blower according to a fourth embodiment of the present invention.

Fig. 5 is a view showing a modification example of the hair dryer shown in Fig. 4.

Fig. 6 is an explanatory view showing, by graphs, energization to a heater unit of the heated air blower according to each of the first to fourth embodiments of the present invention, and a temperature change of hair following the energization.

Fig. 7 is an explanatory view showing a change of an ambient temperature of the heated air blower shown in Fig. 6 and changes of an operating time of a hot air mode and an operating time of a cold air mode following the change of the ambient temperature.

Fig. 8 is an explanatory view showing a first modification example of the graph shown in Fig. 7.

Fig. 9 is an explanatory view showing a second modification example of the graph shown in Fig. 7.

Fig. 10 is a cross-sectional view of a hair brush as a modification example of the heated air blower according to the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0017] A description is made below in detail of embodiments of the present invention while referring to the drawings.

[First Embodiment]

[0018] Fig. 1 is a view showing a first embodiment of a heated air blower of the present invention, and in this embodiment, shows a case where the present invention is applied to a hair dryer 1 as the heated air blower.

[0019] The hair dryer 1 of this embodiment is composed by including: a housing 3 in an inside of which a wind tunnel portion 2 is provided; and a grip portion 5

coupled, so as to be foldable, to a grip attachment portion 3a protruded from a lower side of a rear portion of the housing 3 while interposing a rotatable coupling portion 4 therebetween. Note that, when the description is made of this embodiment, an X-direction in Fig. 1 is defined as a right and left direction, a Y-direction therein is defined as a fore and aft direction, and a Z-direction therein is defined as an up and down direction.

[0020] As shown in Fig. 1, on a rear end portion (an upstream end portion of an air flow passage W: a right side of Fig. 1) of the housing 3, an air inlet port 2a covered with a filter 10 is provided, and meanwhile, on a front end portion (a downstream end portion of the air flow passage W: a left side of Fig. 1) thereof, an air blower port 2b is provided. In the wind tunnel portion 2 of the housing 3, a cylindrical inner cylinder 6 whose centerline is located on a centerline of the wind tunnel portion 2, is provided, and a heater unit (a heating unit) H is provided in an inside of this inner cylinder 6. Note that, in this embodiment, an inner circumferential surface portion of the housing 3 located frontward of the grip portion 5 is defined as the wind tunnel portion 2.

[0021] The air flow passage W includes: a hot air flow passage 31 through which heated air passes in the event when the heater unit H is driven; and a cold air flow passage 32 through which original air passes in that event. Moreover, in this embodiment, a flow diverting portion 12, which branches the air in this air flow passage W, is provided in the housing 3. And, a flow passage in which the air passes from the flow diverting portion 12 through the heater unit H located in the inside of the inner cylinder 6 to be discharged from a first discharge port 7 of the air blower port 2b is defined as a first flow passage W1, while a flow passage in which the air passes from the flow diverting portion 12 through an outside of the inner cylinder 6 to be, discharged from a second discharge port 8 of the air blower port 2b is defined as a second flow passage W2. Hence, the cold air flow passage 32 of this embodiment includes: a first cold air flow passage 32a that serves as a flow passage from the air inlet port 2a to the flow diverting portion 12; and a second cold air flow passage 32b that serves as a flow passage in which the air flows from the flow diverting portion 12, detours around the heater unit H, and is then discharged from the air blower port 2b.

[0022] The first discharge port 7 is arranged on a center portion of the housing 3 when viewed from the front, and the second discharge port 8 is arranged on a peripheral portion of the first discharge port 7. Here, in this embodiment, an opening area of the first discharge port 7 is made larger than an opening area of the second discharge port 8, such that, in terms of an air volume, more air is blown out from the first discharge port 7 than from the second discharge port 8. Note that, onto the front end portion of the housing 3, a nozzle 23 having a double cylinder structure with a main body of which being composed of an inner nozzle portion 21 and an outer nozzle portion 22.

[0023] In a rear portion of an inside of the housing 3, that is, on a somewhat upstream side of the inner cylinder 6, a flow control cylinder 11 is provided, in which a centerline of the flow control cylinder 11 is located on an extension of the centerline of the inner cylinder 6, and an opening 11a on an upstream end portion is gradually expanded toward the air inlet port 2a. And between a downstream end portion of the flow control cylinder 11 and the upstream end portion of the inner cylinder 6, the flow diverting portion 12 is provided, which communicates with an outside space of the inner cylinder 6 (that is, a space between the inner cylinder 6 and the wind tunnel portion 2).

[0024] In an inside of the flow control cylinder 11, an air blower unit 9 is arranged. The air blower unit 9 is composed of: a fan 9a; a motor 9b that rotates the fan 9a; a flow control vane 9c that supports this motor 9b in the inside of the flow control cylinder 11 and exerts a flow control function for the air passing therethrough; and the like. Then, the fan 9a is rotationally driven by the motor 9b, whereby an air flow is generated in the flow control cylinder 11, and the air sucked from the air inlet port 2a is discharged from the air blower port 2b.

[0025] Moreover, in the housing 3, an ion emitting unit 25 is provided. In this embodiment, this ion emitting unit 25 is composed of: an electrostatic atomizer; an ion jetting port 27 that jets electrostatic atomized water generated by the electrostatic atomizer 26. In this embodiment, the ion emitting unit 25 is provided in a space between the inner cylinder 6 and the wind tunnel portion 2, thus making it possible to emit the electrostatic atomized water from the ion jetting port 27 with a part of the air flowing through the second flow passage W2.

[0026] The electrostatic atomizer 26 is a device that generates the electrostatic atomized water by using, as a raw material, water droplets condensed on a constituent member (not shown: a Peltier element, a discharge electrode, an opposite pole plate and the like) thereof in such a manner that a high voltage generated in a high voltage generator 28 provided in the rear portion of the housing 3 is applied to the constituent member.

[0027] The ion jetting port 27 is provided so as to be open on a front surface of an upper portion of the housing 3. From the ion jetting port 27, the electrostatic atomized water is emitted forward, whereby electrons and moisture can be supplied to the hair, and a glossy and moist appearance can be given to the hair.

[0028] On a center portion of a front side of the grip portion 5, a switch unit S is provided to be switchable to a plurality of stages in the up and down direction. By this switch unit S, the motor 9b and the heater unit H are turned on/off, the air volume is controlled, and so on. Moreover, a cord C to be connected to a power supply is attached to a lower end of the grip portion 5.

[0029] Moreover, in the housing 3, a heater wire 30 (a heating element) that drops a voltage to be applied through such a power supply cord C is provided in order to drive the motor 9b of the air blower unit 9. That is to

say, in this embodiment, for the purpose of realizing weight reduction, downsizing and the like of the hair dryer 1, the motor 9b is used, in which a voltage to be actually inputted is lower than the voltage to be applied through the power supply cord C. And, for example 80% of such an input voltage is consumed in the heater wire 30, and the motor 9b is driven by remaining 20% of the voltage concerned. Meanwhile, to the heater unit H, 100% of the voltage is applied as it is.

[0030] Note that, preferably a resistor such as the heater wire 30, which is accompanied with heat generation, is used as this heating element. Use of the heater wire 30 as shown in this embodiment is suitable since an advantage is brought in terms of cost and the heater wire 30 can be arranged in the space of the housing 3 without occupying much of the space. Note that, in this embodiment, the heating element is composed by using the heater wire 30 from viewpoints of the size and the cost; however, for example, a transformer, a block-like resistor and the like, which are accompanied with the heat generation, may be used.

[0031] Moreover, the hair dryer 1 of this embodiment includes a temperature sensing unit 40 sensing an ambient temperature, and controls a temperature of the hot air in response to the ambient temperature detected by this temperature sensing unit 40. And, for example, in the case where the ambient temperature is high in summer and the like, it is made possible to suppress over-drying of the hair by lowering the temperature of the hot air more than in winter, and on the contrary, in the case where the ambient temperature is low in winter and the like, it is made possible to suppress insufficient drying of the hair by increasing the temperature of the hot air more than in summer.

[0032] Here, in this embodiment, this temperature sensing unit 40 is provided in the cold air flow passage 32 in the housing 3. Specifically, in this embodiment, as shown in FIG. 1, the temperature sensing unit 40 is arranged in the first cold air flow passage 32a that serves as the flow passage from the air inlet port 2a to the flow diverting portion 12 in the cold air flow passage 32 mentioned above, and the temperature sensing unit 40 is fixed to a support portion (not shown) provided in the vicinity of the air inlet port 2a.

[0033] As described above, in the hair dryer 1 of this embodiment, the temperature sensing unit 40 is provided in the cold air flow passage 32 in the housing 3, and accordingly, responsiveness of the temperature sensing unit 40 to a change of the ambient temperature can be enhanced. That is to say, even in the case of using the hair dryer 1 after moving the hair dryer 1 from a place where the ambient temperature is high to a place where the ambient temperature is low, air in such a new environment can be captured into the housing 3 and can be applied to the temperature sensing unit 40 provided in the cold air flow passage 32. Hence, the temperature sensing unit 40 becomes capable of detecting the temperature of the new environment more quickly based on

the air concerned, and as a result, becomes capable of supplying hot air of an optimum temperature more rapidly.

[0034] Moreover, in this embodiment, since the air of the new ambient temperature can be applied to the temperature sensing unit 40 as described above, there is an advantage that the hair dryer 1 can instantaneously respond to and follow the change of the ambient temperature even in the case where the ambient temperature is changed during use of the hair dryer 1 concerned.

[Second Embodiment]

[0035] Next, a description is made of a second embodiment of the present invention with reference to the drawing. Fig. 2 is a view showing a hair dryer as a heated air blower according to this embodiment. Note that, when the description is made of this embodiment, the same reference numerals are assigned to the same constituent portions as those in the hair dryer 1 of the above-described first embodiment, and a duplicate description is omitted.

[0036] Such a hair dryer 1A of this embodiment is different from the hair dryer 1 of the first embodiment mainly in that the temperature sensing unit 40 is provided in the second cold air flow passage 32b in the cold air flow passage 32.

[0037] As mentioned above, also in the hair dryer 1A of this embodiment, the cold air flow passage 32 includes: the first cold air flow passage 32a from the air inlet port 2a to the flow diverting portion 12; and the second cold air flow passage 32b in which the air flows from the flow diverting portion 12, detours around the heater unit H, and is then discharged from the air blower port 2b. Then, the temperature sensing unit 40 of this embodiment is provided on an outer circumferential side of the inner cylinder 6, which is equivalent to an inside of the second cold air flow passage 32b, by being fixed to a support portion (not shown).

[0038] As described above, also in the hair dryer 1A of this embodiment, similar functions and effects to those of the first embodiment can be obtained.

[0039] Moreover, in this embodiment, the temperature sensing unit 40 is provided in the second cold air flow passage 32b in which the air flows from the flow diverting portion 12, detours around the heater unit H, and is then discharged from the air blower port 2b. In other words, the temperature sensing unit 40 is arranged away from the air inlet port 2a in the inside of the housing 3. Therefore, for example, in the event where the hair dryer 1 is dropped, and so on, reliability of the hair dryer 1A can be enhanced and a commercial value thereof can be thereby enhanced since the temperature sensing unit 40 can be arranged on the center side of the housing, which is a safer spot.

[0040] Note that, in this embodiment, since the heater unit H is arranged in the inside of the inner cylinder 6, the cold air flow passage 32 (the second cold air flow

passage 32b) is provided on the outside of the inner cylinder 6. However, a configuration of the hair dryer 1A is not limited to this, and for example, in the case of such a configuration in which the heater unit H is arranged on the outside of the inner cylinder 6, the cold air flow passage 32 (the second cold air flow passage 32b) is provided in the inside of the inner cylinder 6.

[0041] Moreover, in this embodiment, in a similar way to the first embodiment, the flow diverting portion 12 is provided at substantially the same axial position in the fore and aft direction Y as that of the grip portion 5 (the grip attachment portion 3a); however, the flow diverting portion 12 may be provided on an upstream side of the grip portion 5 (the grip attachment portion 3a), or may be provided on a downstream side thereof.

[Third Embodiment]

[0042] Next, a description is made of a third embodiment of the present invention with reference to the drawing. FIG. 3 is a view showing a hair dryer as a heated air blower according to this embodiment. Note that, when the description is made of this embodiment, the same reference numerals are assigned to the same constituent portions as those of the hair dryers 1 and 1A of the first and second embodiment, and a duplicate description is omitted.

[0043] Such a hair dryer 1B of this embodiment is different from the hair dryers 1 and 1A of the first and second embodiments mainly in that the voltage dropping heater wire (heating element) 30 for driving the air blower unit 9 is provided on the upstream side (air inlet port 2a side) of the temperature sensing unit 40, and that the temperature sensing unit 40 is arranged so as to be shifted with respect to this heater wire 30 in the fore and aft direction Y serving as an axis direction of the housing 3.

[0044] As shown in Fig. 3, the heater wire 30 of this embodiment is arranged in a rhombus shape (a polygonal shape) in the cold air flow passage 32 when the air inlet port 2a is viewed from the front. As mentioned above, the heater wire 30 is a resistor accompanied with the heat generation. Accordingly, the air, which passes from the air inlet port 2a through this heater wire 30 and flows to the downstream side, is warmed to some extent by contacting the heater wire 30. Accordingly, in this embodiment, the temperature sensing unit 40 is arranged so as to be shifted with respect to the heater wire 30 in the fore and aft direction Y serving as the axis direction of the housing 3, whereby it is made possible to suppress the warmed air from contacting the temperature sensing unit 40 to some extent.

[0045] Moreover, in this embodiment, the temperature sensing unit 40 is arranged at a position between vertices of the rhombus shape of the heater wire 30, the position being apart from the heater wire 30.

[0046] As described above, also in the hair dryer 1B of this embodiment, similar functions and effects to those of the first and second embodiments can be obtained.

[0047] Moreover, in this embodiment, the temperature sensing unit 40 is arranged so as to be shifted with respect to the heater wire (heating element) 30 in the fore and aft direction Y serving as the axis direction of the housing 3. Therefore, the air, which passes through the heater wire 30 and is warmed to some extent, can be suppressed from contacting the temperature sensing unit 40, and thus, sensing accuracy for the ambient temperature can be enhanced.

[0048] Furthermore, in this embodiment, the heater wire (heating element) 30 is arranged in the rhombus shape (the polygonal shape) when the air inlet port 2a is viewed from the front. Therefore, it becomes possible to arrange the temperature sensing unit 40 at the position between the adjacent vertices of the heater wire 30, and thus, the temperature sensing unit 40 can be arranged farther away from the heater wire 30 in comparison with a general configuration in which the heater wire 30 is arranged in a circular arc shape.

[0049] Note that, though the heater wire 30 is arranged in the rhombus shape in this embodiment, the shape of the heater wire 30 is not limited to this, and for example, the heater wire 30 may be arranged in the circular arc shape or a polygonal shape other than the rhombus shape. However, desirably, the heater wire 30 is arranged uniformly along a circumferential direction of the housing 3. This is because, in such a way, a temperature of the cold air to be discharged from the air blower port 2b (in particular, the second discharge port 8) can be made uniform in the circumferential direction. By doing so, an unpleasant feeling such as that the temperature of the cold air seems high at only a part in the circumferential direction can be suppressed from being given to the user.

[0050] Moreover, the temperature sensing unit 40 may be provided at substantially the same position as that of the heater wire 30 in the fore and aft direction Y serving as the axis direction of the housing 3. As a configuration in this case, for example, the heater wire 30 can be provided in a U-shape in which a part of a quadrangular shape (or the circular arc shape) is chipped, and the temperature sensing unit 40 can be arranged in a region of the heater wire 30, which is thus recessed.

[Fourth Embodiment]

[0051] Next, a description is made of a fourth embodiment of the present invention with reference to the drawing. Fig. 4 is a view showing a hair dryer as a heated air blower according to this embodiment. Note that, when the description is made of this embodiment, the same reference numerals are assigned to the same constituent portions as those of the hair dryers 1, 1A and 1B of the first to third embodiments, and a duplicate description is omitted.

[0052] Such a hair dryer 1C of this embodiment is different from the hair dryers 1, 1A and 1B of the first to third embodiments mainly in that the temperature sens-

ing unit 40 is provided on the circuit board 45.

[0053] Specifically, as shown in Fig. 4, in this embodiment, the temperature sensing unit 40 is fixed onto the circuit board 45 on which a control unit 35 is provided integrally therewith, and at least a spot of this circuit board 45, on which the temperature sensing unit 40 is provided, is arranged in the cold air flow passage 32.

[0054] As described above, also in the hair dryer 1C of this embodiment, similar functions and effects to those of the first to third embodiments can be obtained.

[0055] Moreover, in this embodiment, the temperature sensing unit 40 is provided on the circuit board 45. Therefore, it becomes possible to stably hold the temperature sensing unit 40, and for example, in the event where the hair dryer 1C is dropped, and so on, safety thereof can be further enhanced.

[0056] Note that, in this embodiment, the temperature sensing unit 40 is mounted on the circuit board 45 on which the control unit 35 is provided integrally therewith; however, a configuration of the hair dryer 1C is not limited to this, and for example, the temperature sensing unit 40 can be provided on a circuit board dedicated for the temperature sensing unit 40, or the temperature sensing unit 40 can be provided on a circuit board on which the ion emitting unit 25 is provided.

[0057] Next, a description is made of a modification example of the hair dryer 1C according to this fourth embodiment with reference to Fig. 5.

[0058] The hair dryer 1C of this modification example is different from the hair dryer 1C of the fourth embodiment mainly in that the temperature sensing unit 40 is provided on a flow passage surface side of the circuit board 45, on which the air passes. That is to say, in this modification example, the temperature sensing unit 40 is provided on a front surface side 45a of the circuit board 45, which serves as the flow passage surface side, and a back surface side thereof is fixed to an inner side surface of the housing 3.

[0059] As described above, also in the hair dryer 1C of this modification example, similar effects and functions to those of the fourth embodiment can be obtained.

[0060] Moreover, in this modification example, the temperature sensing unit 40 is provided on the flow passage surface side of the circuit board 45, on which the air passes. Therefore, the air captured from the air inlet port 2a can be surely applied to the temperature sensing unit 40, and accordingly, the responsiveness thereof to the change of the ambient temperature can be further enhanced.

[0061] Next, a description is made of the control unit 35 of each of the hair dryers 1, 1A, 1B and 1C. Fig. 6 is an explanatory view showing, by graphs, energization to the heater unit H of each of the hair dryers 1, 1A, 1B and 1C as the heated air blowers according to the first to fourth embodiments, and a temperature change of the hair following the energization.

[0062] In each of the hair dryers 1 to 1C of the respective embodiments, preferably, the control unit 35 (refer

to Fig. 4) controls the heater unit H to automatically switch an operating mode thereof alternately between a hot air mode and a cold air mode. Specifically, as shown in the explanatory view of Fig. 6, in each of the above-described embodiments, the energization to the heater unit H is performed intermittently at an interval of approximately three seconds to ten seconds. In such a way, since there is a type of keratin as a component of the hair, in which a glass transition point is approximately 50°C, a temperature that repeatedly rises and drops from the glass transition point can be given to the hair.

[0063] As described above, in each of the embodiments, the operating mode is automatically switched alternately between the hot air mode and the cold air mode, and accordingly, a switching operation of the user by the switch unit S becomes unnecessary, and the hair driers 1 to 1C with good usability can be provided.

[0064] Moreover, in each of the embodiments, the hot air of approximately 60°C or more, at which a straightening effect for the hair is enhanced, and the cold air of 40°C or less, can be repeatedly generated with accuracy. Accordingly, irrespective of personal skills of those who may use the hair dryer, the straightening effect and a gloss giving effect following the straightening effect can be given to the hair. Moreover, there is also an advantage that a pleasant massage feeling, which is brought by the hot air and the cold air, can be given to a scalp.

[0065] Note that, in each of the embodiments, in order that the temperature of the hair can repeat a temperature cycle in which an upper value is approximately 70°C and a lower value is approximately 30°C, between which a temperature difference is denoted by symbol T, an energization time to the heater unit H is set at between three seconds and ten seconds, however, the energization time is not limited to this. Moreover, a control method for the heater unit H is not limited to the turning on/off of the heater unit H, and for example, such a method of performing the energization only in a part of the cycle may be used by making use of a zero cross of a microcomputer.

[0066] Moreover, as in modification examples shown in Fig. 7 and Fig. 8, preferably, the control unit 35 controls the heater unit H to change the operating time of the hot air mode and the operating time of the cold air mode in response to the temperature detected by the temperature sensing unit 40.

[0067] That is to say, in the configuration in which the energization to the heater unit H is performed intermittently and the operating mode is switched between the hot air mode and the cold air mode, for example, in the case where the ambient temperature is changed to a large extent in summer and winter, it is apprehended that the air (in particular, the hot air) having the above-mentioned optimum temperature for the hair may not be supplied if the operating time of the hot air mode and the operating time of the cold air mode are set as usual. Accordingly, the operating time of the hot air mode and the operating time of the cold air mode are changed in re-

sponse to the ambient temperature detected by the temperature sensing unit 40, whereby it is made possible to supply the air of the optimum temperature for the hair.

[0068] For example, in the modification example shown in Fig. 7, in the case where the ambient temperature is 18°C, the operating time of the cold air mode is set at approximately five seconds, and the operating time of the hot air mode is set at approximately seven seconds, and in the case where the ambient temperature is approximately 28°C, the operating time of the cold air mode is set at approximately seven seconds, and the operating time of the hot air mode is set at approximately five seconds.

[0069] As described above, the operating time of the hot air mode and the operating time of the cold air mode are flexibly changed in response to the ambient temperature, whereby, for example, the overdrying of the hair in summer can be suppressed, and in addition, the insufficient drying of the hair in winter can be suppressed. Note that, besides such a method of constantly changing the operating time of the hot air mode and the operating time of the cold air mode in proportion to the ambient temperature as in the modification example shown in Fig. 7, a step-by-step change of each of the operating times, which has at least two stages or more of changes, can also be performed as in the modification example shown in Fig. 8.

[0070] Moreover, as shown in Fig. 9, preferably, the control unit 35 controls a threshold value in the event where such a detected temperature by the temperature sensing unit 40 rises so that the threshold value concerned can be set higher than a threshold value in the event where the detected temperature drops.

[0071] That is to say, in the case where the ambient temperature detected by the temperature detection unit 40 reaches the threshold value at which the operating time of the hot air mode and the operating time of the cold air mode are changed, a threshold value of the ambient temperature for lengthening the operating time of the hot air mode is set lower than a threshold value of the ambient temperature for shortening the operating time of the hot air mode. On the contrary, though not shown in Fig. 9, a threshold value of the ambient temperature for lengthening an operating time of the cold air mode may be set higher than a threshold value of the ambient temperature for shortening the cold air mode. In such a way, also in the operation at the ambient temperature approximate to the threshold value at which the operating time of the hot air mode and the operating time of the cold air mode are changed, the operating time of the hot air mode and the operating time of the cold air mode are not changed frequently, and the commercial value can be suppressed from being lowered.

[0072] The description has been made above of the preferred embodiments of the present invention; however, the present invention is not limited to the above-described embodiments, and is modifiable in various ways.

[0073] For example, in the respective embodiments

described above, the present invention is applied to the hair dryers 1 to 1C as the heated air blowers; however, for example, as in a modification example shown in Fig. 10, the present invention may be applied to a hair brush 1D in which such a housing 3 having a brush B formed thereon is attached to the grip portion 5. In this case, the temperature sensing unit may be provided in any place as long as the plate is in the inside of the cold air flow passage 32.

[0074] Moreover, in each of the embodiments described above, the electrostatic atomized water is generated in the ion emitting unit; however, for example, fine metal particles may be generated by a fine metal particle generating device. Alternatively, negative ions may be generated by an ion generating block.

Claims

1. A heated air blower comprising:

a housing (3) within which an air blower unit (9) that discharges from an air blower port (2b) air sucked from an air inlet port (2a), a heating unit (H) for heating the air blown by the air blower unit (9), a hot air flow passage (31) through which the heated air passes in an event of driving the heating unit (H), and a cold air flow passage (32) through which original air passes, are provided;
a temperature sensing unit (40) for sensing an ambient temperature; and
a control unit (35) for controlling the heating unit (H) in response to a detected temperature of the temperature sensing unit (40),
wherein the temperature sensing unit (40) is provided in the cold air flow passage (32) in the housing (3).

2. The heated air blower according to claim 1,
wherein the cold air flow passage (32) includes: a first cold air flow passage (32a) that serves as a flow passage from the air inlet port (2a) to a flow diverting portion (12) formed in the housing (3); and a second cold air flow passage (32b) that serves as a flow passage where the air flows from the flow diverting portion (12), detours around the heating unit (H), and is then discharged from the air blower port (2b),
wherein the temperature sensing unit (40) is provided in the second cold air flow passage (32b).

3. The heated air blower according to either one of claims 1 and 2,
wherein a voltage dropping heating element (30) for driving the air blower unit (9) is provided on the air inlet port (2a) side of the temperature sensing unit (40) or at a position substantially same as a position of the temperature sensing unit (40), and

the temperature sensing unit (40) is arranged to be shifted with respect to the heating element (30) in an axial direction (Y) of the housing (3).

4. The heated air blower according to claim 3, wherein the heating element (30) is arranged in a polygonal shape when the air inlet port (2a) is viewed from front.

5. The heated air blower according to either one of claims 1 and 2, wherein the temperature sensing unit (40) is provided on a circuit board (45).

6. The heated air blower according to claim 5, wherein the temperature sensing unit (40) is provided on a flow passage surface (45a) side of the circuit board (45), the flow passage surface (45a) side being a side at which the air passes.

7. The heated air blower according to either one of claims 1 and 2, wherein the control unit (35) controls the heating unit (H) such that an operating mode of the heating unit (H) automatically switches alternately between a hot air mode and a cold air mode.

8. The heated air blower according to claim 7, wherein the control unit (35) controls the heating unit (H) to change an operating time of the hot air mode and an operating time of the cold air mode in response to the detected temperature of the temperature sensing unit (40).

9. The heated air blower according to claim 8, wherein the control unit (35) controls by setting a threshold value in an event where the detected temperature by the temperature sensing unit (40) rises to be higher than a threshold value in an event where the detected temperature drops.

FIG. 1

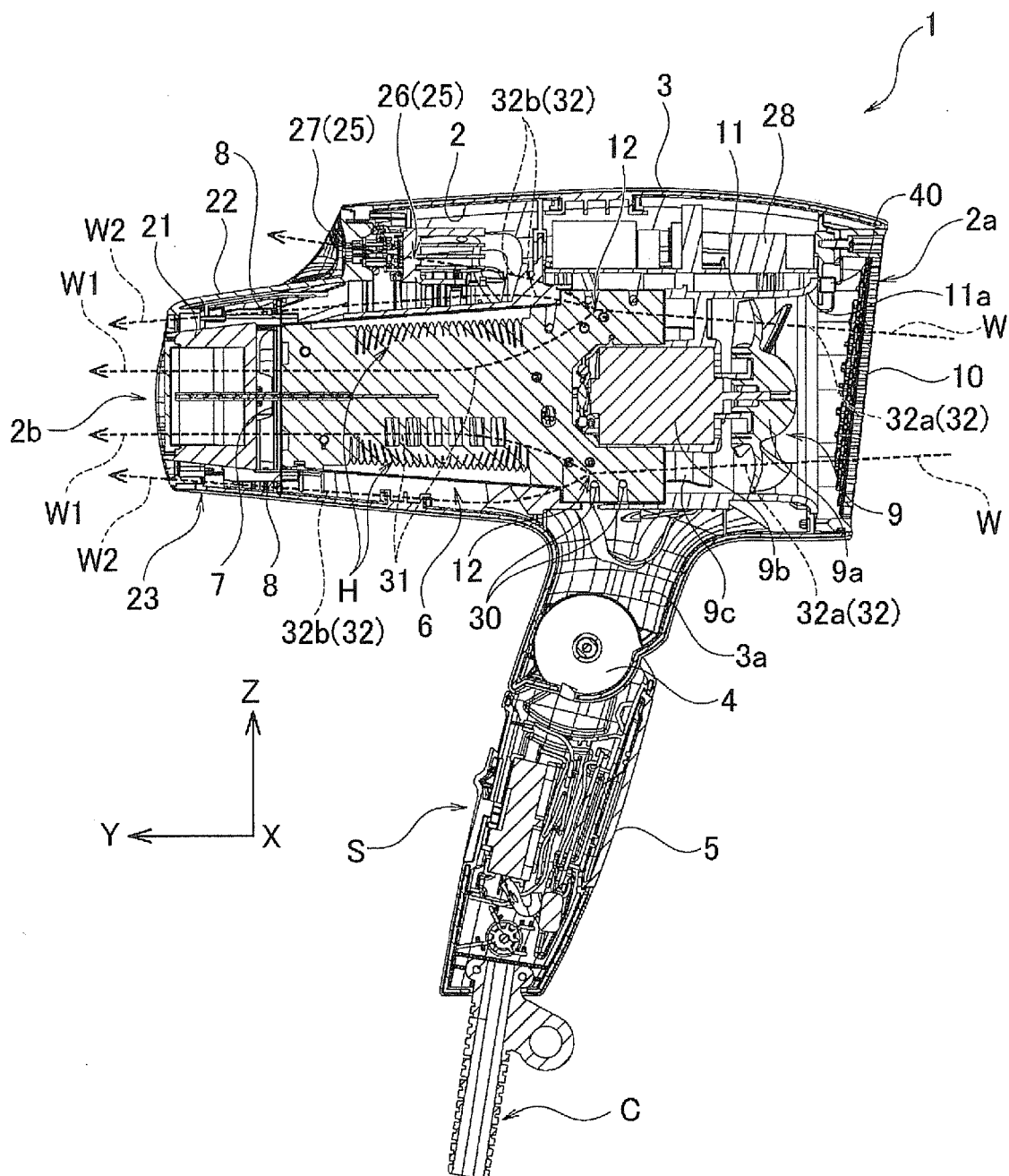


FIG. 2

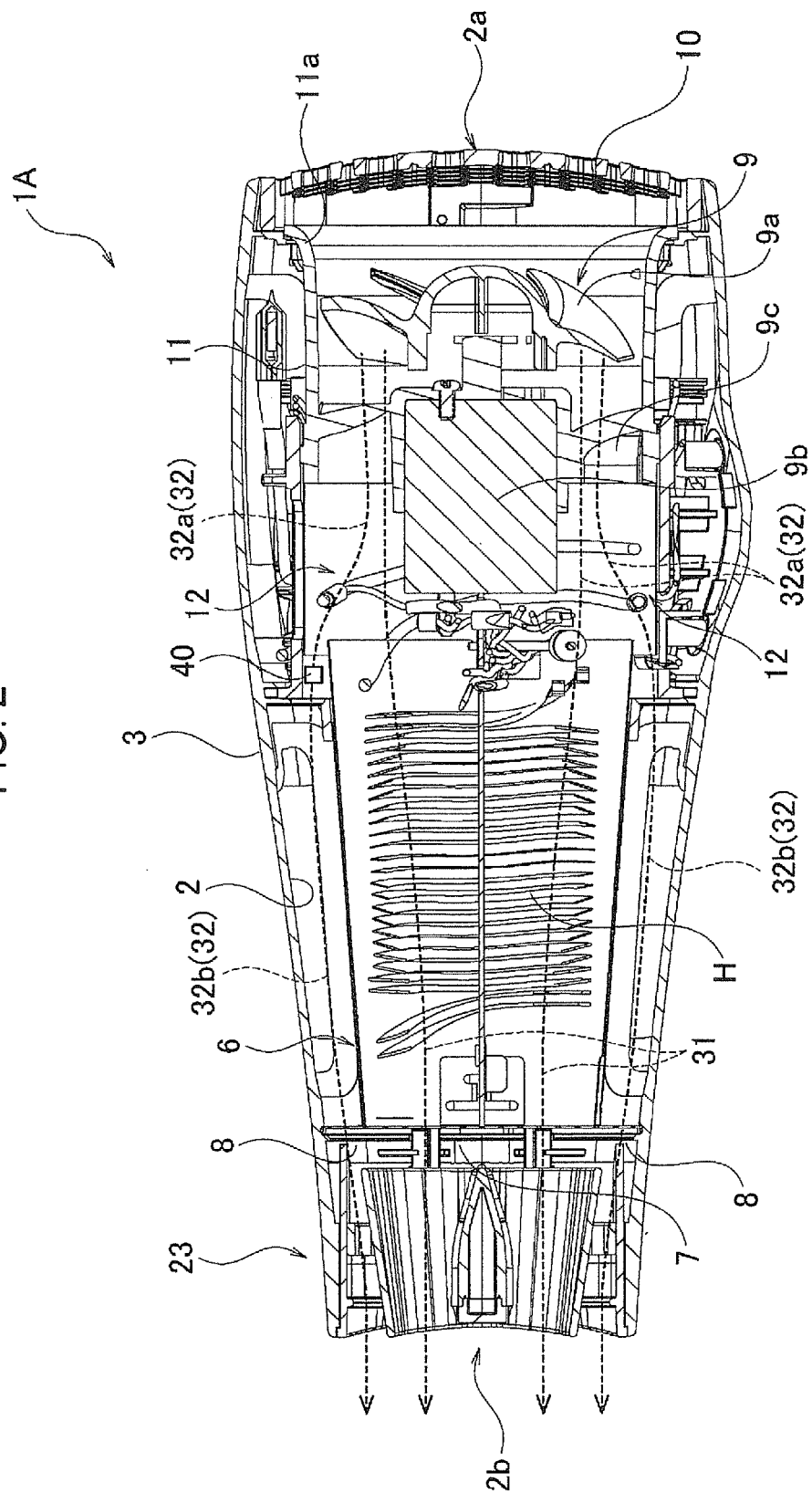


FIG. 3

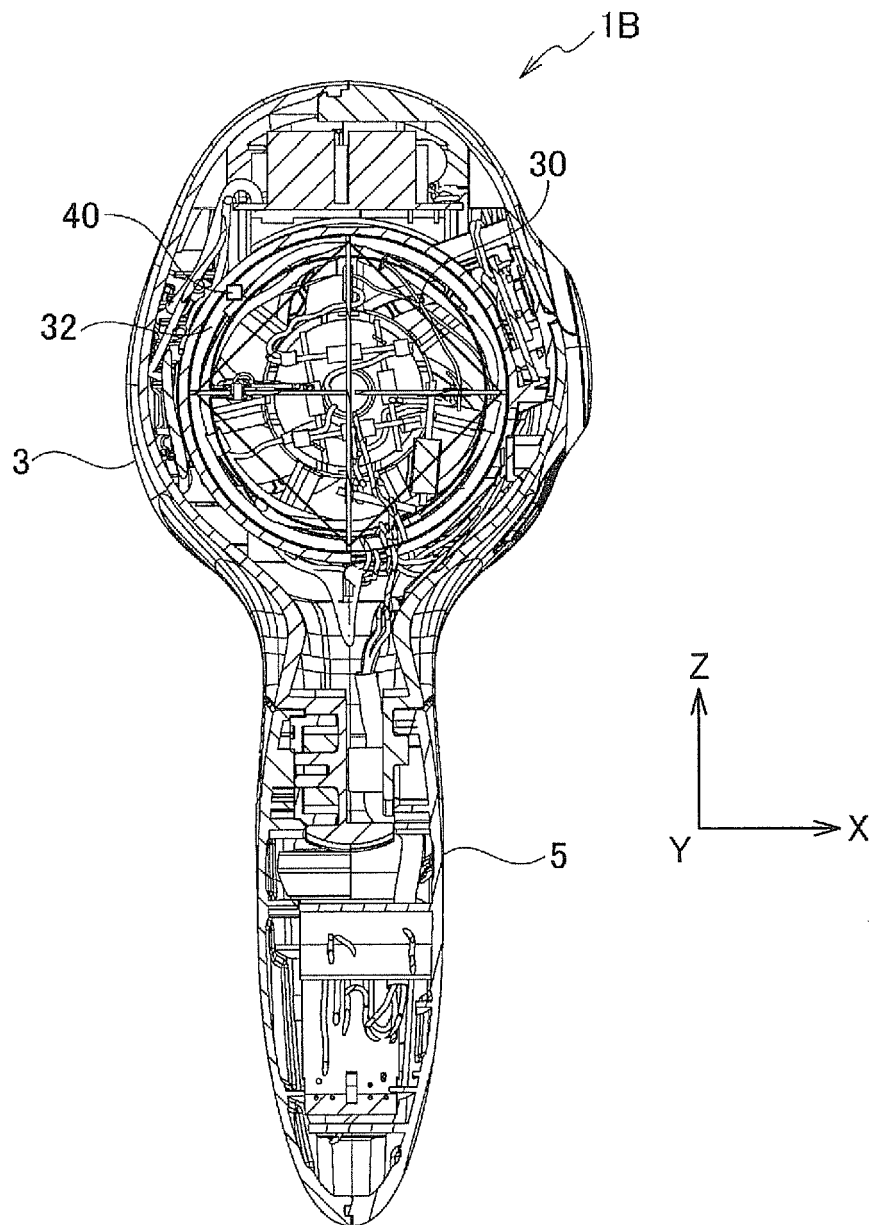


FIG. 4

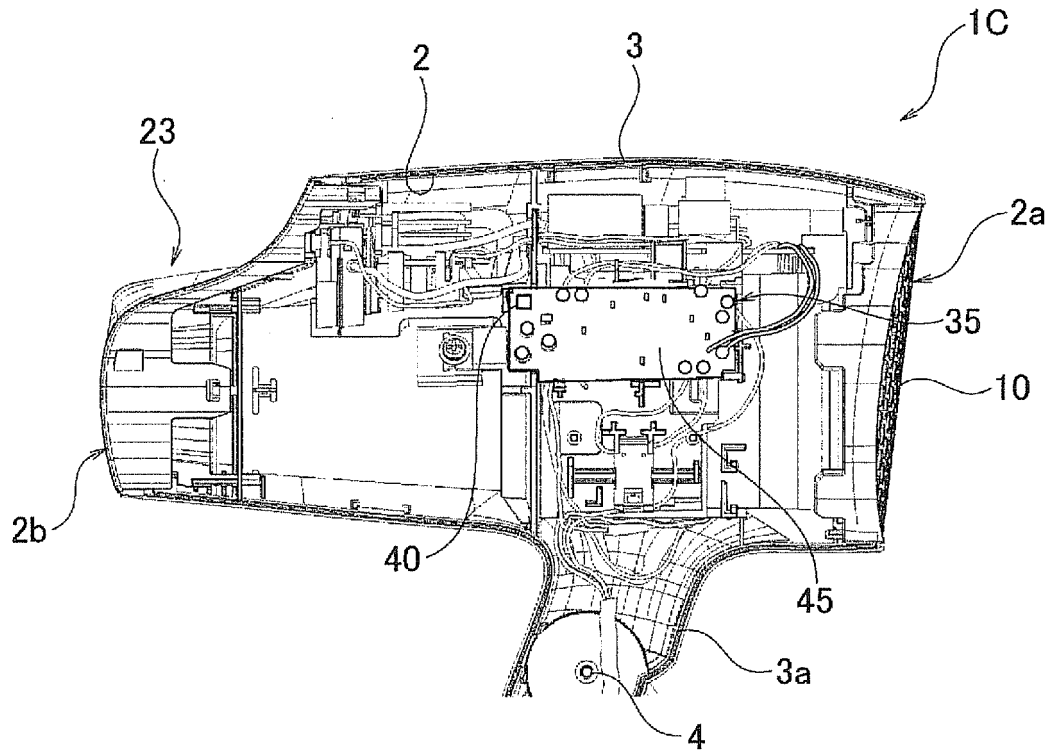


FIG. 5

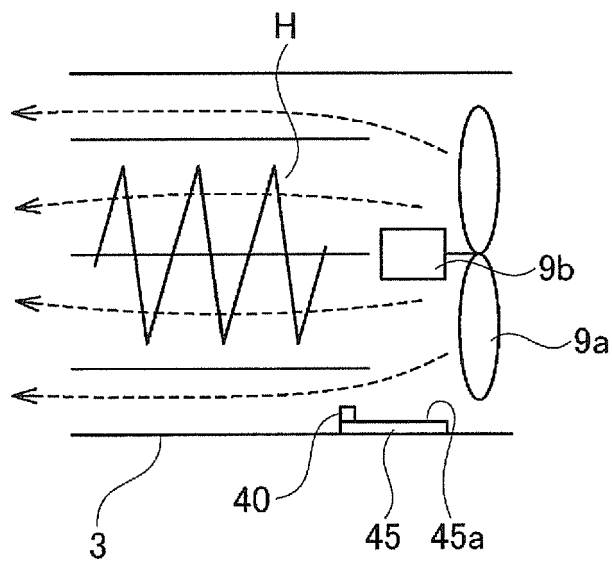


FIG. 6

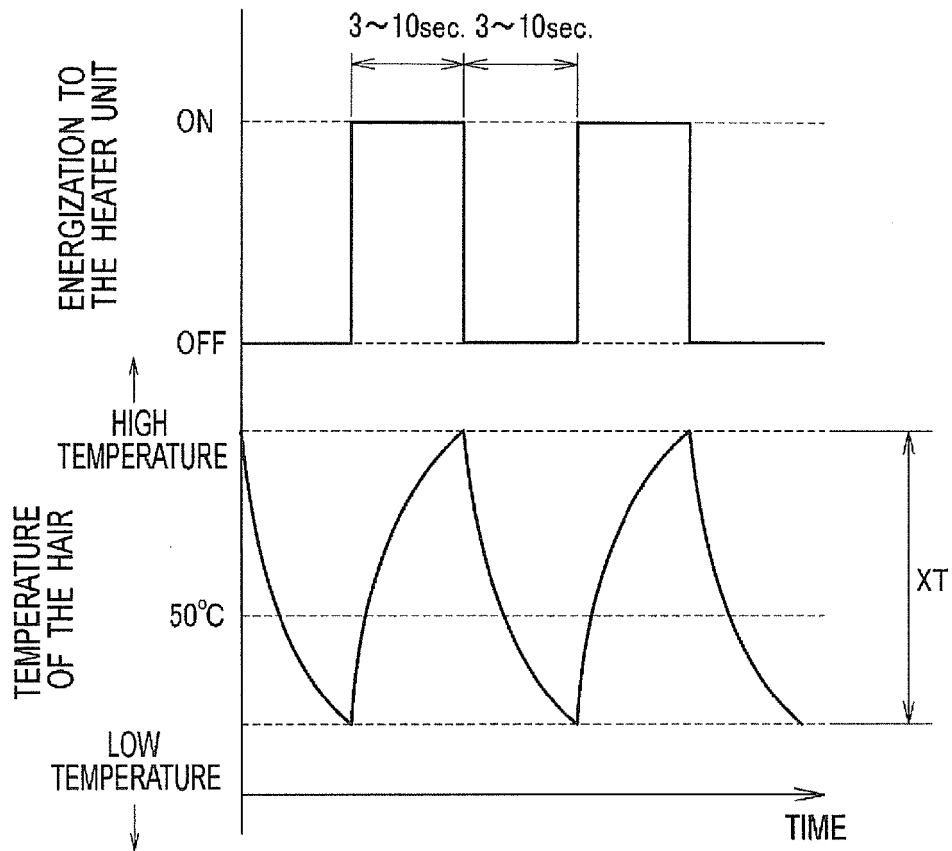


FIG. 7

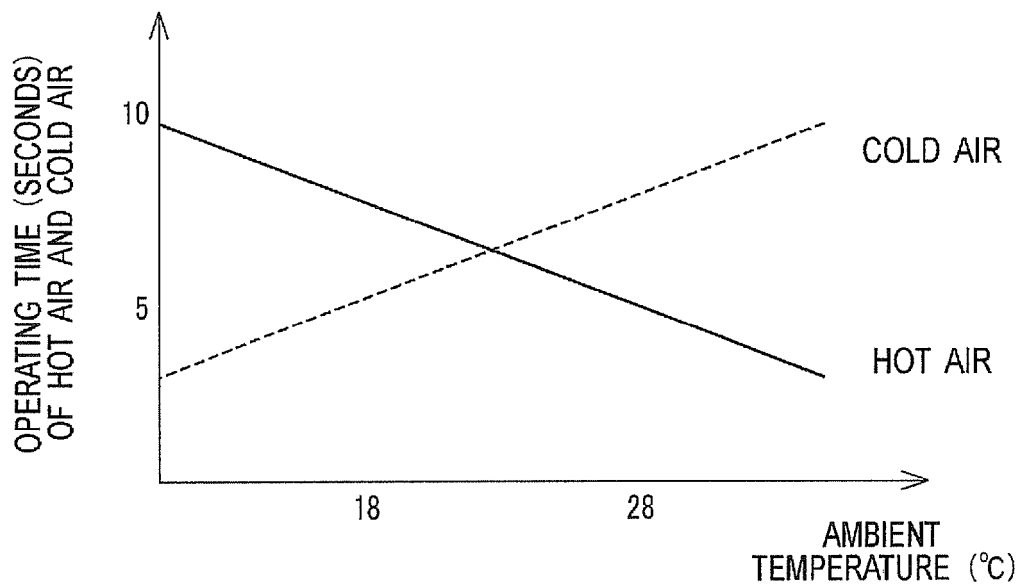


FIG. 8

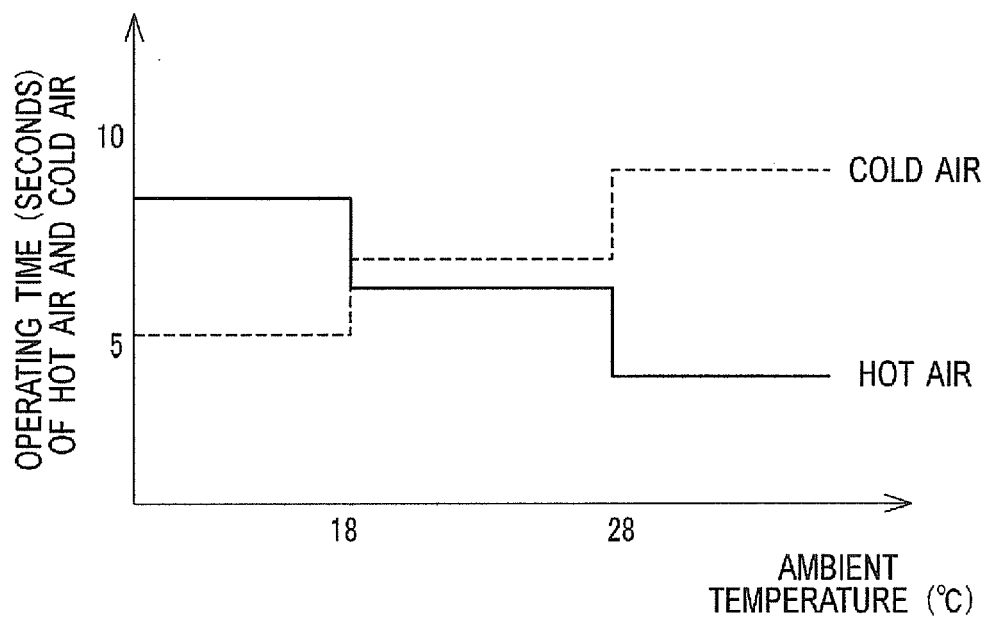


FIG. 9

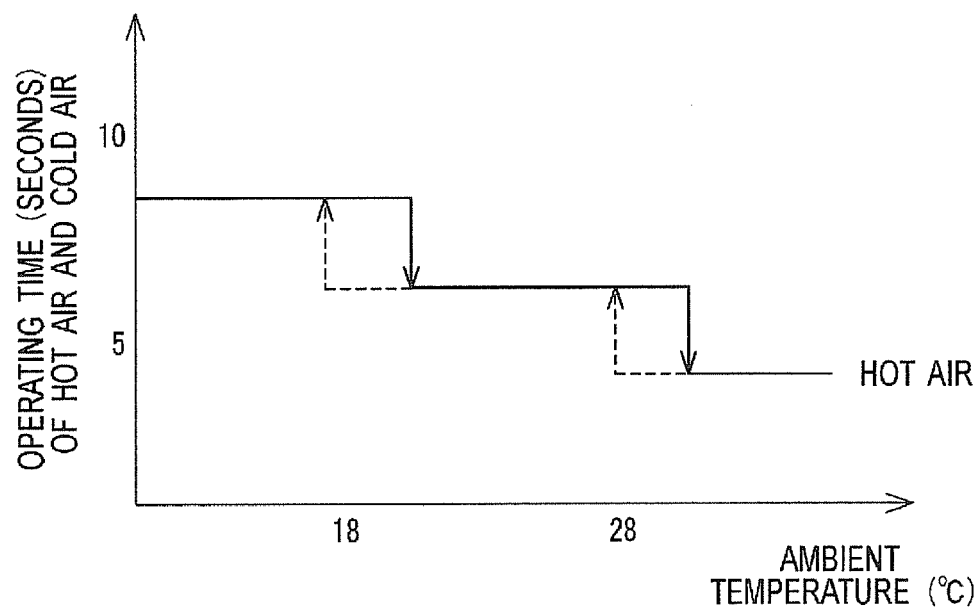
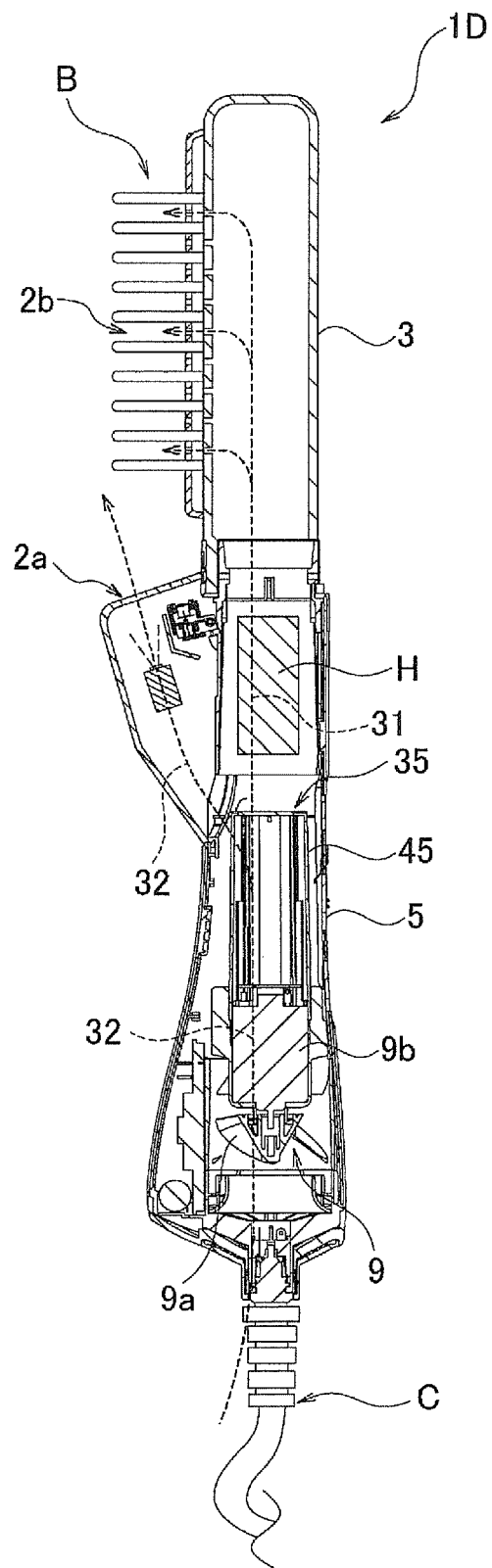


FIG. 10





EUROPEAN SEARCH REPORT

Application Number
EP 12 18 2099

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			A45D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 November 2012	Examiner Nicolás, Carlos
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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