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(71) Applicant: **Zhejiang Yueli Electrical Co., Ltd**
Ningbo Zehjiang (CN)

(72) Inventor: **LI, Longxuan**
Ningbo (CN)

(74) Representative: **Loyer & Abello**
9, rue Anatole de la Forge
75017 Paris (FR)

(54) A TOUCH HAIR DRIER

(57) The present invention discloses a touch hair drier, comprising: a housing supporting a power device (3) and a heating device (4), and a touch handle (2) connecting the housing; the power device (3) and the heating device (4) are powered by an energized circuit (6), and the circuit (6) is provided with a control switch element (7) configured to control the operation of the power device (3) and the heating device (4). During the operation of the hair drier, only if the collecting unit collects any holding power exerted on the touch handle, the control switch element (7) is in the conducting state, and then the power device (3) and the heating device (4) are initiated. Therefore, the touch hair drier in the present invention is designed to prevent from fires caused by the heat generated from the heating device which is on operation for a long continuous time. Hence, the touch hair drier ensures high safety.

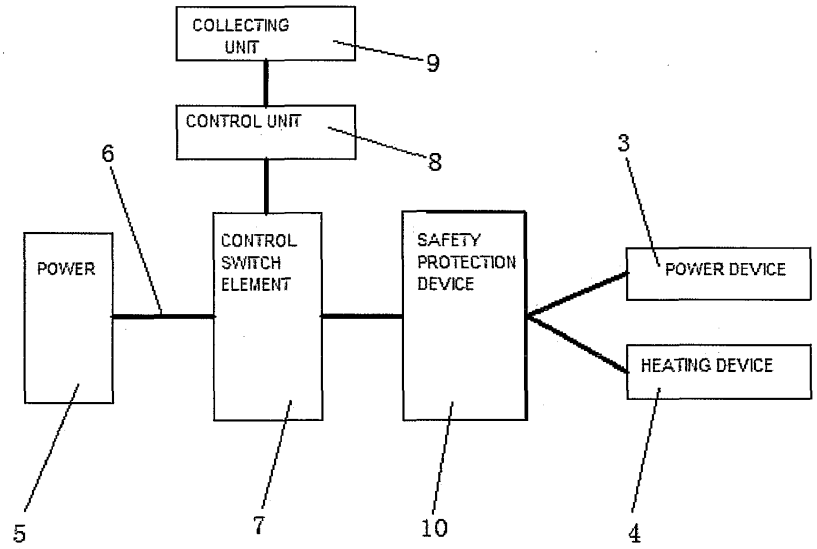

Figure 4

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to hair driers, more specifically, to a touch hair drier.

2. Description of the Related Art

[0002] A hair drier is mainly used for hair treatment and hair-drying, however, it is being widely employed in laboratory, physiotherapy rooms, industrial production and in art design as well for the application of partially drying, heating and physiotherapy. Hair driers are substantially composed of three major components: motors and blades thereof, heating elements and electric-control switch elements, even with huge differences between various hair driers in terms of sizes, types and appearances. A micro hair drier is formed by the combination of motors, blades and housing. Hair driers are directly driven by motors of which rotors rotate blades. While the blades are rotating, air is sucked in from the inlets, thus centrifugal air flow is formed, then the air flow is transferred out by the front mouths of the hair driers. During the air passing through the hair drier, if the heating wires on the heating supports in the mouths are heated, the wind turns to heated wind. Otherwise, it is cold wind. Therefore, the purposes of hair drying and hair treatment are achieved.

[0003] The general power switches of said hair driers are normally arranged on the handle. And after the switches are pressed, blades and heating elements turn to be power on and in operation. During the use of the hair drier, if the user stops using the hair drier and forgets to turn off the power and leaves it for a long time, the fire disaster caused by the combustible near the heat may occur.

[0004] To solve the above safety issue, Chinese Patent (CN 203493012 U) disclosed a smart outage safe hair drier. As shown in Figure 1, it comprises a Shell Body 101. An inner circuit is arranged in Shell Body 101. A Handle 102 is arranged below Shell Body 101. An Electric Wire 103 is arranged below Handle 102. A Plug 104 is arranged at the tail end of Electric Wire 103. A First Switch 105 and a Second Switch 106 are arranged on the handle. A First Microswitch 107 and a Second Microswitch 108 are arranged on the two sides of Shell Body 101 respectively. The electric hair drier obtains power and works only when the two relevant Microswitches 107 and 108 are not in contact with each other, only when the electric hair drier is held by hands, the electric hair drier can work.

[0005] Although the above hair drier solves the safety issue of the exiting hair driers to some extent, if the drier is put in a lumpy surface of an object and thus the microswitches are therefore not touched with each other, the safety issue may still be occurred.

SUMMARY OF THE INVENTION

[0006] To solve the technical problems in the existing hair drier, the present invention provides a touch hair drier having high security.

[0007] In order to achieve the above purposes, the present invention adopts the following technical solutions:

A touch hair drier, comprising: a housing supporting a power device and a heating device; and a touch handle connecting the housing; wherein, the power device and the heating device are successively arranged from the inlet of the housing to the outlet of the housing, the power device and the heating device are powered by an energized circuit, and the circuit is provided with a control switch element configured to control the operation of the power device and the heating device; the touch handle is provided with a control unit configured to control the on-off of the control switch element, and the touch handle is provided with a collecting unit for outputting touch signals to the control unit.

[0008] According to an embodiment of the present invention, the control unit is composed of integrated circuit boards, and the control switch element is composed of a silicon controlled rectifier or a relay; a signal output end of the integrated circuit boards is connected to a signal input end of the silicon controlled rectifier; a current input end of the silicon controlled rectifier is connected to the circuit, and the current output end of the silicon controlled rectifier is connected to the power device and the heating device.

[0009] According to an embodiment of the present invention, the collecting unit comprises a sensor housing forming the inner side of the touch handle, several sensor springs of which two ends respectively connect the sensor housing and the integrated circuit boards; the connecting portion between the sensor springs and the integrated circuit boards is provided with an analog-to-digital converter, and the analog-to-digital converter is connected to the signal input end of the integrated circuit.

[0010] According to an embodiment of the present invention, the circuit is provided with a safety protection device connecting the current output end of the silicon controlled rectifier in series.

[0011] According to an embodiment of the present invention, the safety protection device is a restorable temperature controller.

[0012] According to an embodiment of the present invention, the touch handle is provided with a general power switch configured to control the on-off of all circuits.

[0013] According to an embodiment of the present invention, the power device comprises a motor and blades rotated by the motor.

[0014] According to an embodiment of the present invention, the touch handle is provided with a wind-power regulating switch connecting the motor.

[0015] According to an embodiment of the present invention, the heating device comprises a heating element support and an insulation cover sheathing the periphery of the heating element support.

[0016] According to an embodiment of the present invention, a front wall of the touch handle is further provided with a heat regulating switch.

[0017] The positive effects of the above technical solutions are:

the touch hair drier of the present embodiment provides the control switch element for controlling the operation of the power device and the heating device, the control unit which is arranged in the touch handle and is configured to control the on-off state of the control switch element, and the collecting unit which is arranged on the touch handle and is configured to output touch signal to the control unit. When the touch hair drier is operating, the collecting unit collects the holding power exerted on the touch handle so as to enable the conducting state of the control switch element, and then the power device and the heating device are initiated by electricity. When the user looses the touch handle, the control switch element turns off, so that the power device and the heating device stop running to prevent from the fire disaster caused by the overheat of the heating device. Therefore, the touch hair drier possess high safety.

BRIEF DESCRIPTIONS OF THE DRAWINGS

[0018]

Figure 1 illustrates a front view of a smart outage safe hair drier in the prior art;

Figure 2 illustrates a schematic diagram of the touch hair drier in an embodiment of the present invention;

Figure 3 illustrates an exploded view of the touch hair drier in an embodiment of the present invention;

Figure 4 illustrates a circuit structure diagram of the touch hair drier in an embodiment of the present invention;

Figure 5 illustrates a schematic diagram of the internal of the touch handle in an embodiment of the present invention.

DETAILED DESCRIPTION

[0019] The present invention will be further illustrated in combination with the drawings and embodiments. Obviously, the described embodiments are only part of the available embodiments for the present invention instead of all the embodiments. It should be appreciated that according to the embodiments in the present invention, the other equivalent embodiments which may be achieved by the skilled in the art without making any inventive work should also fall into the scope of the present invention.

[0020] As shown in Figures 2 to 4, the touch hair driers provided in the present embodiments comprises: a Housing 1 supporting a Power Device 3 and a Heating Device 4, and a Touch Handle 2 connecting Housing 1.

[0021] Specifically, Housing 1 has a cylindrical wind tunnel of which two ends respectively form an inlet and an outlet. Touch Handle 2 is arranged at the lower portion of the end of Housing 1. The inlet of Housing 1 is provided with a Filter Screen 11 and a Back Cover 12, and the outlet can be provided with various types of Mouths 13.

[0022] Power Device 3 and Heating Device 4 are successively arranged from the inlet of Housing 1 to the outlet of Housing 1, Power Device 3 and Heating Device 4 are powered by Circuit 6 connecting Power Supply 5, Power Device 3 and Heating Device 4 are connected in parallel, and Circuit 6 is provided with a Control Switch Element 7 configured to control the operation of Power Device 3 and Heating Device 4.

[0023] In this embodiment, Touch Handle 2 is provided with a Control Unit 8 configured to control the on-off of Control Switch Element 7, and Touch Handle 2 is provided with Collecting Unit 9 for outputting the touch signal to Control Unit 8.

[0024] Specifically, Control Unit 8 is composed of integrated circuit boards, and Control Switch Element 7 is composed of a silicon controlled rectifier. The signal output end of the integrated circuit boards is connected to the signal input end of the silicon controlled rectifier, and the current input end of the silicon controlled rectifier is connected to Circuit 6, and the current output end of the silicon controlled rectifier is connected to Power Device 3 and Heating Device 4.

[0025] As shown in Figures 2 to 5, Collecting Unit 9 comprises: a Sensor Housing 91 forming the inner side of Touch Handle 2, four Sensor Springs 92 of which two ends respectively connect Sensor Housing 91 and the integrated circuit boards; and the four Sensor Springs 92 are arranged in equal intervals along the long direction of Touch Handle 2. The connecting portion between Sensor Springs 92 and the integrated circuit boards are provided with an analog-to-digital converter (not shown in figures), and the analog-to-digital converter is connected to the signal input end of the integrated circuit.

[0026] As shown in Figure 4, in one of preferred embodiment, in consideration of the safety of the circuit of the hair drier and to prevent from the overheat in Heating Device 4, Circuit 6 of the hair drier of the present embodiment provides a Safety Protection Device 10 connecting the current output end of the silicon controlled rectifier in series. In this embodiment, Safety Protection Device 10 is a restorable temperature controller.

[0027] As shown in Figure 3, in this embodiment, Power Device 3 comprises a Motor 31 and Blades 32 rotated by Motor 31. Heating Device 4 comprises a heating element support and an Insulation Cover 42 sheathing the

periphery of the heating element support. Heat is generated by the energized heating wires, and Blades 32 driven by Motor 31 transfer air to the outlet and carry the heat generated by the heating element out of the outlet. Insulation Cover 42 can prevent the housing 1 from being damaged due to overheat caused by the heating element support.

[0028] As shown in Figure 2, in one of the preferred embodiment, the front side wall of Touch Handle 2 is, from top to bottom, successively provided with a General Power Switch 21, a Wind-power Regulating Switch 22, a Heat Regulating Switch 23 and power indicator light (not shown in the figures).

[0029] Specifically, General Power Switch 21 is configured to control the on-off of all circuits. Wind-power Regulating Switch 22 connects to Motor 31 and regulates the rotate speed of Motor 31 by wind power so as to regulate the amount of the air outputted by Blades 32. The heat regulating Switch 23 connects to Heating Element Support 41 and regulates the current passed through Heating Element Support 41 to regulate the heat in Heating Element Support 41. In this embodiment, Power Supply 5 refers to an external alternating current power, when Circuit 6 is connected to Power Supply 5, the power indicator light emits light so as to indicate that it has electricity.

[0030] When the hair drier of the present embodiment is in work condition and General Power Switch 21 is on, in this case, if the hands of the user do not touch Touch Handle 2, Power Device 3 and Heating Device 4 will not work due to the off state of the silicon controlled rectifier. When the user holds Touch Handle 2, the analog touch signal would be sent to the analog-to-digital convertor which is at one end of Sensor Springs 92, by several Sensor Springs 92 and Sensor Housing 91 located at the back side of Touch Handle 2. And the analog touch signal would be converted into the digital touch signal, further, the digital touch signal wound be sent to the integrated circuit board. A connection signal would be outputted by the silicon controlled rectifier after an IC operation for the digital touch signal is performed via the integrated circuit board, which enable the current input end and the current output end of the silicon controlled rectifier to be in conduction with each other, so that Heating Device 4 and Power Device 3 arranged in the hair drier can be operated with power.

[0031] The touch hair drier of the present embodiment provides the control switch element for controlling the operation of the power device and the heating device, the control unit which is arranged in the touch handle and is configured to control the on-off state of the control switch element, and the collecting unit which is arranged on the touch handle and is configured to output touch signal to the control unit. During operation of the touch hair drier, the collecting unit collects the holding power exerted on the touch handle so as to enable the control switch element in the conducting state, then the power device and the heating device is initiated. When the user looses the touch handle, the control switch element turns off, so that the power device and the heating device stop running to prevent from the fire disaster caused by the overheat in the heating device. Therefore, the touch hair drier possess high safety.

[0032] It is appreciated that not all the embodiments and implementations are disclosed in this disclosure. It is obvious for the skilled in the art that other changes based on the spirit of this invention may also be made.

[0033] In the present embodiment, the sensor housing and the integrated circuit board is composed of four sensor springs. Certainly, in the hair drier of the present embodiment, the sensor housing and integrated circuit board can be connected by any quantity of sensor springs.

[0034] An external AC power can be employed in the hair drier of the present embodiment. Moreover, the hair drier can be provided with a storage battery as the rechargeable power.

[0035] In the present embodiment, the control switch element can be made by the silicon controlled rectifier, it is certain that the control switch element also can be made by a relay.

Claims

1. A touch hair drier, comprising:

a housing (1) supporting a power device (3) and a heating device (4); and
a touch handle (2) connecting the housing (1);
wherein, the power device (3) and the heating device (4) are successively arranged from the inlet of the housing (1) to the outlet of the housing (1), the power device (3) and the heating device (4) are powered by a circuit (6) which is connected to a power supply (5), and the circuit (6) is provided with a control switch element (7) configured to control the operation of the power device (3) and the heating device (4); and
the touch handle (2) is provided with a control unit (8) configured to control the on-off of the control switch element (7), and the touch handle (2) is provided with a collecting unit (9) for outputting touch signals to the control unit (8).

2. The touch hair drier as disclosed in Claim 1, wherein the control unit (8) is composed of integrated circuit boards, and the control switch element (7) is composed of a silicon controlled rectifier or a relay;
a signal output end of the integrated circuit boards is connected to a signal input end of the silicon controlled rectifier; and
a current input end of the silicon controlled rectifier is connected to the circuit (6), and the current output end of the silicon controlled rectifier is connected to the power device (3) and the heating device (4).

3. The touch hair drier as disclosed in Claim 2, wherein the collecting unit (9) comprises a sensor housing (91) forming the inner side of the touch handle (2), several sensor springs (92) of which two ends respectively connect the sensor housing (91) and the integrated circuit boards; and
the connecting portion between the sensor spring (92) and the integrated circuit boards is provided with an analog-to-digital converter, and the analog-to-digital converter is connected to the signal input end of the integrated circuit.

4. The touch hair drier as disclosed in Claim 1, wherein the circuit (6) is provided with a safety protection device (10) connecting the current output end of the silicon controlled rectifier in series.

5. The touch hair drier as disclosed in Claim 4, wherein the safety protection (10) device is a restorable temperature controller.

6. The touch hair drier as disclosed in Claim 1, wherein the touch handle (2) is provided with a general power switch (21) configured to control the on-off of all circuits.

7. The touch hair drier as disclosed in Claim 6, wherein the power device (3) comprises a motor (31) and blades (32) rotated by the motor (31).

8. The touch hair drier as disclosed in Claim 7, wherein the touch handle (2) is provided with a wind-power regulating switch (22) connecting the motor (31).

9. The touch hair drier as disclosed in Claim 6, wherein the heating device (4) comprises a heating element support (41) and an insulation cover (42) sheathing the periphery of the heating element support (41).

10. The touch hair drier as disclosed in Claim 9, wherein a front wall of the touch handle (2) is further provided with a heat regulating switch (23).

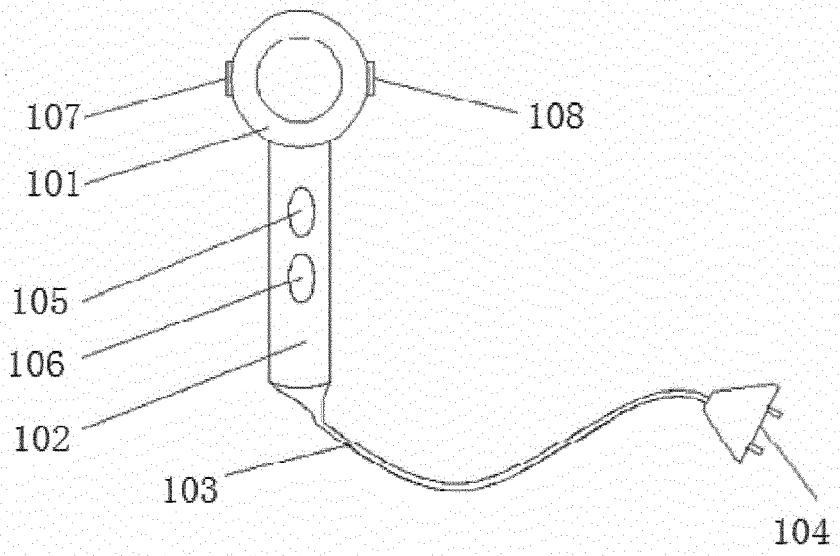

Figure 1

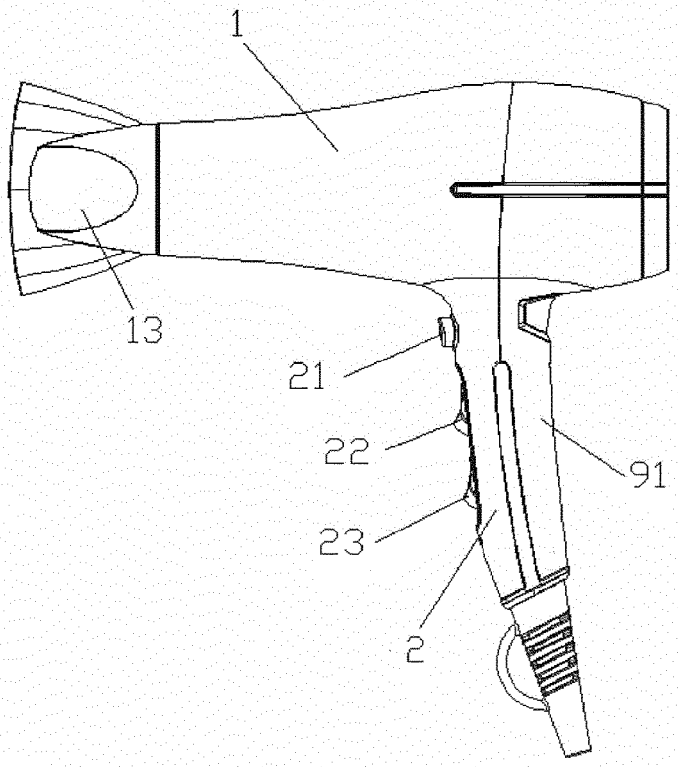

Figure 2

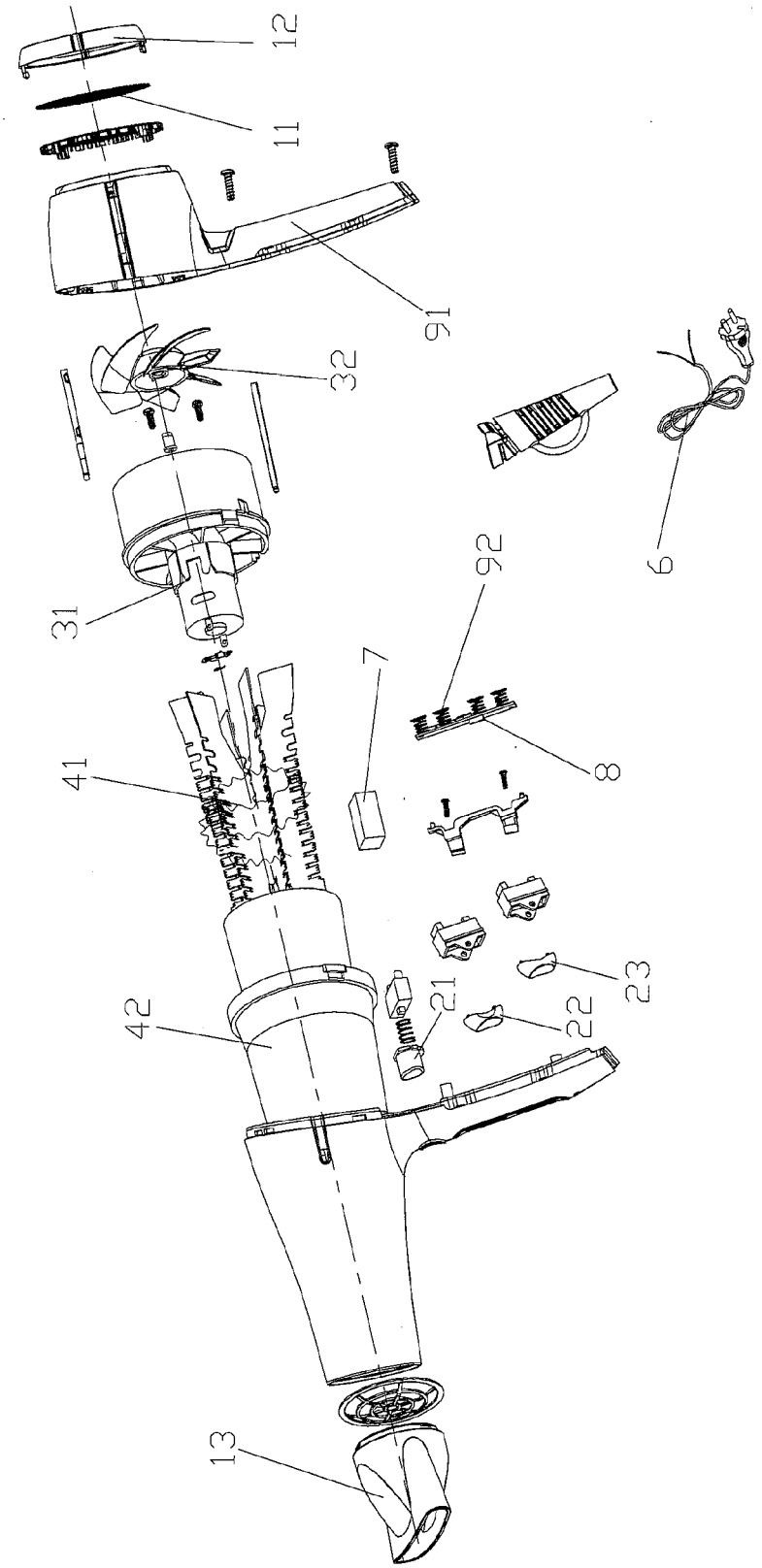

Figure 3

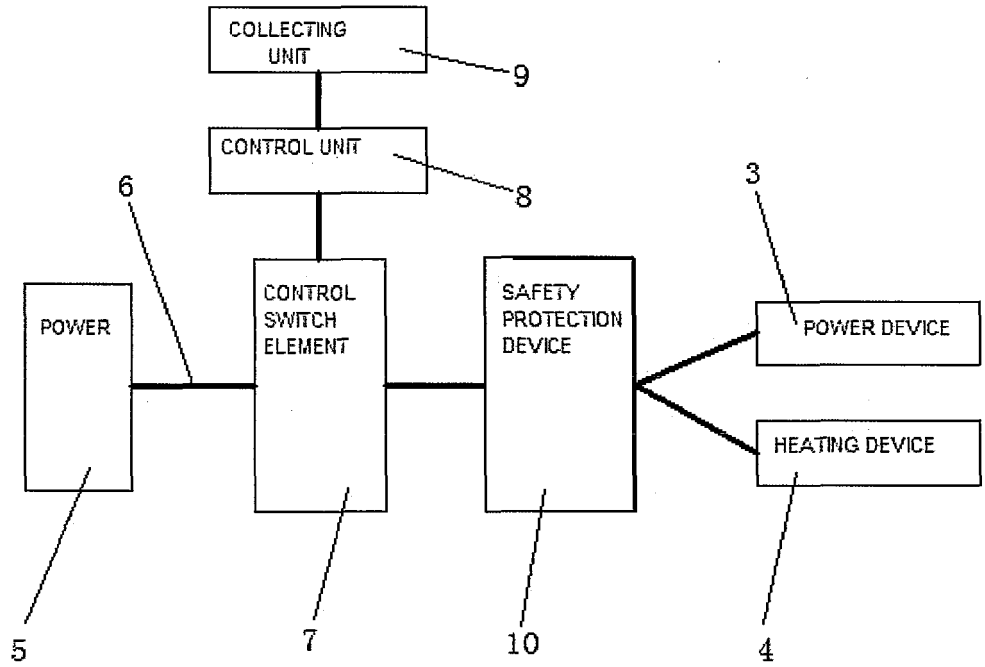
COLLECTING UNIT
9
CONTROL UNIT
8
6
3
POWER
CONTROL SWITCH ELEMENT
SAFETY PROTECTION DEVICE
POWER DEVICE
HEATING DEVICE
5
7
10
4

Figure 4

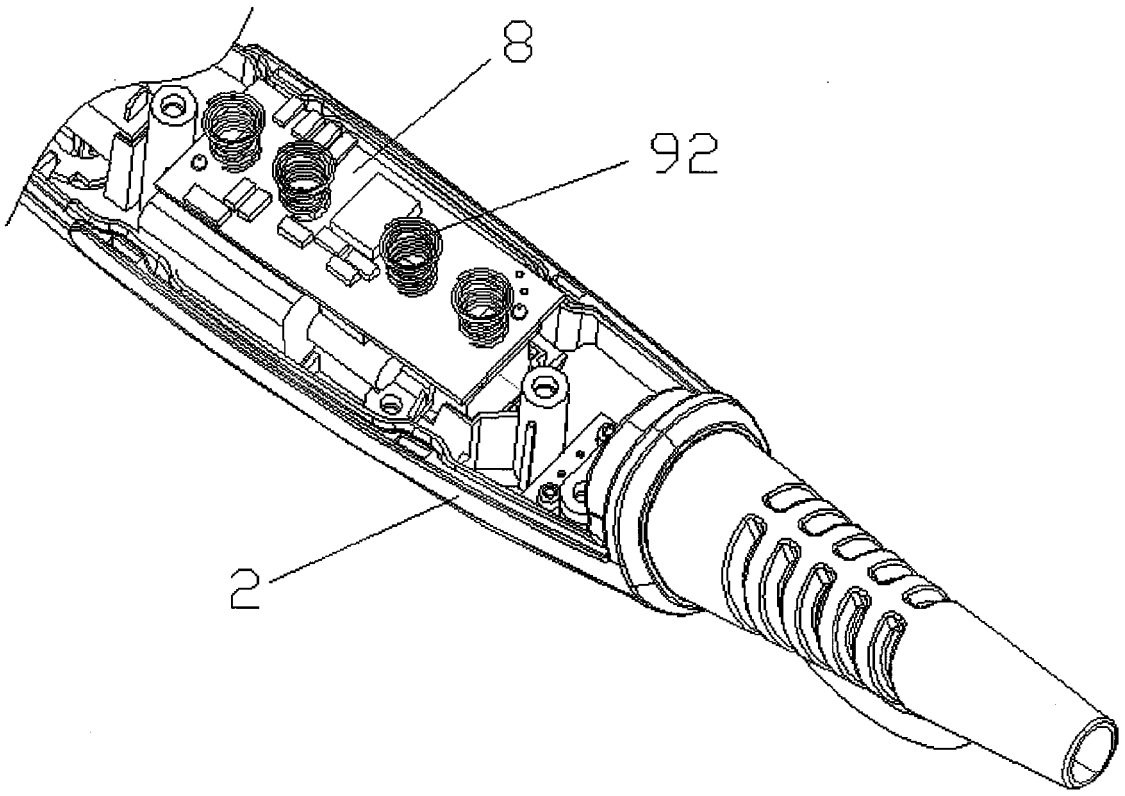

Figure 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 5885

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/011879 A1 (MANDELL JOAN GOLDEN ET AL) 20 January 2005 (2005-01-20) * paragraphs [0005], [0012], [0013], [0027], [0036] - [0038] * * figures 5,8,9 * -----	1-10	INV. A45D20/12 A45D20/10 H05B1/02

TECHNICAL FIELDS SEARCHED (IPC)

A45D
H05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 April 2016	Witkowska-Piela, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 18 5885

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-04-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005011879 A1	20-01-2005	AU 2003265665 A1	19-03-2004
		EP 1540682 A2	15-06-2005
		US 2004040948 A1	04-03-2004
		US 2005011879 A1	20-01-2005
		WO 2004019721 A2	11-03-2004

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 203493012 U **[0004]**