(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 309 923 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
27.09.2023 Bulletin 2023/39

(21) Application number: **16816962.1**

(22) Date of filing: **26.03.2016**

(51) International Patent Classification (IPC):
H02J 7/00 *(2006.01)* ***H05B 1/02*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
H02J 7/007192; H02J 7/00; H02J 7/0031; H02J 7/0063; H02J 7/00714; H05B 1/0272

(86) International application number:
PCT/CN2016/077444

(87) International publication number:
WO 2017/000597 (05.01.2017 Gazette 2017/01)

(54) POWER SUPPLY CONTROL METHOD FOR A MOBILE POWER SUPPLY

STROMVERSORGUNGSSTEUERUNGSVERFAHREN FÜR EINE MOBILE STROMVERSORGUNG

PROCÉDÉ DE COMMANDE D'ALIMENTATION ÉLECTRIQUE POUR UNE ALIMENTATION ÉLECTRIQUE MOBILE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **30.06.2015 CN 201510377011**

(43) Date of publication of application:
18.04.2018 Bulletin 2018/16

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Description

FIELD OF THE INVENTION

[0001] The invention relates to the technical field of circuit control, in particular to a power supply control method based on mobile power sources.

BACKGROUND OF THE INVENTION

[0002] Electric appliances provided with mobile power supplies provide great convenience for people, however, existing electric appliances provided with mobile power supplies use specially-made power supplies as built-in power supplies, which has the disadvantage that when the specially-made power supplies break down, the electric appliances cannot be adaptive to universal mobile power supplies on the market for the reason that hibernation electric current restraints are set for the universal power supplies on the market, namely under the condition that the operating electric current is continuously smaller than a specific electric current value in one minute, the mobile power supplies can stop operating when a preset temperature or a set operating state is reached and the output power needs to be reduced, switches of the mobile power supplies need to be turned on manually for activating the mobile power supplies, which would severely affect user experience.

[0003] In addition, intelligent controlled heating is the development tendency in the technical field of electric heating products (such as electric blankets and electric heating clothes). Intelligent controlled heating can achieve the goal of energy-saving, and meanwhile provide more comfortable temperature environments for people; however, the universal mobile power supplies cannot be used for the electric heating products further restrains the development of the electric heating products. Prior art in this technical field is disclosed in documents US 2015/122791 A1, US 2014/131341 A1 and the description of "Battery Pack Load" of Paul Stoffregen.

SUMMARY OF THE INVENTION

[0004] The invention aims to overcome the defects of the prior art and provides a control method which can prevent the mobile power sources from entering a hibernation state when the temperature of the heating circuit reaches a preset temperature value or decreases.

[0005] In order to solve the above technical problems, the invention provides a power supply control method according to claim 1..

[0006] Besides the above control method, the present disclosure further provides another power supply control method based on the mobile power sources, which is not part of the invention. The control method comprises a single-chip microcomputer capable of inputting a pulse voltage to a heating circuit and the following control steps that:

(a) switching on the mobile power sources and enabling the heating circuit to start heating up;

(b) detecting the temperature T of the heating zone with a temperature detection device: if the temperature T is smaller than the preset temperature T0, enabling the heating circuit to continue heating up; if the temperature T is greater than the preset temperature T0, reducing the output voltage of the mobile power sources and proceeding to the step (c).

(c) keeping the mobile power sources in the activated state by making the single chip microcomputer send a pulse voltage lasting for a time period t2 to the heating circuit every time period t1, and repeating the step (b).

[0007] Furthermore, the time period t1 is 1-30 s, and the time period t2 is 0.1-1 s.

[0008] Furthermore, the current A0 is 10-20 mA.

[0009] Furthermore, the electric current detection device is a single-chip microcomputer.

[0010] Furthermore, the temperature T is set through initializing the control circuit board or a Bluetooth communication module.

[0011] Furthermore, not part of the claimed invention, in the step (b), if the electric current A is equal to the hibernation electric current A0, enabling the heating circuit to continue heating up.

[0012] Furthermore, in the step (b), if the electric current A is equal to the hibernation electric current A0, proceeding to the step (c).

[0013] Furthermore, in the step (b), if the temperature T is equal to the preset temperature T0, enabling the heating circuits to continue heating up.

[0014] Furthermore, in the step (b), if the temperature T is equal to the preset temperature T0, proceeding to the step (c).

[0015] Compared with the prior art, by adoption of the power supply control method based on the mobile power sources of the present invention, the phenomenon of the mobile power sources entering a hibernation state does not occur even when the mobile power sources in wide use is employed to supply power; specifically, by adding a pulse voltage signal to the heating circuit, the mobile power sources are continuously activated, thus ensuring normal operation of the heating circuit and providing the greatest degree of convenience for users.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is a block diagram of steps in one embodiment of the invention;

FIG. 2 is a block diagram of steps in another embodiment which is not part of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0017] A further detailed description of the invention is given with accompanying drawings and specific embodiments as follows.

[0018] As is shown in FIG. 1 , the first embodiment of the invention provides a power supply control method based on mobile power sources, which comprises a single-chip microcomputer capable of inputting a pulse voltage to a heating circuit and comprises the following control steps:

firstly, the heating circuit starts to perform heating after the mobile power source is turned on;
secondly, the magnitude of an electric current A in the heating circuit at the current moment is detected by an electric current detection device, and if the electric current A is greater than a hibernation electric current AC, the heating circuit continues to perform heating until the temperature reaches a preset value, then the heating circuit stops heating and the method proceeds to the third step; if the electric current A is smaller than or equal to the hibernation electric current AC, the method proceeds to the third step;
thirdly, the single-chip microcomputer transmits a pulse voltage lasting for a time period t2 to the heating circuit every time period t1, so that the mobile power source is kept in the activated state; and the second step is repeated after each pulse voltage.

[0019] The magnitude of the electric current A at the current moment can be determined by detecting the current output voltage through the single-chip microcomputer, preferably, an electric current detection program is written in the single-chip microcomputer, and the electric current value at the current moment is detected by the electric current detection program, thus avoiding an external electric current detection circuit, and effectively reducing the size and the manufacturing cost of products.

[0020] According to the operating principle of the embodiment, a switch is pressed down first to make the heating circuit be powered on, and at the moment, the electric current detection program can detect the magnitude of the electric current in the heating circuit; when the magnitude of the electric current at the current moment detected is smaller than 10-20 mA, the single-chip microcomputer in the heating circuit transmits a pulse voltage lasting for 0.1-1 s to the heating circuit every 1-30 s so as to activate the mobile power sources, and thus preventing the mobile power sources from entering a hibernation state; when the magnitude of the electric current at the current moment detected is greater than 10-20 mA, the single-chip microcomputer does not transmit a pulse voltage temporarily, and the heating circuit continues to perform heating. However, when the temperature reaches a preset temperature value, the single-chip microcomputer decreases the output power, and thus reducing the magnitude of the electric current in the heating circuit; the single-chip microcomputer transmits a pulse voltage to the heating circuit to make the mobile power sources continue to operate only when the magnitude of the electric current is smaller than 10-20 mA, and thus the temperature is kept within the range of the preset temperature.

[0021] FIG. 2illustrates another power supply control method which is not part of the invention based on the mobile power sources, which comprises a single-chip microcomputer capable of inputting a pulse voltage to a heating circuit and the following control steps that:

(a) switching on the mobile power sources and enabling the heating circuit to start heating up;

(b) detecting the temperature T of the heating zone with a temperature detection device: if the temperature T is smaller than the preset temperature T0, enabling the heating circuit to continue heating up; if the temperature T is greater than the preset temperature T0, reducing the output voltage of the mobile power sources and proceeding to the step (c).

(c) keeping the mobile power sources in the activated state by making the single chip microcomputer send a pulse voltage lasting for a time period t2 to the heating circuit every time period t1, and repeating the step (b).

[0022] According to the control method in the embodiment, the preset temperature is used as a node for pulse starting, so that the operability of the product is richer, and control is easier and more convenient.

[0023] In addition, since products using mobile power sources as their power supply, whose temperature can only be adjusted through gears, and cannot specifically set the right temperature for the user; however, the temperature of the present invention could be set as a value adjusted to the needs of the user by initializing the control circuit. Moreover, a Bluetooth receiving and sending module can be further arranged in the heating circuit, and a Bluetooth device is made in communication with the Bluetooth receiving and sending module in the heating circuit so that the temperature value can be set through the Bluetooth device.

[0024] Since the mobile power sources in wide use instead of a specially-made power supply is employed to supply power in the present invention, the universality of a heating product is greatly improved; furthermore, to prevent the mobile power sources from entering the hibernation state, a pulse voltage signal is added to the heating circuit, thus the mobile power sources are continuously activated, ensuring normal operation of the heating circuit, and therefore, avoiding the mobile power sources being frequently turned on or off, which provides significant convenience to the user's use.

[0025] Changes and modifications of the above em-

bodiments can be made by those skilled in the field according to the disclosure and illustration in the above description. Furthermore, although certain specific terms are used in the description, these terms are only used for a convenient explanation and do not limit the invention at all.

Claims

1. - A power supply control method for a mobile power source, **characterized in** comprising a single-chip microcomputer capable of inputting a pulse voltage to a heating circuit, wherein the power supply control method comprises the following steps:

   firstly, the heating circuit starts to perform heating after the mobile power source is turned on;
   secondly, the magnitude of an electric current A in the heating circuit at the current moment is detected by an electric current detection device, and if the electric current A is greater than a hibernation electric current A0, the heating circuit continues to perform heating until the temperature reaches a preset value, then the heating circuit stops heating and the method proceeds to the third step; if the electric current A is smaller than or equal to the hibernation electric current A0, the method proceeds to the third step;
   thirdly, the single-chip microcomputer transmits a pulse voltage lasting for a time period t2 to the heating circuit every time period t1, so that the mobile power source is kept in the activated state; and the second step is repeated after each pulse voltage.

2. - The power supply control method for the mobile power source according to claim 1, **characterized in that** the time period t1 is 1-30 s, and the time period t2 is 0.1-2 s.

3. - The power supply control method for the mobile power source according to claim 1, wherein the current A0 is 10-20 mA.

4. - The power supply control method for the mobile power source according to claim 1, wherein the electric current detection device is a single-chip microcomputer.

Patentansprüche

1. - Stromversorgungssteuerungsverfahren für eine mobile Stromversorgung, **dadurch gekennzeichnet, dass** sie einen Ein-Chip-Microcomputer umfasst, der dazu in der Lage ist, eine Impulsspannung in einen Heizkreis einzugeben, wobei das Stromversorgungssteuerungsverfahren die folgenden Schritte umfasst:

   erstens, der Heizkreis beginnt mit dem Heizen, nachdem die mobile Stromversorgung eingeschaltet wurde;
   zweitens, die Stärke des elektrischen Stroms A im Heizkreis im gegenwärtigen Augenblick wird durch eine Vorrichtung zum Nachweis von elektrischem Strom nachgewiesen, und wenn der elektrische Strom A grösser als ein elektrischer Ruhestrom A0 ist, heizt der Heizkreis weiter, bis die Temperatur einen voreingestellten Wert erreicht, dann beendet der Heizkreis das Heizen, und das Verfahren geht zum dritten Schritt über, wenn der elektrische Strom A kleiner oder gleich dem elektrischen Ruhestrom A0 ist, geht das Verfahren zum dritten Schritt über;
   drittens, der Ein-Chip-Microcomputer überträgt jeden Zeitraum t1 eine Impulsspannung, die einen Zeitraum t2 dauert, an den Heizkreis, so dass die mobile Stromversorgung im aktivierten Zustand gehalten wird; und der zweite Schritt wird nach jeder Impulsspannung wiederholt.

2. - Stromversorgungssteuerungsverfahren für eine mobile Stromversorgung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Zeitraum t1 1-30 s beträgt und der Zeitraum t2 0,1 - 2 s beträgt.

3. - Stromversorgungssteuerungsverfahren für eine mobile Stromversorgung nach Anspruch 1, wobei der Strom A0 10 - 20 mA beträgt.

4. - Stromversorgungssteuerungsverfahren für eine mobile Stromversorgung nach Anspruch 1, wobei das Gerät zum Nachweis von elektrischem Strom ein Ein-Chip-Microcomputer ist.

Revendications

1. - Procédé de commande d'alimentation électrique d'une source d'alimentation mobile, **caractérisé par le fait qu'**il comprend un micro-ordinateur monopuce apte à introduire une tension d'impulsion dans un circuit de chauffage, le procédé de commande d'alimentation électrique comprenant les étapes suivantes :

   premièrement, le circuit de chauffage commence à réaliser un chauffage après la mise en marche de la source d'alimentation mobile ;
   deuxièmement, l'amplitude d'un courant électrique A dans le circuit de chauffage à l'instant actuel est détectée par un dispositif de détection de courant électrique et, si le courant électrique A est supérieur à un courant électrique d'hiber-

nation A0, le circuit de chauffage continue à réaliser un chauffage jusqu'à ce que la température atteigne une valeur prédéfinie, puis le circuit de chauffage arrête de chauffer et le procédé passe à la troisième étape ; si le courant électrique A est inférieur ou égal au courant électrique d'hibernation A0, le procédé passe à la troisième étape ;
troisièmement, le micro-ordinateur monopuce transmet une tension d'impulsion d'une durée t2 au circuit de chauffage à chaque période t1, de telle sorte que la source d'alimentation mobile est maintenue à l'état activé ; et la deuxième étape est répétée après chaque tension d'impulsion.

2. - Procédé de commande d'alimentation électrique pour la source d'alimentation mobile selon la revendication 1, **caractérisé par le fait que** la période t1 est de 1 à 30 s, et la période t2 est de 0,1 à 2 s.

3. - Procédé de commande d'alimentation électrique pour la source d'alimentation mobile selon la revendication 1, dans lequel le courant A0 est de 10 à 20 mA.

4. - Procédé de commande d'alimentation électrique pour la source d'alimentation mobile selon la revendication 1, dans lequel le dispositif de détection de courant électrique est un micro-ordinateur monopuce.

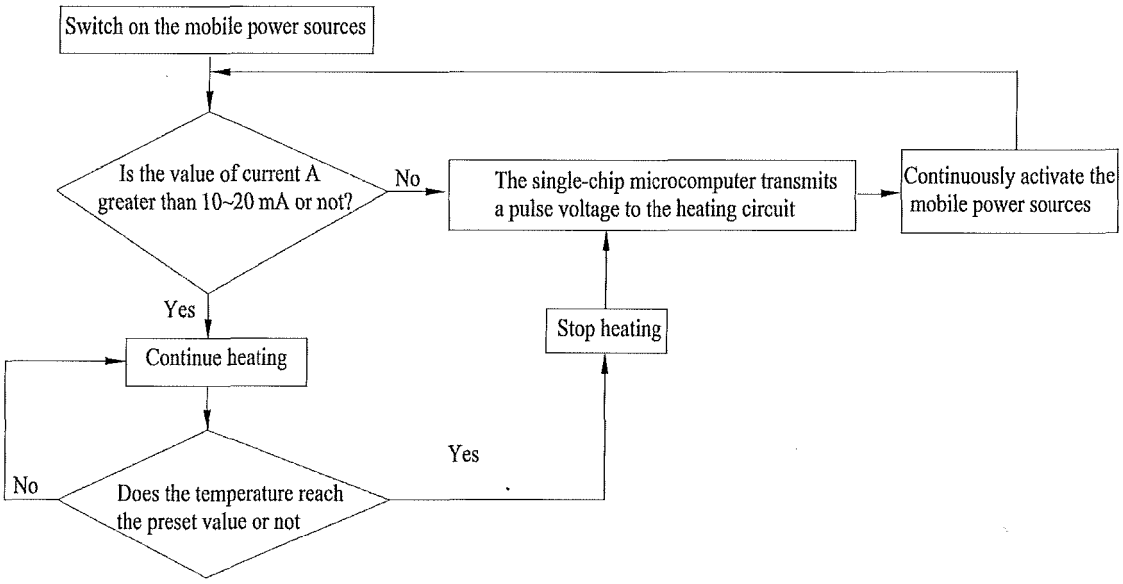
Switch on the mobile power sources
Is the value of current A greater than 10~20 mA or not?
No
The single-chip microcomputer transmits a pulse voltage to the heating circuit
Continuously activate the mobile power sources
Yes
Continue heating
Stop heating
Yes
No
Does the temperature reach the preset value or not

Fig.1

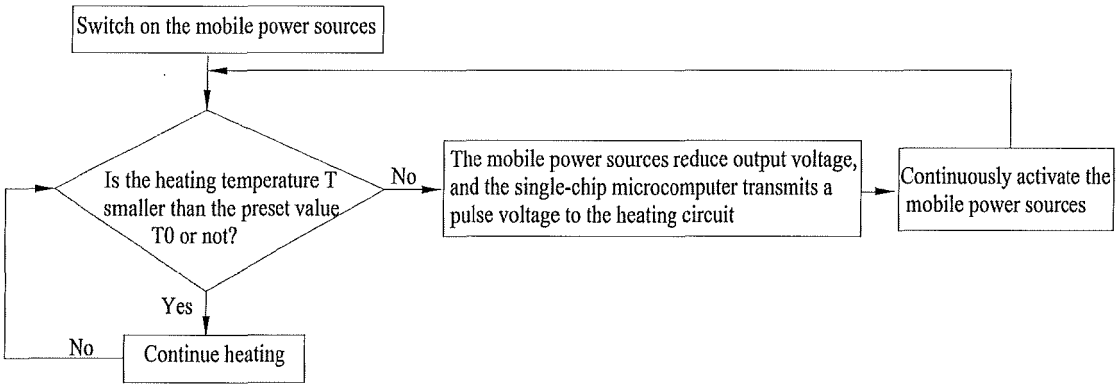
Switch on the mobile power sources
Is the heating temperature T smaller than the preset value T0 or not?
No
The mobile power sources reduce output voltage, and the single-chip microcomputer transmits a pulse voltage to the heating circuit
Continuously activate the mobile power sources
Yes
No
Continue heating

Fig.2

REFERENCES CITED IN THE DESCRIPTION

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