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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	063313-8014US01
First Named Inventor	Yun LEI
Title	A BATTERY CLAMP
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. ☐ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☑ **Specification** [*Total Pages* 21] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. ☑ **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 10]
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   b. ☐ A copy from a prior application (37 CFR 1.63(d))
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A BATTERY CLAMP

CROSS REFERENCE TO PRIORITY

[0001] This application claims priority to Chinese Patent Application No. 201620692248.3 filed June 30, 2016. This application also claims priority to Chinese Patent Application No. 201610506106.8 filed June 30, 2016. This application further claims priority to Chinese Patent Application No. 201610506137.3 filed June 30, 2016. The disclosure of these applications are incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to the technical field of electronic battery and charging control and, in particular, to a battery clamp.

BACKGROUND

[0003] Nowadays the technology of applying a high power lithium battery to an emergency power supply is gradually developing. A high power lithium battery has many advantages, such as a long service life, less pollution, small size and good portability etc. However, a lithium battery may have some defects in real-life applications. For example, when being used for starting a vehicle, the starting electric current of a lithium battery could be very large (up to 1000A). In addition, improper uses, e.g., high temperature and over-charging or over-discharging, will result in battery bulge of an emergency power supply, or even an explosion, which may cause personal injury and property loss. Although certain smart battery clamps can accommodate a large electric current during the starting of a vehicle, they cannot adjust operating modes of a battery clamp based on the actual operating condition of a starting power supply.

[0004] Therefore, it's desired to provide a novel battery clamp. The aforesaid problems can be solved by establishing a communication connection between the novel battery clamp and a starting power supply.

SUMMARY

[0005] The purpose of the present invention is to provide a battery clamp, which aims to solve the aforementioned problems of a lithium battery in an external power supply e.g. battery bulge or explosion resulted from improper uses.

[0006] In order to solve the aforesaid problems, the present invention provides a battery clamp, comprising: a control device, comprising: a housing; a master-control board mounted within the housing; and connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising: at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board; a first and second wire clamps, one ends of the first and second wire clamps are configured to receive power from the external power supply via the control device, and the other ends of the first and second wire clamps are connected to an external device for supplying power to the external device; wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

[0007] Preferably, the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal, wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply.

[0008] Preferably, the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively; a communication port electrically connected to the communication connector; a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps; a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply; wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

[0009] Preferably, the master-control circuit unit further comprises: an electric current detection unit for detecting electric current from the external power supply to the external device; a voltage detection unit for detecting voltage of the external power supply and the external device; and wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric

current range and a predefined voltage range respectively, thereby controlling the switch control unit.

[0010] Preferably, the voltage detection unit comprises: a first voltage detection unit for detecting voltage value of the external power supply; and a second voltage detection unit for detecting voltage value of the external device

[0011] Preferably, the master-control circuit unit further comprises: an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

[0012] Preferably, the master-control circuit unit further comprises: a buzzing circuit unit connected to the master-control chip unit for alerting users about abnormal condition.

[0013] Preferably, the communication connector is disposed between the first and second electrode connectors.

[0014] Preferably, the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

[0015] Preferably, one side of the upper piece is provided with openings for indicator lights and buttons.

[0016] The battery clamp is configured to build a communication connection between the communication connector and an external power supply, by which status information of the external power supply can be transmitted. Based on the status information, detected electric current and voltage value, the power supply from an external power supply to an external device can be controlled, thereby effectively solving the problems of a lithium battery in an external power supply e.g. battery bulge or explosion resulted from improper uses.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] In order to clearly understand the technical solution in the embodiments of the present invention, drawings that used for the embodiments or prior art will be briefly introduced below. Obviously, the drawings described below are merely some

embodiments of the present invention. For a person skilled in the art, other drawings can be obtained according to these drawings below without any inventive effort.

[0018] Fig. 1 is a diagram illustrating a battery clamp in connection with an external power supply and an external device according to one embodiment of the present invention.

[0019] Fig. 2 is a structure diagram of a battery clamp according to one embodiment of the present invention.

[0020] Fig. 3 is a structure diagram illustrating a control device of a battery clamp according to one embodiment of the present invention.

[0021] Fig. 4 is a diagram illustrating a circuit module of a master-control board according to one embodiment of the present invention.

[0022] Fig. 5 is a circuit diagram illustrating voltage input ports, voltage output ports and a communication ports of a master-control board according to one embodiment of the present invention.

[0023] Fig. 6 is a diagram illustrating a module of a master-control circuit unit according to one embodiment of the present invention.

[0024] Fig. 7 is a circuit diagram illustrating a power control unit of a master-control circuit unit according to one embodiment of the present invention.

[0025] Fig. 8 is a circuit diagram illustrating a master-control chip unit of a master-control circuit unit according to one embodiment of the present invention.

[0026] Fig. 9 is a circuit diagram illustrating an electric current detection unit of a master-control circuit unit according to one embodiment of the present invention.

[0027] Fig. 10 is a circuit diagram illustrating a first voltage detection unit of voltage detection units of a master-control circuit unit according to one embodiment of the present invention.

[0028] Fig. 11 is a circuit diagram illustrating a second voltage detection unit of voltage detection units of a master-control circuit unit according to one embodiment of the present invention.

[0029] Fig. 12 is a circuit diagram illustrating a first connection unit of a switch control unit according to one embodiment of the present invention.

[0030] Fig. 13 is a circuit diagram illustrating a second connection unit of a switch control unit according to one embodiment of the present invention.

[0031] Fig. 14 is a circuit diagram illustrating an anti-inverse detection unit according to one embodiment of the present invention.

DETAILED DESCRIPTION

[0032] The present invention is further described below along with the drawings and embodiments, in order to clearly understand the purpose, technical solution and advantage thereof.

[0033] Fig. 1 is a diagram illustrating a battery clamp 100 in connection with an external power supply 200 and an external device 300 according to one embodiment of the present invention.

[0034] As shown in Fig.1, the connection between the battery clamp 100 and the external power supply 200 comprises a power connection, by which the battery clamp 100 can obtain power supply from the external power supply 200. Generally, the power connection is implemented by a pluggable interface.

[0035] The connection between the battery clamp 100 and the external power supply 200 also comprises a communication connection, by which the battery clamp 100 can obtain status information of the external power supply 200. The communication connection can be wired connections, such as via a serial interface, or can be wireless connections, such as via Bluetooth, NFC, Wi-Fi etc.

[0036] As shown in Fig. 1, the battery clamp 100 is configured to use a power connection for supplying power to the external device 300.

[0037] Fig. 2 is a structure diagram of the battery clamp 100 according to one embodiment of the present invention.

[0038] As shown in Fig. 2, the battery clamp 100 comprises a control device 1 and wire clamps 2. One side of the control device 1 is provided with connectors 10, and the other side is provided with wires 20. The control device 1 and the wire clamps 2 are connected via the wires 20. The wire clamps 2 comprises a first and second wire clamps 21, 22 representing an positive and negative electrodes respectively.

[0039] The wire clamps 2 are connected to the external device 300 for supplying power to it. For example, when the external power supply 200 is an emergency starting power supply and the external device 300 is a vehicle, the emergency starting power supply 200 is connected to the vehicle 300 via the battery clamp 100 for starting the vehicle 300.

[0040] Fig. 3 is a structure diagram illustrating a control device of the battery clamp 100 according to one embodiment of the present invention.

[0041] As shown in Fig. 3, the control device 1 comprises: a housing 11, a master-control board 12 and connectors 10. The housing 11 comprises an upper piece 111 and a lower piece 112 which are removably connected together.

[0042] The master-control board 12 is mounted within the housing 11. Specifically, the master-control board 12 is mounted on the lower piece 112.

[0043] The connectors 10 are disposed at one side of the housing 11, and are electrically connected to the master-control board 12.

[0044] The connectors 10 comprise a positive electrode connector 101, a negative electrode connector 102 and a communication connector 103. According to one embodiment of the present invention, the communication connector 103 is disposed between the positive electrode connector 101 and the negative electrode connector 102.

[0045] The positive and negative electrode connectors 101, 102 are connected to the external power supply 200 for receiving power supply.

[0046] A communication connection between the battery clamp 100 and the external power supply is built via the communication connector 103. The battery clamp 100 can obtain status information of the external power supply 200 via the communication connector 103, thereby monitoring and managing the external power supply 200 to prevent bulge or explosion of the external power supply 200.

[0047] According to one embodiment of the present invention, the control device 1 is configured to allow the power supply from the external power supply 200 to the external device 300 when the status information is normal.

[0048] According to one embodiment of the present invention, the status information of the external power supply 200 comprises at least one of the following: temperature, voltage of a battery unit of the external power supply 200.

[0049] According to one embodiment of the present invention, the master-control board 12 of the control device 1 comprises voltage input ports BATs, voltage output ports CARs, a communication port COM, a switch control unit K1, and a master-control circuit unit 128.

[0050] Fig. 4 is a diagram illustrating a circuit module of the master-control board 12 according to one embodiment of the present invention.

[0051] As shown in Fig. 4, the master-control board 12 comprises: voltage input ports BATs (including a positive voltage input port BAT+ and a negative voltage input port BAT-), voltage output ports CARs (including a positive voltage output port CAR+ and a negative voltage output port CAR-), a communication port COM, a switch control unit K1 and a master-control circuit unit 128.

[0052] As discussed above, the positive and negative electrode connectors 101, 102 are connected to the external power supply 200 for receiving power supply. The positive voltage input port BAT+ and the negative voltage input port BAT- are electrically connected to the electrode connectors 101,102 respectively, i.e. the voltage input ports BATs are electrically connected to the external power supply 200, for receiving power supply from the external power supply 200.

[0053] As discussed above, the control device 1 is connected to the wire clamps 2 via the wires 20, and the wire clamps 20 are connected to the external device 300 for supplying power via the wire clamps 20. The positive voltage output port CAR+ and the negative voltage output port CAR- are electrically connected to the first and second wire clamps 21, 22 respectively, i.e. the voltage output ports CARs are electrically connected to the external device 300, for supplying power to the external device 300.

[0054] The positive voltage input port BAT+ is connected to the positive voltage output port CAR+ via the switch control unit K1. The switch control unit K1 is configured to control connection on/off between the positive voltage input port BAT+ and the positive voltage output port CAR+.

[0055] The switch control unit K1 is connected to and controlled by the master-control circuit unit 128.

[0056] The master-control circuit unit 128 is connected to the communication port COM for receiving status information of the external power supply 200.

[0057] The master-control circuit unit 128 is also connected to the positive voltage input port BAT+ or the positive voltage output port CAR+ for detecting voltage values of them, i.e. detecting voltage values of the external power supply 200 or the external device 300.

[0058] The master-control circuit unit 128 is also connected to two grounding ports GND and PGND for detecting an electric current value from the external power supply 200 to the external device 300.

[0059] Based on the status information, the master-control circuit unit 128 can control the switching on/off of the switch control unit K1, thereby controlling the power supply from the external power supply 200 to the external device 300.

[0060] Similarly, based on the voltage values or electric current values detected by the master-control circuit unit 128, the master-control circuit unit 128 can control the switching on/off of the switch control unit K1, thereby controlling the power supply from the external power supply 200 to the external device 300.

[0061] Fig. 5 is a circuit diagram illustrating voltage input ports BATs, voltage output ports CARs, a communication port COM and a switch control unit K1 of the master-control board 12 of the battery clamp 100.

[0062] As shown in Fig, 5, the voltage input ports BATs of the master-control board 12 comprises a positive voltage input port BAT+ and a negative voltage input port BAT-. The voltage output ports CARs of the master-control board 12 comprises a positive voltage output port CAR+ and a negative voltage output port CAR-.

[0063] The voltage input ports BATs are electrically connected to the electrode connectors. Specifically, the positive voltage input port BAT+ is electrically connected to the positive electrode connector 101 for receiving a positive output voltage from the external power supply 200; the negative voltage input port BAT- is electrically connected to the negative electrode connector 102 for receiving a negative output voltage from the external power supply 200.

[0064] The voltage output ports CARs are electrically connected to the wire clamps 20. Specifically, the positive voltage output port CAR+ is electrically connected to the first wire clamp 21 and the negative voltage output port CAR- is electrically connected to the second wire clamp 22 for supplying power to the external device 300.

[0065] In addition, Fig. 5 further illustrates the communication port COM and the switch control unit K1 of the master-control board 12.

[0066] The communication port COM is electrically connected to the communication connector 103.

[0067] The positive voltage input port BAT+ is connecter to the positive voltage output port CAR+ by the switch control unit K1.

[0068] The switch control unit K1 is also connected to the master-control circuit unit 128 via two input ports N_EN and C_EN, and is controlled by the master-control circuit unit 128. The master-control circuit unit 128 is connected to the switch control unit K1 for controlling the switching on/off of the switch control unit K1 based on status information of an external power supply.

[0069] When the switch control unit K1 is off, the positive voltage input port BAT+ is disconnected from the positive voltage output port CAR+, which means the power supply provided by the external power supply 200 is also disconnected from the external device 300. When the switch control unit K1 is on, the positive voltage input port BAT+ connects with the positive voltage output port CAR+, which means the power supply from the external power supply 200 is provided to the external device 300.

[0070] In another embodiment of the present invention, the master-control circuit unit 128 further comprises an electric current detection unit 1283, voltage detection units 1282 and a master-control chip unit 1281. The master-control circuit unit 128 is connected to the communication port COM for obtaining status information of the external power supply 200.

[0071] The master-control circuit unit 128 further comprises a power control unit for supplying the obtained external power to the electric current detection unit 1283, the voltage detection units 1282 and the master-control chip unit 1281.

[0072] Fig. 6 is a diagram illustrating a module of a master-control circuit unit 128 according to one embodiment of the present invention.

[0073] As shown in Fig. 6, the master-control circuit unit 128 comprises a master-control chip unit 1281, an electric current detection unit 1283 and voltage detection units. The voltage detection units further comprises a first voltage detection unit 12821 and a second voltage detection unit 12822.

[0074] Input ports of the first and second voltage detection unit 12821 and 12822 are connected to the positive voltage input port BAT+ and the positive voltage output port CAR+ respectively, thereby detecting voltages of the positive voltage input port BAT+ and positive voltage output port CAR+, i.e. detecting voltages of the external power supply 200 and the external device 300. Output ends of the first and second voltage detection unit 12821 and 12822 are connected to the master-control chip unit 1281 for delivering the detected voltage values to the master-control chip unit 1281.

[0075] Input ports of the electric current detection unit 1283 are connected to two grounding ports GND and PGND for detecting an electric current value from the external power supply 200 to the external device 300. An output port of the electric current detection unit 1283 is connected to the master-control chip unit 1281 for delivering the detected electric current value to the master-control chip unit 1281.

[0076] The master-control chip unit 1281 is connected to the switch control unit K1, and is configured to control the switching on/off of the switch control unit k1 based on the detected electric current or voltage value, thereby controlling the power supply from the external power supply 200 to the external device 300.

[0077] Figs. 7-11 are example circuit diagrams illustrating a power control unit, a master-control chip unit 1281, an electric current detection unit 1283, and voltage detection units 1282 respectively.

[0078] Fig.7 is a circuit diagram illustrating a power control unit according to one embodiment of the present invention.

[0079] As shown in Fig. 7, the circuit of the power control unit comprises a power control chip U1, a plurality of capacitors, and two diodes.

[0080] The power control unit is respectively connected to the positive voltage input port BAT+ and the positive voltage output port CAR+ by the two diodes.

[0081] The power control unit is provided with a voltage output port VCC5. The voltage output port VCC5 is connected to VCC5 ports of the electric current detection unit 1283, the voltage detection units 1282, the master-control chip unit 1281 and an anti-inverse detection unit etc. for providing a drive voltage.

[0082] Fig. 8 is a circuit diagram illustrating a master-control chip unit 1281 according to one embodiment of the present invention.

[0083] As shown in Fig. 8, the master-control chip unit 1281 comprises a control chip U2.

[0084] The 11th pin of the control chip U2 is connected to a communication port COM for communicating between the battery clamp 100 and the external power supply 200.

[0085] The control chip U2 is also provided with a programing port ICPCK. The programing port ICPCK, which is also powered by the voltage output port VCC5 of the power control unit, is used for programing relevant control program on the control chip U2, thereby storing instruction and data on the chip in advance.

[0086] Fig. 9 is a circuit diagram illustrating an electric current detection unit 1283 according to one embodiment of the present invention.

[0087] As shown in Fig. 9, the electric current detection unit 1283 comprises an amplifier U4A, and relevant capacitors and resistors

[0088] The electric current detection unit 1283 is powered by the voltage output port VCC5 of the power control unit. Input ports thereof are connected to two grounding ports GND and PGND for detecting an electric current value of the voltage input ports BATs or the voltage output ports CARs, i.e. the electric current value from the external power supply 200 to the external device 300.

[0089] The electric current detection unit 1283 is also connected to the master-control chip unit 1281. Specifically, an output port CHA IN ISN of the electric current detection unit 1283 is connected to the 16th pin of CHA IN ISN of the control chip U2 for delivering a detected electric current value to the control chip U2.

[0090] According to one embodiment of the present invention, after obtaining a detected electric current value from the external power supply 200 to the external device 300, the master-control chip unit 1281 is configured to compare the detected electric current value with a predefined electric current range, i.e. a protection threshold of starting electric current, which is stored in the master-control chip unit 1281 in advance. If the detected electric current value exceeds the predefined electric current range, the master-control chip unit 1281 will switch off the switch control unit K1 by means of a pre-stored control program. Correspondingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if the detected electric current value does not exceed the predefined

electric current range, the power supply from the external power supply 200 to the external device 300 would be sustained.

Table 1: Parameters with regard to different types of external power supply

Type of battery module	Operating voltage	Low voltage alert threshold	Protection threshold of starting electric current
3C lithium cobalt oxide	8.1-12.6v	Voltage of one battery unit is below 2.7v	550A
4F lithium iron phosphate	8-14.6v	Voltage of one battery unit is below 2.0v	600A
4C lithium cobalt oxide	10.8-16.8v	Voltage of one battery unit is below 2.7v	600A

[0091] For example, as shown in Table 1, when the external power supply 200 is 3C lithium cobalt oxide, the predefined electric current range can be 0-550A. If an electric current value from the external power supply 200 to the external device 300, which is obtained by the master-control chip unit 1281, exceeds 550A, the master-control chip unit 1281 will switch off the switch control unit K1. Correspondingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if the detected electric current value is below 550A, the power supply from the external power supply 200 to the external device 300 would be sustained. Same rules would be applicable when types of the external power supply 200 are 4F lithium iron phosphate and 4C lithium cobalt oxide.

[0092] In one embodiment of the present invention, the status information, predefined current range and predefined voltage range are stored in the control chip U2 in advance.

[0093] In another embodiment of the present invention, the voltage detection units 1282 are connected to the master-control chip unit 1281. The voltage detection units 1282 are configured to detect voltage of the positive voltage input port BAT+ or the positive voltage output port CAR+, i.e. voltage of the external power supply 200 or the external device 300, and to send a detected voltage value to the master-control chip unit 1281.

[0094] In another embodiment of the present invention, the voltage detection units 1282 comprises a first and second voltage detection units.

[0095] Figs. 10 and 11 are circuit diagrams illustrating a first and second voltage detection units respectively.

[0096] As shown in Fig. 10, the first voltage detection unit comprises a diode as well as relevant capacitors and resistors. A power port VCC5 of the first voltage detection unit is connected to the voltage output port VCC5 of the power control unit via the diode. An input port BAT+ of the first voltage detection unit is connected to the positive voltage input port BAT+. An output port VIN_SN of the first voltage detection unit is connected to the 19th pin of VIN_SN of the control chip U2 for detecting voltage value of the positive voltage input port BAT+, and then delivers the detected voltage value to the control chip U2.

[0097] As shown in Fig. 11, the second voltage detection unit comprises two diodes as well as relevant capacitors and resistors. A power port VCC5 of the second voltage detection unit is connected to the voltage output port VCC5 of the power control unit via the diodes. An output port CAR+ of the second voltage detection unit is connected to the positive voltage output port CAR+. An output port VOUT_SN of the second voltage detection unit is connected to the 17th pin of VOUT_SN of the control chip U2 for detecting voltage value of the positive voltage output port CAR+, and then delivers the detected voltage value to the control chip U2.

[0098] According to one embodiment of the present invention, after obtaining a voltage value of the positive voltage input port BAT+ or the positive voltage output port CAR+, the master-control chip unit 1281 is configured to compare the detected voltage value with a predefined voltage range, i.e. range of operating voltage, which is stored in the master-control chip unit 1281 in advance. If the detected voltage value is beyond the predefined voltage range, the master-control chip unit 1281 will switch off the switch control unit K1 by means of a pre-stored control program. Correspondingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if the detected voltage value is not beyond the predefined voltage range, the power supply from the external power supply 200 to the external device 300 would be sustained.

[0099] For example, as shown in Table 1, when the external power supply 200 is 3C lithium cobalt oxide, the predefined voltage range can be 8.1-12.6V. If a voltage value of the positive voltage input port BAT+ or the positive voltage output port CAR+ obtained by the master-control chip unit 1281 is 13V, which is beyond the predefined voltage range, the master-control chip unit 1281 will switch off the switch control unit K1. Correspondingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if a voltage value of the positive voltage input port BAT+ or the positive voltage output port CAR+ is 12V, which is within the predefined voltage range, the power supply from the external power supply 200 to the external device 300 would be sustained. Same rules would be applicable when types of the external power supply 200 are 4F lithium iron phosphate and 4C lithium cobalt oxide.

[00100] In one embodiment of the present invention, the switch control unit K1 further comprises a first and second connection units.

[00101] Figs. 12 and 13 are circuit diagrams illustrating a first and second connection units of the switch control unit K1 according to one embodiment of the present invention. The switch control unit K1 is connected to the control chip U2 by the first and second connection units.

[00102] As shown in Figs. 12 and 13, the 9th pin of RELAY_EN1 and the 14th pin of RELAY_EN2 of the control chip U2 are connected to the two input ports N_EN and C_EN of the switch control unit K1 respectively. The control chip U2 is configured to control switching on/off of the switch control unit K1 by the two pins.

[00103] According to one embodiment of the present invention, after obtaining status information of the external power supply, the control chip U2 of the master-control chip unit 1281 can obtain temperature of a battery unit. Then the control chip U2 is configured to compare the detected temperature with a predefined temperature threshold, which is stored in the master-control chip unit 1281 in advance. If a temperature value of a battery unit exceeds the predefined temperature threshold, the control chip U2 will switch off the switch control unit K1 by means of a pre-stored control program. Accordingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if a temperature value of a battery unit does not exceed the predefined temperature threshold, the power

supply from the external power supply 200 to the external device 300 would be sustained.

[00104] According to another embodiment of the present invention, after obtaining status information of the external power supply, the control chip U2 of the master-control chip unit 1281 can obtain a voltage difference of any two of battery units. Then the control chip U2 is configured to compare the voltages difference between any two of battery units with a predefined voltage difference, which is stored in the master-control chip unit 1281 in advance. If a voltage difference of any two of battery units exceeds the predefined voltage difference of any two of battery units, the control chip U2 will switch off the switch control unit K1 by means of a pre-stored control program. Correspondingly, the power supply from the external power supply 200 to the external device 300 will be switched off as well. On the contrary, if a voltage difference of any two of battery units does not exceed the predefined voltage difference of any two of battery units, the power supply from the external power supply 200 to the external device 300 would be sustained.

[00105] In one embodiment of the present invention, the switch control unit K1 comprises a relay switch.

[00106] In one embodiment of the present invention, the master-control circuit unit 128 further comprises an anti-inverse detection unit.

[00107] Fig. 14 is a circuit diagram illustrating an anti-inverse detection unit according to one embodiment of the present invention. The anti-inverse detection unit is connected to the master-control chip unit 1281 and the positive voltage output port CAR+ for detecting whether a user has inversely connected the first and second wire clamps 21 and 22.

[00108] As shown in Fig. 14, the anti-inverse detection unit comprises a photocoupling chip U3 as well as relevant capacitors and resistors. An output port VCC5 of the anti-inverse detection unit is connected to the output port VCC5 of the power control unit for supplying power to the anti-inverse detection unit. A detecting port of the anti-inverse detection unit is connected to the positive voltage output port CAR+ for detecting whether a user has inversely connected the first and second wire clamps 21 and 22. An output port P_VSN of the anti-inverse detection unit is connected

to the 10th pin of P_VSN of the control chip U2 for delivering a level signal to the control chip U2.

[00109] When the first wire clamp 21 is normally connected to the external device 300, the detecting port of the anti-inverse detection unit is a positive voltage. Correspondingly, a luminous diode in the photocoupling chip U3 is not conductive, and the output port P_VSN of the anti-inverse detection unit will output a high level. When the first wire clamp 21 is inversely connected to the external device 300, the detecting port of the anti-inverse detection unit is a negative voltage. Correspondingly, the luminous diode in the photocoupling chip U3 will be conductive and luminous, and the output port P_VSN of the anti-inverse detection unit will output a low level.

[00110] If the 10th pin of P_VSN of the control chip U2 detects a low level, the wire clamps are proved to be inversely connected. Accordingly, the control chip U2 will switch off the switch control unit K1, and the power supply from the external power supply 200 to the external device will be switched off as well. If the 10th pin of P_VSN of the control chip U2 detects a high level, the wire clamps are proved to be normally connected. Accordingly, the power supply from the external power supply 200 to the external device will be sustained.

[00111] In one embodiment of the present invention, the master-control circuit unit 128 further comprises an indicator light circuit unit, which is connected to the master-control chip unit 1281. The indicator light circuit unit comprises two LED with different colors for indicating normal or abnormal conditions of the control device.

[00112] In one embodiment of the present invention, the master-control circuit unit 128 further comprises a buzzing circuit unit, which is connected to the master-control chip unit 1281. The buzzing circuit unit mainly comprises a loudspeaker for alerting a user about abnormal conditions.

[00113] To sum up, a communication connection between the battery clamp 100 and the external power supply 200 can be built for obtaining status information of the external power supply 200. The status information comprises temperature of battery units, or a voltage difference of any two of battery units of the external power supply. Meanwhile, the battery clamp 100 has functions of electric current or voltage detection and anti-inverse detection etc. Therefore, the battery clamp 100 can effectively solve

the problems of a lithium battery in the external power supply 200 e.g. battery bulge or explosion resulted from improper uses.

[00114] Although the aforesaid embodiments are preferred in the present invention, none of them shall be regarded as a limitation. Any modifications, improvements, or equivalents within spirit or scope of the preset invention fall into the protection scope of the present invention.

WINPLUS Ex. 1002, p. 19

CLAIMS

What is claimed is:

1. A battery clamp, comprising:

a control device, comprising:

a housing;

a master-control board mounted within the housing; and

connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising:

at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

a first and second wire clamps, one ends of the first and second wire clamps are configured to receive power from the external power supply via the control device, and the other ends of the first and second wire clamps are connected to an external device for supplying power to the external device;

wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

2. The battery clamp of claim 1, wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal, wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply.

3. The battery clamp of claim 1, wherein the master-control board comprises:

a first and second voltage input ports electrically connected to the first and second electrode connectors respectively;

a communication port electrically connected to the communication connector;

a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps;

a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and

a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply;

wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

4. The battery clamp of claim 3, wherein the master-control circuit unit further comprises:

an electric current detection unit for detecting electric current from the external power supply to the external device;

a voltage detection unit for detecting voltage of the external power supply and the external device; and

wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

5. The battery clamp of claim 4, wherein the voltage detection unit comprises:

a first voltage detection unit for detecting voltage value of the external power supply; and

a second voltage detection unit for detecting voltage value of the external device.

6. The battery clamp of claim 4, wherein the master-control circuit unit further comprises:

an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

7. The battery clamp of claim 4, wherein the master-control circuit unit further comprises:

a buzzing circuit unit connected to the master-control chip unit for alerting users about abnormal condition.

8. The battery clamp of claim 1, wherein the communication connector is disposed between the first and second electrode connectors.

9. The battery clamp of claim 1, wherein the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

10. The battery clamp of claim 9, wherein one side of the upper piece is provided with openings for indicator lights and buttons.

ABSTRACT

The present invention provides a battery clamp, comprising: a first and second wire clamps and a control device. Each of the first and second wire clamps is electrically connected to the control device. The control device comprises: a housing; a master-control board mounted within the housing; and connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising: at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and at least one communication connector connected to the external power supply for building a communication connection between the battery clamp and the external power supply. The battery clamp is communicatively connected to the external power supply by the communication connector, thereby effectively solving the problems of a lithium battery in an external power supply e.g. battery bulge or explosion resulted from improper uses.

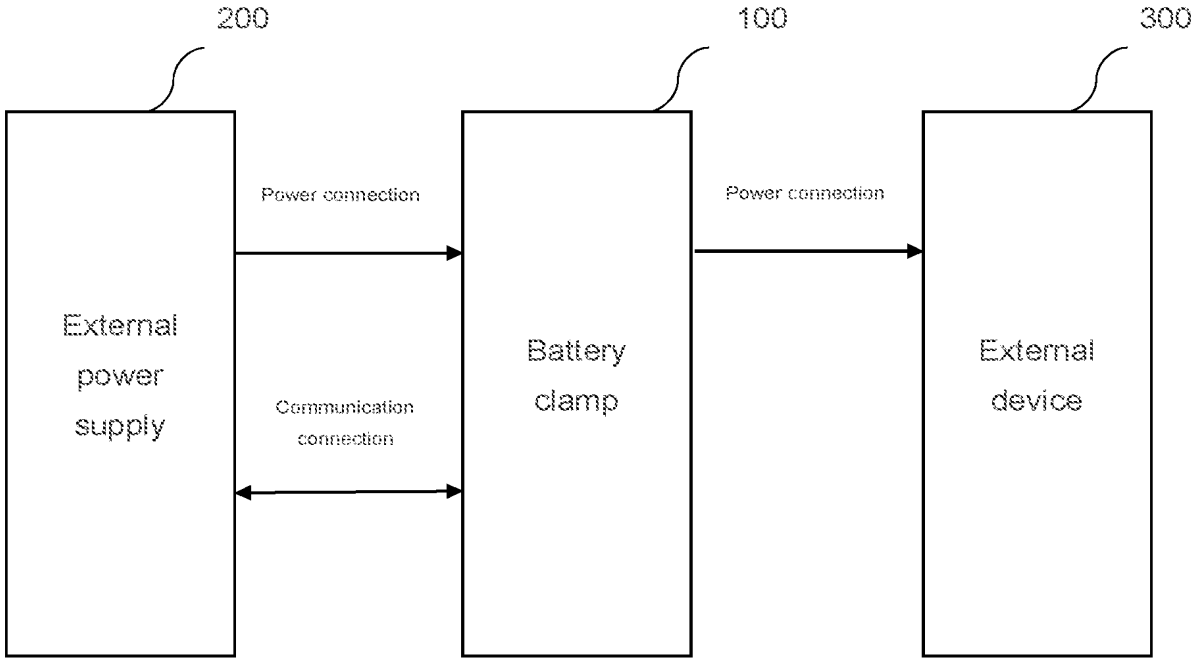

200
100
300
External power supply
Power connection
Communication connection
Battery clamp
Power connection
External device

Fig. 1

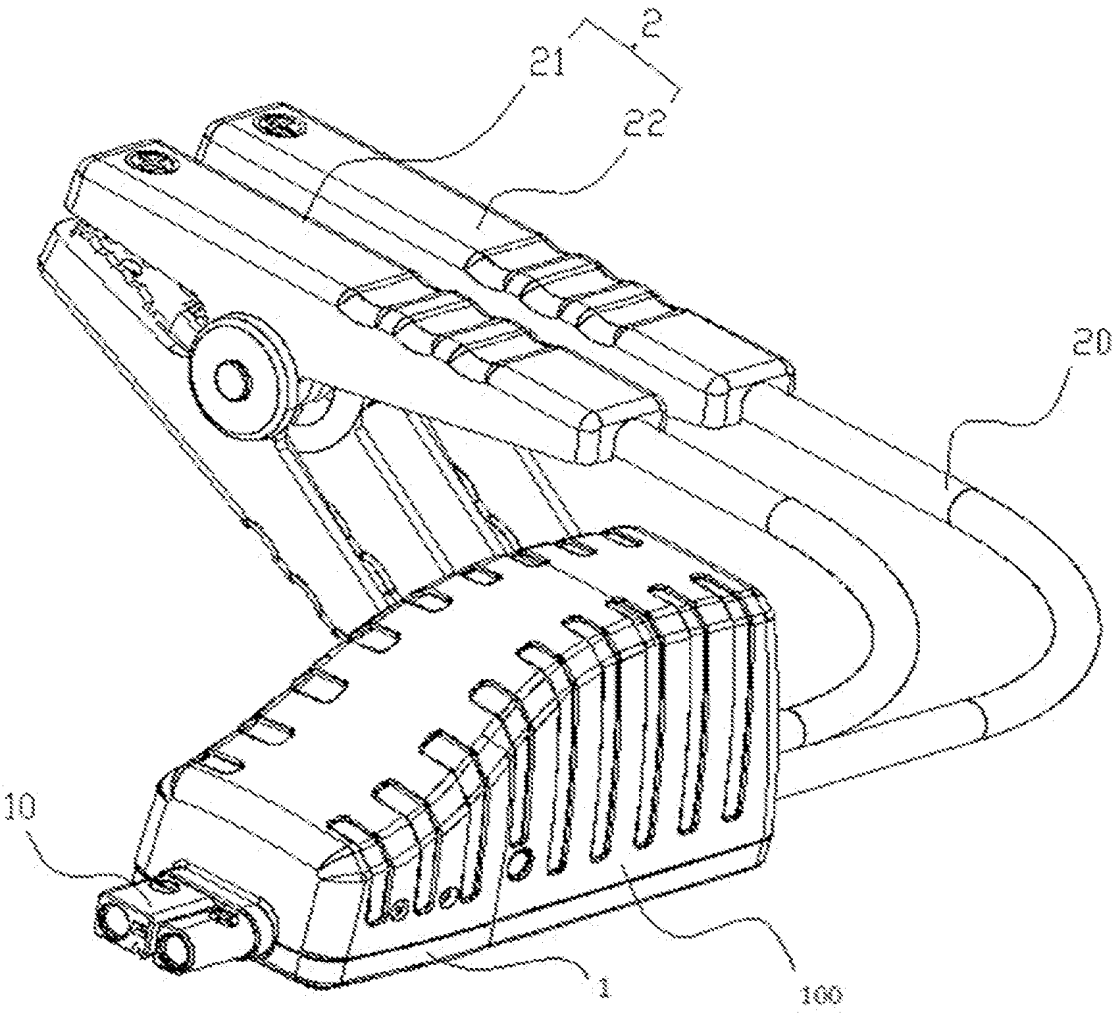


Fig. 2

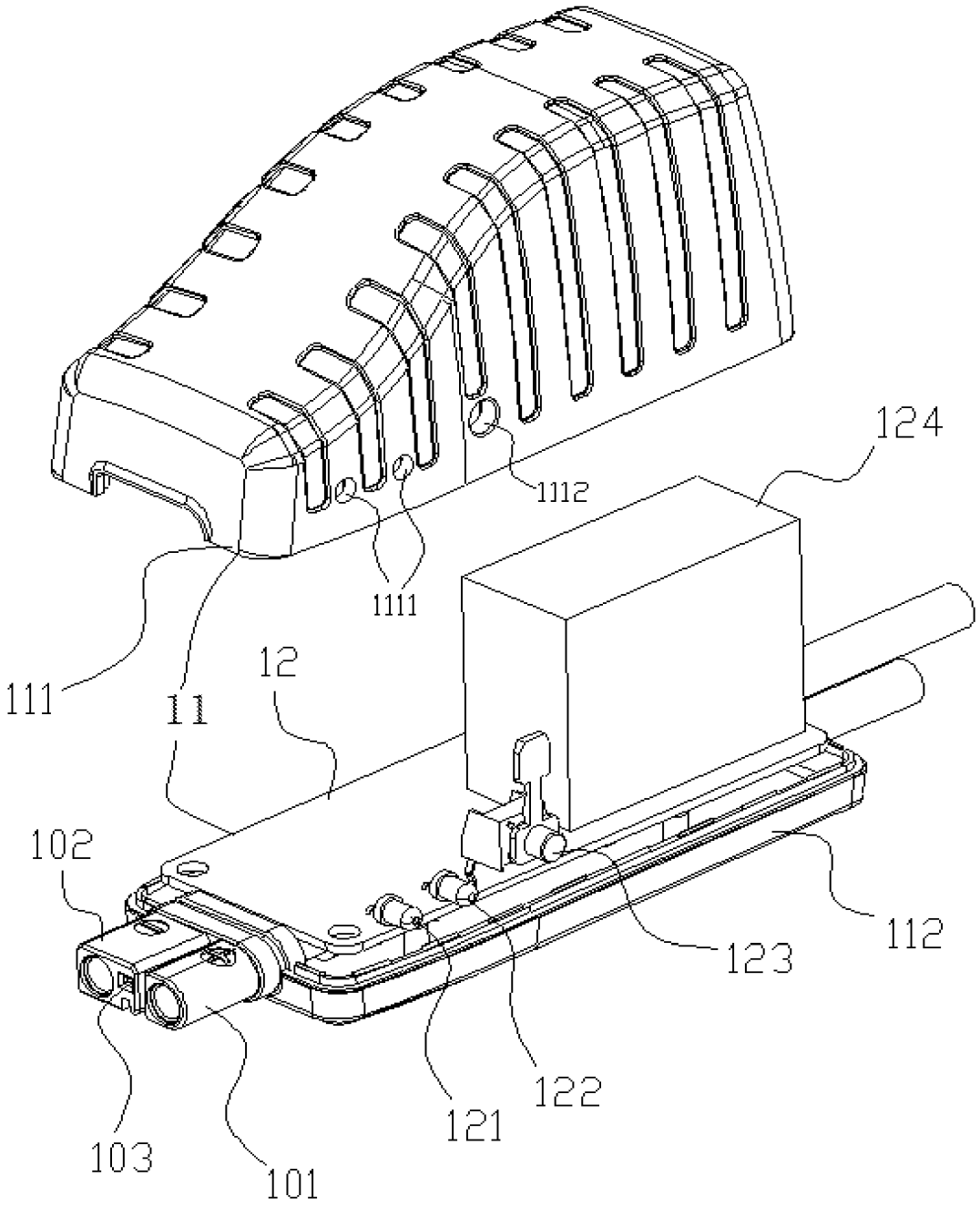


Fig. 3

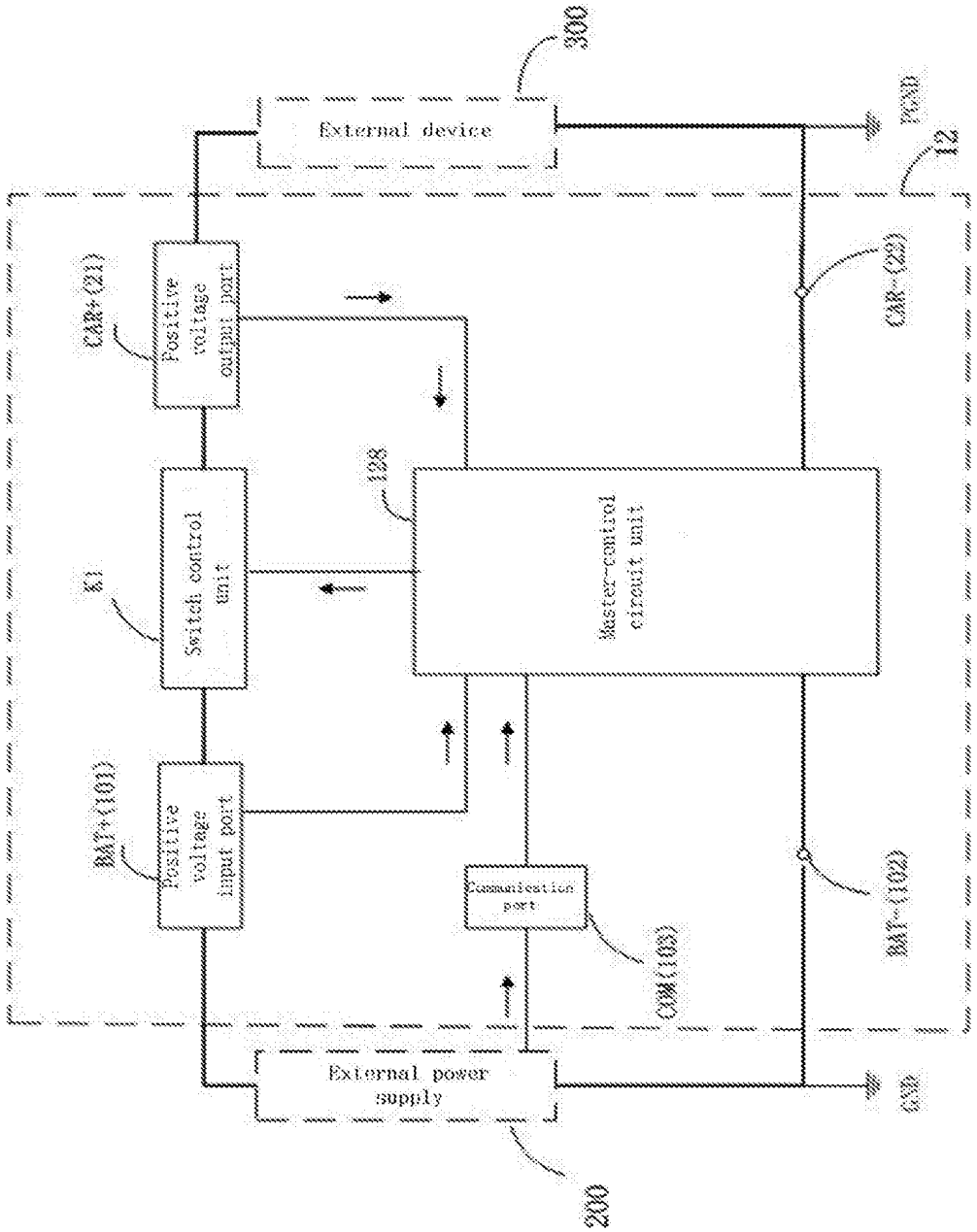

300
External device
POWER
12
CAR+(21)
Positive voltage output port
CAR-(22)
128
Master-control circuit unit
K1
Switch control unit
BAT+(101)
Positive voltage input port
Communication port
COM(103)
BAT-(102)
External power supply
GND
200

Fig. 4

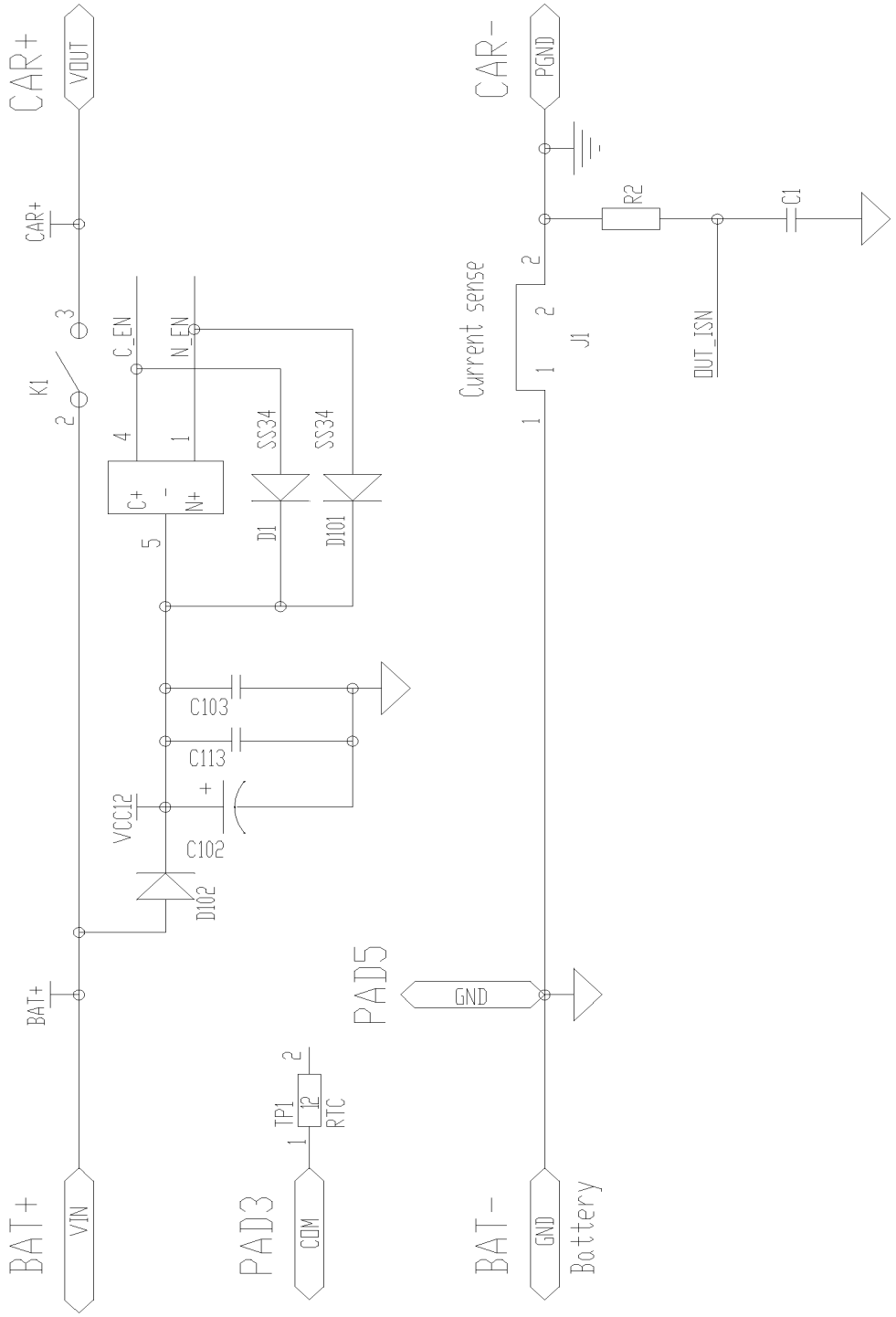

CAR+
VOUT
CAR+
3
K1
2
C_EN
N_EN
4
1
SS34
SS34
C+
-
N+
5
D1
D101
C103
C113
VCC12
+
C102
D102
BAT+
PAD5
GND
TP1
2
12
1
RTC
PAD3
COM
BAT+
VIN
BAT-
GND
Battery
CAR-
PGND
R2
C1
Current sense
2
2
J1
1
1
OUT_ISN

Fig. 5

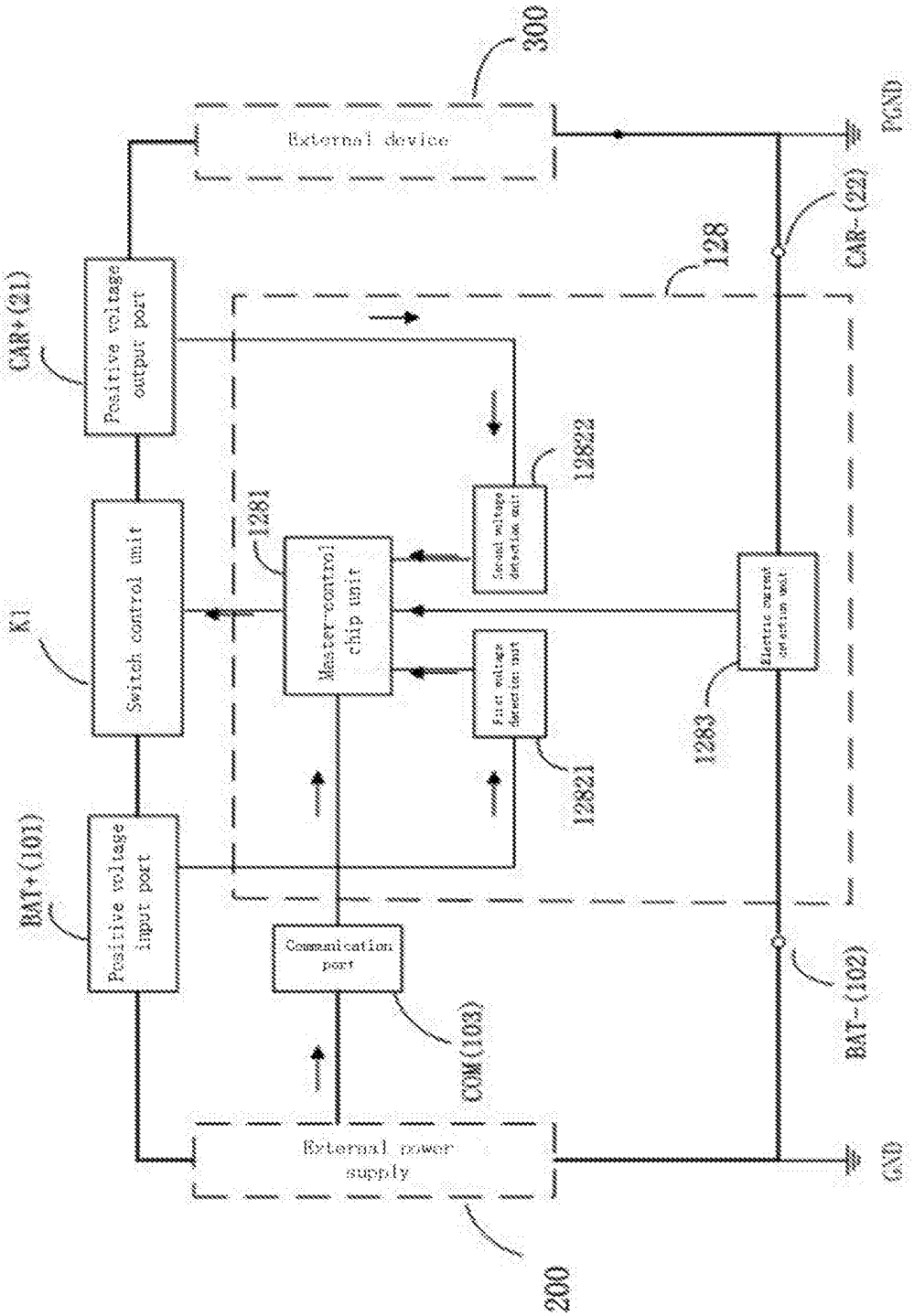

300
External device
PGND
CAR-(22)
128
CAR+(21)
Positive voltage output port
12822
Second voltage detection unit
1281
Master-control chip unit
K1
Switch control unit
First voltage detection unit
Electric current detection unit
12821
1283
BAT+(101)
Positive voltage input port
Communication port
COM(103)
BAT-(102)
External power supply
GND
200

Fig. 6

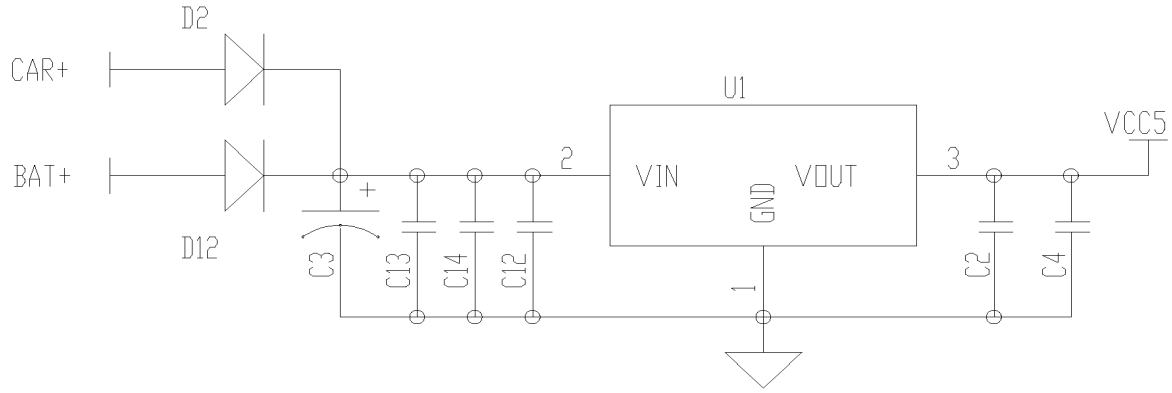

D2
CAR+
BAT+
D12
C3
C13
C14
C12
U1
VIN
VOUT
GND
2
3
1
C2
C4
VCC5

Fig. 7

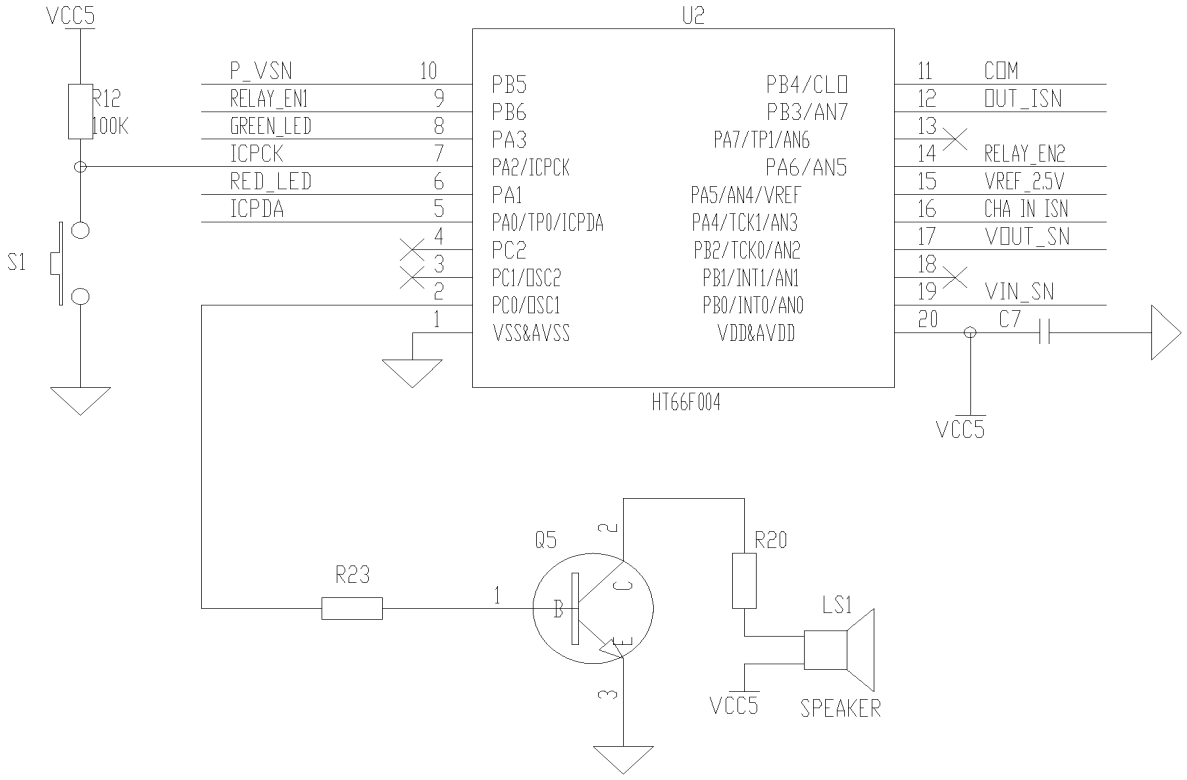

VCC5
R12
100K
S1
U2
P_VSN
RELAY_EN1
GREEN_LED
ICPCK
RED_LED
ICPDA
PB5
PB6
PA3
PA2/ICPCK
PA1
PA0/TP0/ICPDA
PC2
PC1/OSC2
PC0/OSC1
VSS&AVSS
PB4/CLO
PB3/AN7
PA7/TP1/AN6
PA6/AN5
PA5/AN4/VREF
PA4/TCK1/AN3
PB2/TCK0/AN2
PB1/INT1/AN1
PB0/INT0/AN0
VDD&AVDD
HT66F004
COM
OUT_ISN
RELAY_EN2
VREF_2.5V
CHA IN ISN
VOUT_SN
VIN_SN
C7
VCC5
Q5
R23
R20
LS1
B
C
E
VCC5
SPEAKER

Fig. 8

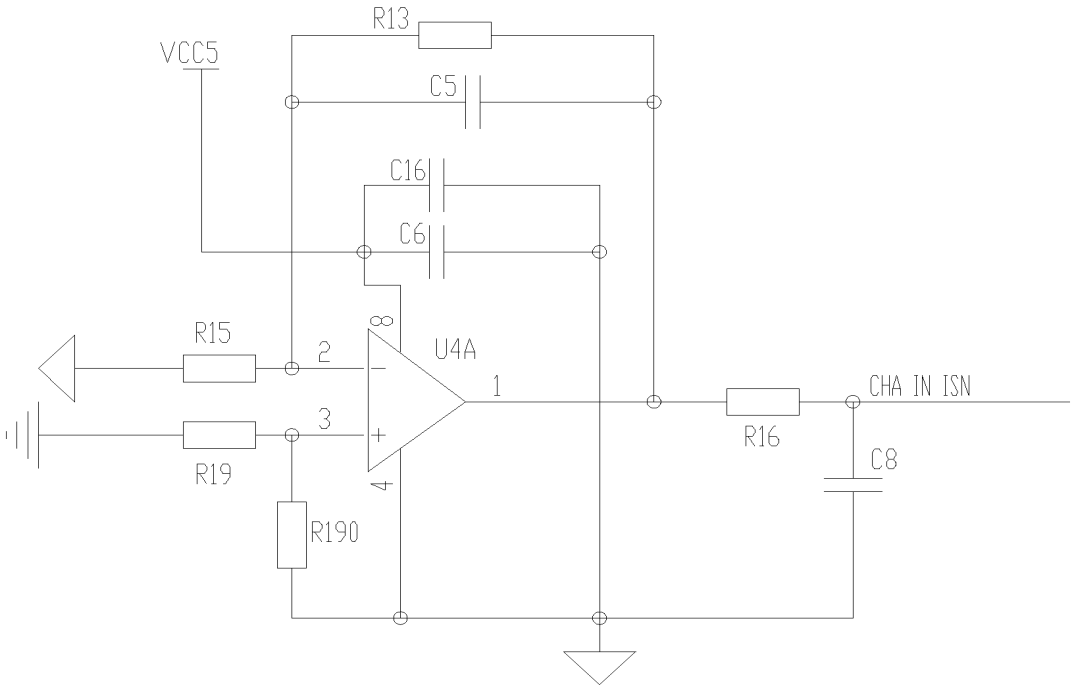

R13
VCC5
C5
C16
C6
R15
2
8
U4A
1
CHA IN ISN
3
R16
R19
4
C8
R190

Fig. 9

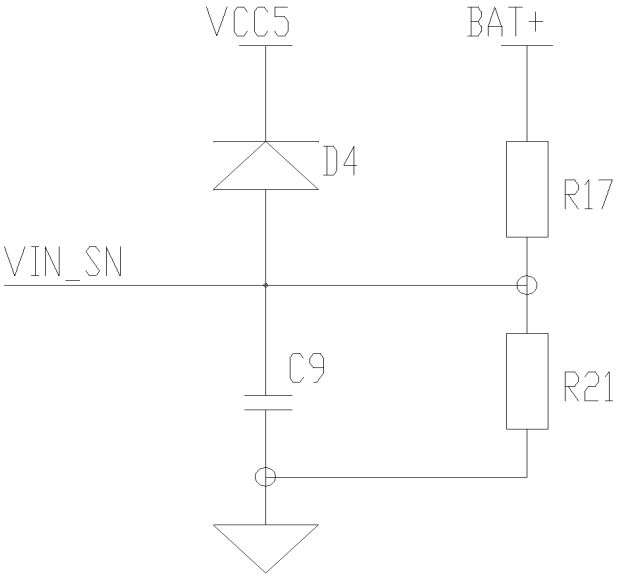

VCC5
BAT+
D4
R17
VIN_SN
C9
R21

Fig. 10

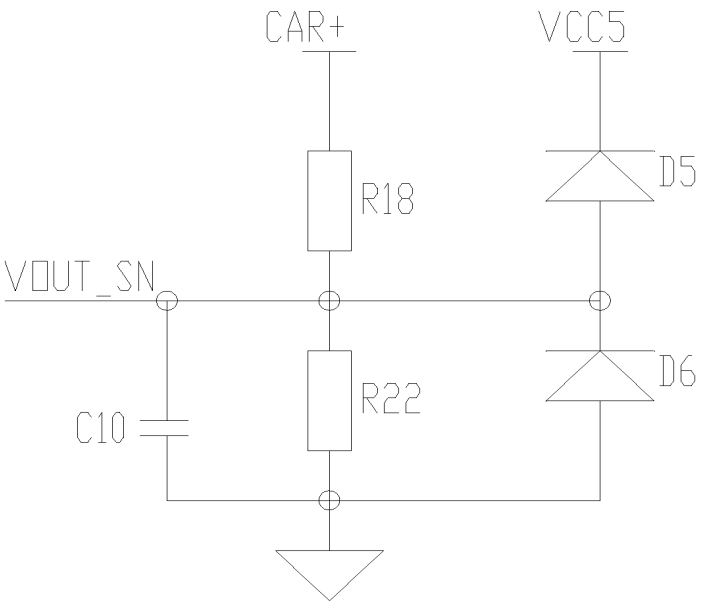


Fig. 11

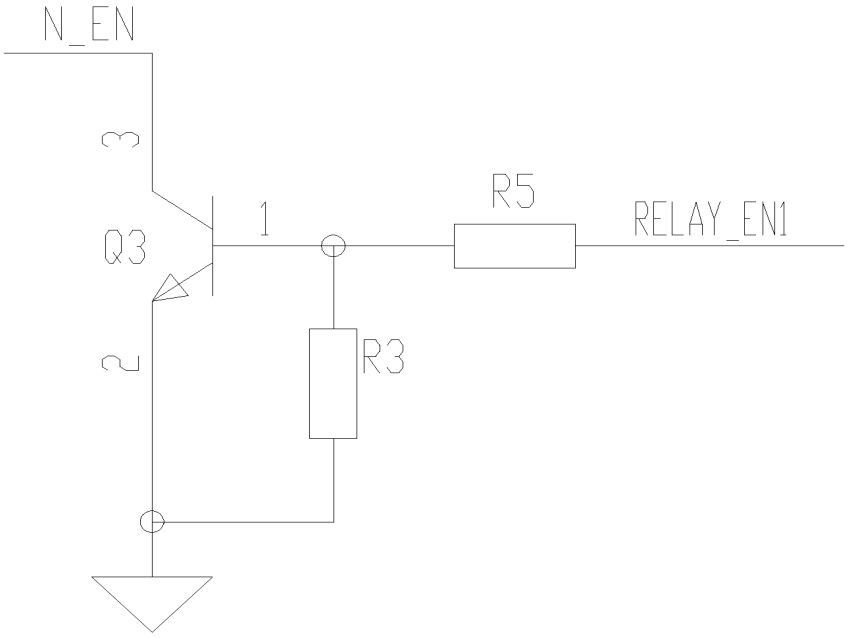


Fig. 12

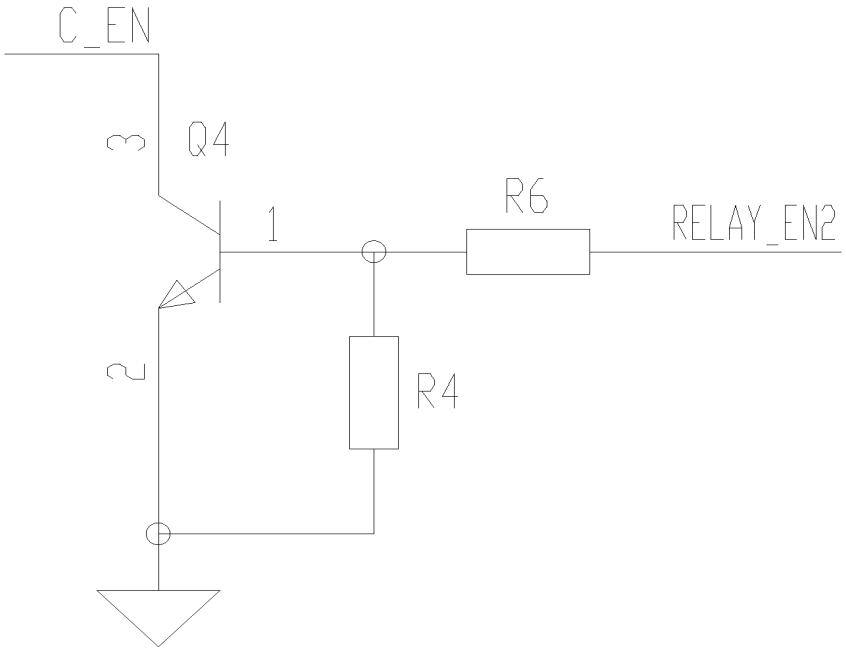


Fig. 13

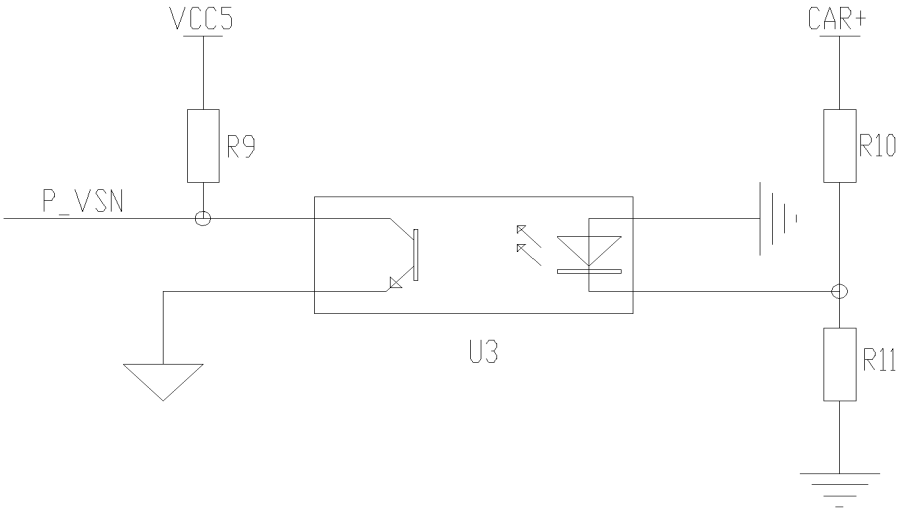


Fig. 14

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Application Number	
Filing Date	
First Named Inventor	Yun LEI
Title	A BATTERY CLAMP
Art Unit	
Examiner Name	
Attorney Docket Number	063313-8014US01

SIGNATURE of Applicant or Patent Practitioner

Signature	/James J. Zhu, Reg. No. 52,396/	Date (Optional)	
Name	James J. Zhu	Registration Number	52,396
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

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Name	Yun LEI		
Title	General Manager		

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ASSIGNMENT AND DECLARATION

FOR UTILITY OR DESIGN PATENT APPLICATION

ASSIGNMENT

WHEREAS I/We, the below named inventor(s), (thereinafter referred to as "Assignor(s)"), have invented one or more certain inventions (the "Invention(s)") described in a United States Patent Application entitled A BATTERY CLAMP (the "Application") and

☒ executed concurrently herewith; or

☐ filed on _____.

SHENZHEN CARKU TECHNOLOGY CO., LTD., a legal entity existing under the laws of People's Republic of China, having an address at No. 1 Building, Yifang Industrial Park, Bantian, Longgang District, Shenzhen, Guangdong, 518000, China (the "Assignee"), desires to acquire the entire right, title and interest in and to the Invention(s) and the Application, and in and to any patents (collectively, "Patents") that may be granted for the Invention(s) in the United States or in any foreign countries or regions in the world.

For valuable consideration, the receipt and sufficiency of which Assignors acknowledge, Assignors hereby sell, assign, and transfer to Assignee, its successors, legal representatives and assigns, any and all of our right, title and interest in and to: the Invention(s), the Application, and any Patents; any divisions, continuations, and continuations-in-part of the Application, any other application claiming the same priority rights as the Application or claiming priority rights from the Application; any reissues, reexaminations, or extensions of any and all Patents; the right to file foreign applications directly in the name of Assignee; and the right to claim priority rights deriving from the Application (collectively, the "Rights"), whether now existing or hereafter arising. Assignors warrant that he is the sole inventor of the Rights, and that the Rights are unencumbered. Assignors also agree to not sign any writing or do any act conflicting with this assignment, and, without further compensation, sign all documents and do such additional acts as Assignee deems necessary or desirable to: perfect Assignee's enjoyment of the Rights; prepare and prosecute the Application or any other applications for Patents; conduct

proceedings regarding the Rights, including any litigation or interference proceedings; or perfect or defend title to the Rights. Assignors request the Commissioner of Patents to issue any Patent of the United States that may be issued on the Invention(s) to Assignee.

DECLARATION OF INVENTOR(S)

As a named inventor below, I hereby declare that: (1) This declaration is directed to the above-identified application; (2) the above-identified application was made or authorized to be made by me; (3) I believe that I am an original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statements made in this declaration are punishable under 18 U. S. C. 1001 by fine or imprisonment of not more than five (5) years, or both.

As a named inventor below, I have reviewed and understand the contents of the application, including the claims, and am aware of the duty to disclose to the USPTO all information known to me to be material to patentability as defined in 37C.F.R. §1.56.

Assignor 1: Yun LEI 2016-8-18

Signature Date

Yun LEI
Print Name

Room A, 2/F, Block 1, Tongsheng Technology Building, Dalang Huahui Road, Longhua

New District, Shenzhen, Guangdong, China
Address

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	A BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Filer:	James J. Zhu
Attorney Docket Number:	063313-8014US01

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**730**

Electronic Acknowledgement Receipt

EFS ID:	26728697
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	A BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	James J. Zhu
Filer Authorized By:	
Attorney Docket Number:	063313-8014US01
Receipt Date:	23-AUG-2016
Filing Date:	
Time Stamp:	22:58:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$730
RAM confirmation Number	6427
Deposit Account	505311
Authorized User	ZHU, JAMES J

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	1_Transmittal.pdf	275735 c4c91fcb9eac0b59036f16f1cf91ccbe83e30cd0	no	2
Warnings:					
Information:					
2	Application Data Sheet	2_ADS.pdf	1503369 af304edfca0a5692a9fb93817838bd5a274404a4	no	6
Warnings:					
Information:					
3		3_Specification.pdf	163266 757cd434e558e47196eccf2e6b964e5b380a86ba	yes	21

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	17
Claims	18	20
Abstract	21	21

Warnings:					
Information:					
4	Drawings-only black and white line drawings	4_Drawings.pdf	3353025 f6e59a449596350b45b1996aea6035285dd1f755	no	10
Warnings:					
Information:					
5	Power of Attorney	5_POA.pdf	3241368 ca861081fabddfd90053df1483f3543c69c2c26a	no	4

Warnings:					
Information:					
6	Oath or Declaration filed	6_Assignment_and_Declaration.pdf	4329421 158e1129fa8cea0b14c38785e46496b4c8f4a7eb	no	2
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	34685 a0c2d08542eff44d25fef24e999c258c59d800e5	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	12900869	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT4020333

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
YUN LEI	08/18/2016

RECEIVING PARTY DATA

Name:	SHENZHEN CARKU TECHNOLOGY CO., LTD.
Street Address:	NO. 1 BUILDING, YIFANG INDUSTRIAL PARK, BANTIAN, LONGGANG DISTRICT
City:	SHENZHEN
State/Country:	CHINA

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	15245146

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 888 886 8168
Email: patent@junhe.com
Correspondent Name: JUN HE LAW OFFICES P.C.
Address Line 1: 2100 GENG ROAD
Address Line 2: SUITE 102
Address Line 4: PALO ALTO, CALIFORNIA 94303

ATTORNEY DOCKET NUMBER:	063313-8014US01
NAME OF SUBMITTER:	JAMES J. ZHU
SIGNATURE:	/James J. Zhu, Reg. No. 52,396/
DATE SIGNED:	08/23/2016
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 2
source=6_Assignment_and_Declaration#page1.tif
source=6_Assignment_and_Declaration#page2.tif

ASSIGNMENT AND DECLARATION

FOR UTILITY OR DESIGN PATENT APPLICATION

ASSIGNMENT

WHEREAS I/We, the below named inventor(s), (thereinafter referred to as "Assignor(s)"), have invented one or more certain inventions (the "Invention(s)") described in a United States Patent Application entitled A BATTERY CLAMP (the "Application") and

☒ executed concurrently herewith; or

☐ filed on _____.

SHENZHEN CARKU TECHNOLOGY CO., LTD., a legal entity existing under the laws of People's Republic of China, having an address at No. 1 Building, Yifang Industrial Park, Bantian, Longgang District, Shenzhen, Guangdong, 518000, China (the "Assignee"), desires to acquire the entire right, title and interest in and to the Invention(s) and the Application, and in and to any patents (collectively, "Patents") that may be granted for the Invention(s) in the United States or in any foreign countries or regions in the world.

For valuable consideration, the receipt and sufficiency of which Assignors acknowledge, Assignors hereby sell, assign, and transfer to Assignee, its successors, legal representatives and assigns, any and all of our right, title and interest in and to: the Invention(s), the Application, and any Patents; any divisions, continuations, and continuations-in-part of the Application, any other application claiming the same priority rights as the Application or claiming priority rights from the Application; any reissues, reexaminations, or extensions of any and all Patents; the right to file foreign applications directly in the name of Assignee; and the right to claim priority rights deriving from the Application (collectively, the "Rights"), whether now existing or hereafter arising. Assignors warrant that he is the sole inventor of the Rights, and that the Rights are unencumbered. Assignors also agree to not sign any writing or do any act conflicting with this assignment, and, without further compensation, sign all documents and do such additional acts as Assignee deems necessary or desirable to: perfect Assignee's enjoyment of the Rights; prepare and prosecute the Application or any other applications for Patents; conduct

proceedings regarding the Rights, including any litigation or interference proceedings; or perfect or defend title to the Rights. Assignors request the Commissioner of Patents to issue any Patent of the United States that may be issued on the Invention(s) to Assignee.

DECLARATION OF INVENTOR(S)

As a named inventor below, I hereby declare that: (1) This declaration is directed to the above-identified application; (2) the above-identified application was made or authorized to be made by me; (3) I believe that I am an original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statements made in this declaration are punishable under 18 U. S. C. 1001 by fine or imprisonment of not more than five (5) years, or both.

As a named inventor below, I have reviewed and understand the contents of the application, including the claims, and am aware of the duty to disclose to the USPTO all information known to me to be material to patentability as defined in 37C.F.R. §1.56.

Assignor 1: Yun LEI 2018-8-18

Signature Date

Yun LEI
Print Name

Room A, 2/F, Block 1, Tongsheng Technology Building, Dalang Huahui Road, Longhua

New District, Shenzhen, Guangdong, China
Address

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	063313-8014US01
	Application Number	
Title of Invention	A BATTERY CLAMP	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yun		LEI	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Shenzhen	Country of Residence i	CN

Mailing Address of Inventor:

Address 1	2/F, Block 1, Tongsheng Technology Building,		
Address 2	Dalang Huahui Road, Longhua New District		
City	Shenzhen	State/Province	
Postal Code		Country i	CN

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	96568		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	A BATTERY CLAMP		
Attorney Docket Number	063313-8014US01	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	10	Suggested Figure for Publication (if any)	

PTO/AIA/14 (03-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	063313-8014US01
	Application Number	
Title of Invention	A BATTERY CLAMP	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	96568		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201620692248.3	CN	2016-06-30	

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	063313-8014US01
	Application Number	
Title of Invention	A BATTERY CLAMP	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201610506106.8	CN	2016-06-30	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201610506137.3	CN	2016-06-30	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	063313-8014US01
	Application Number	
Title of Invention	A BATTERY CLAMP	

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	Shenzhen Carku Technology Co., Ltd.		
Mailing Address Information For Applicant:			
Address 1	No. 1 Building, Yifang Industrial Park, Bantian,		
Address 2	Longgang District		
City	Shenzhen	**State/Province**	
Country	CN	Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

If the Assignee is an Organization check here. ☐

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	063313-8014US01
	Application Number	
Title of Invention	A BATTERY CLAMP	

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/James J. Zhu, Reg. No. 52,396/			Date (YYYY-MM-DD)	2016-08-23
First Name	James	Last Name	Zhu	Registration Number	52396

Additional Signature may be generated within this form by selecting the Add button.

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Co o p eration Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/245,146	08/23/2016	2115	730	063313-8014US01	10	1

CONFIRMATION NO. 7477

FILING RECEIPT

96568
Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

OC000000085738054

Date Mailed: 09/13/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Yun LEI, Shenzhen, CHINA;

Applicant(s)

Shenzhen Carku Technology Co., Ltd., Shenzhen, CHINA;

Power of Attorney: The patent practitioners associated with Customer Number 96568

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
CHINA 201620692248.3 06/30/2016
CHINA 201610506106.8 06/30/2016
CHINA 201610506137.3 06/30/2016

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 09/12/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/245,146**
Projected Publication Date: To Be Determined - pending completion of Corrected Papers
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

BATTERY CLAMP

Preliminary Class

713

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

WINPLUS Ex. 1002, p. 57

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/245,146

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	10 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/245,146	08/23/2016	Yun LEI	063313-8014US01

CONFIRMATION NO. 7477

96568
Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

FORMALITIES LETTER

OC000000085738055

Date Mailed: 09/13/2016

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 4, 6.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 1, 4, 6 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cma/

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

in re Application of: Yun LEI	Examiner:
Application No.: 15/245,146	Art Unit: 2115
Filed: August 23, 2016	Conf. No: 7477
For: **BATTERY CLAMP**	Customer No.: 96568

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice to File Corrected Application Papers mailed on September 13, 2016 regarding the above-mentioned application, the applicant respectfully submits the following:

Amendments to the drawings on page 2;
Remarks on page 3.

AMENDMENTS TO THE DRAWINGS

1) Figures 1, 4 and 6 are replaced by clearer drawings of the same contents, respectively.

2) The figure number of figure 5 is re-orientated to be in the same direction as the view.

The replacement sheets including the amended drawings are attached to the response.

Please use the replacement sheets to replace the original drawings of the application.

REMARKS

Objections to the Drawings

The applicant has amended the drawings to correct the informalities of the drawings indicated in the notice.

The replacement sheets and annotated sheets of the drawings are attached to the response.

CONCLUSION

The applicant believes that, with the amendments and the present response, all the amended claims are in full condition for allowance and a notification of such allowance is respectfully requested. Should the Examiner have any further questions or reservations, the Examiner is invited to telephone the undersigned attorney at (650) 265-2682.

Respectfully submitted,
Jun He Law Offices P.C.

Dated: September 28, 2016

/James J. Zhu, Reg. No. 52,396/
James J. Zhu, Ph.D.
Reg. No. 52,396

Correspondence Address:
Customer No. 96568
Jun He Law Offices P.C.
2100 Geng Road., Suite.102
Palo Alto, CA 94303
Tel: 1-888-8868168
Fax: 1-888-8082168

1/10

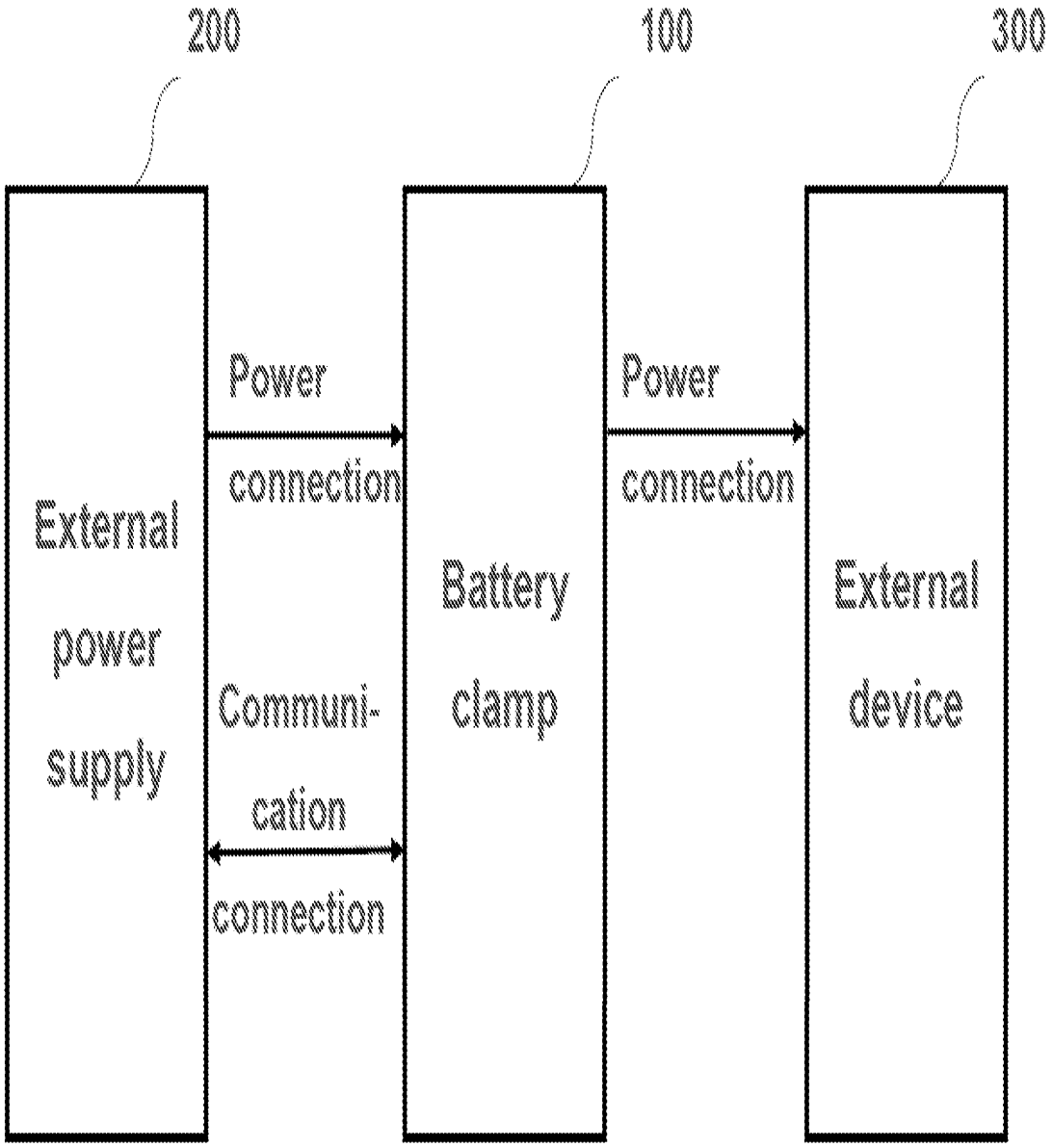

200
100
300
External power supply
Power connection
Communi-cation connection
Battery clamp
Power connection
External device

Fig. 1

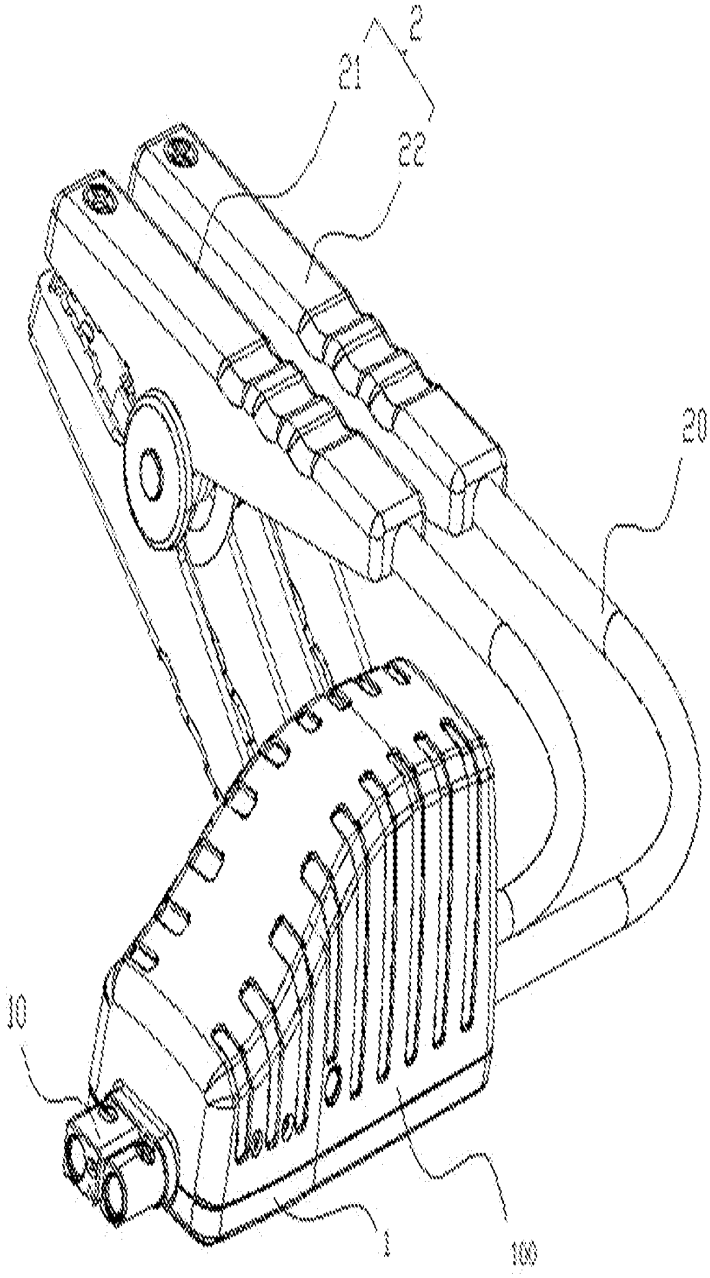


Fig. 2

3/10

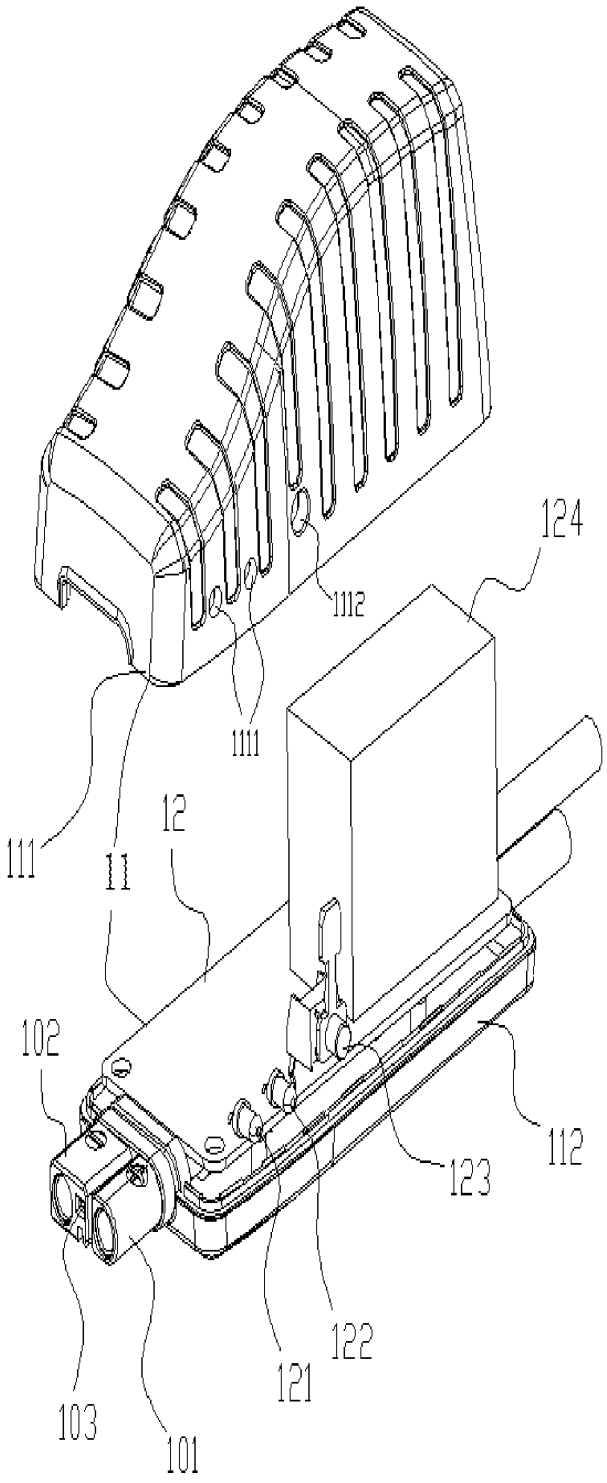


Fig. 3

4/10

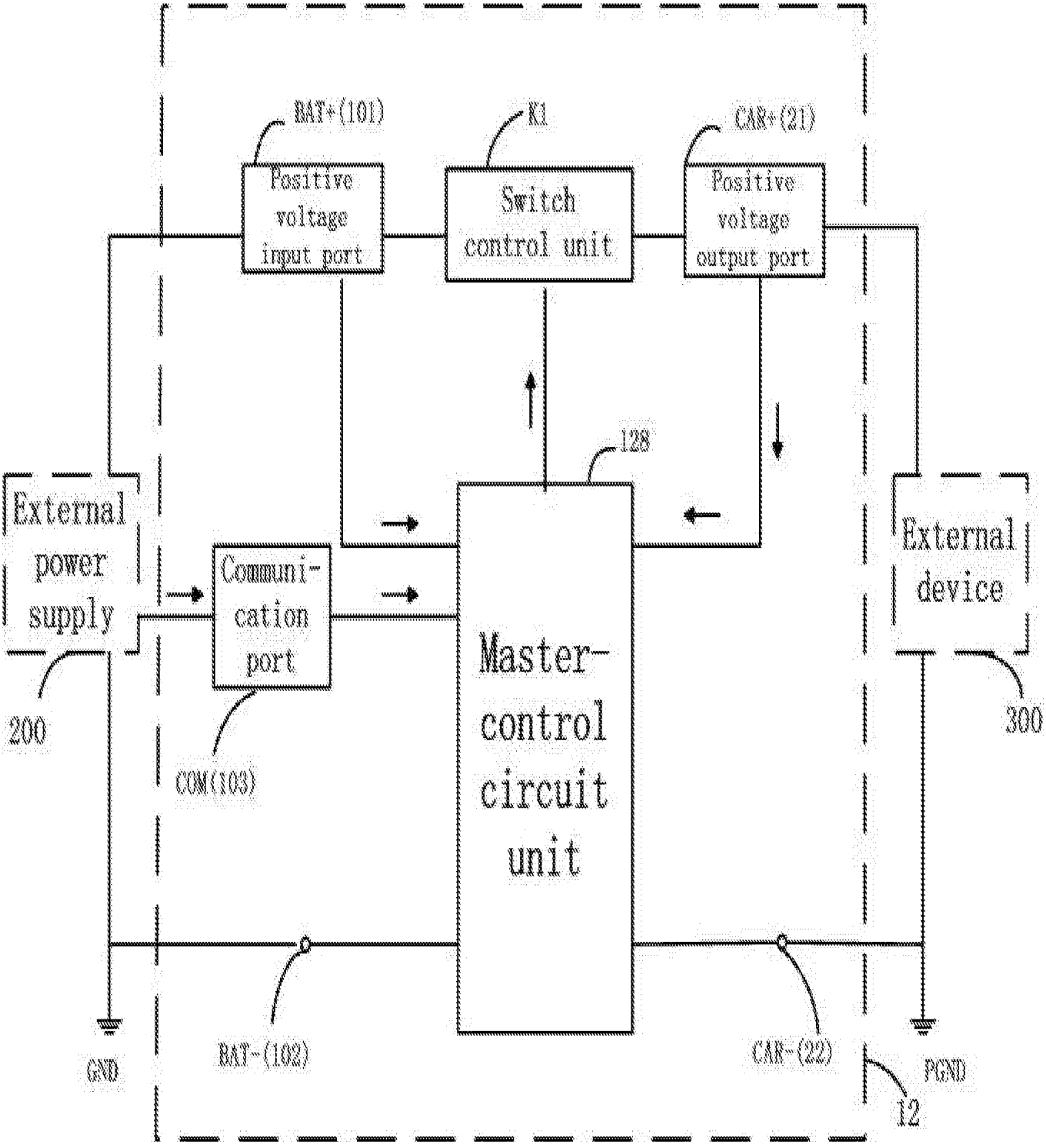

BAT+(101)
K1
CAR+(21)
Positive voltage input port
Switch control unit
Positive voltage output port
128
External power supply
Communi-cation port
Master-control circuit unit
External device
200
COM(103)
300
GND
BAT-(102)
CAR-(22)
PGND
12

Fig. 4

5/10

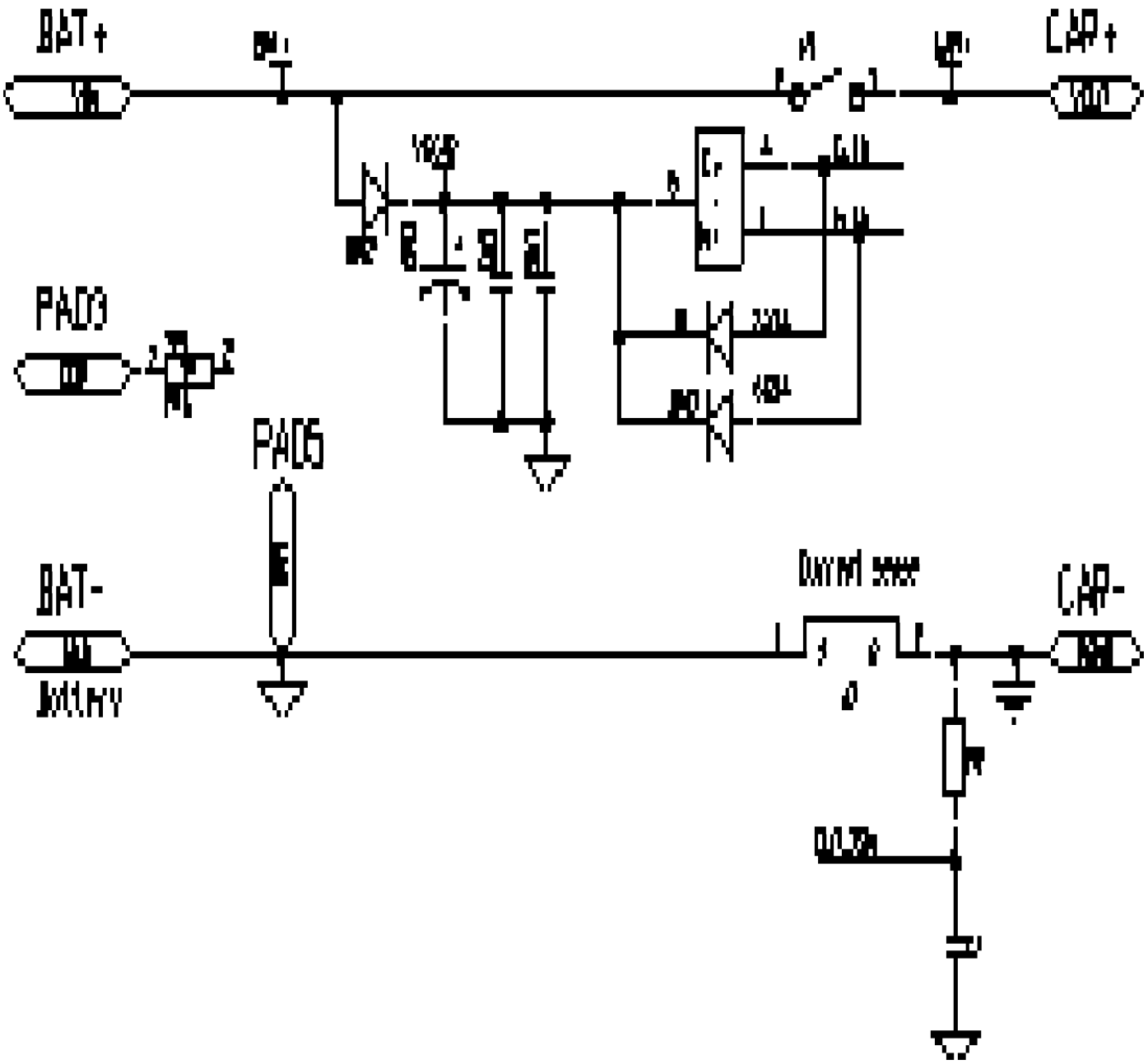


Fig. 5

6/10

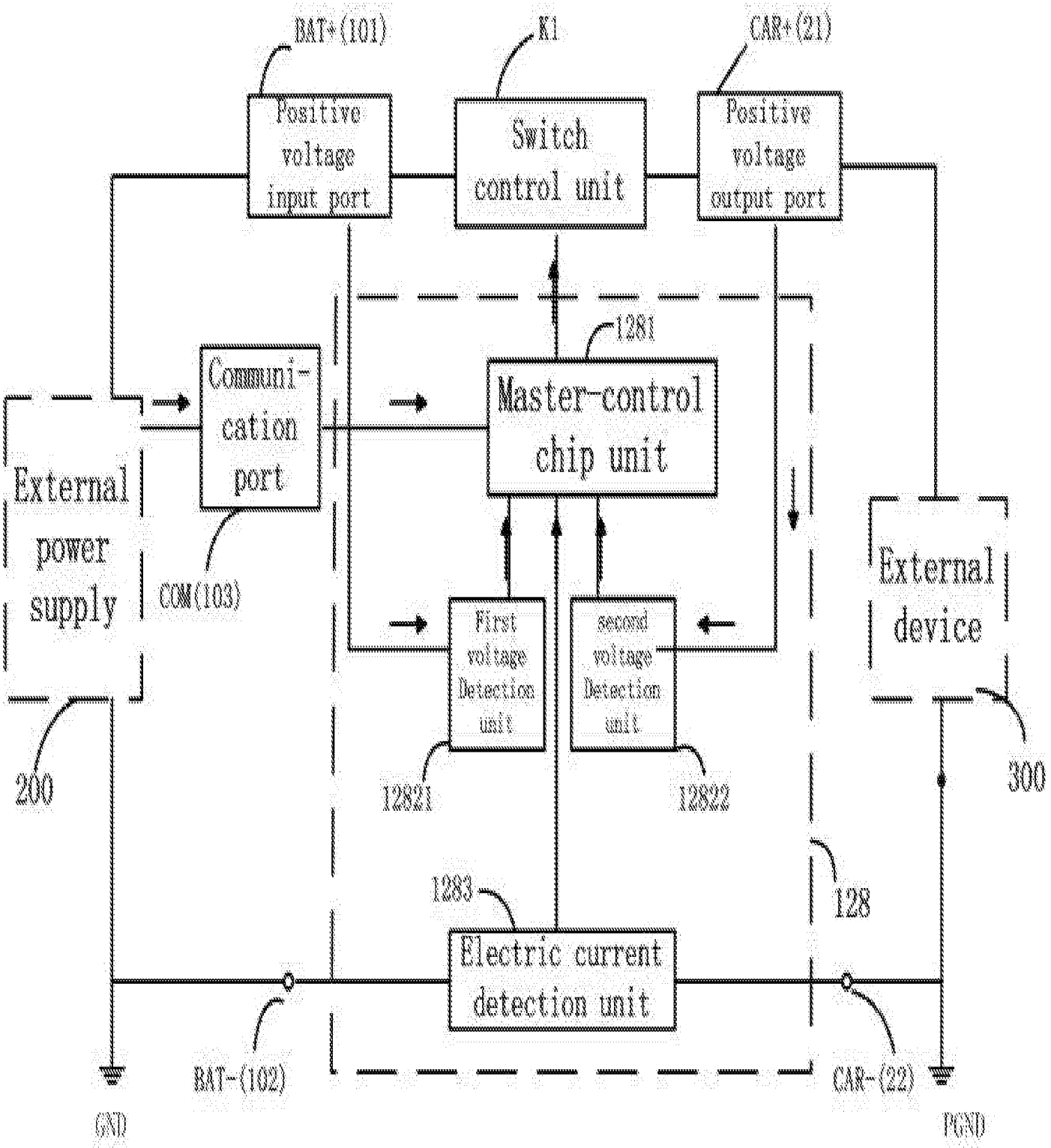

BAT+(101)
K1
CAR+(21)
Positive voltage input port
Switch control unit
Positive voltage output port
1281
Communi-cation port
Master-control chip unit
External power supply
COM(103)
First voltage Detection unit
second voltage Detection unit
External device
200
12821
12822
300
1283
128
Electric current detection unit
BAT-(102)
CAR-(22)
GND
PGND

Fig. 6

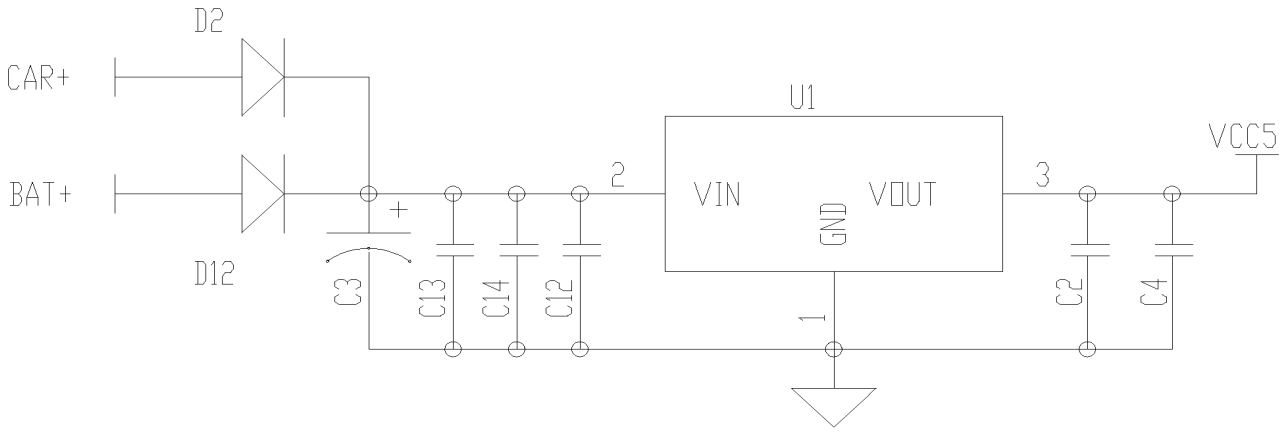


Fig. 7

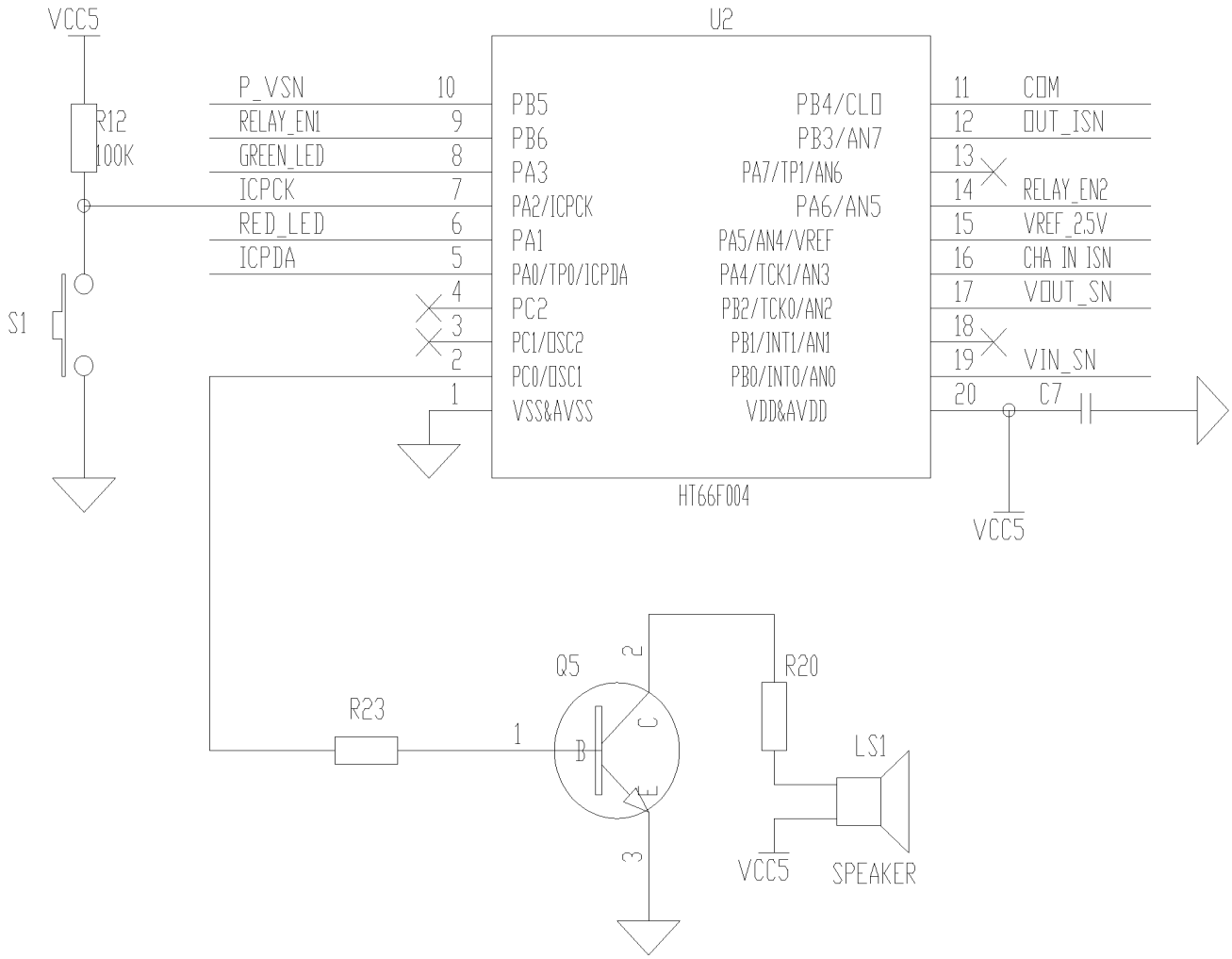


Fig. 8

WINPLUS Ex. 1002, p. 70

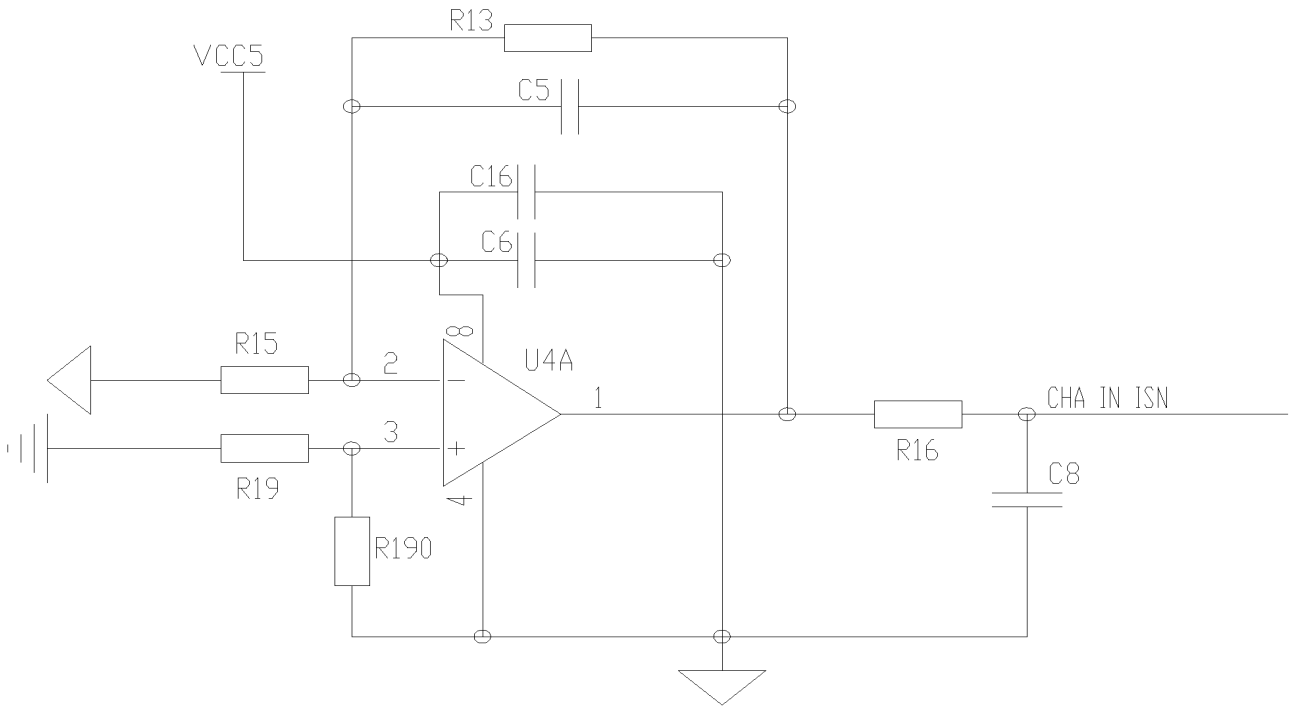

R13
VCC5
C5
C16
C6
R15
2
8
U4A
1
CHA IN ISN
3
R16
R19
4
C8
R190

Fig. 9

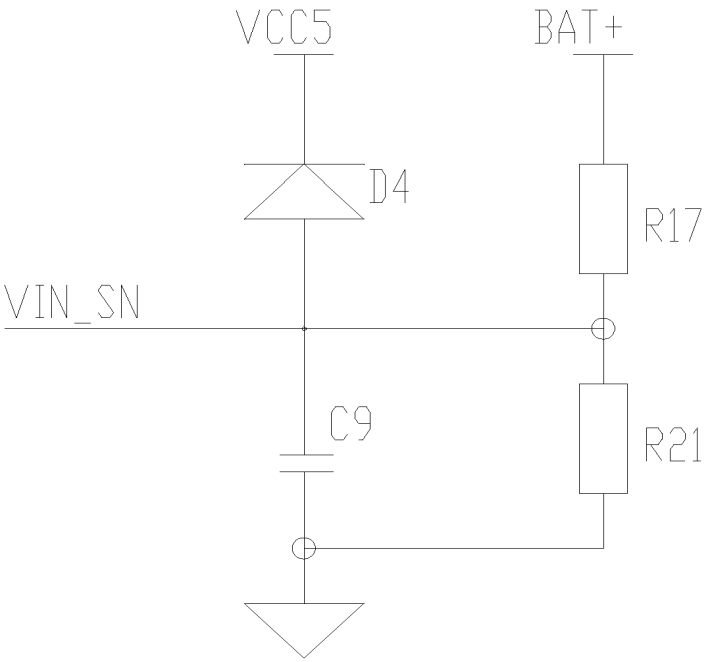

VCC5
BAT+
D4
R17
VIN_SN
C9
R21

Fig. 10

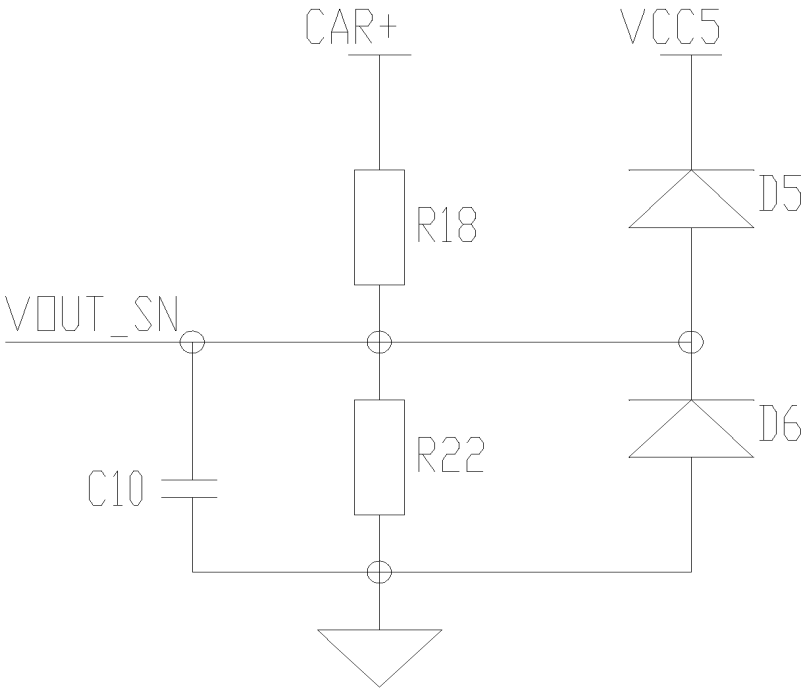


Fig. 11

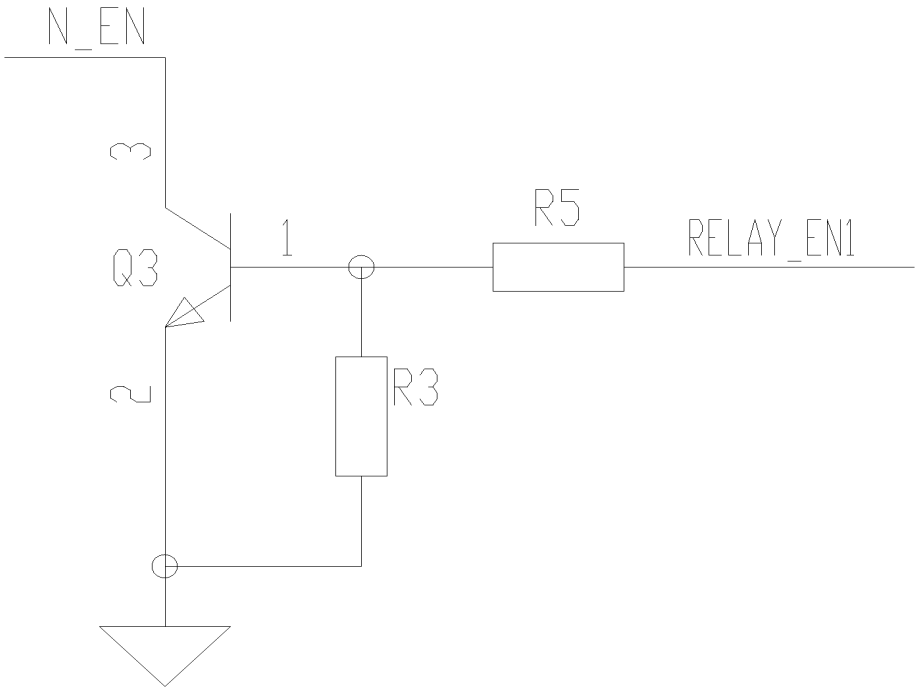


Fig. 12

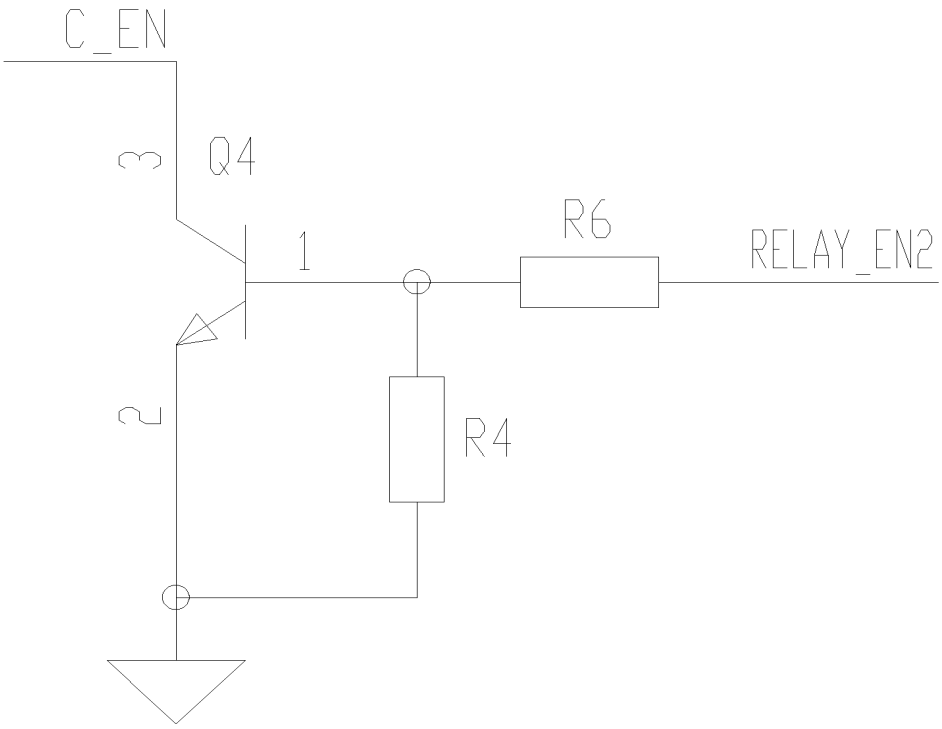


Fig. 13

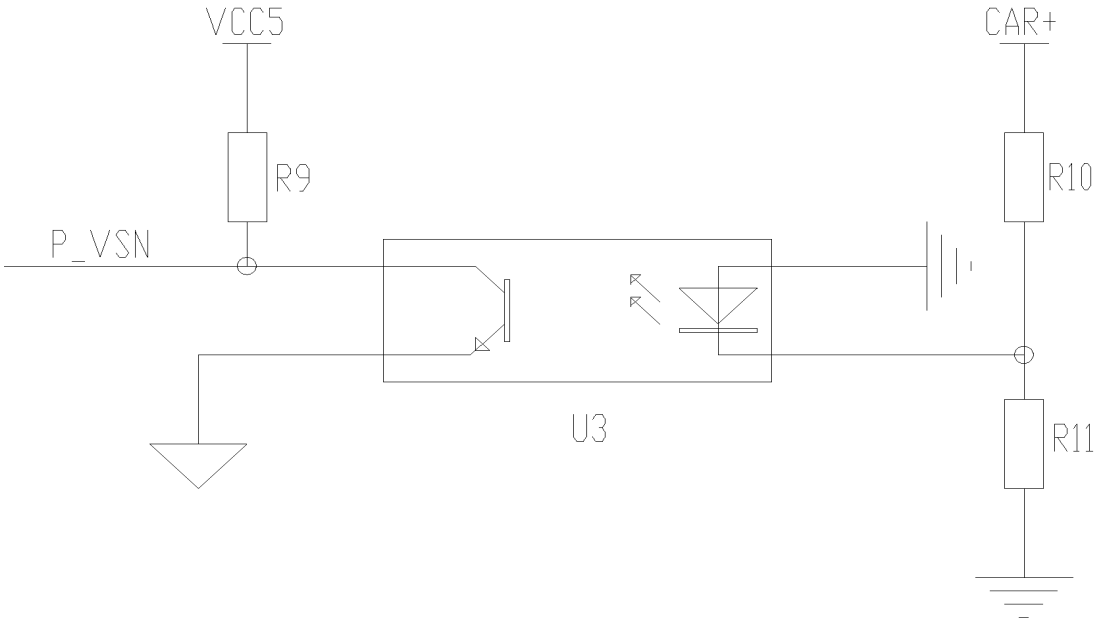
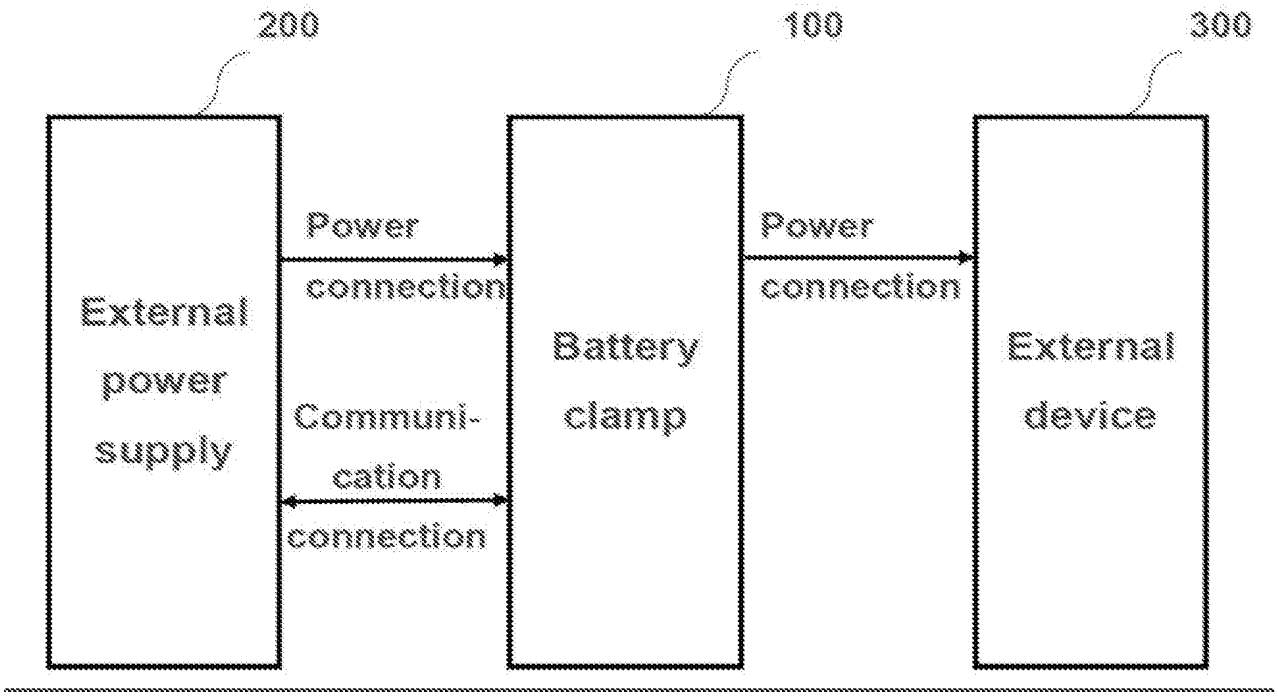


Fig. 14


200
100
300
External power supply
Power connection
Communi-cation connection
Battery clamp
Power connection
External device

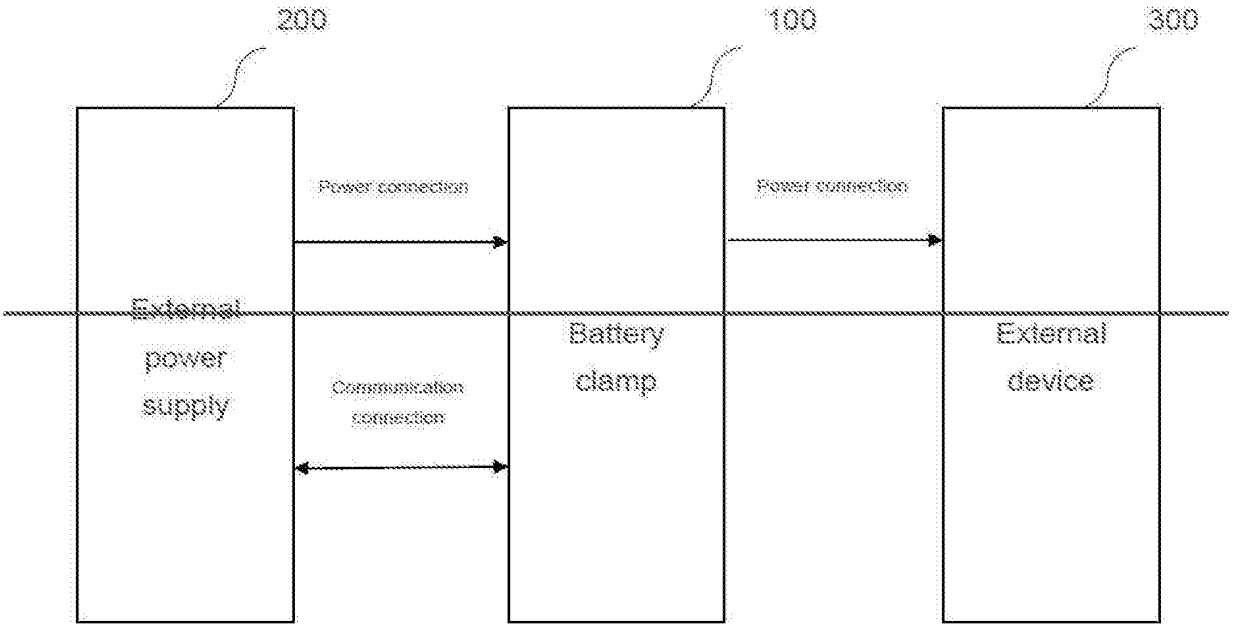

200
100
300
Power connection
Power connection
External power supply
Communication connection
Battery clamp
External device

Fig. 1

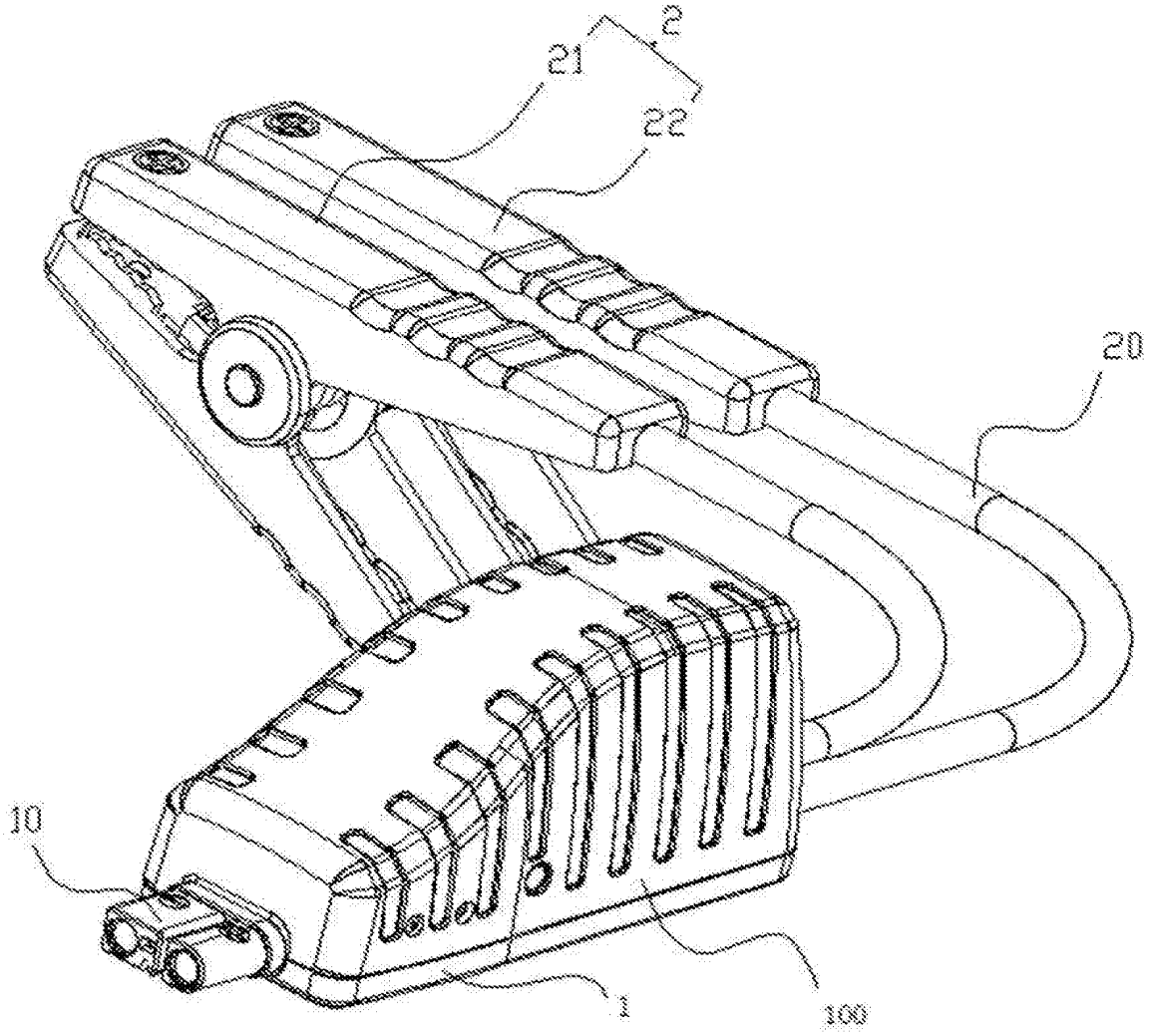


Fig. 2

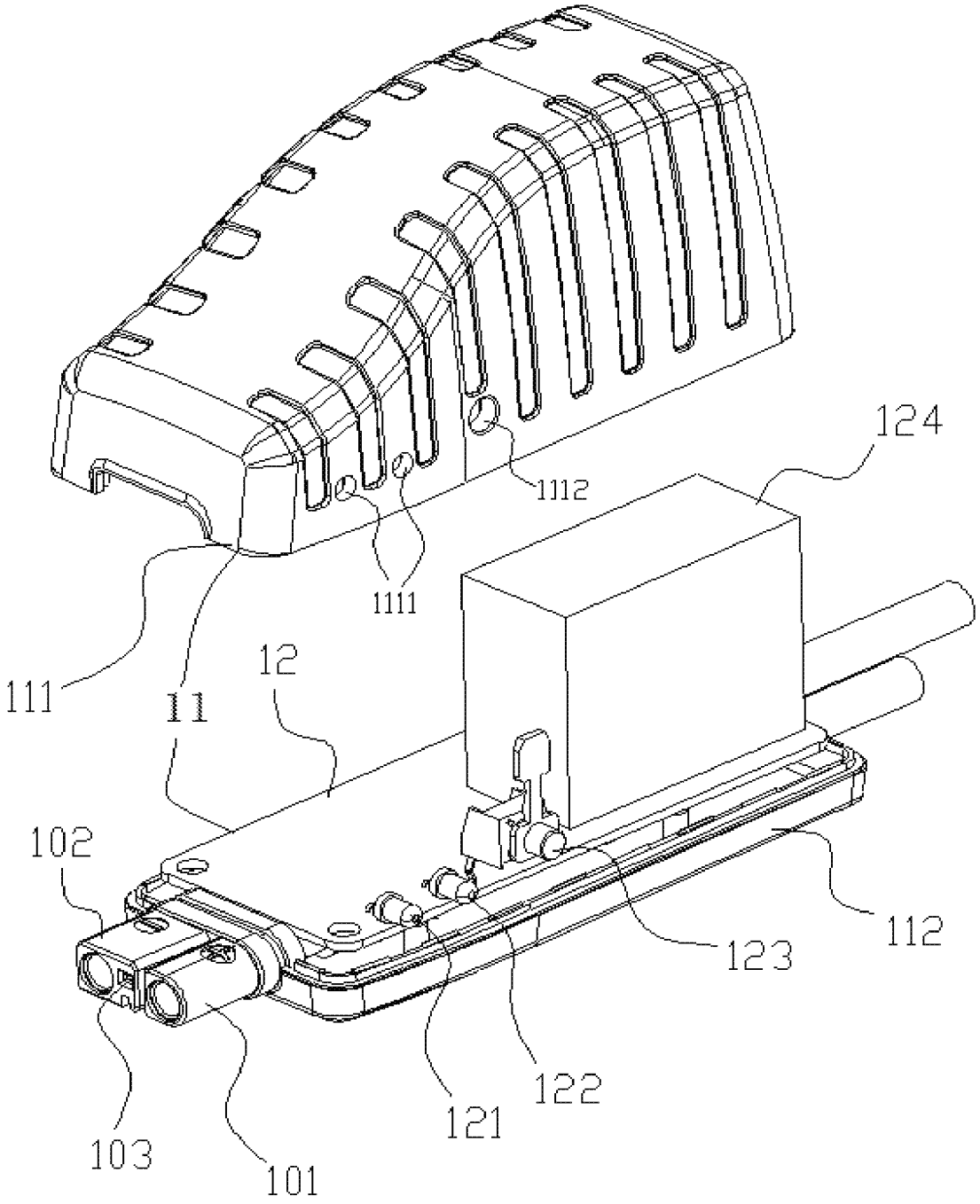
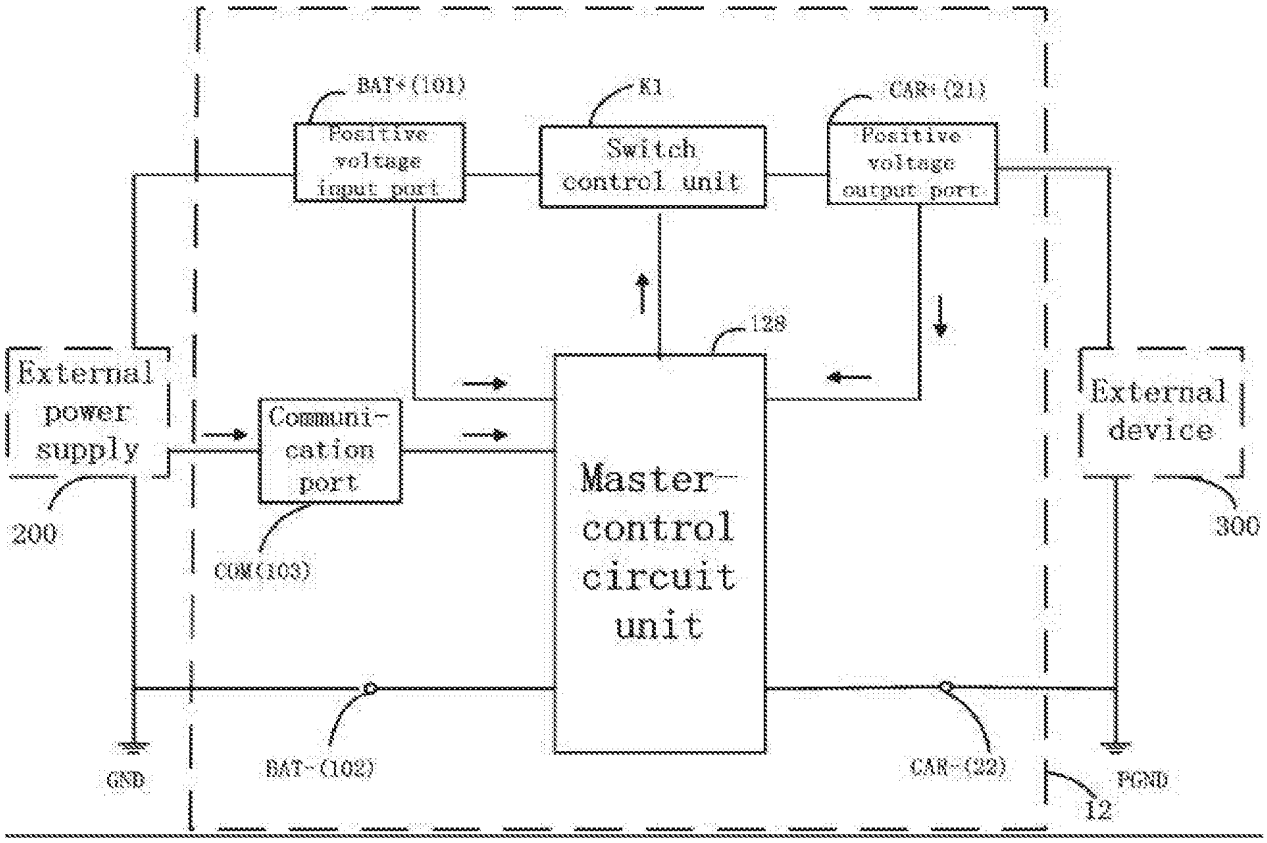


Fig. 3

WINPLUS Ex. 1002, p. 76


BAT+(101)
Positive voltage input port
81
Switch control unit
CAR+(21)
Positive voltage output port
128
External power supply
200
Communi-cation port
COM(103)
Master-control circuit unit
External device
300
GND
BAT-(102)
CAR-(22)
PGND
12

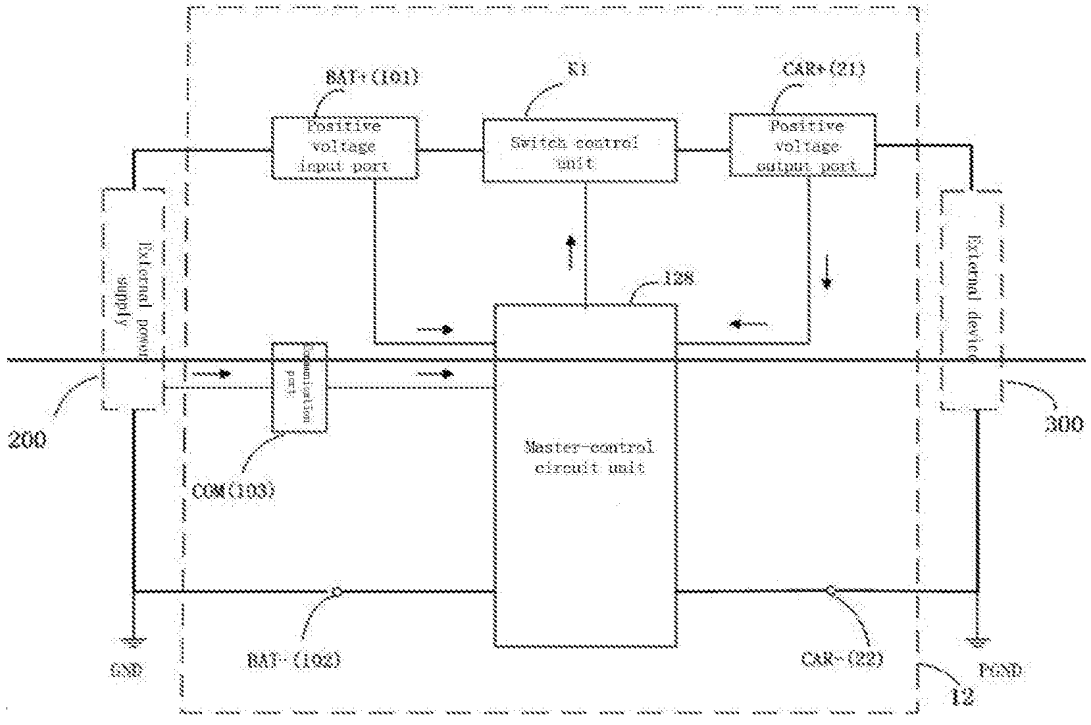
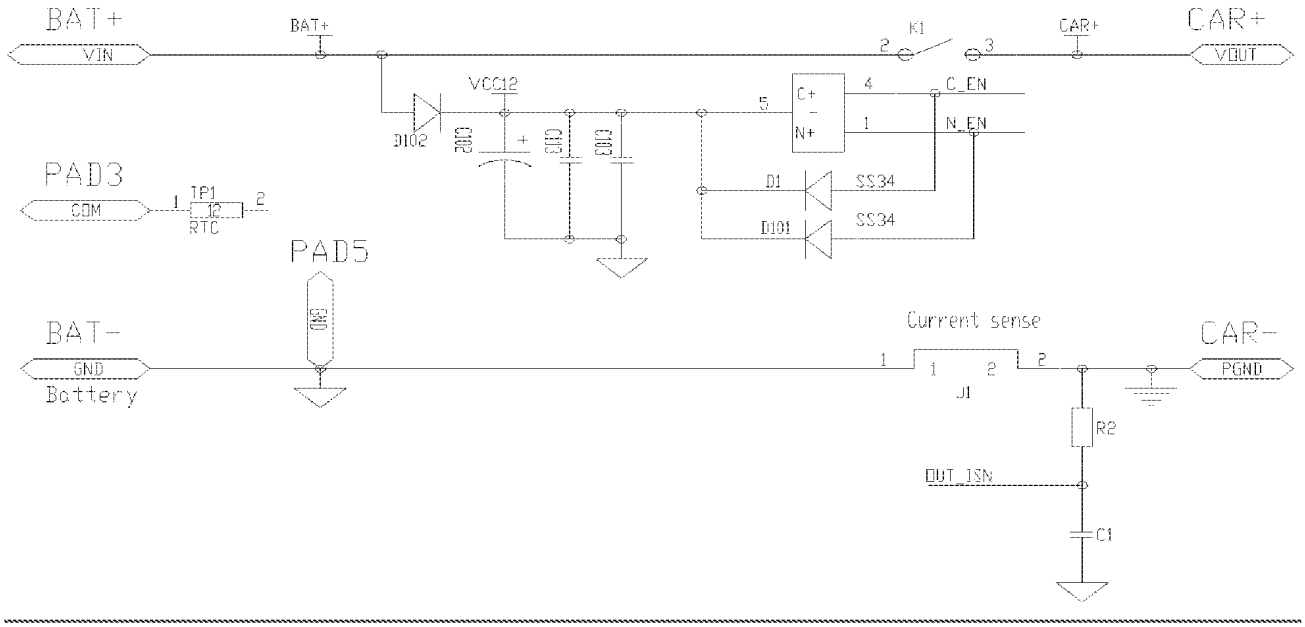

BAT+(101)
Positive voltage input port
81
Switch control unit
CAR+(21)
Positive voltage output port
External power supply
128
External device
200
COM(103)
Master-control circuit unit
300
GND
BAT-(102)
CAR-(22)
PGND
12

Fig. 4


BAT+
VIN
BAT+
K1
2
3
CAR+
CAR+
VOUT
VCC12
D102
C102
C103
C101
5
C+
N+
4
1
C_EN
N_EN
D1
SS34
D101
SS34
PAD3
COM
TP1
J2
RTC
1
2
PAD5
GND
BAT-
GND
Battery
Current sense
1
1
2
2
J1
CAR-
PGND
R2
OUT_ISN
C1

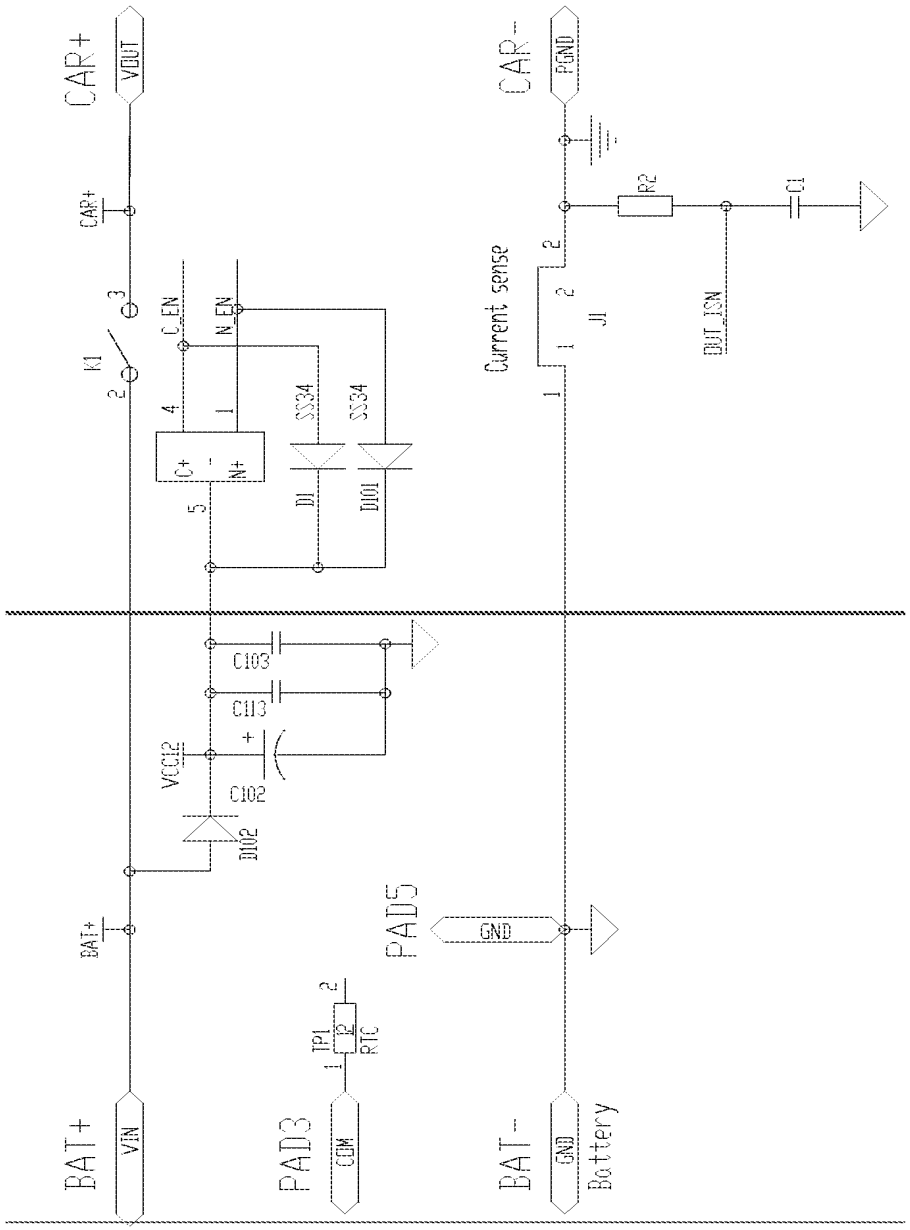
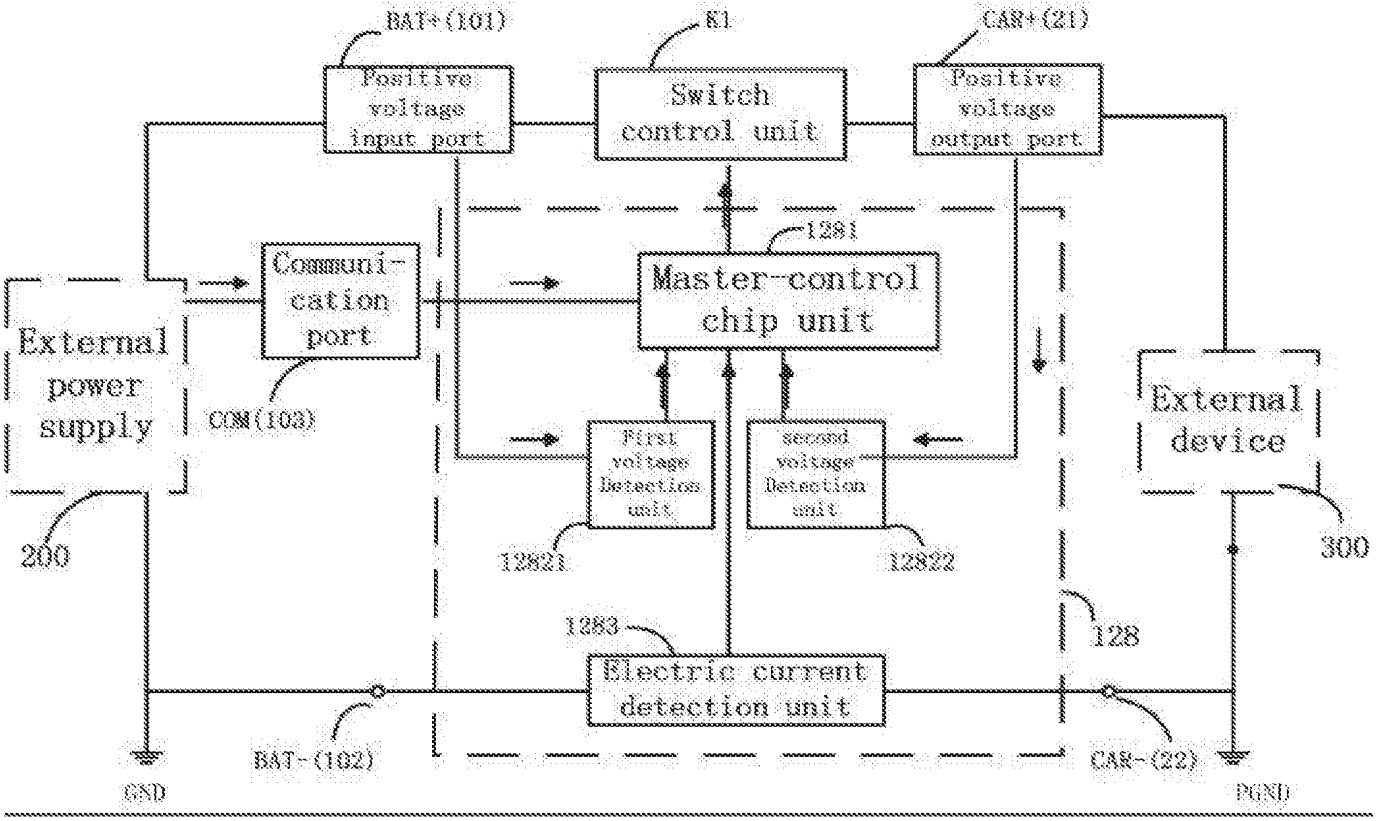

CAR+
VBUT
CAR-
PGND
CAP+
C_EN
N_EN
K1
SS34
SS34
C+
N+
D1
D101
R2
C1
Current sense
J1
OUT_ISN
C103
C113
VCC12
C102
D102
BAT+
PAD5
GND
TP1
R2
RTC
BAT+
VIN
PAD3
COM
BAT-
GND
Battery

Fig. 5


BAT+(101)
K1
CAR+(21)
Positive voltage input port
Switch control unit
Positive voltage output port
1281
Communi-cation port
Master-control chip unit
External power supply
CON(103)
First voltage Detection unit
second voltage Detection unit
External device
200
12821
12822
300
1283
128
Electric current detection unit
BAT-(102)
CAR-(22)
GND
PGND

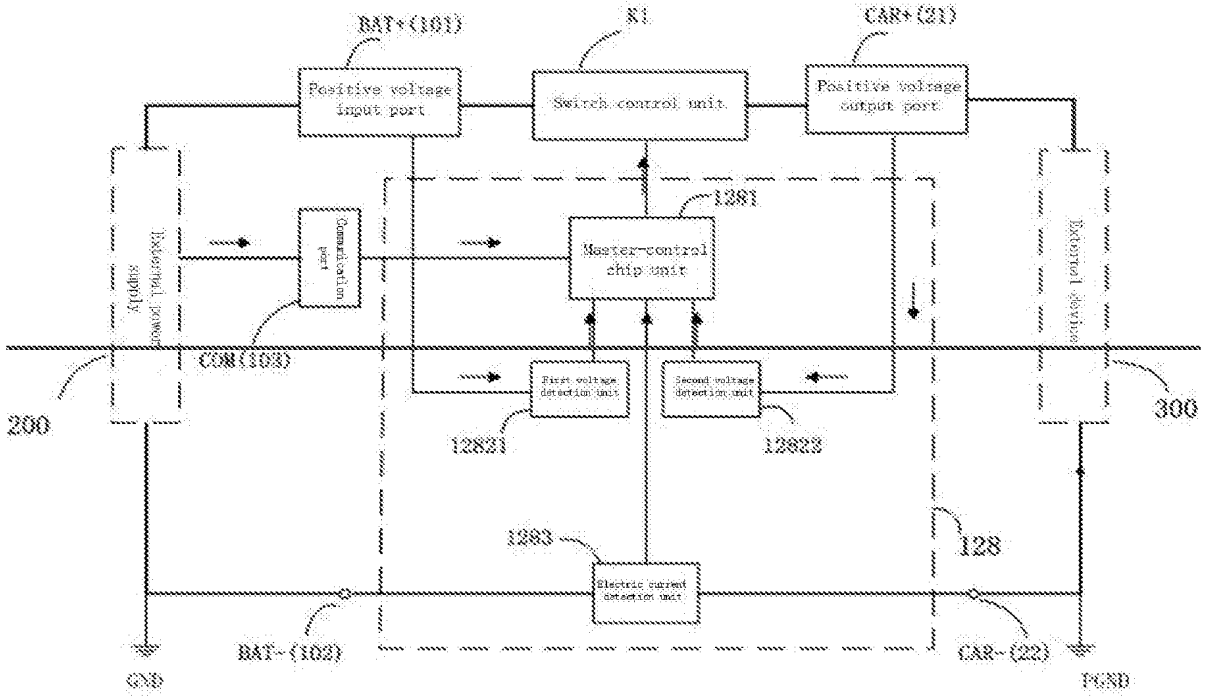

BAT+(101)
K1
CAR+(21)
Positive voltage input port
Switch control unit
Positive voltage output port
1281
Communication port
Master-control chip unit
External power supply
External device
CON(103)
First voltage detection unit
Second voltage detection unit
200
300
12821
12822
1283
128
Electric current detection unit
BAT-(102)
CAR-(22)
GND
PGND

Fig. 6

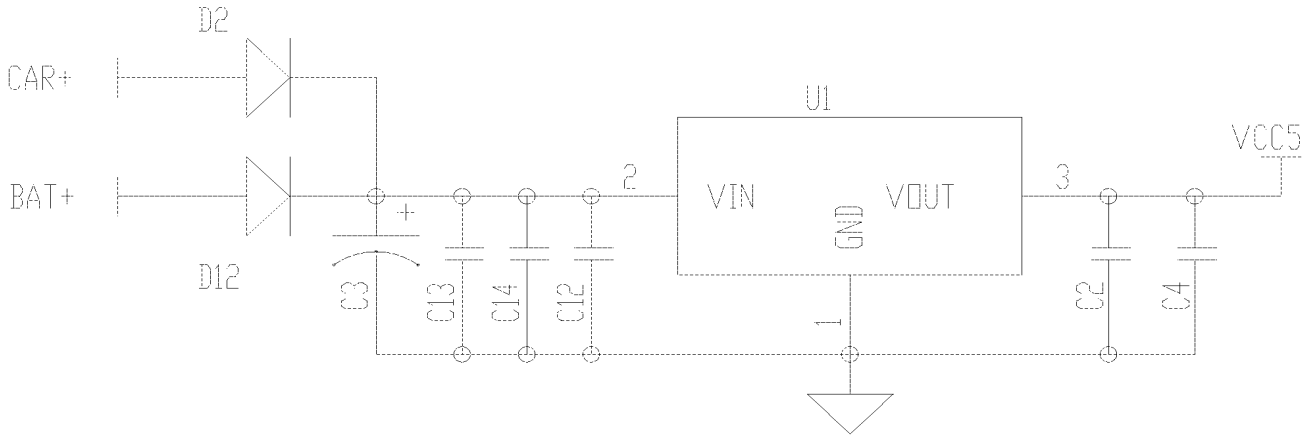


Fig. 7

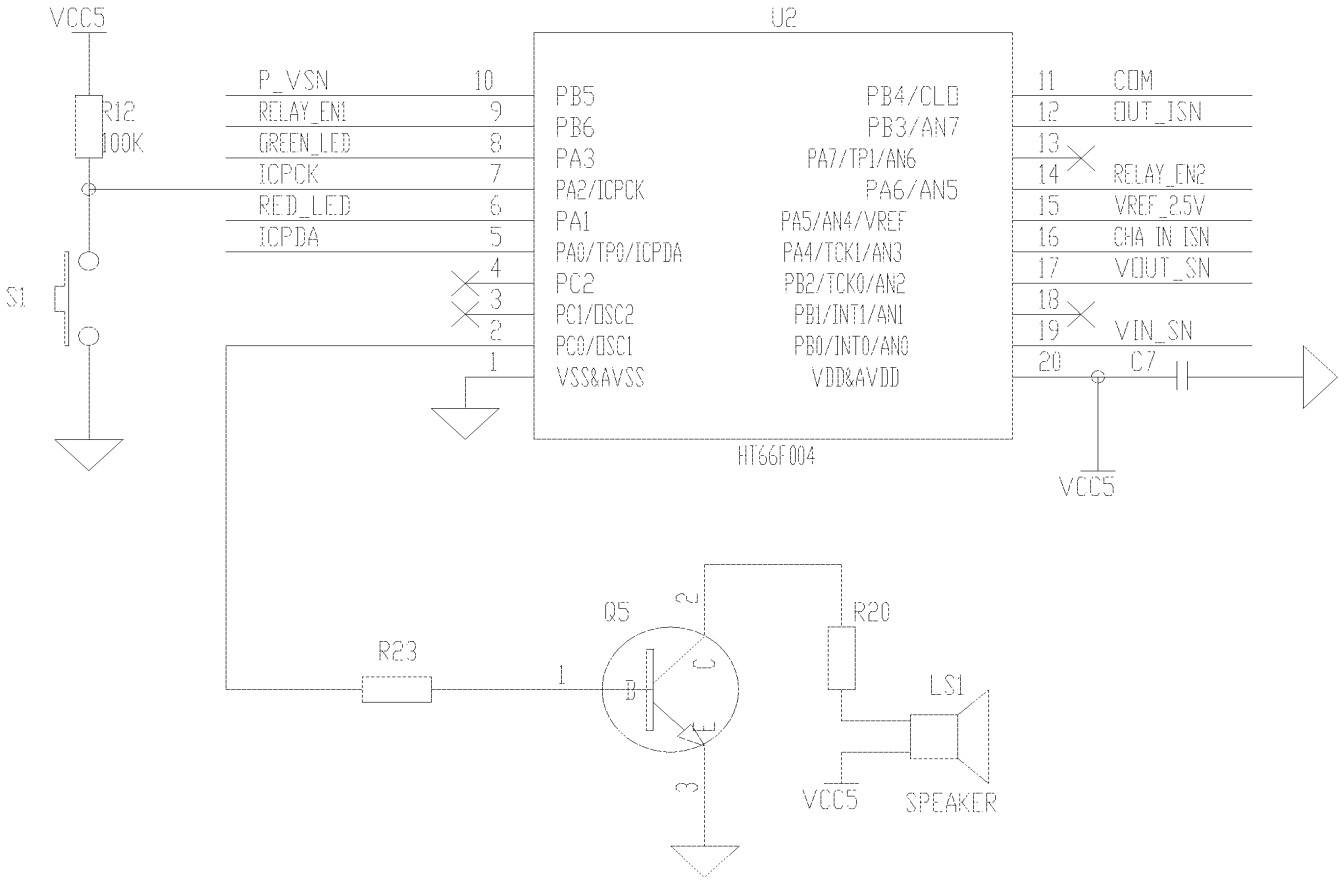


Fig. 8

WINPLUS Ex. 1002, p. 81

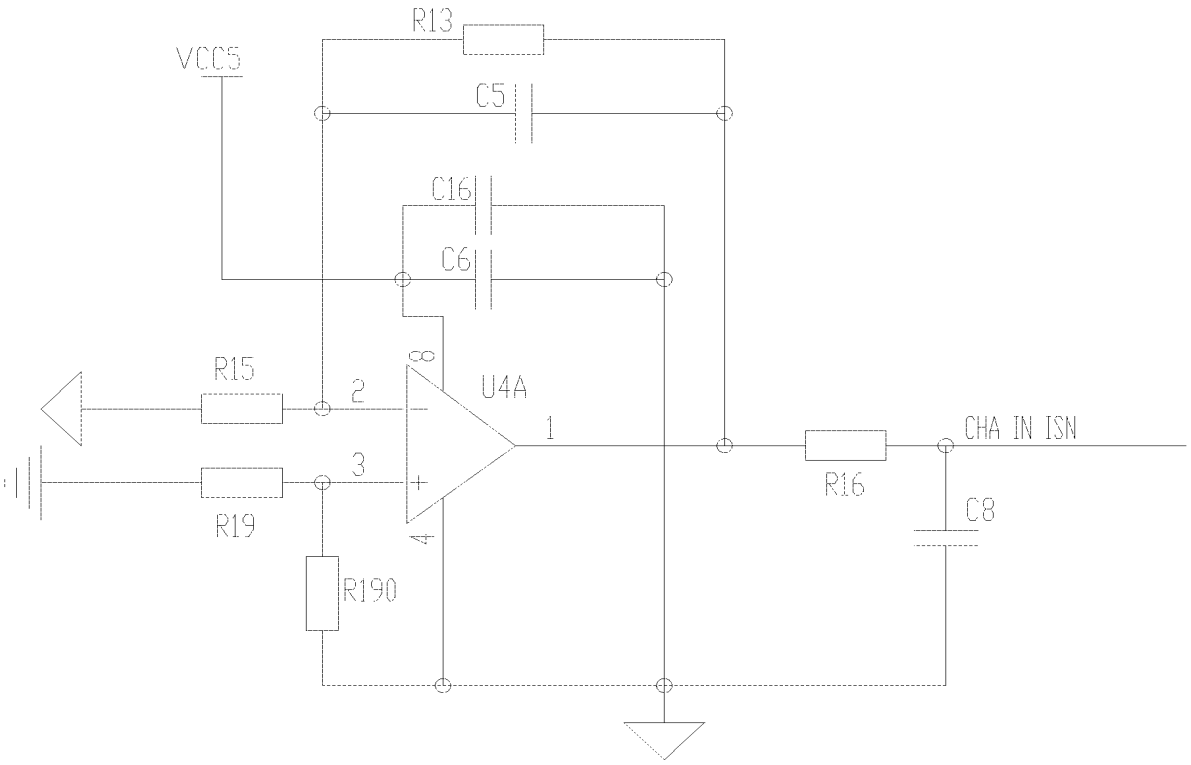

R13
VCC5
C5
C16
C6
R15
2
8
U4A
1
CHA IN ISN
3
R16
R19
4
C8
R190

Fig. 9

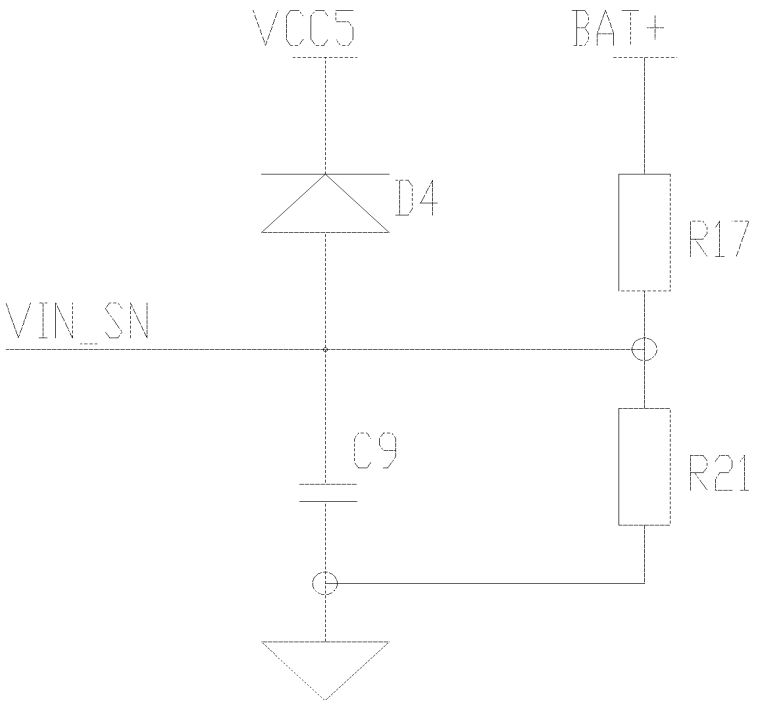

VCC5
BAT+
D4
R17
VIN_SN
C9
R21

Fig. 10

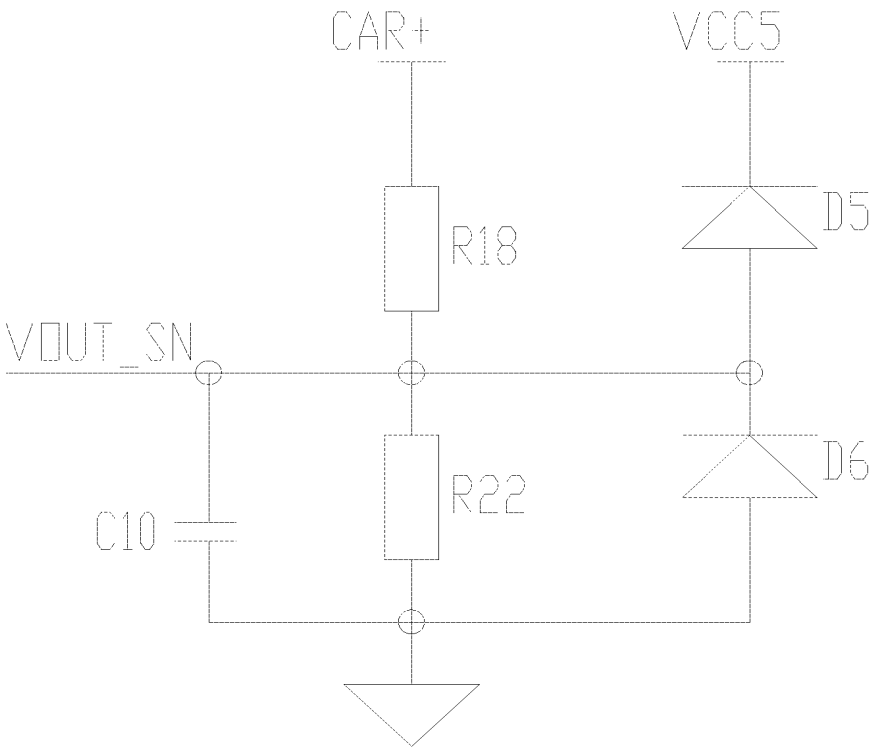


Fig. 11

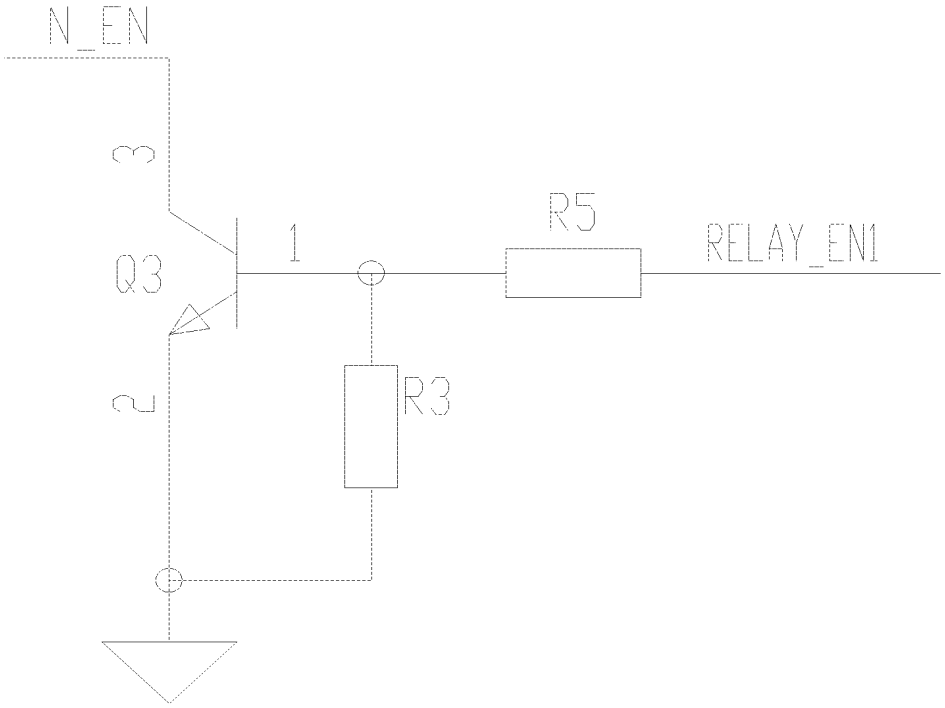


Fig. 12

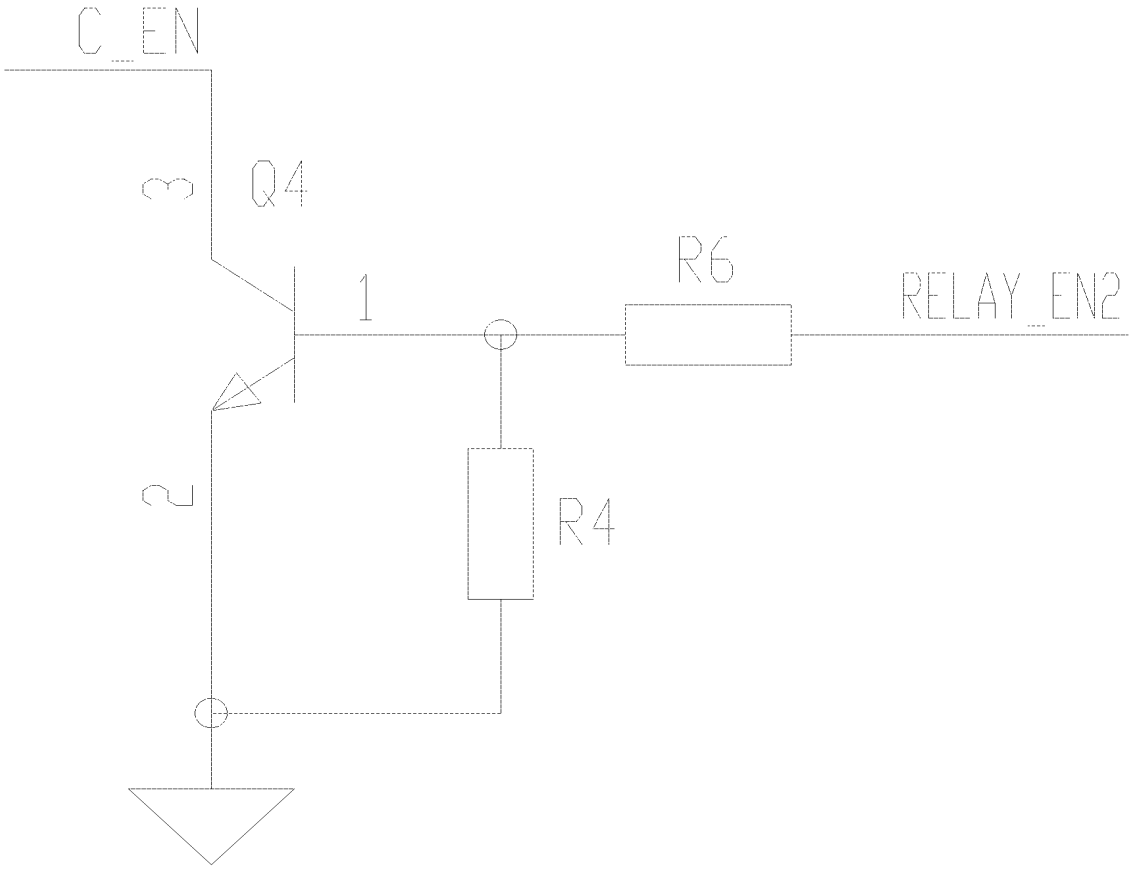


Fig. 13

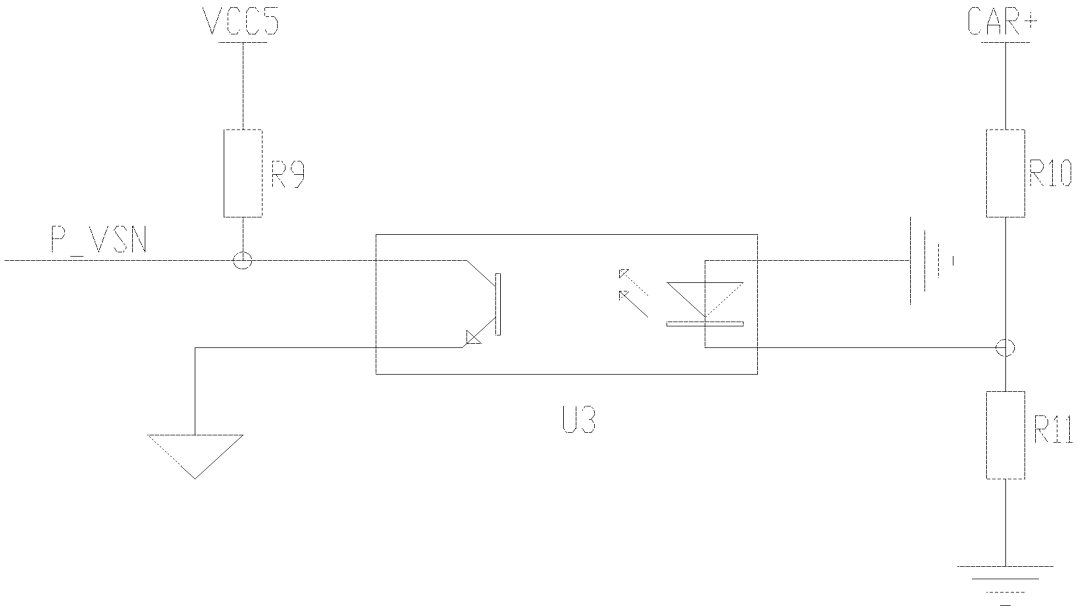


Fig. 14

Electronic Acknowledgement Receipt

EFS ID:	27348825
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	James J. Zhu
Filer Authorized By:	
Attorney Docket Number:	063313-8014US01
Receipt Date:	27-OCT-2016
Filing Date:	23-AUG-2016
Time Stamp:	22:40:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1_Transmittal.pdf	262950 fc77ef077a6d105c94851a9fef70e998f20fad0f	no	2

Warnings:

Information:					
2		2_Response_to_notice_to_corrected_application_papers.pdf	55438 37e3044b63e4b910937b1b8488a51bb5f363b11b	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Applicant Response to Pre-Exam Formalities Notice		1	1	
	Drawings-only black and white line drawings		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	3	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	3_Replacement_sheet_for_drawings.pdf	2079802 b2ac24453bcb17888dff182979e8a6e404f08028	no	10
Warnings:					
Information:					
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<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	15/245,146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2115
Examiner Name	
Attorney Docket Number	063313-8014US01

Total Number of Pages in This Submission

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☑ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☑ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
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- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
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- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Jun He Law Offices, P.C.		
Signature	/James J. Zhu, Reg. No. 52,396/		
Printed name	James J. Zhu		
Date	2016-10-27	Reg. No.	52,396

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/245,146

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	10 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/245,146	08/23/2016	2115	730	063313-8014US01	10	1

CONFIRMATION NO. 7477

UPDATED FILING RECEIPT

96568
Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

OC000000086981892

Date Mailed: 11/04/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Yun LEI, Shenzhen, CHINA;

Applicant(s)

Shenzhen Carku Technology Co., Ltd., Shenzhen, CHINA;

Power of Attorney: The patent practitioners associated with Customer Number 96568

Domestic Applications for which benefit is claimed - None.
A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
CHINA 201620692248.3 06/30/2016
CHINA 201610506106.8 06/30/2016
CHINA 201610506137.3 06/30/2016

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

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If Required, Foreign Filing License Granted: 09/12/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/245,146**
Projected Publication Date: 01/04/2018
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

BATTERY CLAMP

Preliminary Class

713

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201610506137.3

申　请　类　型：发明专利

发明 创造 名称：一种电瓶夹动作执行方法及装置

申　　请　　日：2016 年 06 月 30 日

申　　请　　人：深圳市华思旭科技有限公司

发明人或设计人：雷云

局长

申长雨

2017 年 02 月 01 日

2016105061373

权 利 要 求 书

1. 一种电瓶夹动作执行方法，其特征在于，所述方法包括：

接收电源装置发送的状态数据包；

根据所述的状态数据包执行动作。

2. 根据权利要求 1 所述的电瓶夹动作执行方法，其特征在于，所述状态数据包包括电池组合类型及容量。

3. 根据权利要求 1 或 2 所述的电瓶夹动作执行方法，其特征在于，所述状态数据包包括电池状态，所述电池状态包括单节电池的电压及电池温度。

4. 根据权利要求 1 所述的所述的电瓶夹动作执行方法，其特征在于，所述状态数据包包括第一起始位、一个或者多个第一数据位以及第一结束位。

5. 根据权利要求 2 所述的所述的电瓶夹动作执行方法，其特征在于，所述根据所述的状态数据包执行动作，包括：根据所述电池组合类型及容量设置电池的工作电压、低电压提示以及启动电流保护值。

6. 根据权利要求 1-5 之一所述的电瓶夹动作执行方法，其特征在于，所述接收电源装置发送的状态数据包之前还包括：

发送查询数据包给所述电源装置。

7. 一种电瓶夹动作执行装置，其特征在于，所述装置包括：

接收模块，用于接收电源装置发送的状态数据包；

执行模块，用于根据所述的状态数据包执行动作。

8. 根据权利要求 7 所述的所述的电瓶夹动作执行装置，其特征在于，所述电瓶夹动作执行装置还包括：

发送模块，用于发送查询数据包给所述电源装置。

9. 根据权利要求 7 或 8 所述的电瓶夹动作执行装置，其特征在于

所述状态数据包包括电池组合类型及容量。

10. 根据权利要求 9 所述的所述的电瓶夹动作执行方法，其特征在于，所述状态数据包还包括电池状态，所述电池状态包括单节电池的电压及电池温度。

2016105061373

说 明 书

一种电瓶夹动作执行方法及装置

技术领域

本发明涉及灯具电子配件领域，尤其涉及一种电瓶夹动作执行方法及装置。

背景技术

目前，高倍率锂电池应用于启动电源的技术已逐渐成熟，它有循环寿命长、无污染、体积小等优点。但锂电池在应用中也存在一些缺点，比如，用于启动车辆的锂电池启动电源，其启动电流非常大（可达到 1000A 以上）、高温以及过充过放等不恰当使用会导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失。然而，现有的智能电瓶夹虽然可以在汽车启动时提供较大的电流，但是其并不能根据启动电源的实际工作情况来调整电瓶夹的工作状态。

同时从汽车应急启动电源的内部的电池组合及类型来看，主要分为以下几种：

电池类型	连接方式	单体电池电压	电池组额定电压
钴酸锂	3 串	3.7V	11.1V
钴酸锂	4 串	3.7V	14.8V
磷酸铁锂	4 串	3.2V	12.8V

这几种电池在启动汽车时，相应的工作模式与保护点电压各不相同，那么几种类型的应急启动电源就需要各自配备一种类型的电瓶夹，这样将造成产品的通用性不强，给生产和使用带来不便。

发明内容

本发明的目的在于提供一种电瓶夹动作执行方法及装置，旨在解决现有电瓶夹不能根据启动电源的实际工作情况来调整电瓶夹的工作状态问题。

为了解决上述技术问题，第一方面，本发明提供了一种电瓶夹动作执行方法，该方法包括：

接收电源装置发送的状态数据包；

根据所述的状态数据包执行动作。

优选的，所述状态数据包包括电池组合类型及容量。

优选的，所述状态数据包还包括电池状态，所述电池状态包括单节电池的电压及电池温度。

优选的，所述数据包包括第一起始位、一个或者多个第一数据位以及第一结束位。

优选的，所述根据所述的状态数据包执行动作，包括：根据所述电池组合类型及容量设置电池的工作电压、低电压提示以及启动电流保护值。

优选的，所述接收电源装置发送的状态数据包之前还包括：

发送查询数据包给所述电源装置。

第二方面的，本发明还提供了一种电瓶夹动作执行装置，所述装置包括：

接收模块，用于接收电源装置发送的状态数据包；

执行模块，用于根据所述的状态数据包执行动作。

优选的，所述电瓶夹动作执行装置还包括：

发送模块，用于发送查询数据包给所述电源装置。

优选的，所述状态数据包包括电池组合类型及容量。

优选的，所述状态数据包还包括电池状态，所述电池状态包括单节电池的电压及电池温度。

本发明的提供的电瓶夹动作执行方法，通过接收电源装置发送的状态数据包，然后根据状态数据包执行动作，使得电瓶夹能够根据电源装置的电源状态来执行相关的动作，调整电瓶夹的工作状态。

附图说明

为了更清楚地说明本发明实施例中的技术方案，下面将对实施例或现有技术描述中所需要使用的附图作简单地介绍，显而易见地，下面描述中的附图仅仅是本发明的一些实施例，对于本领域普通技术人员来讲，在不付出创造性劳动性的前提下，还可以根据这些附图获得其他的附图。

图 1 是本发明一实施例提供的电瓶夹动作执行方法的流程图；

图 2 是本发明又一实施例提供的电瓶夹动作执行方法的流程图；

图 3 是本发明一实施例提供的电瓶夹动作执行装置的结构框图。

具体实施方式

为了使本发明的目的、技术方案及优点更加清楚明白，以下结合附图及实施例，对本发明进行进一步详细说明。应当理解，此处所描述的具体实施例仅仅用以解释本发明，并不用于限定本发明。

本发明实施例提供了一种电瓶夹动作执行方法，参照图 1，该方法包括以下步骤：

步骤 101、接收电源装置发送的状态数据包。

本发明实施中，电源装置（比如应急启动电源）与电瓶夹之间可以进行通讯，具体的，电源装置主机与电瓶夹主机之间进行通信连接，可以是有线连接例如通过串行接口连接，也可以是无线通信连接例如蓝牙、NFC、wifi 连接等，电源装置主机将检测模块（比如单节电池的电压检测模块及电池组温度检测模块）检测到的状态数据（比如电源装置内部电池的温度、电池电压等）以状态数据包的形式发送给电瓶夹，电瓶夹主机接收电源装置发送的状态数据包。

本发明实施例中，状态数据包包括电池组合类型及容量。电池组合类型代表电池类型，其是与适配电瓶夹类型相匹配的，电池组合类型可以用 2bit 或者为 4bit 进行表示，比如，0001 时表示当前电池组合类型适配的电瓶夹为 3C 电瓶夹，0002 时表示当前电池组合类型适配的电瓶夹为 4C 电瓶夹，0003 时表示当前电池组合类型适配的电瓶夹为 4F 电瓶夹。本发明实施例中电池容量可以用 2 个字节进行表示，表示电池容量范围为：0-6535mAh。其中，上述 3C 电瓶夹是指其适配的对应的电源装置的电池组由 3 个钴酸锂电池串联组成，单节电池电压为 3.7V，组合后的电池组的额定电压为 11.1V。4C 电瓶夹是指其适配的对应的电源装置的电池组由 4 个钴酸锂电池串联组成，单节电池电压为 3.7V，组合后的电池组的额定电压为 14.8V。4F 电瓶夹是指其适配的对应的电源装置的电池组由 4 个磷酸铁锂电池串联组成，单节电池电压为 3.2V，组合后的电池组的额定电压为 12.8V。

优选的，所述状态数据包还包括电池状态，所述电池状态包括单节电池的电压及电池温度。单节电池电压可以用 5bit 进行表示，表示范围为 0-15V，具体可以根据需求进行设定，同样电池温度也可类似进行表示。同时单节电池的电压及电池温度也可以简单地用 1bit 进行表示，即用 1 或 0 表示，比如单电池电压位为 1 时表示欠压，为 0 时表示正常；电池温度位为 1 时表示过温、0 表示温度正常。

优选的，本发明实施例中，状态数据包结构包括第一起始位、一个或者多个第一数据位以及第一结束位。第一起始位用于同步，第一数据位即为指示电源装置状态的数据位，用于指示电源装置的状态，具体的，一个或多个数据位即为了表示上述的电池组合类型及容量、电池状态。同时第一数据位的定义也可以根据实际需求进行调整，在此，不做限制。第一结束位指示数据传输终止位。

优选的，本发明实施例中，状态数据包格式如表 1 所示。

表 1 状态数据包格式

第一起始位	第一数据位	第一结束位

本发明实施例中由于在通讯中，状态数据包加入电源装置的对应电池类型相匹配的电池组合类型以及电池状态信息，电瓶夹收到电源装置发来的电池组合类型信息后，切换到与之相匹配的工作模式，使一种电瓶夹能够通用于不同的类型的电源装置。

步骤 102、根据所述的状态数据包执行动作。

具体的，电瓶夹接收电源装置发送的状态数据包后，会根据状态数据包执行相关的动作，该动作包括：根据电池组合类型及容量设置电池的工作电压、低电压提示以及启动电流保护值。比如可以根据表 2，对应的进行设置，电瓶夹接收电源装置发送的状态数据包，若电池组合类型为 3C 时，电瓶夹会设置电池工作电压为 8.1-12.6v，设置启动电流保护值为 550A，当单节电池电压小于 2.7v 时，会发出报警提示等。

表 2 不同电池组合类型对应的参数设置

电池组合类型	工作电压	低电压提示	启动电流的保护值

3C	8.1-12.6v	单节电压小于 2.7v	550A
4F	8-14.6v	单节电压小于 2.0v	600A
4C	10.8-16.8v	单节电压小于 2.7v	600A

电瓶夹接收电源装置发送的状态数据包后，会根据状态数据包执行相关的动作，该动作还包括但不限于切换到与电源装置相匹配的工作模式、切断电流输出开关、发送报警信息等等。比如接收到电源装置发来的状态数据包后，会根据状态数据包中的电池组合类型信息，切换到与之相匹配的工作模式；再例如当状态数据包中指示电池温度不正常或者电池欠压时，电瓶夹主机会控制切断电流输出的主开关；又例如当状态数据包中指示电源装置电池电量低于预设值时，电瓶夹主机也会控制切断电流输出的主开关。

本发明实时实施例中，通过接收电源装置发送的状态数据包，然后根据状态数据包执行动作，使得电瓶夹能够根据电源装置的电源状态来执行相关的动作，调整电瓶夹的工作状态。同时由于状态数据包包含电池组合类型数据信息，电瓶夹会根据状态数据包中的电池组合类型信息，切换到与之相匹配的工作模式，使一种电瓶夹能够通用于不同的类型的电源装置，从而增强了电瓶夹的通用性。

图 2 为本发明实施例提供的又一电瓶夹动作执行方法流程图，参照图 2，该电瓶夹动作执行方法包括以下步骤：

步骤 201、发送查询数据包给电源装置。

步骤 202、接收电源装置发送的状态数据包。

步骤 203、根据所述的状态数据包执行动作。

上述步骤 202、203 分别与前述实施例中的步骤 101、102 相同，在此不在赘

述。本发明实施例与前述实施例不同之处在于，在接收电源装置发送的状态数据包之前电瓶夹会发送查询数据包给电源装置，电源装置接收到该查询数据包之后再发送状态数据包给电瓶夹。电瓶夹可根据需求，周期性地发送查询数据包给电源装置，电源装置接收到该查询数据包之后再发送状态数据包给电瓶夹，这样电源装置可以根据电瓶夹需求进行反馈电池状态信息，节省资源。若电瓶夹发送查询数据包给电源装置后，预设时间内，电瓶夹没有收到电源装置发送的状态数据包，说明通信连接失败，电瓶夹主机会发出报警信息，告知用户通信失败，进一步提高安全性。

本发明实施例中查询数据包包括第二起始位、第二数据位以及第二结束位。第二起始位用于同步。优选的，第二数据位与第一数据位相匹配，表示要查询的类型比如是要查询电池组合类型、电池状态或者都要查询等。第二结束位表示数据传输终止位。第二数据位定义是与第一数据位定义相匹配，使得通信协议简单易行。

本发明实施例还提供了一种电瓶夹动作执行装置，该电瓶夹执行装置可应用于电瓶夹中，参照图 3，该装置包括：接收模块 31、执行模块 32。 接收模块 31，用于接收电源装置发送的状态数据包，优选的，状态数据包包括电池组合类型及容量。状态数据包还可以包括电池状态，电池状态包括单节电池的电压及电池温度。优选的，状态数据包结构表示包括第一起始位、一个或者多个第一数据位以及第一结束位。执行模块 32，用于根据所述的状态数据包执行动作。接收模块 31 接收电源装置发送的状态数据包后，执行模块 32 会根据状态数据包执行相关的动作，比如接收模块 31 接收到电源装置发来的状态数据包后，执行模块 32 根据电池组合类型及容量设置电池的工作电压、低电压提示、启动电流保护值及电

压判断值。比如可以根据下表对应的进行设置。或者执行模块 32 根据状态数据包中的电池组合类型信息，切换到与之相匹配的工作模式，再例如当状态数据包中指示电池温度不正常或者电池欠压时，执行模块 32 会控制切断电流输出的主开关。

优选的，电瓶夹动作执行装置还包括发送模块 33。发送模块 33，用于发送查询数据包给电源装置。查询数据包包括第二起始位、第二数据位以及第二结束位。

本发明提供的电瓶夹动作执行装置，通过接收模块接收电源装置发送的状态数据包，然后执行模块根据状态数据包执行动作，使得电瓶夹能够根据电源装置的电源状态来执行相关的动作，调整电瓶夹的工作状态，提高了电瓶夹的通用性。

本实施例中的装置与前述实施例中的电瓶夹动作执行方法是基于同一发明构思下的两个方面，在前面已经对方法实施过程作了详细的描述，所以本领域技术人员可根据前述描述清楚地了解本实施中的系统的结构及实施过程，为了说明书的简洁，在此就不再赘述。

以上所述仅为本发明的较佳实施例而已，并不用以限制本发明，凡在本发明的精神和原则之内所作的任何修改、等同替换和改进等，均应包含在本发明的保护范围之内。

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说 明 书 附 图

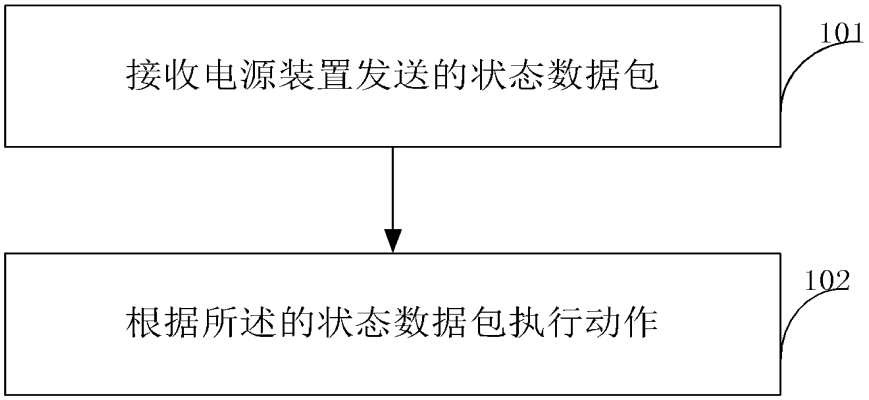


图 1

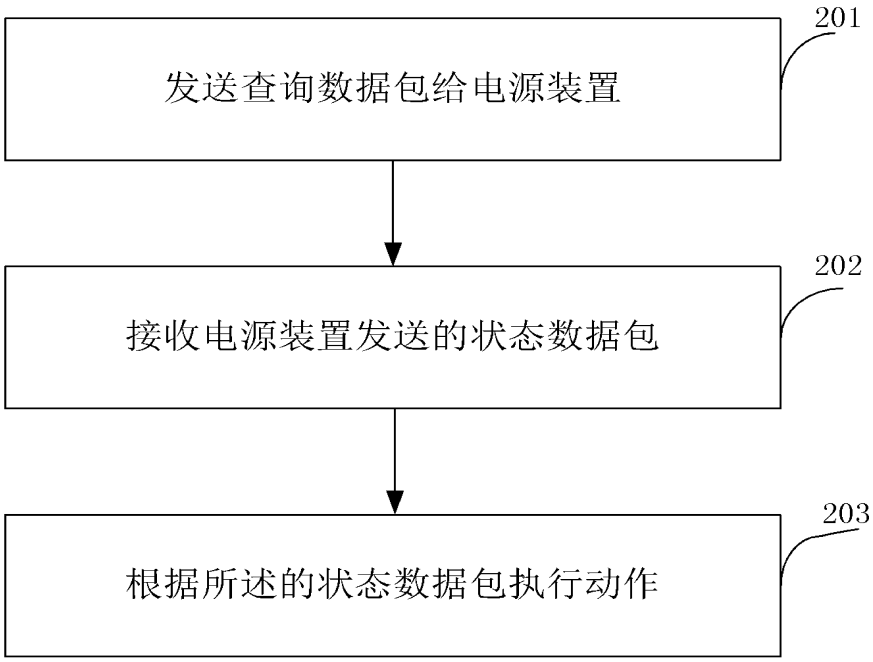


图 2

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说 明 书 附 图

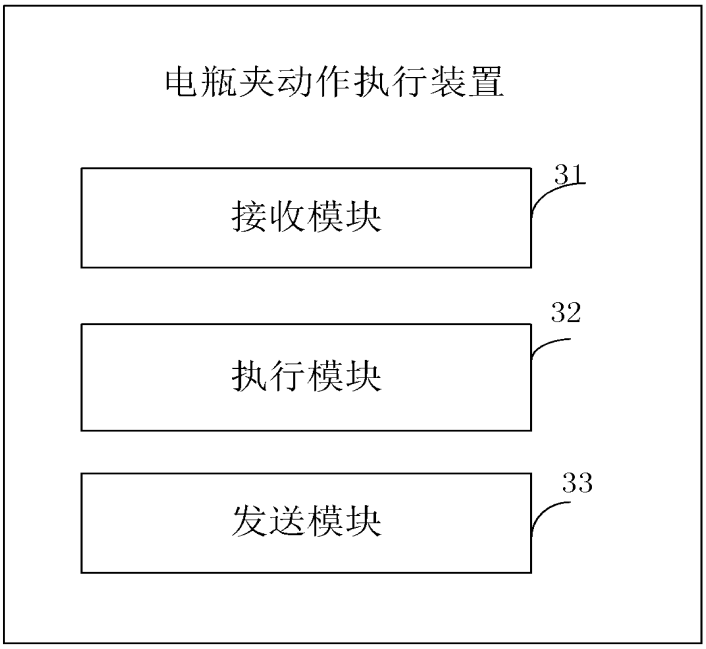


图 3

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STATE INTELLECTUAL PROPERTY OFFICE
OF THE PEOPLE'S REPUBLIC OF CHINA

证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201620692248.3

申　请　类　型：实用新型专利

发明 创造 名称：一种电瓶夹

申　　请　　日：2016 年 06 月 30 日

申　　请　　人：深圳市华思旭科技有限公司

发明人或设计人：雷云

局长

申长雨

2017 年 02 月 01 日

2016206922483

权 利 要 求 书

1. 一种电瓶夹，包括第一线夹、第二线夹和控制装置，所述第一线夹、第二线夹均与所述控制装置电性连接，其特征在于，所述控制装置包括外壳、主控板和连接口；

所述主控板安装在所述外壳内，所述连接口设置在所述外壳的一侧并与所述主控板电性连接；

所述连接口包括两电极连接口和通讯连接口，所述电极连接口和外部电源连接用于传输电压，所述通讯连接口用于将所述电瓶夹和外部电源建立通讯连接。

2. 根据权利要求 1 所述的电瓶夹，其特征在于，所述主控板包括电压输入端、电压输出端、通讯端、开关控制单元和主控电路单元；

所述电压输入端和所述电极连接口电性连接，所述电压输出端与所述第一线夹、第二线夹电性连接，所述通讯端与所述通讯连接口电性连接，所述电压输入端通过所述开关控制单元和主控电路单元与所述电压输出端连接；

所述主控电路单元和所述通讯端连接，用于获取外部电源信息；

所述主控电路单元和所述开关控制单元连接，用于根据所述外部电源信息控制所述开关控制单元的开关。

3. 根据权利要求 2 所述的电瓶夹，其特征在于，所述主控电路单元包括供电单元、检测电流放大单元、检测电压单元和主控芯片单元；

所述供电单元的两个输入端分别与所述电压输入端和电压输出端连接，所述供电单元的输出端分别与所述检测电流放大单元、检测电压单元和主控芯片单元连接用于提供驱动电压；

所述检测电流放大单元还与所述主控芯片单元连接用于将检测的电流值传

递给所述主控芯片单元；

所述检测电压单元与所述主控芯片单元连接，所述检测电压单元检测所述电压输入端和/或电压输出端的电压值，并将所述电压值传递给所述主控芯片单元。

4. 根据权利要求 3 所述的电瓶夹，其特征在于，所述主控电路单元还包括防反接检测单元，所述防反接检测单元与所述供电单元的输出端连接，所述防反接检测单元还与所述主控芯片单元和电压输出端连接，用于保护电路。

5. 根据权利要求 3 所述的电瓶夹，其特征在于，所述检测电压单元包括第一检测电压单元和第二检测电压单元；

所述第一检测电压单元和所述电压输入端连接，用于检测所述电压输入端的电压值；

所述第二检测电压单元和所述电压输出端连接，用于检测所述电压输出端的电压值。

6. 根据权利要求 4 所述的电瓶夹，其特征在于，所述主控电路单元还包括指示灯电路单元，所述指示灯电路单元与所述主控芯片单元连接，用于指示所述控制装置的工作状态。

7. 根据权利要求 6 所述的电瓶夹，其特征在于，所述主控电路单元还包括蜂鸣电路单元，所述蜂鸣电路单元与所述主控芯片单元连接，用于报警提示用户出现异常情况。

8. 根据权利要求 1 所述的电瓶夹，其特征在于，所述通讯连接口设置在所述两电极连接口之间。

9. 根据权利要求 1 所述的电瓶夹，其特征在于，所述外壳包括上壳体和下壳

体，所述上壳体和下壳体可拆卸固定连接，所述主控板固定安装在所述下壳体内。

10. 根据权利要求 9 所述的电瓶夹，其特征在于，所述上壳体的一侧还设有指示灯孔和按键孔。

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说 明 书

一种电瓶夹

技术领域

本实用新型涉及电子配件技术领域，尤其涉及一种电瓶夹。

背景技术

目前，高倍率锂电池应用于启动电源的技术已逐渐成熟，它有循环寿命长、无污染、体积小等优点。但锂电池在应用中也存在一些缺点，比如，用于启动车辆的锂电池启动电源，其启动电流非常大（可达到 1000A 以上）、高温以及过充过放等不恰当使用会导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失。然而，现有的智能电瓶夹虽然可以在汽车启动时提供较大的电流，但是其并不能根据启动电源的实际工作情况来调整电瓶夹的工作状态。

因此有必要提供一种新的电瓶夹，通过电瓶夹与启动电源建立通讯连接来解决上述问题。

实用新型内容

本实用新型的目的在于提供电瓶夹，旨在解决现有的外部电源中的锂电池因使用不当易出现鼓包和爆炸等问题。

为了解决上述问题，本实用新型采用以下技术方案，提供了一种电瓶夹，该电瓶夹包括：第一线夹、第二线夹和控制装置，所述第一线夹、第二线夹均与所述控制装置电性连接，所述控制装置包括外壳、主控板和连接口；

所述主控板安装在所述外壳内，所述连接口设置在所述外壳的一侧并与所述主控板电性连接；

所述连接口包括两电极连接口和通讯连接口，所述电极连接口和外部电源连接用于传输电压，所述通讯连接口用于将所述电瓶夹和外部电源建立通讯连接。

优选地，所述主控板包括电压输入端、电压输出端、通讯端、开关控制单元和主控电路单元；

所述电压输入端和所述电极连接口电性连接，所述电压输出端与所述第一线夹、第二线夹电性连接，所述通讯端与所述通讯连接口电性连接，所述电压输入端通过所述开关控制单元和主控电路单元与所述电压输出端连接；

所述主控电路单元和所述通讯端连接，用于获取外部电源信息；

所述主控电路单元和所述开关控制单元连接，用于根据所述外部电源信息控制所述开关控制单元的开关。

优选地，所述主控电路单元包括供电单元、检测电流放大单元、检测电压单元和主控芯片单元；

所述供电单元的两个输入端分别与所述电压输入端和电压输出端连接，所述供电单元的输出端分别与所述检测电流放大单元、检测电压单元和主控芯片单元连接用于提供驱动电压；

所述检测电流放大单元还与所述主控芯片单元连接用于将检测的电流值传递给所述主控芯片单元；

所述检测电压单元与所述主控芯片单元连接，所述检测电压单元检测所述电压输入端和/或电压输出端的电压值，并将所述电压值传递给所述主控芯片单元。

优选地，所述主控电路单元还包括防反接检测单元，所述防反接检测单元与所述供电单元的输出端连接，所述防反接检测单元还与所述主控芯片单元和电压输出端连接，用于保护电路。

优选地，所述检测电压单元包括第一检测电压单元和第二检测电压单元；

所述第一检测电压单元和所述电压输入端连接，用于检测所述电压输入端的电压值；

所述第二检测电压单元和所述电压输出端连接，用于检测所述电压输出端的电压值。

优选地，所述主控电路单元还包括指示灯电路单元，所述指示灯电路单元与所述主控芯片单元连接，用于指示所述控制装置的工作状态。

优选地，所述主控电路单元还包括蜂鸣电路单元，所述蜂鸣电路单元与所述主控芯片单元连接，用于报警提示用户出现异常情况。

优选地，所述通讯连接口设置在所述两电极连接口之间。

优选地，所述外壳包括上壳体和下壳体，所述上壳体和下壳体可拆卸固定连接，所述主控板固定安装在所述下壳体内。

优选地，其特征在于，所述上壳体的一侧还设有指示灯孔和按键孔。

有益效果：本实用新型的实施例提供了一种电瓶夹，该电瓶夹包括第一线夹、第二线夹和控制装置，所述第一线夹、第二线夹均与所述控制装置电性连接，所述控制装置包括外壳、主控板和连接口；所述主控板安装在所述外壳内，所述连接口设置在所述外壳的一侧并与所述主控板电性连接；所述连接口包括两电极连接口和通讯连接口，所述电极连接口和外部电源连接用于传输电压，所述通讯

连接口用于将所述电瓶夹和外部电源建立通讯连接。该电瓶夹通过通讯连接口和外部电源建立通讯连接，可以有效解决外部电源中的锂电池因使用不当易出现鼓包和爆炸等问题。

附图说明

为了更清楚地说明本实用新型实施例中的技术方案，下面将对实施例描述中所需要使用的附图作简要介绍，显而易见，下面描述中的附图仅仅是本实用新型的一些实施例，对于本领域的普通技术人员来讲，在不付出创造性劳动性的前提下，还可以根据这些附图获得其他的附图。

图 1 是本实用新型一实施例提供的电瓶夹的结构示意图；

图 2 是本实用新型一实施例提供的电瓶夹的控制装置的结构示意图；

图 3 是本实用新型一实施例提供的电压输入端、电压输出端以及通讯端的电路图；

图 4 是本实用新型一实施例提供的供电单元的电路图；

图 5 是本实用新型一实施例提供的主控芯片单元的电路图；

图 6 是本实用新型一实施例提供的检测电流放大单元的电路图；

图 7 是本实用新型一实施例提供的第一检测电压单元的电路图；

图 8 是本实用新型一实施例提供的第二检测电压单元的电路图；

图 9 是本实用新型一实施例提供的防反接检测单元的电路图；

图 10 是本实用新型一实施例提供的开关控制单元的第一连接单元的电路图；

图 11 是本实用新型一实施例提供的开关控制单元的第二连接单元的电路图。

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说 明 书

具体实施方式

为了使本实用新型的目的、技术方案及优点更加清楚明白，下面结合附图和具体实施方式对本实用新型作进一步详细说明。

图 1 示出了本实用新型一实施例提供的电瓶夹的结构，该电瓶夹包括控制装置 1 和线夹 2，控制装置 1 和线夹 2 通过线缆 20 连接，线夹 2 包括第一线夹 21 和第二线夹 22，分别代表着正极和负极；线夹 2 用于和外部设备连接，用于通过线夹 2 给外部设备供电，比如外部电源为应急启动电源，外部设备为汽车，通过该电瓶夹可以将应急启动电源和汽车连接，用于启动该汽车。如图 2 所示，控制装置 1 包括外壳（外壳包括上壳体 111 和下壳体 112）、主控板 12 和连接口 10；主控板 12 安装在外壳内，具体地，主控板 12 固定安装在下壳体 112 内，上壳体 111 和下壳体 112 可拆卸固定连接；连接口 10 设置在外壳的一侧并与主控板 12 电性连接；连接口 10 包括正电极连接口 101、负电极连接口 102 和通讯连接口 103，通讯连接口 103 设置在两电极连接口之间，正电极连接口 101、负电极连接口 102 和外部电源连接用于传输电压，通讯连接口 103 用于将电瓶夹和外部电源建立通讯连接。因此，该电瓶夹可以监控和管理外部电源，防止外部电源出现鼓包或爆炸等现象。

为了使电瓶夹可以监控和管理外部电源，如图 3 所示，该电瓶夹的主控板包括电压输入端 BAT、电压输出端 CAR、通讯端 COM、开关控制单元 K1 和主控电路单元；电压输入端 BAT 和电极连接口电性连接，即电压输入端 BAT+与正电极连接口 101 连接，电压输入端 BAT-与负电极连接口 102 连接，电压输出端 CAR+与第

一线夹 21、电压输出端 CAR+与第二线夹 22 电性连接，通讯端 COM 与通讯连接口 103 电性连接，电压输入端 BAT 通过开关控制单元 K1 和主控电路单元与电压输出端 CAR 连接；主控电路单元和通讯端 COM 连接，用于获取外部电源信息，电源信息包括电源温度、电压和电流等信息；主控电路单元和开关控制单元 K1 连接，用于根据外部电源信息控制开关控制单元 K1 的开关。

在本优选的实施例中，主控电路单元包括供电单元、检测电流放大单元、检测电压单元和主控芯片单元。其中，供电单元的电路图如图 4 所示，供电单元的电路主要包括一供电芯片 U1、多个电容和两个二极管组成的电路，供电单元的电路通过两个二极管分别与电压输入端 BAT+和电压输出端连接 CAR+连接，供电单元的电路的电压输出端 VCC5，电压输出端 VCC5 用于检测电流放大单元、检测电压单元和主控芯片单元连接用于提供驱动电压。如图 5 所示，主控芯片单元主要包括控制芯片 U2，控制芯片 U2 还连接有程序烧录口，烧录口也有供电单元的电压输出端 VCC5 供电，用于向控制芯片 U2 烧录相应的控制程序。如图 6 所示，检测电流放大单元主要包括放大器 U4A 及相应的电容和电阻，检测电流放大单元还与主控芯片单元连接，具体的检测电流放大单元的输出端和控制芯片 U2 的 CHAINISN 引脚连接，是用于将检测的电流值传递给控制芯片 U2，检测电流放大单元的输入端是供电单元的电路的电压输出端 VCC5 连接用于检测电压输入端 BAT 或电压输出端 CAR 的电流值；检测电压单元与主控芯片单元连接，检测电压单元检测电压输入端 BAT 和/或电压输出端 CAR 的电压值，并将电压值传递给主控芯片单元；检测电压单元包括第一检测电压单元和第二检测电压单元，如图 7 所示，第一检测电压单元主要包括一个二极管以及相应的电容电阻等，通过二极

管和供电单元的电路的电压输出端 VCC5 连接，第一检测电压单元的输入端和电压输入端 BAT+连接，第一检测电压单元的输出端和控制芯片 U2 的引脚连接，检测所述电压输入端的电压值，并将该电压值传递给控制芯片 U2；第二检测电压单元的电路如图 8 所示，第二检测电压单元与电压输出端 CAR+和控制芯片 U2 的引脚连接，用于检测电压输出端的电压值，并将该电压值传递给控制芯片 U2；控制芯片 U2 接受电压输入端的电压值或电压输出端的电压值，并作出比较，根据预先烧录的控制程序控制开关控制单元 K1 的导通或断开。

如图 9 所示，主控电路单元还包括防反接检测单元，防反接检测单元的具体电路如图 9 所示，主要包括一个 U3 芯片及相应的电容电阻，防反接检测单元与供电单元的输出端 VCC5 连接，防反接检测单元还与主控芯片单元（控制芯片 U2）和电压输出端 CAR+连接，用于检测用户是否接反第一线夹和第二线夹，起到保护电路作用。

在本优选的实施例中，主控电路单元包括第一连接单元和第二连接单元，第一连接单元的电路如图 10 所示，第二连接单元的电路如图 11 所示，第一连接单元和第二连接单元用于连接开关控制单元 K1 和控制芯片 U2；其中，优选地，开关控制单元 K1 采用一个继电器开关。主控电路单元还包括指示灯电路单元，指示灯电路单元与主控芯片单元连接，指示灯电路单元包括两个不同颜色的 LED，不同颜色的 LED 用于显示该控制装置的正常和异常现象。主控电路单元还包括蜂鸣电路单元，蜂鸣电路单元与主控芯片单元连接，蜂鸣电路单元主要包括一个扬声器，于报警提示用户出现异常情况。

综上，从上述实施例的电瓶夹可以看出，该电瓶夹可以和外部电源建立通讯

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连接用以获取外部电源的电源信息，该电源信息包括外部电源的温度、充放电流和电压等，同时该电瓶夹还具有电流电压检测和防反接等功能，因此使用该电瓶夹可以有效地解决外部电源中的锂电池因使用不当易出现鼓包和爆炸等问题。

对本领域的技术人员来说，可根据以上描述的技术方案以及构思，做出其它各种相应的改变以及形变，而所有的这些改变以及形变都应该属于本实用新型权利要求的保护范围之内。

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说 明 书 附 图

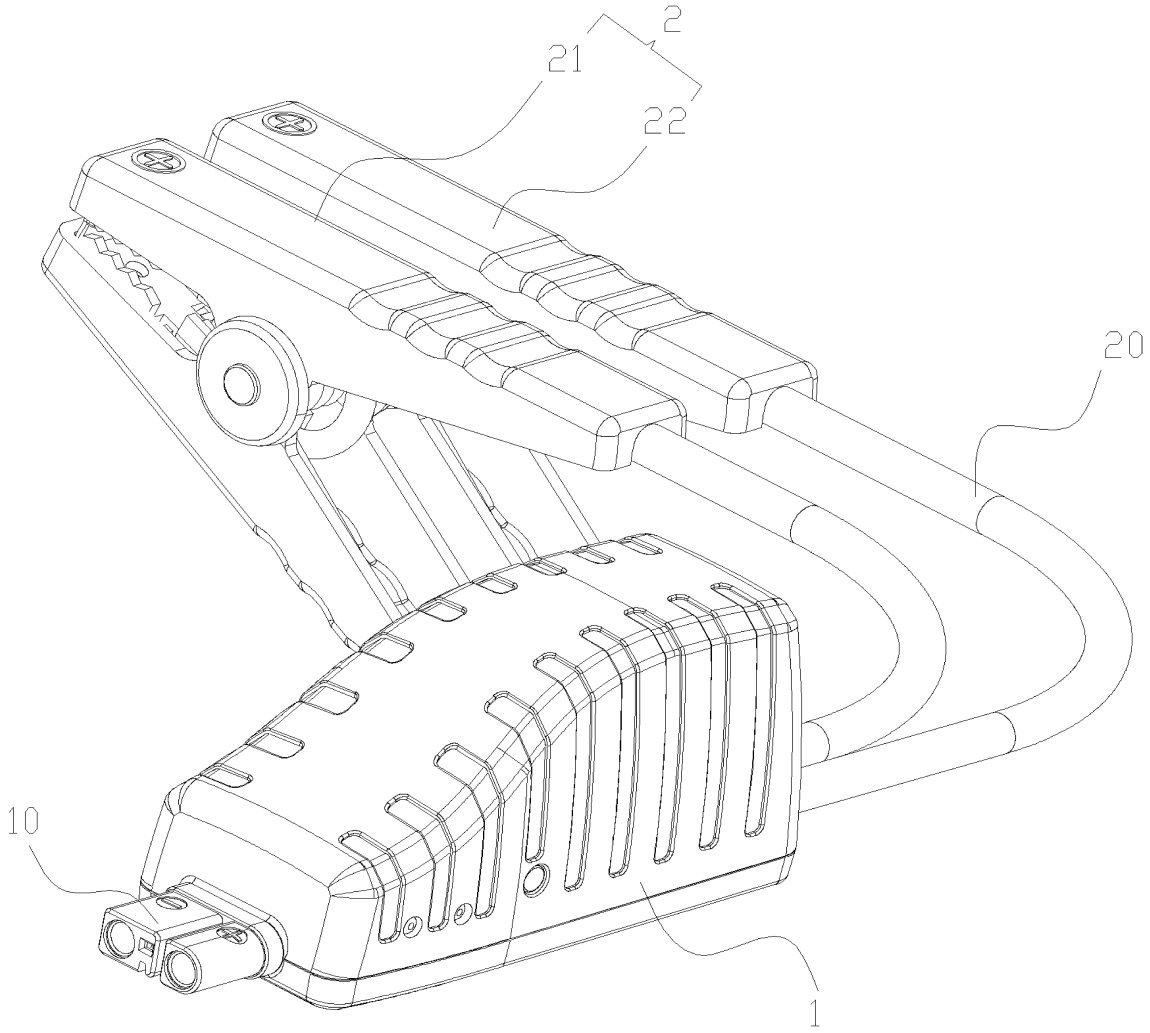


图 1

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说 明 书 附 图

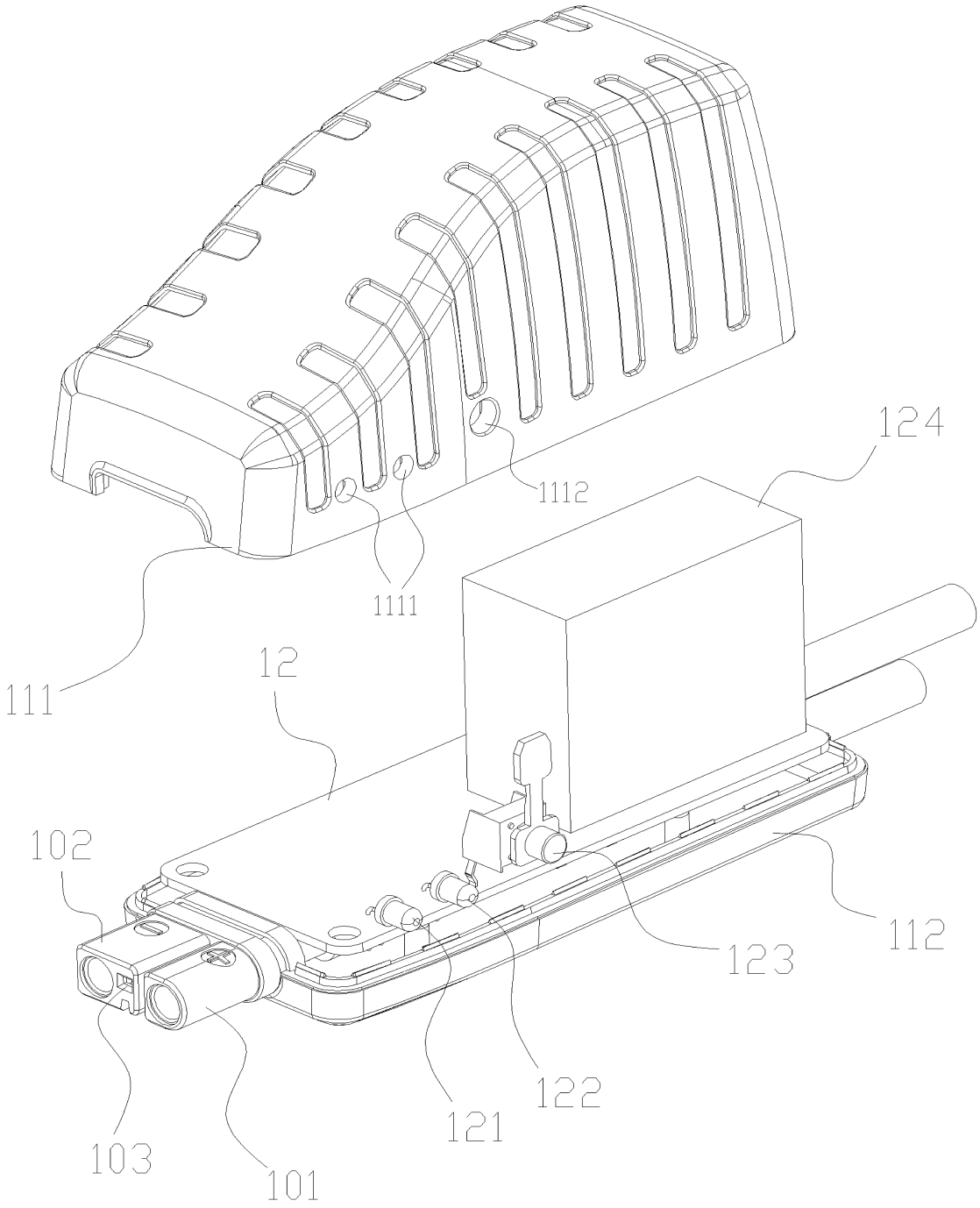


图 2

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说 明 书 附 图

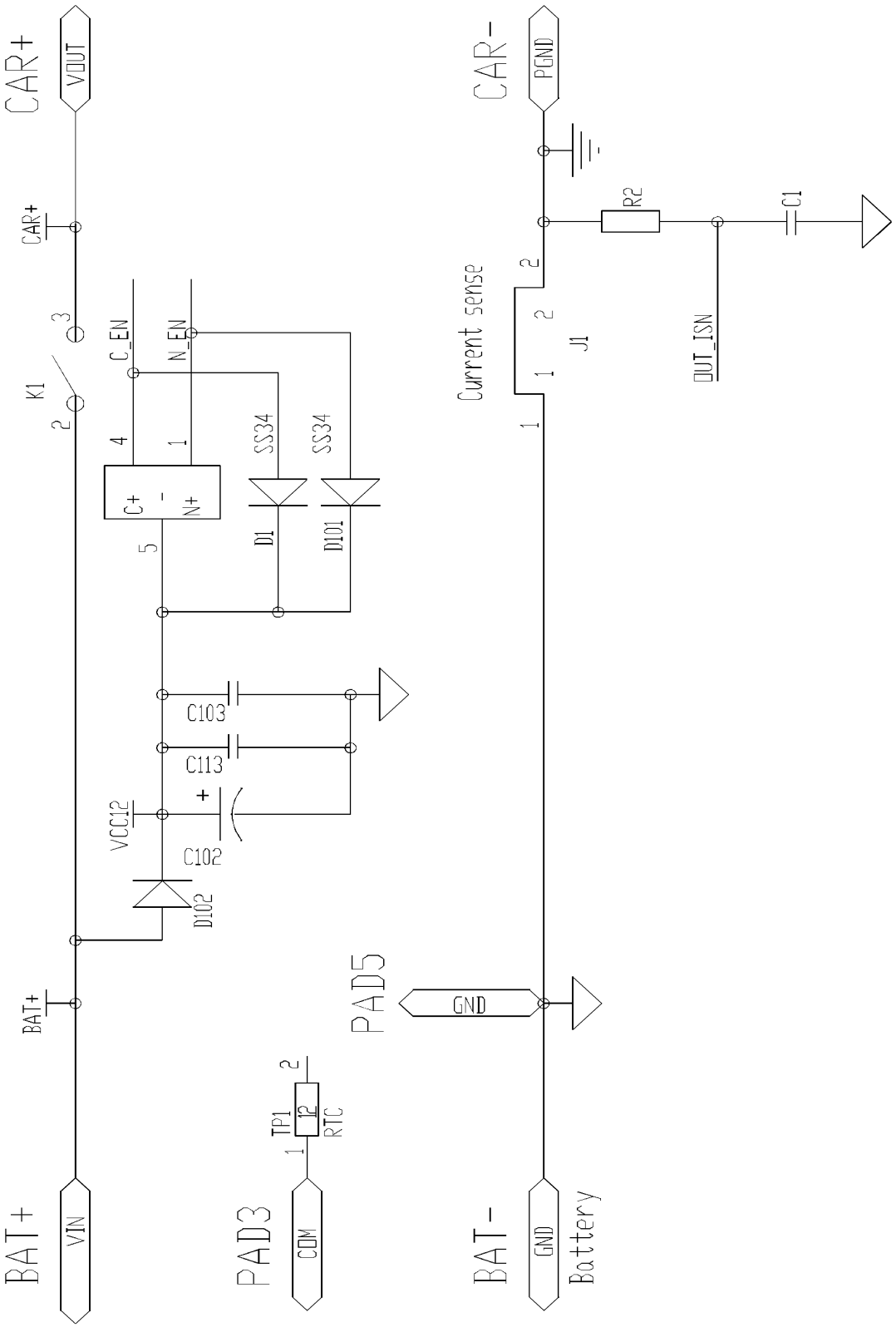


图 3

说 明 书 附 图

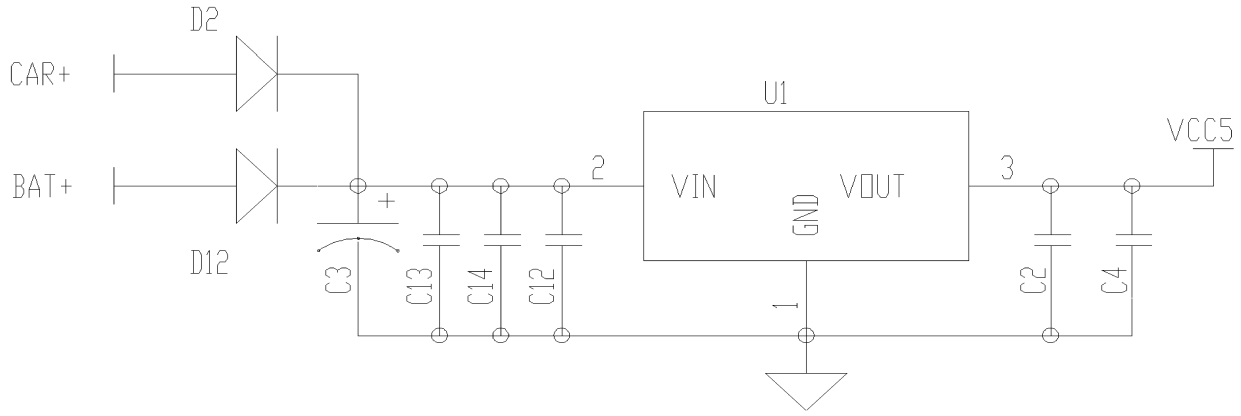

D2
CAR+
BAT+
D12
C3
C13
C14
C12
U1
VIN
GND
VOUT
2
3
1
C2
C4
VCC5

图 4

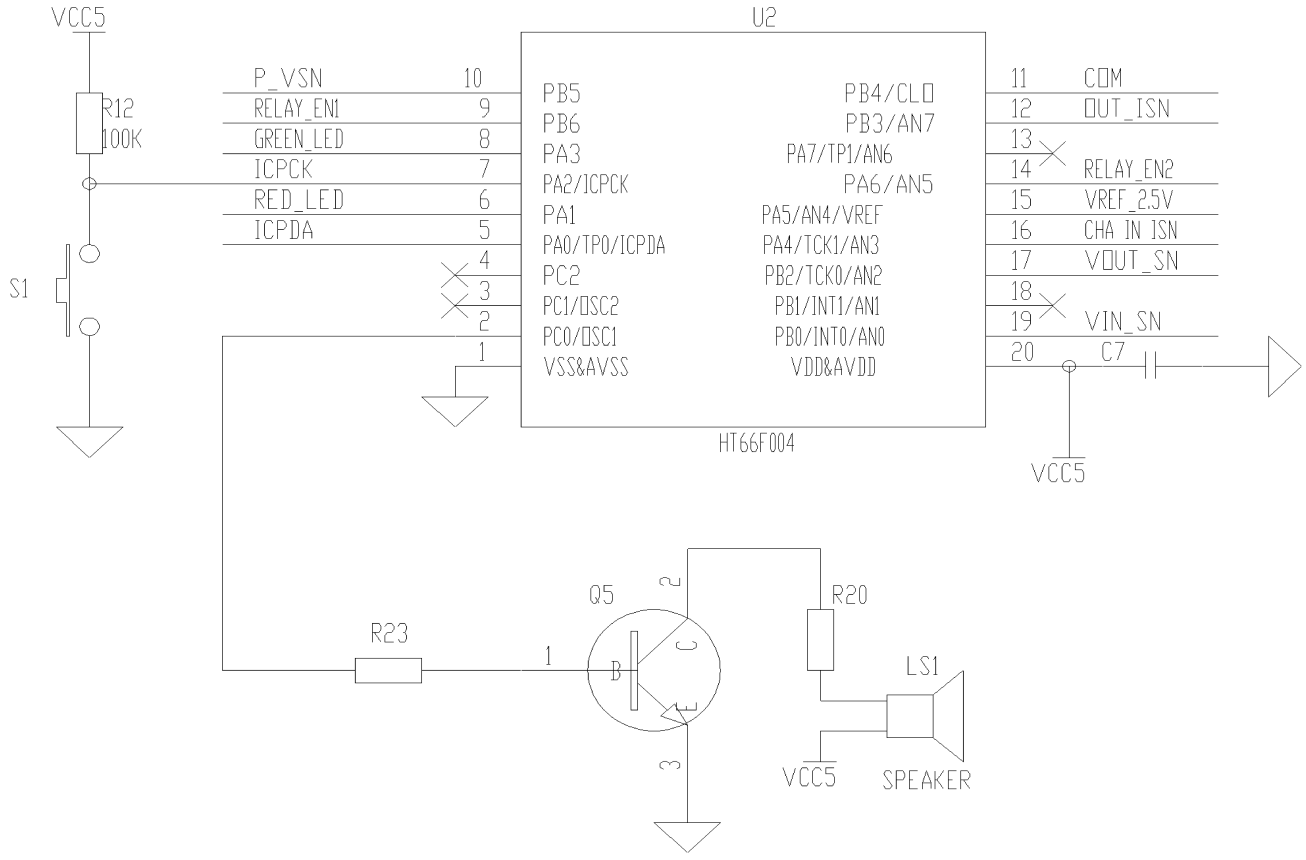

VCC5
R12
100K
S1
U2
P_VSN
RELAY_EN1
GREEN_LED
ICPCK
RED_LED
ICPDA
PB5
PB6
PA3
PA2/ICPCK
PA1
PA0/TP0/ICPDA
PC2
PC1/OSC2
PC0/OSC1
VSS&AVSS
PB4/CLO
PB3/AN7
PA7/TP1/AN6
PA6/AN5
PA5/AN4/VREF
PA4/TCK1/AN3
PB2/TCK0/AN2
PB1/INT1/AN1
PB0/INT0/AN0
VDD&AVDD
COM
OUT_ISN
RELAY_EN2
VREF_2.5V
CHA IN ISN
VOUT_SN
VIN_SN
C7
HT66F004
Q5
R23
R20
LS1
SPEAKER

图 5

说 明 书 附 图

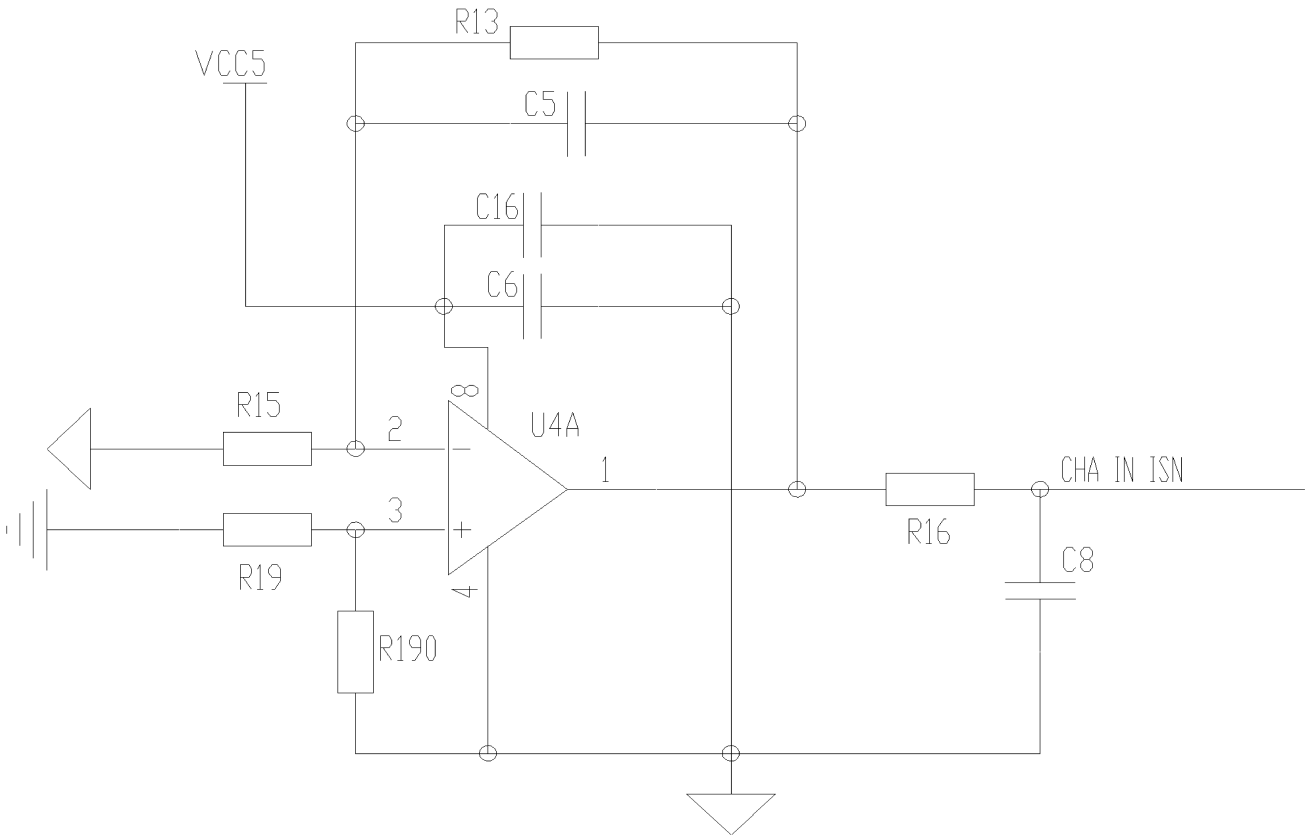


图 6

说 明 书 附 图

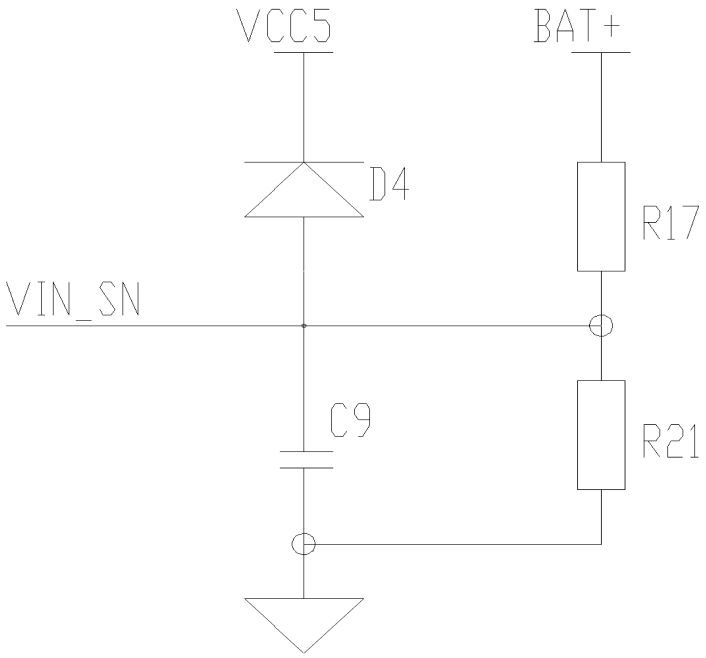


图 7

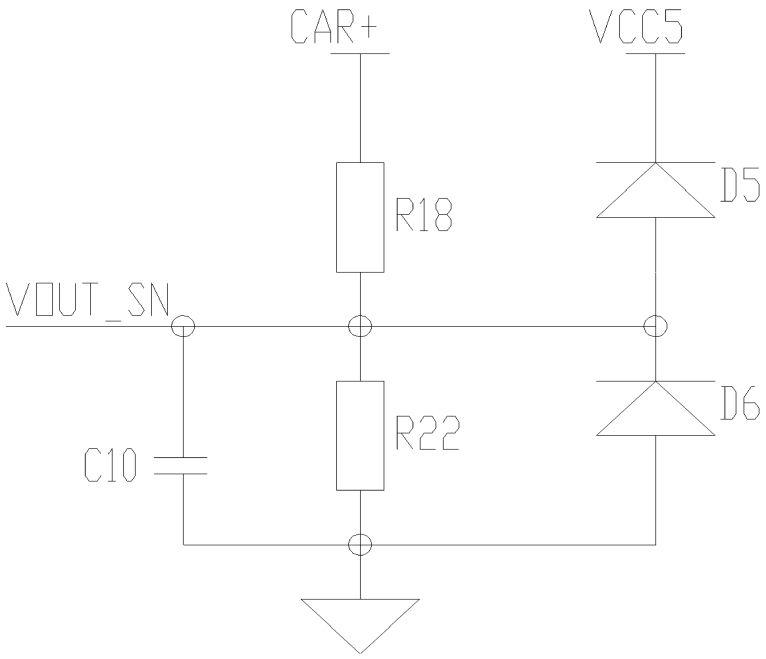


图 8

说 明 书 附 图

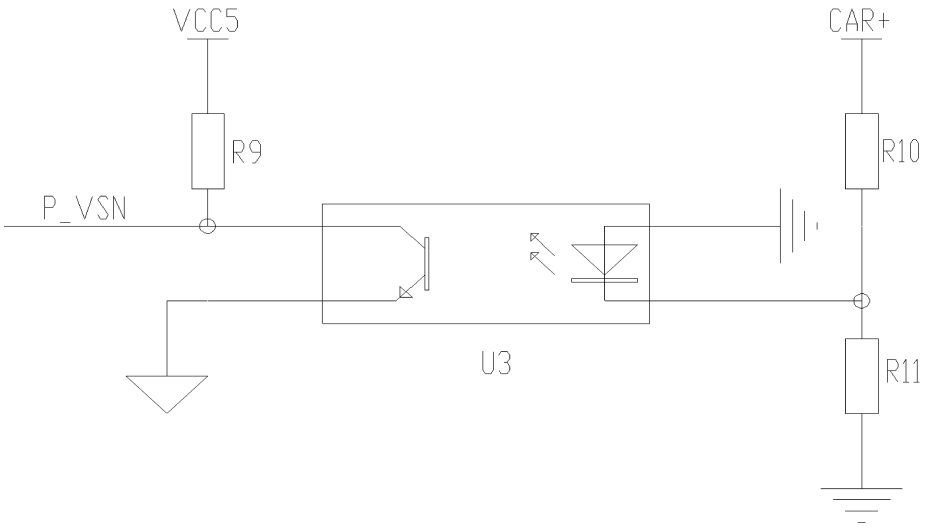


图 9

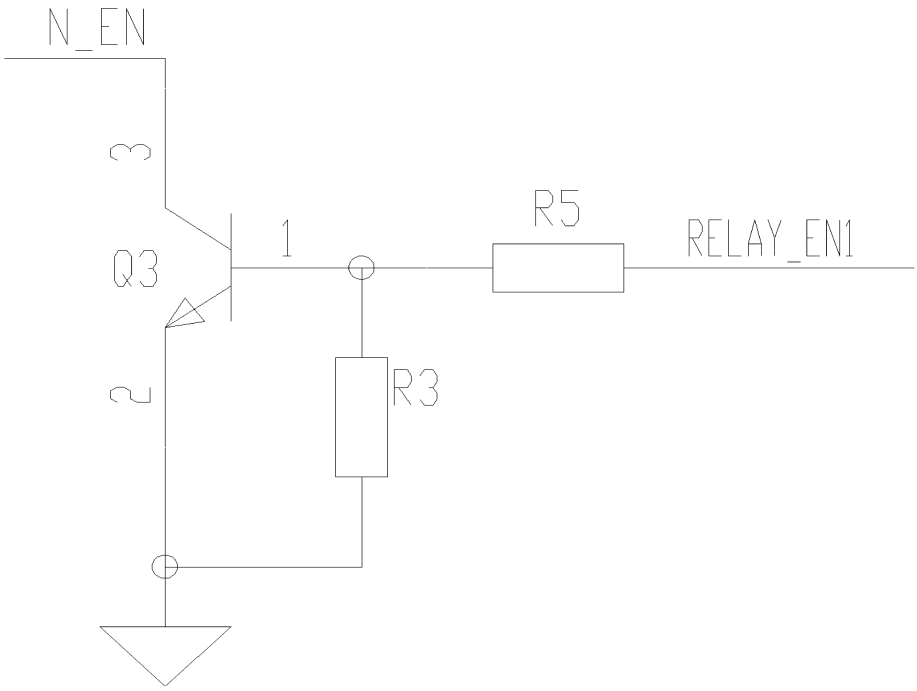


图 10

说 明 书 附 图

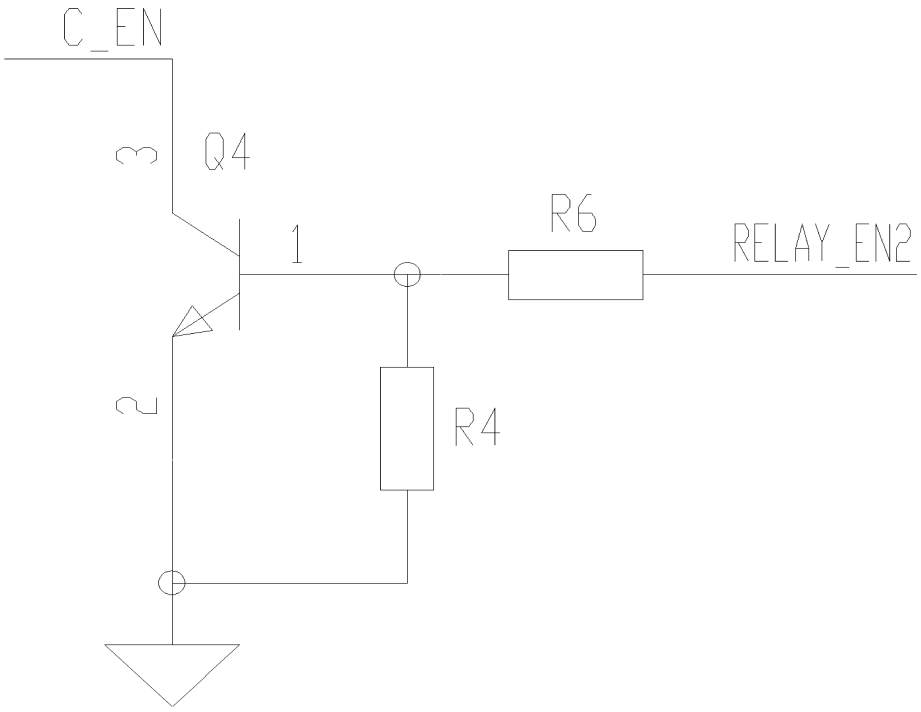


图 11

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STATE INTELLECTUAL PROPERTY OFFICE
OF THE PEOPLE'S REPUBLIC OF CHINA

证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201610506106.8

申　请　类　型：发明专利

发明 创造 名称：一种应急电源的管理系统和方法

申　　请　　日：2016 年 06 月 30 日

申　　请　　人：深圳市华思旭科技有限公司

发明人或设计人：雷云

局长

申长雨

2017 年 02 月 01 日

2016105061068

权 利 要 求 书

1. 一种应急电源的管理系统，其特征在于，包括：应急电源和电瓶夹，所述电瓶夹和所述应急电源连接，用于给外部设备提供电压；

所述电瓶夹和所述应急电源连接还包括通讯连接，所述电瓶夹获取所述应急电源的参数值，并根据所述参数值执行相应动作。

2. 根据权利要求 1 所述的应急电源的管理系统，其特征在于，所述应急电源包括电芯组件和第一 MCU 主控单元，所述第一 MCU 主控单元和所述电芯组件连接用于监控所述电芯组件；

所述电芯组件包括多个串联连接的电芯组，所述电芯组包括多个并联的单体电芯；

所述第一 MCU 主控单元包括温度检测电路，所述温度检测电路用于检测所述单体电芯的温度参数值。

3. 根据权利要求 2 所述的应急电源的管理系统，其特征在于，所述第一 MCU 主控单元还包括电压采样电路，所述电压采样电路用于检测所述单体电芯的电压参数值。

4. 根据权利要求 3 所述的应急电源的管理系统，其特征在于，所述温度检测电路包括一个或多个 NTC 热敏电阻，所述 NTC 热敏电阻用于测量所述单体电芯或者电芯组的温度参数值。

5. 根据权利要求 3 所述的应急电源的管理系统，其特征在于，所述第一 MCU 主控单元包括电压采样电路，所述电压采样电路与所述单体电芯连接用于检测所述单体电芯的电压参数值。

6. 根据权利要求 2 或 3 所述的应急电源的管理系统，其特征在于，所述电瓶夹包括开关控制单元和第二 MCU 主控单元；

所述第二 MCU 主控单元和所述第一 MCU 主控单元通讯连接，用于获取所述应急电源的参数值；

所述第二 MCU 主控单元和所述开关控制单元连接，用于根据所述参数值控制所述开关控制单元的开关。

7. 一种应急电源的管理方法，其特征在于，包括：

获取应急电源的参数值；

根据所述参数值执行相应动作。

8. 根据权利要求 7 所述应急电源的管理方法，其特征在于，所述获取应急电源的参数值，包括获取应急电源的电池组合类型信息及电池容量信息；

所述根据所述参数值执行相应动作包括：根据所述电池组合类型信息，选择与所述应急电源相对应的工作模式；以及根据所述电池容量信息，设置保护电流值。

9. 根据权利要求 8 所述应急电源的管理方法，其特征在于，所述获取应急电源的参数值包括获取应急电源的单体电芯的温度参数值；

所述根据所述参数值执行相应动作包括：判断所述温度参数值是否大于温度预设值，若是，则停止给外部设备提供电压。

10. 根据权利要求 9 所述应急电源的管理方法，其特征在于，所述获取应急电源的参数值，包括：

获取应急电源的单体电芯的电压参数值，并计算任意两个所述单体电芯的电压参数值的差值；

所述根据所述参数值执行相应动作包括：判断所述电压参数值的差值是否大于电压预设值，如是，则停止给外部设备提供电压。

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说 明 书

一种应急电源的管理系统和方法

技术领域

本发明涉及应急电源管理领域，尤其涉及一种应急电源的管理系统和方法。

背景技术

目前，高倍率锂电池应用于应急电源的技术已逐渐成熟，为了提高电池容量，应急电源一般会采用多节单体锂电池组合而成，高倍率锂电池使得应急电源具有使用寿命长、无污染、体积小和便于携带等优点。但是，应急电源中的锂电池也具有本身固有的缺点，比如应急电源用于启动车辆时，其启动电流非常大（可达到 100A-500A 之间）、高温以及过充过放等不恰当使用会导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失。

因此，有必要提供一种应急电源的管理系统和方法来解决上述问题，使得用户可以安全放心地使用锂电池应急电源。

发明内容

本发明的目的在于提供一种应急电源的管理系统和方法，旨在解决现有的锂电池应急电源因启动电流过大、高温以及过充过放等使用导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失问题。

为了解决上述技术问题，第一方面，提供了一种应急电源的管理系统，所述的应急电源的管理系统包括：应急电源和电瓶夹，所述电瓶夹和所述应急电源连接，用于给外部设备提供电压；

所述电瓶夹和所述应急电源连接还包括通讯连接，所述电瓶夹获取所述应急电源的参数值，并根据所述参数值执行相应动作。

优选地，所述应急电源包括电芯组件和第一 MCU 主控单元，所述第一 MCU 主控单元和所述电芯组件连接用于监控所述电芯组件；

所述电芯组件包括多个串联连接的电芯组，所述电芯组包括多个并联的单体电芯；

所述第一 MCU 主控单元包括温度检测电路，所述温度检测电路用于检测所述单体电芯的温度参数值。

优选地，所述第一 MCU 主控单元还包括电压采样电路，所述电压采样电路用于检测所述单体电芯的电压参数值。

优选地，所述温度检测电路包括一个或多个 NTC 热敏电阻，所述 NTC 热敏电阻用于测量所述单体电芯或电芯组的温度参数值。

优选地，所述第一 MCU 主控单元包括电压采样电路，所述电压采样电路与所述单体电芯连接用于检测所述单体电芯的电压参数值。

优选地，所述电瓶夹包括开关控制单元和第二 MCU 主控单元；

所述第二 MCU 主控单元和所述第一 MCU 主控单元通讯连接，用于获取所述应急电源的参数值；

所述第二 MCU 主控单元和所述开关控制单元连接，用于根据所述参数值控制所述开关控制单元的开关。

第二方面，还提供了一种应急电源的管理方法，该应急电源的管理方法包括：

获取应急电源的参数值；

根据所述参数值执行相应动作。

优选地，所述获取应急电源的参数值，包括获取应急电源的电池组合类型信息及电池容量信息；

所述根据所述参数值执行相应动作包括：根据所述电池组合类型信息，选择与所述应急电源相对应的工作模式；以及根据所述电池容量信息，设置保护电流值。

优选地，所述获取应急电源的参数值包括获取应急电源的单体电芯的温度参数值；

所述根据所述参数值执行相应动作包括：判断所述温度参数值是否大于温度预设值，若是，则停止给外部设备提供电压。

优选地，所述获取应急电源的参数值，包括：

获取应急电源的单体电芯的电压参数值，并计算任意两个所述单体电芯的电压参数值的差值；

所述根据所述参数值执行相应动作包括：判断所述电压参数值的差值是否大于电压预设值，如是，则停止给外部设备提供电压。

有益效果:本发明的实施例提供了一种应急电源的管理系统，与现有技术相比，该管理系统包括：应急电源和电瓶夹，所述电瓶夹和所述应急电源连接，用于给外部设备提供电压；所述电瓶夹和所述应急电源连接还包括通讯连接，所述电瓶夹获取所述应急电源的参数值，并根据所述参数值执行相应动作。另一方面，本发明的实施例提供了一种应急电源的管理方法，该方法包括：获取应急电源的参数值；并根据所述参数值执行相应动作。该管理系统和方法可以有效地解决锂电池应急电源因启动电流过大、高温以及过充过放等使用导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失问题。同时使得该管理系统可以使用不同的类

型的电池。

附图说明

为了更清楚地说明本发明实施例中的技术方案，下面将对实施例或现有技术描述中所需要使用的附图作简单地介绍，显而易见地，下面描述中的附图仅仅是本发明的一些实施例，对于本领域普通技术人员来讲，在不付出创造性劳动性的前提下，还可以根据这些附图获得其他的附图。

图 1 是本发明一实施例提供的应急电源的管理系统的结构图；

图 2 是本发明一实施例提供的应急电源的第一 MCU 主控单元中的控制芯片的电路图；

图 3 是本发明一实施例提供的应急电源的温度检测电路图；

图 4 是本发明一实施例提供的应急电源的电压采样电路和均衡电路图；

图 5 是本发明一实施例提供的电瓶夹的第二 MCU 主控单元的电路结构图；

图 6 是本发明一实施例提供的电瓶夹的包含开关控制单元和通讯接口的电路结构图；

图 7 是本发明一实施例提供的应急电源的管理方法的流程图。

具体实施方式

为了使本发明的目的、技术方案及优点更加清楚明白，以下结合附图及实施例，对本发明进行进一步详细说明。应当理解，此处所描述的具体实施例仅仅用以解释本发明，并不用于限定本发明。

图 1 示出了本发明一实施例提供的应急电源的管理系统的结构，该管理系统

1 包括应急电源 11 和电瓶夹 12，电瓶夹 12 和应急电源 11 连接，用于给外部设备提供电压，在本优选的实施例中，电瓶夹 12 和应急电源 11 的连接可以采用接口插拔的连接方式；电瓶夹 12 和应急电源 11 连接还包括通讯连接，电瓶夹 12 获取应急电源 11 的参数值，并根据该参数值执行相应动作。比如外部设备为汽车，应急电源 11 通过电瓶夹 12 和汽车连接，用于给汽车提供启动电压，因为启动电流过大，有时还需要多次启动，会造成应急电源里的锂电池出现鼓包、甚至爆炸等现象，使用电瓶夹 12 获取此时应急电源 11 的参数值，比如温度和电压等，并判断应急电源 11 的温度或电压是否过高，超过安全值，安全值即是预先写入电瓶夹 12 里的预设值，若应急电源 11 的温度或电压大于预设值，则停止给汽车提供启动电压，从而实现保护应急电源 11 的锂电池应急电源因启动电流过大、高温以及过充过放等使用导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失问题。

应急电源 11 包括第一 MCU 主控单元 111 和电芯组件 112，第一 MCU 主控单元 111 主要包括第一控制芯片 U1，第一控制芯片 U1 如图 2 所示，第一 MCU 主控单元 111 和电芯组件 112 连接用于检测控制电芯组件 112；电芯组件 112 包括多个串联连接的电芯组，该电芯组包括多个并联的单体电芯；第一 MCU 主控单元 111 包括温度检测电路，温度检测电路用于检测单体电芯的温度参数值，如图 3 所示，温度检测电路包括至少一个 NTC 热敏电阻，可以实时检测由于大电流造成的单体电芯或者电芯组的温度，当电芯组件 112 的温度过高时或者电芯组件 112 的其中一个单体电芯的温度过高时，第一 MCU 主控单元 111 及时检测该过高的温度值并传递给电瓶夹 12，电瓶夹 12 包括第二 MCU 主控单元 121 和开关控制单元 122，第二 MCU 主控单元 121 主要包括一个控制芯片 U2，开关控制单元 122 主要包括一

个继电器；第二 MCU 主控单元 121 和第一 MCU 主控单元 111 通讯连接，用于获取应急电源 11 的参数值，该参数值包括单体电芯的温度参数值、电压参数值或任意两个单体电芯的电压参数值的差值；第二 MCU 主控单元 121 和开关控制单元 122 连接，用于根据接收到参数值控制开关控制单元的开关。

第一 MCU 主控单元还包括电压采样电路和均衡电路，电压采样电路和均衡电路的具体电路如图 4 所示，电压采样电路 401 通过均衡电路与单体电芯连接用于检测单体电芯的电压参数值，并将单体电芯的电压参数值传递第一 MCU 主控单元 111，由第一 MCU 主控单元 111 计算任意两个单体电芯的电压参数值的差值并发送给电瓶夹 12，电瓶夹 12 电压参数值的差值和预设值相比较，判断是否停止给汽车提供电压。这样可以有效地避免应急电源的里每个单体电芯出现问题，因为应急电源的内部电池组是由 3 片、4 片锂电池单体电芯串联或并联组成，锂电池的单体电芯在制造过程中存在不可避免的差异，由锂电池单体电芯组成的电芯组也同样存在组内差异，当电芯组内的某一片单体电芯的电量过低或内阻变大时，在电芯组的正负极端口是无法感知到这种现象的发生，当用户使用内部存在单体电芯的电压差过大的电芯组启动车辆时，巨大的启动电流会导致性能最差的单体电芯出现鼓包甚至爆炸现象，存在安全隐患。

如图 5 所示，第二 MCU 主控单元主要包第二控制芯片 U2，第二控制芯片 U2 主要用于获取应急电源 11 的参数值，第二控制芯片 U2 和电瓶夹 12 的通讯端口 PAD3 连接，电瓶夹 12 的通讯端口 PAD3 如图 6 所示，图 6 还包括开关控制单元 K1，第二控制芯片 U2 通过通讯端口 PAD3 与第一 MCU 主控单元中的控制芯片 U1 上的端口 TP1 连接完成通讯连接。另外，电瓶夹通过与应急电源的通讯连接，获取应急电源的参数值，还包括获取应急电源的电池组合类型信息及电池容量信

息，电池组合类型信息包括电池类型和连接方式等，例如钴酸锂电池的 3 串连接方式、磷酸铁锂的电池的 4 串连接方式，不同的电池以及不同的连接方式需要不同的工作模式，在获取电池组合类型信息后，选择与该应急电源相对应的工作模式；电池容量信息，即是容量大小信息，根据该设置保护电流值，防止电流过大造成击穿等，可以有效地保护应急电源和电瓶夹组成管理系统以及相应的外部设备。

另外，第二 MCU 主控单元还包括防反接检测单元，该防反接检测单元主要包括一个芯片及相应的电容电阻，防反接检测单元还与主控芯片单元（控制芯片 U2）和电瓶夹的电压输出端连接，防反接检测单元用于检测用户是否接反电瓶夹的线夹，起到保护电路作用。第二 MCU 主控单元还包括指示灯电路单元，该指示灯电路单元用于指示该电瓶夹的工作状态，工作状态包括正常和异常两种情况，正常情况下显示绿灯，异常情况下显示红灯，用于提醒用户该应急电源的管理系统出现异常情况，第二 MCU 主控单元还包括蜂鸣电路单元，当应急电源的管理系统出现异常情况时，蜂鸣电路单元用于报警提示用户出现异常情况。

图 7 示出了本发明一实施例提供的应急电源的管理方法的流程，该方法包括以下步骤：

S101、获取应急电源的参数值。

在本步骤中，获取应急电源的参数值，是指电瓶夹获取应急电源的参数值，在此之前，电瓶夹要和应急电源建立连接，此连接包括提供电压的电性连接和用于通讯交互的通讯连接；获取应急电源的参数值包括获取应急电源的单体电芯的温度参数值或者获取应急电源的单体电芯的电压参数值。其中，获取应急电源的参数值，包括：获取应急电源的单体电芯的电压参数值；计算任意两个所述单体

电芯的电压参数值的差值。获取应急电源的参数值，还包括获取应急电源的电池组合类型信息及电池容量信息等。

S102、根据所述参数值执行相应动作。

在 S102 步骤中，判断所述参数值是否大于预设值，包括：判断温度参数值是否大于温度预设值；判断电压参数值的差值是否大于电压预设值。若温度参数值大于温度预设值，则电瓶夹停止给外部设备提供电压；或者电压参数值的差值大于电压预设值，则电瓶夹停止给外部设备提供电压。该方法可以有效地解决锂电池应急电源因启动电流过大、高温以及过充过放等使用导致启动电源鼓包，甚至爆炸，造成人身伤害及财产损失问题。根据所述电池组合类型信息，选择与所述应急电源相对应的工作模式，从而使得该电瓶夹可以适用不同类型的电池；以及根据该电池容量信息，设置保护电流值，选择与该应急电源相对应的工作模式；电池容量信息，即是容量大小信息，根据该设置保护电流值，防止电流过大造成击穿等，可以有效地保护应急电源和电瓶夹组成管理系统以及相应的外部设备。

该方法中的应急电源和电瓶夹均包括控制芯片，该控制芯片可以写入控制程序并执行相应的逻辑运算，预设值为预先写入到控制芯片的值，比如温度预设值为 55° 和电压预设值为 1V，若单体电芯的温度参数值大于温度预设值 55°，则电瓶夹停止给外部设备提供电压，外部设备可以为汽车或游艇等设备；或者电压参数值的差值大于电压预设值 1V，则电瓶夹停止给外部设备提供电压；从而实现对应急电源的保护。

以上所述仅为本发明的较佳实施例而已，并不用以限制本发明，凡在本发明的精神和原则之内所作的任何修改、等同替换和改进等，均应包含在本发明的保护范围之内。

说 明 书 附 图

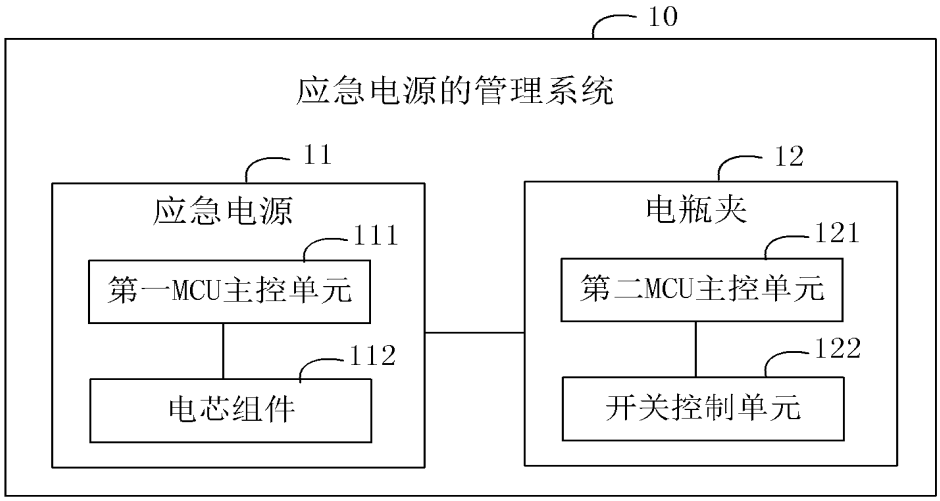

10
应急电源的管理系统
11
应急电源
111
第一MCU主控单元
112
电芯组件
12
电瓶夹
121
第二MCU主控单元
122
开关控制单元

图 1

说 明 书 附 图

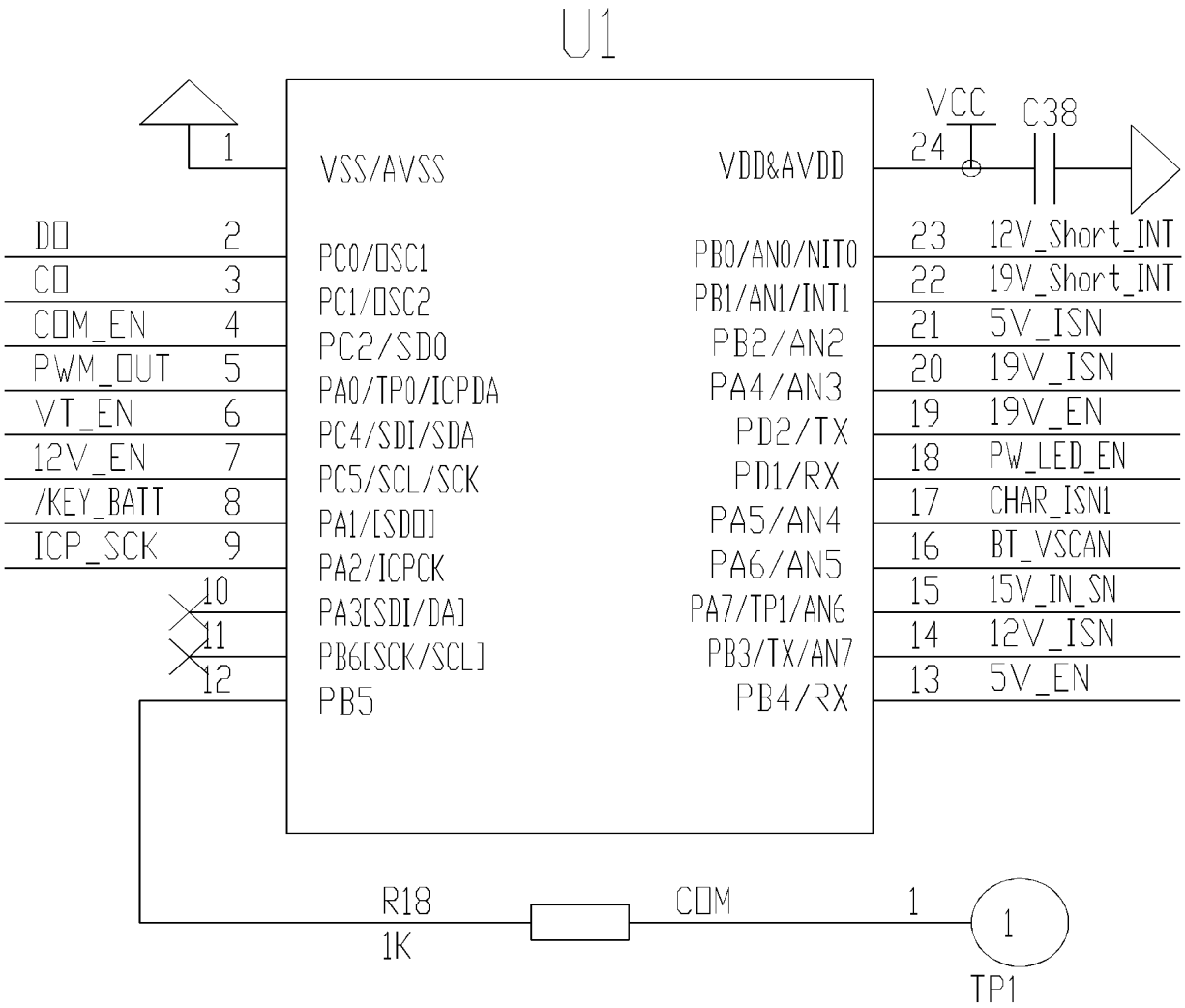

U1
1
VSS/AVSS
VDD&AVDD
24
VCC
C38
DO
2
PC0/OSC1
PB0/AN0/NIT0
23
12V_Short_INT
CO
3
PC1/OSC2
PB1/AN1/INT1
22
19V_Short_INT
COM_EN
4
PC2/SDO
PB2/AN2
21
5V_ISN
PWM_OUT
5
PA0/TP0/ICPDA
PA4/AN3
20
19V_ISN
VT_EN
6
PC4/SDI/SDA
PD2/TX
19
19V_EN
12V_EN
7
PC5/SCL/SCK
PD1/RX
18
PW_LED_EN
/KEY_BATT
8
PA1/[SDO]
PA5/AN4
17
CHAR_ISN1
ICP_SCK
9
PA2/ICPCK
PA6/AN5
16
BT_VSCAN
10
PA3[SDI/DA]
PA7/TP1/AN6
15
15V_IN_SN
11
PB6[SCK/SCL]
PB3/TX/AN7
14
12V_ISN
12
PB5
PB4/RX
13
5V_EN
R18
1K
COM
1
1
TP1

图 2

说 明 书 附 图

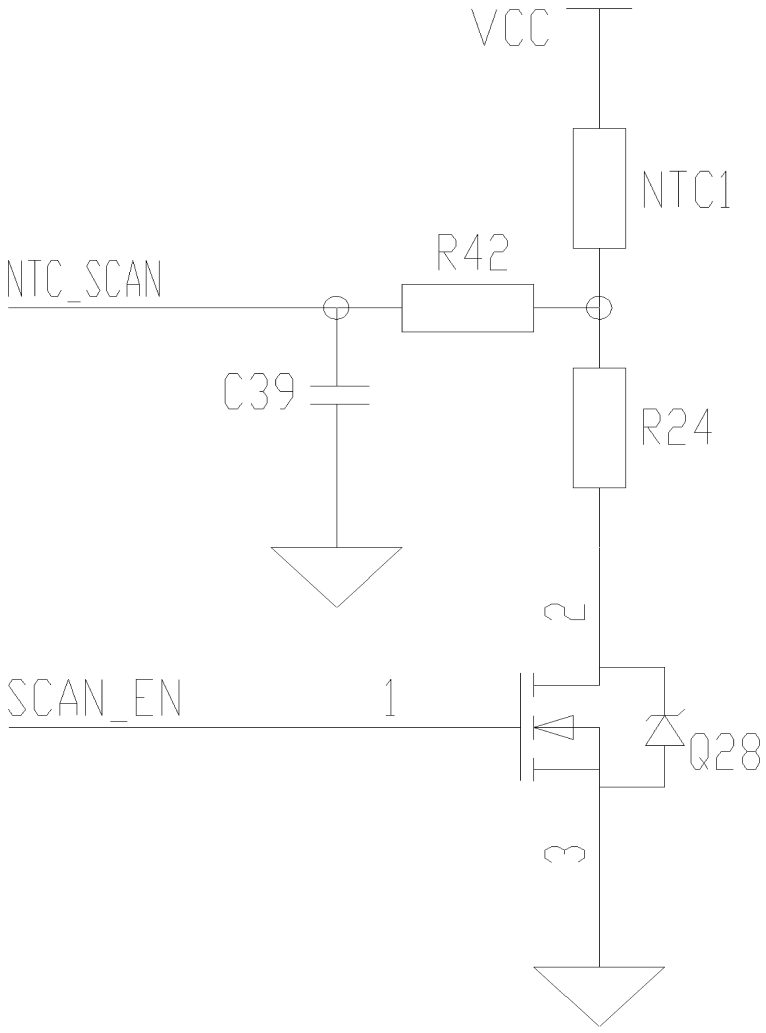


图 3

说 明 书 附 图

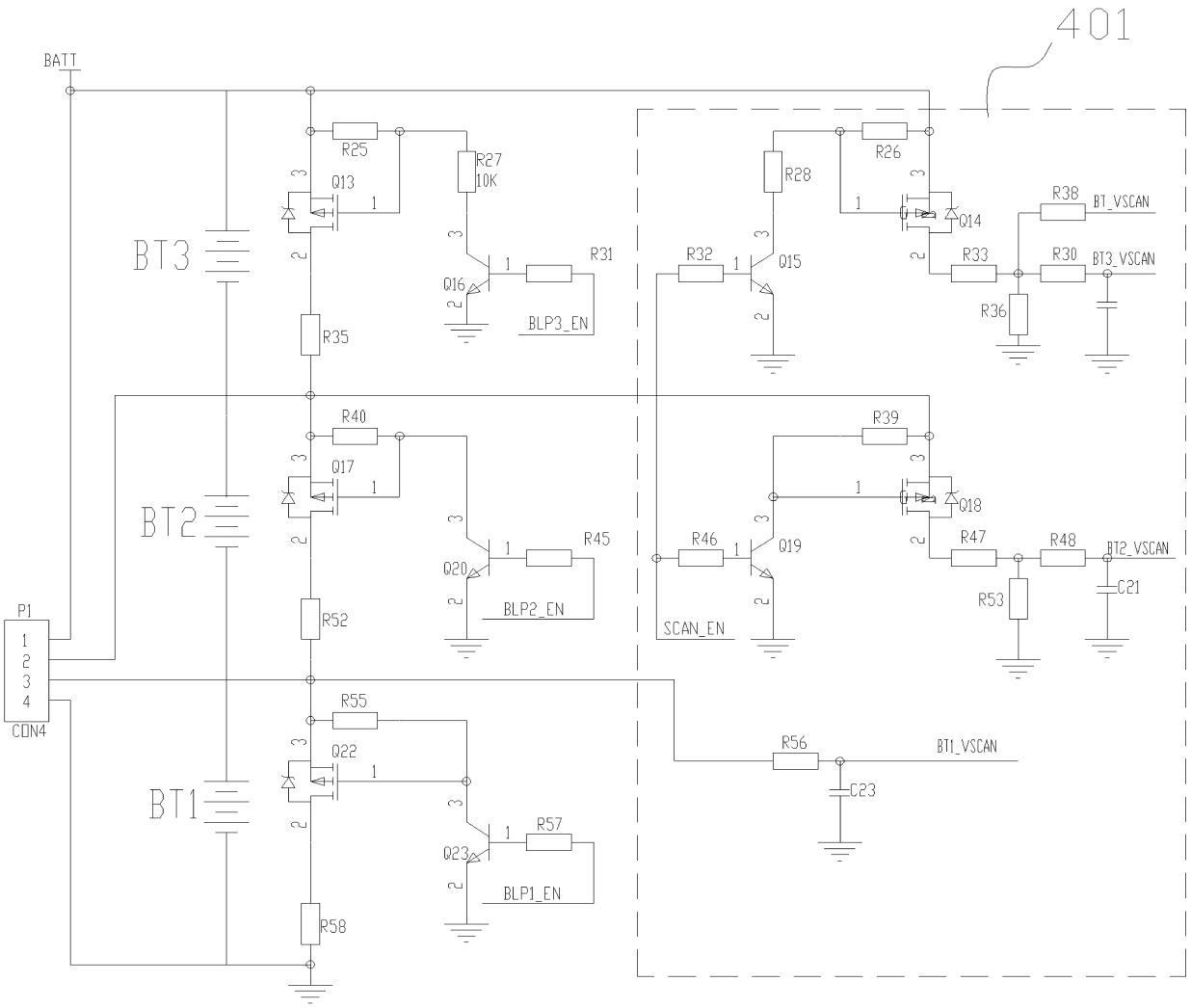

401
BATT
BT3
BT2
BT1
P1
1
2
3
4
CON4
R25
R27
10K
Q13
R31
Q16
BLP3_EN
R35
R40
Q17
R45
Q20
BLP2_EN
R52
R55
Q22
R57
Q23
BLP1_EN
R58
R26
R28
R38
BT_VSCAN
Q14
R32
Q15
R33
R30
BT3_VSCAN
R36
R39
Q18
R46
Q19
R47
R48
BT2_VSCAN
R53
C21
SCAN_EN
R56
BT1_VSCAN
C23

图 4

说 明 书 附 图

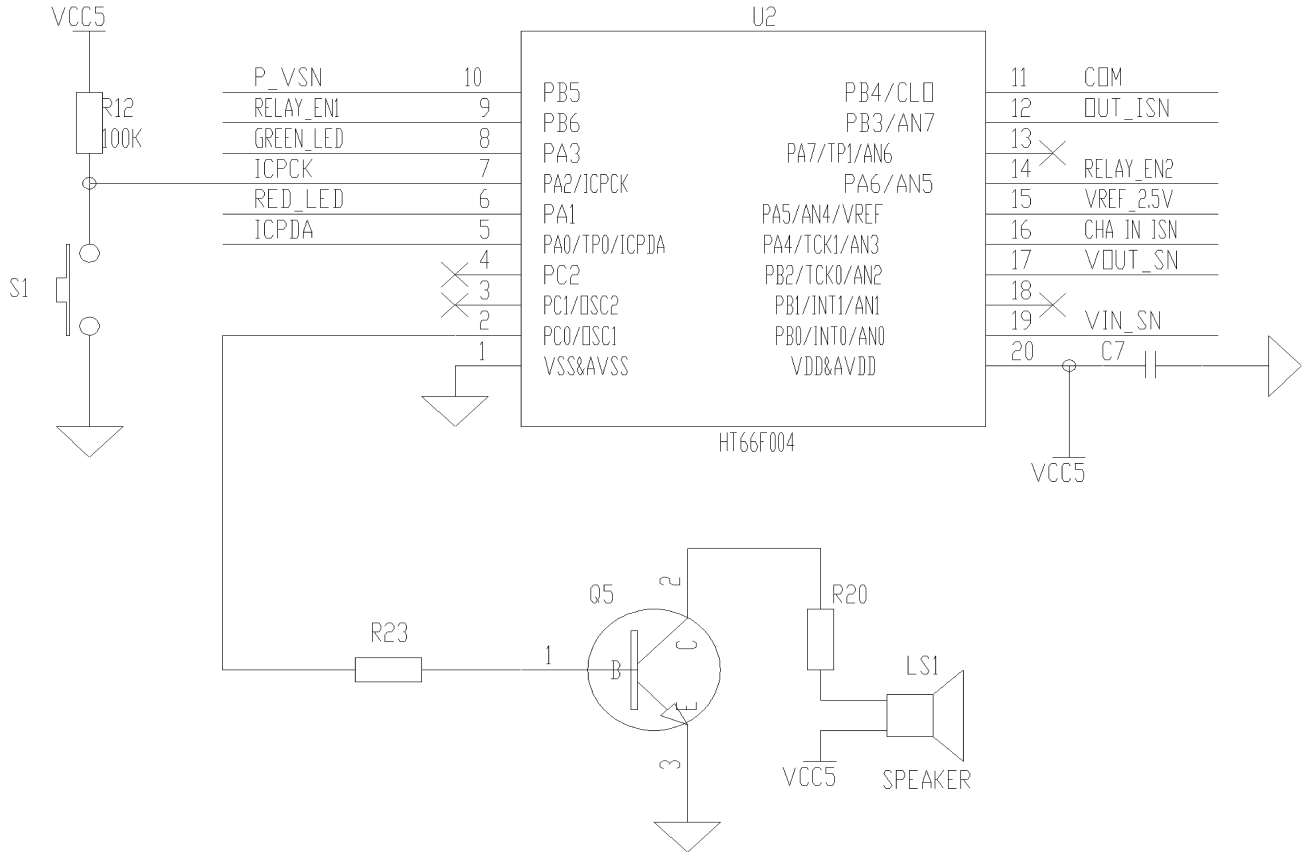

VCC5
R12
100K
S1
P_VSN
RELAY_EN1
GREEN_LED
ICPCK
RED_LED
ICPDA
10
9
8
7
6
5
4
3
2
1
U2
PB5
PB6
PA3
PA2/ICPCK
PA1
PA0/TP0/ICPDA
PC2
PC1/OSC2
PC0/OSC1
VSS&AVSS
PB4/CLO
PB3/AN7
PA7/TP1/AN6
PA6/AN5
PA5/AN4/VREF
PA4/TCK1/AN3
PB2/TCK0/AN2
PB1/INT1/AN1
PB0/INT0/AN0
VDD&AVDD
HT66F004
11
12
13
14
15
16
17
18
19
20
COM
OUT_ISN
RELAY_EN2
VREF_2.5V
CHA_IN_ISN
VOUT_SN
VIN_SN
C7
VCC5
R23
Q5
2
1
3
B
C
E
R20
LS1
VCC5
SPEAKER

图 5

说 明 书 附 图

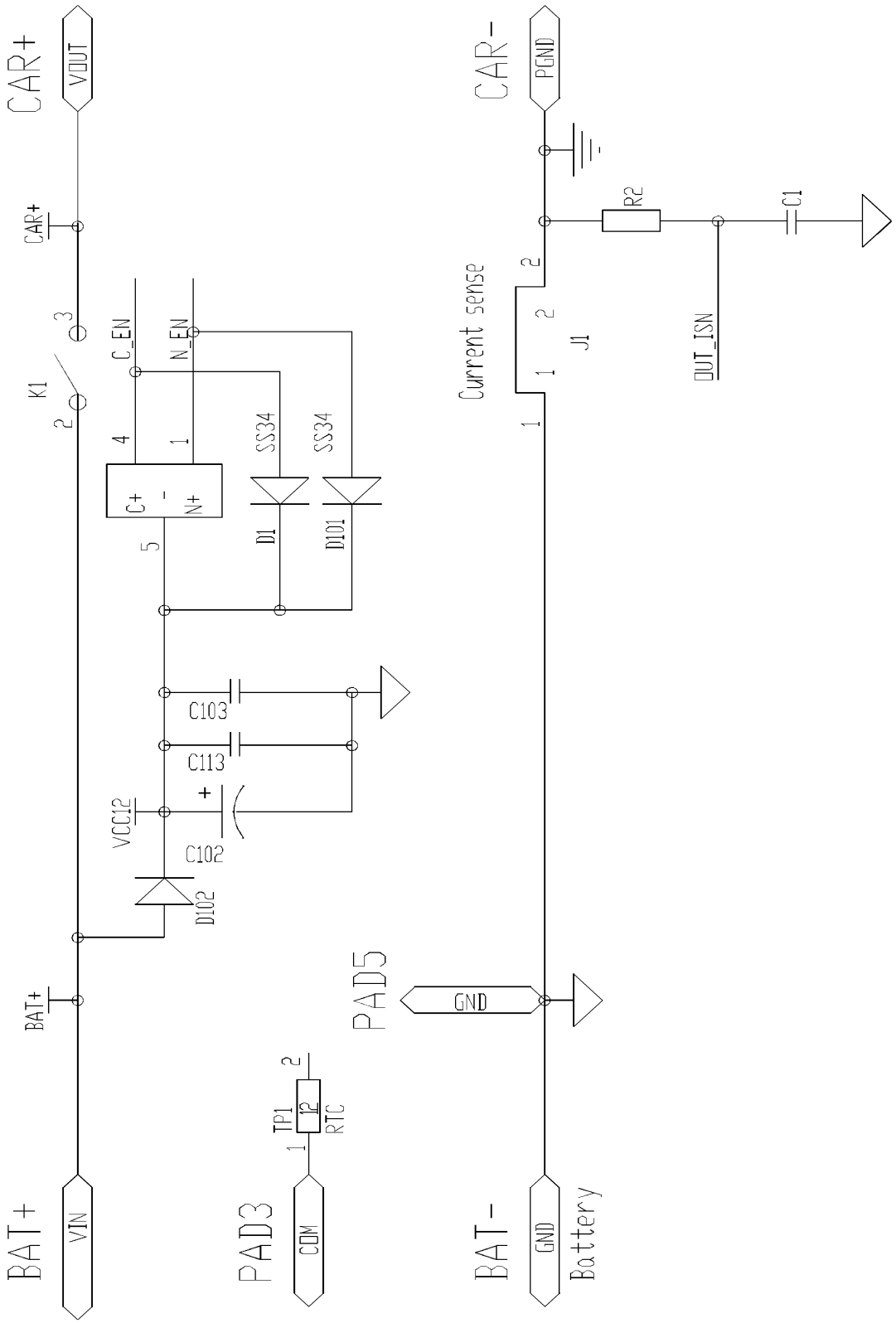

CAR+
VOUT
CAR+
K1
C_EN
N_EN
SS34
SS34
C+
N+
D1
D101
C103
C113
VCC12
C102
D102
BAT+
PAD5
GND
TP1
12
RTC
PAD3
COM
BAT+
VIN
BAT-
GND
Battery
CAR-
PGND
R2
C1
Current sense
J1
OUT_ISN

图 6

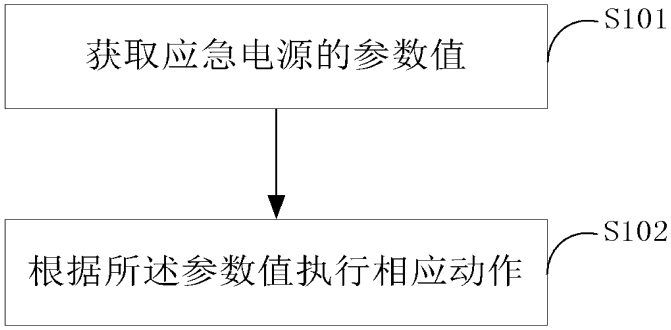


图 7

PTO/SB/08a (03-15)
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(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

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	1	20100173182	A1	2010-07-08	BAXTER MICHAEL et al.	

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	1	20120130432	KR	A	2012-12-03	KOREA ELECTRO TECHNOLOGY RESEARCH INSTITUTE		☓
	2	3013164	FR	A1	2015-05-15	INTELLIGENT ELECTRONIC SYSTEMS		☒
	3	2010252520	JP	A	2010-11-04	NISSAN MOTOR		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15245146
	Filing Date	2016-08-23
	First Named Inventor	Yun LEI
	Art Unit	2859
	Examiner Name	WILLIAMS, ARUN C
	Attorney Docket Number	063313-8014US01

	4	2660950	EP	A2	2013-11-06	LG CHEMICAL LTD		☐
	5	202015103173	DE	U1	2015-07-06	ZONESKING TECHNOLOGY CO		☒
	6	2016/003471	WO	A1	2016-01-07	NOCO COMPANY		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	The extended European search report for EP16189167.6, issued on Feb. 20, 2017	

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/James J. Zhu, Reg. No. 52,396/	Date (YYYY-MM-DD)	2017-12-25
Name/Print	James J. Zhu	Registration Number	52,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	31329583
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	James J. Zhu
Filer Authorized By:	
Attorney Docket Number:	063313-8014US01
Receipt Date:	25-DEC-2017
Filing Date:	23-AUG-2016
Time Stamp:	01:13:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1_Transmittal.pdf	262602 c536b8115e15ec6b91c2dd2d477c394b115cd530	no	2

Warnings:

Information:					
2	Foreign Reference	3_KR20120130432A.pdf	684922 3a6b048319f4eba75ad182cf227e474d7bf5007a	no	14
Warnings:					
Information:					
3	Foreign Reference	4_Abstract_of_KR20120130432A.pdf	70376 e23325c3774c45b217e9f3c916d10231f5beb5a6	no	1
Warnings:					
Information:					
4	Foreign Reference	5_FR3013164A1.pdf	668257 6a93b0155d103ad62bddbf489b6619ae1b3a695e	no	18
Warnings:					
Information:					
5	Foreign Reference	6_Abstract_of_FR3013164A1.pdf	80384 15214af409d2be8916f494778fca23e062800b62	no	1
Warnings:					
Information:					
6	Foreign Reference	7_JP2010252520A.pdf	162695 81b57e3d1d8fca8c518e34b0d7d38e91fa7590c4	no	7
Warnings:					
Information:					
7	Foreign Reference	8_Abstract_of_JP2010252520.pdf	37105 73fc5445675691fb4024ab717bbed4b5aaa6460f	no	1
Warnings:					
Information:					
8	Foreign Reference	9_EP2660950A2.pdf	821850 589cac38c31ec18e69efed450111fa0e43c684a6	no	18
Warnings:					
Information:					

9	Foreign Reference	10_DE202015103173U1.pdf	290880 796d4f6d46bfcaab9efd4e78be5b0f2243212ea6	no	9
Warnings:					
Information:					
10	Foreign Reference	11_Abstract_of_DE202015103173U1.pdf	67661 d613ba1aa73ac3680befb77ee2dd57ec344c05f1	no	1
Warnings:					
Information:					
11	Foreign Reference	12_WO2016-003471A1.pdf	861456 3e0cbef596e1c0ecd7fc8fd07409c41910e0ec22	no	22
Warnings:					
Information:					
12	Non Patent Literature	13_EESR.pdf	446729 3f5b28e4500267d11e579ece10c9ebd787e5385f	no	12
Warnings:					
Information:					
13	Information Disclosure Statement (IDS) Form (SB08)	2_IDS.pdf	1035409 a32dfd49a0c431aa2a7fb9dddfc0aa8be7afe941	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	5490326		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	15/245,146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

Total Number of Pages in This Submission

ENCLOSURES (*Check all that apply*)

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation
- ☐ Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

Foreign references cited in the EESR

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Jun He Law Offices, P.C.		
Signature	/James J. Zhu, Reg. No. 52,396/		
Printed name	James J. Zhu		
Date	2017-12-25	Reg. No.	52,396

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

(19) 대한민국특허청(KR)
(12) 공개특허공보(A)

(11) 공개번호 10-2012-0130432
(43) 공개일자 2012년12월03일

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H02J 7/00 (2006.01) *B60L 11/18* (2006.01)
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심사청구일자 2011년05월23일

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(뒷면에 계속)
(74) 대리인
특허법인명문

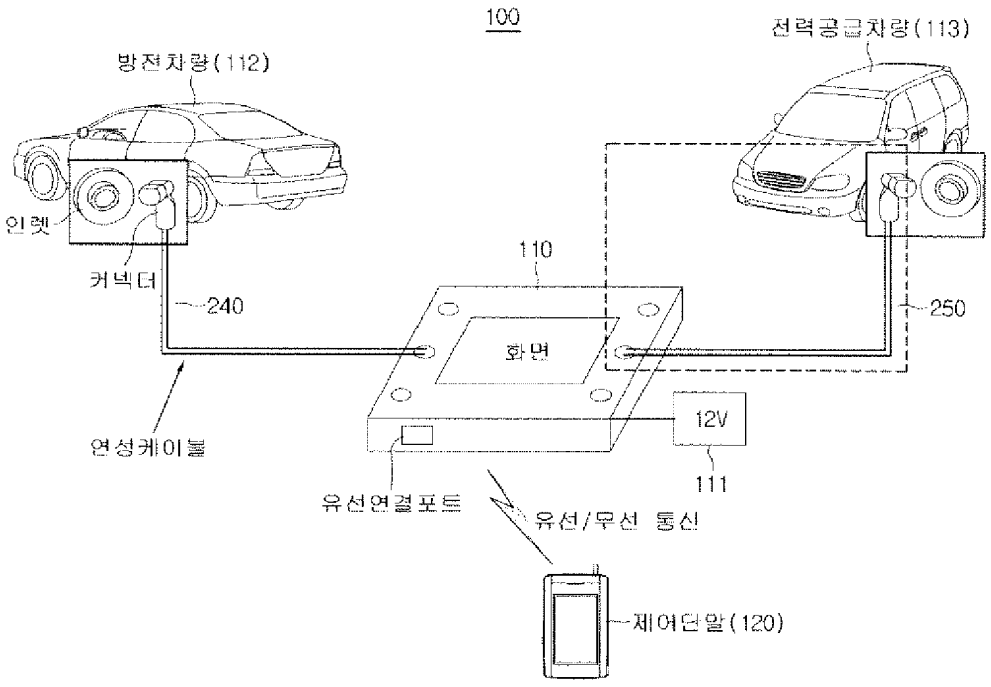
전체 청구항 수 : 총 6 항

(54) 발명의 명칭 **주위 전기 자동차를 이용해 방전된 전기 자동차에게 충전서비스를 제공하는 과금 가능 휴대형 장치**

(57) 요 약

본 발명은 전기 자동차의 배터리가 완전히 방전되어 운행이 불가능 할 때 이동형 발전기를 탑재하고 직접 전력을 생산하거나 저장된 전력을 제공할 수 있는 차량과 전력 전송 케이블로 연결하고 BMS(Battery Management System)와 통신하고, 전력을 제어함으로써 방전차량을 충전시키며 사용자의 유/무선 휴대 단말기로 제어 신호의 입력이나 과금 처리가 가능하도록 한 휴대형 충전장치에 관한 것이다.

대 표 도



WINPLUS Ex. 1002, p. 155

BNSDOCID: <KR__1020120130432A__I_>

(72) 발명자
손홍관
경상남도 김해시 장유면 금관대로599번길 26-7

최정희
경상남도 창원시 성산구 원이대로 495, 201동 607호 (반림동, 트리비앙아파트)

WINPLUS Ex. 1002, p. 156

BNSDOCID: <KR__1020120130432A__I_>

특허청구의 범위

청구항 1

충전 대상인 제1차량의 인렛에 연결하기 위한 전력전송 케이블과 통신선, 제어파일럿 신호선, 웨이크업 신호선으로 구성된 연성 케이블과 커넥터로 구성된 제1 충전 케이블;

전력을 공급할 제2차량의 인렛에 연결하기 위한 전력전송 케이블과 통신선, 제어파일럿 신호선, 웨이크업 신호선으로 구성된 연성 케이블과 커넥터로 구성된 제2 충전 케이블;

상기 제 1 충전 케이블의 전력전송 케이블 및 제 2 충전 케이블의 전력전송 케이블과 연결되어 상기 제2차량으로부터 상기 제1차량으로 공급되는 전력량을 계측하기 위한 전력 제어부;

상기 제 1 충전 케이블의 통신선과 제어파일럿 신호선, 웨이크업 신호선과 상기 제 2 충전 케이블의 통신선과 제어파일럿 신호선, 웨이크업 신호선에 연결된 통신 제어부; 및

상기 통신 제어부를 통한 상기 제1차량 및 상기 제2차량과의 제어파일럿 신호선에 기초하여 각 차량을 인식하고, 웨이크업 신호선을 통해 상기 제 1 차량과 제 2 차량의 BMS로 전원을 공급하는 것을 제어하고, 통신선을 통해 구동되는 각 차량의 BMS로부터 배터리 상태정보를 받아 공급 가능 전력량을 산출하고, 사용자로부터 입력 받는 상기 공급 가능 전력량 이하의 요구 충전량 및 충전 시작 요청에 따라 상기 전력 제어부가 상기 요구 충전량만큼 상기 제2차량의 전력 전송 케이블을 통해 상기 제1차량의 전력 전송 케이블로 전력을 공급하도록 제어하는 충전 관리부

를 포함하는 것을 특징으로 하는 휴대형 충전장치.

청구항 2

제1항에 있어서,

디스플레이 수단 위에서의 터치 입력 방식 또는 외부에 키패드를 구비하고 버튼 누름 방식으로 상기 요구 충전량 및 상기 충전 시작 요청을 입력받거나,

유선 또는 무선 통신하는 통신부를 통하여 외부의 제어 단말과 통신하여 상기 제어 단말로부터 상기 요구 충전량 및 상기 충전 시작 요청을 입력받는 것을 특징으로 하는 휴대형 충전장치.

청구항 3

제1항에 있어서,

상기 충전 관리부는, 충전을 종료한 후 유선 또는 무선 통신하는 통신부를 통하여 외부의 제어 단말로 충전 완료 정보를 전송한 후, 상기 충전 완료 정보에 대한 상기 제어 단말로부터의 승인 통보를 수신하면 상기 충전 완료 정보에 포함된 충전량 정보에 따라 과금 정보를 계산하고 상기 제1차량 운전자에 대해 상기 과금 정보에 따른 과금 처리를 수행하는 과금부

를 포함하는 것을 특징으로 하는 휴대형 충전장치.

청구항 4

제3항에 있어서,

상기 과금부 또는 상기 과금부로부터 상기 과금 정보를 수신하는 상기 제어 단말이, 상기 제1차량 운전자의 결제 수단을 통해 전자 지불 처리하는 것을 특징으로 하는 휴대형 충전장치.

청구항 5

제4항에 있어서,

상기 전자 지불 처리는 전자 화폐 수단인 충전식 스마트 카드를 통해 이루어지거나, 네트워크로 연동하는 전자 지불 시스템의 승인으로 결제가 이루어지도록 하는 상기 제1차량 운전자의 계좌 정보, 신용카드정보, 또는 USIM 정보를 통해 이루어지는 것을 특징으로 하는 휴대형 충전장치.

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청구항 6

충전 대상인 제1차량에 연결된 전력 전송 케이블과 통신선, 제어파일럿 신호선, 웨이크업 신호선을 포함한 제1충전 케이블, 및 전력을 공급할 제2차량에 연결된 전력 전송 케이블과 통신선, 제어파일럿 신호선, 웨이크업 신호선을 포함한 제2충전 케이블을 휴대형 충전장치에 연결시키고,

상기 휴대형 충전장치를 이용하여,

상기 제1차량의 통신선과 상기 제2차량의 통신선을 통한 상기 제1차량 및 상기 제2차량과의 통신에 기초하여 상기 제1차량과 상기 제2차량으로부터 배터리 상태정보를 수신하면,

공급 가능 전력량을 자동으로 산출하고, 사용자로부터 입력받는 상기 공급 가능 전력량 이하의 요구 충전량 및 충전 시작 요청에 따라 상기 요구 충전량만큼 상기 제2차량의 전력 전송 케이블을 통해 상기 제1차량의 전력 전송 케이블로 전력을 공급하도록 제어하는 것을 특징으로 하는 충전 방법.

명 세 서

기 술 분 야

[0001] 본 발명은 과금이 가능한 휴대형 충전장치에 관한 것으로서, 전기 자동차의 배터리가 완전히 방전되어 운행이 불가능 할 때 이동형 발전기를 탑재하고 직접 전력을 생산하거나 저장된 전력을 제공할 수 있는 차량과 충전 케이블로 연결하고 각 차량의 BMS(Battery Management System)와의 통신을 통해 안전하고 편리하게 전력을 공급함으로써 방전차량을 충전시키며 사용자의 유/무선 휴대 단말기로 제어 신호의 입력이나 과금 처리가 가능하도록 한 휴대형 충전장치에 관한 것이다.

배 경 기 술

[0002] 일반적으로 내연기관 자동차의 경우 배터리가 방전되면 점프 케이블을 사용하여 다른 차량의 배터리에 연결한 후 시동하여 운행할 수 있다. 그러나, 점프 케이블을 연결하는 운전자는 점프 케이블 연결 시에 스파크가 빈번하게 발생하기 때문에 안전성에 심각한 문제가 발생할 수 있어 사용에 많은 부담감을 갖게 된다.

[0003] 또한, 최근에는 순수 전기자동차 또는 플러그인 하이브리드 전기자동차가(이하 전기자동차) 각광을 받고 있는데, 전기자동차는 배터리가 완전 방전되거나 배터리에 충전된 전력이 일정량 이상 사용된 경우에 배터리를 재충전할 필요가 있다. 전기 자동차는 BMS(Battery Management System)를 장착하여 배터리의 상태를 관리하고 충전과 운행 시 배터리 모니터링을 가능하게 함으로써, 운전석 앞의 계기판에 현재의 배터리 상태를 표시하도록 제어할 수 있지만, 운전자의 부주의로 인하여 배터리 재충전 시기를 놓쳐 자동차를 운행할 수 없는 상황이 발생될 수 있다.

[0004] 방전된 전기 자동차의 운전자는 배터리를 충전할 수 있는 가정이나 서비스 센터 등 충전소까지 차량을 견인하여 충전을 시도하거나, 운행중인 다른 차량 또는 긴급 출동 서비스 차량으로부터 전원을 공급받아 배터리를 충전하거나, 배터리를 교체하여 운행할 수 있다. 주위의 운행중인 전기자동차와 점프케이블을 통해 전원을 공급받는 경우, 차량 견인이나 배터리 교체 없이 간편하게 방전차량을 충전시킬 수도 있지만, 이 경우 두 차량에 탑재된 배터리의 특성이 맞지 않는 경우 위험성이 높다는 문제점이 있다. 새로운 배터리로 교체하는 경우 교체에 따른 많은 시간과 높은 배터리 비용이 소비자에게 부담될 수 있으며, 중고 배터리로 교체하는 경우 신용 및 안전성 문제로 인해 많은 사용자들과 분쟁이 발생할 수 있다.

발명의 내용

해결하려는 과제

[0005] 따라서, 본 발명은 상술한 문제점을 해결하기 위한 것으로서, 본 발명의 목적은, 전기 자동차의 배터리가 방전되어 운행이 불가능 할 때 서비스 제공을 목적으로 하는 개인 사업자 또는 서비스 센터 직원 등이 이동형 발전기를 탑재하고 전력을 생산하는 자동차 또는 여분의 전력을 공급 가능한 차량을 각각 충전 케이블로 연결하고 각 차량의 BMS(Battery Management System)와의 통신을 통해 안전하고 편리하게 전력을 공급함으로써 방전된 차량을 충전시키며 사용자의 유/무선 제어 단말기로 제어 신호의 입력이나 과금 처리가 가능하도록 한 휴대형 충전장치를 제공하는데 있다.

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과제의 해결 수단

[0006] 먼저, 본 발명의 특징을 요약하면, 상기와 같은 본 발명의 목적을 달성하기 위한 본 발명의 일면에 따른, 휴대형 충전장치는, 충전 대상인 제1차량의 인렛에 연결하기 위한 커넥터와 전력 전송 케이블과 통신선, 웨이크업(Wake-Up) 신호선, 제어파일럿 신호선을 포함한 제 1 충전 케이블; 전력을 공급할 제2차량의 인렛에 연결하기 위한 커넥터와 전력 전송 케이블과 통신선, 웨이크업 신호선, 제어파일럿 신호선을 포함한 제 2 충전 케이블; 상기 제 2 충전 케이블의 전력 전송 케이블로부터 상기 제 2 충전 케이블의 전력 전송 케이블로 전력을 공급하기 위한 전력 제어부; 상기 제 1 충전 케이블에 연결된 상기 제1차량의 BMS와 통신을 위한 통신선 및 웨이크업 신호선, 제어파일럿 신호선과 상기 제 2 충전 케이블에 연결된 상기 제2차량의 BMS와 통신을 위한 통신선 및 웨이크업 신호선, 제어파일럿 신호선에 연결된 통신 제어부; 및 상기 통신 제어부를 통한 상기 제1차량 및 상기 제2차량과에 설치된 제어파일럿 회로가 전달하는 제어파일럿 신호에 기초하여 각 차량을 인식하고, 웨이크업 신호선을 통해 BMS를 구동하기 위한 12V전원을 인가하고, 상기 제 1 차량과 제 2 차량의 BMS로부터 배터리 상태정보를 수신하여 공급가능한 전력량과 사용자의 충전 요구량을 받고, 충전 시작 요청에 따라 전력 제어부의 전력 공급 스위치를 제어함으로써 충전을 시작하고, 종료하도록 하는 충전 관리부를 포함한다.

[0007] 상기 충전 관리부는 세부적으로 전력 제어부와 통신 제어부를 제어하는 충전 제어부; 충전 제어부로 송/수신되는 이벤트와 메시지를 표시하기 위한 디스플레이부; 공급할 충전량의 설정, 충전의 시작등 사용자의 요구를 입력 가능한 터치스크린 또는 키패드 등과 같은 입력부; 자체 디스플레이부와 입력부를 대신하여 사용자의 원격 제어 단말기를 이용하여 동일한 작업을 수행하기 위해 연결되는 유선 또는 무선 통신부; 충전이 완료된 후 충전 요금을 정산하기 위해 충전 요금을 계산하고 과금하는 과금부를 포함한다.

[0008] 제 1 차량과 제 2 차량의 BMS로부터 배터리 상태 정보를 수신함으로써 자동으로 방전된 차량과 전력을 공급할 차량을 인지하는 것이 가능하다. 그러나, 편의를 위하여 제 1 차량은 방전된 차량으로 제 1 충전 케이블에 연결하고, 제 2 차량은 전력을 공급할 차량으로 제 2 충전 케이블로 연결되는 것으로 구분한다.

[0009] 충전의 시작과 종료는 충전 관리부를 통해 이루어지는 것이 일반적이나, 충전 관리부와 전력 제어부를 독립적으로 운영하는 것 또한 가능하다. 즉, 충전 관리부는 충전을 시작할 때 방전차량의 소유자가 요구한 충전 요구량을 전력 제어부에 통보하고, 전력 제어부는 충전이 완료되었을 때 충전 관리부로 신호를 전달함으로써, 충전 완료를 충전 관리부가 인지하게 할 수 있다. 이 때, 충전 관리부는 통신 제어부로부터 이상 신호가 전달되었을 경우 전력 제어부를 제어하여 충전을 정지시키거나 전류의 양을 조절 할 수 있다.

[0010] 충전 제어부로 송수신되는 사용자의 요구사항 또는 BMS의 상태정보 등의 이벤트 또는 메시지는 디스플레이부에 표시되며, 공급할 충전량의 설정, 충전의 시작 등 사용자의 요구를 입력 가능한 터치스크린 또는 키패드 등을 입력부에 연결하여 사용하는 것이 가능하다. 또한, 유선 또는 무선 통신이 가능한 통신부를 통하여 외부의 제어 단말에서 상기 방식과 동일한 작업을 수행할 수 있으며, 발생되는 이벤트와 메시지를 제어 단말에서 동시에 수신하는 것 또한 가능하다.

[0011] 상기 전력 제어부가 상기 요구 충전량만큼 상기 제1차량의 전력 전송 케이블로 전력을 공급하면, 상기 충전 관리부는 전력 제어부의 전력 공급 스위치를 제어하여 전력 공급을 중단시킨다. 이후 제 1 차량과 2차량으로부터 충전 종료 메시지를 수신하고, 이에 대한 충전 종료 응답을 전송한 후, 웨이크업 신호에 인가된 12V전원을 차단함으로써 충전을 종료할 수 있다

[0012] 또한, 상기 제1차량이 배터리 또는 BMS의 문제로 인해 통신 제어부를 통해 충전 종료를 요청하면 충전 관리부는 즉각 전력 제어부의 스위치를 제어하여 전력 공급을 중단하고, 통신 제어부를 통해 제 1 차량으로 충전 종료 응답 메시지를 전송할 수 도 있다. 휴대형 충전기는 이후 제 2 차량으로부터 전달되는 충전 종료 메시지에 응답할 수도 있다.

[0013] 또한, 상기 제2차량이 배터리 또는 BMS의 문제로 인해 통신 제어부를 통해 충전 종료를 요청하면 충전 관리부는 즉각 전력 제어부의 스위치를 제어하여 전력 공급을 중단하고, 통신 제어부를 통해 제 2 차량으로 충전 종료 응답 메시지를 전송할 수 도 있다. 휴대형 충전기는 이후 제 1 차량으로부터 전달되는 충전 종료 메시지에 응답할 수도 있다.

[0014] 상기 충전 제어부가 충전을 종료한 후 휴대형 충전장치의 디스플레이 또는 유선 또는 무선으로 통신하는 통신부를 통하여 외부의 제어 단말로 충전 완료 정보를 전송한 후, 상기 충전 완료 정보에 대한 승인 또는 승인 메시지를 수신하면 상기 충전 완료 정보에 포함된 충전량 정보에 따라 과금 정보를 계산하고 상기 제1차량 운전자에

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대해 상기 과금 정보에 따른 과금 처리를 수행한다.

[0015] 상기 과금부 또는 상기 과금부로부터 상기 과금 정보를 수신하는 상기 제어 단말이, 상기 제1차량 운전자의 결제 수단을 통해 전자 지불 처리할 수 있다. 상기 과금 처리는 직접적인 금전거래를 통해 이루어지거나, 유/무선 네트워크와 연동되어 충전식 스마트 카드, 또는 신용카드, 하이패스 카드, 휴대폰의 소액결제 등과 같은 다양한 전자지불 시스템을 통해 결제가 진행될 수 있다. 이때, 상기 제1차량 운전자의 주민등록 번호 정보, 계좌 정보, 신용카드정보, 또는 USIM 정보를 필요로 할 수 있다.

[0016] 본 발명의 다른 일면에 따른 충전 방법은, 충전 대상인 제1차량과 전력공급차량인 제2차량에 연결된 전력 전송 케이블과 웨이크업 신호선, 제어파일럿 신호선을 통신선을 포함한 충전 케이블을 휴대형 충전장치에 연결시키고, 상기 휴대형 충전장치를 이용하여, 상기 제1차량의 제어파일럿 회로와 연결되는 제어파일럿 신호선과 상기 제2차량의 제어파일럿 회로와 연결되는 제어파일럿 신호선을 통해 각 차량을 인식하고, 웨이크업 신호선을 통해 BMS에 구동 전원인 12V를 공급하면, 상기 제1차량과 제 2 차량은 연결된 통신선을 통해 BMS 상태 정보를 휴대형 충전장치로 제공한다. 이 후, 휴대형 충전장치는 제 2 차량의 BMS 상태 정보로부터 공급가능한 전력량을 산출하여 방전차량의 소유자에게 전달하고, 방전차량의 소유자는 공급가능한 전력량 이하의 전력량을 휴대형 충전기로 요구하고, 시작 요청을 수행함으로써 상기 요구 충전량만큼 상기 제2차량의 전력 전송 케이블을 통해 상기 제1차량의 배터리로 전력을 공급하도록 제어하는 것을 특징으로 한다.

[0017] 그러나, 전력을 공급할 차량이 차량 내의 BMS 정보를 사전에 인지하고 있다면, 충전 케이블이 연결되기 전에 공급가능한 전력량을 방전차량의 소유자에게 전달할 수도 있다.

발명의 효과

[0018] 본 발명에 따른 휴대형 충전장치는, 서비스 제공을 목적으로 하는 개인 사업자 또는 서비스 센터 직원 등이 이동형 발전기를 탑재하고 전력을 생산하는 자동차 또는 여분의 전력을 공급 가능한 전기자동차와 BMS와의 통신을 통해 방전차량을 충전하는 데 이용될 수 있으며, 관리자의 복잡한 조작 없이 다양한 종류의 배터리를 탑재한 차량과 서로 연결하여 충전시킬 수 있고 내장된 회로나 휴대 단말을 이용해 충전시 제어를 편리하게 수행될 수 있으며, 과금 처리가 바로 이루어지도록 할 수 있으므로 방전차량의 소유자와 전력공급차량의 소유자가 모두 편리하게 충전 서비스를 이용할 수 있게 된다.

도면의 간단한 설명

[0019] 도1은 본 발명의 일실시예에 따른 휴대형 충전장치를 이용한 충전 서비스 시스템을 설명하기 위한 도면이다.

도 2는 본 발명의 일실시예에 따른 휴대형 충전장치를 설명하기 위한 도면이다.

도 3은 본 발명의 일실시예에 따른 휴대형 충전장치를 이용한 충전 서비스 시스템의 동작을 설명하기 위한 흐름도이다.

도 4는 본 발명의 일실시예에 따른 휴대형 충전장치를 이용한 충전 시의 충전 종료 조건의 여러 가지를 설명하기 위한 도면이다.

발명을 실시하기 위한 구체적인 내용

[0020] 이하 첨부 도면들 및 첨부 도면들에 기재된 내용들을 참조하여 본 발명의 바람직한 실시예를 상세하게 설명하지만, 본 발명이 실시예들에 의해 제한되거나 한정되는 것은 아니다.

[0021] 특히, 이하에서 언급되는 차량(방전차량, 전력공급차량 등)은 재충전 가능한 배터리에 충전된 전력을 에너지로 이용하는 플러그인 전기 자동차인 것으로 예를 들어 설명한다. 다만, 이에 한정되는 것은 아니며 경우에 따라 이하에서 언급되는 차량은 배터리를 필요로 하는 가스, 휘발유, 경유 등 화석 연료를 사용하여 운행되는 일반 차량일 수도 있으며, 차량의 연료 사용량을 줄이기 위해 전기 모터를 보조 동력원으로 사용하는 하이브리드 전기자동차일 수도 있다. 또한, 차량의 크기는 무관하며 승용차뿐만 아니라, 승합차, 버스, 트럭, 트레일러, 기타 특수차에 대하여도 이하에서 기술하는 기술이 유사하게 적용될 수 있다.

[0022] 도1은 본 발명의 일실시예에 따른 휴대형 충전장치(110)를 이용한 충전 서비스 시스템(100)을 설명하기 위한 도면이다.

[0023] 도 1을 참조하면, 본 발명의 일실시예에 따른 충전 서비스 시스템(100)은, 배터리가 방전되어 충전이 필요한 충

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전 대상인 방전차량(112)과, 배터리가 충전되어 있어서 전력을 공급할 수 있는 전력공급차량(113)과, 충전 케이블을 통해 접속시키는 휴대형 충전장치(110), 휴대형 충전장치(110)에 연결되어 방전차량(112)과 전력공급차량(113)를 각각 연결시키기 위한 충전 케이블(240/250), 및 휴대형 충전장치(110)와 유선 또는 무선으로 필요한 신호를 주고 받을 수 있는 제어단말(120)을 포함한다. 또한, BMS(Battery Management System)의 구동 전원을 공급하는 배터리(111)을 포함한다.

[0024] 각 충전 케이블(240/250)은 배터리에 전력을 공급하기 위해 연결된 전력 전송 케이블과 차량의 연결여부를 인지하는 제어파일럿 신호선, 배터리(111)를 이용해 BMS의 구동전원을 전달하는 웨이크업 신호선, BMS의 상태정보를 교환하기 위한 통신선으로 구성된다.

[0025] 방전차량(112)의 인렛으로 휴대형 충전장치(110)의 충전 케이블(240)이 연결될 수 있고, 전력공급차량(113)의 인렛으로 휴대형 충전장치(110)의 다른 충전 케이블(250)이 연결될 수 있다.

[0026] 휴대형 충전장치(110)는 방전차량(112)과 전력공급차량(113)의 제어파일럿 회로를 통해 제어 파일럿 신호를 수신함으로써 각 차량의 접속을 인식하고, 웨이크업 신호선을 통해 BMS의 구동을 위한 12V 전원을 각 차량(112/113)의 BMS로 전달한다. 각 차량(112/113)의 BMS에 전원이 인가되면, BMS는 통신선을 통해 각 차량(112/113)의 배터리의 잔여 전력량(SOC: State of Charge, %로 전송)과 정전류 값, 정전압 값등 배터리의 상태정보를 휴대형 충전장치(110)로 전달할 수 있다. 휴대형 충전장치(110)는 전달된 상기 잔여 전력량에 의해 방전차량(112)과 전력공급차량(113)을 결정할 수 있으며, 전력공급차량(113)으로부터 받은 배터리 상태정보에 의존하여 공급 가능한 전력량을 결정하고, 방전차량(112)의 사용자로부터 받은 요구 충전량 및 충전 시작 요청에 따라, 휴대형 충전기(110)은 전력 제어 스위치(223/225)를 제어함으로써 전력을 방전차량으로 공급할 수 있다. 그러나, 전력공급차량(113)의 BMS 정보를 사전에 인지하고 있다면, 각 충전 케이블 (111/112)이 연결되기 전에 공급 가능한 전력량을 방전차량(112)의 소유자에게 전달할 수 있다.

[0027] 여기서 전력공급차량(113)은 서비스 제공을 목적으로 하는 개인 사업자 또는 서비스 센터 직원 등이 이동형 발전기를 탑재하고 전력을 생산하는 자동차 또는 여분의 전력을 공급 가능한 전기자동차일 수 있고, 휴대형 충전장치(110)는 각 차량의BMS와 통신을 통해 배터리 상태정보를 모니터링하고, 전력을 제어함으로써 방전차량(112)의 배터리가 충전되도록 할 수 있다.

[0028] 여기서, 휴대형 충전장치(110)는 자체에 구비된 디스플레이 수단 위에서의 터치 입력 방식 또는 자체에 구비된 버튼의 누름 방식으로 사용자로부터 위와 같은 요구 충전량이나 충전 시작 요청을 입력받을 수 있다. 다만, 이에 한정되지 않으며, 제어 단말(120)은 휴대형 충전장치(110)의 연결 포트를 통해 유선으로 연결되어 이더넷(Ethernet), 시리얼 케이블(Serial Cable), CAN(Controller Area Network) 등과 같은 다양한 유선 통신 방식으로 연결되거나, 휴대형 충전장치(110)의 무선통신모듈을 통해 무선랜, 지그비, 블루투스, 또는 NFC(Near Field Communication) 방식 등 근거리 무선 통신으로 연결될 수 있다. 이에 따라 휴대형 충전장치(110)는 제어 단말(120)과의 유선 또는 무선 통신으로 제어 단말(120)을 통해 사용자가 입력한 위와 같은 요구 충전량이나 충전 시작 요청을 입력받을 수도 있다. 또한, 과금을 위해 스마트 폰(Smart phone)을 이용하여 무선인터넷(WiBro, WiFi 등) 등의 네트워크에 접속함으로써 과금을 처리할 수 있다.

[0029] 여기서, 제어 단말(120)은 전용 유선 또는 무선 단말일 수 있고, 또한, 이동통신망(WCDMA, GSM 등), 무선인터넷(WiBro, WiFi 등) 등의 네트워크를 통해 통신하는 스마트폰, 셀룰러폰(Cellular phone), 피씨에스폰(PCS phone: Personal Communications Services phone), 무선 통신이 가능한 동기식/비동기식 IMT-2000(International Mobile Telecommunication-2000), 개인용 디지털 보조기(PDA:Personal Digital Assistant), 왑폰(WAP phone: Wireless application protocol phone), 모바일 게임기(mobile play-station), 기타 PMP(Portable Multimedia Player) 등의 휴대형 또는 이동 단말일 수도 있으며, 경우에 따라서는 노트북 PC, 데스크탑 PC, 팜 PC(Palm Personal Computer) 등이나 기타 다른 전자 기기와 통신할 수 있는 가정용 또는 기업용 사회 전반의 다양한 전자 기기 또는 장치를 포함할 수 있다.

[0030] 본 발명의 위와 같은 휴대형 충전장치(110)는 사용자 또는 서비스 센터 직원 등이 주위의 전력 제공이 가능한 차량(113)을 이용해 방전차량(112)을 충전하는 데 손쉽게 이용될 수 있으며, 차량을 서로 연결하여 간단히 충전시킬 수 있고 내장된 회로나 제어 단말(120)을 이용해 충전시의 제어가 편리하게 수행될 수 있다. 또한, 이하에서 기술하는 바와 같이, 과금 처리가 바로 이루어지도록 할 수도 있어서 방전차량(112)의 소유자와 전력공급차량(113)의 소유자가 모두 편리하게 충전 서비스를 이용할 수 있게 된다.

[0031] 이하, 도 2, 도3, 도 4를 참조하여, 본 발명의 일실시예에 따른 휴대형 충전장치(110)에 대하여 좀 더 자세히

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설명한다.

[0032] 도 2는 본 발명의 일실시예에 따른 휴대형 충전장치(110)를 설명하기 위한 도면이다.

[0033] 도 2를 참조하면, 본 발명의 일실시예에 따른 휴대형 충전장치(110)는, 충전 관리부(210), 전력 제어부(220), 통신 제어부(230), 제 1 충전 케이블(240), 및 제 2 충전 케이블(250)을 포함한다.

[0034] 각 충전 케이블(240/250)은 각 차량에 연결하기 위해 사용하며, 충전 관리부(210)은 전력 제어부(220)과 통신 제어부(230)으로부터 수신되는 메시지에 기반하여 전력 제어부(220)를 제어하여 전력 공급을 시작하고 중단할 수 있다. 전력 제어부(220)로는 충전 케이블(240/250)의 전력전송 케이블이 연결되고, 통신 제어부(230)는 제어 파일럿 신호, 웨이크업 신호선, 통신선을 통해 각 차량(112/113)과 연결되어 각 차량(112/113)의 BMS와 통신을 통해 상태 정보를 교환하고, 수신된 메시지를 분석하여 충전 관리부(210)로 전달할 수 있다. 각 충전 케이블(240/250)은, 각각 연성 케이블(242/252)과 차량의 인렛과 연결하기 위한 커넥터(241/251)를 포함한다.

[0035] 휴대형 충전장치(110)의 전력 제어부(220)가 양방향으로 전력 전송이 가능하고, 유연하게 전압과 전류를 조절하는 것이 가능하다면 BMS의 상태 정보 메시지를 통해 방전차량(112)과 전력공급차량(113)를 구분할 수 있기 때문에 제 1 충전 케이블(240)과 제 2 충전 케이블(250)의 역할을 구분할 필요가 없다. 본 발명에서는 편의를 위해 제 1 충전 케이블 (240)의 커넥터(241)는 방전차량(112)의 인렛으로 연결되며, 제 2 충전 케이블(250)의 커넥터(251)는 전력공급차량(113)의 인렛으로 연결된다고 가정한다.

[0036] 또한, 전력 제어부(220)는 전류 측정 센서(224/226)와 전력전송 제어 스위치(223/225)를 포함한다. 전력전송 제어 스위치(223/225)는 충전 관리부(210)로부터 전달되는 제어 신호에 따라 전력 공급을 제어하는 스위치이다. 전류 측정 센서(223/225)는 각 충전 케이블에 공급되는 전류의 양을 측정하는 센서이다.

[0037] 효율적인 충전을 수행하기 위한 알고리즘은 전력 제어부(220) 또는 충전 관리부(210) 내의 충전 제어부(211)에 포함되어 있을 수 있다. 예를 들어, 현재는 충전을 위해 CC(Constant Current) 모드로 전력을 공급하다가 방전차량(112)의 배터리가 80%정도의 충전이 되면 CV(Constant Current) 모드로 변경하여 완전히 충전되는 것을 시도 하는 것이 일반적이지만, 최근에는 먼저 배터리가 허용할 수 있는 높은 전류를 공급한 후 서서히 전류를 낮추는 것이 배터리에 더 유리한 것으로 알려져 있다. 그러므로, 충전 관리부(210) 또는 전력 제어부(220)는 배터리의 안정성을 확보하고, 효율적이면서 신속한 충전을 위해 다양한 패턴으로 충전을 시도할 수 있는 충전 알고리즘을 가지고 있을 수 있다.

[0038] 통신 제어부(230)는 각각 제1충전 케이블 (240) 의 통신선과 웨이크업 신호선, 제어파일럿 신호선과 제2충전 케이블(250) 의 통신선과 웨이크업 신호선, 제어파일럿 신호선에 연결되어 있다. 통신 제어부(230)의 통신선은 CAN(Controller Area Network) 또는 PLC(Power Line Communication)를 이용할 수 있으며 방전차량(112)과 전력공급차량(113)의 BMS로부터 배터리 상태 정보를 얻을 수 있다. 여기서, CAN 통신을 예로 들어 설명하지만, 이에 한정되는 것은 아니며, 경우에 따라서는 다른 통신 방식이 사용될 수도 있다. 제어파일럿 신호선은 각 차량(112/113)의 인렛에 휴대형 충전장치(110)의 각 케이블(240/250)이 연결되었는지를 평가하기 위한 신호를 받는 신호선이며, 웨이크업 신호선은 각 차량(112/113)의 BMS로 구동 전원을 인가하기 위한 신호선이다. 이 신호선에 인가된 12V 전원을 통해 방전차량(112)의 배터리가 완전히 방전되더라도 구동전원을 받음으로써 동작이 가능하게 한다.

[0039] 또한, 충전 관리부(210)는 충전 제어부(211), 입력부(212), 디스플레이부(213), 통신부(214), 및 과금부(215)를 더 포함한다.

[0040] 충전 관리부(210)는 통신 제어부(230)에서의 방전차량(112)의 제어파일럿 신호선과 전력공급차량(113)의 제어파일럿 신호선을 통해 각 차량(112/113)의 접속을 인식할 수 있다. 각 차량의 연결이 인식되면 충전 관리부(210)는 통신 제어부(230)의 웨이크업 신호선을 통해 12V전류를 공급함으로써 각 차량의 BMS를 구동시킨다. 이후 충전 관리부(210)는 통신 제어부(230)의 통신선을 통해 방전차량(112)과 전력공급차량(113)으로부터 배터리 상태 정보를 수신할 수 있다. 이에 기반하여 충전 제어부(211)는 전력공급차량(113)의 공급 가능한 전력량을 산출 할 수 있으며, 사용자로부터 입력받는 공급 가능 전력량 이하의 요구 충전량 및 충전 시작 요청에 따라 해당 요구 충전량만큼 전력공급차량(113)의 전력 전송 케이블을 통해 방전차량(112)의 전력 전송 케이블로 전력을 공급하도록 전력 제어부(220)를 제어함으로써, 방전차량(112)의 배터리가 충전되도록 할 수 있다.

[0041] 여기서, 휴대형 충전장치(110)는 자체에 구비된 LCD 등의 디스플레이부(213)의 화면 위에서의 터치 입력 방식 또는 자체에 키패드를 구비하여 사용자가 누름 버튼을 입력부(212)가 인지함으로써 요구 충전량과 충전 시작 요청을 입력 받을 수 있다. 다만, 이에 한정되지 않으며, 제어 단말(120)은 휴대형 충전장치(110)의 통신부(214)

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의 연결 포트를 통해 유선으로 연결되어 시리얼 통신(Serial Communication), CAN(Controller Area Network)과 같은 유선 통신 방식으로 연결되거나, 통신부(214)의 무선통신모듈을 통해 무선랜, 지그비, 블루투스, 또는 NFC(Near Field Communication) 방식 등 근거리 무선 통신이나, 이동통신(WCDMA, GSM 등), 무선인터넷(WiBro, WiFi 등) 등의 네트워크를 이용한 통신 방식으로 연결될 수도 있으며, 이에 따라 휴대형 충전장치(110)는 제어 단말(120)과의 유선 또는 무선 통신으로 제어 단말(120)을 통해 사용자가 입력한 위와 같은 요구 충전량이나 충전 시작 요청을 입력 받을 수도 있다.

[0042] 충전 관리부(210)가 충전을 종료한 후 유선 또는 무선 통신하는 통신부(214)를 통하여 외부의 제어 단말(120)로 충전 완료 정보를 전송한 후, 해당 충전 완료 정보에 대한 제어 단말(120)로부터의 승인 통보를 수신하면, 과금부(215)는 충전 완료 정보에 포함된 충전량 정보에 따라 과금 정보를 계산하고 방전차량(112)의 운전자에 대해 해당 과금 정보에 따른 과금 처리를 수행할 수 있다. 예를 들어, 전력량(VAh) 당 미리 정해진 가격의 과금 정보가 계산될 수 있다.

[0043] 이하 도 3의 흐름도를 참조하여 위와 같은 본 발명의 일실시예에 따른 휴대형 충전장치(110)를 포함한 충전 서비스 시스템(100)의 동작을 좀 더 자세히 설명한다.

[0044] 먼저, 제1충전 케이블(240)을 방전차량(112)에 연결하고(S10), 제2충전 케이블(250)을 전력공급차량(113)에 연결한다(S11). 충전 케이블(240/250)은 전력 전송 케이블과, 배터리 상태정보를 교환하기 위한 통신선 및 BMS 구동을 위한 전력을 공급하는 웨이크업 신호선, 충전 케이블의 연결을 확인하는 제어파일럿 신호선을 포함한다.

[0045] 이에 따라, 통신 제어부(230)는 파일럿 회로(pilot circuit)를 이용하여 방전차량(112)과 전력공급차량(113)의 충전 케이블이 휴대형 충전기(110)에 연결되었다는 것을 확인하는 제어파일럿 신호(control pilot signal)를 확인하면(S20/S21), 각 차량(112/113)의 웨이크업(WakeUp) 신호를 이용하여 BMS 구동을 위한 12V 전원을 각 차량(112/113)의 BMS에 공급한다(S30, S31). 각 차량(112/113)의 BMS가 동작하고, BMS는 배터리 상태 정보를 전송하게 된다(S40, S41). BMS가 전송하는 배터리 상태 정보(S40, S41)는 배터리 잔여 충전량(SOC)과 정전류 값, 정전압 값을 포함한다. 통신 제어부(211)는 BMS로부터 배터리 상태 정보를 포함하는 메시지를 받아 충전 제어부(211)로 전달한다. 충전 제어부(211)는 전력공급차량(113)으로부터 전달된 배터리 상태 정보 메시지로부터 공급 가능한 전력량을 결정하고(S42), 디스플레이부(270)를 통해 사용자가 인지할 수 있도록 한다. 또한, 통신부(214)를 통해 제어단말(120)로 메시지를 전송할 수 있다. 공급 가능한 전력량은 전력을 공급하는 공급자에 의해 결정될 수도 있겠지만, 기본값은 전력공급차량(113)의 BMS가 전달한 SOC값의 50%로 한다. 충전 서비스를 목적으로 하는 자가발전이 가능한 자동차의 경우 BMS의 SOC를 무한대로 설정함으로써 완전 충전도 가능하게 할 수 있으며, 충전이 완료되면 CC모드 에서 CV모드로 변경되기 때문에 휴대형 충전장치(110)는 충전의 종료를 쉽게 인지 할 수 있다.

[0046] 방전차량(112) 또는 전력공급차량(113)이 전송한 BMS 상태정보 메시지에 어떠한 오류가 포함되어 있는 경우 충전 불가 메시지를 디스플레이부(213)에 표시할 수 있다. 또한, 통신부(212)를 통해 제어단말(120)로 동일한 메시지를 전달할 수 있다.

[0047] 한편, 위와 같이 충전 준비가 완료되고, 요구하는 충전량이 공급가능한 충전량보다 적은 경우 사용자는 디스플레이부(213)의 화면 위에서의 터치 입력 방식이나, 입력부(212)에 구비된 키패드의 버튼 누름 방식 등으로 요구 충전량(S50)과 충전 시작 요청(S60)을 입력할 수 있으며, 이외에도 통신부(214)의 유선연결포트나 무선통신모듈을 통해 통신하는 제어 단말(120)에서 사용자에 의해 입력된 위와 같은 요구 충전량이나 충전 시작 요청을 전송하면 통신부(214)가 이를 수신하여 충전 제어부(211)로 전달할 수도 있다. 또한, 전력공급차량(113)의 공급 가능한 전력량이 적은 경우, 충전 서비스를 포기하는 것 또한 가능하다. 이러한 경우 충전 종료(S43) 순서를 수행하게 된다.

[0048] 휴대형 충전장치(110)와 통신하기 위하여 제어 단말(120)에는 소정 어플리케이션이 미리 설치될 수 있으며, 해당 어플리케이션의 실행으로 휴대형 충전장치(110)와 방전차량(112) 및 전력공급차량(113) 간에 송수신되는 모든 상태 정보 메시지(S40, S41)는 충전 관리부(210)에 연결된 통신부(214)에 의해 제어 단말(120)로 전송되므로 디스플레이부(213)와 동시에 확인할 수 있다. 또한, 제어 단말(120)에서 요구 충전량(S50)이나 충전 시작 요청(S60)에 대한 정보를 입력하고 통신부(214)를 통해 충전 관리부(210)로 전송함으로써 디스플레이부(213)의 터치 패널 또는 입력부(212)에 연결된 키패드 등과 동일한 역할을 수행할 수 있다. 제어 단말(120)에 설치된 어플리케이션은 하기하는 바와 같이 과금 처리도 수행할 수 있다.

[0049] 충전 시작에 대한 정보가 입력되면(S60), 충전 제어부(211)는 제 2 충전 케이블(250)에 접속된 전력공급차량

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(113)의 배터리로부터 제 1 충전 케이블(220)에 접속된 방전차량(112)의 배터리로 전력을 공급하기 위해 전력 제어부(220)의 전력전송 제어 스위치(223)를 제어한다(S61). 충전이 시작되면서 통신 제어부(230)는 통신선을 이용하여 방전차량(112)과 전력공급차량(113)의 BMS으로부터 현재 배터리의 상태 정보를 수신하고 (S40, S41), 충전 제어부(211)로 통보한다. 충전 제어부(211)는 계측된 전력량과 각 BMS로부터 받은 전력량을 디스플레이부(213) 또는 제어 단말(120)으로 표시함으로써 사용자에게 신뢰성을 줄 수 있다.

[0050] 충전 제어부(211)는 위와 같이 사용자가 입력한 해당 요구 충전량만큼 전력공급차량(113)의 제 2 충전 케이블(250)을 통해 방전차량(112)의 제 1 충전 케이블로 전력을 공급하기 위해 전력 제어부(220)의 전류 측정 센서(224 또는 225)의 신호를 분석하여 공급되는 전압 값, 전류 값, 공급되는 누적 전력량 등을 설정된 시간 단위로 파악할 수 있다. 또한, 충전 관리부(210)는 통신 제어부(230)를 통해 연결된 통신선을 이용하여 방전차량(112)과 전력공급차량(113)의 BMS로부터 배터리 상태 정보를 얻어 전력 제어부(212)의 전류 측정 센서(224 또는 225)에 기초하여 계측한 값과 비교 함으로써 사용자에게 신뢰성을 주고, 차량 내의 문제점을 발견할 수 있다.

[0051] 충전 관리부(210)는 효율적인 충전을 수행하고, 과충전과 과방전의 방지를 위해서 다양한 방법으로 전력을 공급할 수 있도록 전력 제어부(210)를 제어할 수 있다. 현재는 충전을 위해 CC(Constant Current) 모드로 전력을 공급하다가 방전차량(112)의 배터리가 80%정도의 충전이 되면 CV(Constant Current) 모드로 변경하여 완전히 충전되는 것을 시도 하는 것이 일반적이지만 최근에는 먼저 배터리가 허용할 수 있는 높은 전류를 공급한 후 서서히 전류를 낮추는 것이 배터리에 더 유리한 것으로 알려져 있다. 그러므로, 충전 관리부(210) 또는 전력 제어부(220)는 배터리의 성능을 최대화하고, 배터리가 최소로 손상될 수 있는 다양한 방법으로 충전을 시도할 수 있는 충전 알고리즘을 가지고 있을 수 있다.

[0052] 사용자가 요구한 충전량에 도달되었는지에 대한 평가에 있어, 충전 제어부(211)가 사용자가 요구한 전력량을 전력 제어부(220)로 전달하면 전력 제어부(220)가 계측을 수행하고, 요구 전력량에 도달하였을 때 충전 완료 이벤트를 충전 제어부(211)로 전달할 수도 있다. 또한 다른 방법으로 전력 제어부(212)는 계측만 수행하여 충전 관리부(210)로 통보하고 충전 제어부(211)가 요구 충전량에 도달하였는지 평가할 수도 있다. 설명의 편의를 위해 전력 제어부(211)는 계측만 하고, 충전 제어부(211)가 평가를 하는 것으로 설명한다.

[0053] 전력 제어부(220)가 계측 정보를 충전 관리부(210)로 전달하면, 충전 제어부(211)는 요구된 충전량에 도달하는지 점검하고, 요구된 충전량에 도달하면, 충전 제어부(211)는 전력 제어부(220)의 전력 전송 제어 스위치(223 또는 225)를 제어하고 전력 공급을 중단하도록 제어할 수 있다(S62). 이 후, 각 차량(112/113)의 BMS는 충전 종료에 대한 메시지를 통신선을 통해 통신 제어부(230)로 전달하고, 통신 제어부(230)은 이를 충전 제어부(211)으로 전달한다. 충전 제어부(211)는 통신 제어부(230)를 통해 충전 종료 메시지에 대한 응답을 각 차량으로 전송하고(S45/S46), 웨이크업 신호선을 통해 공급되는 12V BMS구동전원 공급을 중단함으로써 충전을 정지시킬 수 있다(S51/S52).

[0054] 이와 같은 충전 종료 과정은 도 4의 (A)나 (B)와 같이 처리될 수도 있다.

[0055] 예를 들어, 충전 중에, 도 4의 (A)와 같이, 방전차량(112)의 BMS가 배터리의 과열 또는 과충전 등과 같은 이상현상을 감지하면 충전 제어부(211)는 통신 제어부(230)를 통해 충전 종료 메시지를 수신하고, 즉시, 전력 제어부(220)의 전력전송 제어 스위치(223)를 제어하여 전력 공급을 중단시키고, 방전차량(112)과 전력공급차량(113)으로부터 충전 종료 메시지를 전송 받을 수 있고, 방전차량(112)과 전력공급차량(113)으로 해당 응답을 전송할 수 있다.

[0056] 다른 예로서, 충전 중에, 도 4의 (B)와 같이, 전력공급차량(113)이 소유한 배터리 또는 발전기의 과열 또는 과방전 등과 같은 이상현상을 감지하면 충전 제어부(211)는 통신 제어부(230)를 통해 전력공급차량(113)으로부터 충전 종료 메시지를 수신하고, 즉시, 전력 제어부(220)의 전력전송 제어 스위치(225)를 제어하여 전력 공급을 중단시키고, 방전차량(112)과 전력공급차량(113)으로부터 충전 종료 메시지를 전송 받을 수 있고, 방전차량(112)과 전력공급차량(113)으로 해당 응답을 전송할 수 있다.

[0057] 한편, 도 3예서, 위와 같이 충전이 종료되면, 충전 제어부(211)는 통신 제어부(230)에 포함된 웨이크업 신호로 전달되는 12V 전압 공급을 중지함으로써 BMS의 동작을 정지시킬 수 있다(S51, S52). 이때, 충전 제어부(211)는 디스플레이부(213)와 통신부(214)를 통한 제어 단말(120)로 충전 완료 정보를 전송할 수 있다(S70).

[0058] 이에 따라 충전 관리부(211)는 해당 충전 완료 정보에 대하여 제어 단말(120)에 사용자가 입력하여 전송한 승인 통보를 제어 단말(120)로부터 수신할 수 있고(S71), 과금부(215)는 충전 완료 정보(S70)에 포함된 충전량 정보에 따라 과금 정보를 계산하고 방전차량(112)의 운전자에 대해 해당 과금 정보에 따른 과금 처리를 수행할 수

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있다. 예를 들어, 전력량(VAh) 당 미리 정해진 가격의 과금 정보가 계산될 수 있다.

[0059] 방전차량(112)의 운전자는 해당 과금 정보에 대한 금액을 직접 현금으로 전력공급차량(113)의 운전자(서비스 센터 직원 등)에게 지불할 수도 있지만(S72), 방전차량(112)의 운전자의 결제 수단을 통해 전자 지불 처리할 수도 있다(S73).

[0060] 예를 들어, 과금부(215)는 방전차량(112)의 운전자의 충전식 스마트 카드, 신용카드, USIM(Universal Subscriber Identity Module)이 장착된 휴대 단말 등의 결제 수단을 통해 전자 지불 처리가 이루어지도록 할 수 있으며, 과금부(215)가 제어 단말(120)로 해당 과금 정보를 전송하면 제어 단말(120)에서 위와 같은 결제 수단을 통하여 전자 지불 처리가 이루어지도록 할 수도 있다.

[0061] 예를 들어, 과금부(215) 또는 제어 단말(120)은 전자 지불 시스템을 위한 어플리케이션을 탑재할 수 있으며, 이를 이용하여 과금부(215) 또는 제어 단말(120)은 전자 화폐 수단인 충전식 스마트 카드의 정보를 읽고 지불을 요청하고(S73) 잔액에서 차감하여 과금이 이루어지도록 할 수 있다(S74). 또는 전자지불 시스템은 이동통신망(WCDMA, GSM 등), 무선인터넷(WiBro, WiFi 등) 등의 네트워크를 통해 연동하는 시스템일 수도 있고, 이때에는 과금 정보와 함께 방전차량(112)의 운전자의 계좌 정보(계좌이체인 경우), 신용카드정보, 또는 USIM 정보 등 소정 결제 수단의 정보를 입력부(212)를 통해 직접 입력하거나 제어 단말(120)에 입력하면, 과금부(215) 또는 제어 단말(120)이 네트워크 상의 금융기관 등의 전자지불 시스템으로 지불을 요청하고, 전자지불 시스템에서는 공인인증 등을 통하여 승인함으로써 해당 과금에 대한 결제를 처리할 수도 있다. 전자지불 시스템은 승인 시 과금 정보에 포함된 전력공급차량(113)의 운전자(서비스 센터 직원 등)의 계좌나, 전력공급차량(113)의 운전자가 가맹점 회사인 경우에는, 해당 가맹점의 계좌로 해당 과금액을 이체할 수 있다.

[0062] 이상과 같이 본 발명은 비록 한정된 실시예와 도면에 의해 설명되었으나, 본 발명은 상기의 실시예에 한정되는 것은 아니며, 본 발명이 속하는 분야에서 통상의 지식을 가진 자라면 이러한 기재로부터 다양한 수정 및 변형이 가능하다. 그러므로, 본 발명의 범위는 설명된 실시예에 국한되어 정해져서는 아니 되며, 후술하는 특허청구범위뿐 아니라 이 특허청구범위와 균등한 것들에 의해 정해져야 한다.

부호의 설명

[0063] 휴대형 충전장치(110)

제어단말(120)

충전 관리부(210)

충전 제어부(211)

입력부(212)

디스플레이부(213)

통신부(214)

과금부(215)

전력 제어부(220)

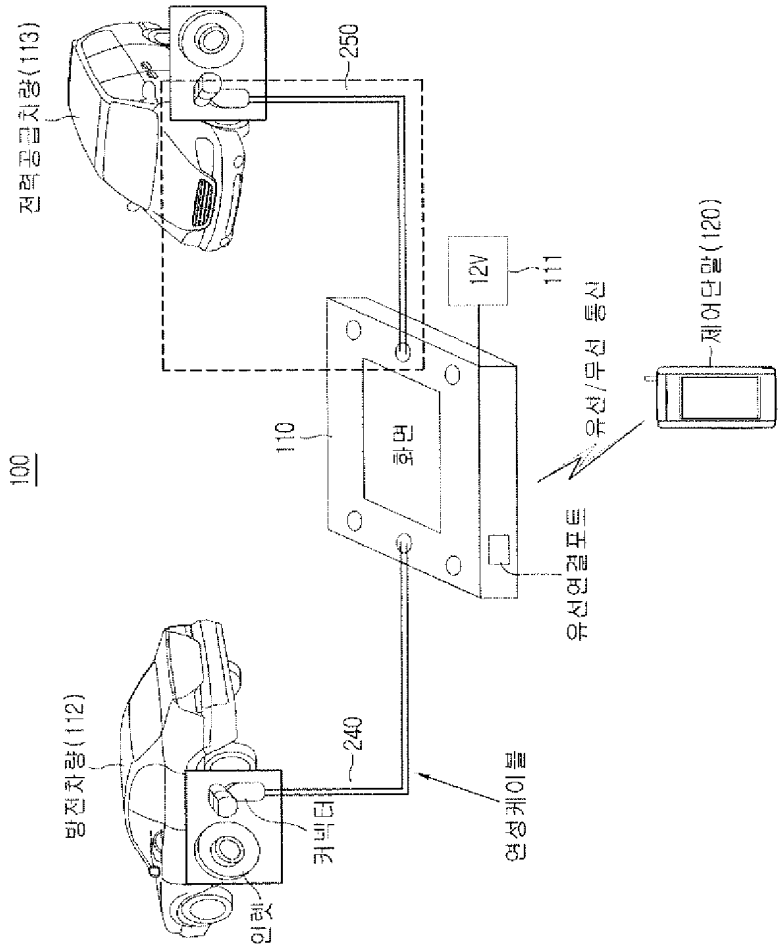
통신 제어부(230)

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도면

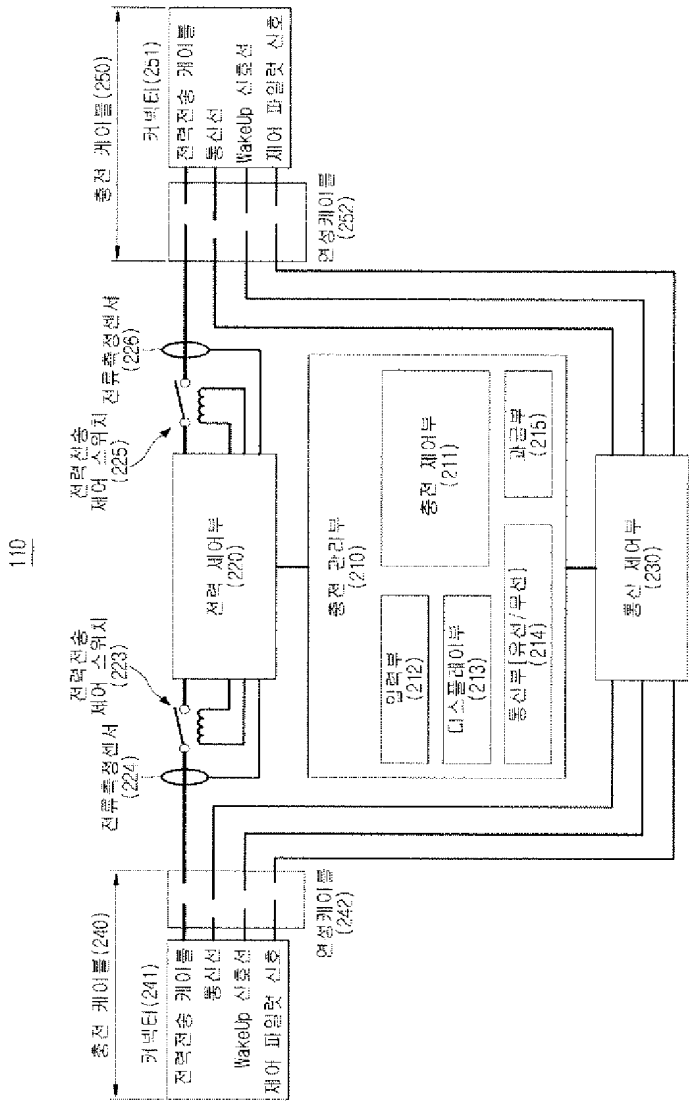
도면1



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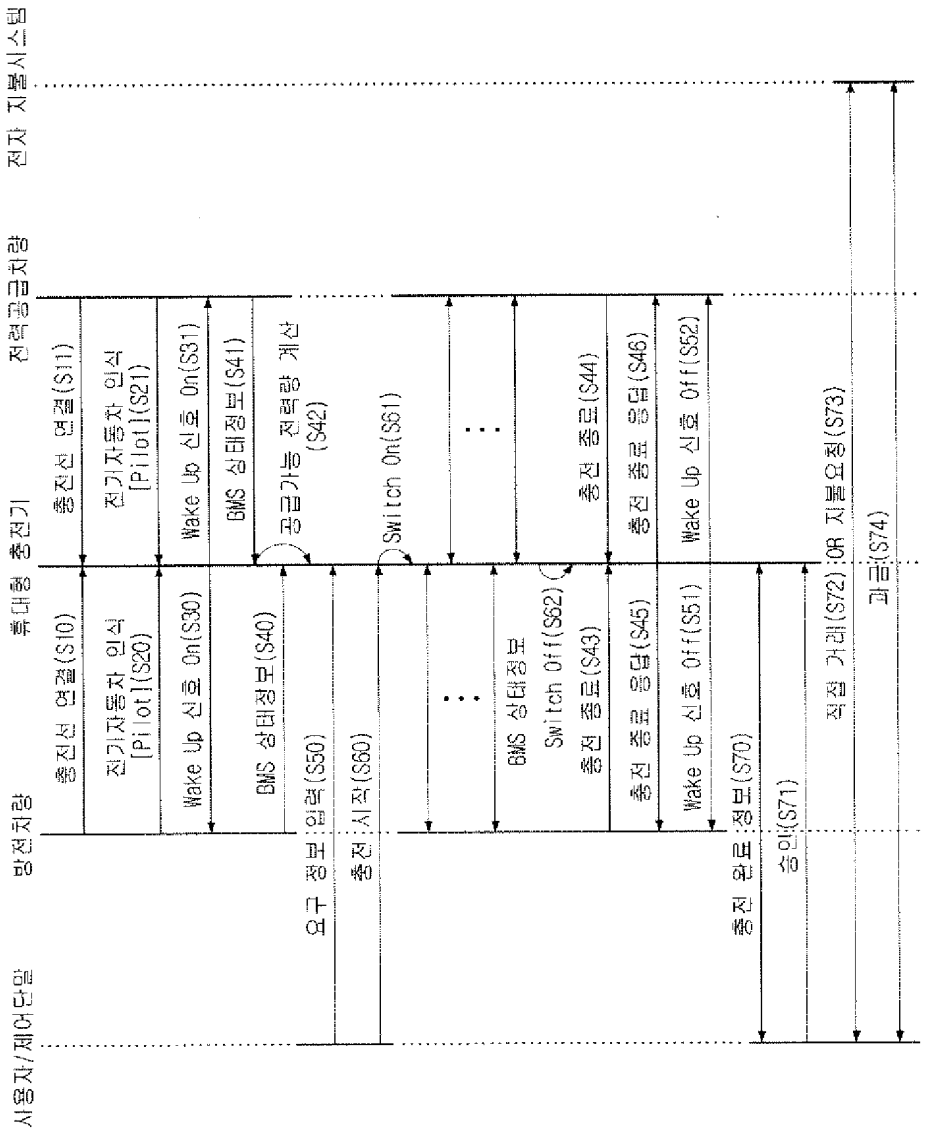
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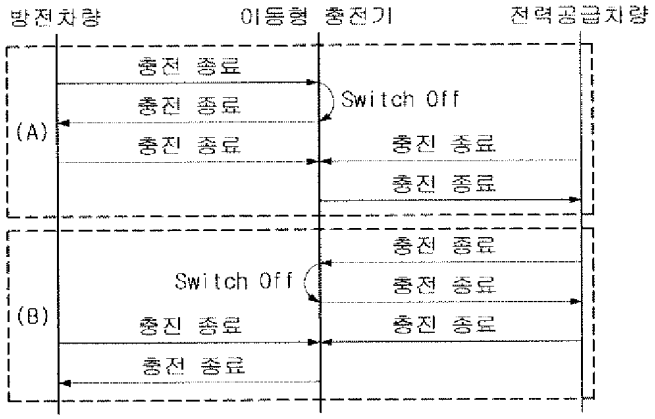
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도면3



도면4



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BNSDOCID: <KR__1020120130432A__I_>

Espacenet

Bibliographic data: KR20120130432 (A) — 2012-12-03

Portable Device for Providing Charging and Billing Service for Discharged Electric Vehicle using Other Electric Vehicle

Inventor(s):

Applicant(s):

Classification: - international: ***B60L11/18; H02J7/00***
- cooperative: **B60L11/18**; **G06Q50/30**; **H02J7/00**; Y02T10/7005; more

Application number: KR20110048349 20110523 Global Dossier

Priority number(s): KR20110048349 20110523

Also published as: KR101245540 (B1)

Abstract of KR20120130432 (A)

PURPOSE: A portable device for providing a billing and electric charging service for discharged electric vehicles is provided to perform an easy control of the charging service by using a built-in circuit or a mobile terminal for electric vehicles. CONSTITUTION: A first charge cable(240) comprises a power transmission cable; a flexible cable composed of a communication line, a control pilot signal wire and a wakeup signal line; and a connector. A second charge cable(250) comprises a power transmission cable; a flexible cable composed of a communications line, a control pilot signal wire and a wakeup signal line; and a connector. A power control unit(220) measures the electric energy supplied to a first vehicle from a second vehicle. A communications control unit(230) is connected to the communication line, the control pilot signal wire and the wakeup signal line of the first charge cable, and the communication line, the control pilot signal wire and the wakeup signal line of the second charge cable. A charge administration unit(210) performs the control through the communications control unit based on the control pilot signal wire of the first vehicle and the second vehicle. [Reference numerals] (210) Charging administration unit; (211) Charging control unit; (212) Input unit; (213) Display unit; (214) Communication unit(wired/wireless); (215) Payment unit; (220) Power control unit; (223,225) Power transmission control switch; (224,226) Current measuring sensor; (230) Communication control unit; (240,250) Charging cable; (242,252) Flexible cable; (251) Connector; (AA,EE) Power transmission cable; (BB,FF) Communication line; (CC,GG) WakeUp signal line; (DD,HH) Control pilot signal

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(72) **Inventeur(s) :** BIAGINI ERIC, COSTE FRANCOIS et JEAN GUILLAUME.

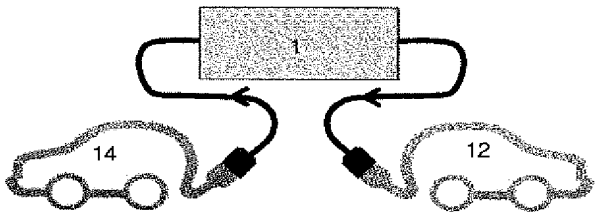
(73) **Titulaire(s) :** INTELLIGENT ELECTRONIC SYSTEMS Société par actions simplifiée.

(74) **Mandataire(s) :** FULCONIS RENAUD.

(54) PROCEDE DE CHARGE DE VEHICULE ELECTRIQUE A VEHICULE ELECTRIQUE.

(57) L'invention concerne un dispositif de charge (1) adapté à être connecté d'une part à une batterie d'un premier véhicule électrique (14), et d'autre part à une batterie d'un deuxième véhicule électrique (12), à être alimenté en courant d'entrée continu par la batterie du premier véhicule électrique (14) et à alimenter la batterie du deuxième véhicule électrique (12) avec un courant de sortie continu.

L'invention concerne également un procédé de charge utilisant ce dispositif de charge.



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PROCEDE DE CHARGE DE VEHICULE ELECTRIQUE A VEHICULE ELECTRIQUE

DOMAINE DE L'INVENTION

La présente invention concerne un procédé de charge de véhicule électrique à véhicule électrique, ainsi qu'un dispositif de charge permettant la mise en œuvre de ce procédé.

ARRIERE-PLAN TECHNIQUE

De nombreux véhicules utilisent l'énergie électrique et sont équipés de batteries, par exemple des véhicules automobiles électriques, mais également des nacelles, des transpalettes...

L'alimentation des batteries de ces véhicules est effectuée en courant continu. A cet, effet, il est connu d'utiliser des dispositifs de charge permettant de convertir le courant alternatif issu du réseau de distribution électrique en courant continu approprié pour la charge de batterie.

On connaît deux types de dispositifs de charge : d'une part les chargeurs embarqués, qui sont montés directement sur les véhicules électriques ; et d'autre part les chargeurs externes, intégrés dans des bornes de charge fixes (par exemple en atelier, parking, garage, ou sur la voirie). Par ailleurs, il existe des chargeurs externes montés sur des chariots mobiles, généralement encombrants et de masse élevée.

Toutefois, les véhicules électriques présentent des risques d'immobilisation, par exemple du fait de l'autonomie limitée des batteries ou en cas de défaillance de chargeur embarqué ou de chargeur externe. En outre, les véhicules électriques peuvent ne pas être équipés de chargeur embarqué, en particulier dans le cas d'une utilisation où la charge de batterie peut être systématiquement réalisée avec un chargeur externe fixe dans une station de recharge par exemple.

Il existe donc un besoin d'améliorer la sécurité d'utilisation des véhicules électriques et notamment d'éviter les risques d'immobilisation par déchargement excessif des batteries.

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RESUME DE L'INVENTION

L'invention concerne en premier lieu un dispositif de charge adapté à être connecté d'une part à une batterie d'un premier véhicule électrique, et d'autre part à une batterie d'un deuxième véhicule électrique, à être alimenté en courant d'entrée continu par la batterie du premier véhicule électrique et à alimenter la batterie du deuxième véhicule électrique avec un courant de sortie continu.

Selon un mode de réalisation, le courant d'entrée et le courant de sortie sont différents, le dispositif de charge étant adapté à convertir le courant d'entrée en courant de sortie.

Selon un mode de réalisation, le dispositif de charge est intégré dans le premier véhicule électrique, ou est intégré dans le deuxième véhicule électrique.

Selon un mode de réalisation, le dispositif de charge est un dispositif de charge amovible et portable.

Selon un mode de réalisation, le dispositif de charge est également adapté à être connecté d'une part à une source de courant alternatif et d'autre part à une batterie d'un véhicule électrique, à être alimenté par un courant d'entrée issu de la source de courant alternatif, à convertir le courant d'entrée en un courant de sortie continu, et à alimenter la batterie du véhicule électrique avec ledit courant de sortie continu.

Selon un mode de réalisation, le dispositif de charge comprend un premier étage assurant la conversion du courant d'entrée en courant intermédiaire continu ainsi qu'un deuxième étage assurant la conversion du courant intermédiaire en courant de sortie.

Selon un mode de réalisation, le dispositif de charge comporte un système de contrôle adapté à ajuster les paramètres de l'alimentation de la batterie du deuxième véhicule, de préférence à ajuster les paramètres de la conversion du courant d'entrée en courant de sortie ; et adapté à échanger des informations et instructions avec le premier véhicule et/ou avec le deuxième véhicule et/ou le cas échéant avec la source de courant alternatif.

Selon un mode de réalisation, le système de contrôle est pourvu de moyens d'alimentation auxiliaire, choisis de préférence parmi une batterie auxiliaire et un convertisseur auxiliaire adapté à recevoir un courant externe continu ou alternatif et à le convertir en courant continu d'alimentation du système de contrôle.

Selon un mode de réalisation, le véhicule électrique est une automobile électrique.

L'invention concerne également un procédé de charge d'une batterie de véhicule électrique, comprenant :

- la connexion d'un dispositif de charge à une batterie d'un premier véhicule et / ou à une batterie d'un deuxième véhicule ;
- l'alimentation du dispositif de charge par un courant d'entrée continu issu de la batterie du premier véhicule ;
- l'alimentation de la batterie du deuxième véhicule par un courant de sortie issu du dispositif de charge.

Selon un mode de réalisation, le procédé comprend :

- la conversion du courant d'entrée en courant de sortie continu par le dispositif de charge.

Selon un mode de réalisation, le dispositif de charge est intégré dans le premier véhicule, et l'étape de connexion consiste à relier le dispositif de charge au deuxième véhicule, de préférence au moyen d'un câble électrique ; ou le dispositif de charge est intégré dans le deuxième véhicule, et l'étape de connexion consiste à relier le dispositif de charge au premier véhicule, de préférence au moyen d'un câble électrique.

Selon un mode de réalisation, le dispositif de charge est un dispositif amovible, et l'étape de connexion consiste à relier le dispositif de charge au premier véhicule et au deuxième véhicule.

Selon un mode de réalisation, le courant de sortie présente une tension de 200 à 550 V ; et/ou le courant de sortie présente une puissance inférieure ou égale à 20 kW, de préférence inférieure ou égale à 10 kW ou à 6 kW.

Selon un mode de réalisation, le procédé comporte l'ajustement de paramètres de l'alimentation de la batterie du deuxième véhicule et l'échange d'informations et d'instructions entre le dispositif de charge et le premier véhicule et/ou le deuxième véhicule ; le procédé comprenant de préférence l'envoi d'une instruction du dispositif de charge au premier véhicule pour déclencher l'alimentation du dispositif de charge par la batterie du premier véhicule.

Selon un mode de réalisation, le procédé comprend une étape préliminaire d'alimentation du dispositif de charge par une source d'alimentation auxiliaire, de préférence choisie parmi une batterie auxiliaire et un courant externe continu ou alternatif.

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Selon un mode de réalisation, le véhicule électrique est une automobile électrique.

La présente invention permet de surmonter les inconvénients de l'état de la technique. Elle permet plus particulièrement d'améliorer la sécurité d'utilisation des véhicules électriques et notamment d'éviter les risques d'immobilisation des véhicules.

Cela est accompli grâce à la mise au point d'un dispositif de charge permettant de charger une batterie de véhicule électrique à partir de la batterie d'un autre véhicule électrique, ce dispositif constituant ainsi un véritable chargeur de secours permettant de recharger une batterie de véhicule électrique en cas de panne.

BREVE DESCRIPTION DES FIGURES

La **figure 1** est un schéma montrant le fonctionnement d'un dispositif de charge selon l'invention, dans un premier mode de fonctionnement.

La **figure 2** est un schéma montrant le fonctionnement d'un dispositif de charge selon l'invention, dans un deuxième mode de fonctionnement.

La **figure 3** est un exemple de schéma électrique général du circuit électrique du dispositif de charge selon l'invention.

DESCRIPTION DE MODES DE REALISATION DE L'INVENTION

L'invention est maintenant décrite plus en détail et de façon non limitative dans la description qui suit.

L'invention propose un dispositif de charge adapté pour alimenter une batterie de véhicule électrique. Par véhicule électrique on entend un appareil motorisé susceptible de déplacer ou transporter des personnes ou du matériel, dont le moteur est alimenté en énergie électrique par une batterie motrice.

Le véhicule électrique est de préférence une automobile électrique. Alternativement, il peut s'agir par exemple d'un engin de manutention tel qu'un chariot élévateur, une nacelle élévatrice, un transpalette.

Selon un mode de réalisation, il s'agit d'un dispositif de charge amovible et portable. Par « *portable* » ou « *transportable* » ou entend que le dispositif peut être soulevé et déplacé par un adulte seul en bonne santé, sans l'aide d'un quelconque appareillage spécialisé. Le dispositif n'est pas intégré de façon permanente sur une structure fixe telle qu'une borne de charge pour véhicule électrique. Le dispositif n'est pas non plus intégré de

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façon permanente au véhicule électrique, c'est-à-dire qu'il ne s'agit pas d'un chargeur embarqué.

A titre d'illustration, le dispositif peut avoir une masse inférieure ou égale à 20 kg, de préférence inférieure ou égale à 15 kg, ou à 10 kg, ou à 7,5 kg, ou à 5 kg.

A titre d'illustration, le dispositif peut présenter une dimension maximale inférieure ou égale à 60 cm, de préférence inférieure ou égale à 50 cm, ou à 40 cm, ou à 30 cm.

Le dispositif peut être intégré dans un boîtier, le cas échéant pourvu de câbles électriques appropriés.

Alternativement, le dispositif peut être embarqué, c'est-à-dire intégré de manière fixe dans un véhicule électrique (soit le véhicule donneur de courant, soit le véhicule receveur de courant, soit un véhicule qui peut être à la fois donneur de courant et receveur de courant selon le mode de fonctionnement du dispositif). Il peut en particulier être connecté de manière permanente à la batterie du véhicule dans lequel il est intégré.

Selon un premier mode de fonctionnement, qui est illustré à la **figure 1**, le dispositif de charge 1 est connecté à une batterie d'un premier véhicule électrique 14 et à une batterie d'un deuxième véhicule électrique 12, au moyen le cas échéant de câbles appropriés.

La batterie du premier véhicule électrique 14 constitue une source de courant : elle alimente le dispositif de charge 1 en un courant d'entrée, qui dans ce mode de fonctionnement est continu. Et le dispositif de charge 1 alimente la batterie du deuxième véhicule électrique 12 par un courant de sortie, qui est également continu.

Selon un mode de réalisation, le dispositif de charge 1 n'opère aucune conversion, par exemple dans le cas où l'un au moins des véhicules est pourvu d'un dispositif de charge réversible capable de fournir un transfert de courant maîtrisé depuis la batterie d'un véhicule vers la batterie de l'autre véhicule. Dans un tel cas, le dispositif de charge 1 peut se limiter à un simple dispositif de raccordement et de gestion de protocoles entre les deux véhicules électriques : il peut alors simplement être intégré dans un câble de liaison entre les véhicules électriques.

Alternativement, et de manière préférée, le courant d'entrée est différent du courant de sortie, et le dispositif de charge 1 opère donc une conversion DC-DC.

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Etant donné que la tension à laquelle une batterie de véhicule électrique se charge (ou se décharge) varie selon son niveau de charge, un tel mode de réalisation est particulièrement avantageux.

Ainsi, le dispositif de charge 1 peut agir selon les cas comme un élévateur ou un abaisseur de tension.

Selon un mode de réalisation, le dispositif de charge 1 comprend une isolation galvanique entre l'entrée et la sortie.

Selon un mode de réalisation alternatif, le dispositif de charge 1 est dépourvu d'isolation galvanique entre l'entrée et la sortie.

Le courant d'entrée délivré, dans ce mode de fonctionnement, peut avoir par exemple une tension de 20 à 1500 V, de préférence de 50 à 550 V, de manière plus particulièrement préférée de 200 à 550 V, et tout particulièrement de 300 à 500 V.

Dans un deuxième mode de fonctionnement, illustré à la **figure 2**, le dispositif de charge 1 est connecté d'une part à une source de courant alternatif 11 et d'autre part, en sortie, à une batterie de véhicule électrique 12, au moyen le cas échéant de câbles appropriés.

La source de courant alternatif 11 peut être par exemple le réseau de distribution électrique général. Elle alimente le dispositif de charge 1 en courant d'entrée alternatif, de préférence un courant monophasé (et alternativement éventuellement un courant multiphasé, notamment triphasé). Si le courant d'entrée est monophasé, il peut avoir par exemple une tension de 85 à 265 V (par exemple 110 ou 230 V).

Dans un troisième mode de fonctionnement, le dispositif de charge 1 est connecté d'une part à une source de courant continu (qui peut être par exemple une batterie externe fixe, ou une batterie externe sur un chariot mobile, ou une batterie externe embarquée sur un engin de dépannage) et d'autre part, en sortie, à une batterie de véhicule électrique, au moyen le cas échéant de câbles appropriés.

Le courant d'entrée délivré, dans ce troisième mode de fonctionnement, peut avoir par exemple une tension de 20 à 1500 V, de préférence de 50 à 550 V, de manière plus particulièrement préférée de 200 à 550 V, et tout particulièrement de 300 à 500 V.

Selon un mode de réalisation, le dispositif de charge est adapté à fonctionner selon le premier mode de fonctionnement seulement.

Selon un mode de réalisation, le dispositif de charge est adapté à fonctionner à la fois selon le premier mode et selon le deuxième mode de fonctionnement.

Selon un mode de réalisation, le dispositif de charge est adapté à fonctionner à la fois selon le premier mode et selon le troisième mode de fonctionnement.

Selon un mode de réalisation, le dispositif de charge est adapté à fonctionner à la fois selon le premier mode, le deuxième mode et le troisième mode de fonctionnement.

Dans chaque mode de fonctionnement, le courant de sortie délivré est un courant continu approprié pour la charge d'une batterie de véhicule électrique, c'est-à-dire ayant une tension de 20 à 1500 V, de préférence de 50 à 550 V, de manière plus particulièrement préférée de 200 à 550 V, et tout particulièrement de 300 à 500 V.

Dans le deuxième mode de fonctionnement, le dispositif de charge 1 opère une conversion AC-DC.

Selon un mode de réalisation, le dispositif de charge 1 assure une conversion du courant d'entrée en courant intermédiaire (continu) puis une conversion du courant intermédiaire en courant de sortie. De préférence la conversion du courant intermédiaire en courant de sortie est effectuée au moyen d'un transformateur muni de part et d'autre de modules de conversion à découpage.

De préférence, le dispositif de charge 1 comprend des moyens d'échange d'informations et d'instructions avec la source de courant (ou avec les différentes sources de courant possibles) et avec le véhicule électrique devant être chargé (par exemple avec la batterie de celui-ci) ; ainsi que des moyens d'ajustement des paramètres de la conversion du courant d'entrée en courant de sortie, notamment en fonction d'informations reçues de la source de courant et/ou d'informations reçus de la batterie du véhicule électrique à charger et/ou d'instructions données par l'utilisateur. L'ensemble de ces moyens permet une gestion complète du protocole de charge.

L'interface du dispositif de charge 1 peut ainsi être compatible avec la norme EN61851, en modes 1 et/ou 2 et/ou 3, et/ou compatible avec la norme Chademo et/ou compatible avec la norme ISO 15118 et/ou compatible avec la norme J1772 et/ou toute autre norme définissant un protocole et un système de communication entre le dispositif de charge, la source de courant et le véhicule.

Selon un mode de réalisation, le dispositif de charge 1 fonctionne selon l'une ou l'autre norme selon le véhicule à charger et la source de courant.

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Les moyens d'échange d'informations et d'instructions avec la source de courant peuvent notamment être aptes à déclencher la fourniture de courant d'entrée par la source de courant (notamment par la batterie du premier véhicule, pour ce qui est du premier mode de fonctionnement), dans le cadre d'un fonctionnement sécurisé.

Les moyens d'échange d'informations et d'instructions avec la source de courant peuvent également être aptes à éviter une décharge excessive de celle-ci, lorsqu'il s'agit d'une batterie de véhicule (premier mode de fonctionnement) voire d'une batterie externe (troisième mode de fonctionnement).

Selon un mode de réalisation, le dispositif de charge 1 est réversible, c'est-à-dire qu'il est susceptible de restituer de l'énergie depuis la batterie du véhicule électrique 12 vers la source de courant, et plus particulièrement vers la source de courant alternatif 11.

Selon un mode de réalisation, le véhicule électrique dont la batterie est chargée au moyen du dispositif de charge selon l'invention est un véhicule électrique dépourvu de chargeur embarqué (c'est-à-dire de dispositif assurant une conversion de courant électrique alternatif en courant continu propre à alimenter la batterie).

Selon un mode de réalisation, le dispositif de charge 1 comporte des moyens d'alimentation auxiliaire. Ces moyens d'alimentation sont notamment utiles pour permettre l'échange d'informations et d'instructions avec la source de courant et avec la batterie à charger dans une phase préliminaire, permettant de déclencher la fourniture de courant par la source de courant.

Ces moyens d'alimentation auxiliaire peuvent comprendre une batterie auxiliaire (ou une ou plusieurs piles électriques) dans le dispositif de charge 1 lui-même. Alternativement, on peut prévoir un convertisseur auxiliaire adapté à être alimenté en courant externe et à le convertir en courant continu adapté pour le fonctionnement du dispositif de charge 1 notamment pendant la phase préliminaire susmentionnée.

On peut notamment prévoir d'alimenter ce convertisseur auxiliaire avec un courant alternatif issu du réseau de distribution électrique. On peut également prévoir de l'alimenter avec une batterie externe, ou encore avec le réseau électrique de bord qui alimente les équipements d'un véhicule électrique (soit le véhicule cible qui est chargé, soit le cas échéant le véhicule qui est utilisé comme source de courant).

En faisant référence à la **figure 3**, un circuit électrique possible pour le dispositif de charge 1 selon l'invention est décrit plus en détail.

Dans cet exemple, le dispositif de charge 1 comprend une interface d'entrée 22 qui échange des informations et instructions avec une source de courant 21 et peut être alimentée en courant électrique par cette source de courant 21 ou au contraire (en mode de redistribution) fournir du courant électrique à celle-ci.

Dans le premier mode de fonctionnement qui a été décrit ci-dessus, la source de courant 21 est une batterie de véhicule électrique. Dans le deuxième mode de fonctionnement qui a été décrit ci-dessus, la source de courant 21 est une source de courant alternatif. Dans le troisième mode de fonctionnement qui a été décrit ci-dessus, la source de courant 21 est une autre source de courant continu.

Le dispositif de charge 1 comprend également une interface de sortie 27 qui échange des informations et instructions avec une batterie de véhicule électrique 28 et peut alimenter celle-ci en courant électrique continu ou au contraire (en mode de redistribution) recevoir du courant électrique continu de celle-ci.

Le dispositif de charge 1 comporte en outre un premier module 23, un deuxième module 24 et un troisième module 26. Entre le deuxième module 24 et le troisième module 26 est prévu un transformateur 25.

Le premier module 23 constitue le premier étage du convertisseur (assurant la conversion courant d'entrée / courant intermédiaire) et l'ensemble formé du deuxième module 24, du transformateur 25 et du troisième module 26 constitue le deuxième étage du convertisseur (assurant la conversion courant intermédiaire / courant de sortie).

Le premier module 23 est connecté à l'interface d'entrée 22. Il comprend un ensemble d'inductances L1, L2, de diodes D1, D2, d'éléments de commutation Q1, Q2 et un condensateur C1. Ce premier module 23 est capable de convertir un courant alternatif d'entrée (issu de la source de courant 21) en courant continu de tension U1 aux bornes du condensateur C1 (courant intermédiaire). Ce premier module 23 réalise aussi une fonction de correction de facteur de puissance. Il est également susceptible de fonctionner en conversion DC-DC lorsque la source de courant 21 fournit un courant d'entrée continu.

Le deuxième module 24 est un hacheur en pont, comprenant des éléments de commutation Q3, Q4, Q5, Q6. Il convertit le courant continu de tension U1 en courant alternatif alimentant le transformateur 25. Il présente de préférence une structure résonnante ou quasi-résonnante.

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Le transformateur 25 assure l'isolation galvanique, qui est imposée par les normes de sécurité pour toute charge à partir du réseau de distribution électrique.

Il fournit un courant alternatif en entrée du troisième module 26, qui est un redresseur, comprenant des éléments de commutation Q7, Q8, Q9, Q10 et un condensateur C2. Ce redresseur fournit un courant continu de tension U2 aux bornes du condensateur C2 et ainsi à l'interface de sortie 27 (courant de sortie).

Un système de contrôle 29 reçoit des informations et fournit des instructions à l'interface d'entrée 22, à l'interface de sortie 27 et au premier module 23, deuxième module 24 et troisième module 26.

Ce système de contrôle 29 est alimenté en énergie par des moyens d'alimentation auxiliaire 30 tels que décrits ci-dessus. Les moyens d'alimentation auxiliaire 30 peut être compris dans le dispositif de charge 1 ou être extérieurs à celui-ci, comme cela est représenté sur la figure.

Dans l'hypothèse où le dispositif de charge 1 n'est pas prévu pour être utilisé selon le deuxième mode de fonctionnement, il est possible d'utiliser une structure simplifiée assurant seulement une conversion DC-DC, et par exemple dépourvue de transformateur 25, si une isolation galvanique n'est pas requise pour des raisons de sécurité.

Une autre structure (simplifiée) possible pouvant être utilisée à la place de la structure décrite ci-dessus comporterait un module de conversion unique doté d'une commande complexe.

REVENDICATIONS

1. Dispositif de charge (1) adapté à être connecté d'une part à une batterie d'un premier véhicule électrique (14), et d'autre part à une batterie d'un deuxième véhicule électrique (12), à être alimenté en courant d'entrée continu par la batterie du premier véhicule électrique (14) et à alimenter la batterie du deuxième véhicule électrique (12) avec un courant de sortie continu.

2. Dispositif de charge (1) selon la revendication 1, dans lequel le courant d'entrée et le courant de sortie sont différents, le dispositif de charge (1) étant adapté à convertir le courant d'entrée en courant de sortie.

3. Dispositif de charge (1) selon la revendication 1 ou 2, qui est intégré dans le premier véhicule électrique (14), ou qui est intégré dans le deuxième véhicule électrique (12).

4. Dispositif de charge (1) selon la revendication 1 ou 2, qui est un dispositif de charge amovible et portable.

5. Dispositif de charge (1) selon l'une des revendications 1 à 4, qui est également adapté à être connecté d'une part à une source de courant alternatif (11) et d'autre part à une batterie d'un véhicule électrique (12), à être alimenté par un courant d'entrée issu de la source de courant alternatif (11), à convertir le courant d'entrée en un courant de sortie continu, et à alimenter la batterie du véhicule électrique (12) avec ledit courant de sortie continu.

6. Dispositif de charge (1) selon la revendication 5, dans lequel le dispositif de charge (1) comprend un premier étage (23) assurant la conversion du courant d'entrée en courant intermédiaire continu ainsi qu'un deuxième étage (24, 25, 26) assurant la conversion du courant intermédiaire en courant de sortie.

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7. Dispositif de charge (1) selon l'une des revendications 1 à 6, comportant un système de contrôle (29) adapté à ajuster les paramètres de l'alimentation de la batterie du deuxième véhicule (12), de préférence à ajuster les paramètres de la conversion du courant d'entrée en courant de sortie ; et adapté à échanger des informations et instructions avec le premier véhicule (14) et/ou avec le deuxième véhicule (12) et/ou le cas échéant avec la source de courant alternatif (11).

8. Dispositif de charge (1) selon la revendication 7, dans lequel le système de contrôle (29) est pourvu de moyens d'alimentation auxiliaire (30), choisis de préférence parmi une batterie auxiliaire et un convertisseur auxiliaire adapté à recevoir un courant externe continu ou alternatif et à le convertir en courant continu d'alimentation du système de contrôle (29).

9. Dispositif selon l'une des revendications 1 à 7, dans lequel le véhicule électrique est une automobile électrique.

10. Procédé de charge d'une batterie de véhicule électrique (12), comprenant :

- la connexion d'un dispositif de charge (1) à une batterie d'un premier véhicule (14) et / ou à une batterie d'un deuxième véhicule (12) ;
- l'alimentation du dispositif de charge (1) par un courant d'entrée continu issu de la batterie du premier véhicule (14) ;
- l'alimentation de la batterie du deuxième véhicule (12) par un courant de sortie issu du dispositif de charge (1).

11. Procédé selon la revendication 10, comprenant :

- la conversion du courant d'entrée en courant de sortie continu par le dispositif de charge (1).

12. Procédé selon la revendication 10 ou 11, dans lequel le dispositif de charge (1) est intégré dans le premier véhicule (14), et l'étape de connexion consiste à relier le dispositif de charge (1) au deuxième véhicule (12), de préférence au moyen

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d'un câble électrique ; ou dans lequel le dispositif de charge (1) est intégré dans le deuxième véhicule (12), et l'étape de connexion consiste à relier le dispositif de charge (1) au premier véhicule (14), de préférence au moyen d'un câble électrique.

13. Procédé selon l'une des revendications 10 à 12, dans lequel le dispositif de charge (1) est un dispositif amovible, et l'étape de connexion consiste à relier le dispositif de charge (1) au premier véhicule (14) et au deuxième véhicule (12).

14. Procédé selon l'une des revendications 10 à 13, dans lequel le courant de sortie présente une tension de 200 à 550 V ; et/ou dans lequel le courant de sortie présente une puissance inférieure ou égale à 20 kW, de préférence inférieure ou égale à 6 kW.

15. Procédé selon l'une des revendications 10 à 14, comportant l'ajustement de paramètres de l'alimentation de la batterie du deuxième véhicule (12) et l'échange d'informations et d'instructions entre le dispositif de charge (1) et le premier véhicule (14) et/ou le deuxième véhicule (12) ; le procédé comprenant de préférence l'envoi d'une instruction du dispositif de charge (1) au premier véhicule (14) pour déclencher l'alimentation du dispositif de charge (1) par la batterie du premier véhicule (14).

16. Procédé selon l'une des revendications 10 à 15, comprenant une étape préliminaire d'alimentation du dispositif de charge (1) par une source d'alimentation auxiliaire (30), de préférence choisie parmi une batterie auxiliaire et un courant externe continu ou alternatif.

17. Procédé selon l'une des revendications 10 à 16, dans lequel le véhicule électrique est une automobile électrique.

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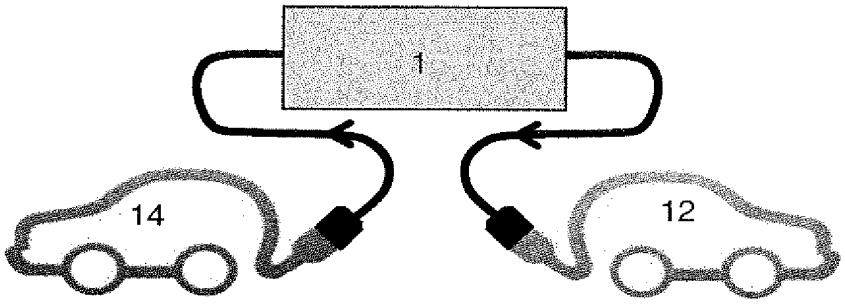


Fig. 1

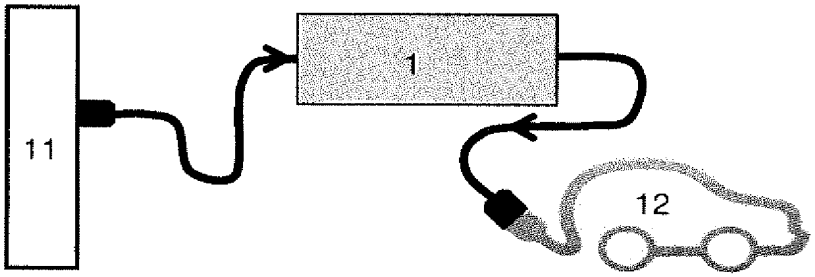


Fig. 2

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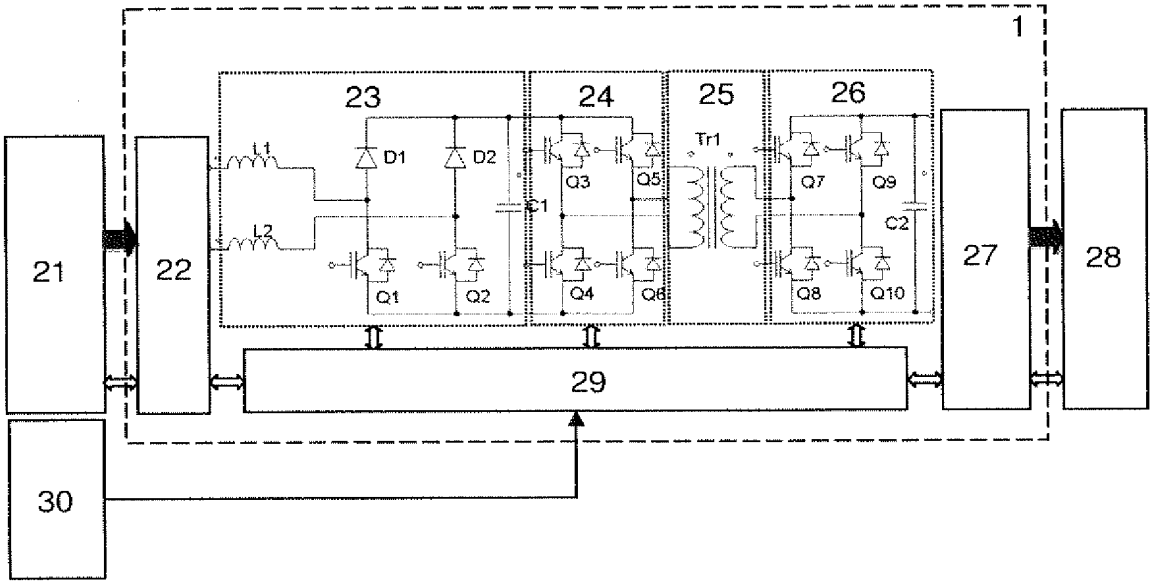


Fig. 3

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RÉPUBLIQUE FRANÇAISE

INSTITUT NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE

RAPPORT DE RECHERCHE PRÉLIMINAIRE

établi sur la base des dernières revendications déposées avant le commencement de la recherche

N° d'enregistrement national

FA 792075
FR 1360940

DOCUMENTS CONSIDÉRÉS COMME PERTINENTS		Revendication(s) concernée(s)	Classement attribué à l'invention par l'INPI
Catégorie	Citation du document avec indication, en cas de besoin, des parties pertinentes		
X	FR 2 978 303 A1 (ST MICROELECTRONICS SA [FR]) 25 janvier 2013 (2013-01-25) * le document en entier * -----	1-17	H02J7/00 B60L11/18
X	EP 2 660 950 A2 (LG CHEMICAL LTD [KR]) 6 novembre 2013 (2013-11-06) * le document en entier * -----	1,2,4,7, 9-11, 13-17	
X	JP 2007 267561 A (SHIMIZU HIROSHI) 11 octobre 2007 (2007-10-11) * le document en entier * -----	1,2,4,7, 9-11, 13-17	
			DOMAINES TECHNIQUES RECHERCHÉS (IPC) H02J B60L

1

Date d'achèvement de la recherche	Examinateur
28 août 2014	Annibal, Stewart

CATÉGORIE DES DOCUMENTS CITÉS

X : particulièrement pertinent à lui seul
Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie
A : arrière-plan technologique
O : divulgation non-écrite
P : document intercalaire

T : théorie ou principe à la base de l'invention
E : document de brevet bénéficiant d'une date antérieure à la date de dépôt et qui n'a été publié qu'à cette date de dépôt ou qu'à une date postérieure.
D : cité dans la demande
L : cité pour d'autres raisons

& : membre de la même famille, document correspondant

EPO FORM 1503 12.99 (P04C14)

BNSDOCID: <FR_____3013164A1_I_>

ANNEXE AU RAPPORT DE RECHERCHE PRÉLIMINAIRE RELATIF A LA DEMANDE DE BREVET FRANÇAIS NO. FR 1360940 FA 792075

La présente annexe indique les membres de la famille de brevets relatifs aux documents brevets cités dans le rapport de recherche préliminaire visé ci-dessus.
Les dits membres sont contenus au fichier informatique de l'Office européen des brevets à la date du 28-08-2014
Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office européen des brevets, ni de l'Administration française

Document brevet cité au rapport de recherche	Date de publication	Membre(s) de la famille de brevet(s)	Date de publication
FR 2978303 A1	25-01-2013	AUCUN	
EP 2660950 A2	06-11-2013	CN 103283113 A	04-09-2013
		EP 2660950 A2	06-11-2013
		JP 2014504139 A	13-02-2014
		KR 20130032664 A	02-04-2013
		US 2013264995 A1	10-10-2013
		WO 2013042988 A2	28-03-2013
JP 2007267561 A	11-10-2007	JP 4694399 B2	08-06-2011
		JP 2007267561 A	11-10-2007

EPO FORM P0465

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No.12/82

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Espacenet

Bibliographic data: FR3013164 (A1) — 2015-05-15

PROCEDE DE CHARGE DE VEHICULE ELECTRIQUE A VEHICULE ELECTRIQUE

Inventor(s): BIAGINI ERIC [FR]; COSTE FRANCOIS [FR]; JEAN GUILLAUME [FR] ± (BIAGINI ERIC, ; COSTE FRANCOIS, ; JEAN GUILLAUME)

Applicant(s): INTELLIGENT ELECTRONIC SYSTEMS [FR] ± (INTELLIGENT ELECTRONIC SYSTEMS)

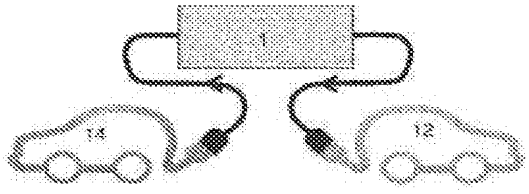
Classification: - **international:** ***B60L11/18; H02J7/00***
- **cooperative:** **B60L11/1811**; **B60L11/1816**; **B60L11/1822**; **B60L11/1844**; **H02J7/0027**; **H02J7/0054**; **H02M3/33584**; Y02T10/7005; Y02T10/7072; Y02T90/127; Y02T90/14

Application number: FR20130060940 20131108

Priority number(s): FR20130060940 20131108

Also published as: CA2929408 (A1) CN105934864 (A) EP3066739 (A1) HK1223198 (A1) US2016288664 (A1) more

Abstract of FR3013164 (A1)



L'invention concerne un dispositif de charge (1) adapté à être connecté d'une part à une batterie d'un premier véhicule électrique (14), et d'autre part à une batterie d'un deuxième véhicule électrique (12), à être alimenté en courant d'entrée continu par la batterie du premier véhicule électrique (14) et à alimenter la batterie du deuxième véhicule électrique (12) avec un courant de sortie continu. L'invention concerne également un procédé de charge utilisant ce dispositif de charge.

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2010-252520
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(51)Int.Cl.		F I			テーマコード（参考）
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H01M 10/44	(2006.01)	H02J	7/00	P	5G503
H01M 10/46	(2006.01)	H02J	7/00	L	5H030
H01B 7/00	(2006.01)	H01M	10/44	A	5H115
B60L 11/18	(2006.01)	H01M	10/46	101	

審査請求 未請求　請求項の数 5　OL　（全 12 頁）　最終頁に続く

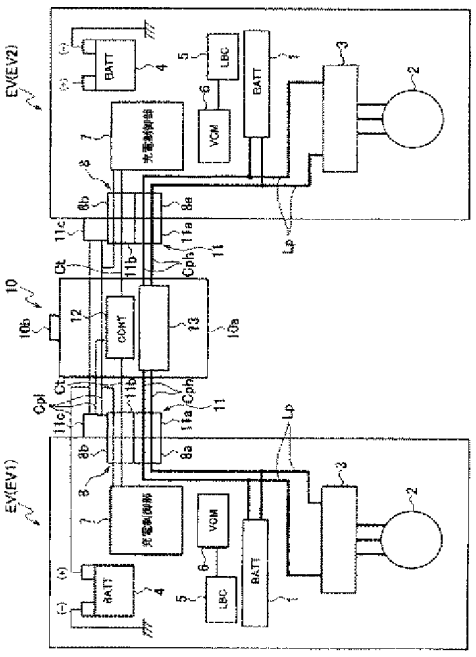
(21)出願番号　特願2009-98916(P2009-98916)
(22)出願日　平成21年4月15日(2009.4.15)

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(54)【発明の名称】車車間充電方法、車車間充電用ケーブルおよび電動車両

(57)【要約】　（修正有）
【課題】インバータの動作が不安定となることを抑制しつつバッテリの充電を車車間において有効に行う。
【解決手段】電源ラインにおいてコンデンサとバッテリ１との間の分岐点から導出された充電用コネクタに充電用ケーブル１０をそれぞれ接続することにより電気自動車ＥＶ同士が相互に接続されている。この状態において、充電用ケーブル１０に付帯する充電制御用コンピュータ１２は、充電制御部７の各々と通信することにより、一方の電気自動車ＥＶ１の強電バッテリ１に蓄電された電力を他方の電気自動車ＥＶ２の強電バッテリ１に充電する。
【選択図】図１



BNSDOCID: <JP_____2010252520A__I_>

【特許請求の範囲】
【請求項1】
電動機を駆動するインバータに電源ラインを介して直流電力を供給するバッテリを備えた電動車両同士の車車間充電方法において、
前記電源ラインにおいて前記バッテリおよびインバータの間に並列接続されたコンデンサと前記バッテリとの間の分岐点から導出された充電用コネクタと、前記電源ラインに設けられたリレーの開閉状態を制御する充電コントローラとを備える前記電動車両同士が、前記充電用コネクタに接続された充電用ケーブルを介して相互に接続された状態において、前記充電用ケーブルに付帯する充電制御用コンピュータが、前記充電コントローラの各々と通信することにより、一方の電動車両のバッテリに蓄電された電力を他方の電動車両のバッテリに充電することを特徴とする車車間充電方法。
【請求項2】
前記充電制御用コンピュータは、充電開始時、充電側の電動車両の充電コントローラおよび送電側の電動車両の充電コントローラに起動指令をそれぞれ出力しており、
前記充電コントローラのそれぞれは、前記充電制御用コンピュータから前記起動指令が入力された場合、前記コンデンサと前記バッテリとの間の前記電源ライン上に設けられた電源系リレーと、前記充電用コネクタと前記電源ライン上の分岐点との間を繋ぐライン上に設けられた充電系リレーとをそれぞれオフ状態からオン状態へと切り替えることを特徴とする請求項１に記載された車車間充電方法。
【請求項3】
前記充電制御用コンピュータは、送電側の電動車両の充電コントローラへの起動指令よりも充電側の電動車両の充電コントローラへの起動指令を遅延させて出力することを特徴とする請求項２に記載された車車間充電方法。
【請求項4】
電動車両が備える充電用コネクタと嵌合可能なコネクタが両端に取り付けられた送電ケーブルと、
通信ケーブルと、
前記通信ケーブルを介して電動車両が備える充電コントローラとそれぞれ通信可能なコンピュータとを有し、
前記電動車両は、電動機を駆動するインバータに電源ラインを介して直流電力を供給するバッテリを備え、前記充電用コネクタが、前記電源ラインにおいて前記バッテリおよび前記インバータの間に並列接続されたコンデンサと前記バッテリとの間の分岐点から導出されていることを特徴とする車車間充電用ケーブル。
【請求項5】
電動機を駆動するインバータに電源ラインを介して直流電力を供給するバッテリを備える電動車両において、
前記バッテリおよび前記インバータの間に並列接続されたコンデンサと、前記バッテリとの間の分岐点から導出された充電用コネクタと、
前記電源ライン上に設けられたリレーの開閉状態を制御する充電コントローラとを備え、
前記充電コントローラは、前記充電用コネクタを用いた前記バッテリの充電時の動作モードとして、車両間で充電を行う車車間充電モードと、外部の充電器からの充電を行う通常モードとを切り替え可能に有することを特徴とする電動車両。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は、車車間充電方法、車車間充電用ケーブルおよび電動車両に関する。
【背景技術】
【0002】
従来より、電動機により駆動する電動車両が備えるバッテリを充電する手法が種々提案

WINPLUS Ex. 1002, p. 190
BNSDOCID: <JP_____2010252520A_I_>

されている。例えば、特許文献１には、外部電源（救援車両）と自車両の強電バッテリとを直接接続して充電が可能な電動車両用電源装置が開示されている。この電動車両は、正極側および負極側の高電圧ケーブルを介して供給される供給電力を交流に変換して車両駆動用モータを駆動するインバータと、インバータに正極側および負極側の高電圧ケーブルを介して電力を供給するバッテリとを備える。この場合、バッテリとインバータとの間の正極側および負極側の高電圧ケーブル間にコンデンサ（キャパシタ）を並列に接続し、コンデンサとインバータとの間の正極側および負極側の各高電圧ケーブルに、バッテリ充電用の外部電源を接続可能としている。

【図面の簡単な説明】

【0008】

【図1】本発明の実施形態にかかる車車間充電システムを概略的に示す構成図

【図2】車車間充電システムにおける電気自動車の回路構成の要部を模式的に示す説明図

【図3】充電用ケーブル１０を用いた車車間充電方法の手順を示すフローチャート

【符号の説明】

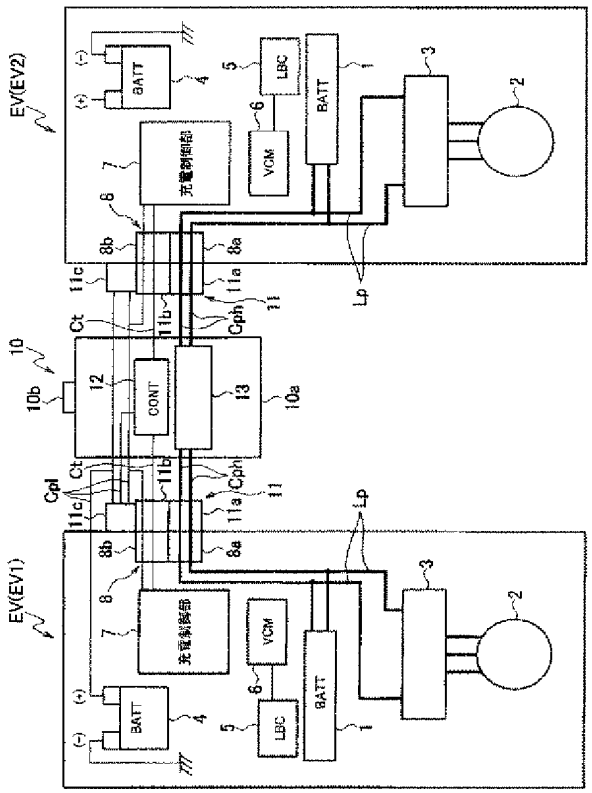
【0050】

ＥＶ…電気自動車
１…強電バッテリ
２…モータ
３…インバータ
３ａ…インバータ回路
３ｂ…コンデンサ
４…サブバッテリ
５…バッテリコントローラ
６…車載コンピュータ
７…充電制御部
８…充電用コネクタ
１０…充電用ケーブル
１０ａ…本体ユニット
１０ｂ…充電開始スイッチ
１１…ケーブル側コネクタ
１２…コントローラ

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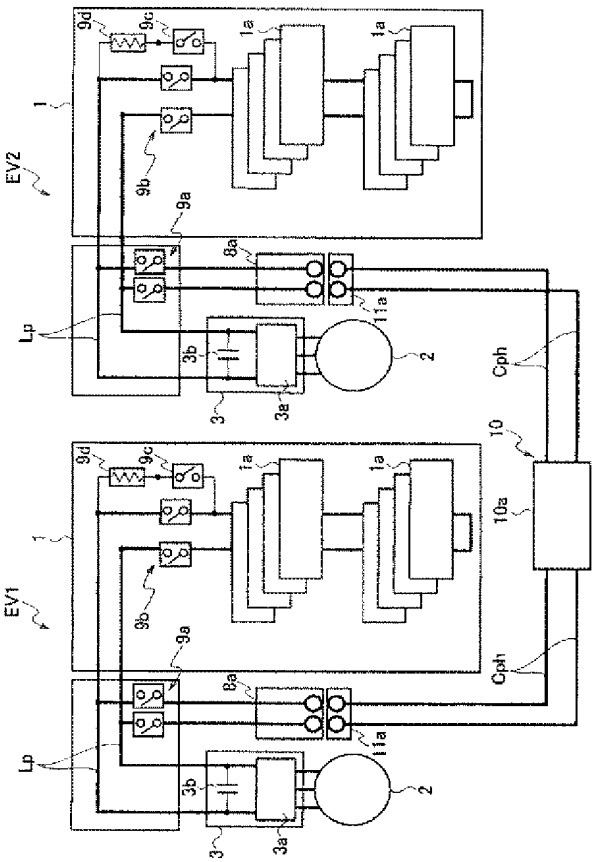
BNSDOCID: <JP_____2010252520A__I_>

【図1】



BNSDOCID: <JP_____2010252520A__I_>

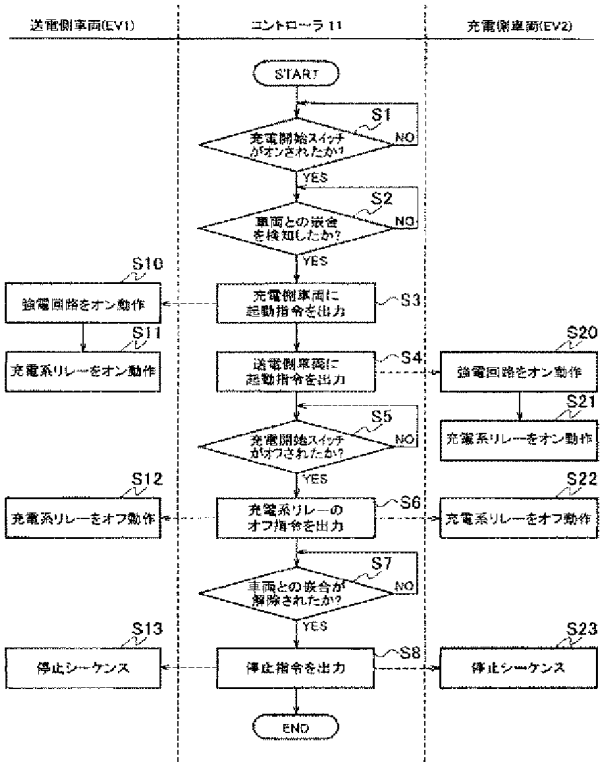
【図2】



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【図3】



BNSDOCID: <JP_____2010252520A__I_>

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	Ｈ０１Ｂ　7/00	３１０	
	Ｂ６０Ｌ　11/18	Ｃ	

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5G503 AA01 AA04 BB01 FA06 GD04
5H030 AS08 BB27 DD12
5H115 PA08 PC06 PG04 PI15 PI16 PI29 PI30 PO07 PO10 PO14
PU10 PV02 PV09 PV23 QE12 QN03 SE06 T102

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Patent Abstracts of Japan

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PUBLICATION DATE : 04-11-10

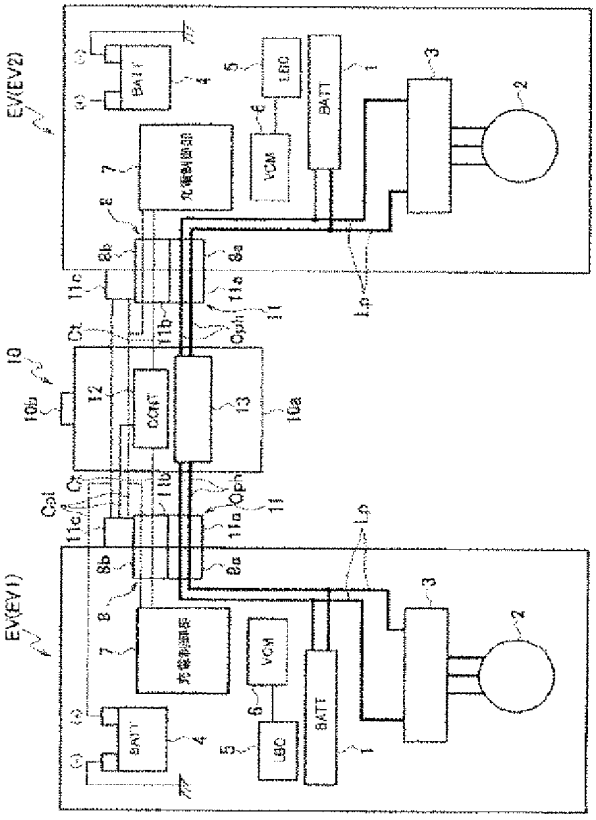
APPLICATION DATE : 15-04-09
APPLICATION NUMBER : 2009098916

APPLICANT : NISSAN MOTOR CO LTD;

INVENTOR : NAKAJIMA TAKESHI;

INT.CL. : H02J 7/00 (2006.01), H01M 10/44 (2006.01), H01M 10/46 (2006.01), H01B 7/00 (2006.01), B60L 11/18 (2006.01)

TITLE : INTER-VEHICLE CHARGING METHOD, INTER-VEHICLE CHARGING CABLE AND ELECTRIC VEHICLE



ABSTRACT : PROBLEM TO BE SOLVED: To effectively charge a battery between vehicles, while instability of an operation of an inverter is suppressed.

SOLUTION: By having a charging cable 10 is connected to a charging connector, derived from a branching point between a capacitor and the battery 1 in a power supply line, electric vehicles EV are mutually connected. A charging control computer 12, attached to the charging cable 10, communicates with charging control parts 7 in such a state; thus the power accumulated in the strong electric battery 1 of one electric vehicle EV1 is charged to the strong electric battery 1 of the other electric vehicle EV2.

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H02J 7/04 *(2006.01)* ***H01M 10/46*** *(2006.01)*
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Daejeon 302-223 (KR)

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(54) **BATTERY CHARGING SYSTEM AND CHARGING METHOD USING SAME**

(57) Disclosed are a battery charging system and method. The battery charging system according to the present invention includes a first connector connected to both ends of a battery of a charging providing car; a second connector connected to both ends of a battery of a charging target car; a converter configured to convert a voltage transmitted from the battery of the charging providing car through the first connector and transmit the converted voltage to the battery of the charging target car through the second connector; and a controller connected to each of a battery management system (BMS) of the charging providing car and a BMS of the charging target car to control a voltage conversion ratio of the converter based on a state information on each of the batteries transmitted from each of the BMSs.

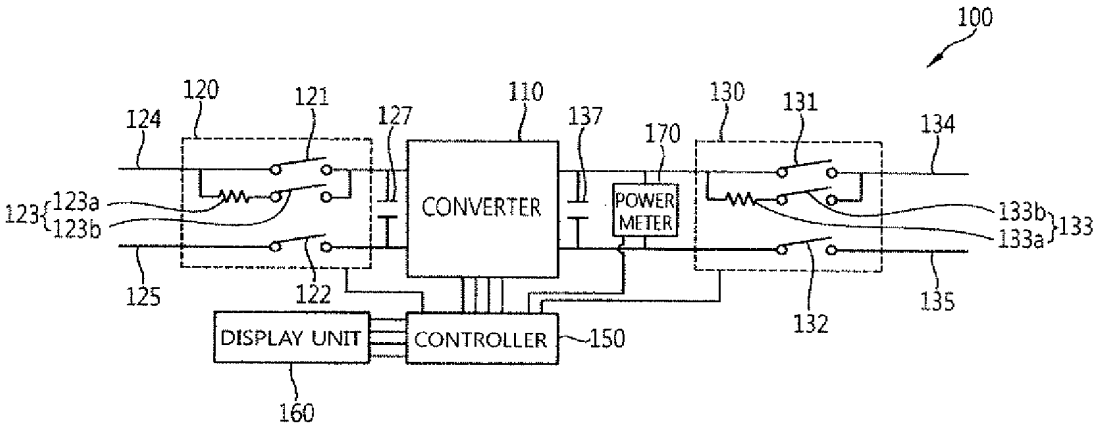


FIG.1

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Description

[Technical Field]

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2011-0096404 filed in the Korean Intellectual Property Office on September 23, 2011, the entire contents of which are incorporated herein by reference.

[0002] The present invention relates to a battery charging system and a battery charging method using same, and more particularly, to a battery charging system capable of charging batteries between electric cars and a battery charging method using same.

[Background Art]

[0003] Due to an exhaustion of fossil fuel and an interest in environmental pollution, an electric car driven using electric energy has been actively researched. Currently, a hybrid car using both an internal combustion engine and an electric motor as driving sources is commercialized, and a pure electric car using only electric energy is researched and commercialized.

[0004] A battery of the electric car using electric energy may be completely discharged by negligence of a user while driving or an unexpected reason. Particularly, in the hybrid car and the pure electric car starting with the use of electric motor power, when a battery for storing electric energy is discharged, the car should be towed to a charging station or an area where a power supply is possible.

[0005] US Registered Patent No. 8, 000, 858 published on February 12, 2009 discloses an apparatus for charging an electric car.

[0006] However, after a battery is discharged, only a method can be used in which a tow truck must be used to move the electric car to a place where such a charging apparatus is installed.

[Detailed Description of the Invention]

[Technical Problem]

[0007] An object of the present invention is to provide a battery charging system capable of transmitting electric energy between electric cars and a battery charging method using same.

[Technical Solution]

[0008] A battery charging system according to the present invention to solve the above described problems includes a first connector connected to both ends of a battery of a charging providing car; a second connector connected to both ends of a battery of a charging target car; a converter connected between the first connector and the second connector and configured to convert a voltage transmitted from the battery of the charging providing car through the first connector and transmit the converted voltage to the battery of the charging target car through the second connector; and a controller configured to control an electrical connection of the first connector and the second connector and connected to each of a battery management system (BMS) of the charging providing car and a BMS of the charging target car to control a voltage conversion ratio of the converter based on a state information on each of the batteries transmitted from each of the BMSs.

[0009] Further, the first connector may include a first positive electrode relay configured to connect a positive electrode of the battery of the charging providing car and a positive electrode of an input terminal of the converter; a first negative electrode relay configured to connect a negative electrode of the battery of the charging providing car and a negative electrode of the input terminal of the converter; a first capacitive element connected to the input terminal of the converter in parallel; and a first precharge unit connected to the first positive electrode relay in parallel, wherein the first precharge unit comprises a first precharge relay and a first precharge resistor connected to the first precharge relay in series.

[0010] Further, the controller may perform an input side precharge of charging a predetermined voltage in the first capacitive element by opening the first positive electrode relay to disconnect a connection and closing the first negative electrode relay and the first precharge relay when the first connector is connected to the battery of the charging providing car, and perform power transmission to the converter from the battery of the charging providing car by closing the first positive electrode relay and opening the first precharge relay when the input side precharge is completed.

[0011] Further, the second connector may include a second positive electrode relay configured to connect a positive electrode of the battery of the charging target car and a positive electrode of an output terminal of the converter; a second negative electrode relay configured to connect a negative electrode of the battery of the charging target car and a negative electrode of the output terminal of the converter; a second capacitive element connected to the output terminal of the converter in parallel; and a second precharge unit connected to one of the second positive electrode relay and the second negative electrode relay in parallel, wherein the second precharge unit comprises a second precharge relay and a second precharge resistor connected to the second precharge relay in series.

[0012] Further, the controller may perform an output side precharge of charging a predetermined voltage in the second capacitive element by opening the second positive eletrode relay to disconnect a connection and closing the second negative electrode relay and the second precharge relay when the second connector is connected to the battery of the charging target car, and perform power transmission to the battery of the charging

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target car from the converter by closing the second positive electrode relay and opening the second precharge relay when the output side precharge is completed.

[0013] Further, the state information on the battery of the charging providing car transmitted from the BMS of the charging providing car may contain at least one of energy transmittable from the BMS of the charging providing car, a maximum instantaneous output power allowance, an output voltage of the battery of the charging providing car, and a power quantity transmitted from the battery of the charging providing car.

[0014] Further, the state information on the battery of the charging target car transmitted from the BMS of the charging target car may contain at least one of energy receivable from the BMS of the charging target car, a maximum instantaneous input power allowance, an input voltage of the battery of the charging target car, and a power quantity transmitted to the battery of the charging target car.

[0015] Further, the battery charging system may further include a power meter connected to the converter and configured to measure a transmitted power quantity provided to the battery of the charging target car from the battery of the charging providing car.

[0016] The controller may receive the transmitted power quantity from the power meter and calculate a rate based on the transmitted power quantiy.

[0017] The battery charging system may further include a display unit connected to the controller, wherein the display unit displays the transmitted power quantity and/or information on the rate.

[0018] Further, the converter may be a DC/DC converter configured to receive DC power and output the DC power.

[0019] A battery charging method according to the present invention to solve the above described problems includes receiving battery state information on a battery of a charging providing car and a battery of a charging target car from a BMS of the charging providing car and a BMS of the charging target car, respectively; performing an input side precharge by connecting a first precharge relay provided between the battery of the charging providing car and an input terminal of the converter with a first precharge resistor; performing an output side precharge by connecting a second precharge relay provided between the battery of the charging target car and an output terminal of the converter with a second precharge resistor; after the input side precharge ends, transmitting power to the input terminal of the converter from the battery of the charging providing car by disconnecting a connection of the first precharge relay and closing a first positive electrode relay configured to connect the battery of the charging providing car and the input terminal of the converter; after the output side precharge ends, transmitting power to the battery of the charging target car from the output terminal of the converter by disconnecting a connection of the second precharge relay and closing a second positive electrode relay configured to connect the battery of the charging target car and the output terminal of the converter; controlling a voltage conversion ratio of the converter based on the battery state information and charging the battery of the charging target car, by a controller.

[0020] Further, the battery state information received from the BMS of the charging providing car by the controller may contain information on at least one of energy transmittable from the BMS of the chargig providing car, a maximum instantaneous output power allowance, an output voltage of the battery of the charging providing car, and a power quantity transmitted from the battery of the charging providing car.

[0021] Further, the battery state information received from the BMS of the charging target car by the controller may contain information on at least one of receivable energy, a maximum instantaneous input power allowance, an output voltage of the battery of the charging target car, and a power quantity transmitted to the battery of the charging target car.

[0022] Further, the battery charging method may further include measuring a transmitted power quantity provided to the battery of the charging target car through the converter.

[0023] Further, the battery charging method may further include calculating a power rate based on the transmitted power quantity.

[0024] Further, the battery charging method may further include displaying information on the transmitted power quantity and/or the power rate.

[0025] Further, the battery charging method may further include receiving the transmitted power quantity and/or the power rate before charging is initiated in order to select the transmitted power quantity and/or the power rate in advance.

[0026] Further, the battery charging method may further include disconnecting a connection of the first precharge relay, the second precharge relay, a first main relay and a second main relay when a charging for the battery of the charging target car is completed.

[0027] Further, the battery charging method may further include making a request for stopping power transmission/reception to the BMS of the charging providing car and the BMS of the charging target car when a charging of the battery of the charging target car is completed.

[0028] Further, the battery charging method may further include making a request for electrically separating the battery of the charging target car from the inverter and a request for electrically separating the battery of the charging providing car from the inverter.

[Advantageous Effects]

[0029] When a battery of an electric car is discharged or needs to be charged due to other reasons, a battery charging system and a battery charging method using same according to the present invention can conveniently solve a battery charging problem with low costs since

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the electric car can receive energy from another neighboring electric car without being moved to a charging facility by a tow truck.

[0030] Further, since a DC/DC converter is used, there is an advantage in that a power transmission efficiency is higher in comparison with a conventional method of charging a battery by converting AC power to DC power.

[Brief Description of Drawings]

[0031]

FIG. 1 is a block diagram illustrating a battery charging system according to an exemplary embodiment of the present invention.

FIG. 2 is a block diagram illustrating a battery charging system, a charging providing car, and a charging target car according to an exemplary embodiment of the present invention.

FIGS. 3 to 5 are block diagrams illustrating an operation process of a battery charging system according to an exemplary embodiment of the present invention.

FIG. 6 is a flowchart illustrating a charging method using a battery charging system according to the present invention.

[Best Mode]

[0032] Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. However, the present exemplary embodiment is not limited to the following exemplary embodiment and may be implemented in various forms. The present exemplary embodiment is provided to make the disclosure of the present invention perfect and to make those skilled in the art perfectly comprehend the scope of the present invention. Shapes of components in the drawings may be exaggeratedly expressed for a clear description, and the same reference numerals in the drawings will be assigned to the same elements.

[0033] An electric car which will be described below refers to a vehicle using one or more electric motors for thrust. Energy used for moving the electric car includes an electrical source such as a rechargeable battery and/or a fuel cell. The electric car may be a hybrid electric vehicle using an internal combustion engine as another power source.

[0034] FIG. 1 is a block diagram illustrating a battery charging system according to an exemplary embodiment of the present invention.

[0035] As illustrated in FIG. 1, a battery charging system according to an exemplary embodiment of the present invention includes a converter 110, a first connector 120, a second connector 130, a power meter 170, a controller 150, and a display unit 160.

[0036] The converter 110 converts a voltage level applied to an input terminal of the converter 110 and outputs the converted voltage level to an output terminal.

[0037] In general, a state of charging (SOC) of a battery (not shown) of a discharged electric car (hereinafter, referred to as a charging target car) is lower than an SOC of a battery (not shown) of an electric car (hereinafter, referred to as a charging providing car) providing charging energy. Accordingly, a voltage level of the battery of the charging target car is lower than a voltage level of the battery of the charging providing car.

[0038] Therefore, a converter for a voltage drop in which an output voltage is lower than an input voltage may be used as the converter 110.

[0039] Further, since the battery of the charging providing car may provide DC power and the battery of the charging target car may receive DC power, the converter 110 may be a DC/DC converter for receiving DC power and outputting the DC power.

[0040] The input terminal of the converter 110 includes the first connector 120.

[0041] The first connector 120 may include a first positive electrode relay 121 connected to a positive electrode line 124 of the input terminal of the converter 110 and configured to be turned on/off, a first negative electrode relay 122 connected to a negative electrode line 125 of the input terminal of the converter 110 and configured to be turned on/off, a first precharge unit 123 connected to the first positive electrode relay 121 in parallel, and a first capacitive element 127 connected between the positive electrode line 124 and the negative electrode line 125 and connected to the converter 110 in parallel.

[0042] Further, the first precharge unit 123 may include a first precharge relay 123b configured to be turned on/off and a first precharge resistor 123a connected to the first precharge relay 123b in series.

[0043] Here, "off" means disconnecting a corresponding connection, and "on" means the reverse thereof.

[0044] When the input terminal of the converter 110 is connected to the battery of the charging providing car, the first precharge unit 123 prevents a momentary over current due to a rapid voltage change.

[0045] That is, the first positive electrode relay 121 is turned off and the first precharge relay 123b is turned on, so that the voltage applied from the battery of the charging providing car is applied to the first capacitive element 127 through the first precharge resistor 123a and voltages of both ends of the first capacitive element 127 are charged to reach a predetermined value.

[0046] Thereafter, the momentary over current due to the rapid voltage change is prevented by turning off the first precharge relay 123b and turning on the first positive electrode relay 121 to directly connect the battery of the charging providing car and the converter 110.

[0047] The output terminal of the converter 110 includes the second connector 130.

[0048] The second connector 130 may be formed in a similar structure to that of the first connector 120.

[0049] That is, the second connector 130 may include

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a second positive electrode relay 131 connected to a positive electrode line 134 of the output terminal of the converter 110 and configured to be turned on/off, a second negative electrode relay 132 connected to a negative electrode line 135 of the output terminal of the converter 110 and configured to be turned on/off, a second precharge unit 133 connected to the second positive electrode relay 131 in parallel, and a second capacitive element 137 connected between the positive electrode line 134 and the negative electrode line 135 and connected to the converter 110 in parallel.

[0050] Further, the second precharge unit 133 may include a second precharge relay 133b configured to be turned on/off and a second precharge resistor 133a connected to the second precharge relay 133b in series.

[0051] When the output terminal of the converter 110 is connected to the battery of the charging target car, the second precharge unit 133 also prevents a momentary over current due to a rapid voltage change. Since the function is similar to that of the first precharge unit 123, its detailed description will be omitted.

[0052] The power meter 170 may be connected to the converter 110 in parallel to measure a transmitted power quantity provided to the battery of the charging target car from the converter 110.

[0053] The controller 150 may be connected to the converter 110 by a data bus to control an input and output voltage conversion ratio of the converter 110.

[0054] Further, the controller 150 may be connected to the first connector 120 and the second connector 130 to perform on/off controls of the first positive electrode relay 121, the first negative electrode relay 122, and the first precharge relay 123b of the first connector 120, and the second positive electrode relay 131, the second negative electrode relay 132, and the second precharge relay 133b of the second connector 130.

[0055] Moreover, the controller 150 may be connected to the power meter 170 to calculate power rates based on the transmitted power quantity measured by the power meter 170 and provide charge information.

[0056] Furthermore, the controller 150 may communicate with a BMS (not shown) of the battery of the charging target car and a BMS (not shown) of the battery of the charging providing car, perform a power transfer control, and compare a power quantity transmitted through the battery recognized by each BMS with the transmitted power quantity measured by the power meter 170.

[0057] The display unit 160 may display information, which is provided to a user during the charging, on a screen. For example, the display unit 160 may display information on a selection of a charging amount, an initiation of the charging, a progress of the charging, an end of the charging, a transmitted power quantity, a power rate and the like and receive information which can be selected by the user among the above listed information.

[0058] The display unit 160 may be connected to the controller 150 by a data bus to bidirectionally transfer information.

[0059] FIG. 2 is a block diagram illustrating the battery charging system, a charging providing car, and a charging target car according to an exemplary embodiment of the present invention.

[0060] As illustrated in FIG. 2, the battery charging system 100 may transmit electric energy from a charging providing car 200 to a charging target car 300, between the charging providing car 200 and the charging target car 300.

[0061] The charging providing car 200 includes a battery management system (BMS) 210, a battery 220, an inverter 230, a motor 240, and a relay unit 250.

[0062] The battery 220 is an electricity storage source for storing electric energy which becomes power of the car. The BMS 210 may check various information on a state of the battery 220, for example, a maximum instantaneous input/output power allowance, an output voltage of the battery, an SOC and the like, control charging/discharging of the battery 220, and perform a control of the relay unit 250 connected to the battery 220.

[0063] The relay unit 250 may include a first main relay 251 connected to the positive electrode line of the battery 220 and configured to be turned on/off, a second main relay 252 connected to the negative electrode line and configured to be turned on/off, and an auxiliary relay 253 connected to the first main relay 251 in parallel.

[0064] The auxiliary relay 253 is a component for preventing an over current from flowing between the battery 220 and the inverter 230. When the over current is detected, the auxiliary relay 253 may restrain the current by using an auxiliary resistor 254 by turning off the first main relay 251 and turning on the auxiliary relay 253.

[0065] The inverter 230 is a component for converting DC power transmitted from the battery 220 to AC power and transmitting the converted AC power to the motor 240 or converting AC power transmitted from the motor 240 to DC power and then transmitting the converted DC power to the battery 220.

[0066] Further, the motor 240 is a component for generating driving power transmitted to the car.

[0067] Since a configuration of the charging target car 300 is similar to that of the charging providing car 200, its detailed description will be omitted.

[0068] FIG. 3 is a block diagram illustrating a precharge step of the battery charging system according to an exemplary embodiment of the present invention.

[0069] As illustrated in FIG. 3, in order to charge a battery 320 of the charging target car 300 by transmitting power to the charging target car 300 from the charging providing car 200, the controller 150, the BMS 210 of the charging providing car 200, and a BMS 310 of the charging target car 300 are first connected. The controller 150 and BMSs 210 and 310 of the respective cars 200 and 300 may communicat through a method such as a controller area network (CAN), FlexRay or the like.

[0070] The controller 150 may transmit power transmission mode information data to the BMSs 210 and 310 of the respective cars 200 and 300. As illustrated in FIG.

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3, the BMS 210 or 310 of each car having received corresponding data separates the battery 220 or 320 from the inverter 230 or 330 by turning off all of the first main relay 251 or 351, the second main relay 252 or 352, and the auxiliary relay 253 or 353.

[0071] Further, the BMS 210 of the charging providing car 200 may be switched to a power transmission state, and the BMS 310 of the charging target car 300 may be switched to a power reception state.

[0072] When the off states of the relay units 250 and 350 are identified through the BMSs 210 and 310 of the respective cars 200 and 300 and the controller 150, the display unit 160 may display an information message for connecting the first connector 120 and the second connector 130 of the battery charging system 100. Alternatively, the first connector 120 and the second connector 130 may be in a connection state while all the relays 121, 122, 123b, 131, 132, and 133b are turned off.

[0073] The first connector 120 may be connected to both ends of the battery 220 of the charging providing car 200, and the second connector 130 may be connected to both ends of the battery 320 of the charging target car 300.

[0074] Meanwhile, selection of a charging initiation and the charging quantity/charging amount may be input into or a selectable interface may be displayed in the display unit 160. In this case, the charging quantity/charging amount displayed in the display unit 160 may be displayed within a range in which the charging providing car 200 can be driven, by considering the power quantity charged in the battery 220 of the charging providing car 200.

[0075] When the user selects the charging quantity or the charging amount and inputs a charging initiation signal, the controller 150 initiates the charging. At this time, the controller 150 may first identify the connection of the first connector 120 and the second connector 130 and then initiate the charging. When the connection of the first connector 120 and the second connector 130 is not recognized, the display unit 160 may display a message of identifying the connection of the first connector 120 and the second connector 130.

[0076] As illustrated in FIG. 3, when the charging is initiated, the controller 150 turns off the first positive electrode relay 121 and the second positive electrode relay 131 (or maintains the off state), and turns on the first precharge relay 123b, the second precharge relay 133b, the first negative electrode relay 122, and the second negative electrode relay 132.

[0077] Accordingly, prior to beginning the charging in earnest, in order to prevent the momentary over current due to the rapid voltage change generated by the connection between the battery charging system 100 and each battery 220 or 320 of each car 200 or 300, a precharge of charging in advance the first capacitive element 127 and the second capacitive element 137 is performed in the first connector 120 and the second connector 130, respectively.

[0078] The precharge may be performed until the first capacitive element 127 and the second capacitive element 137 are charged with a predetermined voltage value. Alternatively, the precharge may be performed until a charging time passes based on a time constant (τ) by a capacitance value (C) of each capacitive element 127 or 137 and a resistance value (R) of each precharge resistor 123a or 133a.

[0079] FIG. 4 is a block diagram illustrating a state where the charging is performed between the charging providing car and the charging target car by the battery charging system according to an exemplary embodiment of the present invention.

[0080] As illustrated in FIG. 4, after the precharge is completed, the controller 150 allows power to be transmitted to the input terminal of the converter 110 from the battery 220 of the charging providing car 200 by turning off the first precharge relay 123b and turning on the first positive electrode relay 121. The controller 150 allows the power to be transmitted to the battery 320 of the charging target car 300 from the output terminal of the converter 110 by turning off the second precharge relay 133b and turning on the second positive electrode relay 131 at the same time.

[0081] The controller 150 may receive information on a state of the battery of the charging providing car 200 such as energy transmittable from the BMS 210 of the charging providing car 200, a maximum instantaneous output allowance, an output voltage of the battery 220 and the like.

[0082] Further, the controller 150 may receive information on a state of the battery of the charging target car 300 such as energy receivable from the BMS 310 of the charging target car 300, a maximum instantaneous input allowance, an output voltage of the battery 320 and the like.

[0083] The controller 150 may control a voltage conversion ratio of the converter 110 based on the information on the state of the battery received from the BMS 210 or 310 of each car and allow power transmission to be achieved.

[0084] The voltage conversion ratio means a ratio of a voltage output to the output terminal to a voltage applied to the input terminal.

[0085] Further, the controller 150 may communicate with the BMS 210 or 310 of each car and control a power transmission state of each car 200 or 300 through each BMS 210 or 310. The power transmission state refers to an output voltage/current of the battery 220 or 320 of each car 200 or 300, a transmitted power quantity and the like.

[0086] In addition, the controller 150 may receive data on a transmitted power quantity measured by the power meter 170. The transmitted power quantity transmitted from the power meter 170 may be compared with the transmitted power quantity received from the BMS 210 or 310 of each car. Furthermore, the controller 150 may calculate a power rate through the transmitted power

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quantity.

[0087] Further, the controller 150 may allow the user to recognize a power transmission state by displaying information on the transmitted power quantity and the power rate in the display unit 160 in real time.

[0088] FIG. 5 is a block diagram illustrating a state where a battery charging is completed according to an exemplary embodiment of the present invention.

[0089] As illustrated in FIG. 5, when the battery 320 of the charging target car 300 is completely charged, the controller 150 disconnects a connection between the converter 110 and the battery 220 of the charging providing car 200 by turning off the first positive electrode relay 121 and the first negative electrode relay 122 and disconnects a connection between the converter 110 and the battery 320 of the charging target car 300 by turning off the second positive electrode relay 131 and the second negative electrode relay 132, so that power transmission through the battery charging system 100 may be blocked. Further, the controller 150 may make a request for stopping power transmission and power charging to the BMS 210 of the charging providing car 200 and the BMS 310 of the charging target car 300, respectively. Accordingly, the BMS 210 of the charging providing car 200 may stop outputting power from the battery 220, and the BMS 310 of the charging target car 300 may stop receiving power from the battery 320.

[0090] In addition, the controller 150 may transmit accumulated power quantities completely transmitted from the power meter 170 and/or the respective BMSs 210 and 310 of the charging providing car 200 and the charging target car 300 and data on a power rate calculated based on the accumulated power quantities to the display unit 160.

[0091] The display unit 160 may display the accumulated power quantities and the power rate received from the controller 150 to allow the user to identify them.

[0092] When the user selects a charging quantity or a charging amount when initially starting the charging, a time when the corresponding charging quantity or charging amount is reached may be considered as a charging completion time. Alternatively, the charging may be completed by a charging stop signal of the user.

[0093] Thereafter, the user may complete a charging operation by separating the first connector 120 from the battery 220 of the charging providing car 200, separating the second connector 130 from the battery 320 of the charging target car 300, and separating the controller 150 from the BMSs 210 and 310 of the respective cars 200 and 300.

[0094] When the charging is required since the battery of the electric car is discharged by the above configuration or due to another reason, the electric car may receive energy from another neighboring electric car without being moved to a charging facility by a tow truck, thereby conveniently solving a battery charging problem with low costs.

[0095] Further, since a DC/DC converter is used, a power transmission efficiency is higher in comparison with a conventional method of charging a battery by converting AC power to DC power.

[0096] Hereinafter, a battery charging method using a battery charging system according to an exemplary embodiment of the present invention will be described.

[0097] FIG. 6 is a flowchart illustrating a charging method using a battery charging system according to the present invention.

[0098] As illustrated in FIG. 6, in order to charge the battery 320 of the charging target car 300 by transmitting power to the charging target car 300 from the charging providing car 200, the controller 150 is first connected with the BMS 210 of the charging providing car 200 and the BMS 310 of the charging target car 300 (step S11). The connected controller 150 and BMSs 210 and 310 of the respective cars 200 and 300 may communicate with each other through a method such as a CAN and the like.

[0099] Thereafter, the controller 150 may transmit power transmission mode information data to the BMSs 210 and 310 of the respective cars 200 and 300.

[0100] The BMS 210 or 310 of each car 200 or 300 having received the corresponding data electrically separates the battery 220 or 320 from the inverter 230 or 330 by turning off all of the first main relay 251 or 351, the second main relay 252 or 352, and the auxiliary relay 253 or 353 (step S12).

[0101] Further, the battery charging system 100 is connected to the battery 220 of the charging providing car 200 and the battery 320 of the charging target car 300 (step S13).

[0102] Specifically, the first connector 120 may be connected to both ends of the battery 220 of the charging providing car 200, and the second connector 130 may be connected to both ends of the battery 320 of the charging target car 300.

[0103] The first connector 120 and the second connector 130 may be connected while all the relays 121, 122, 123b, 131, 132, and 133b are turned off. Alternatively, when the off states of the relay units 250 and 350 of the respective cars 200 and 300 are identified through the BMSs 210 and 310 of the respective cars 200 and 300 and the controller 150 and an information message for connecting the first connector 120 and the second connector 130 of the battery charging system 100 is displayed in the display unit 160, the first connector 120 and the second connector 130 may be connected to the battery 220 or 320 of each car 200 or 300.

[0104] The controller 150 may receive information on a state of the battery of the charging providing car 200 from the BMS 210 of the charging providing car 200 and information on a state of the battery of the charging target car 300 from the BMS 310 of the charging target car 300 at the same time (step S14).

[0105] At this time, the information on the state of the battery transmitted from the BMS 210 of the charging providing car 200 may be transmittable energy, a maximum instantaneous output allowance, an output voltage

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of the battery 220 and the like. Further, the information on the state of the battery transmitted from the BMS 310 of the charging target car 300 may be receivable energy, a maximum instantaneous input allowance, an output voltage of the battery 320 and the like.

[0106] The selection of a charging initiation and the charging quantity/charging amount may be input into or a selectable interface may be displayed in the display unit 160, and the user can input or select the charging quantity/charging amount by the corresponding interface (step S15).

[0107] In this case, the charging quantity/charging amount displayed in the display unit 160 may be displayed within a range in which the charging providing car 200 can be driven, by considering the power quantity charged in the battery 220 of the charging providing car 200.

[0108] When the user selects the charging quantity or the charging amount and inputs a charging initiation signal, the controller 150 initiates the charging. At this time, the controller 150 may first identify the connection of the first connector 120 and the second connector 130 and then initiate the charging. When the connection of the first connector 120 and the second connector 130 is not recognized, the display unit 160 may display a message of the connection of the first connector 120 and the second connector 130.

[0109] When the charging is initiated, the controller 150 turns off the first positive electrode relay 121 and the second positive electrode relay 131 (or maintains the off state) (step S16), and turns on the first precharge relay 123b, the second precharge relay 133b, the first negative electrode relay 122, and the second negative electrode relay 132 (step S17).

[0110] Accordingly, prior to beginning the charging in earnest, a precharge of charging in advance the first capacitive element 127 and the second capacitive element 137 is performed (step S18).

[0111] The precharge is to prevent a momentary over current due to a rapid voltage change generated when the battery charging system 100 is connected to the batteries 220 and 320 of the respective cars 200 and 300.

[0112] The precharge may be performed until the first capacitive element 127 and the second capacitive element 137 are charged with a predetermined voltage value. Alternatively, the precharge may be performed until a charging time passes based on a time constant (τ) by a capacitance value (C) of each capacitive element 127 or 137 and a resistance value (R) of each precharge resistor 123a or 133a.

[0113] After the precharge is completed, the controller 150 controls such that the first precharge relay 123b and the second precharge relay 133b are turned off (step S19), and controls such that the first positive electrode relay 121 and the second positive electrode relay 131 are turned on (step S20).

[0114] Further, the controller 150 may control a voltage conversion ratio of the converter 110 based on the information on the state of the battery received from the BMS 210 or 310 of each car 200 or 300, and allow power to be transmitted to the battery 320 of the charging target car 300 from the battery 220 of the charging providing car 200 through a medium of the battery charging system 100 (step S21).

[0115] In a process of performing the charging, the controller 150 may receive data on the measured transmitted power quantity from the power meter 170. The transmitted power quantity transmitted from the power meter 170 may be compared with the transmitted power quantity received from the BMSs 210 and 310 of the respective cars 200 and 300. Further, the controller 150 may calculate a power rate through the transmitted power quantities.

[0116] In addition, an accumulated transmitted power quantity and data on a power rate therefor are transmitted to the display unit 160 from the controller 150, and the display unit 160 allows the user to recognize a power transmission state by displaying information on the accumulated transmitted power quantity and the power rate in real time (step S22).

[0117] The controller 150 may determine whether the charging is completed by comparing the accumulated transmitted power quantity and the power rate therefor with the charging quantity/charging amount input or selected by the user when the charging is initiated (step S23).

[0118] That is, when the accumulated transmitted power quantity and the power rate therefor are lower than the charging quantity/charging amount input by the user, the power transmission is continued. When both values are equal, it may be determined that the charging is completed.

[0119] In this case, the charging may be completed by a charging stop signal of the user.

[0120] When the controller 150 determines that the charging is completed, the controller 150 disconnects a connection between the converter 110 and the battery 220 of the charging providing car 200 by turning off the first positive electrode relay 121 and the first negative electrode relay 122 and disconnects a connection between the converter 110 and the battery 320 of the charging target car 300 by turning off the second positive electrode relay 131 and the second negative electrode relay 132, so that power transmission through the battery charging system 100 may be blocked (step S24).

[0121] Further, the controller 150 may make a request for stopping the power transmission and the power charging to the BMS 210 of the charging providing car 200 and the BMS 310 of the charging target car 300, respectively (step S25). Accordingly, the BMS 210 of the charging providing car 200 may stop outputting power from the battery 220, and the BMS 310 of the charging target car 300 may stop receiving power from the battery 320.

[0122] Thereafter, the user may complete a charging operation by separating the first connector 120 from the battery 220 of the charging providing car 200, separating

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the second connector 130 from the battery 320 of the charging target car 300, and separating the controller 150 from the BMSs 210 and 310 of the respective cars 200 and 300.

[0123] The above-described exemplary embodiment of the present invention illustrated in the drawings should not be construed to limit the technical idea of the present invention. The scope of the present invention is limited only by the appended claims and those skilled in the art can improve and modify the technical idea of the present invention in various forms. Therefore, such an improvement and modification will be included in the scope of the present invention as long as the improvement and the modification are apparent to those skilled in the art.

Claims

1. A battery charging system comprising:

   a first connector connected to both ends of a battery of a charging providing car;
   a second connector connected to both ends of a battery of a charging target car;
   a converter connected between the first connector and the second connector and configured to convert a voltage transmitted from the battery of the charging providing car through the first connector and transmit the converted voltage to the battery of the charging target car through the second connector; and
   a controller configured to control an electrical connection of the first connector and the second connector and connected to each of a battery management system (BMS) of the charging providing car and a BMS of the charging target car to control a voltage conversion ratio of the converter based on a state information on each of the batteries transmitted from each of the BMSs.

2. The battery charging system according to claim 1, wherein the first connector comprises:

   a first positive electrode relay configured to connect a positive electrode of the battery of the charging providing car and a positive electrode of an input terminal of the converter;
   a first negative electrode relay configured to connect a negative electrode of the battery of the charging providing car and a negative electrode of the input terminal of the converter;
   a first capacitive element connected to the input terminal of the converter in parallel; and
   a first precharge unit connected to the first positive electrode relay in parallel,
   wherein the first precharge unit comprises a first precharge relay and a first precharge resistor connected to the first precharge relay in series.

3. The battery charging system according to claim 2, wherein the controller performs an input side precharge of charging a predetermined voltage in the first capacitive element by opening the first positive electrode relay to disconnect a connection and closing the first negative electrode relay and the first precharge relay when the first connector is connected to the battery of the charging providing car, and performs power transmission to the converter from the battery of the charging providing car by closing the first positive electrode relay and opening the first precharge relay when the input side precharge is completed.

4. The battery charging system according to claim 1, wherein the second connector comprises:

   a second positive electrode relay configured to connect a positive electrode of the battery of the charging target car and a positive electrode of an output terminal of the converter;
   a second negative electrode relay configured to connect a negative electrode of the battery of the charging target car and a negative electrode of the output terminal of the converter;
   a second capacitive element connected to the output terminal of the converter in parallel; and
   a second precharge unit connected to one of the second positive electrode relay and the second negative electrode relay in parallel,
   wherein the second precharge unit comprises a second precharge relay and a second precharge resistor connected to the second precharge relay in series.

5. The battery charging system according to claim 4, wherein the controller performs an output side precharge of charging a predetermined voltage in the second capacitive element by opening the second positive eletrode relay to disconnect a connection and closing the second negative electrode relay and the second precharge relay when the second connector is connected to the battery of the charging target car, and performs power transmission to the battery of the charging target car from the converter by closing the second positive electrode relay and opening the second precharge relay when the output side precharge is completed.

6. The battery charging system according to claim 1, wherein the state information on the battery of the charging providing car transmitted from the BMS of the charging providing car contains at least one of energy transmittable from the BMS of the charging providing car, a maximum instantaneous output power allowance, an output voltage of the battery of the charging providing car, and a power quantity transmitted from the battery of the charging providing

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car.

7. The battery charging system according to claim 1, wherein the state information on the battery of the charging target car transmitted from the BMS of the charging target car contains at least one of energy receivable from the BMS of the charging target car, a maximum instantaneous input power allowance, an input voltage of the battery of the charging target car, and a power quantity transmitted to the battery of the charging target car.

8. The battery charging system according to claim 1, further comprising:

a power meter connected to the converter and configured to measure a transmitted power quantity provided to the battery of the charging target car from the battery of the charging providing car.

9. The battery charging system according to claim 8, wherein the controller receives the transmitted power quantity from the power meter and calculates a rate based on the transmitted power quantity.

10. The battery charging system according to claim 9, further comprising:

a display unit connected to the controller, wherein the display unit displays the transmitted power quantity and/or information on the rate.

11. The battery charging system according to claim 1, wherein the converter is a DC/DC converter configured to receive DC power and output the DC power.

12. A battery charging method comprising:

receiving battery state information on a battery of a charging providing car and a battery of a charging target car from a BMS of the charging providing car and a BMS of the charging target car, respectively;
performing an input side precharge by connecting a first precharge relay provided between the battery of the charging providing car and an input terminal of the converter with a first precharge resistor;
performing an output side precharge by connecting a second precharge relay provided between the battery of the charging target car and an output terminal of the converter with a second precharge resistor;
after the input side precharge ends, transmitting power to the input terminal of the converter from the battery of the charging providing car by disconnecting a connection of the first precharge relay and closing a first positive electrode relay configured to connect the battery of the charging providing car and the input terminal of the converter;
after the output side precharge ends, transmitting power to the battery of the charging target car from the output terminal of the converter by disconnecting a connection of the second precharge relay and closing a second positive electrode relay configured to connect the battery of the charging target car and the output terminal of the converter; and
controlling a voltage conversion ratio of the converter based on the battery state information and charging the battery of the charging target car, by a controller.

13. The battery charging method according to claim 12, wherein the battery state information received from the BMS of the charging providing car by the controller contains information on at least one of energy transmittable from the BMS of the chargig providing car, a maximum instantaneous output power allowance, an output voltage of the battery of the charging providing car, and a power quantity transmitted from the battery of the charging providing car.

14. The battery charging method according to claim 12, wherein the battery state information received from the BMS of the charging target car by the controller contains information on at least one of receivable energy, a maximum instantaneous input power allowance, an output voltage of the battery of the charging target car, and a power quantity transmitted to the battery of the charging target car.

15. The battery charging method according to claim 12, further comprising:

measuring a transmitted power quantity provided to the battery of the charging target car through the converter.

16. The battery charging method according to claim 15, further comprising:

calculating a power rate based on the transmitted power quantity.

17. The battery charging method according to claim 16, further comprising:

displaying information on the transmitted power quantity and/or the power rate.

18. The battery charging method according to claim 17, further comprising:

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receiving the transmitted power quantity and/or the power rate before charging is initiated in order to select the transmitted power quantity and/or the power rate in advance.

19. The battery charging method according to claim 12, further comprising:

disconnecting a connection of the first precharge relay, the second precharge relay, a first main relay and a second main relay when a charging for the battery of the charging target car is completed.

20. The battery charging method according to claim 12, further comprising:

making a request for stopping power transmission/reception to the BMS of the charging providing car and the BMS of the charging target car when a charging for the battery of the charging target car is completed.

21. The battery charging method according to claim 12, further comprising:

making a request for electrically separating the battery of the charging target car from the inverter and a request for electrically separating the battery of the charging providing car from the inverter.

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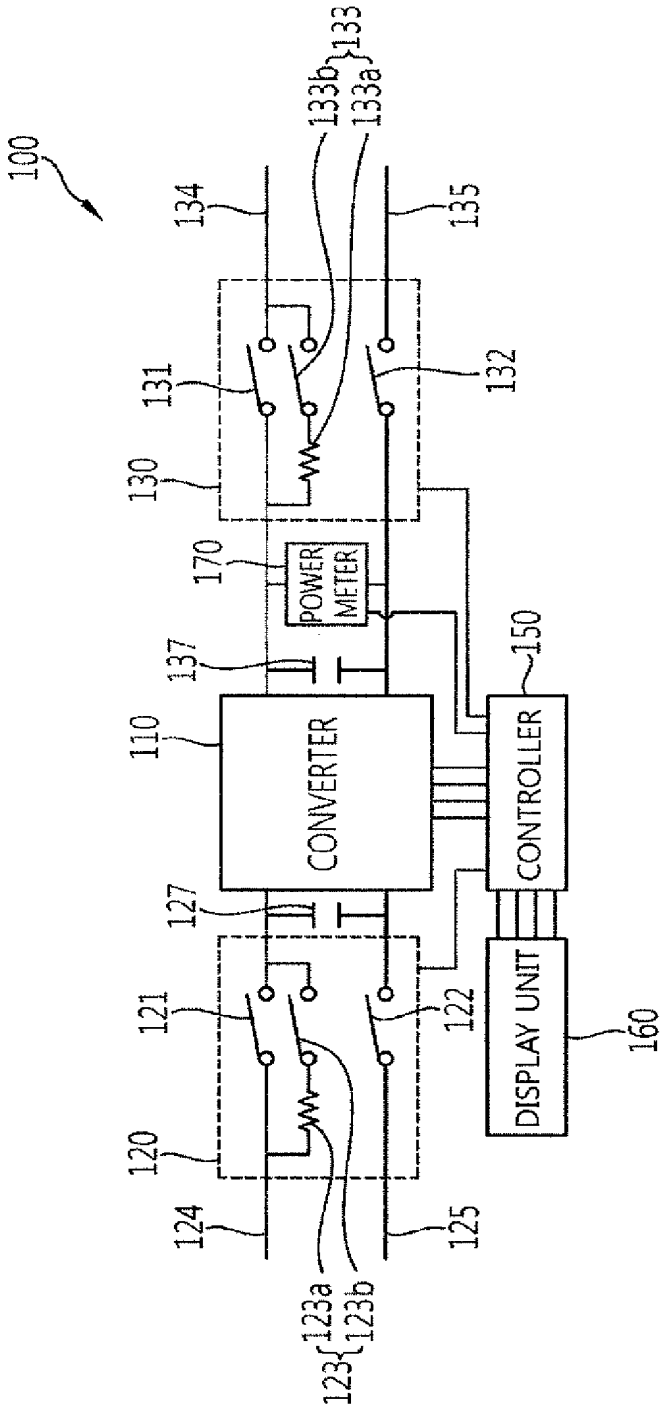


FIG.1

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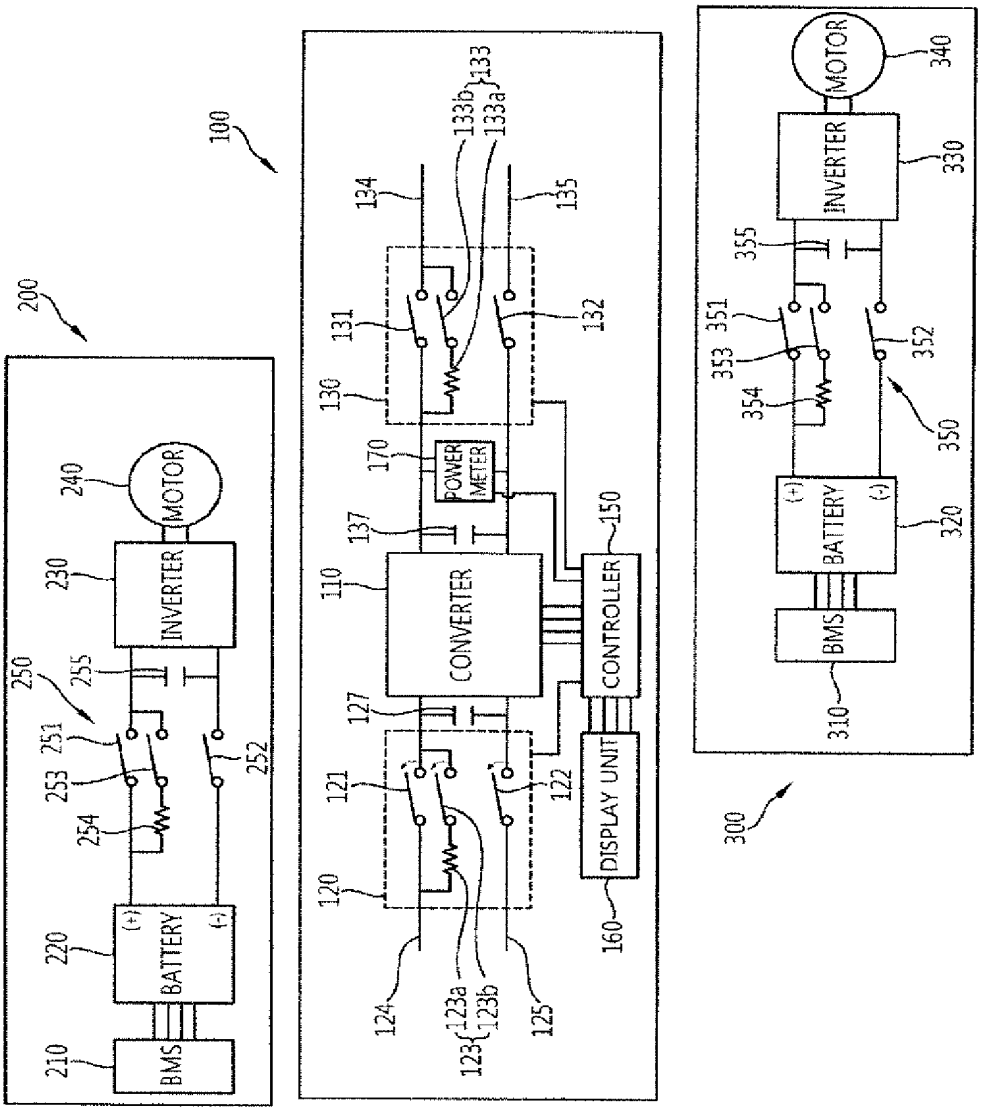


FIG.2

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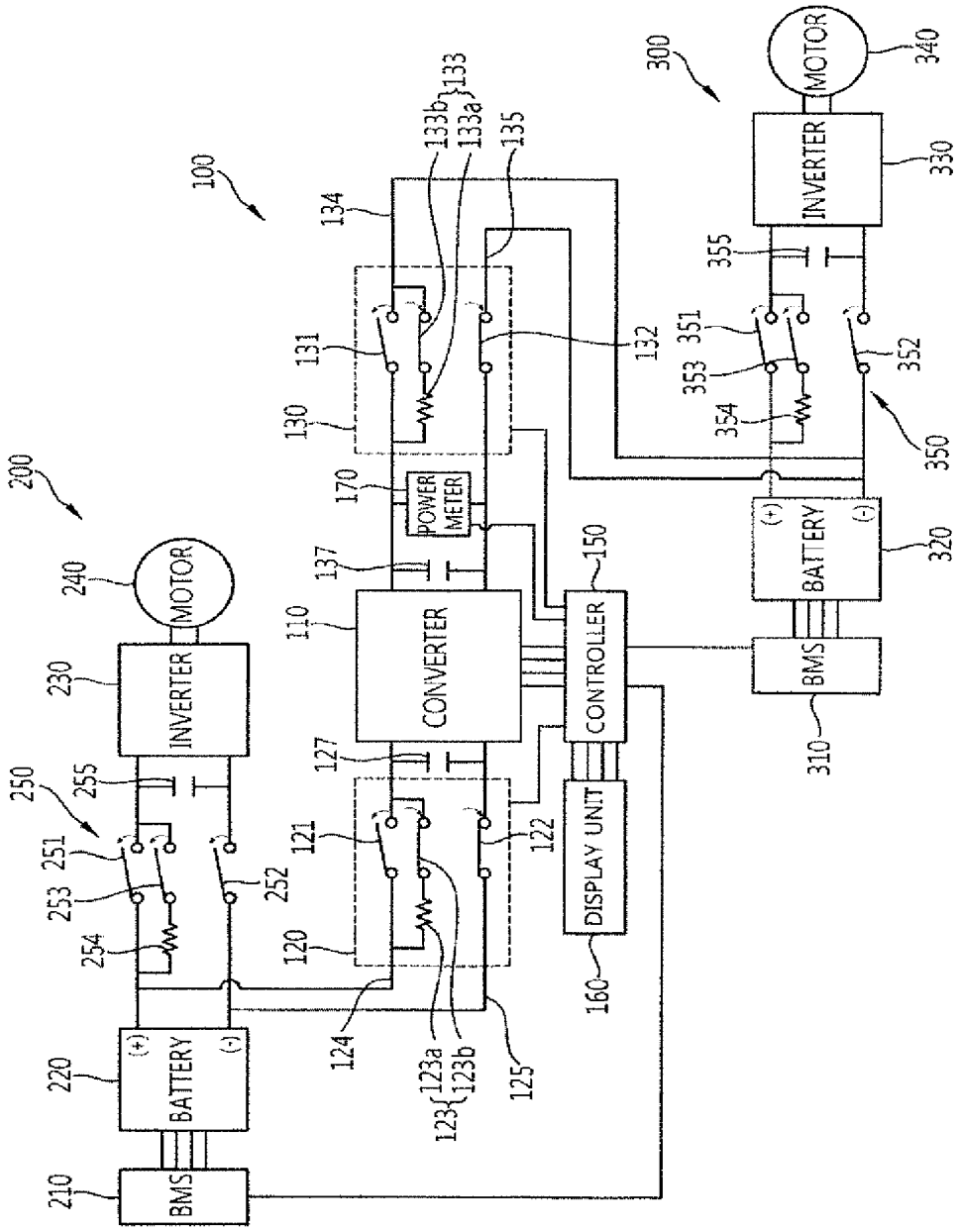


FIG.3

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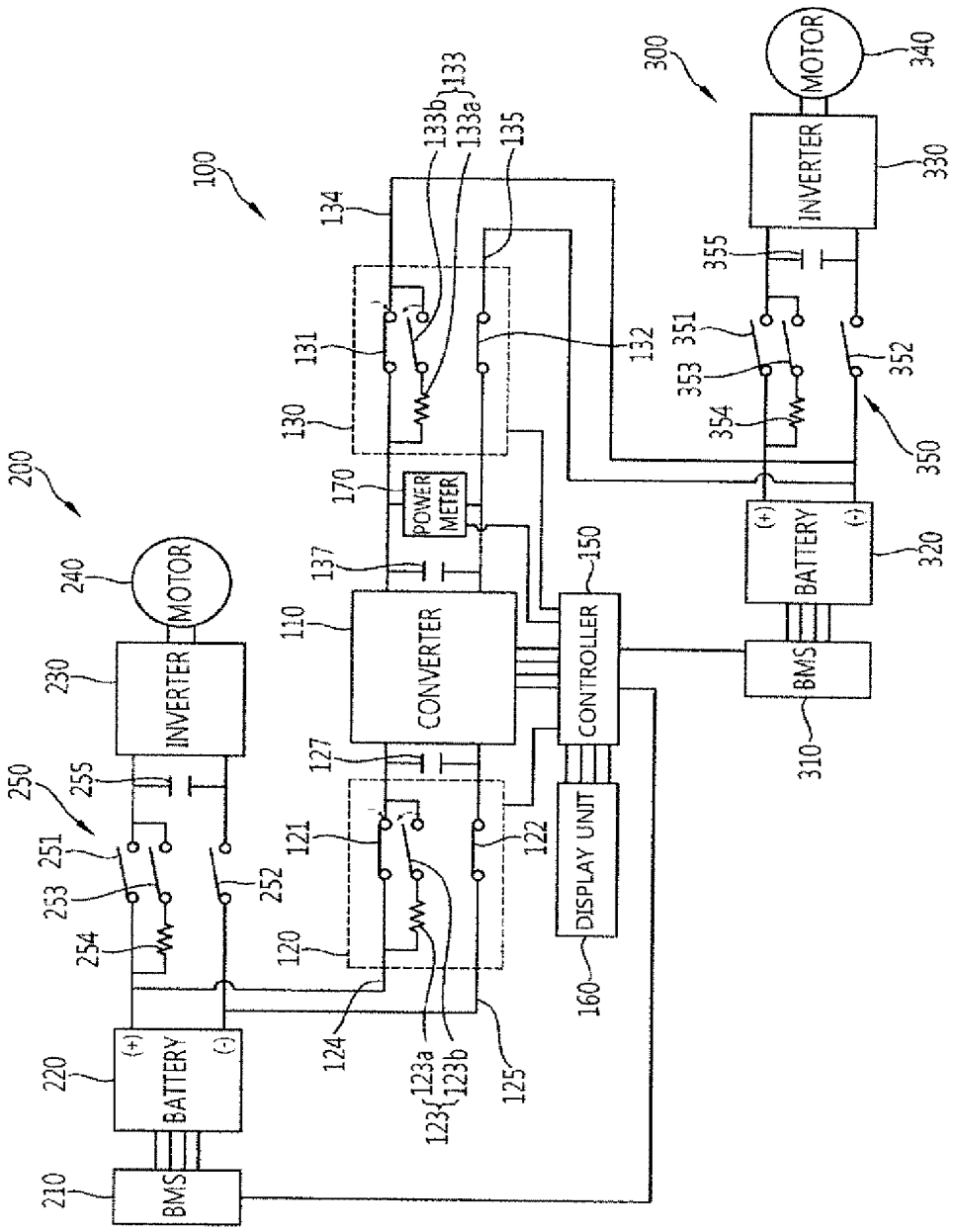


FIG.4

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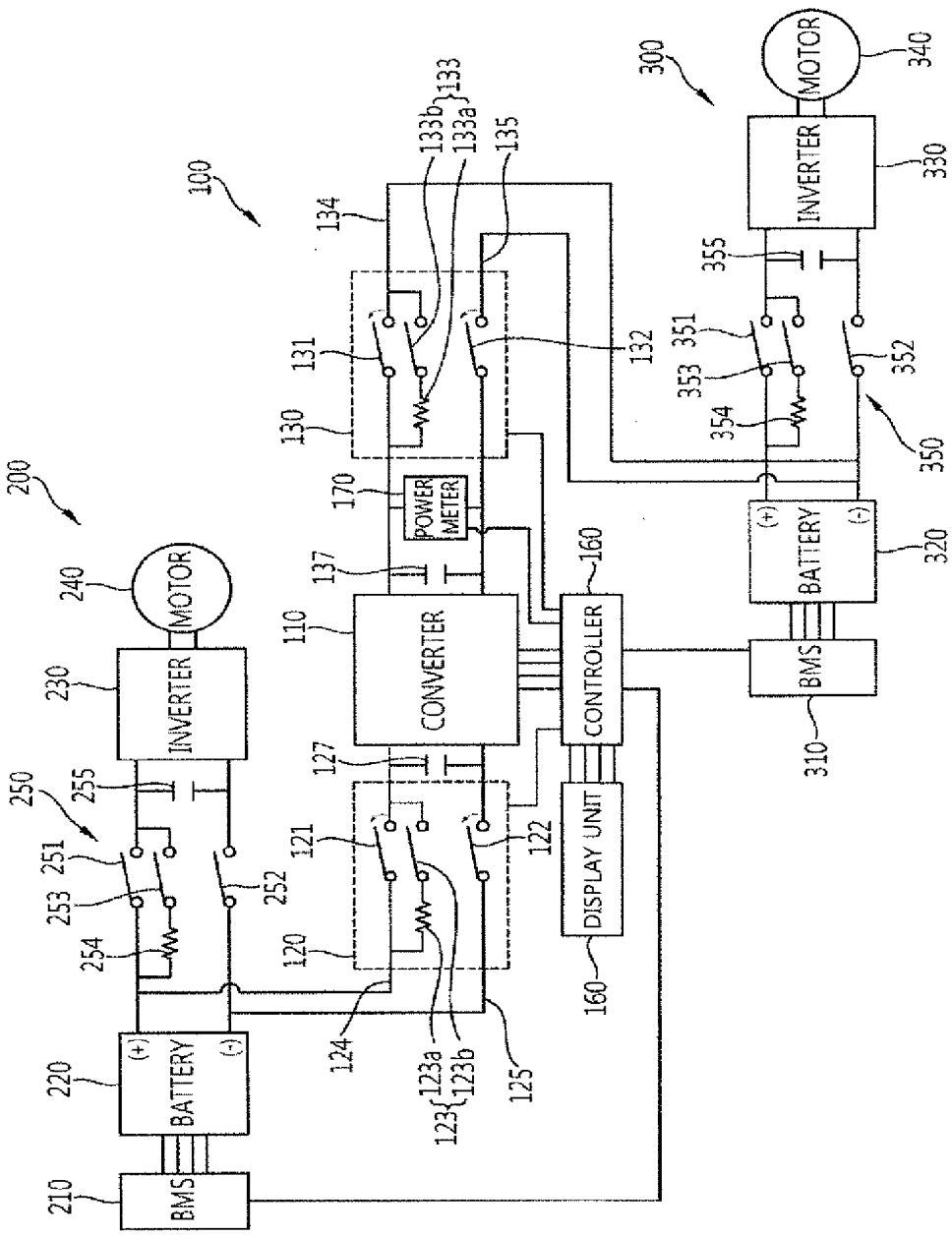


FIG.5

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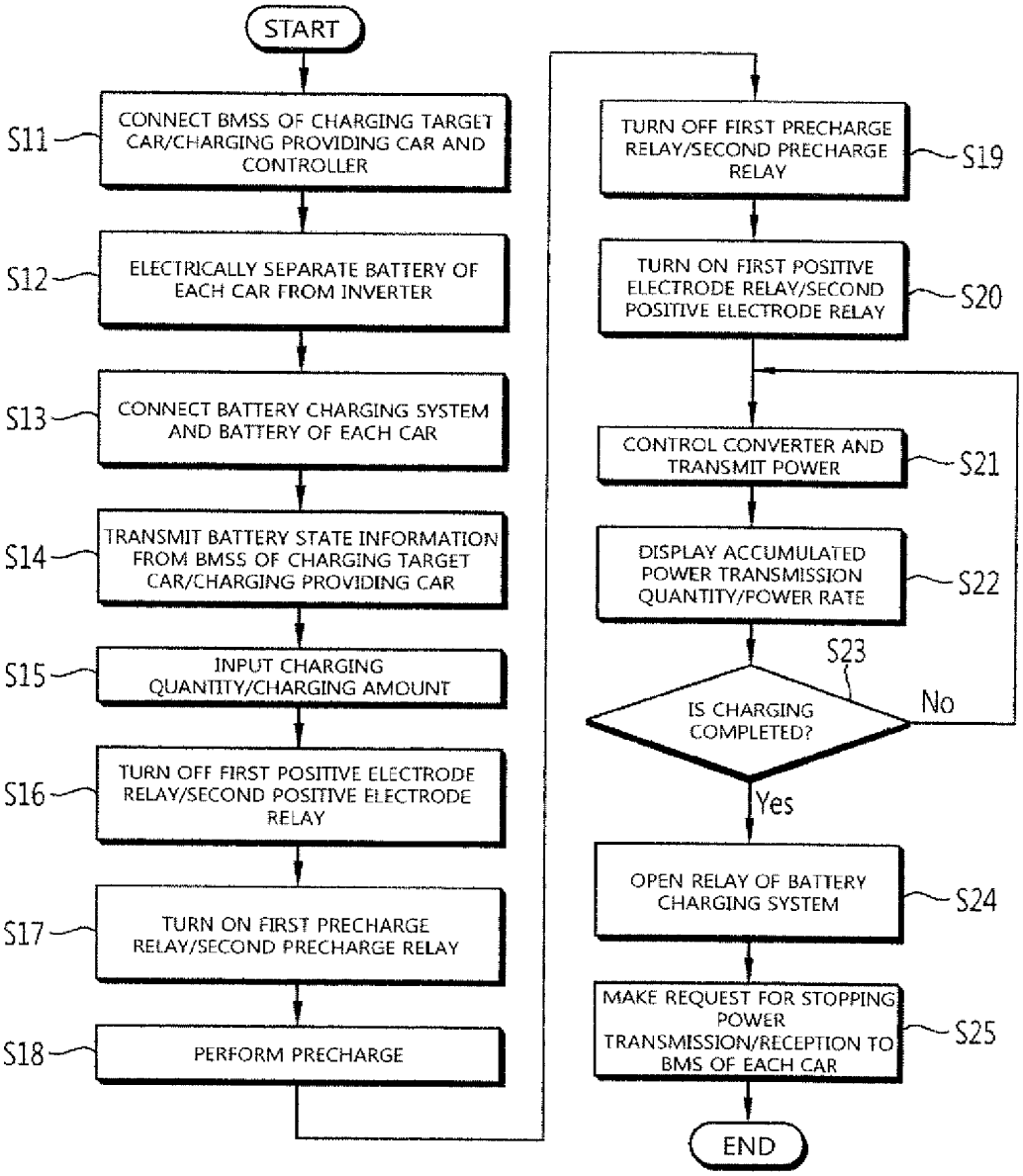


FIG.6

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REFERENCES CITED IN THE DESCRIPTION

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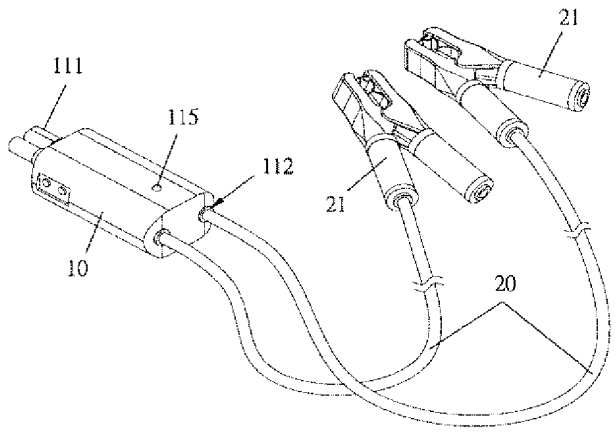
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(54) Bezeichnung: **Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien**

(57) Hauptanspruch: Ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien, umfassend:
ein Adapterelement, wobei eine Leiterplatte im Adapterelement angeordnet ist, wobei ein Schutzmodul, ein Eingangsanschluss, ein Ausgangsanschluss, eine Batterie-Detektionseinheit, mindestens ein Anzeigeelement und mindestens ein Warnelement auf der Leiterplatte angeordnet sind, wobei ein Ende des Schutzmoduls elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende des Schutzmoduls elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei ein Ende der Batterie-Detektionseinheit elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende der Batterie- Detektionseinheit elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei jedes Anzeigeelement elektrisch mit der Batterie-Detektionseinheit verbunden sein kann, wobei jedes Warnelement elektrisch mit dem Schutzmodul verbunden sein kann;
ein Stromübertragungselement, wobei das Stromübertragungselement mindestens einen Stromübertragungsanschluss aufweist, wobei das Stromübertragungselement elektrisch mit dem Ausgangsanschluss des Adapterelements verbunden sein kann.



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Beschreibung

Technisches Gebiet der Erfindung

[0001] Die vorliegende Erfindung betrifft ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien und insbesondere eines, bei dem die Leiterplatte des Adapterelements mit einem Schutzmodul und einer Batterie-Detektionseinheit ausgestattet ist, sodass, wenn der Verbraucher die vorliegende Erfindung zur Starthilfe benutzt, sowohl eine Schutzfunktion als auch eine Stromerkennungsfunktion für Auto- oder Motorradbatterien durch die vorliegende Erfindung erzielt werden können, um in der vorliegenden Erfindung eine multifunktionale Erkennungsanwendung bereitzustellen.

Stand der Technik

[0002] Normalerweise muss bei einem leeren Akkustand zur Stromführung ein Starthilfekabel benutzt werden. Allerdings hat der Erfinder beim Einsatzablauf des Starthilfekabels registriert, dass der Akkustrom bei der Stromführung aufgrund der schlechten Struktur des bestehenden Leiterdrahts des Starthilfekabels nicht in der Lage ist, das Auto effektiv zu starten.

[0003] Darüber hinaus ist das Starthilfekabel normalerweise bei der Starthilfe mit einem Stromversorgungsgerät verbunden. Da herkömmliche Starthilfekabel insgesamt über keine Schutzvorrichtungen vefügen, sind diese Starthilfekabel nur zur Bereitstellung der Stromübertragung verwendbar. Wenn jedoch im Stromversorgungszustand ein Rückstrom auftritt, führt dies leicht dazu, dass das Stromversorgungsgerät aufgrund des Rückstroms beschädigt wird.

Aufgabe der Erfindung

[0004] Im Hinblick auf die Nachteile der Verwendung bestehender Starthilfekabel stellt die vorliegende Erfindung ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien bereit, bei dem die Leiterplatte des Adapterelements mit einem Schutzmodul und einer Batterie-Detektionseinheit ausgestattet ist, sodass, wenn der Verbraucher die vorliegende Erfindung zur Starthilfe verwendet, sowohl eine Schutzfunktion als auch eine Stromerkennungsfunktion für Auto- oder Motorradbatterien durch die vorliegende Erfindung erzielt werden können, um in der vorliegenden Erfindung eine multifunktionale Erkennungsanwendung bereitzustellen.

[0005] Zur Erreichung des obigen Ziels wird ein erfindungsgemäßes Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien bereitgestellt, umfassend:

ein Adapterelement, wobei eine Leiterplatte im Adapterelement angeordnet ist, wobei ein Schutzmodul, ein Eingangsanschluss, ein Ausgangsanschluss, eine Batterie-Detektionseinheit, mindestens ein Anzeigeelement und mindestens ein Warnelement auf der Leiterplatte angeordnet sind, wobei ein Ende des Schutzmoduls elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende des Schutzmoduls elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei ein Ende der Batterie-Detektionseinheit elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende der Batterie-Detektionseinheit elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei jedes Anzeigeelement elektrisch mit der Batterie-Detektionseinheit verbunden sein kann, wobei jedes Warnelement elektrisch mit dem Schutzmodul verbunden sein kann;
ein Stromübertragungselement, wobei das Stromübertragungselement mindestens einen Stromübertragungsanschluss aufweist, wobei das Stromübertragungselement elektrisch mit dem Ausgangsanschluss des Adapterelements verbunden sein kann.

[0006] Beim erfindungsgemäßen Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien ist die Leiterplatte des Adapterelements mit einem Schutzmodul und einer Batterie-Detektionseinheit ausgestattet, sodass, wenn der Benutzer die vorliegende Erfindung zur Starthilfe verwendet, sowohl eine Schutzfunktion als auch eine Stromerkennungsfunktion für Auto- oder Motorradbatterien durch die vorliegende Erfindung erzielt werden können, um in der vorliegenden Erfindung eine multifunktionale Erkennungsanwendung bereitzustellen.

Kurzbeschreibung der Zeichnung

[0007] **Fig.** 1 zeigt schematisch eine perspektivische Darstellung gemäß der vorliegenden Erfindung;

[0008] **Fig.** 2 zeigt ein schematisches Blockdiagramm des erfindungsgemäßen Adapterelements;

[0009] **Fig.** 3 zeigt schematisch eine perspektivische Darstellung des Detektionsvorgangs, bei welchem die vorliegende Erfindung einen Auto- oder Motorradakku detektiert;

[0010] **Fig.** 4 zeigt schematisch eine perspektivische Darstellung des Starthilfevorgangs, bei welchem die vorliegende Erfindung mit einem Mobilnetzteil verbunden ist.

[0011] **Fig.** 5 zeigt eine schematische Darstellung des Detektionsvorgangs für das Motorrad gemäß der vorliegenden Erfindung.

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Detaillierte Beschreibung der bevorzugten Ausführungsbeispiele

[0012] Bezugnehmend auf **Fig.** 1 und **Fig.** 2 stellt die vorliegende Erfindung ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien bereit, umfassend:
ein Adapterelement **10**, wobei im Adapterelement **10** eine Leiterplatte **11** angeordnet ist, wobei auf der Leiterplatte **11** ein Schutzmodul **113**, ein Eingangsanschluss **111**, ein Ausgangsanschluss **112**, eine Batterie-Detektionseinheit **114**, mindestens ein Anzeigeelement **115** und mindestens ein Warnelement **116** angeordnet sind, wobei ein Ende des Schutzmoduls **113** elektrisch mit dem Eingangsanschluss **111** verbunden sein kann, wobei das andere Ende des Schutzmoduls **113** elektrisch mit dem Ausgangsanschluss **112** verbunden sein kann, wobei ein Ende der Batterie-Detektionseinheit **114** elektrisch mit dem Eingangsanschluss **111** verbunden sein kann, wobei das andere Ende der Batterie-Detektionseinheit **114** elektrisch mit dem Ausgangsanschluss **112** verbunden sein kann, wobei jedes Anzeigeelement **115** elektrisch mit der Batterie-Detektionseinheit **114** verbunden sein kann, wobei jedes Warnelement **116** elektrisch mit dem Schutzmodul **113** verbunden sein kann,
ein Stromübertragungselement **20**, wobei das Stromübertragungselement **20** mindestens einen Stromübertragungsanschluss **21** aufweist, wobei das Stromübertragungselement **20** elektrisch mit dem Ausgangsanschluss **112** des Adapterelements **10** verbunden sein kann.

[0013] Jeder Stromübertragungsanschluss **21** kann hierbei eine Übertragungsklemme oder ein Übertragungsanschluss sein.

[0014] Die Batterie-Detektionseinheit **114** kann hierbei ein MCU, ein Komparator oder ein Verstärker sein.

[0015] Das Anzeigeelement **115** kann hierbei eine Flüssigkristallanzeigevorrichtung, ein Lichtemissionselement oder eine Sprachansageeinrichtung sein.

[0016] Das Lichtemissionselement kann hierbei ein mehrfarbiger LED-Chip oder ein monochromer LED-Chip sein.

[0017] Bezugnehmend auf **Fig.** 2 und **Fig.** 3 ist in der vorliegenden Erfindung eine Batterie-Detektionseinheit **114** angeordnet. Wenn der Benutzer für die Batterie oder den Akku **30** des Autos oder Motorrads eine Starthilfe durchführen möchte, kann der Ausgangsanschluss **112** zuvor mit dem Stromübertragungselement **20** verbunden werden, wobei jeder der Stromübertragungsanschlüsse **21** des Stromübertragungselements **20** mit der Batterie oder dem Akku **30** verbunden wird, wodurch der Stromzustand durch die Batterie-Detektionseinheit **114** erkannt wird, wobei ferner die Batterie-Detektionseinheit **114** elektrisch mit jedem der Anzeigeelemente **115** verbunden sein kann. Wenn das Anzeigeelement **115** ein Lichtemissionselement und eine mehrfarbige LED-Chip ist und der Batteriezustand beim Detektionsprozess der Batterie oder des Akkus **30** des Autos oder Motorrads normal ist, zeigt die mehrfarbige LED-Chip ein grünes Licht an. Wenn der Batteriezustand anormal oder veraltet ist, zeigt die mehrfarbige LED-Chip ein gelbes Licht an. Wenn der Batteriezustand defekt und nicht verfügbar ist, zeigt die mehrfarbige LED-Chip ein rotes oder blinkendes Licht an. Durch diese Zustandsanzeigen weiß der Benutzer bei der Starthilfe über den Status der Batterie oder des Akkus **30** des Autos oder Motorrads schon vorher Bescheid, um die Effektivität der Starthilfe zu erhöhen. Wenn der Benutzer den Status der Batterie oder des Akkus **30** des Autos oder Motorrads erfasst hat, kann er anschließend bestimmen, ob er die Batterie oder den Akku **30** austauschen muss, um eine Situation eines nicht startenden Autos oder Motorrads zu vermeiden und um die Verkehrssicherheit zu gewährleisten.

[0018] Bezugnehmend auf Fig. kann mit der vorliegenden Erfindung mittels des Mobilnetzteils **40** eine Starthilfe durchgeführt werden. In der vorliegenden Erfindung ist ein Eingangsanschluss **111** angeordnet, wobei der Eingangsanschluss **111** und ein Mobilnetzteil **40** zum Erzielen eines Stromversorgungszustands durch gegenseitiges Einstecken miteinander verbunden werden können. Außer dem gegenseitigen Einstecken mit einem Mobilnetzteil **40** zum Erreichen eines Stromversorgungszustands kann durch die erfindungsgemäße Batterie-Detektionseinheit **114** eine synchrone Erfassung für den Status der Batterie oder des Akkus **30** des Autos oder Motorrads beim Starthilfeprozess erzielt werden, sodass man über die Strommenge der Batterie oder des Akkus **30** des Autos oder Motorrads bei der Starthilfe zu jeder Zeit informiert ist, um die Funktion eines Smartstarthilfekabels zu erreichen.

[0019] Bezugnehmend auf **Fig.** 5 kann beim Stromübertragungselement **20** jeder Stromübertragungsanschluss **21** ein Übertragungsanschluss sein. Wenn der Benutzer den Status des Akkus **30** des Motorrads detektieren oder einen Starthilfevorgang durchführen möchte, kann der Stromübertragungsanschluss **21** als Übertragungsanschluss fungieren und einen effektiven Anschluss bereitstellen, um für den Benutzer eine einfache Detektion sicherzustellen.

Schutzansprüche

1. Ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien, umfassend:

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ein Adapterelement, wobei eine Leiterplatte im Adapterelement angeordnet ist, wobei ein Schutzmodul, ein Eingangsanschluss, ein Ausgangsanschluss, eine Batterie-Detektionseinheit, mindestens ein Anzeigeelement und mindestens ein Warnelement auf der Leiterplatte angeordnet sind, wobei ein Ende des Schutzmoduls elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende des Schutzmoduls elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei ein Ende der Batterie-Detektionseinheit elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende der Batterie- Detektionseinheit elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei jedes Anzeigeelement elektrisch mit der Batterie-Detektionseinheit verbunden sein kann, wobei jedes Warnelement elektrisch mit dem Schutzmodul verbunden sein kann;
ein Stromübertragungselement, wobei das Stromübertragungselement mindestens einen Stromübertragungsanschluss aufweist, wobei das Stromübertragungselement elektrisch mit dem Ausgangsanschluss des Adapterelements verbunden sein kann.

2. Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien nach Anspruch 1, bei dem die Batterie-Detektionseinheit ein MCU, ein Komparator oder ein Verstärker ist.

3. Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien nach Anspruch 1, bei dem das Anzeigeelement eine Flüssigkristallanzeigevorrichtung, ein Lichtemissionselement oder eine Sprachansageeinrichtung ist.

4. Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien nach Anspruch 3, bei dem das Lichtemissionselement ein mehrfarbiger LED-Chip oder ein monochromer LED-Chip ist.

5. Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien nach Anspruch 1, bei dem jeder Stromübertragungsanschluss eine Übertragungsklemme oder ein Übertragungsanschluss ist.

Es folgen 5 Seiten Zeichnungen

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Anhängende Zeichnungen

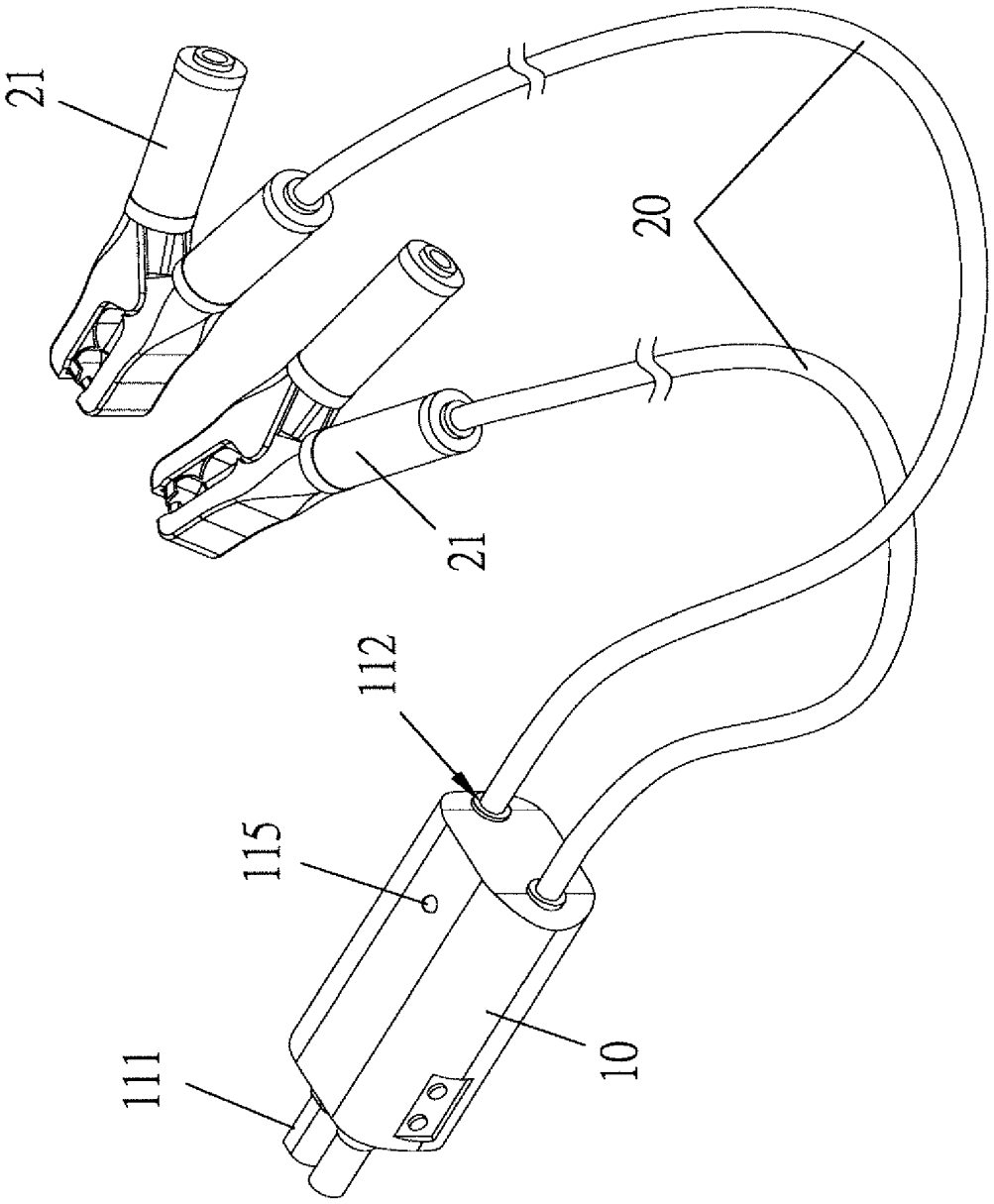


FIG. 1

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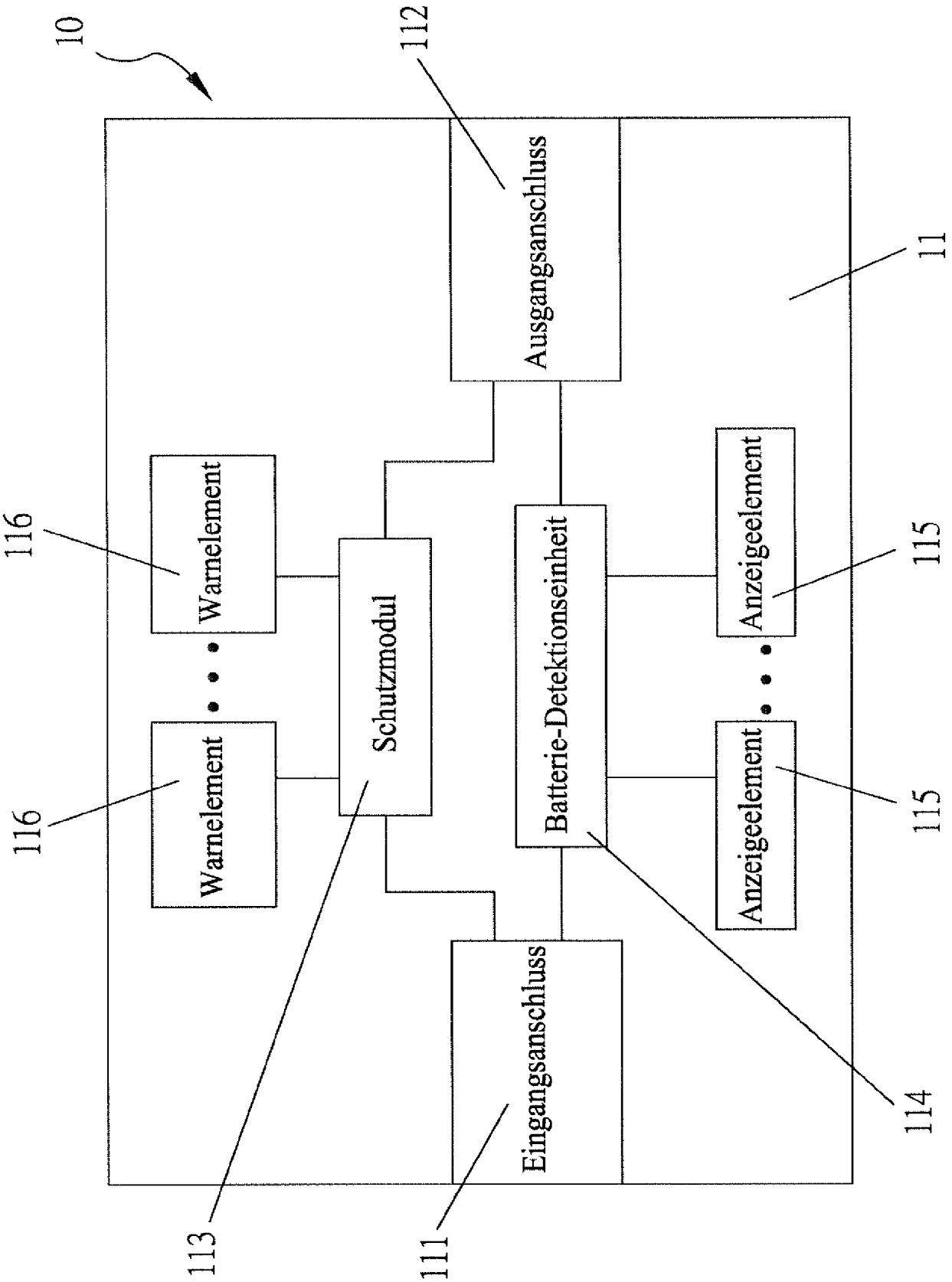


FIG. 2

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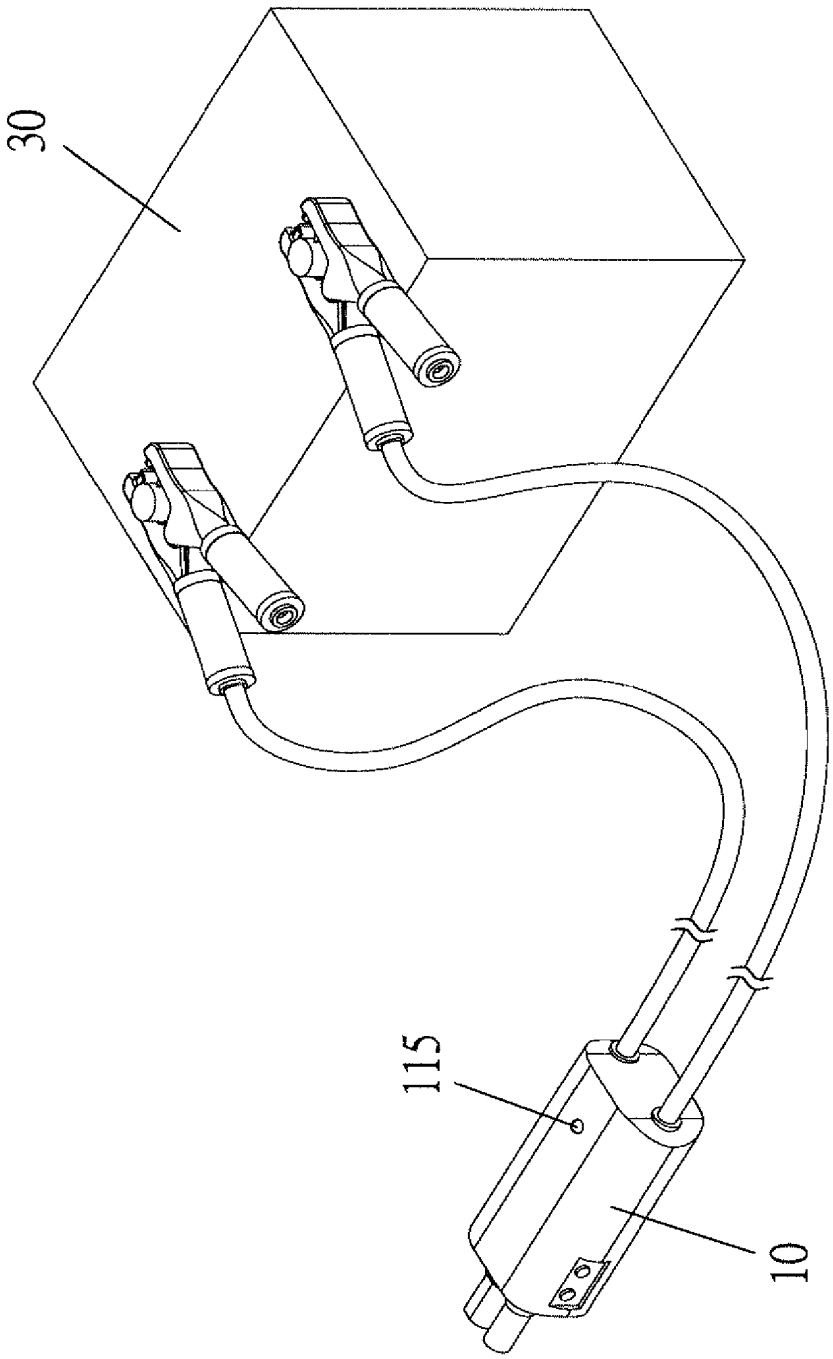


FIG. 3

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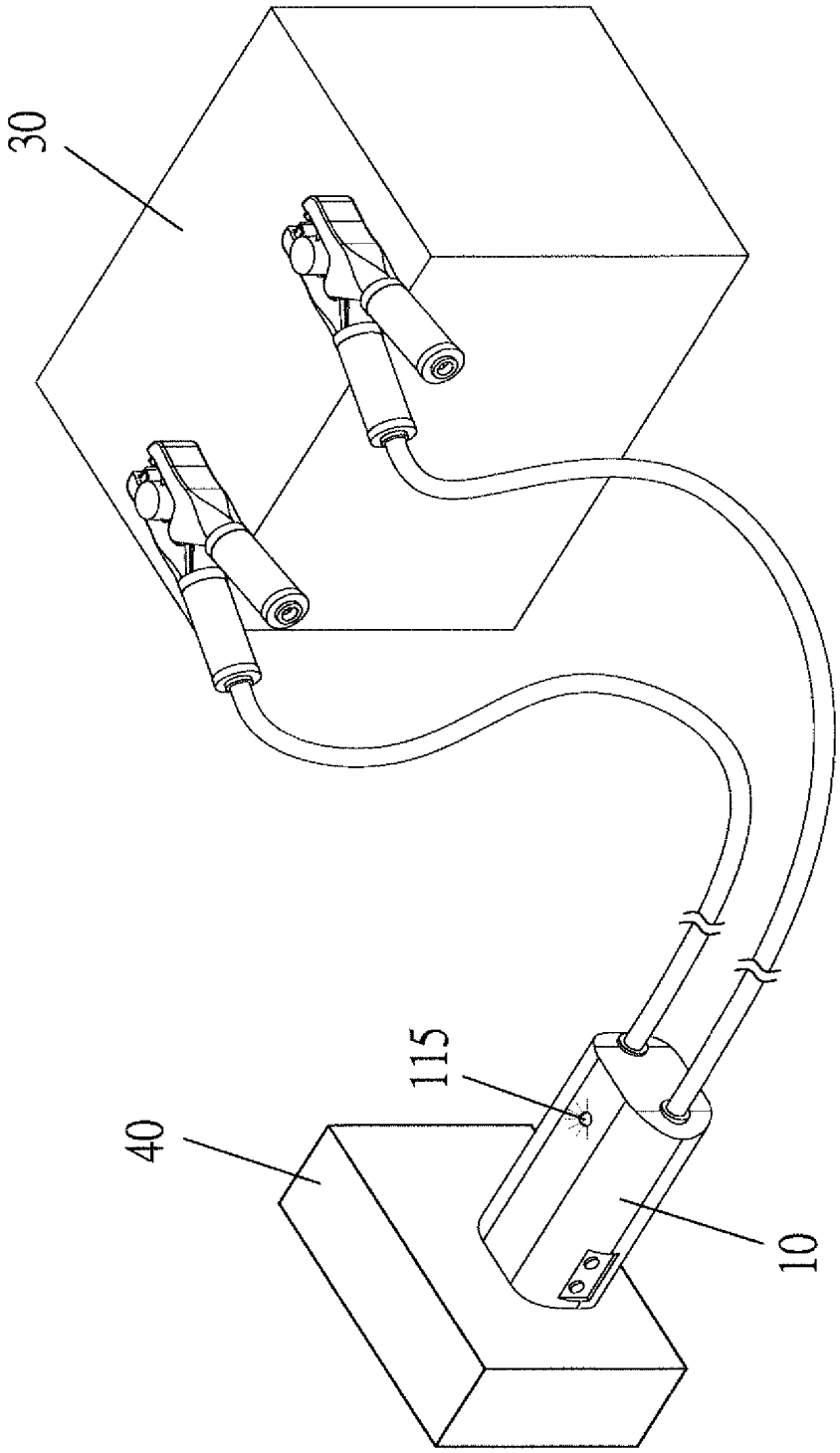


FIG. 4

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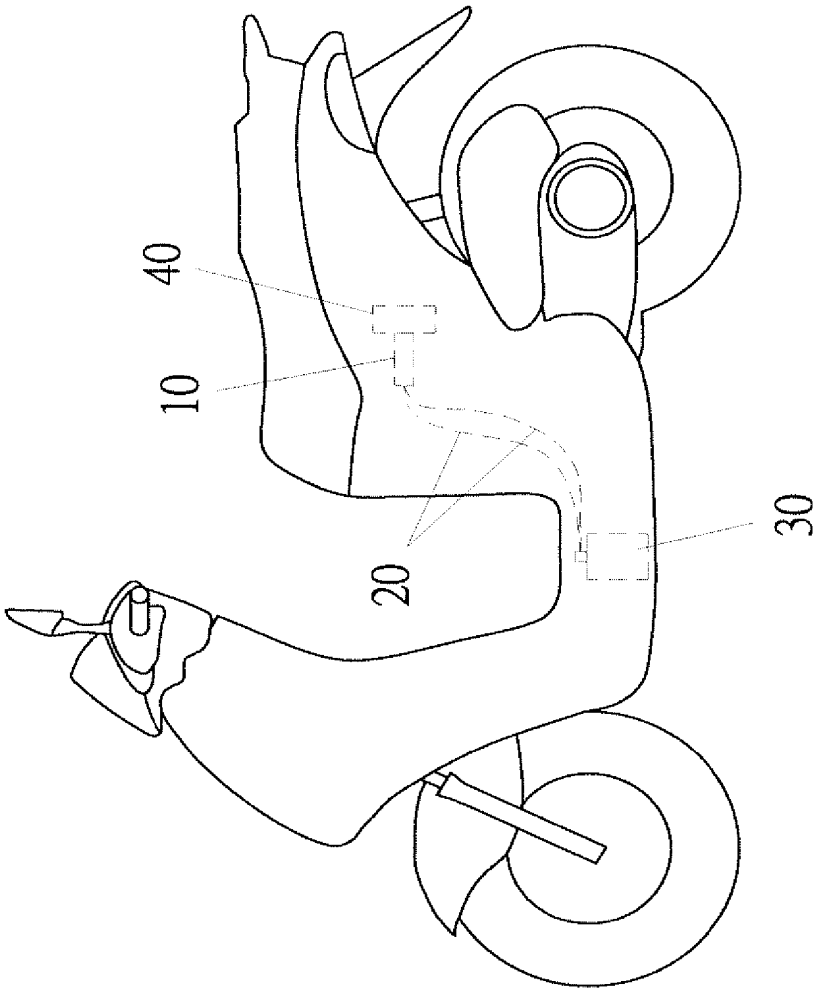


FIG. 5

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Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien

Inventor(s):

Applicant(s): ZONESKING TECHNOLOGY CO [TW] ± (ZONESKING TECHNOLOGY CO., LTD)

Classification: **- international:** ***B60R16/033***
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Priority number(s): DE201520103173U 20150617

Abstract of DE202015103173 (U1)

Ein Smartstarthilfekabel mit Stromerkennungsfunktion für Auto- oder Motorradbatterien, umfassend: ein Adapterelement, wobei eine Leiterplatte im Adapterelement angeordnet ist, wobei ein Schutzmodul, ein Eingangsanschluss, ein Ausgangsanschluss, eine Batterie-Detektionseinheit, mindestens ein Anzeigeelement und mindestens ein Warnelement auf der Leiterplatte angeordnet sind, wobei ein Ende des Schutzmoduls elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende des Schutzmoduls elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei ein Ende der Batterie-Detektionseinheit elektrisch mit dem Eingangsanschluss verbunden sein kann, wobei das andere Ende der Batterie- Detektionseinheit elektrisch mit dem Ausgangsanschluss verbunden sein kann, wobei jedes Anzeigeelement elektrisch mit der Batterie-Detektionseinheit verbunden sein kann, wobei jedes Warnelement elektrisch mit dem Schutzmodul verbunden sein kann; ein Stromübertragungselement, wobei das Stromübertragungselement mindestens einen Stromübertragungsanschluss aufweist, wobei das Stromübertragungselement elektrisch mit dem Ausgangsanschluss des Adapterelements verbunden sein kann.

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(54) **Title**: PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

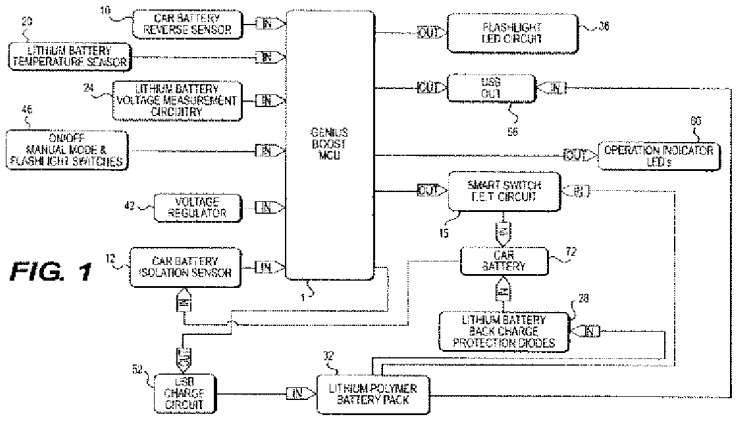


FIG. 1

(57) **Abstract**: A handheld device for jump starting a vehicle engine includes a rechargeable lithium ion battery pack and a microcontroller. The lithium ion battery is coupled to a power output port of the device through a FET smart switch actuated by the microcontroller. A vehicle battery isolation sensor connected in circuit with positive and negative polarity outputs detects the presence of a vehicle battery connected between the positive and negative polarity outputs. A reverse polarity sensor connected in circuit with the positive and negative polarity outputs detects the polarity of a vehicle battery connected between the positive and negative polarity outputs, such that the microcontroller will enable power to be delivered from the lithium ion power pack to the output port only when a good battery is connected to the output port and only when the battery is connected with proper polarity of positive and negative terminals.

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PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

BACKGROUND OF THE INVENTION

The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery. Prior art devices are known, which provide either a pair of electrical connector cables that connect a fully-charged battery of another vehicle to the engine start circuit of the dead battery vehicle, or portable booster devices which include a fully-charged battery which can be connected in circuit with the vehicle's engine starter through a pair of cables.

Problems with the prior art arose when either the jumper terminals or clamps of the cables were inadvertently brought into contact with each other while the other ends were connected to a charged battery, or when the positive and negative terminals were connected to the opposite polarity terminals in the vehicle to be jumped, thereby causing a short circuit resulting in sparking and potential damage to batteries and/or bodily injury.

Various attempts to eliminate these problems have been made in the prior art. **U.S. Patent No. 6,212,054** issued April 3, 2001, discloses a battery booster pack that is polarity sensitive and can detect proper and improper connections before providing a path for electric current flow. The device uses a set of LEDs connected to optical couplers oriented by a control circuit. The control circuit controls a solenoid assembly controlling the path of power current. The control circuit causes power current to flow through the solenoid assembly only if the points of contact of booster cable clamp connections have been properly made.

U.S. Patent No. 6,632,103 issued October 14, 2003, discloses an adaptive booster cable connected with two pairs of clips, wherein the two pairs of clips are respectively attached to two batteries to transmit power from one battery to the other battery. The adaptive booster cable includes a polarity detecting unit connected to each clip, a switching unit and a current detecting unit both provided between the two pairs of clips. After the polarity of each clip is sensed by the polarity detecting unit, the switching unit generates a proper connection between the two

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batteries. Therefore, the positive and negative terminals of the two batteries are correctly connected based on the detected result of the polarity detecting unit.

U.S. Patent No. 8,493,021 issued July 23, 2013, discloses apparatus that monitors the voltage of the battery of a vehicle to be jump started and the current delivered by the jump starter batteries to determine if a proper connection has been established and to provide fault monitoring. Only if the proper polarity is detected can the system operate. The voltage is monitored to determine open circuit, disconnected conductive clamps, shunt cable fault, and solenoid fault conditions. The current through the shunt cable is monitored to determine if there is a battery explosion risk, and for excessive current conditions presenting an overheating condition, which may result in fire. The system includes an internal battery to provide the power to the battery of the vehicle to be jump started. Once the vehicle is started, the unit automatically electrically disconnects from the vehicle's battery.

U.S. Patent No. 5,189,359 issued February 23, 1993, discloses a jumper cable device having two bridge rectifiers for developing a reference voltage, a four-input decoder for determining which terminals are to be connected based on a comparison of the voltage at each of the four terminals to the reference voltage, and a pair of relays for effecting the correct connection depending on the determination of the decoder. No connection will be made unless only one terminal of each battery has a higher voltage than the reference voltage, indicating "positive" terminals, and one has a lower voltage than the reference voltage, indicating "negative" terminals, and that, therefore, the two high voltage terminals may be connected and the two lower voltage terminals may be connected. Current flows once the appropriate relay device is closed. The relay device is preferably a MOSFET combined with a series array of photodiodes that develop MOSFET gate-closing potential when the decoder output causes an LED to light.

U.S. Patent No. 5,795,182 issued August 18, 1998, discloses a polarity independent set of battery jumper cables for jumping a first battery to a second battery. The apparatus includes a relative polarity detector for detecting whether two batteries are configured cross or parallel. A three-position high current capacity crossbar pivot switch is responsive to the relative polarity

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detector for automatically connecting the plus terminals of the two batteries together and the minus terminals of the two batteries together regardless of whether the configuration detected is cross or parallel, and an undercurrent detector and a delay circuit for returning the device to its ready and unconnected state after the device has been disconnected from one of the batteries. The crossbar pivot switch includes two pairs of contacts, and a pivot arm that pivots about two separate points to ensure full electrical contact between the pairs of contacts. The invention can also be used to produce a battery charger that may be connected to a battery without regard to the polarity of the battery.

U.S. Patent No. 6,262,492 issued July 17, 2001, discloses a car battery jumper cable for accurately coupling an effective power source to a failed or not charged battery, which includes a relay switching circuit connected to the power source and the battery by two current conductor pairs. First and second voltage polarity recognition circuits are respectively connected to the power source and the battery by a respective voltage conductor pair to recognize the polarity of the power source and the battery. A logic recognition circuit produces a control signal subject to the polarity of the power source and the battery, and a driving circuit controlled by the control signal from the logic recognition circuit drives the relay switching circuit, enabling the two poles of the power source to be accurately coupled to the two poles of the battery.

U.S. Patent No. 5,635,817 issued June 3, 1997, discloses a vehicle battery charging device that includes a control housing having cables including a current limiting device to prevent exceeding of a predetermined maximum charging current of about 40 to 60 amps. The control housing includes a polarity detecting device to verify the correct polarity of the connection of the terminals of the two batteries and to electrically disconnect the two batteries if there is an incorrect polarity.

U.S. Patent No. 8,199,024 issued June 12, 2012, discloses a safety circuit in a low-voltage connecting system that leaves the two low-voltage systems disconnected until it determines that it is safe to make a connection. When the safety circuit determines that no unsafe conditions exist and that it is safe to connect the two low-voltage systems, the safety circuit may connect the two systems by way of a "soft start" that provides a connection between the two

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systems over a period of time that reduces or prevents inductive voltage spikes on one or more of the low-voltage systems. When one of the low-voltage systems has a completely-discharged battery incorporated into it, a method is used for detection of proper polarity of the connections between the low-voltage systems. The polarity of the discharged battery is determined by passing one or more test currents through it and determining whether a corresponding voltage rise is observed.

U.S. Patent No. 5,793,185 issued August 11, 1998, discloses a hand-held jump starter having control components and circuits to prevent overcharging and incorrect connection to batteries.

While the prior art attempted solutions to the abovementioned problems as discussed above, each of the prior art solutions suffers from other shortcomings, either in complexity, cost or potential for malfunction. Accordingly, there exists a need in the art for further improvements to vehicle jump start devices.

SUMMARY OF THE INVENTION

In accordance with an aspect of the invention, apparatus is provided for jump starting a vehicle engine, including: an internal power supply; an output port having positive and negative polarity outputs; a vehicle battery isolation sensor connected in circuit with said positive and negative polarity outputs, configured to detect presence of a vehicle battery connected between said positive and negative polarity outputs; a reverse polarity sensor connected in circuit with said positive and negative polarity outputs, configured to detect polarity of a vehicle battery connected between said positive and negative polarity outputs; a power FET switch connected between said internal power supply and said output port; and a microcontroller configured to receive input signals from said vehicle isolation sensor and said reverse polarity sensor, and to provide an output signal to said power FET switch, such that said power FET switch is turned on to connect said internal power supply to said output port in response to signals from said sensors indicating the presence of a vehicle battery at said output port and proper polarity connection of

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positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.

In accordance with another aspect of the invention, the internal power supply is a rechargeable lithium ion battery pack.

In accordance with yet another aspect of the invention, a jumper cable device is provided, having a plug configured to plug into an output port of a handheld battery charger booster device having an internal power supply; a pair of cables integrated with the plug at one respective end thereof; said pair of cables being configured to be separately connected to terminals of a battery at another respective end thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a functional block diagram of a handheld vehicle battery boost apparatus in accordance with one aspect of the present invention;

Figs. 2A – 2C are schematic circuit diagrams of an example embodiment of a handheld vehicle battery boost apparatus in accordance with an aspect of the invention;

Fig. 3 is a perspective view of a handheld jump starter booster device in accordance with one example embodiment of the invention; and

Fig. 4 is a plan view of a jumper cable usable with the handheld jump starter booster device in accordance with another aspect of the invention.

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DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a functional block diagram of a handheld battery booster according to one aspect of the invention. At the heart of the handheld battery booster is a lithium polymer battery pack 32, which stores sufficient energy to jump start a vehicle engine served by a conventional 12 volt lead-acid or valve regulated lead-acid battery. In one example embodiment, a high-surge lithium polymer battery pack includes three 3.7V, 2666 mAh lithium polymer batteries in a 3S1P configuration. The resulting battery pack provides 11.1V, 2666Ah (8000Ah at 3.7V, 29.6Wh). Continuous discharge current is 25C (or 200 amps), and burst discharge current is 50C (or 400 amps). The maximum charging current of the battery pack is 8000mA (8 amps).

A programmable microcontroller unit (MCU) 1 receives various inputs and produces informational as well as control outputs. The programmable MCU 1 further provides flexibility to the system by allowing updates in functionality and system parameters, without requiring any change in hardware. According to one example embodiment, an 8 bit microcontroller with 2K x 15 bits of flash memory is used to control the system. One such microcontroller is the HT67F30, which is commercially available from Holtek Semiconductor Inc.

A car battery reverse sensor 10 monitors the polarity of the vehicle battery 72 when the handheld battery booster device is connected to the vehicle's electric system. As explained below, the booster device prevents the lithium battery pack from being connected to the vehicle battery 72 when the terminals of the battery 72 are connected to the wrong terminals of the booster device. A car battery isolation sensor 12 detects whether or not a vehicle battery 72 is connected to the booster device, and prevents the lithium battery pack from being connected to the output terminals of the booster device unless there is a good (e.g. chargeable) battery connected to the output terminals.

A smart switch FET circuit 15 electrically switches the handheld battery booster lithium battery to the vehicle's electric system only when the vehicle battery is determined by the MCU 1 to be present (in response to a detection signal provided by isolation sensor 12) and connected with the correct polarity (in response to a detection signal provided by reverse sensor 10). A lithium battery temperature sensor 20 monitors the temperature of the lithium battery pack 32 to

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detect overheating due to high ambient temperature conditions and overextended current draw during jump starting. A lithium battery voltage measurement circuit 24 monitors the voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.

Lithium battery back-charge protection diodes 28 prevent any charge current being delivered to the vehicle battery 72 from flowing back to the lithium battery pack 32 from the vehicle's electrical system. Flashlight LED circuit 36 is provided to furnish a flashlight function for enhancing light under a vehicle's hood in dark conditions, as well as providing SOS and strobe lighting functions for safety purposes when a vehicle may be disabled in a potentially dangerous location. Voltage regulator 42 provides regulation of internal operating voltage for the microcontroller and sensors. On/Off manual mode and flashlight switches 46 allow the user to control power-on for the handheld battery booster device, to control manual override operation if the vehicle has no battery, and to control the flashlight function. The manual button functions only when the booster device is powered on. This button allows the user to jump-start vehicles that have either a missing battery, or the battery voltage is so low that automatic detection by the MCU is not possible. When the user presses and holds the manual override button for a predetermined period time (such as three seconds) to prevent inadvertent actuation of the manual mode, the internal lithium ion battery power is switched to the vehicle battery connect port. The only exception to the manual override is if the car battery is connected in reverse. If the car battery is connected in reverse, the internal lithium battery power shall never be switched to the vehicle battery connect port.

USB charge circuit 52 converts power from any USB charger power source, to charge voltage and current for charging the lithium battery pack 32. USB output 56 provides a USB portable charger for charging smartphones, tablets, and other rechargeable electronic devices. Operation indicator LEDs 60 provide visual indication of lithium battery capacity status as well as an indication of smart switch activation status (indicating that power is being provided to the vehicle's electrical system).

Detailed operation of the handheld booster device will now be described with reference to the schematic diagrams of Figs. 2A-2C. As shown in Fig. 2A, the microcontroller unit 1 is the center of all inputs and outputs. The reverse battery sensor 10 comprises an optically coupled

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isolator phototransistor (4N27) connected to the terminals of vehicle battery 72 at input pins 1 and 2 with a diode D8 in the lead conductor of pin 1 (associated with the negative terminal CB-), such that if the battery 72 is connected to the terminals of the booster device with the correct polarity, the optocoupler LED 11 will not conduct current, and is therefore turned off, providing a "1" or high output signal to the MCU 1. The car battery isolation sensor 12 comprises an optically coupled isolator phototransistor (4N27) connected to the terminals of vehicle battery 72 at input pins 1 and 2 with a diode D7 in the lead conductor of pin 1 (associated with the positive terminal CB+), such that if the battery 72 is connected to the terminals of the booster device with the correct polarity, the optocoupler LED 11A will conduct current, and is therefore turned on, providing a "0" or low output signal to the MCU, indicating the presence of a battery across the jumper output terminals of the handheld booster device.

If the car battery 72 is connected to the handheld booster device with reverse polarity, the optocoupler LED 11 of the reverse sensor 10 will conduct current, providing a "0" or low signal to microcontroller unit 1. Further, if no battery is connected to the handheld booster device, the optocoupler LED 11A of the isolation sensor 12 will not conduct current, and is therefore turned off, providing a "1" or high output signal to the MCU, indicating the absence of any battery connected to the handheld booster device. Using these specific inputs, the microcontroller software of MCU 1 can determine when it is safe to turn on the smart switch FET 15, thereby connecting the lithium battery pack to the jumper terminals of the booster device. Consequently, if the car battery 72 either is not connected to the booster device at all, or is connected with reverse polarity, the MCU 1 can keep the smart switch FET 15 from being turned on, thus prevent sparking/short circuiting of the lithium battery pack.

As shown in Fig. 2B, the FET smart switch 15 is driven by an output of the microcontroller 1. The FET smart switch 15 includes three FETs (Q15, Q18, and Q19) in parallel, which spreads the distribution of power from the lithium battery pack over the FETs. When that microcontroller output is driven to a logic low, FETs 16 are all in a high resistance state, therefore not allowing current to flow from the internal lithium battery negative contact 17 to the car battery 72 negative contact. When the micro controller output is driven to a logic high, the FETs 16 (Q15, Q18, and Q19) are in a low resistant state, allowing current to flow freely from the internal lithium battery pack negative

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contact 17 (LB-) to the car battery 72 negative contact (CB-). In this way, the microcontroller software controls the connection of the internal lithium battery pack 32 to the vehicle battery 72 for jumpstarting the car engine.

Referring back to Fig. 2A, the internal lithium battery pack voltage can be accurately measured using circuit 24 and one of the analog-to-digital inputs of the microcontroller 1. Circuit 24 is designed to sense when the main 3.3V regulator 42 voltage is on, and to turn on transistor 23 when the voltage of regulator 42 is on. When transistor 23 is conducting, it turns on FET 22, thereby providing positive contact (LB+) of the internal lithium battery a conductive path to voltage divider 21 allowing a lower voltage range to be brought to the microcontroller to be read. Using this input, the microcontroller software can determine if the lithium battery voltage is too low during discharge operation or too high during charge operation, and take appropriate action to prevent damage to electronic components.

Still referring to Fig. 2A, the temperature of the internal lithium battery pack 32 can be accurately measured by two negative temperature coefficient (NTC) devices 20. These are devices that reduce their resistance when their temperature rises. The circuit is a voltage divider that brings the result to two analog-to-digital (A/D) inputs on the microcontroller 1. The microcontroller software can then determine when the internal lithium battery is too hot to allow jumpstarting, adding safety to the design.

The main voltage regulator circuit 42 is designed to convert internal lithium battery voltage to a regulated 3.3 volts that is utilized by the microcontroller 1 as well as by other components of the booster device for internal operating power. Three lithium battery back charge protection diodes 28 (see Fig. 2B) are in place to allow current to flow only from the internal lithium battery pack 32 to the car battery 72, and not from the car battery to the internal lithium battery. In this way, if the car electrical system is charging from its alternator, it cannot back-charge (and thereby damage) the internal lithium battery, providing another level of safety. The main power on switch 46 (Fig. 2A) is a combination that allows for double pole, double throw operation so that with one push, the product can be turned on if it is in the off state, or turned off if it is in the on state. This circuit also uses a microcontroller output 47 to "keep alive" the power when it is activated by the on switch. When the switch is pressed the microcontroller turns this output to a high logic level to keep power on when the switch is

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released. In this way, the microcontroller maintains control of when the power is turned off when the on/off switch is activated again or when the lithium battery voltage is getting too low. The microcontroller software also includes a timer that turns the power off after a predefined period of time, (such as, e.g. 8 hours) if not used.

The flashlight LED circuit 45 shown in Fig. 2B controls the operation of flashlight LEDs. Two outputs from the microcontroller 1 are dedicated to two separate LEDs. Thus, the LEDs can be independently software-controlled for strobe and SOS patterns, providing yet another safety feature to the booster device. LED indicators provide the feedback the operator needs to understand what is happening with the product. Four separate LEDs 61 (Fig. 2A) are controlled by corresponding individual outputs of microcontroller 1 to provide indication of the remaining capacity of the internal lithium battery. These LEDs are controlled in a "fuel gauge" type format with 25%, 50%, 75% and 100% (red, red, yellow, green) capacity indications. An LED indicator 63 (Fig. 2B) provides a visual warning to the user when the vehicle battery 72 has been connected in reverse polarity. "Boost" and on/off LEDs 62 provide visual indications when the booster device is provide jump-start power, and when the booster device is turned on, respectively.

A USB output 56 circuit (Fig. 2C) is included to provide a USB output for charging portable electronic devices such as smartphones from the internal lithium battery pack 32. Control circuit 57 from the microcontroller 1 allows the USB Out 56 to be turned on and off by software control to prevent the internal lithium battery getting too low in capacity. The USB output is brought to the outside of the device on a standard USB connector 58, which includes the standard voltage divider required for enabling charge to certain smartphones that require it. The USB charge circuit 52 allows the internal lithium battery pack 32 to be charged using a standard USB charger. This charge input uses a standard micro-USB connector 48 allowing standard cables to be used. The 5V potential provided from standard USB chargers is up-converted to the 12.4VDC voltage required for charging the internal lithium battery pack using a DC-DC converter 49. The DC-DC converter 49 can be turned on and off via circuit 53 by an output from the microcontroller 1.

In this way, the microcontroller software can turn the charge off if the battery voltage is measured to be too high by the A/D input 22. Additional safety is provided for helping to

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eliminate overcharge to the internal lithium battery using a lithium battery charge controller 50 that provides charge balance to the internal lithium battery cells 51. This controller also provides safety redundancy for eliminating over discharge of the internal lithium battery.

Fig. 3 is a perspective view of a handheld device 300 in accordance with an exemplary embodiment of the invention. 301 is a power on switch. 302 shows the LED "fuel gauge" indicators 61. 303 shows a 12 volt output port connectable to a cable device 400, described further below. 304 shows a flashlight control switch for activating flashlight LEDs 45. 305 is a USB input port for charging the internal lithium battery, and 306 is a USB output port for providing charge from the lithium battery to other portable devices such as smartphones, tablets, music players, etc. 307 is a "boost on" indicator showing that power is being provided to the 12V output port. 308 is a "reverse" indicator showing that the vehicle battery is improperly connected with respect to polarity. 309 is a "power on" indicator showing that the device is powered up for operation.

Fig. 4 shows a jumper cable device 400 specifically designed for use with the handheld device 300. Device 400 has a plug 401 configured to plug into 12 volt output port 303 of the handheld device 300. A pair of cables 402a and 402b are integrated with the plug 401, and are respectively connected to battery terminal clamps 403a and 403b via ring terminals 404a and 404b. The port 303 and plug 401 may be dimensioned so that the plug 401 will only fit into the port 303 in a specific orientation, thus ensuring that clamp 403a will correspond to positive polarity, and clamp 403b will correspond to negative polarity, as indicated thereon. Additionally, the ring terminals 404a and 404b may be disconnected from the clamps and connected directly to the terminals of a vehicle battery. This feature may be useful, for example, to permanently attach the cables 302a-302b to the battery of a vehicle. In the event that the battery voltage becomes depleted, the handheld booster device 300 could be properly connected to the battery very simply by plugging in the plug 401 to the port 303.

The invention having been thus described, it will be apparent to those skilled in the art that the same may be varied in many ways without departing from the spirit or scope of the invention. Any and all such variations are intended to be encompassed within the scope of the following claims.

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BNSDOCID: <WO____2016003471A1_I_>

WHAT IS CLAIMED IS:

1. Apparatus for jump starting a vehicle engine, comprising:

an internal power supply;

an output port having positive and negative polarity outputs;

a vehicle battery isolation sensor connected in circuit with said positive and negative polarity outputs, configured to detect presence of a vehicle battery connected between said positive and negative polarity outputs;

a reverse polarity sensor connected in circuit with said positive and negative polarity outputs, configured to detect polarity of a vehicle battery connected between said positive and negative polarity outputs;

a power FET switch connected between said internal power supply and said output port; and

a microcontroller configured to receive input signals from said vehicle isolation sensor and said reverse polarity sensor, and to provide an output signal to said power FET switch, such that said power FET switch is turned on to connect said internal power supply to said output port in response to signals from said sensors indicating the presence of a vehicle battery at said output port and proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.

2. The apparatus of claim 1, wherein said internal power supply comprises a lithium ion battery.

3. The apparatus of claim 2, wherein said lithium ion battery comprises a battery pack of multiple lithium ion batteries.

4. The apparatus of claim 1, wherein said power FET switch comprises a plurality of FETs in parallel.

5, The apparatus of claim 1, wherein said vehicle isolation sensor and reverse polarity sensor comprise optically coupled isolator phototransistors.

BNSDOCID: <WO_____2016003471A1_I_>

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6. The apparatus of claim 1, further comprising a plurality of power diodes coupled between said output port and said internal power supply to prevent back-charging of said internal power supply from an electrical system connected to said output port.

7. The apparatus of claim 1, further comprising a temperature sensor configured to detect temperature of said internal power supply and to provide a temperature signal to said microcontroller.

8. The apparatus of claim 1, further comprising a voltage measurement circuit configured to measure output voltage of said internal power supply and to provide a voltage measurement signal to said microcontroller.

9. The apparatus of claim 1, further comprising a voltage regulator configured to convert output voltage of said internal power supply to a voltage level appropriate to provide operating power to internal components of the apparatus.

10. The apparatus of claim 1, further comprising a USB output port configured to provide charging power from said internal power supply to a USB-chargeable device.

11. The apparatus of claim 1, further comprising a USB charging port configured to provide charging power from an external power source to said internal power supply.

12. The apparatus of claim 1, further comprising a flashlight circuit configured to provide a source of light to a user.

13. The apparatus of claim 12, wherein said source of light is at least one LED.

14. The apparatus of claim 13, wherein said microcontroller is configured to control said at least one LED to provide a visual alarm indicating an emergency situation.

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BNSDOCID: <WO_____2016003471A1_I_>

15. The apparatus of claim 1, further comprising a plurality of visual indicators configured to display remaining capacity status of said internal power supply.

16. The apparatus of claim 15, wherein said plurality of visual indicators comprises a plurality of LEDs providing output light of different colors.

17. The apparatus of claim 1, further comprising a visual indicator configured to warn a user when a vehicle battery is connected with reverse polarity.

18. The apparatus of claim 1, further comprising separate visual indicators configured to display the power on status of the apparatus, and the jump start boost power status of power supplied to said output port.

19. The apparatus of claim 1, further comprising a manual override switch configured to activate a manual override mode to enable a user to connect jump start power to said output port when said vehicle battery isolation sensor is unable to detect presence of a vehicle battery.

20. The apparatus of claim 19, wherein said microcontroller is configured to detect actuation of said manual override switch for at least a predetermined period of time before activation of said manual override mode.

21. The apparatus of claim 1, further comprising a jumper cable device including a plug configured to plug into said output port, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to terminals of a battery at another respective end thereof.

22. The apparatus of claim 21, wherein said jumper cable device further comprises a pair of ring terminals configured to respectively connect said pair of cables at said another end thereof with one of a battery terminal, or a battery terminal clamp.

BNSDOCID: <WO_____2016003471A1_I_>

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23. The apparatus of claim 21, wherein said output port and said plug are dimensioned so that the plug will fit into the output port only in one specific orientation.

24. A jumper cable device, comprising:

a plug configured to plug into an output port of a handheld battery charger booster device having an internal power supply;

a pair of cables integrated with the plug at one respective end thereof;

said pair of cables being configured to be separately connected to terminals of a battery at another respective end thereof.

25. The jumper cable device of claim 24, further comprising a pair of ring terminals configured to respectively connect said pair of cables at said another end thereof with one of a battery terminal, or a battery terminal clamp.

26. The jumper cable device of claim 24, wherein said output port and said plug are dimensioned so that the plug will fit into the output port only in one specific orientation.

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BNSDOCID: <WO____2016003471A1_I_>

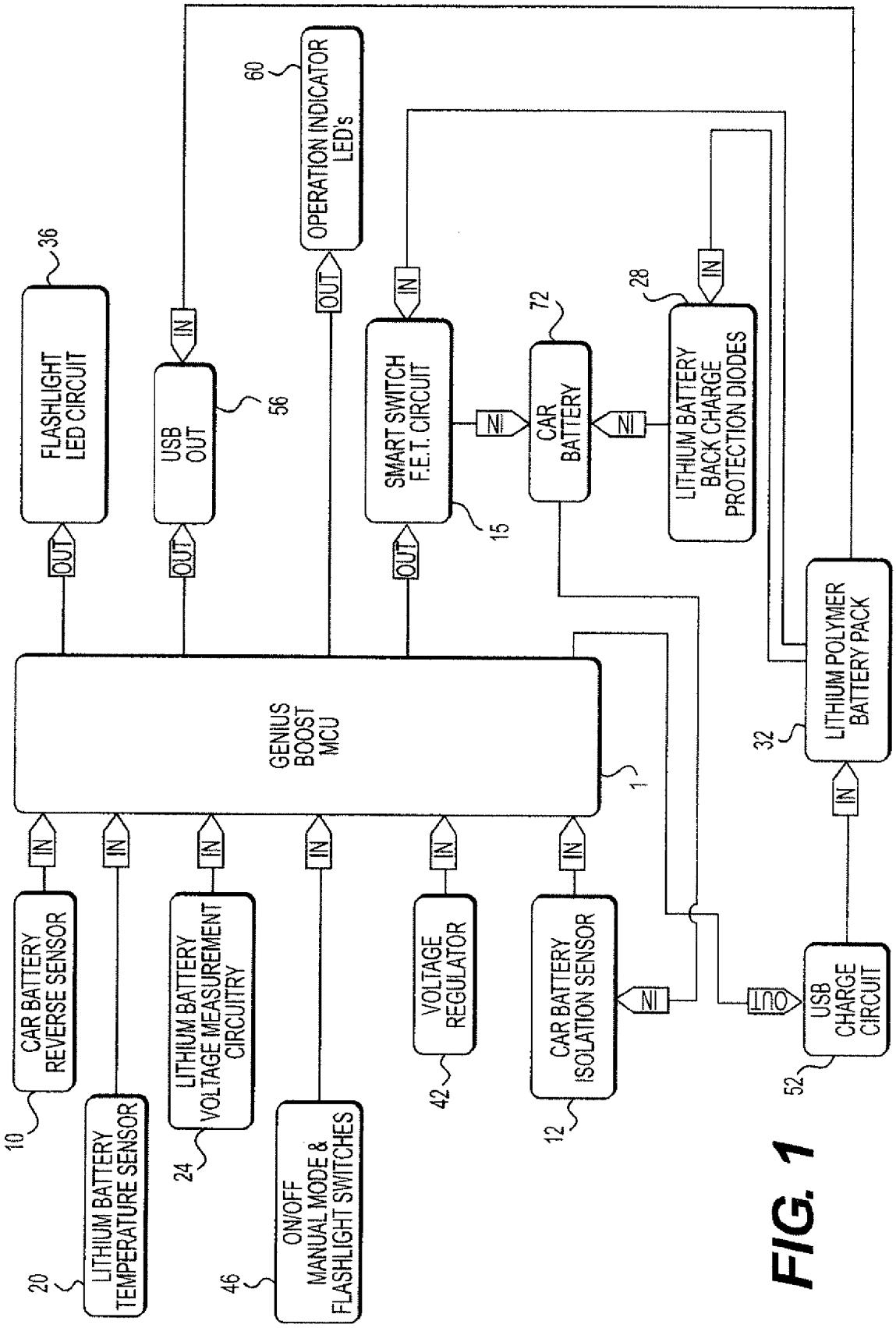


FIG. 1

WINPLUS Ex. 1002, p. 241

BNSDOCID: <WO_____2016003471A1_I_>

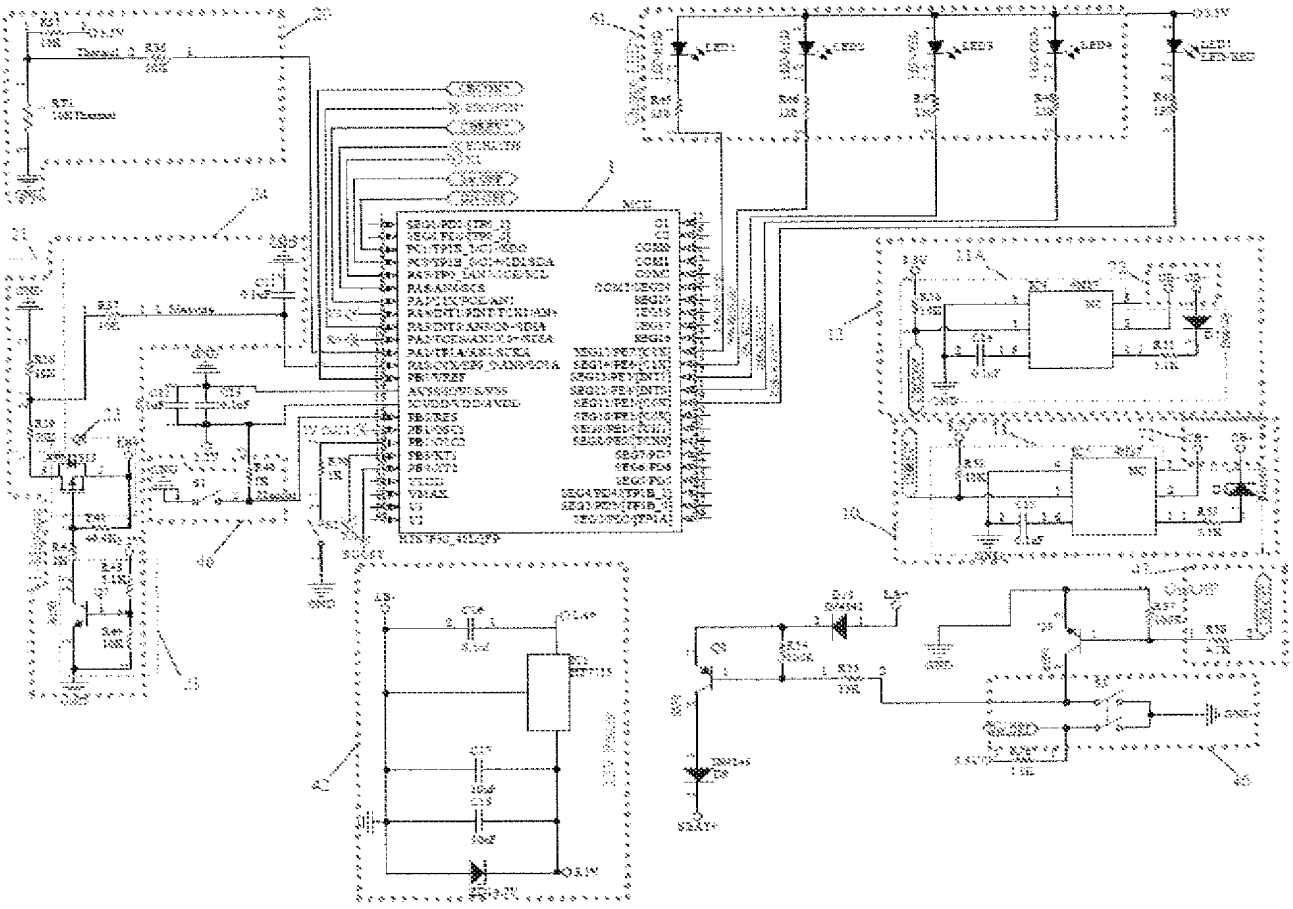


FIG. 2A

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BNSDOCID: <WO_____2016003471A1_I_>

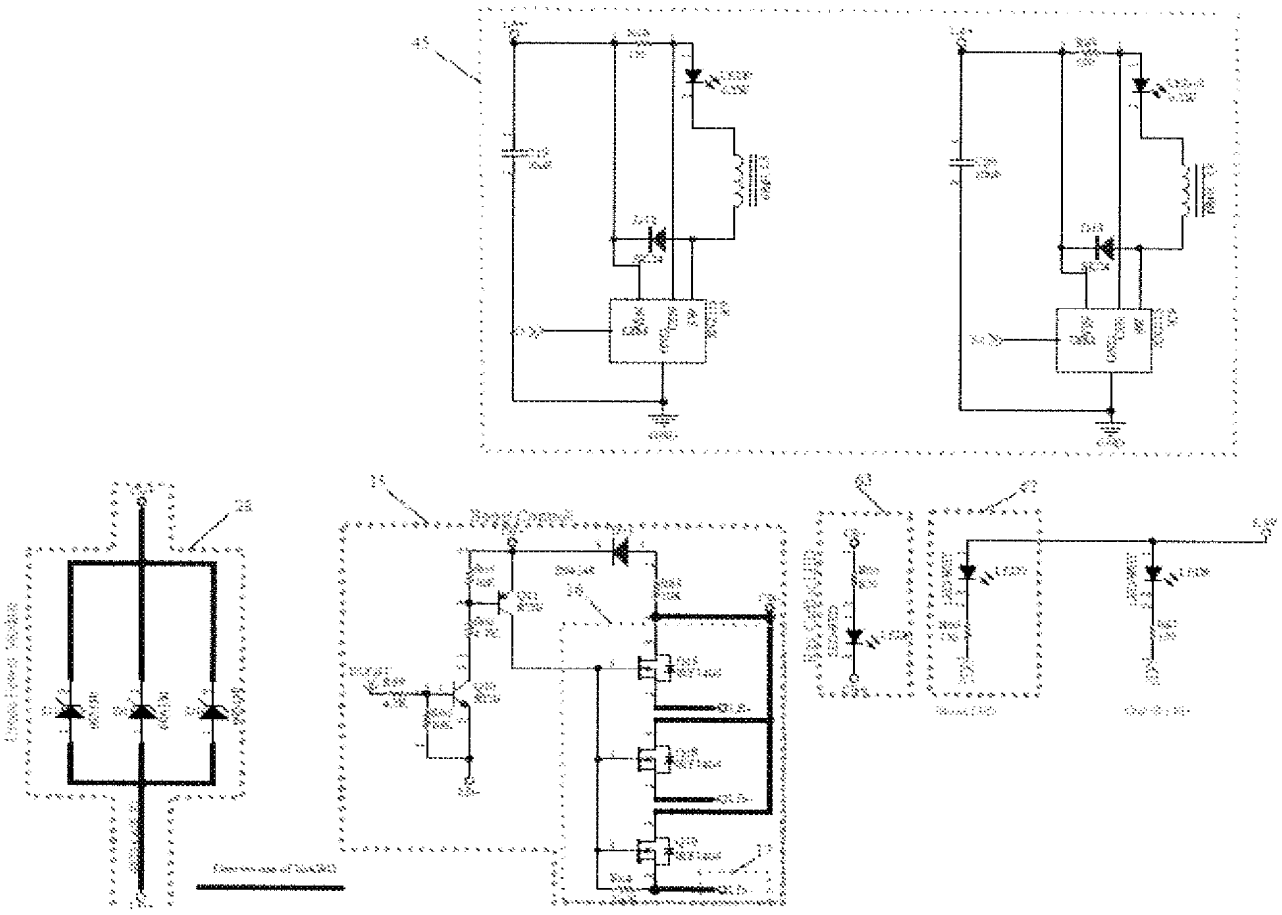


FIG. 2B

WINPLUS Ex. 1002, p. 243

BNSDOCID: <WO_____2016003471A1_L>

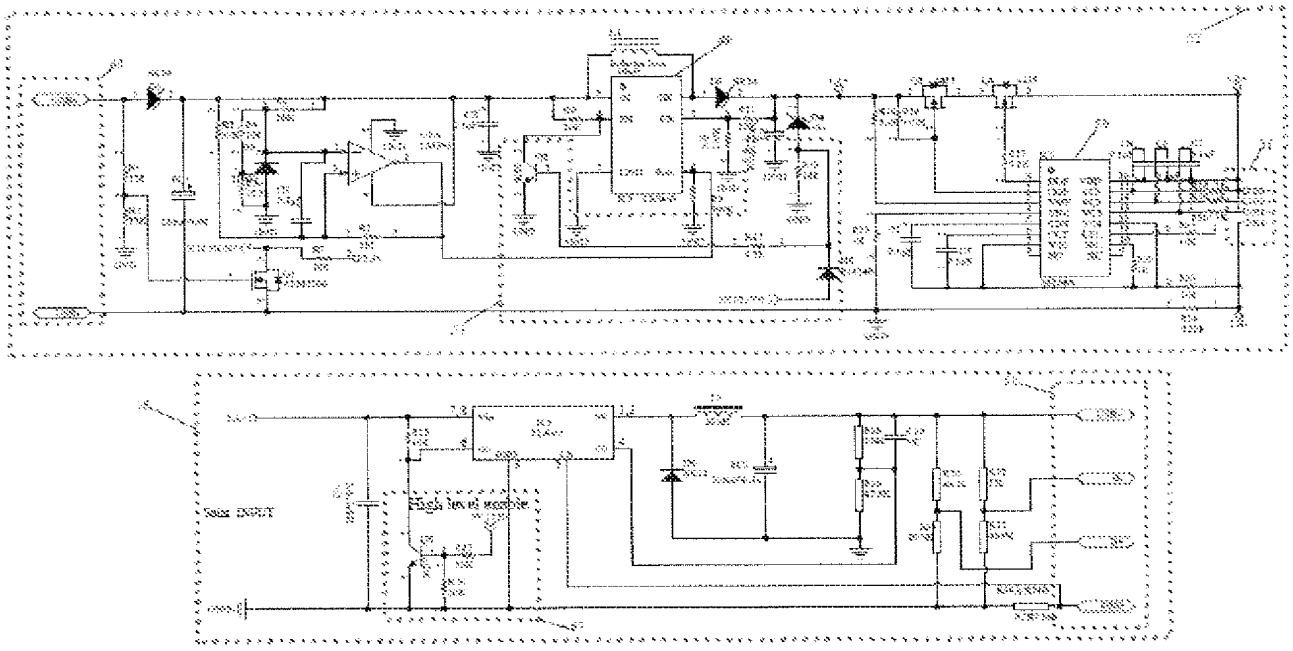


FIG. 2C

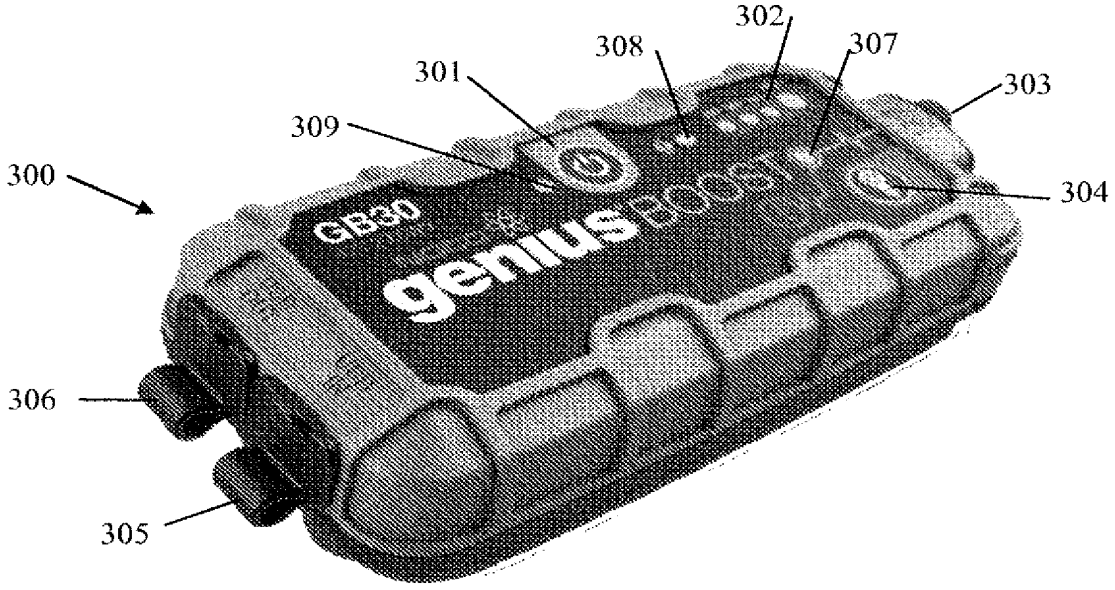


FIG. 3

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BNSDOCID: <WO_____2016003471A1_I_>

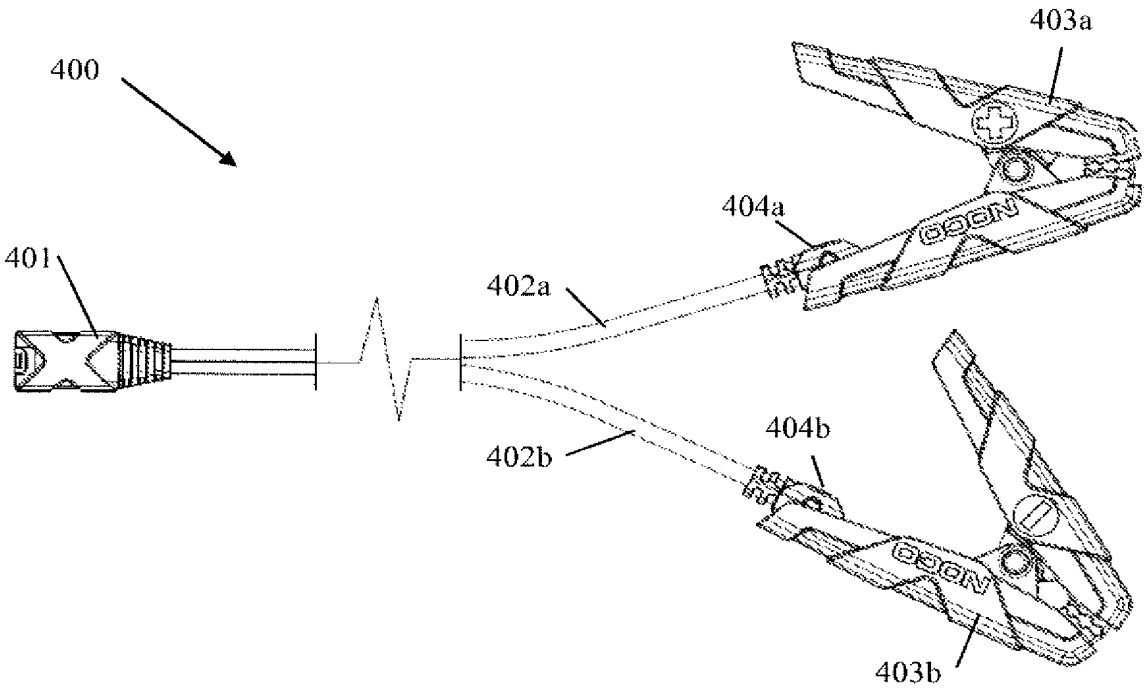


FIG. 4

BNSDOCID: <WO_____2016003471A1_I_>

WINPLUS Ex. 1002, p. 245

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/045434

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H02J 7/00 (2014.01)
CPC - H02J7/0034 (2014.09)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - B60R-016/03, B60R-016/04, F02N-11/08, H02J 7/00 (2014.01)
USPC -307/150, 320/105, 307/127, 340/636.1, 340/636.150, 361/82, 320/103

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - H02J7/0063, H02J7/0034, H02J 2001/006 (2014.09)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2005/0110467 A1 (THOMASON) 26 May 2005 (26.05.2005) entire document	1, 4-6,8-9, 12-18, 22, 25 --- 2, 3, 7, 10, 11, 19, 20, 21, 23, 24, 26
Y	WO 2013/137873 A1 (DAO) 19 September 2013 (19.09.2013) entire document	2-3, 10-11
Y	US 6362599 B1 (TURNER et al.) 26 March 2002 (26.03.2002) entire document	7, 19-20
Y	US 7148580 B2 (SODEMANN et al.) 12 December 2006 (12.12.2006) entire document	21,23,24,26
A	US 6803743 B2 (GEORGE et al.) 12 October 2004 (12.10.2004) entire document	1-26

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 October 2014	03 NOV 2014

Name and mailing address of the ISA/US	Authorized officer:
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

BNSDOCID: <WO_____2016003471A1_I_>

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/245,146	08/23/2016	Yun LEI	063313-8014US01

CONFIRMATION NO. 7477

96568
Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

PUBLICATION NOTICE

OC00000096467457

Title:BATTERY CLAMP

Publication No.US-2018-0006478-A1
Publication Date:01/04/2018

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PLUS Search Results for S/N 15245146, Searched Mon Jan 08 10:54:52 EST 2018

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

96568 7590 01/12/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

EXAMINER	
WILLIAMS, ARUN C	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
01/12/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

zhuj@junhe.com
patent@junhe.com
zengb@junhe.com

Office Action Summary	Application No. 15/245,146	Applicant(s) LEI, YUN	
	Examiner ARUN WILLIAMS	Art Unit 2859	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/23/2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-10* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-3 and 8-10* is/are rejected.

8)☒ Claim(s) *4-7* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *8/23/2016* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☒ All b)☐ Some** c)☐ None of the:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *12/25/2017*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

1. This is a first action on the merits, in response to the claims received 8/23/2016. Claims 1-10 are pending for prosecution below.

Priority

2. Receipt is acknowledged of certified copies of papers required by 37 CFR 1.55.

3. Information Disclosure Statement

The information disclosure statement (IDS) file on 12/25/2017 has been considered by the examiner. An initialed copy is attached herewith.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

5. **Claim(s) 1-3,8-10 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Yen, (USNO.2007/0018609).**

As for claim 1, Yen discloses and shows in Fig. 1 a battery clamp, comprising: a control device **(10)**, comprising: a housing; a master-control board mounted within the housing; and connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising: at least a first and second electrode connectors, which are connected to an external power supply **(via 1)**

for receiving power, and at least one communication connector **(within 40)** connected to the external power supply for receiving status information **(via 11 & 12)** of the external power supply, and sending the status information to the master-control board; a first and second wire clamps, one ends of the first and second wire clamps are configured to receive power from the external power supply via the control device, and the other ends of the first and second wire clamps are connected to an external device **(7)** for supplying power to the external device; wherein the control device is configured to control power supply from the external power supply to the external device based on the status information **(par.[0011-0013])**

As for claim 2, Yen discloses control device is configured to allow the power supply from the external power supply to the external device when the status information is normal, wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply **(via 11 & 12) (par.[0011-0013])**.

As for claim 3, Yen discloses the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively; a communication port electrically connected to the communication connector; a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps; a switch control unit **(within 10)** for controlling connection between the first voltage input port and the first voltage output port; and a master-control circuit unit connected to the communication port for obtaining the status

information of the external power supply; wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port **(par.[0011-0013])**.

As for claim 8, Yen discloses and shows in Fig. 1 the communication connector is disposed between the first and second electrode connectors.

As for claim 9, Yen discloses and shows in Fig. 1 the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

As for claim 10, Yen discloses and shows in Fig. 1 one side of the upper piece is provided with openings for indicator lights and buttons.

Allowable Subject Matter

1. Claims 4-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: an electric current detection unit for detecting electric current from the external power supply to the external device; a voltage detection unit for detecting voltage of the external power supply and the external device; and wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit, in combination with the remaining limitations of independent claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Williams whose telephone number is 571-272-9765. The examiner can normally be reached on Mon - Thrus, 6:30am - 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Isla-Rodas can be reached on 571-272-5056. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Arun Williams/
Primary Examiner, Art Unit 2859

Arun Williams
Primary Examiner
Art Unit 2859

Notice of References Cited	Application/Control No. 15/245,146	Applicant(s)/Patent Under Reexamination LEI, YUN	
	Examiner ARUN WILLIAMS	Art Unit 2859	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2005/0110467 A1	05-2005	Thomason, Lincoln	H02J7/0031	320/165
*	B	US-2007/0018609 A1	01-2007	Yen; Jen-Yen	H02J7/0034	320/107
*	C	US-2013/0099736 A1	04-2013	Roberts; Julie Christine	F02N11/12	320/109
*	D	US-2014/0265592 A1	09-2014	Clarke; Patrick J.	H02J1/06	307/66
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

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	1	20100173182	A1	2010-07-08	BAXTER MICHAEL et al.	

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	1	20120130432	KR	A	2012-12-03	KOREA ELECTRO TECHNOLOGY RESEARCH INSTITUTE		☒
	2	3013164	FR	A1	2015-05-15	INTELLIGENT ELECTRONIC SYSTEMS		☒
	3	2010252520	JP	A	2010-11-04	NISSAN MOTOR		☒

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	4	2660950	EP	A2	2013-11-06	LG CHEMICAL LTD		☐
	5	202015103173	DE	U1	2015-07-06	ZONESKING TECHNOLOGY CO		☒
	6	2016/003471	WO	A1	2016-01-07	NOCO COMPANY		☐

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	1	The extended European search report for EP16189167.6, issued on Feb. 20, 2017	

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Examiner Signature	/ARUN C WILLIAMS/	Date Considered	01/07/2018

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WINPLUS Ex. 1002, p. 257

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15245146	LEI, YUN
	Examiner	Art Unit
	ARUN WILLIAMS	2859

CPC- SEARCHED		
Symbol	Date	Examiner
H02J7/0034, H02J7/0054, Y02E60/12, H02J7/0042, H02J2001/006	1/6/2018	AW

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
320	105	1/6/2018	AW

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Assignee search (PALM)	1/6/2018	AW
see attached EAST search history printout	1/7/2018	AW

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/ARUN WILLIAMS/ Primary Examiner.Art Unit 2859

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	47098	320/105.ccls. (H02J7/0034, H02J7/0054, Y02E60/12, H02J7/0042, H02J2001/006).cpc. and @ad<"20160630"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/01/07 00:23
S3	7154	(status data transmit$4) and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/01/07 01:03
S4	26614	(status data transmit$4) same clamp?	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/01/07 01:07
S5	35	(status data transmit$4) same clamp? and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/01/07 01:07

EAST Search History (Interference)

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

in re Application of: Yun LEI	Examiner: WILLIAMS, ARUN C
Application No.: 15/245,146	Art Unit: 2859
Filed: August 23, 2016	Conf. No: 7477
For: **BATTERY CLAMP**	Customer No.: 96568

RESPONSE TO NON-FINAL ACTION

Mail Stop Non-Final
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Non-Final Action mailed on January 12, 2018 regarding the above-mentioned application, the applicant respectfully submit the following:

Amendments to the claims begin on page 2;

Remarks begin on page 5.

AMENDMENTS TO THE CLAIMS

1. (**Currently amended**) A battery clamp **for delivering an instantaneous starting current from an external power supply to an external device**, **the battery clamp** comprising:

a control device, comprising:

a housing;

a master-control board mounted within the housing; and

connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising:

at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

a first and second wire clamps, ~~one ends of the first and second wire clamps are~~**each having an end** configured to receive power from the external power supply via the control device, and ~~the other ends of the first and second wire clamps are~~**another end** connected to [[an]]**the** external device for supplying power to the external device;

wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

2. (Original) The battery clamp of claim 1, wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal, wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply.

3. (Original) The battery clamp of claim 1, wherein the master-control board comprises:

a first and second voltage input ports electrically connected to the first and second electrode connectors respectively;

a communication port electrically connected to the communication connector;

a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps;

a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and

a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply;

wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

4. (Original) The battery clamp of claim 3, wherein the master-control circuit unit further comprises:

an electric current detection unit for detecting electric current from the external power supply to the external device;

a voltage detection unit for detecting voltage of the external power supply and the external device; and

wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

5. (Original) The battery clamp of claim 4, wherein the voltage detection unit comprises:

a first voltage detection unit for detecting voltage value of the external power supply; and

a second voltage detection unit for detecting voltage value of the external device.

6. (Original) The battery clamp of claim 4, wherein the master-control circuit unit further comprises:

an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

7. (Original) The battery clamp of claim 4, wherein the master-control circuit unit further comprises:

a buzzing circuit unit connected to the master-control chip unit for alerting users about abnormal condition.

8. (Original) The battery clamp of claim 1, wherein the communication connector is disposed between the first and second electrode connectors.

9. (Original) The battery clamp of claim 1, wherein the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

10. (Original) The battery clamp of claim 9, wherein one side of the upper piece is provided with openings for indicator lights and buttons.

REMARKS

1. Amendments to the Claims

The preamble of claim 1 has been amended as "*A battery clamp* ***for delivering an instantaneous starting current from an external power supply to an external device***". The support for the amendment can be found from paragraphs [0039] and [0091] of the specification.

In addition, same limitations of claim 1 have been rephrased.

Thus, no new matter is added.

2. Rejection under 35 U.S.C. §102

Claims 1-3, 8-10 are rejected under 35 U.S.C. §102 as being anticipated by YEN (USNO.2007/0018609).

These grounds of rejection are respectively traversed for reasons as follows.

Claim 1, as amended, recites:

> "*A battery clamp* ***for delivering an instantaneous starting current from an external power supply to an external device***, ***the battery clamp*** *comprising:*
>
> *a control device, comprising:*
>
> *a housing;*
>
> *a master-control board mounted within the housing; and*
>
> *connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising:*

at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

*a first and second wire clamps, ~~one ends of the first and second wire clamps are~~**each having an end** configured to receive power from the external power supply via the control device, and ~~the other ends of the first and second wire clamps are~~**another end** connected to [[an]]**the** external device for supplying power to the external device;*

wherein the control device is configured to control power supply from the external power supply to the external device based on the status information."

In the Rejection, the Office states:

As for claim 1, Yen discloses and shows in Fig. 1 a battery clamp, comprising: a control device **(10)**, comprising: a housing; a master-control board mounted within the housing; and connectors disposed at one side of the housing, and being electrically connected to the master-control board, comprising: at least a first and second electrode connectors, which are connected to an external power supply **(via 1)** for receiving power, and at least one communication connector **(within 40)** connected to the external power supply for receiving status information **(via 11 & 12)** of the external power supply, and sending the status information to the master-control board; a first and second wire clamps, one ends of the first and second wire clamps are configured to receive power from the external power supply via the control device, and the other ends of the first and second wire clamps are connected to an external device **(7)** for supplying power to the external device; wherein the control device is configured to control power supply from the external power supply to the external device based on the status information **(par.[0011-0013])**

(Office Action, bottom of page 2 to upper portion of page 3, emphasis added)

The paragraphs [0011]-[0013] of YEN referred by the Office is reproduced below:

[0011] The polarity control **10** has an input end electrically connected to the DC output jack **3** of the rectifier **1** through an electric wire **4** and a plug **40**, an output end electrically connected to the terminal clamps **200** through a respective electric wire **4**, a polarity switch **13** for switching the positive and negative polarity between the two electric wires **4** to the terminal clamps **200**, an indicator light **11**, which is turned on to indicate the operation status of the polarity control **10** when DC power supply passes therethrough from the rectifier **1** to the terminal clamps **200**, and a polarity light **12**, which is turned on when the two electric wires **4** matches the metal contacts **8** of the battery **7** in polarity.

[0012] The two terminal clamps **200** are identical, each comprising a first electrically insulative clamping arm **20**, a second electrically insulative clamping arm **21**, a pivot **5** fastened to respective lugs **22** of the clamping arms **20** and **21** to pivotally secure the two clamping arms **20** and **21** together, and a torsional spring **6** mounted on the pivot **5** and stopped between the clamping arms **20** and **21** to support the clamping arms **20** and **21** in the close position. The first clamping arm **20** has a locating groove **23** longitudinally disposed at the top side, a through hole **24** disposed at one end of the through the top and bottom sides, a rear bottom female screw **26**, and a front bottom pressure block **25**. Each terminal clamp **200** further comprises a first metal conducting plate **27** and a second metal conducting plate **28**. The first metal conducting plate **27** and the second metal conducting plate **28** are fastened together and affixed to the top side of the rear bottom female screw **26** with a screw **29**. The first metal conducting plate **27** is fixedly and electrically connected to one electric wire **4**. The second metal conducting plate **28** is an angled member having a horizontal part fitted into the locating groove **23** and a vertical part inserted through the through hole **24**.

> **[0013]** Referring to FIGS. **1** and **2** again, the two terminal clamps **200** and respectively clamped on the battery **7** to be charged, keeping the second metal conducting plates **28** of the two terminal clamps **200** in close contact with the respective metal contacts **8** of the battery **7**, and then the power input cable **2** is connected to an AC power supply outlet, for enabling the rectifier **1** to rectify AC power supply into the desired DC power supply for charging the battery **7**. If the a polarity light **12** is off after installation of the battery charger, switch the polarity switch **13** to exchange the polarity between the two electric wires to the terminal clamps **200** so that DC power supply can be outputted from the rectifier **1** through the polarity control **10** to the terminal clamps **200** and then the metal contacts **8** of the battery **7** to charge the battery **7** to the saturated status.

(Paragraphs [0011]-[0013] of YEN, emphasis added) It can be seen that, YEN discloses a polarity control 10 having an input end that is **only electrically connected to** a DC output jack 3 of a rectifier 1 through an electric wire 4 and a plug 4. In other words, the plug 4 does not include a communication connector connected to the rectifier 1 for receiving status information of the rectifier 1, let alone sending the status information of the rectifier 1 to the polarity control 10. Thus, YEN is silent of "*at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board*" as recited in claim 1.

Furthermore, YEN relates to a battery charger for charging any of a variety of secondary battery for mobile telephones. According to YEN, the battery charger includes two terminal clamps 200 being respectively clamped on the battery 7 to be charged (see Fig. 2 of YEN). In particular, the battery charger can deliver a continuous low current to the battery 7, if the terminal clamps 200 match metal contacts 8 of the battery 7 in polarity (the polarity light 12 is turned on in this situation). If the polarity light 12 is off after installation of the battery charger, a polarity switch 13 can be manually switched to exchange the polarity between the two battery clamps so that power supply can be provided to the battery 7 (see paragraph [0013] of YEN). In the application

scenario of YEN, **a continuous low current** is required to be delivered to the battery 7 of a mobile telephone, and thus a manual operation of switching the polarity switch 13 is acceptable when the terminal clamps do not match the metal contacts 8 of the battery 7 in polarity. In contrast, the battery clamp of claim 1 directs to delivering **an instantaneous starting current** from an external power supply to an external device, e.g. a vehicle, and the control device of the battery clamp can control the power supply from the external power supply to the external device based on the status information of the external powers supply. In other words, in the circumstance that an instantaneous starting current is required in the application scenario of claim 1, the manual operation of switching the polarity switch 13 as disclosed in YEN cannot be applied to claim 1 since the instantaneous starting current may have already produced unrepairable damage to the battery in a very short time if connected incorrectly. Accordingly, YEN fails to teach, or even teaches against, the solution of claim 1.

In conclusion, the currently amended claim 1 is not anticipated by YEN, since YEN neither discloses nor teaches the solution of claim 1. All the other claims which depend on amended claim 1 are likewise distinguished from the reference.

Withdrawal of the rejections and allowance of the above claims is warranted.

CONCLUSION

The applicant believes that, with the amendments and the present response, all the amended claims are in full condition for allowance and a notification of such allowance is respectfully requested. Should the Examiner have any further questions or reservations, the Examiner is invited to telephone the undersigned attorney at (650) 265-2682.

Respectfully submitted,
Jun He Law Offices P.C.

Dated: April 9, 2018

/James J. Zhu, Reg. No. 52,396/
James J. Zhu, Ph.D.
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	1	20160336770	A1	2016-11-17	BOSCH GMBH ROBERT	
	2	20120139491	A1	2012-06-07	EBERHARD MARTIN et al.	
	3	20160001666	A1	2016-01-07	NOCO COMPANY	
	4	20130169038	A1	2013-07-04	KING ALLEN	
	5	20070123316	A1	2007-05-31	RESEARCH IN MOTION LIMITED	

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	6	20150054467	A1	2015-02-26	SANYO ELECTRIC CO	
	7	20140315048	A1	2014-10-23	SAMSUNG SDI CO LTD	
	8	20130264995	A1	2013-10-10	LG CHEMICAL LTD	
	9	20100173182	A1	2010-07-08	BAXTER MICHAEL et al.	

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	Attorney Docket Number	063313-8014US01

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	Art Unit	2859
	Examiner Name	WILLIAMS, ARUN C
	Attorney Docket Number	063313-8014US01

CERTIFICATION STATEMENT

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/James J. Zhu, Reg. No. 52,396/	Date (YYYY-MM-DD)	2018-04-09
Name/Print	James J. Zhu	Registration Number	52,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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EFS ID:	32275477
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	Yi Zhang
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Attorney Docket Number:	063313-8014US01
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Filing Date:	23-AUG-2016
Time Stamp:	05:16:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1_Transmittal.pdf	263402 fdbc91722ac189e7495b9040bba57e64403 9521e	no	2

Warnings:

Information:					
2		2_Response_to_Non-Final_Office_Action_of_20180112.pdf	277799 d5282498713920c01982169dce093c9251a571ad	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	10

Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	3_IDS_form.pdf	1035443 fdcc6d2af0e050c85be732e6813ea1d7c1a642be	no	5
Warnings:					
Information:					
			Total Files Size (in bytes):	1576644	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	15/245,146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

Total Number of Pages in This Submission

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

The each item of information contained in the IDS form was cited by the examiner in the Non-Final Rejection of US Application No. 15/245,142, issued on February 22, 2018.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Jun He Law Offices, P.C.		
Signature	/James J. Zhu, Reg. No. 52,396/		
Printed name	James J. Zhu		
Date	2018-04-09	Reg. No.	52,396

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/245,146	Filing Date 08/23/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **04/09/2018**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 10	Minus	** 20	= 0	X $50 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $230 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ANITA JOHNSON

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

96568 7590 07/23/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES OF AMERICA

EXAMINER
WILLIAMS, ARUN C

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 07/23/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

TITLE OF INVENTION: BATTERY CLAMP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	10/23/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

WINPLUS Ex. 1002, p. 280

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

96568 7590 07/23/2018
Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES OF AMERICA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

TITLE OF INVENTION: BATTERY CLAMP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	10/23/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
WILLIAMS, ARUN C	2859	320-105000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

WINPLUS Ex. 1002, p. 281

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

96568 7590 07/23/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES OF AMERICA

EXAMINER	
WILLIAMS, ARUN C	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 07/23/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

WINPLUS Ex. 1002, p. 282

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/245,146	Applicant(s) LEI, YUN	
	Examiner ARUN WILLIAMS	Art Unit 2859	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *response filed 4/9/2018*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-10*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☒ All b) ☐ Some *c) ☐ None of the:
   1. ☒ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 4/9/2018
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ARUN WILLIAMS/
Primary Examiner, Art Unit 2859

EAST Search History

EAST Search History (Prior Art)

< This search history is empty>

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	1	(clamp? same communication same status same control same external).clm.	US-PGPUB; USPAT	OR	OFF	2018/06/22 13:17
L6	0	(320/105.ccls. (H02J7/0034, H02J7/0054, Y02E60/12, H02J7/0042, H02J2001/006).cpc. and @ad<"20160630") and 4	US-PGPUB; USPAT	OR	OFF	2018/06/22 13:17

6/22/2018 1:18:09 PM
C:\Users\awilliams4\Documents\EAST\Workspaces\15245146.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15245146	LEI, YUN
	Examiner	Art Unit
	ARUN WILLIAMS	2859

CPC- SEARCHED		
Symbol	Date	Examiner
H02J7/0034, H02J7/0054, Y02E60/12, H02J7/0042, H02J2001/006	1/6/2018	AW

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
320	105	1/6/2018	AW

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Assignee search (PALM)	1/6/2018	AW
see attached EAST search history printout	1/7/2018	AW
updated EAST search	6/22/2018	AW

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
320,H02J,Y02 E,H02J	All of the above	6/22/2018	AW

	/ARUN WILLIAMS/ Primary Examiner.Art Unit 2859

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20160336770	A1	2016-11-17	BOSCH GMBH ROBERT	
	2	20120139491	A1	2012-06-07	EBERHARD MARTIN et al.	
	3	20160001666	A1	2016-01-07	NOCO COMPANY	
	4	20130169038	A1	2013-07-04	KING ALLEN	
	5	20070123316	A1	2007-05-31	RESEARCH IN MOTION LIMITED	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.W/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

	6	20150054467	A1	2015-02-26	SANYO ELECTRIC CO	
	7	20140315048	A1	2014-10-23	SAMSUNG SDI CO LTD	
	8	20130264995	A1	2013-10-10	LG CHEMICAL LTD	
	9	20100173182	A1	2010-07-08	BAXTER MICHAEL et al.	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ARUN C WILLIAMS/	Date Considered	06/22/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

WINPLUS Ex. 1002, p. 288

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.W/

Bibliographic Data

Application No: 15/245,146

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /ARUN C WILLIAMS/ [ ]

Examiner's Signature | Initials

Title: BATTERY CLAMP

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
08/23/2016	320	2859	063313-8014US01
RULE			

APPLICANTS

Shenzhen Carku Technology Co., Ltd., Shenzhen, CHINA

INVENTORS

Yun LEI Shenzhen, CHINA

CONTINUING DATA

FOREIGN APPLICATIONS

CHINA 201620692248.3 06/30/2016

CHINA 201610506137.3 06/30/2016

CHINA 201610506106.8 06/30/2016

IF REQUIRED, FOREIGN LICENSE GRANTED**

09/12/2016

**** SMALL ENTITY ****

STATE OR COUNTRY

CHINA

ADDRESS

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES

FILING FEE RECEIVED

$730

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15245146	LEI, YUN
	Examiner	**Art Unit**
	ARUN WILLIAMS	2859

CPC						
Symbol					**Type**	**Version**
H02J		7	/	0045	F	2013-01-01
H02J		7	/	0047	I	2013-01-01
H02J		7	/	0054	I	2013-01-01
H02J		7	/	0029	I	2013-01-01
H02J		2007	/	0096	A	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	10	
/ARUN WILLIAMS/ Primary Examiner.Art Unit 2859	06/22/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15245146	LEI, YUN
	Examiner	**Art Unit**
	ARUN WILLIAMS	2859

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
320	105	H 0 2 J 7/00	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	10	
/ARUN WILLIAMS/ Primary Examiner.Art Unit 2859	06/22/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15245146	LEI, YUN
	Examiner	**Art Unit**
	ARUN WILLIAMS	2859

☒ **Claims renumbered in the same order as presented by applicant** ☐ **CPA** ☐ **T.D.** ☐ **R.1.47**

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1														
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 10	
/ARUN WILLIAMS/ Primary Examiner.Art Unit 2859 (Primary Examiner)	06/22/2018 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

96568 7590 08/02/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES OF AMERICA

EXAMINER	
WILLIAMS, ARUN C	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
08/02/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

zhuj@junhe.com
patent@junhe.com
zengb@junhe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 15245146
Applicant : Lei
Filing Date : 08/23/2016
Date Mailed : 08/02/2018

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Chris Harmon/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 15245146 **Drawings filed: 10/27/2016**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [X] The character of the lines, numbers, and letters is poor. FIG(s) 5
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [ ] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s)
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

in re Application of: Yun LEI.	Examiner: WILLIAM, ARUN C
Application No.: 15/245,146	Art Unit: 2859
Filed: August 23, 2016	Conf. No: 7477
For: **BATTERY CLAMP**	Customer No.: 96568

Amendment

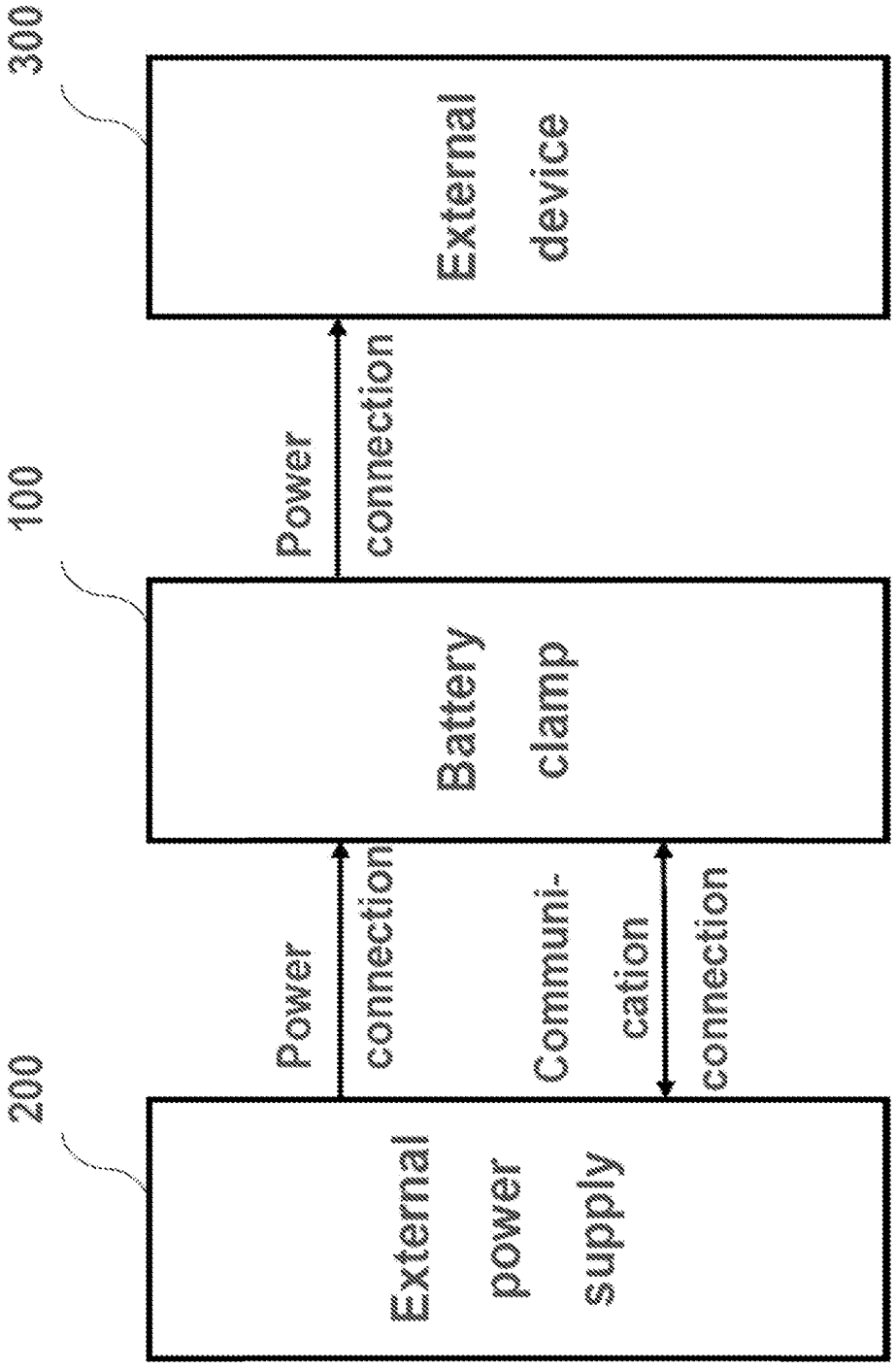
Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice to File Corrected Application Papers mailed on August 2, 2018 regarding the above-mentioned application, the applicant respectfully submits the following:

Amendment to the drawings on page 2;

Remarks on page 3.


300
External device
100
Power connection
Battery clamp
200
Power connection
Communi-cation connection
External power supply

1/10

Fig. 1

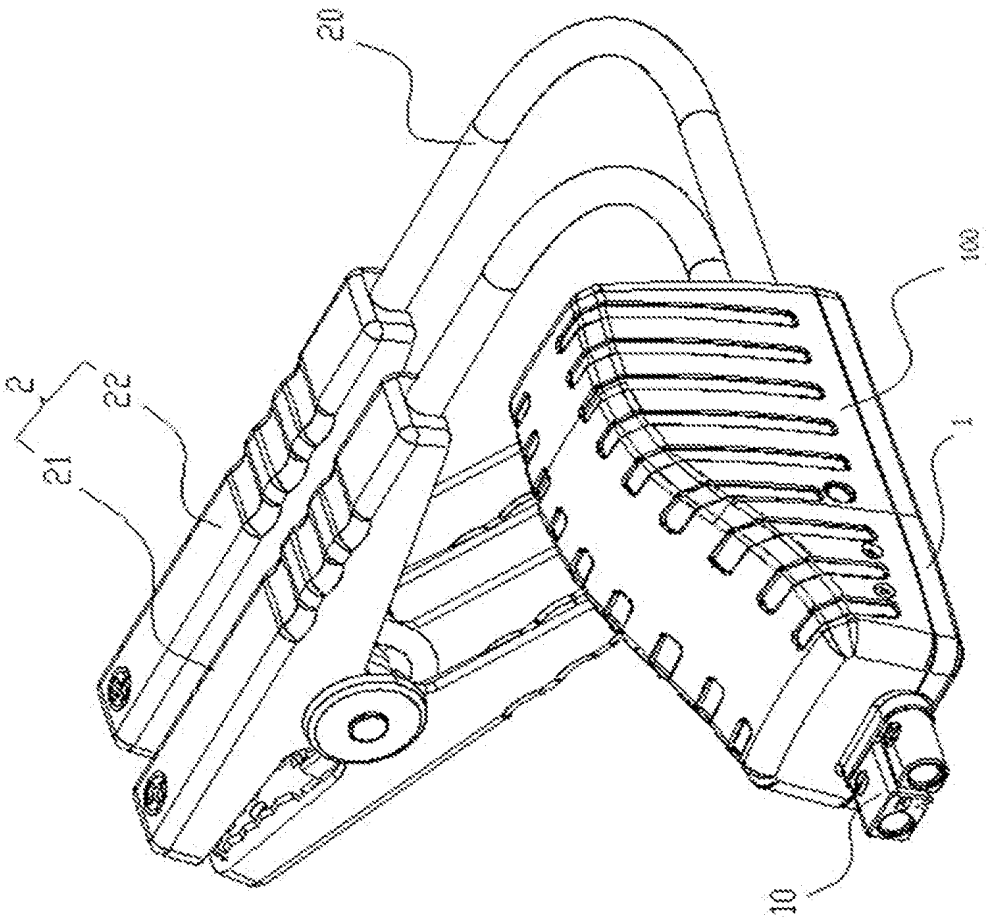


Fig. 2

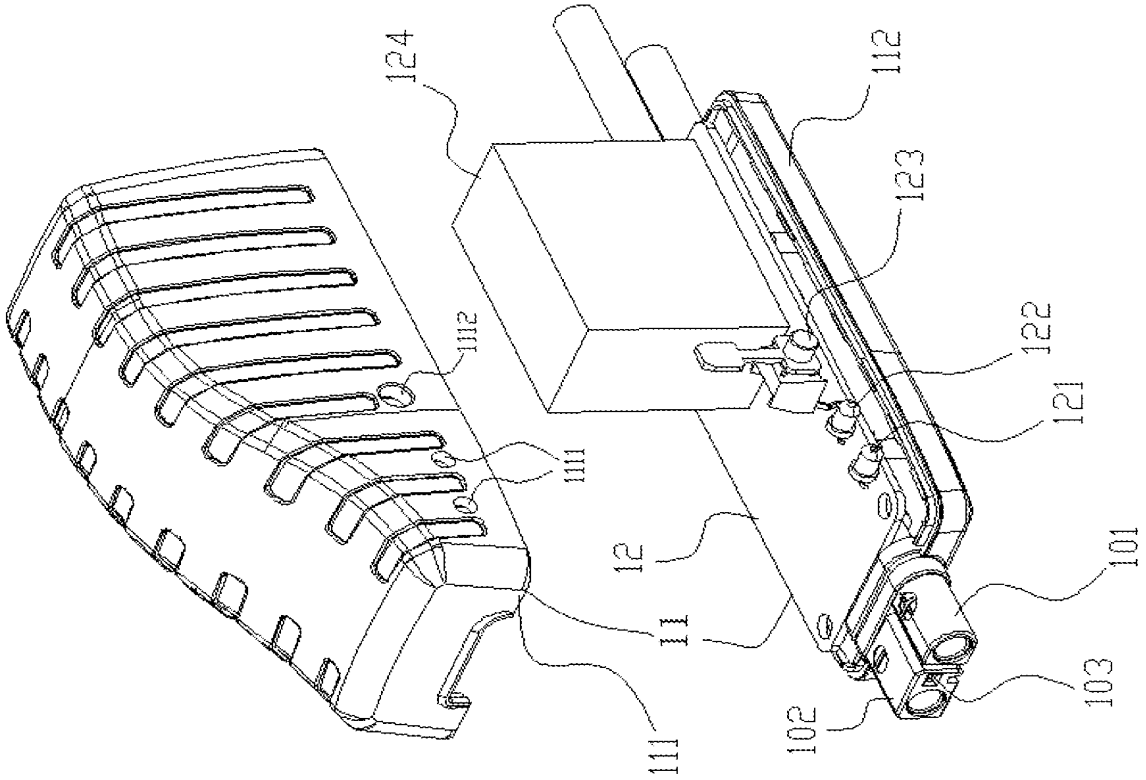


Fig. 3

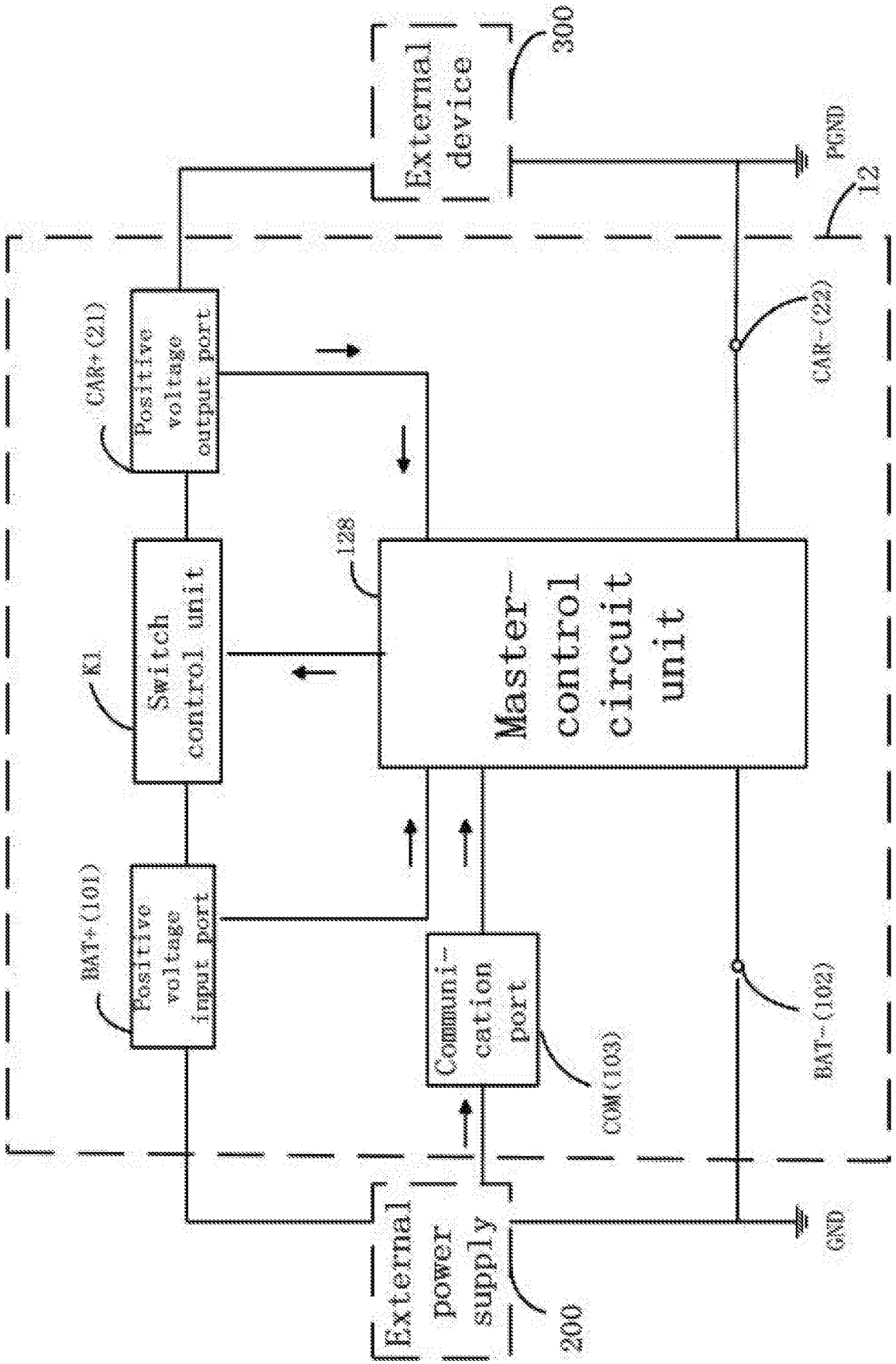

External device
300
PGND
12
CAR+ (21)
Positive voltage output port
CAR- (22)
128
Master-control circuit unit
K1
Switch control unit
BAT+ (101)
Positive voltage input port
Communi-cation port
COM (103)
BAT- (102)
External power supply
200
GND

Fig. 4

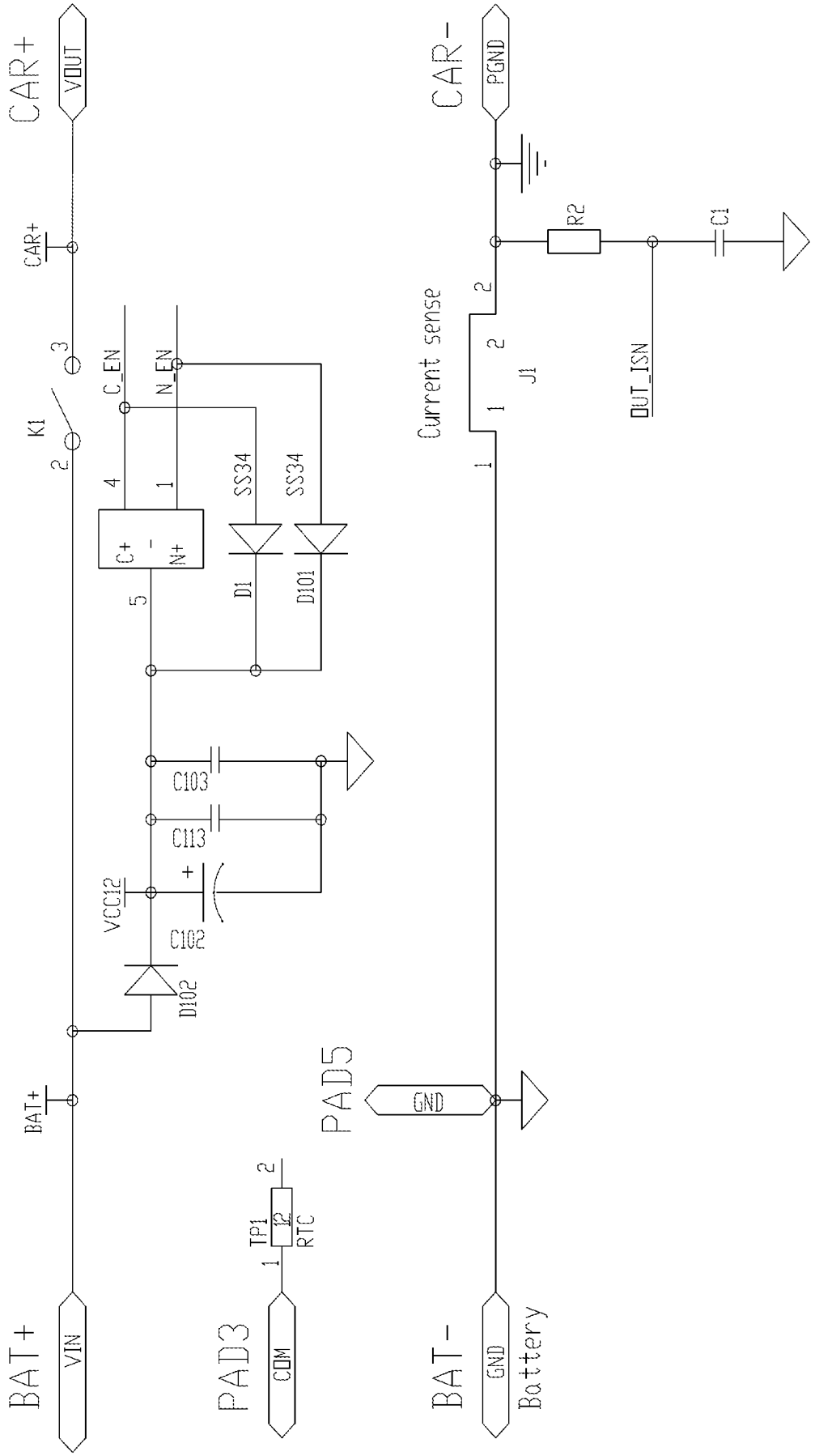

CAR+
VOUT
CAR+
3
K1
2
C_EN
N_EN
4
1
SS34
SS34
C+
-
N+
5
D1
D101
C103
C113
VCC12
+
C102
D102
BAT+
VIN
PAD3
COM
TP1
RTC
1
2
PAD5
GND
CAR-
PGND
R2
C1
Current sense
J1
2
2
1
1
OUT_ISN
BAT-
GND
Battery

Fig. 5

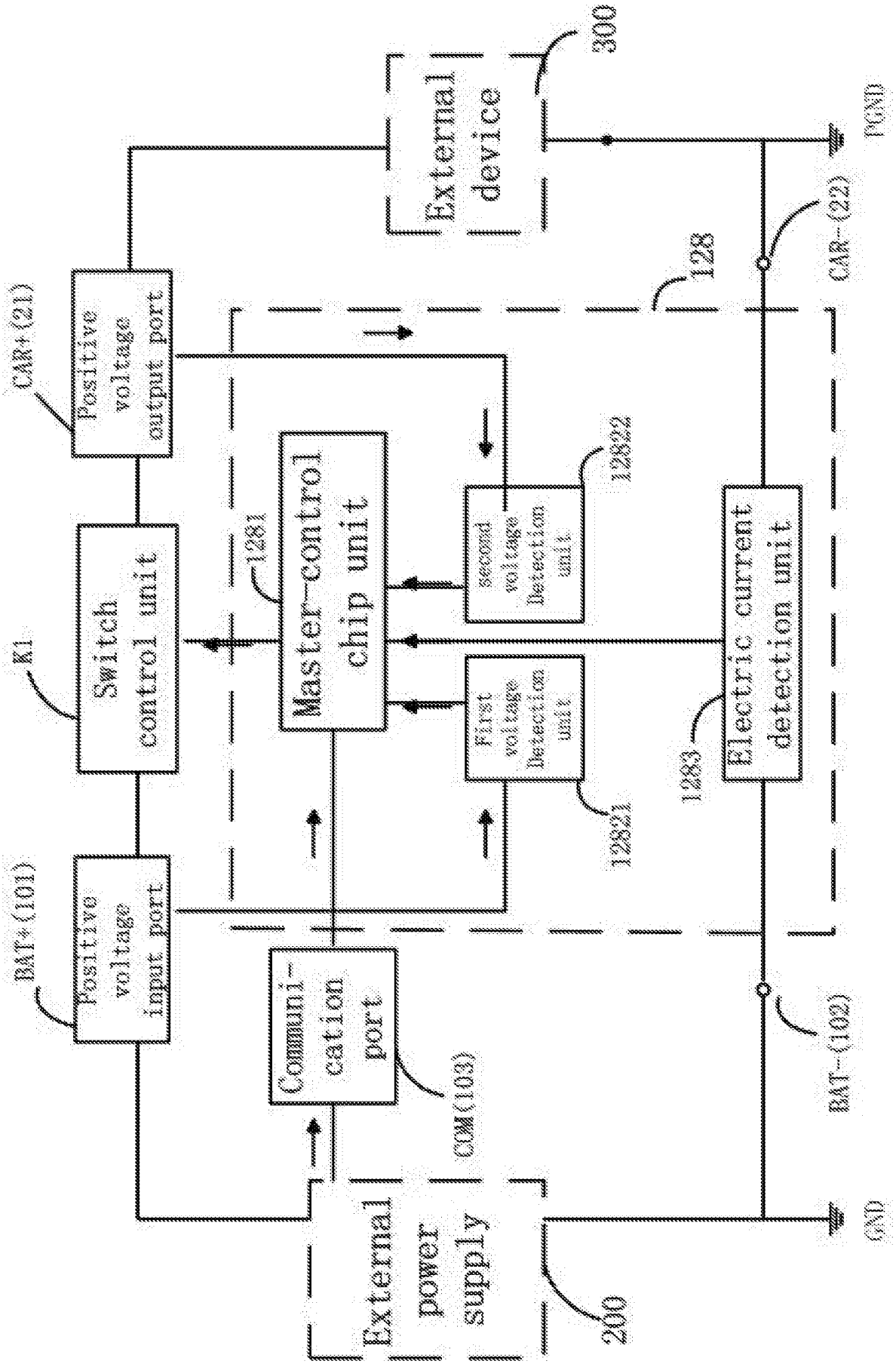

External power supply
200
External device
300
Positive voltage input port
BAT+(101)
Positive voltage output port
CAR+(21)
Communi-cation port
COM(103)
Switch control unit
K1
Master-control chip unit
1281
First voltage Detection unit
12821
second voltage Detection unit
12822
Electric current detection unit
1283
128
BAT-(102)
CAR-(22)
GND
GND

Fig. 6

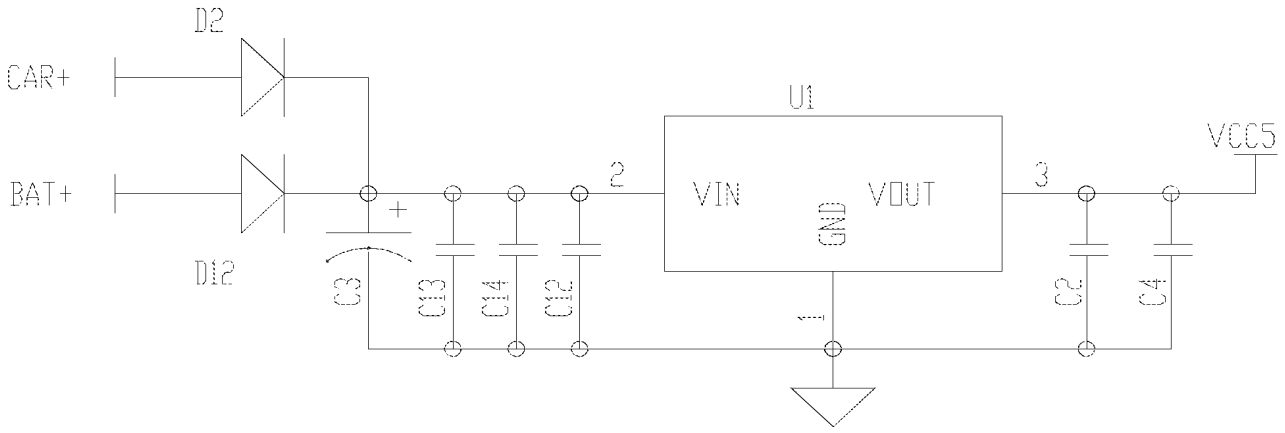

D2
CAR+
BAT+
D12
C3
C13
C14
C12
U1
VIN
GND
VOUT
2
3
1
C2
C4
VCC5

Fig. 7

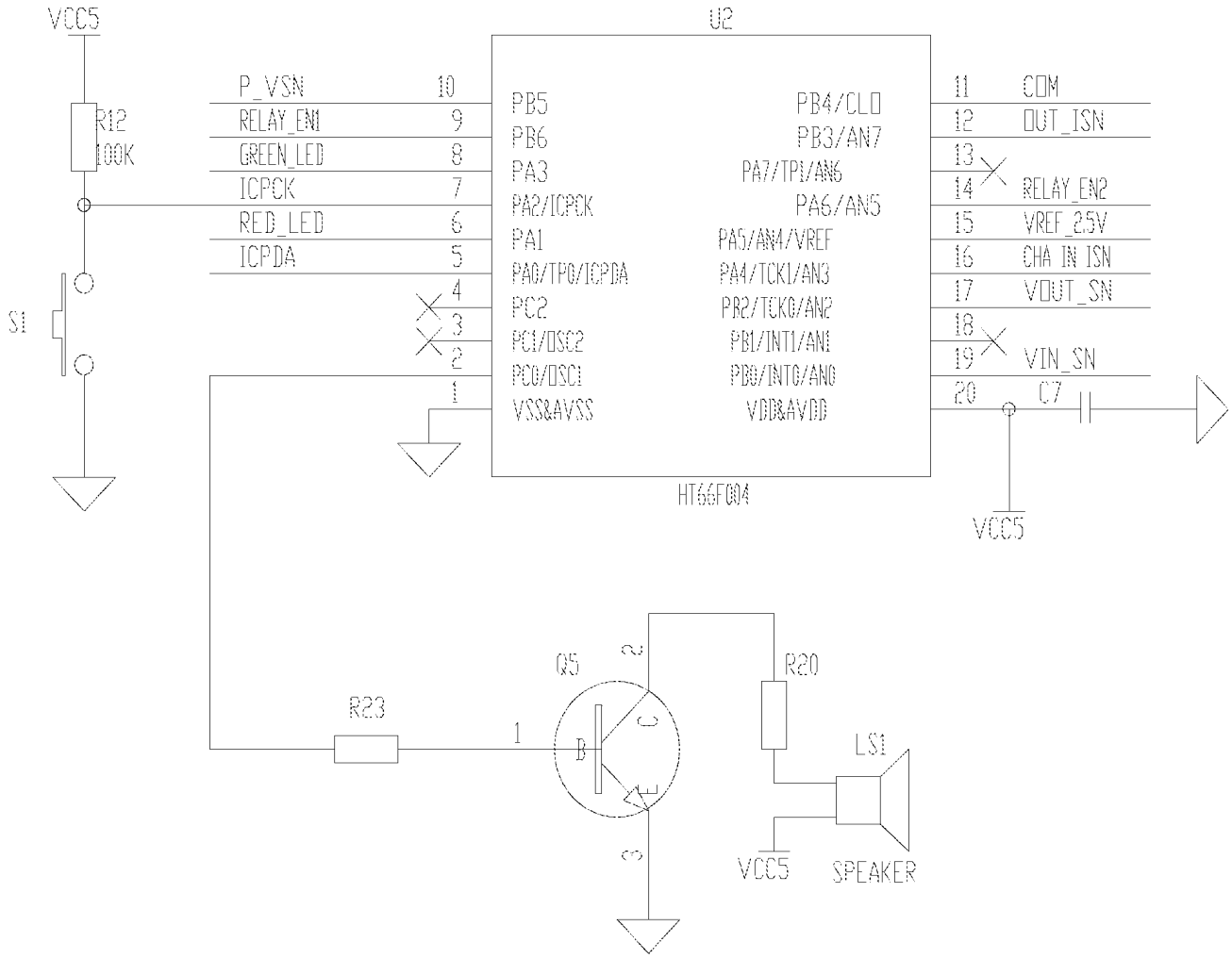

VCC5
R12
100K
S1
U2
P_VSN
RELAY_EN1
GREEN_LED
ICPCK
RED_LED
ICPDA
PB5
PB6
PA3
PA2/ICPCK
PA1
PA0/TP0/ICPDA
PC2
PC1/OSC2
PC0/OSC1
VSS&AVSS
PB4/CLO
PB3/AN7
PA7/TP1/AN6
PA6/AN5
PA5/AN4/VREF
PA4/TCK1/AN3
PB2/TCK0/AN2
PB1/INT1/AN1
PB0/INT0/AN0
VDD&AVDD
COM
OUT_ISN
RELAY_EN2
VREF_2.5V
CHA IN ISN
VOUT_SN
VIN_SN
C7
HT66F004
Q5
R23
R20
LS1
SPEAKER

Fig. 8

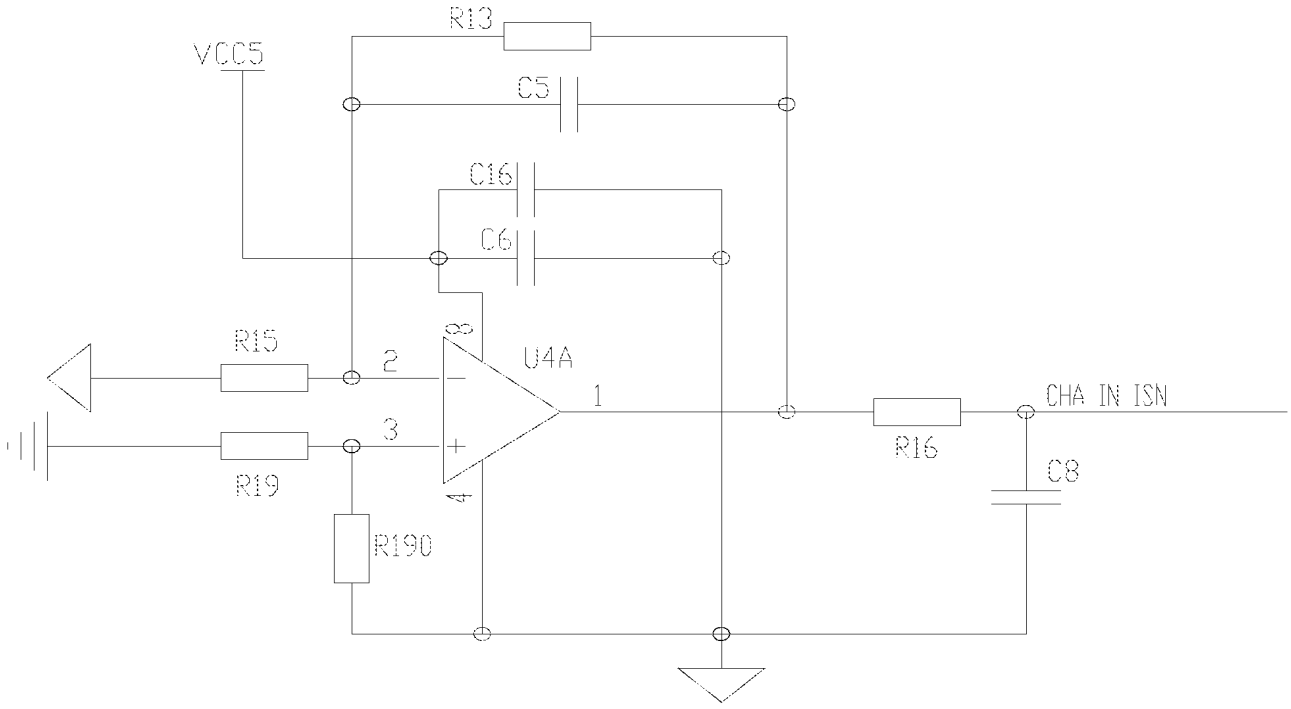

R13
VCC5
C5
C16
C6
R15
2
8
U4A
1
CHA IN ISN
3
+
R16
R19
4
C8
R190

Fig. 9

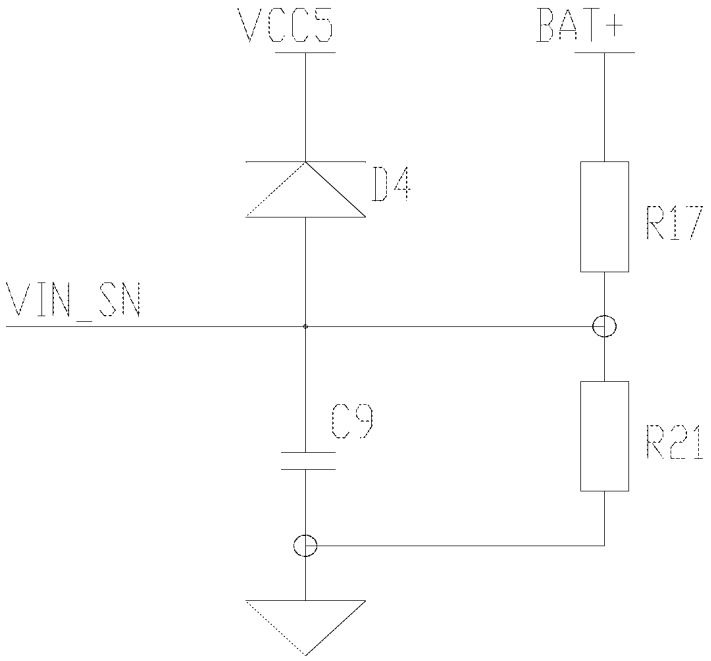

VCC5
BAT+
D4
R17
VIN_SN
C9
R21

Fig. 10

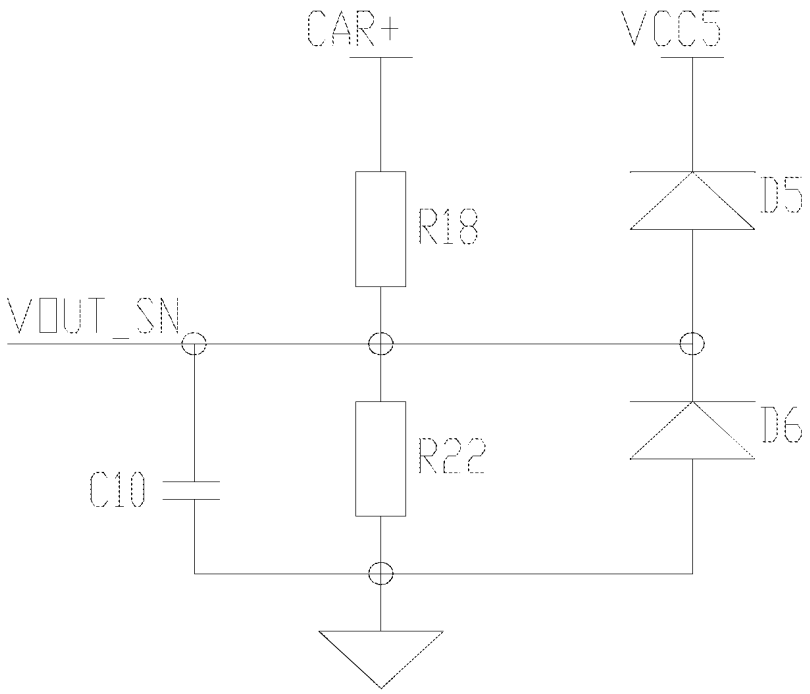


Fig. 11

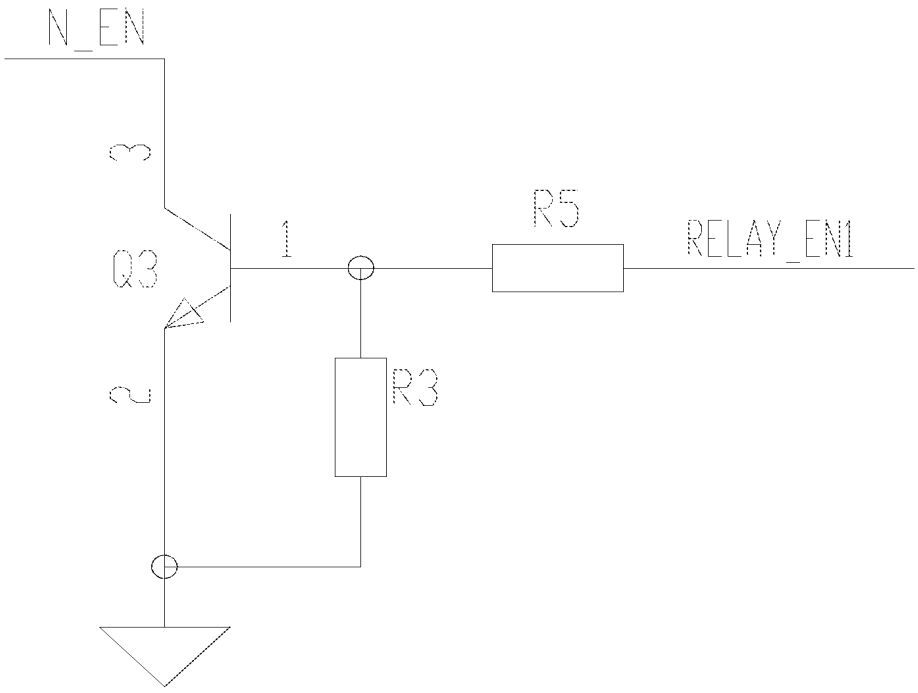


Fig. 12

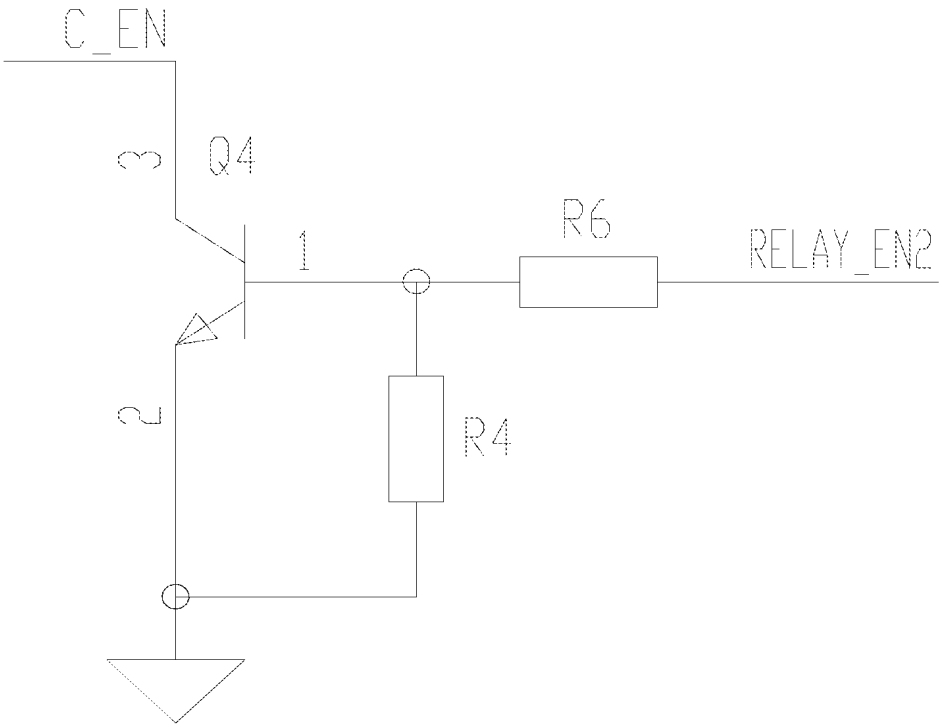


Fig. 13

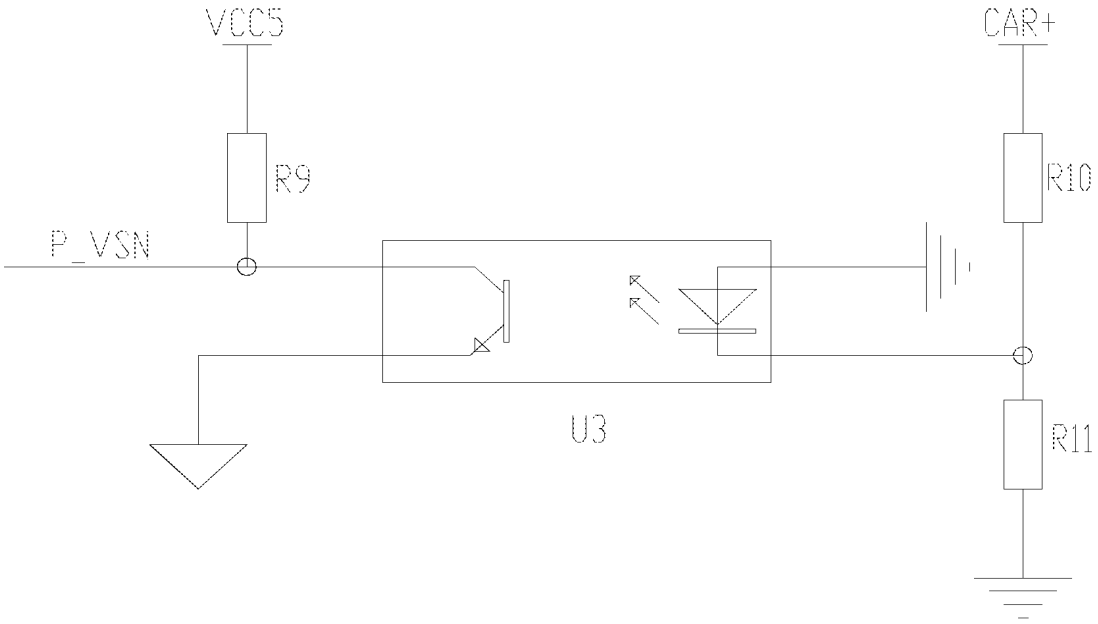


Fig. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	08/23/2016	Yun LEI	063313-8014US01	7477

96568 7590 08/02/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303
UNITED STATES OF AMERICA

EXAMINER	
WILLIAMS, ARUN C	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
08/02/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

zhuj@junhe.com
patent@junhe.com
zengb@junhe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 15245146
Applicant : Lei
Filing Date : 08/23/2016
Date Mailed : 08/02/2018

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Chris Harmon/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 15245146 **Drawings filed: 10/27/2016**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [X] The character of the lines, numbers, and letters is poor. FIG(s) 5
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [ ] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s)
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as "New" or "Amended" or "Canceled" as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as "Canceled" but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as "Canceled." See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

Electronic Acknowledgement Receipt

EFS ID:	33363980
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	Yi Zhang
Filer Authorized By:	
Attorney Docket Number:	063313-8014US01
Receipt Date:	03-AUG-2018
Filing Date:	23-AUG-2016
Time Stamp:	05:37:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1_Transmittal.pdf	263666 a17927b215bdae351a2dcf6bc0e27158f9f7eb58	no	2

Warnings:

Information:					
2		2_Response_to_Notice_to_File_Corrected_Application_Papers.pdf	46352 7df7c881e611cdd8b1af781eded152f6391012dc	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	3	3
	Drawings-only black and white line drawings	2	2
	Amendment after Notice of Allowance (Rule 312)	1	1

Warnings:					
Information:					
3	Drawings-only black and white line drawings	3_Replacement_sheet_for_drawings.pdf	2472435 b893badef23f7e03c23c0754704c898a2c6b0f8b	no	10
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	4_Notice_to_File_Corrected_Application_Papers.pdf	1752819 3f2289465ab853f63b254abfd3d6daf45722d6a6	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	4535272		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	15/245,146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

ENCLOSURES (*Check all that apply*)

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☑ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation
- ☐ Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

Notice to File Corrected Application Papers

Remarks

Response to the Notice to File Corrected Application Papers

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Jun He Law Offices, P.C.		
Signature	/James J. Zhu, Reg. No. 52,396/		
Printed name	James J. Zhu		
Date	2018-08-03	Reg. No.	52,396

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

AMENDMENT TO THE DRAWINGS

1) Figure 5 is replaced by a clearer drawing of the same contents.

Please use the replacement sheets to replace the original drawings of the application.

WINPLUS Ex. 1002, p. 314

REMARKS

The applicant has amended the drawings to correct the poor character of Figure 5 indicated in the notice.

The replacement sheets of the drawings are attached to the response.

CONCLUSION

Should the Examiner have any further questions or reservations, the Examiner is invited to telephone the undersigned attorney at (650) 265-2682.

Respectfully submitted,

Jun He Law Offices P.C.

Dated: August 3, 2018

/James J. Zhu, Reg. No. 52,396/
James J. Zhu, Ph.D.
Reg. No. 52,396

Correspondence Address:
Customer No. 96568
Jun He Law Offices P.C.
2100 Geng Road., Suite.102
Palo Alto, CA 94303
Tel: 1-888-8868168
Fax: 1-888-8082168

PART B – FEE(S) TRANSMITTAL

Complete and send this form, together with the applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22314-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note Use Block 1 for any change of address)

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, EFS-Web transmitted, or facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's Name)
(S-signature)
(Date)

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
15/245,146	08/23/2016	Yun Lei	063313-8014US01	7477

TITLE OF INVENTION:

APPLN: TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	10/23/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS

1. Change of correspondence address or indication of "Fee Address" (37CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered attorney or agent. If no name is listed, no name will be printed

1. Jun He Law Offices P.C.
2. James J. Zhu
3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

1a. NAME OF ASSIGNEE: SHENZHEN CARKU TECHNOLOGY CO, LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): NO. 1 BUILDING, YIFANG INDUSTRIAL PARK, BANTIAN, LONGGANG DISTRICT, SHENZHEN, CHINA 518000

Please check the appropriate assignee categories (will not be printed on the patent): ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☑ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies

4b. Payment of Fees(s): **(Please first reapply and previously paid fee shown above)**
☐ A check is enclosed
☐ Payment be credit card. Form PTO-2038 is attached
☑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 50-5311 (enclose an extra copy of this form)

5. Change of Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /James J. Zhu, Reg. No. 52,396/ Date 2018-10-22

Typed or printed name James J. Zhu Registration No. 52,396

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	15245146
Filing Date:	23-Aug-2016
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Filer:	James J. Zhu
Attorney Docket Number:	063313-8014US01

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**500**

Electronic Acknowledgement Receipt

EFS ID:	34069275
Application Number:	15245146
International Application Number:	
Confirmation Number:	7477
Title of Invention:	BATTERY CLAMP
First Named Inventor/Applicant Name:	Yun LEI
Customer Number:	96568
Filer:	James J. Zhu
Filer Authorized By:	
Attorney Docket Number:	063313-8014US01
Receipt Date:	22-OCT-2018
Filing Date:	23-AUG-2016
Time Stamp:	03:01:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$500
RAM confirmation Number	102218INTEFSW00007693505311
Deposit Account	505311
Authorized User	Sonia PAN

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	ptol85b-063313-8014US01.pdf	154508 b997c95193a7a1c041a4519aa5f47e75f4e7b011	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29678 418ca70c2f421290720b917c8ff7c5ef94daeb1e	no	2
Warnings:					
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		Total Files Size (in bytes):	184186		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15245146
Filing Date	2016-08-23
First Named Inventor	Yun LEI
Art Unit	2859
Examiner Name	WILLIAMS, ARUN C
Attorney Docket Number	063313-8014US01

Change(s) applied to document, /C.H.J./ 7/27/2018

	6	20150054467	A1	2015-02-26	SANYO ELECTRIC CO	Takano et al.	
	7	20140315048	A1	2014-10-23	SAMSUNG SDI CO LTD	Yang	
	8	20130264995	A1	2013-10-10	LG CHEMICAL LTD	Lee	
	9	20100173182	A1	2010-07-08	BAXTER MICHAEL et al.		

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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EXAMINER SIGNATURE

Examiner Signature	/ARUN C WILLIAMS/	Date Considered	06/22/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.W/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
Change(s) applied to document, /C.H.J./ 7/27/2018	1	20160336770	A1	2016-11-17	BOSCH GMBH ROBERT	Benz et al.
	2	20120139491	A1	2012-06-07	EBERHARD MARTIN et al.	
	3	20160001666	A1	2016-01-07	NOCO COMPANY	Nook et al.
	4	20130169038	A1	2013-07-04	KING ALLEN	
	5	20070123316	A1	2007-05-31	RESEARCH IN MOTION LIMITED	Little

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C.W/

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/245,146	12/04/2018	10148105	063313-8014US01	7477

96568 7590 11/14/2018

Jun He Law Offices P.C.
2100 Geng Road
Suite 102
Palo Alto, CA 94303

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Shenzhen Carku Technology Co., Ltd., Shenzhen, CHINA;
Yun LEI, Shenzhen, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Central District of California on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
8:21-cv-02021	12/8/2021	Central District of California

PLAINTIFF	DEFENDANT
Plaintiff Shenzhen CARKU Technology Co., Ltd.	Winplus North America, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	10,148,105	12/4/2018	Shenzhen CARKU Technology Co., Ltd.
2			
3			
4			
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy