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Application Number: 16820040 Document Date: 03/16/2020

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

FIELD OF THE INVENTION

[0001] The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery.

BACKGROUND TO THE INVENTION

[0002] Prior art devices are known for jump-starting a vehicle, 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.

[0003] 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.

[0004] 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.

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[0005] 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 batteries. Therefore, the positive and negative terminals of the two batteries are correctly connected based on the detected result of the polarity detecting unit.

[0006] 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.

[0007] 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

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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.

[0008] 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 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.

[0009] 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.

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[0010] 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.

[0011] 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 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.

[0012] 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.

[0013] 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.

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SUMMARY OF THE INVENTION

[0014] In accordance with an aspect of the invention, an apparatus is provided 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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port; a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.

[0015] In accordance with an embodiment of the invention, the internal power supply is a rechargeable lithium ion battery pack.

[0016] A jumper cable device may also be provided, having a plug configured to plug into said output port; 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.

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[0017] Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Fig. 1 is a functional block diagram of a handheld vehicle battery boost apparatus in accordance with one aspect of the present invention;

[0019] 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;

[0020] Fig. 3 is a perspective view of a handheld jump starter booster device in accordance with one example embodiment of the invention; and

[0021] 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.

DETAILED DESCRIPTION OF THE INVENTION

[0022] 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).

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[0023] 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.

[0024] 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.

[0025] 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 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.

[0026] 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

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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.

[0027] 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).

[0028] 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 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

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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.

[0029] 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.

[0030] 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 microcontroller output is driven to a logic high, the FETs 16 (Q15, Q18, and Q19) are in a low resistant state, allowing current to flow

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freely from the internal lithium battery pack negative 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.

[0031] 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.

[0032] 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.

[0033] 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

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cannot back-charge (and thereby damage) the internal lithium battery, providing another level of safety.

[0034] 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 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.

[0035] 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.

[0036] 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

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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.

[0037] 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.

[0038] 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 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.

[0039] 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.

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[0040] 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.

[0041] 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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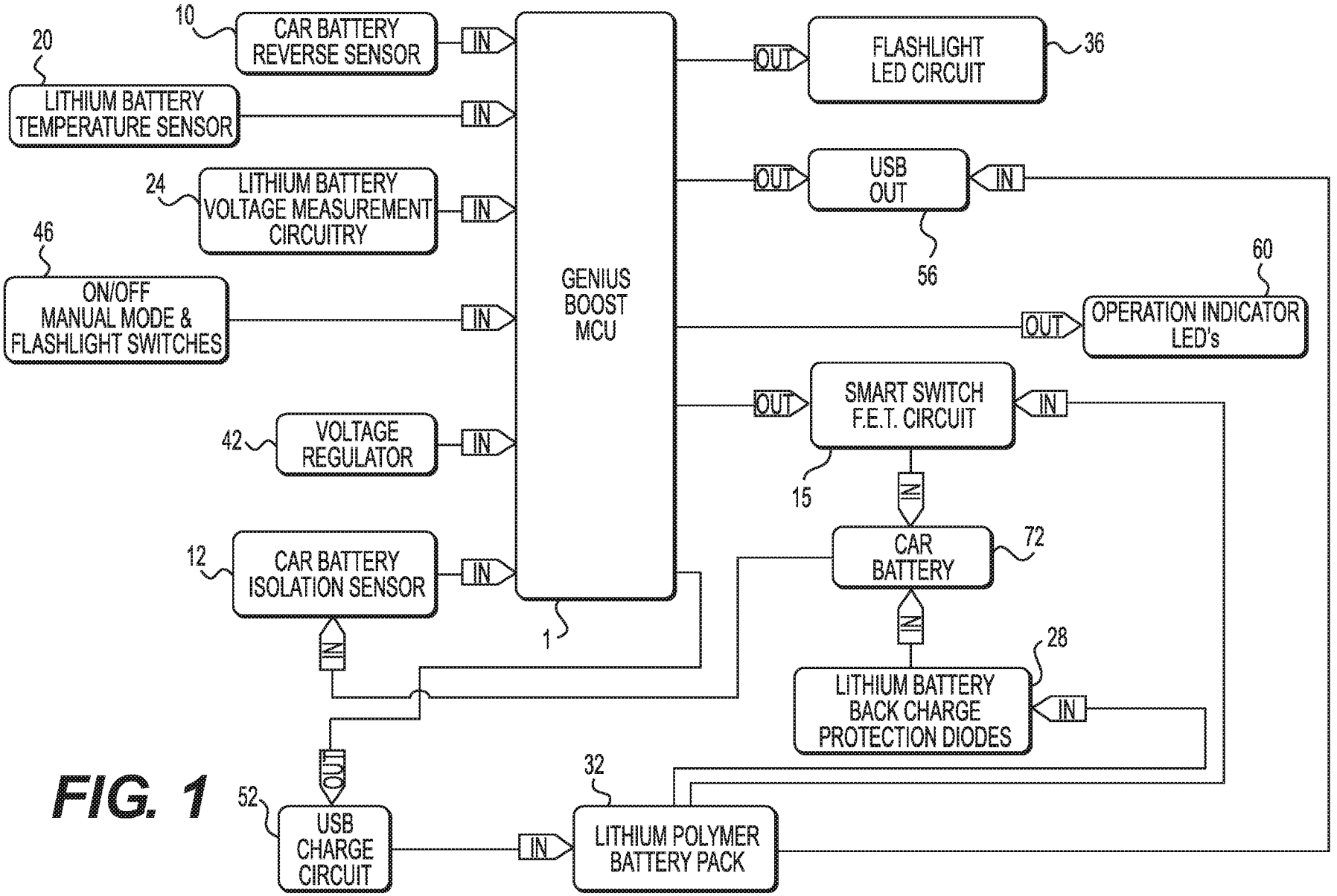


FIG. 1

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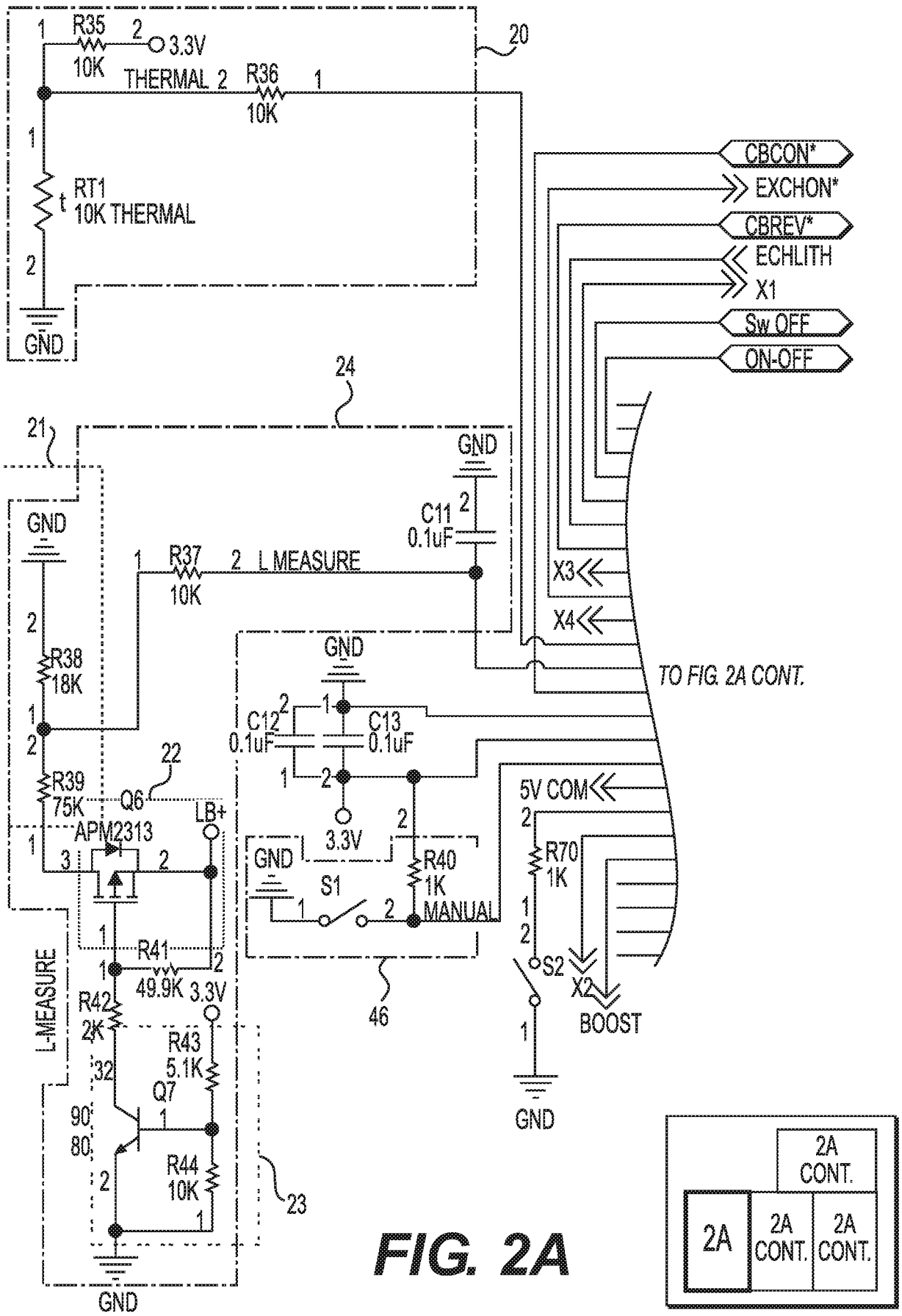
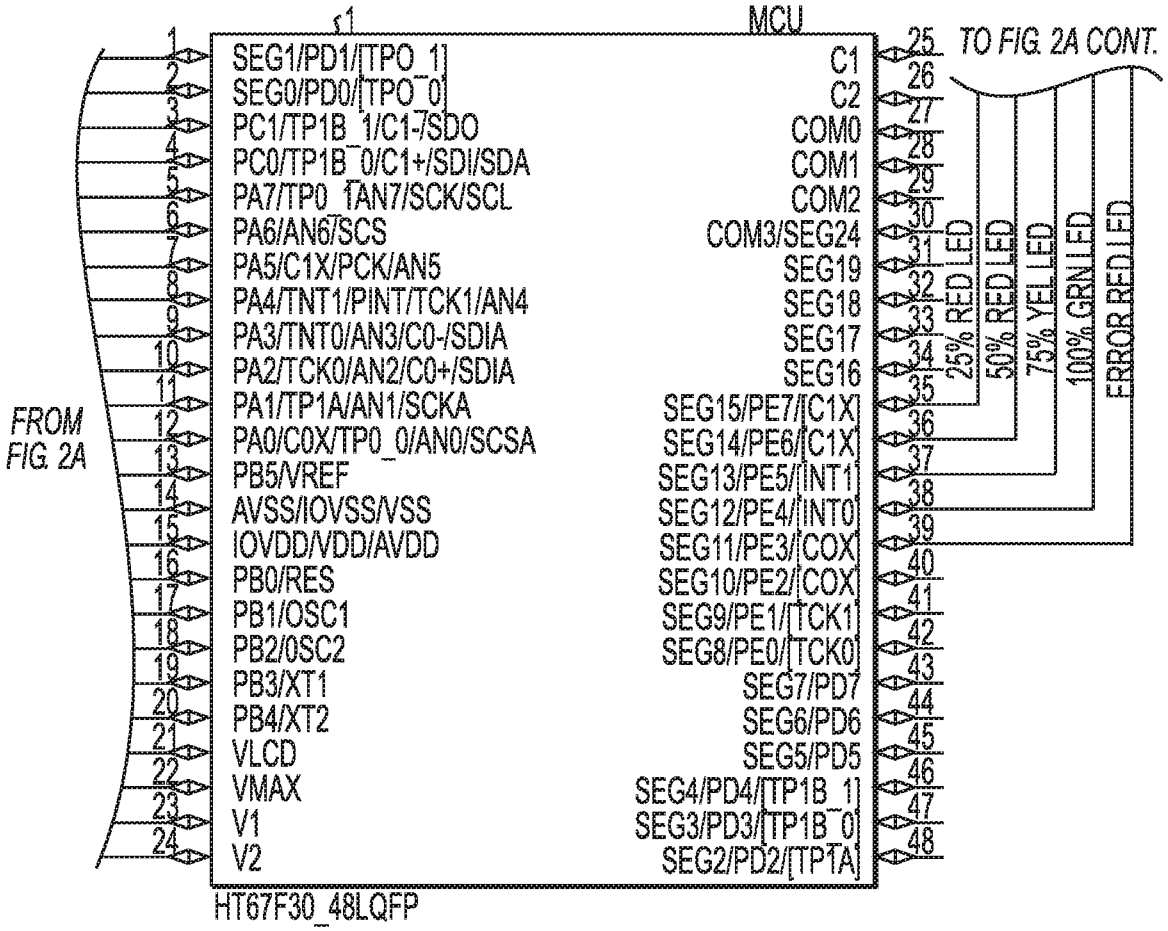
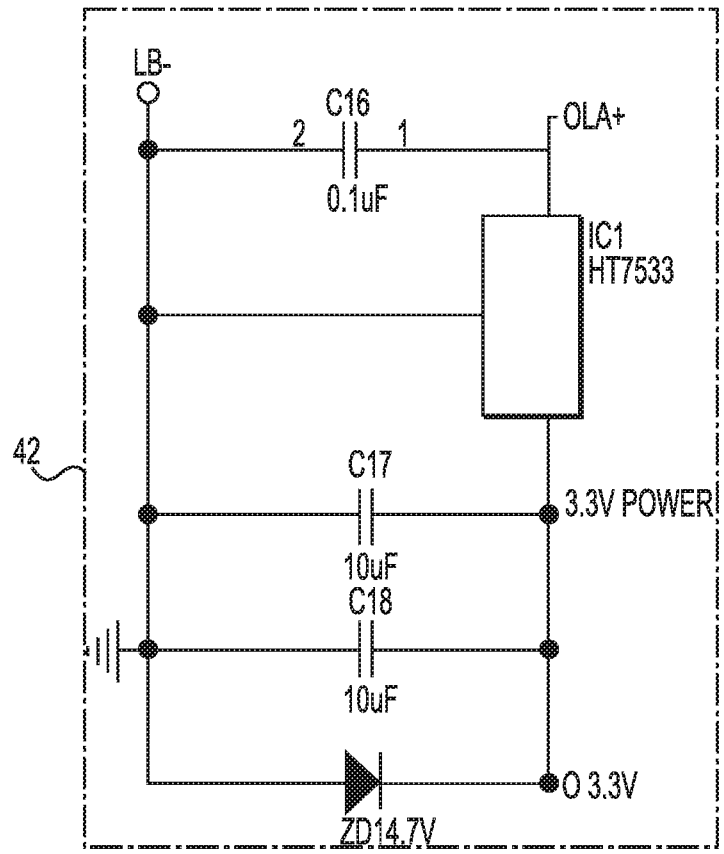

20
R35
10K
3.3V
THERMAL
R36
10K
RT1
10K THERMAL
GND
CBCON*
EXCHON*
CBREV*
ECHLITH
X1
Sw OFF
ON-OFF
24
21
GND
C11
0.1uF
R37
10K
L MEASURE
X3
X4
TO FIG. 2A CONT.
R38
18K
C12
0.1uF
C13
0.1uF
3.3V
5V COM
R70
1K
R39
75K
22
Q6
APM2313
LB+
S1
R40
1K
MANUAL
S2
X2
BOOST
46
R41
49.9K
R42
2K
R43
5.1K
Q7
R44
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L-MEASURE
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CONT.
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CONT.
2A
CONT.

FIG. 2A





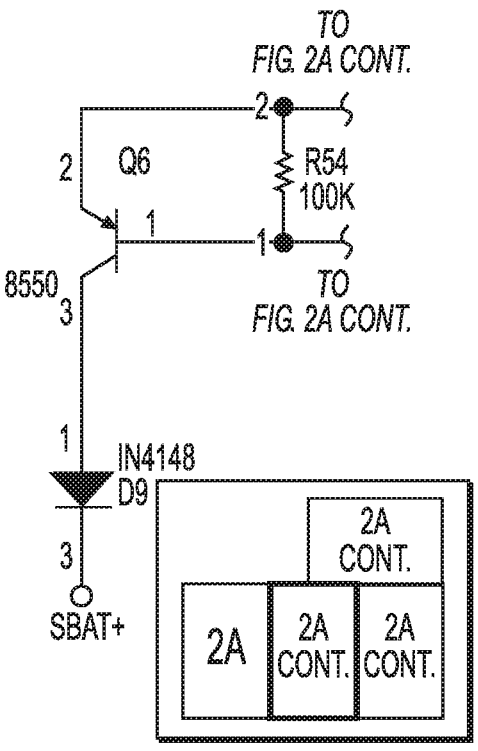


FIG. 2A CONT.

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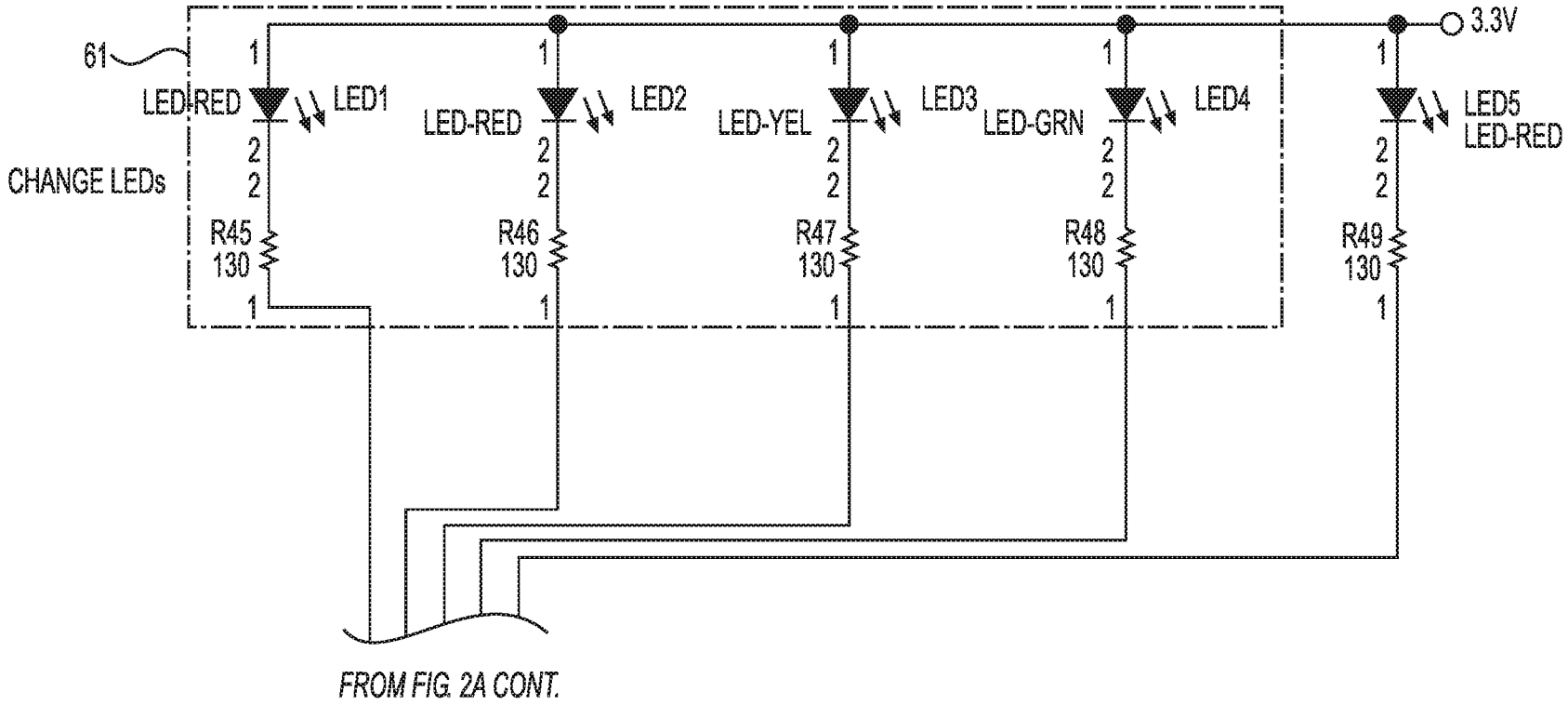


FIG. 2A CONT.

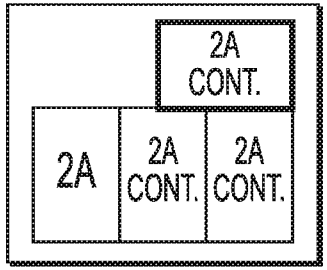


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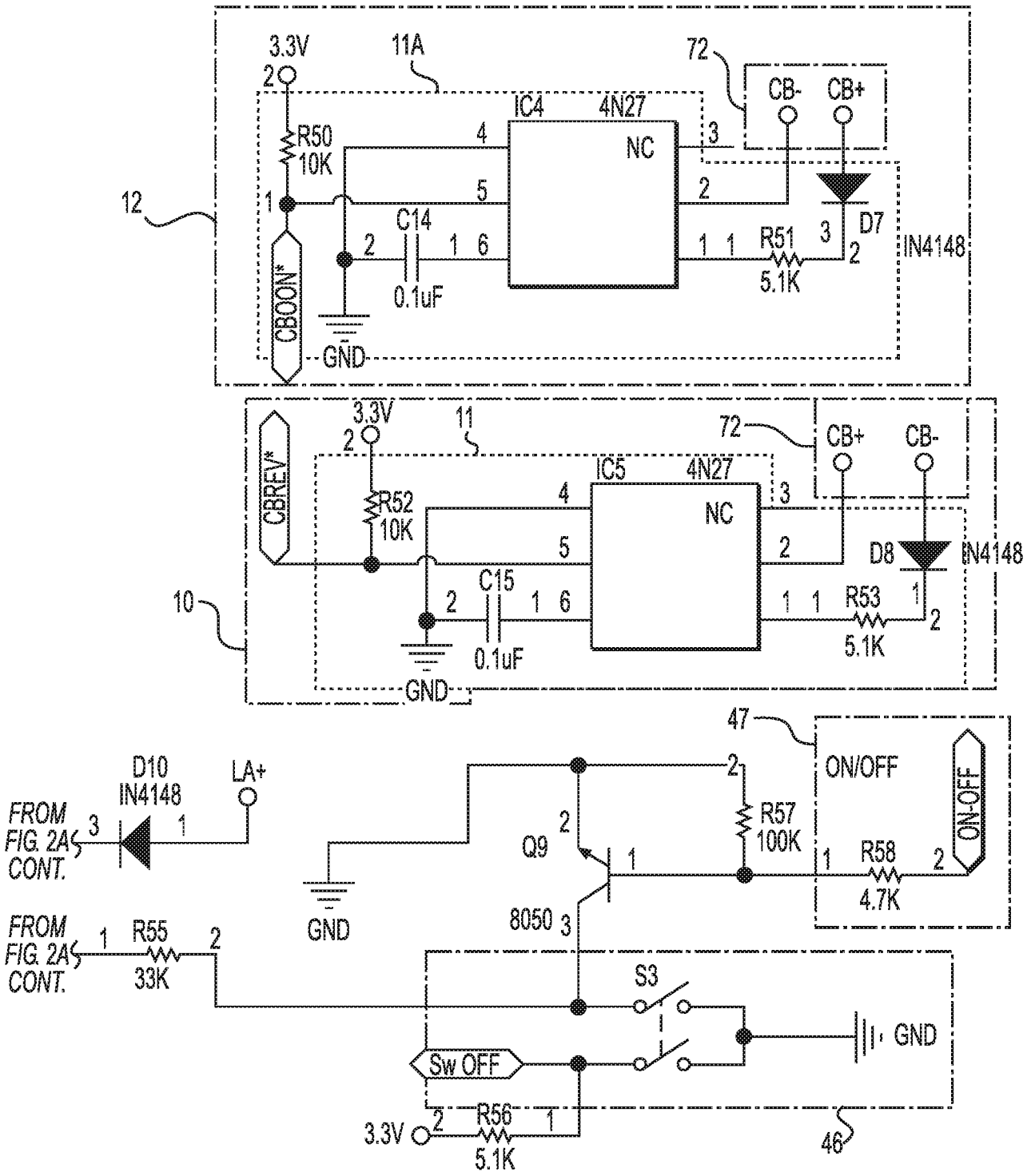


FIG. 2A CONT.

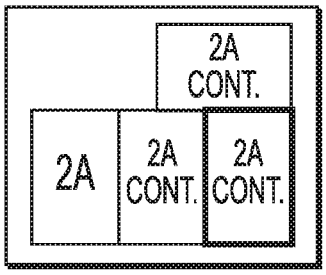


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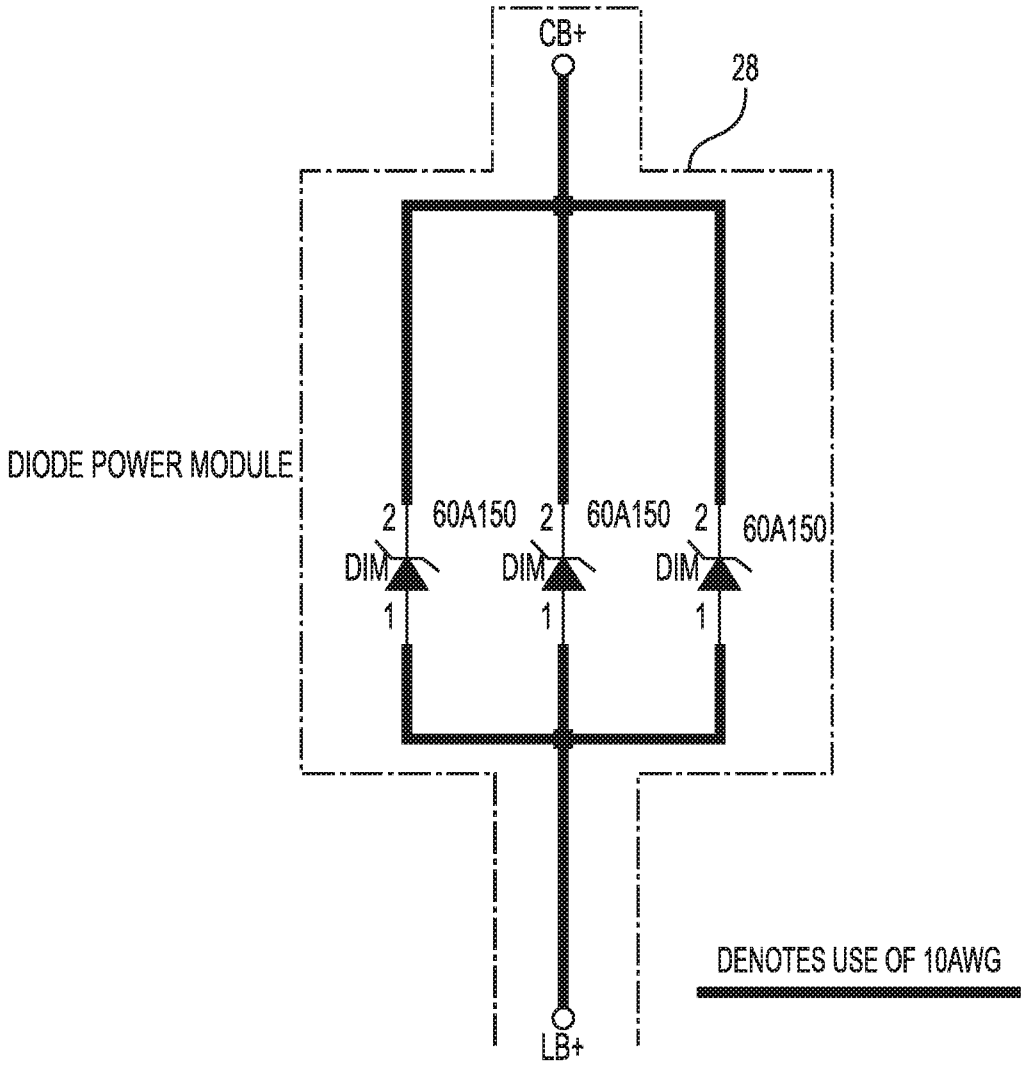


FIG. 2B

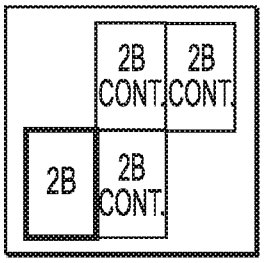


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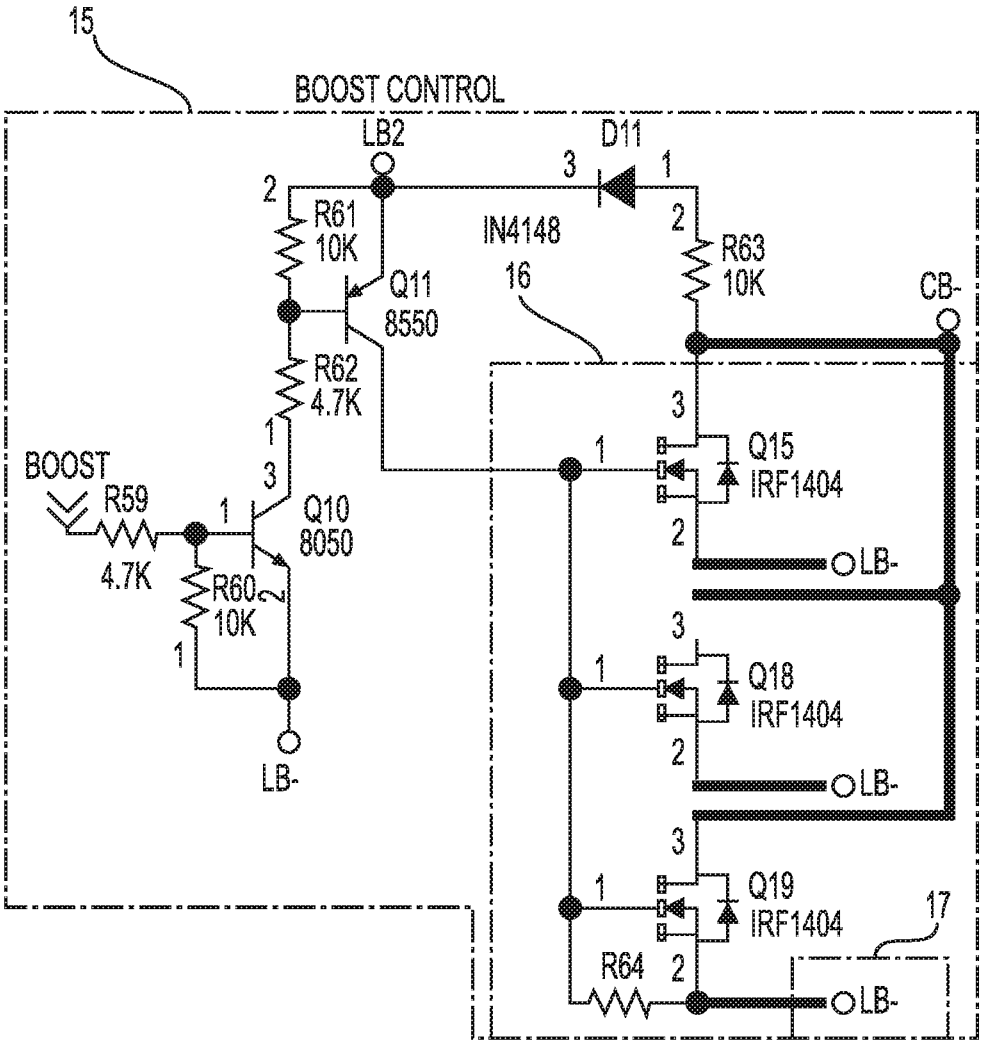


FIG. 2B CONT.

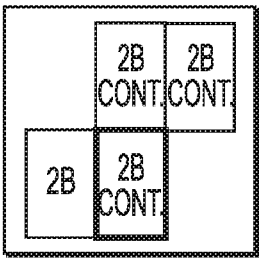


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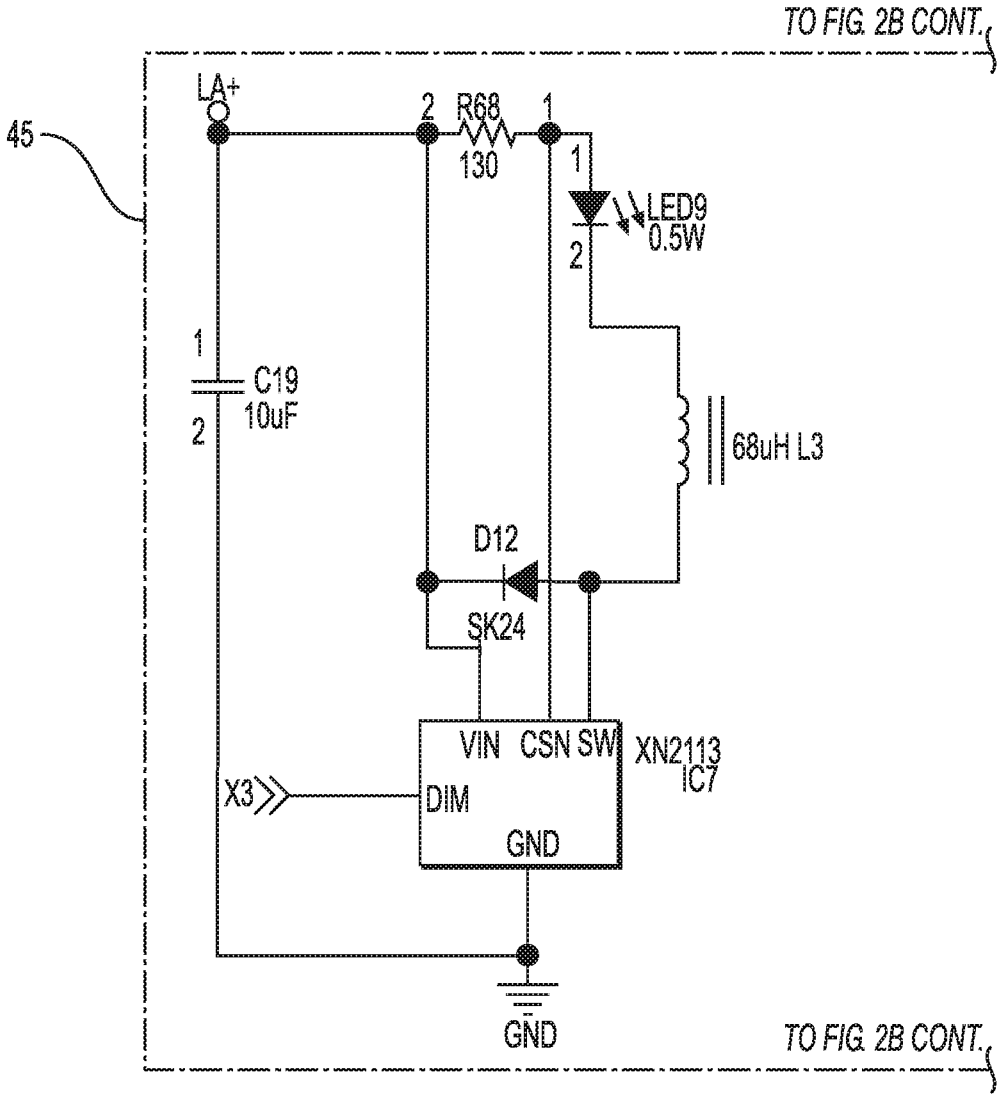


FIG. 2B CONT.

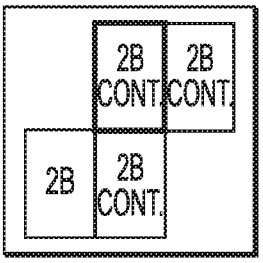


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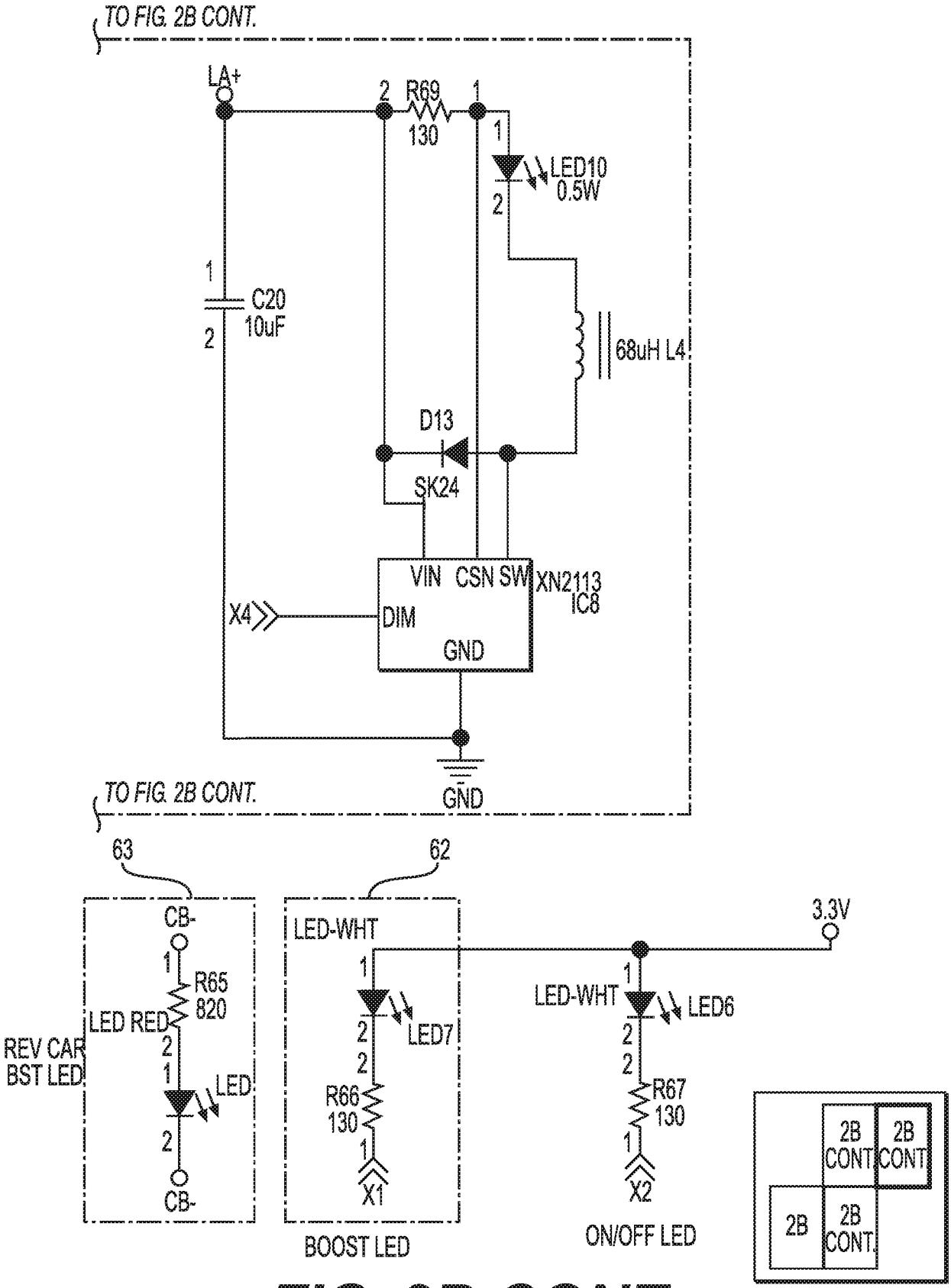

TO FIG. 2B CONT.
LA+
2
R69
130
1
1
LED10
0.5W
2
1
C20
10uF
2
68uH L4
D13
SK24
VIN
CSN
SW
XN2113
IC8
X4
DIM
GND
GND
TO FIG. 2B CONT.
63
62
CB-
1
R65
820
LED RED
2
REV CAR
BST LED
1
LED
2
CB-
LED-WHT
1
LED7
2
2
R66
130
1
X1
BOOST LED
3.3V
1
LED-WHT
LED6
2
2
R67
130
1
X2
ON/OFF LED
2B CONT
2B CONT
2B
2B CONT.

FIG. 2B CONT.

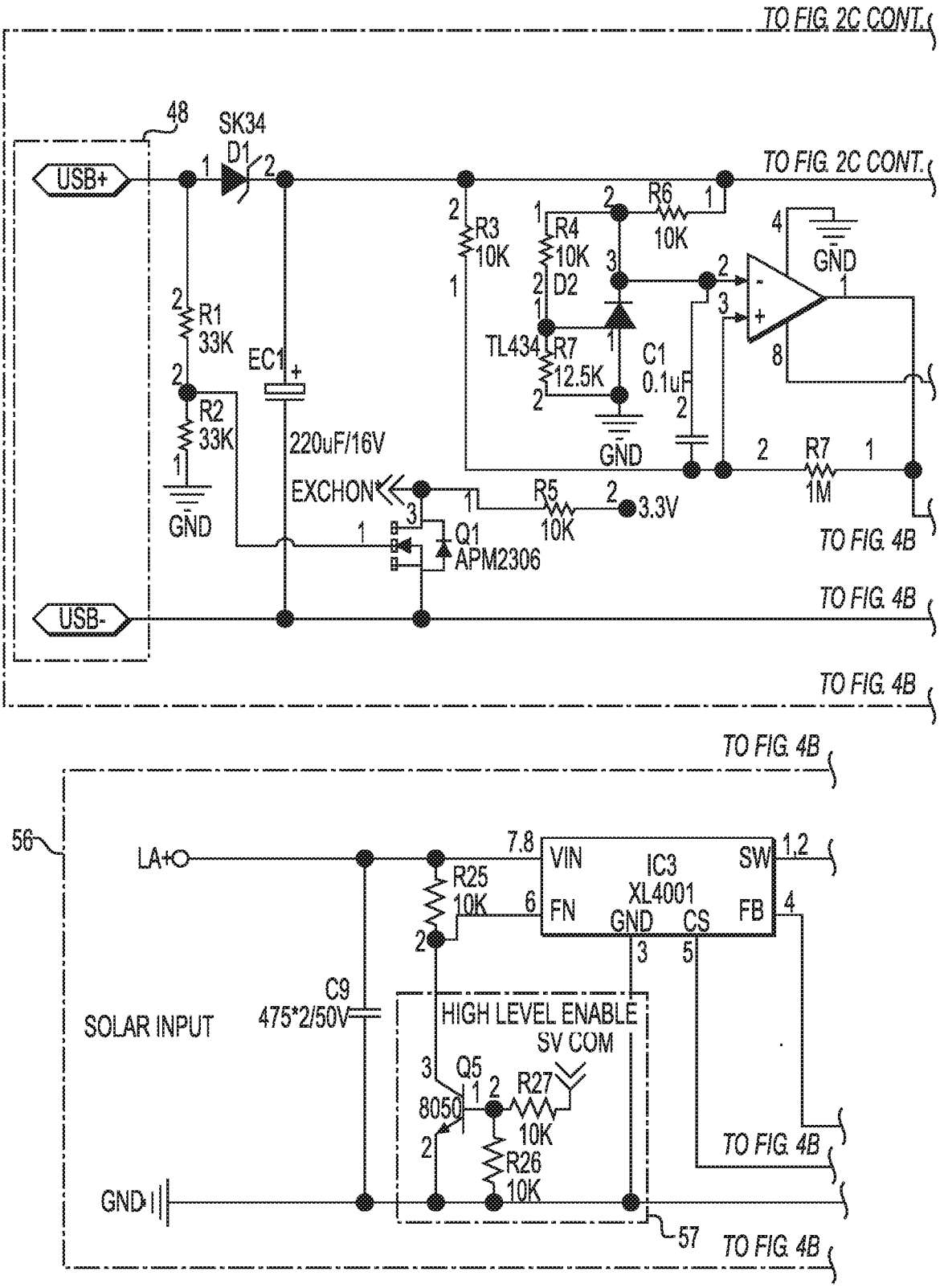


FIG. 2C

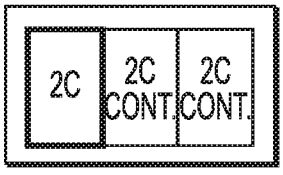


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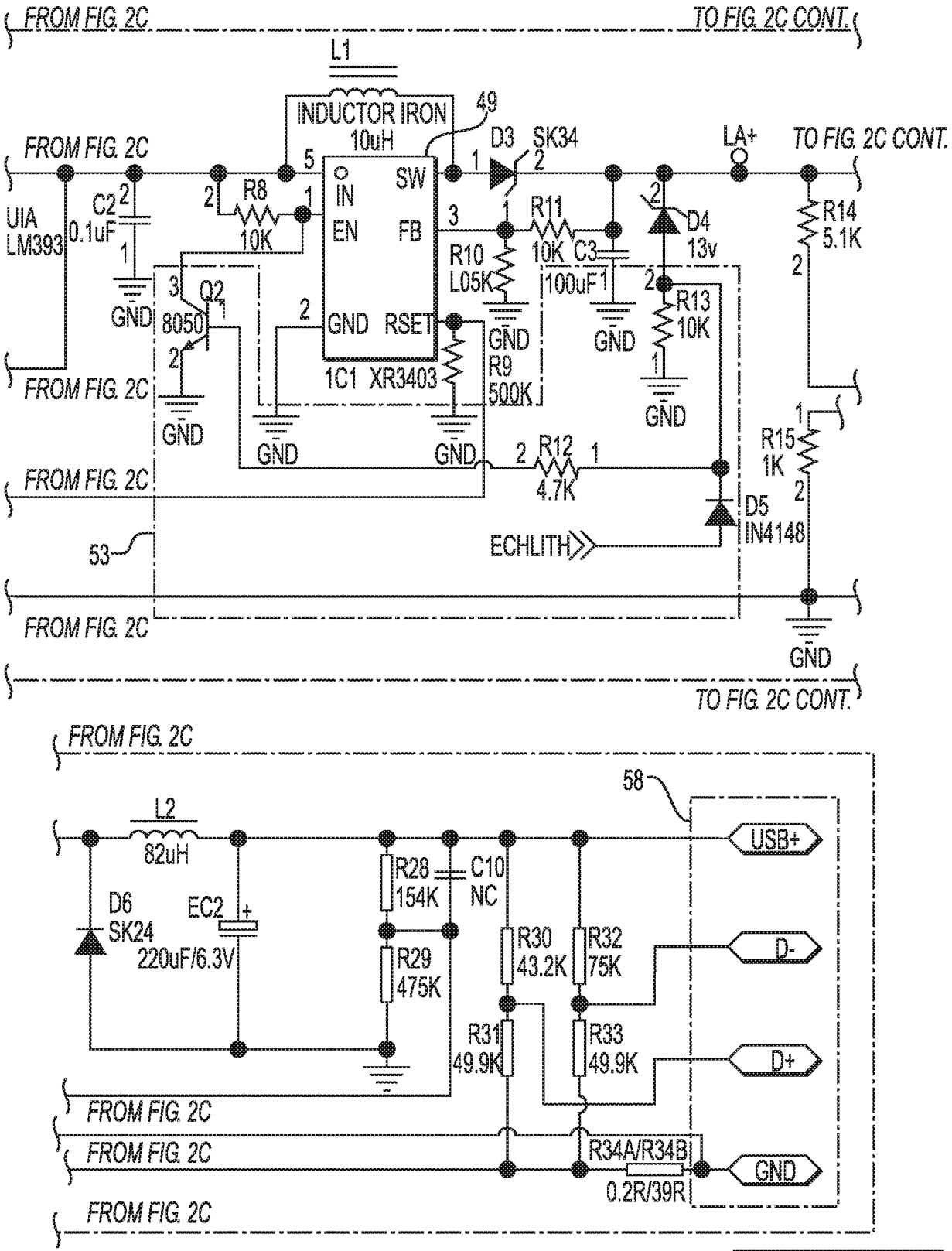
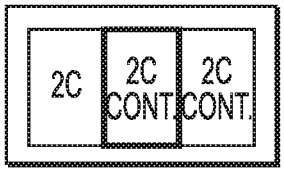

FROM FIG. 2C
TO FIG. 2C CONT.
L1
INDUCTOR IRON
10uH
49
D3 SK34
LA+
TO FIG. 2C CONT.
UIA
LM393
C2
0.1uF
R8
10K
IN
SW
EN
FB
GND
RSET
1C1 XR3403
R10
L05K
R11
10K
C3
100uF
D4
13v
R13
10K
R14
5.1K
Q2
8050
R9
500K
R12
4.7K
R15
1K
D5
IN4148
ECHLITH
53
L2
82uH
58
USB+
D6
SK24
EC2
220uF/6.3V
R28
154K
C10
NC
R29
475K
R30
43.2K
R32
75K
D-
R31
49.9K
R33
49.9K
D+
R34A/R34B
0.2R/39R
GND

FIG. 2C CONT.


2C
2C CONT.
2C CONT.

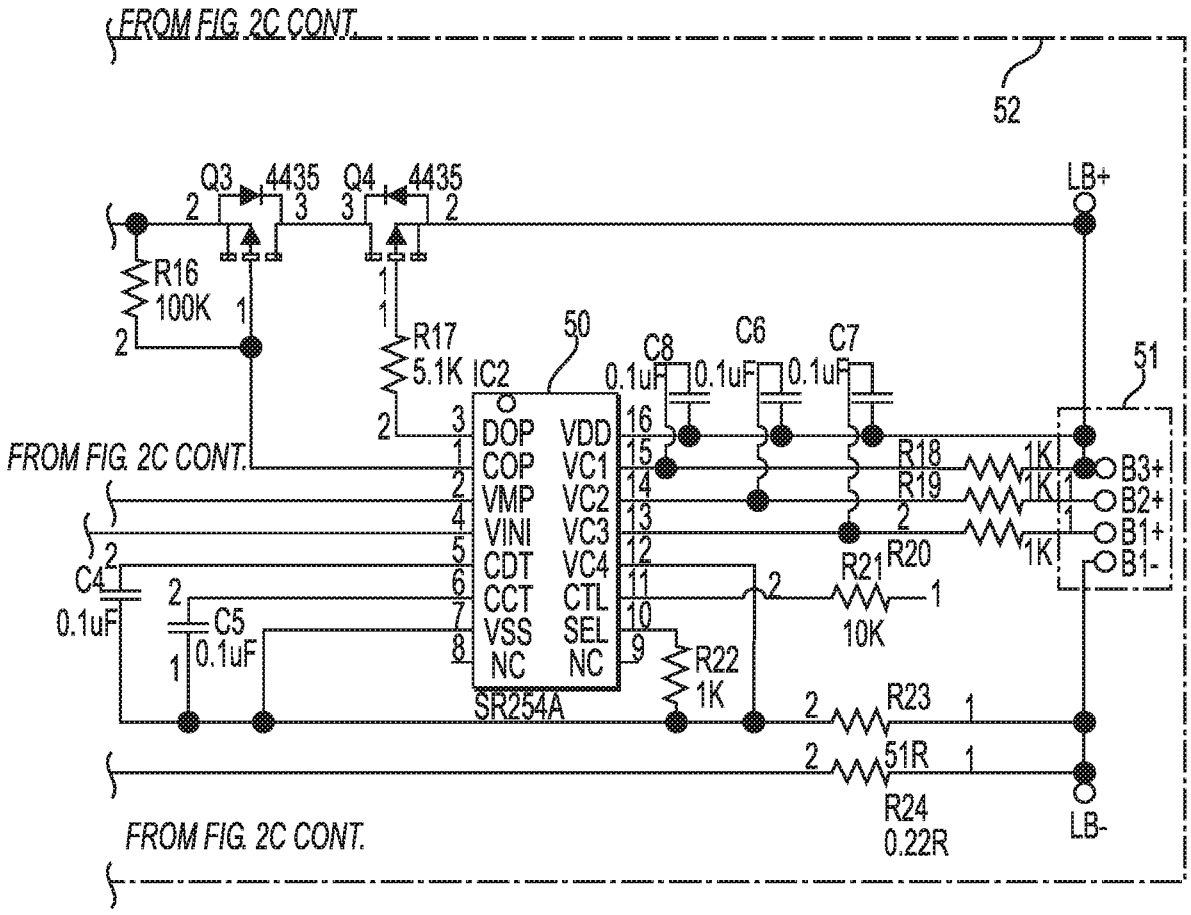


FIG. 2C CONT.

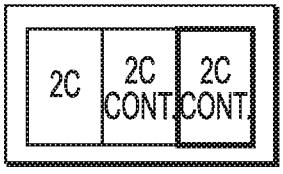


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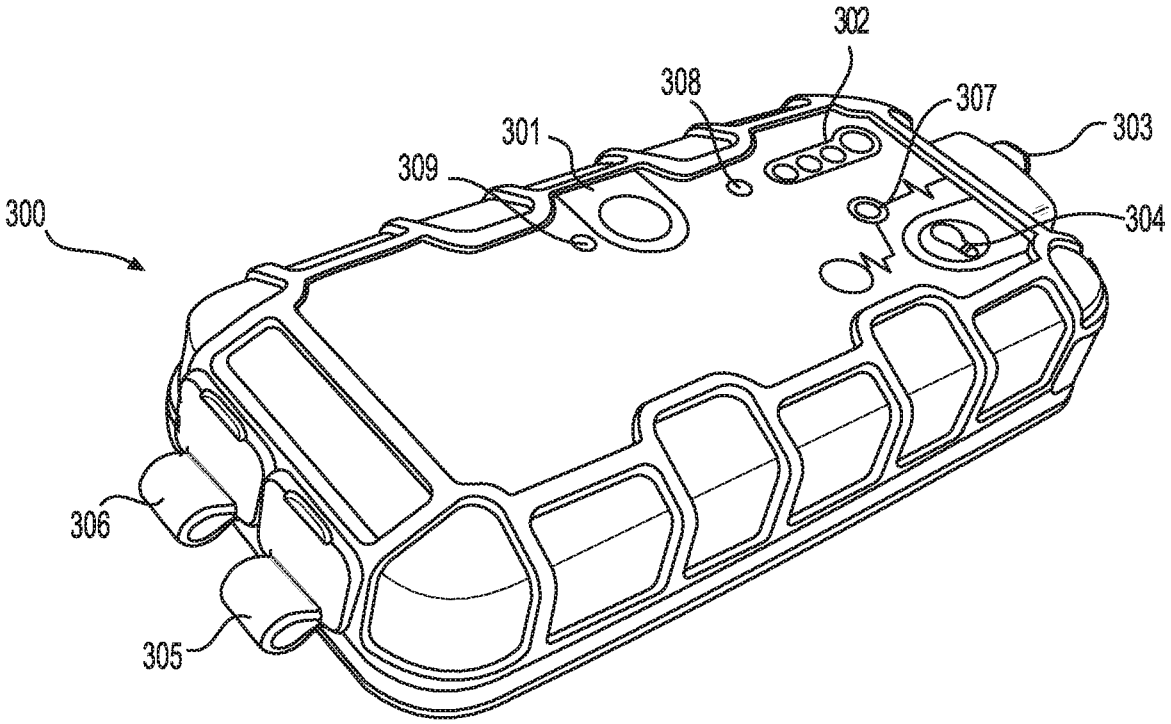


FIG. 3

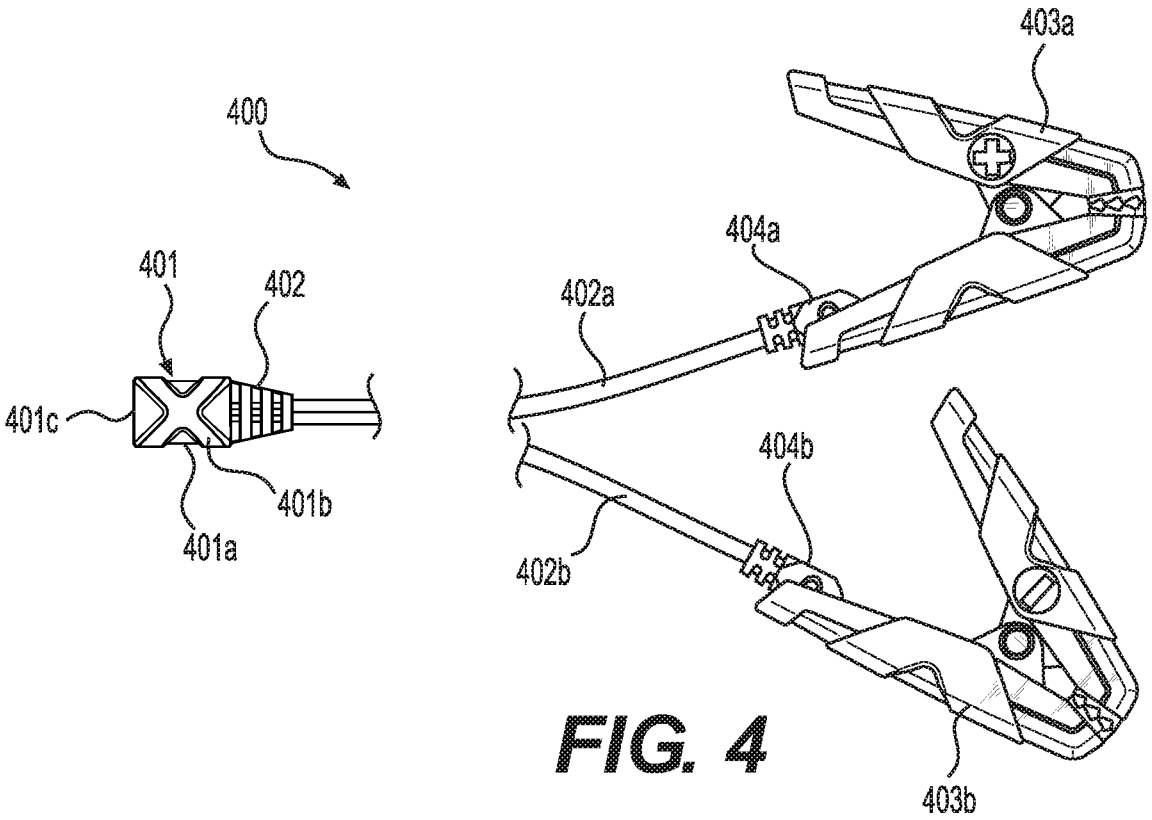


FIG. 4

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: Derek Michael Underhill Date (Optional) :_____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 and 1.14. This collection is estimated to take 1 minute 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: Commissionor 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Privacy Act Statement

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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.
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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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

ABSTRACT

A handheld device for jump starting a vehicle engine includes a rechargeable lithium ion battery pack (32) and a microcontroller (1). The lithium ion battery is coupled to a power output port of the device through a power switch circuit (15) actuated by the microcontroller. A vehicle battery isolation sensor (12) connected in circuit with positive and negative polarity outputs detects the presence of a vehicle battery (72) connected between the positive and negative polarity outputs. A reverse polarity sensor (10) 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

  filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: William Knight Nook Date (Optional): 7-7-14

Signature: William Knight Nook

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: James Richard Stanfield Date (Optional): 7/8/2014

Signature: James Richard Stanfield

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/AIA/15 (03-13)
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UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	054985-000055-US-02-01
First Named Inventor	Jonathan Lewis NOOK
Title	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTE
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* 18] 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* 13]
6. **Inventor's Oath or Declaration** [*Total Pages* 4] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [✔] A copy from a prior application (37 CFR 1.63(d))
7. [✔] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee _____
11. [ ] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [ ] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** _____

*__Note__: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✔] The address associated with Customer Number: 20230 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/William L. Klima/	Date	March 16, 2020
Name (Print/Type)	William L. Klima	Registration No. (Attorney/Agent)	32422

This collection of information is required by 37 CFR 1.53(b). 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 and 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.**

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port;

a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

4. The apparatus of claim 1, wherein said power 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.

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.

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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 and a battery terminal clamp.

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

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
	Jonathan	Lewis	NOOK	

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

City	State/Province	Country of Residence
Gates Mills	OH	US

Mailing Address of Inventor:

Address 1	c/o The Noco Company, 30339 Diamond Parkway, #102
Address 2	
City	Glenwillow
State/Province	OH
Postal Code	44139
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	William	Knight	NOOK	

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

City	State/Province	Country of Residence
Shaker Heights	OH	US

Mailing Address of Inventor:

Address 1	c/o The Noco Company, 30339 Diamond Parkway, #102
Address 2	
City	Glenwillow
State/Province	OH
Postal Code	44139
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	Richard	STANFIELD	

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

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

City	Glendale	State/Province	AZ	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o The Noco Company, 30339 Diamond Parkway, #102		
Address 2			
City	Glenwillow	State/Province	OH
Postal Code	44139	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Derek	Michael	UNDERHILL	

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

City	Tempe	State/Province	AZ	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o The Noco Company, 30339 Diamond Parkway, #102		
Address 2			
City	Glenwillow	State/Province	OH
Postal Code	44139	Country	US

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	20230		
Email Address	Patlaw@vorys.com	Add Email	Remove Email

Application Information:

Title of the Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION		
Attorney Docket Number	054985-000055-US-02-01	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	13	Suggested Figure for Publication (if any)	

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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	20230		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15691884	2017-08-31

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15691884	Continuation of	14619655	2015-02-11	9770992	2017-09-26

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14619655	Division of	14325938	2014-07-08	9007015	2015-04-14

Prior Application Status	Pending	Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14325938	Continuation of	PCT/US14/45434	2014-07-03

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

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. 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(i)(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)

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

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.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

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.

Applicant 1 — Remove

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	THE NOCO COMPANY		
Mailing Address Information For Applicant:			
Address 1	30339 Diamond Parkway, #102		
Address 2			
City	Glenwillow	**State/Province**	OH
Country	US	Postal Code	44139
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	THE NOCO COMPANY

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	30339 Diamond Parkway, #102		
Address 2			
City	Glenwillow	**State/Province**	OH
Country i	US	Postal Code	44139
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/William L. Klima/			Date (YYYY-MM-DD)	2020-03-16
First Name	William L.	Last Name	Klima	Registration Number	32422

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

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. 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	054985-000055-US-02-01
	Application Number	
Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION	

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.**

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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 CooperationTreaty.

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:	38878728
Application Number:	16820040
International Application Number:	
Confirmation Number:	1056
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Customer Number:	20230
Filer:	William Leonard Klima/Lisa Elliott
Filer Authorized By:	William Leonard Klima
Attorney Docket Number:	054985-000055-US-02-01*
Receipt Date:	16-MAR-2020
Filing Date:	
Time Stamp:	16:31:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$935
RAM confirmation Number	E20203FG31384070
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	TL.pdf	316133 cbc77f05696e98c7a2653dd5450e4f525d4c4c10	no	2
Warnings:					
Information:					
2	Application Data Sheet	ADS.pdf	1862819 1bb572a616436ed61344dc5fcd8bbbabbbed3fe9	no	9
Warnings:					
Information:					
3		DECLARATIONS.pdf	718788 18c076270b390a6ebe8850a8b13a4dcfbec9942b	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Oath or Declaration filed	1	2
	Oath or Declaration filed	3	4
	Oath or Declaration filed	5	6
	Oath or Declaration filed	7	8

Warnings:					
Information:					
4		Appl.pdf	72765 804be03b61a204c938ccef1eb3ae1d9380ae3925	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

	Specification		1		13
	Claims		14		17
	Abstract		18		18
Warnings:					
Information:					
5	Drawings-other than black and white line drawings	Drawings.pdf	726412 b70a2ea9f975688dd59cdf8145e65c6fd0b9555b	no	13
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	36829 b00441a685065f1ae4bb9214595474334242 4292	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3733746		

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/AIA/01 (06-12)
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 displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

  filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Jonathan Lewis Nook Date (Optional): 7/7/2014

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 and 1.14. This collection is estimated to take 1 minute 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Privacy Act Statement

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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).
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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)).
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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Filer:	William Leonard Klima/Lisa Elliott
Attorney Docket Number:	054985-000055-US-02-01*

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	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	3	50	150
Miscellaneous-Filing:				
Petition:				

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**935**

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK et al.
Art Unit	2859
Examiner Name	NOT YET ASSIGNED
Attorney Docket Number	054985.000055-US-02-01

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	8493021	B2	2013-07-23	RICHARDSON et al.	
	2	D746774	S	2016-01-05	NOOK et al.	
	3	D735665	S	2015-08-04	NOOK et al.	
	4	D726121	S	2015-04-07	NOOK et al.	
	5	6822425	B2	2004-11-23	KRIEGER et al.	
	6	6147471	A	2000-11-14	HUNTER; ALTON G.	
	7	6054779	A	2000-04-25	ZUBKO; RONALD L.	
	8	6212054	B1	2001-04-03	CHAN; SING	

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	9	6362599	B1	2002-03-26	Turner et al.	
	10	6803743	B2	2004-10-12	George et al.	
	11	5965998		1999-10-12	Whiting et al.	
	12	4885524		1989-12-05	Wilburn	
	13	5083076		1992-01-21	Scott	
	14	6130519		2000-10-10	Whiting et al.	
	15	6262559		2001-07-17	Eggert et al.	
	16	5111130		1992-05-05	Bates	
	17	5189359		1993-02-23	Kronberg	
	18	5635817		1997-06-03	Shiska	
	19	5635818		1997-06-03	Quintero	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	20	5793185		1998-08-11	PRELEC et al.	
	21	5795182		1998-08-18	JACOB	
	22	5921809		1999-07-13	FINK	
	23	6140796		2000-10-31	MARTIN et al.	
	24	6212054		2001-04-03	CHAN	
	25	6262492		2001-07-17	SHENG	
	26	6632103		2003-10-14	LIU	
	27	6756764		2004-06-29	SMITH et al.	
	28	7301303		2007-11-27	HULDEN	
	29	7872361		2011-01-18	MCFADDEN	
	30	8199024		2012-06-12	BAXTER et al.	

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	Application Number	16820040
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	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
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	Attorney Docket Number	054985.000055-US-02-01

	31	8376775		2013-02-19	RINEHARDT	
	32	3933140	A	1976-01-20	GYNN; GEORGE E.	
	33	4041445	A	1977-08-09	CARTER; REID F.	
	34	4931731	A	1990-06-05	JENKS; WILLIAM C.	
	35	5486434	A	1996-01-23	AOYAMA; MASAHIKO	
	36	6648701	B2	2003-11-18	MOUISSIE; BOB	
	37	7749031	B2	2010-07-06	DETTER; GARY C	
	38	8076900	B1	2011-12-13	BROWN AUDLEY	
	39	6386907	A	2002-05-14	RUFFA	
	40	6426606	B1	2002-07-30	PURKEY	
	41	9506446	b2	2016-11-29	XINFANG	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	42	9770992	B2	2017-09-26	NOOK et al.	
	43	D625265	S	2010-10-12	DUMELLE et al.	
	44	D649116	S	2011-11-22	NAKATSUKA	
	45	D689020	S	2013-09-03	DEMIRJIAN et al.	
	46	D726109	S	2015-04-07	NOOK et al.	
	47	D726114	S	2015-04-07	NOOK et al.	
	48	9007015	B1	2015-04-14	NOOK et al.	

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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
	1	20130154543	A1	2013-06-20	RICHARDSON et al.	
	2	20040130298	A1	2004-07-08	KRIEGER et al.	

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	3	20020041174	A1	2002-04-11	PURKEY	
	4	20100301800	A1	2010-12-02	INSKEEP	
	5	20140159509	A1	2014-06-12	INSKEEP	
	6	20050110467	A1	2005-05-26	Thomason	
	7	20050040788	A1	2005-02-24	Tseng	
	8	20050252573	A1	2005-11-17	Montani	
	9	20070285049	A1	2007-12-13	Krieger et al.	
	10	20120091944	A1	2012-04-19	Rogers	
	11	20130314041	A1	2013-11-28	Proebstle	
	12	20110068734	A1	2011-03-24	WALDRON; JOHN F.	
	13	20040066168	A1	2004-04-08	GEORGE et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	14	20150306964	A1	2015-10-29	WANG	
	15	20160001666	A1	2016-01-07	NOOK et al.	
	16	20180342891	A1	2018-11-29	NOOK et al.	
	17	20180111491	A1	2018-04-26	NOOK et al.	
	18	20180215274	A1	2018-08-02	NOOK et al.	
	19	20180269703	A1	2018-09-20	NOOK et al.	
	20	20180345803	A1	2018-12-06	NOOK et al.	
	21	20190308518	A1	2019-10-10	NOOK et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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	2010/129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES		

EFS Web 2.1.17

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	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	2	2013/137873	WO	A1	2013-09-19	DAO		☒
	3	2004/036714	WO	A1	2004-04-29	VECTOR PRODUCTS, INC.		☐
	4	2016/003471	WO	A1	2016-01-07	THE NOCO COMPANY		☐
	5	2 916 782	CA	A1	2016-01-07	THE NOCO COMPANY		☐
	6	2018-534892	JP	A	2018-11-22	THE NOCO COMPANY		☒
	7	107852004	CN	A	2018-03-27	THE NOCO COMPANY		☒
	8	3308446	EP	A1	2018-04-18	THE NOCO COMPANY		☐
	9	3286429	EP	A1	2018-02-28	THE NOCO COMPANY		☐
	10	2017/139524	WO	A1	2017-08-17	THE NOCO COMPANY		☐

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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]

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	1	PROJECTA; "2x22 Amp Hour High Performance Jumpstarter"; 2013; pages 1-20

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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.

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	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK et al.
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	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

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	/William L. Klima/	Date (YYYY-MM-DD)	2020-03-17
Name/Print	William L. Klima	Registration Number	32422

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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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Privacy Act Statement

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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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Electronic Acknowledgement Receipt

EFS ID:	38890173
Application Number:	16820040
International Application Number:	
Confirmation Number:	1056
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Customer Number:	20230
Filer:	William Leonard Klima/Renee Tisdale
Filer Authorized By:	William Leonard Klima
Attorney Docket Number:	054985-000055-US-02-01
Receipt Date:	17-MAR-2020
Filing Date:	
Time Stamp:	15:24:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1300
RAM confirmation Number	E20203GF24238763
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PRELIMINARYAMENDMENT.pdf	151503 8e87c19aabb3abbdece5f6956a94184d42f490c3	yes	13
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Preliminary Amendment		1	1	
	Claims		2	11	
	Applicant Arguments/Remarks Made in an Amendment		12	13	
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IDSPART1.pdf	1429648 9ad710fe0c12d19f9b23a7781640b485ff91c597	no	11
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	IDSPART2.pdf	1745799 69cc423839449fb468f97f1bf140d34b81da179b	no	6
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
4	Fee Worksheet (SB06)	fee-info.pdf	30247 0cb852f5bf6df0a69f45f006a4499e6419fe9852	no	2
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Total Files Size (in bytes):	3357197

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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.

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.

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK et al.
Art Unit	2859
Examiner Name	NOT YET ASSIGNED
Attorney Docket Number	054985.000055-US-02-01

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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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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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	2018-536789	JP	A	2018-12-13	THE NOCO COMPANY		☒
	2	108884801	CN	A	2018-11-23	THE NOCO COMPANY		☒
	3	3407405	EP	A1	2018-11-28	THE NOCO COMPANY		☐

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	Art Unit	2859
	Examiner Name	NOT YET ASSIGNED
	Attorney Docket Number	054985.000055-US-02-01

	4	2527858	GB	A	2016-01-06	THE NOCO COMPANY		☐
	5	2010/129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES, INC.		☐
	6	2017/138963	WO	A1	2017-08-17	THE NOCO COMPANY		☐
	7	20 2013 102 599	DE	U1	2013-08-13	ASIA BRIGHT INDUSTRIAL HONG KONG CO		☒
	8	295 07 501	DE	US	1995-06-29	SEO SOLAR SONNENENERGIE OPPACH		☒
	9	20 2009 016 260	DE	U1	2010-03-25	TSAI MING WEI		☒
	10	10 2014 114 997	DE	A1	2016-01-07	THE NOCO COMPANY		☒
	11	2015258229	AU	A1	2016-01-28	THE NOCO COMPANY		☐
	12	2557733	GB	A	2018-06-27	THE NOCO COMPANY		☐
	13	2016392707	AU	A1	2017-11-30	THE NOCO COMPANY		☐
	14	11 2016 002 206	DE	T5	2018-03-15	THE NOCO COMPANY		☒

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	Attorney Docket Number	054985.000055-US-02-01

	15	2 957 431	CA	A1	2017-08-11	THE NOCO COMPANY		☐
	16	2016269555	AU	B2	2017-01-05	THE NOCO COMPANY		☐
	17	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		☐
	18	3 005 971	CA	A1	2017-08-17	THE NOCO COMPANY		☐
	19	2562950	GB	A	2018-11-28	THE NOCO COMPANY		☐
	20	2019201081	AU	A1	2019-03-07	THE NOCO COMPANY		☐
	21	2017217661	AU	B2	2018-11-15	THE NOCO COMPANY		☐
	22	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		☐

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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.	T5
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EXHIBIT 1002
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EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

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CERTIFICATION STATEMENT

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OR

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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	/William L. Klima/	Date (YYYY-MM-DD)	2020-03-17
Name/Print	William L. Klima	Registration Number	32422

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Electronic Patent Application Fee Transmittal

Application Number:	16820040
Filing Date:	
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Filer:	William Leonard Klima/Renee Tisdale
Attorney Docket Number:	054985-000055-US-02-01

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:				
CLAIMS IN EXCESS OF 20	2202	26	50	1300
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1300**

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 23. (Cancelled)

24. (New) A jump starting device for boosting or charging a depleted or discharged battery having a positive battery terminal and a negative battery terminal, the jump starter device comprising:

a power supply;

a positive battery connector for connecting the jump starter device to the positive battery terminal of the depleted or discharged battery;

a negative battery connector for connecting the jump starter device to the negative battery terminal of the depleted or discharged battery;

a power switch connected in circuit with the power supply and the positive and negative battery connectors, the power switch configured to switch power on or off from the power supply to the depleted or discharged battery, the power switch configured to switch power on only when properly connected to the positive and negative battery connectors; and

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

a USB charging input configured to provide charging power from an external power source to the power supply.

25. (New) The device according to claim 24, wherein the USB charging input comprises a USB charging port.

26. (New) The device according to claim 24, wherein the USB charging input comprises a USB charging circuit.

27. (New) The device according to claim 24, wherein the USB charging input comprises a USB charging port connected to the power supply by a USB charging circuit.

28. (New) The device according to claim 27, wherein the USB charging circuit comprises a DC-DC converter.

29. (New) The device according to claim 28, wherein the DC-DC converter is configured to convert 5V potential provided from a USB charger to 12.4VDC.

30. (New) The device according to claim 27, wherein the USB charging circuit is configured to convert power from any USB charger power source to charge voltage and current for charging the power supply.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

31. (New) The device according to claim 28, wherein the DC-DC converter is configured to be turned on and off via a circuit by an output from a microcontroller.

32. (New) The device according to claim 31, wherein the power source is a rechargeable battery, and wherein microcontroller software can turn charge off if the rechargeable battery voltage is measured to be too high by an A/D input.

33. (New) The device according to claim 32, wherein the rechargeable battery is a lithium battery, and further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells of the lithium battery.

34. (New) The device according to claim 33, wherein the lithium battery charge controller is also configured to provide safety redundancy for eliminating over discharge of the lithium battery.

35. (New) The device according to claim 25, wherein the USB port is a micro-USB connector.

36. (New) The device according to claim 24, further comprising a USB output configured to provide charging power from the power supply to a USB-chargeable device.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

37. (New) The device according to claim 36, wherein the USB output comprises a USB output port.

38. (New) The device according to claim 36, wherein the USB output comprises a USB output circuit.

39. (New) The device according to claim 36, wherein the USB output comprises a USB output port connected to the power supply by a USB output circuit.

40. (New) The device according to claim 24, wherein the USB output is configured to provide a portable charger for charging smartphones, tablets, music players, and other rechargeable electronic devices.

41. (New) The device according to claim 39, further comprising a microcontroller and a control circuit, the control circuit from the microcontroller allows the USB output circuit to be turned on and off by software control to prevent the power supply getting too low in capacity.

42. (New) The device according to claim 30, wherein the USB output is brought to an outside of the jump charge device with a USB connector.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

43. (New) The device according to claim 42, wherein the USB connector includes a voltage divider configured to enable charge to certain smartphones that require it.

44. (New) The device according to claim 24, wherein the power supply is a rechargeable battery disposed within the jump starter device.

45. (New) The device according to claim 24, wherein the power switch comprises a power switch control system or circuit configured to control the power switch and turn power on or off from the power supply to the depleted or discharged battery when connected to the positive and negative battery connectors.

46. (New) The device according to claim 45, wherein the power switch control system or circuit comprises one or more sensors configured to detect whether the positive and negative battery connectors are properly connected to the depleted or discharged battery prior to switching on the power switch.

47. (New) The device according to claim 46, wherein the power switch control system or circuit is configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors.

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48. (New) The device according to claim 46, wherein the power switch system or circuit is configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors;

49. (New) The device according to claim 46, wherein the power switch control system or circuit is configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors,

wherein the power switch control system or circuit switches on the power supply to connect the power supply to the depleted or discharged battery only when the depleted or discharged battery is present when connected between the positive and negative battery connectors and the depleted or discharged battery is connected with correct polarity between the positive and negative battery terminals.

50. (New) The device according to claim 45, wherein the power switch control system or circuit comprises a microcontroller configured for providing an output controlling the power switch.

51. (New) The device according to claim 50, wherein the microcontroller receives input from one or more sensors configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery

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connectors, and to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors.

52. (New) The device according to claim 51, wherein the one or more sensors includes one sensor configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and another sensor configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors.

53. (New) The device according to claim 52, wherein the one or more sensors is one or more sensing circuits.

54. (New) The device according to claim 50, wherein the microcontroller switches the power switch on to provide power from the power supply to the depleted or discharged battery only when the depleted or discharged battery is determined by the microcontroller to be present and connected with the correct polarity.

55. (New) The device according to claim 50, wherein the microcontroller is a programmable microcontroller configured to allow updates in functionality and system parameters.

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56. (New) The device according to claim 55, wherein the programmable microcontroller comprises a memory.

57. (New) The device according to claim 24, wherein the positive battery connector comprises a positive battery cable, and the negative battery connector comprises a negative battery cable.

58. (New) The device according to claim 57, wherein the positive battery cable comprises a positive battery clamp and the negative battery cable comprises a negative battery clamp.

59. (New) The device according to claim 24, wherein said power switch comprises a plurality of FETs in parallel.

60. (New) The device according to claim 51, wherein the one sensor is configured for detecting presence of the depleted or discharged battery when connected between the positive and negative battery connections, and the other sensor is a reverse polarity sensor.

61. (New) The device according to claim 60, wherein the one sensor configured for detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors.

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62. (New) The device according to claim 24, further comprising a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery.

63. (New) The device according to claim 24, further comprising an output port providing positive and negative polarity outputs to the positive and negative battery connectors.

64. (New) The device according to claim 50, further comprising a temperature sensor configured to detect temperature of the power supply and to provide a temperature signal to the microcontroller.

65. (New) The device according to claim 50, further comprising a voltage measurement circuit configured to measure output voltage of the power supply and to provide a voltage measurement signal to the microcontroller.

66. (New) The device according to claim 24, further comprising a voltage regulator configured to convert output voltage of the power supply to a voltage level appropriate to provide operating power to internal components of the device.

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67. (New) The device according to claim 60, further comprising a manual override switch configured to activate a manual override mode to enable a user to connect jump start power to the positive and negative battery connectors when the one sensor configured for detecting presence of the depleted or discharged battery is unable to detect presence of the depleted or discharged battery.

68. (New) The device according to claim 67, wherein the microcontroller is configured to detect actuation of the manual override switch for at least a predetermined period of time before activation of the manual override mode.

69. (New) The device according to claim 24, wherein the positive and negative battery connectors are defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof.

70. (New) The device according to claim 69, wherein the output port and the plug are dimensioned so that the plug will fit into the output port only in one specific orientation.

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REMARKS

Upon entry of the above amendments, claims 1-23 are cancelled, without prejudice or disclaimer. Claims 24-70 are newly added and pending. The newly added claims do not introduce new matter within the meaning of 35 U.S.C. §132.

Applicants reserve the right to reintroduce any cancelled subject matter to this application or to any child applications, or to reintroduce the full scope of any claim amended herein.

Accordingly, the Examiner is respectfully requested to enter the above amendments before examination.

Favorable consideration is requested.

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CONCLUSION

In view of the foregoing, Applicants respectfully submit that the application is in condition for examination on the merits. The Examiner is invited to contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

Respectfully submitted,

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/William L. Klima/
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Date: March 17, 2020

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Jonathan Lewis NOOK et al.		Conf. No.:	1056
Appl. No.:	16/820,040	Examiner:	Not Yet Assigned
Filing Date:	March 16, 2020	Art Unit:	2859

Title: **PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION**

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Prior to examination on the merits and calculating the filing fees for the continuation application, filed herewith, please enter the following amendments:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 12 of this paper.

A **Conclusion** appears at page 13 of this paper.

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Petitioner ADC (IPR2024-00671)



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Document Code:WFEE

User :C41739

Sale Accounting Date:03/27/2020

Sale Item Reference Number	Effective Date
16820040	03/17/2020

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20203QE57476958	2202	CLAIMS IN EXCESS OF 20	$1,200.00	Deposit Account

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/820,040

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE($)	FEE($)		RATE($)	FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	47 minus 20 =	* 27	x 50 =	1350	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 230 =	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	2135		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
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)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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
16/820,040	03/16/2020	2859	2135	054985-000055-US-02-01	47	1

CONFIRMATION NO. 1056

20230
Vorys, Sater, Seymour and Pease LLP
1909 K St., NW
9th Floor
WASHINGTON, DC 20006-1152

FILING RECEIPT

OC000000115810708

Date Mailed: 03/31/2020

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

Jonathan Lewis NOOK, Gates Mills, OH;
William Knight NOOK, Shaker Heights, OH;
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Derek Michael UNDERHILL, Tempe, AZ;

Applicant(s)

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Assignment For Published Patent Application

THE NOCO COMPANY, Glenwillow, OH

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/691,884 08/31/2017 PAT 10604024
which is a CON of 14/619,655 02/11/2015 PAT 9770992
which is a DIV of 14/325,938 07/08/2014 PAT 9007015
which is a CON of PCT/US14/45434 07/03/2014

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 03/30/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/820,040**

Projected Publication Date: 07/09/2020

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Preliminary Class

320

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

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/820,040	03/16/2020	Jonathan Lewis NOOK	054985-000055-US-02-01

CONFIRMATION NO. 1056

20230
Vorys, Sater, Seymour and Pease LLP
1909 K St., NW
9th Floor
WASHINGTON, DC 20006-1152

PUBLICATION NOTICE

OC000000118332900

Title:PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Publication No.US-2020-0215926-A1
Publication Date:07/09/2020

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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.

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PTO/SB/08a (02-18)
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(Not for submission under 37 CFR 1.99)

Application Number	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK
Art Unit	2859
Examiner Name	M. Baye DIAO
Attorney Docket Number	054985-000055-US-02-02

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	3933140	A	1976-01-20	Gynn	
	2	4041445	A	1977-08-09	Carter	
	3	4885524	A	1989-12-05	Wilburn	
	4	4910628	A	1990-03-20	Minagawa ET AL.	
	5	4931731	A	1990-06-05	Jenks	
	6	5083076	A	1992-01-21	Scott	
	7	5111130	A	1992-05-05	Bates	
	8	5189359	A	1993-02-23	Kronberg	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	9	5486434	A	1996-01-23	Aoyama	
	10	5635817	A	1997-06-03	Shiska	
	11	5635818	A	1997-06-03	Quintero	
	12	5650974	A	1997-07-22	Yoshimura	
	13	5793185	A	1998-08-11	Prelec ET AL.	
	14	5795182	A	1998-08-18	Jacob	
	15	5921809	A	1999-07-13	Fink	
	16	5953681	A	1999-09-14	Cantatore	
	17	5965998	A	1999-10-12	Whiting ET AL.	
	18	6054779	A	2000-04-25	Zubko	
	19	6130519	A	2000-10-10	Whiting ET AL.	

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	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	20	6140796	A	2000-10-31	Martin ET AL.	
	21	6147471	A	2000-11-14	Hunter	
	22	6212054	B1	2001-04-03	Chan	
	23	6262492		2001-07-17	Sheng	
	24	6262559		2001-07-17	Eggert ET AL.	
	25	6362599	B1	2002-03-26	Turner ET AL.	
	26	6386907	A	2002-05-14	Ruffa	
	27	6426606	B1	2002-07-30	Purkey	
	28	6632103		2003-10-14	Liu	
	29	6648701	B2	2003-11-18	Mouissie	
	30	6756764		2004-06-29	Smith ET AL.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	31	6803743	B2	2004-10-12	George ET AL.	
	32	6822425	B2	2004-11-23	Krieger ET AL.	
	33	7148580	B2	2006-12-12	Sodemann ET AL.	
	34	7301303		2007-11-27	Hulden	
	35	7749031	B2	2010-07-06	Detter	
	36	7872361		2011-01-18	Mcfadden	
	37	8076900	B1	2011-12-13	Brown	
	38	8172603	B1	2012-05-08	Richardet, Jr.	
	39	8199024		2012-06-12	Baxter ET AL.	
	40	8376775		2013-02-19	Rinhardt	
	41	8493021	B2	2013-07-23	Richardson ET AL.	

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	42	9007015	B1	2015-04-14	Nook ET AL.	
	43	9041244		2015-05-26	Graf	
	44	9506446	B2	2016-11-29	Liu	
	45	9770992	B2	2017-09-26	Nook ET AL.	
	46	D625265	S	2010-10-12	Dumelle ET AL.	
	47	D649116	S	2011-11-22	Nakatsuka	
	48	D689020	S	2013-09-03	Demirjian ET AL.	
	49	D726109	S	2015-04-07	Nook ET AL.	
	50	D726114	S	2015-04-07	Nook ET AL.	
	51	D726121	S	2015-04-07	Nook ET AL.	
	52	D735665	S	2015-08-04	Nook ET AL.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	53	D746774	S	2016-01-05	Nook ET AL.	

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	1	20020041174	A1	2002-04-11	PURKEY	
	2	20040066168	A1	2004-04-08	GEORGE ET AL.	
	3	20040130298	A1	2004-07-08	KRIEGER ET AL.	
	4	20050040788	A1	2005-02-24	TSENG	
	5	20050110467	A1	2005-05-26	THOMASON	
	6	20050252573	A1	2005-11-17	MONTANI	
	7	20070278990	A1	2007-12-06	RAICHLE	
	8	20070285049	A1	2007-12-13	KRIEGER ET AL.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	9	20100301800	A1	2010-12-02	INSKEEP	
	10	20110068734	A1	2011-03-24	WALDRON	
	11	20120091944	A1	2012-04-19	ROGERS	
	12	20120319487	A1	2012-12-20	SHAH	
	13	20130154543	A1	2013-06-20	RICHARDSON ET AL.	
	14	20130241488	A1	2013-09-19	DAO	
	15	20130314041	A1	2013-11-28	PROEBSTLE	
	16	20140159509	A1	2014-06-12	INSKEEP	
	17	20150137740	A1	2015-05-21	ALLOS	
	18	20150306964	A1	2015-10-29	WANG	
	19	20160001666	A1	2016-01-07	NOOK ET AL.	

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	20	20180111491	A1	2018-04-26	NOOK ET AL.	
	21	20180215274	A1	2018-08-02	NOOK ET AL.	
	22	20180269703	A1	2018-09-20	NOOK ET AL.	
	23	20180342891	A1	2018-11-29	NOOK ET AL.	
	24	20180345803	A1	2018-12-06	NOOK ET AL.	
	25	20190308518	A1	2019-10-10	NOOK ET AL.	

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	1	2015258229	AU	A1	2016-01-28	THE NOCO COMPANY		
	2	2016269555	AU	B2	2017-01-05	THE NOCO COMPANY		
	3	2016392707	AU	A1	2017-11-30	THE NOCO COMPANY		

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	4	2017217661	AU	B2	2018-11-15	THE NOCO COMPANY		
	5	2019201081	AU	A1	2019-03-07	THE NOCO COMPANY		
	6	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		
	7	2916782	CA	A1	2016-01-07	THE NOCO COMPANY		
	8	2957431	CA	A1	2017-08-11	THE NOCO COMPANY		
	9	3005971	CA	A1	2017-08-17	THE NOCO COMPANY		
	10	107852004	CN	A	2018-03-27	THE NOCO COMPANY		☒
	11	108884801	CN	A	2018-11-23	THE NOCO COMPANY		☒
	12	29507501	DE	U1	1995-06-29	SEO SOLAR SONNENENERGIE OPPACH		☒
	13	102014114997	DE	A1	2016-01-07	THE NOCO COMPANY		☒
	14	112016002206	DE	T5	2018-03-15	THE NOCO COMPANY		☒

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	Attorney Docket Number	054985-000055-US-02-02

	15	202009016260	DE	U1	2010-03-25	TSAI MING WEI		☐
	16	202013102599	DE	U1	2013-08-13	ASIA BRIGHT INDUSTRIAL HONG KONG CO	Abstract	☒
	17	2472698	EP	A2	2012-07-04	IFINEON TECHNOLOGIES		☐
	18	3286429	EP	A1	2018-02-28	THE NOCO COMPANY		☐
	19	3308446	EP	A1	2018-04-18	THE NOCO COMPANY		☐
	20	3407405	EP	A1	2018-11-28	THE NOCO COMPANY		☐
	21	2527848	GB	A	2016-01-06	THE NOCO COMPANY		☐
	22	2557733	GB	A	2018-06-27	THE NOCO COMPANY		☐
	23	2562950	GB	A	2018-11-28	THE NOCO COMPANY		☐
	24	2018534892	JP	A	2018-11-22	THE NOCO COMPANY		☒
	25	2018536789	JP	A	2018-12-13	THE NOCO COMPANY		☒

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	Attorney Docket Number	054985-000055-US-02-02

	26	2004036714	WO	A1	2004-04-29	VECTOR PRODUCTS, INC.		☐
	27	2010129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES, INC.		☐
	28	2013137873	WO	A1	2013-09-19	DAO		☐
	29	2016003471	WO	A1	2016-01-07	THE NOCO COMPANY		☐
	30	2017138963	WO	A1	2017-08-17	THE NOCO COMPANY		☐
	31	2017139524	WO	A1	2017-08-17	THE NOCO COMPANY		☐

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	1	copy of the Petition for Inter Partes Review of US Patent No. 9,007,015; 49 pages; filed January 15, 2018.	
	2	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on October 23, 2018; 1 page	
	3	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on September 21, 2018; 1 page	

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	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	4	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on February 27, 2018; 1 page
	5	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on December 5, 2017; 1 page
	6	PROJECTA; "2x22 Amp Hour High Performance Jumpstarter"; 2013; pages 1-20

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*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.

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	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

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	/William L. Klima/	Date (YYYY-MM-DD)	2020-07-23
Name/Print	William L. Klima	Registration Number	32422

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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(12) STANDARD PATENT APPLICATION (11) Application No. **AU 2019201081 A1**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Battery connector device for a battery jump starting device

(51) International Patent Classification(s)
F02N 11/12 (2006.01) ***H02J 7/00*** (2006.01)
F02N 11/14 (2006.01) ***H02J 7/32*** (2006.01)
F02N 19/00 (2010.01)

(21) Application No: **2019201081** (22) Date of Filing: **2019.02.15**

(43) Publication Date: **2019.03.07**
(43) Publication Journal Date: **2019.03.07**

(62) Divisional of:
2017217661

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(74) Agent / Attorney
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ABSTRACT

A battery device for use in a vehicle jump starter, the device comprising:

a battery comprising at least one battery cell having a positive terminal tab and a negative terminal tab;

a positive battery cable of the vehicle jump starter directly connected to the positive terminal tab of the at least one battery cell; and

a negative terminal conductor bar directly connected to the negative terminal tab of the at least one battery cell.

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TITLE

BATTERY CONNECTOR DEVICE FOR A BATTERY JUMP STARTING DEVICE

FIELD

A portable battery connector device, for example, a battery connector arrangement or assembly for a battery jump starting device, in particular a portable vehicle jump starting apparatus, configured for enhancing the conductivity between the battery of the jump starting apparatus and a battery being charged.

BACKGROUND

The exists a portable vehicle battery jump start apparatus as disclosed in U.S. Patent No. 9,007,015 to Nook et al. The apparatus utilizes a lithium ion battery pack. In this type of apparatus, there exists a need to maximize conductivity from the battery pack to the vehicle battery of the vehicle being jump started.

For successful car jump-starts, there are two main factors dictating the results. The first factor is the amount of power provided by the lithium ion battery pack, and the second factor is the maximum conductivity. You need both factors to have the best chance to jump-start big engines. One factor without the other factor is not enough.

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SUMMARY

The presently described subject matter is directed to a battery device, for example, a battery connector, battery connector arrangement, or battery conductor assembly for use in a device for jump starting a vehicle, and a device for jump starting a vehicle comprising the battery connector device.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having at least one battery conductor connected to a terminal of the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having at least one battery conductor or cable connected to a battery tab of the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive conductor and a negative conductor connected to the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive conductor plate and/or a negative conductor plate connected to the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive conductor plate and/or a negative conductor plate connected to the battery, and a positive cable connected to the positive conductor plate and/or a negative cable connected to the negative conductor plate.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal of the battery and/or a negative battery conductor connected to a negative terminal of the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal contact of the battery and/or a negative battery conductor connected to a negative terminal contact of the battery, the battery conductors being soldered to the respective terminals of the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal of the battery and/or a negative battery conductor connected to a negative terminal contact of the battery, and a relay connected to one of the battery conductors of the battery.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal contact of the battery and/or a negative battery conductor connected to a negative terminal contact of the battery, and a relay connected to the negative battery conductor.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal contact of the battery and/or a negative battery conductor connected to

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a negative terminal contact of the battery, and a relay connected to the negative battery conductor.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal contact of the battery and/or a negative battery conductor connected to a negative terminal contact of the battery, and multiple relays connected to the negative battery conductor.

The presently described subject matter is directed to a battery connector device comprising or consisting of a battery having a positive battery conductor connected to a positive terminal contact of the battery and/or a negative battery conductor connected to a negative terminal contact of the battery, and a positive cable connected to the positive battery conductor.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a front view of the battery jump starting device with the clamps un-deployed.

FIG. 2 is a rear perspective view of the battery jump starting device shown in FIG. 1.

FIG. 3 is an end perspective view of the battery jump starting device shown in FIGS. 1 and 2.

FIG. 4 is a front perspective view of the battery jump starting device shown in FIG. 1, however, with the clamps deployed.

FIG. 5 is a front perspective view of a battery connector device contained within the battery jump starting device shown in FIG. 1, however, with the negative cable not yet installed.

FIG. 6 is a top planer view of the battery connector device shown in FIG. 5.

FIG. 7 is a side elevational view of the battery connector device shown in FIG. 5.

FIG. 8 is an end elevational view of the battery connector device shown in FIG. 5.

FIG. 9 is a perspective view of the battery connector device shown in FIG. 5, however, with the negative cable connected to the battery connector device.

FIG. 10 is a view perspective view of the battery connector device shown in FIG. 5, however, with a diode connector installed on the positive cable.

FIG. 11 is a perspective view of the battery connector device connected to other components or parts of the battery jump starting device.

FIG. 12 is a perspective view of the battery assembly of the battery connector device shown in FIG. 5.

FIG. 13 is a front perspective view of another battery connector device for the battery jump starting device.

FIG. 14 is a detailed view of the positive cable connection with the relay printed circuit board prior to being soldered thereto.

FIG. 15 is a detailed view of the positive cable connection with the relay printed circuit board after being soldered thereto.

FIG. 16 is a front perspective view of the battery assembly of the battery connector device shown in FIG. 13.

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FIG. 17 is a partial top planar view of the battery assembly shown in FIG. 16, however, with the positive terminal conductor sheet in an unwound condition.

FIG. 18 is a partial top planer view of the positive terminal conductor of the battery assembly shown in FIG. 16.

FIG. 19 is an end perspective view of the positive terminal conductor partially wound around the end of the positive cable.

FIG. 20 is an end perspective view of the positive terminal conductor fully wound around the end of the positive cable.

FIG. 21 is a side perspective view of the positive terminal conductor fully wound around and soldered to the end of the positive cable.

FIG. 22 is an opposite end perspective view of the positive terminal conductor fully wound around and soldered to the end of the positive cable.

FIG. 23 is a perspective view of the diode connector between sections of the positive cable.

FIG. 24 is a perspective view of a Schottky Diode used in the diode connector.

FIG. 25 is a perspective view of the diode connector insulated with a shrink wrap sleeve.

FIG. 27 is a graphical illustration showing a load test of the battery connection shown in FIGS. 5-10.

FIG. 28 is a graphical illustration showing a load test of the battery connection shown in FIGS. 13-25.

FIG. 29 is a front view of a further battery connector device for the battery jump starting device.

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FIG. 30 is a front view of the battery connector device comprising a plurality of battery cells, separate tab, and conductors (e.g. plate conductors) prior to assembly.

FIG. 31 is a front view of the battery connector device comprising battery cells being prepared with separate tabs for lengthening the tabs.

FIG. 32 is a front view of the battery connector device comprising the plurality of battery cells, separate tab, and conductors shown in FIG. 30, after assembly.

FIG. 33 is a perspective view showing the battery connector device comprising the battery cell assembly shown in FIG. 32, after folding the battery cells.

FIG. 34 is an end perspective view of the battery connector device showing the separate tab being wrapped or wound around an exposed end of the positive cable, and soldered together.

FIG. 35 is an opposite end perspective view of the battery connector device showing a negative battery tab wrapped around the negative terminal conductor plate and welded and/or soldered together.

FIG. 36 is a perspective view of the battery connector device showing the flat separate tab connected to the battery and extending outwardly prior to connection to the positive cable.

FIG. 37 is a side view of the temperature sensor assembly with wires and connector.

FIG. 38 is a perspective view of the diode circuit board assembled connected inline or spliced into the positive cable.

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DETAILED DESCRIPTION

A battery jump starter device 10 is shown in FIGS. 1 and 2. The battery jump starting device 10 comprises a casing 12 having a display 14 provided with an arrangement of light emitting diodes (LEDs) 16.

The battery jump starting device 10 further comprises a positive cable 18 having a positive clamp 20 and a negative cable 22 having a negative clamp 24. The positive cable 18 and negative cable 22 pass through openings 12a, 12b, respectively, in the casing 12.

The clamps 20, 24 are stowed away or docked in an un-deployed mode by clamping each to a respective side posts 26 extending outwardly on opposite sides of the casing 12, as shown in FIG. 1. The side posts 26 are shown in FIG. 2. The clamps 20, 24 are docked when the battery jump starter device 10 is in non-use, and then unclamped from the side post 26 during use.

The battery jump starting device 10 is configured to jump start a vehicle battery. For example, the battery jump starting device 10 can be the PORTABLE VEHICLE JUMP START APPARATUS WITH SAFETY PROTECTION disclosed in U.S. Patent No. 9,007,015, which is fully incorporated herein by reference, or a device or apparatus similar thereto.

The battery jump starting device 10 comprises electrical components or parts located inside the casing 12. For example, the battery jump starting device 10 comprises a battery connector device 100 shown in FIGS. 3 - 9.

The battery connector device 100 comprises a battery assembly 110 having a battery 112. For example, the battery 112 is a lithium ion rechargeable type battery. The

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battery connector device 100 is configured to maximize conductivity from the battery 112 to the cables 18, 22 and clamps 20, 24 of the battery jump starter device 10. The battery 112 comprises a battery casing 112a, for example, a rectangular-shaped battery casing 112a.

The battery 112 comprises a positive tab at one end (e.g. width) of the battery 112, and a negative terminal tab at an opposite end (e.g. width) of the battery 112. For example, the battery 112 comprises one or more battery cells each having a positive and negative tab. For example, the positive tab from one battery cell is located at the one end of the battery 112 and the negative tab from one battery cell is located at the opposite end of the battery 112. A positive terminal conductor plate 114 is connected (e.g. soldered, welded, or sonically welded) at the one end of the battery 112 to the positive tab (i.e. contact) of the battery 112. The positive terminal conductor plate 114 extends along the one end (e.g. width) of the battery 112.

The positive cable 18 can be connected (e.g. directly connected by soldering) to the positive terminal conductor plate 114 and/or the positive tab of the battery 112. For example, the positive terminal conductor bar 114 can be provided with a conductive loop 116 wrapping around (e.g. entirely wrapping around) and connected (e.g. crimped and/or soldered) to an exposed end 18a of the positive cable 18. For example, the positive terminal conductor plate 114 is made from heavy gauge copper sheet (e.g. machined, cut, or stamped therefrom).

As shown in FIGS. 5 and 6, the positive terminal conductor sheet 114 can be configured (e.g. bent) to wrap around one of the square-shaped corners of the rectangular-shaped casing 112a of the battery 112 (e.g. L-shaped). The L-shaped

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positive terminal conductor sheet 114 can extend along an end of the battery 112 and along at least a portion of the side of the battery 112, as shown in FIG. 5.

The positive terminal conductor plate 114 can also be mechanically coupled and/or adhered to the outer surface of the battery casing 112a to provide additional support and stability thereof (e.g. assembled to survive mechanical shock when drop testing the battery jump starter device 10). For example, the positive terminal conductor bar 114 can be mechanically connected to the battery casing 112 by adhesive (e.g. silicon adhesive), double sided tape, double sided foam tape, insulated plastic or ceramic connector with snap fit connection and/or adhesive connection, and/or the battery casing 112 can be formed (e.g. molded) to mechanically connect (e.g. snap fit or interference connection) with the positive terminal conductor plate 114.

The positive cable 18 can be a single piece of wire or a cable (e.g. twisted or braided wires) extending from the battery 110 to the positive clamp 20. Specifically, one end of the positive cable 18 is connected to the positive terminal conductor plate 114 connected to the battery 18, and the opposite end of the positive cable 18 is connected to the positive clamp 20.

More specifically, the positive cable 18 can comprise a flexible or bent cable portion 118 for changing the direction of the positive cable 18 within the casing 12. The positive cable 18 can be fitted with a flexible outer sleeve portion 120 transitioning into a flexible inner sleeve portion 122 to flexibly accommodate the positive cable 18 passing through the casing 12. The flexible outer sleeve portion 120 is externally located relative to the casing 12 of the battery jump starter device 10, and the flexible inner sleeve

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portion 122 is internally located relative to the casing 12 of the battery jump starter device 10.

The flexible outer sleeve portion 120 is configured to reinforce the connection between the positive cable 18 and the casing 12 of the battery jump starter device while remaining flexible. For example, the flexible outer sleeve portion 120 is provided with one or more grooves 124 (e.g. three (3) shown in FIG. 5) exposing portions of the positive cable 18. The one or more grooves 124 act as hinges to ease bending of the positive cable 18 within the flexible outer sleeve portion 120.

The flexible sleeve 120 comprises an outer flange 124 spaced apart (e.g. a small distance equal to about a wall thickness of the casing 12 of the battery jump starter device 10) from an in inner flange 126. The flanges 124, 126 further anchor the positive cable 18 to the casing 12 of the battery jump starter device 10.

The flexible sleeve 120 comprises a sleeve portion 128 (FIG. 6) connecting together the outer flange 124 and inner flange 126. For example, the flexible outer sleeve portion 120 is molded or applied onto and around the positive cable 18 as a single unit (e.g. the flexible sleeve 120 is molded onto a portion of the positive cable 18 inserted within the mold during the molding process). Alternatively, the flexible sleeve 120 is made (e.g. molded) separately, and then installed or assembled onto a portion of the positive cable 18.

The positive cable 18 comprises an inner conductor 18b (e.g. single wire conductor, twisted wires, or braided wires) disposed within an outer insulating sheath 18c (e.g. extruded plastic sheath). The inner conductor 18b, for example, can be a solid wire conductor or a multi strand metal wire conductor comprising bundle of wires 18d.

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The inner wire can be made of copper or aluminum. The flexible sleeve 120 can be applied (e.g. molded or installed or assembled) onto and surrounding the outer insulating sheath 18c of the positive cable 18.

The battery connector device 100 further comprises a negative terminal conductor plate 130 connected (e.g. soldered, welded, or sonically welded) at an opposite end of the battery 112 to the negative tab (i.e. contact) of the battery 112. The negative terminal conductor plate 130 can extend along the opposite end of the battery 112.

The other end of the negative terminal conductor plate 130 is provided with a negative terminal conductor plate connector portion 132, as shown in FIGS. 5 and 6.

The negative terminal conductor plate 130 can be configured to wrap around one of the corners of the rectangular-shaped battery 112 (e.g. L-shaped). The L-shaped negative terminal conductor plate 130 can extend along an end of the battery 112 and along at least a portion of the side of the battery 112, as shown in FIGS. 5 and 6.

The negative terminal conductor bar 130 can also be mechanically coupled and/or adhered to the outer surface of the battery casing 112a to provide additional support and stability thereof (e.g. to survive mechanical shock when drop testing the battery jump starter device 10). For example, the negative terminal conductor bar 114 can be mechanically connected to the battery casing 112a by adhesive (e.g. silicon adhesive), double sided tape, double sided foam tape, insulating plastic or ceramic connector with snap fit connection and/or adhesive connection, and/or the battery casing 112 can be formed (e.g. molded) to mechanically connect (e.g. snap fit or interference connection) with the positive terminal conductor plate 114.

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The battery connector device 100 further comprises a smart switch battery interface 134. The smart switch battery interface 134 comprises a relay printed circuit board (PCB) 136 having a first circuit board conductor bar 138 spaced apart from a second circuit board conductor bar 140 located on one side of the circuit board 136, as shown in FIGS. 5 and 6.

A pair of relays 142 are mounted on an opposite side of the circuit board 136. The relays 142 include relay anchoring pins 142a located in through holes 136a in the relay printed circuit board 136 (FIGS. 5 and 7). The relays 142 further comprise relay connector pins 142b extending through the through holes 136b provided in the circuit board 136 and slots 138a provided in the first conductor bar 138. The relays 142 even further comprise relay connector pins 142c located in the through holes 136c provided in the circuit board 136 and through holes 140a provided in the second conductor bar 140. The relay anchoring pins 136a are soldered in place to mechanically connect the relays 142 to the circuit board 136. The relay connecting pins 142b and 142c are soldered in place to mechanically and electrically connect the relays 142, respectively, to the circuit board conductor plates 138, 140.

The through holes 136a in the circuit board 136 are rectangular-shaped (FIGS. 5 and 7) and accommodate the relay anchoring pins 142a. Specifically, a base portion of the relay anchoring pins 142a are rectangular-shaped with square-shaped ends. The square-shaped ends are dimensionally less wide verses the base portions creating transverse edges oriented flush with the outer surface of the circuit board 136. When solder is applied to the exposed ends of the relay anchoring pins 142a, the solder

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connects to the sides of the square-shaped ends and transverse edges to anchor and lock the relay anchoring pins to the circuit board 136.

The slots 132a provided in negative terminal conductor bar connector portion 132 are rectangular-shaped and the through holes138a in the first circuit board conductor bar 138 (FIG. 3) are T-shaped to accommodate the three (3) horizontally oriented relay connector pins 142b, as shown in FIG. 3. The ends of the relay connector pins 142b are shown flush with the outer surface of the negative terminal conductor bar connector portion 132. When solder is applied to the exposed ends of the relay connector pins 142b, the solder fills in the slots 132a in the negative terminal conductor bar connector portion 132 and the through holes 138a of the first circuit board conductor bar 138, and connects the sides of the connector pins 142b with inner edges of the slots 132a and through holes 138a to anchoring the relays 142 to the circuit board 136 and negative terminal conductor bar connector portion 132. This applied solder also electrically connects the negative terminal conductor bar connector portion 132 to the first circuit board conductor bar 138.

The through holes 140a provided in the second circuit board conductor bar 140 are T-shaped to accommodate the three (3) vertically oriented relay connecting pins 142c, as shown in FIG. 3. The relay connector prongs 140a extend outwardly from the outer surface of the circuit board 136 to connect with the exposed conductor end 144a of the negative cable 144, and shown in FIG. 7. When solder is applied to the exposed conductor end 144a and the ends of the relay connector prongs 140a, the solder fills in the T-shaped slot and electrically connects the relay connector prongs 140a, second

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circuit board conductor 140, and exposed conductor end 144a of the negative cable 144.

The negative terminal conductor bar connector portion 132 of the negative terminal conductor bar 130 is connected (e.g. by soldering) to the first circuit board conductor bar 138 of the circuit board 136. The exposed conductor end 22a (i.e. with the insulating sheath removed) of the negative cable 22 is connected (e.g. by soldering) to the second circuit board conductor bar 140, as shown in FIG. 9.

The battery connector device 100 can be modified by providing the positive cable 18 with a diode connection 150, as shown in FIG. 10. For example, a diode connection is installed (e.g. spliced) into the positive cable 18. The diode connection 150 comprises a diode printed circuit board (PCB) 152 provided with a set of back-charge diodes 154 (e.g. Schottky Diodes) located on one side thereof, and a conductor bar 156 provided on an opposite side of the circuit board 152.

ASSEMBLY

The battery jump starting device 10 comprises the casing 12 having an upper casing portion 12a and a lower casing portion 12b, as shown in FIG. 11. The upper casing portion 12a and the lower casing portion 12b are configured to be connected together when assembling the battery jump starting device 10.

The battery jump starting device 10 further comprises the battery connection device 100 and controller assembly 210 both disposed within the casing 12. The

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controller assembly 210 comprises a circuit board 212 located adjacent to another circuit board 214.

The positive terminal of the battery assembly 110 (FIG. 12) is connected to the circuit board 212 via a positive power wire 216. For example, the positive power wire 216 is soldered to the positive conductor bar 114 (FIG. 5). The negative terminal of the battery assembly 110 is connected to the circuit board 214 via a negative power wire 218.

The relay circuit board 136 is provided with a wire set 220 having a connector 222. The connector 222 is configured to connect with the relay board connector 224 located on the circuit board 212 of the controller assembly 210 during assembly of the battery jump starting device 10.

The battery assembly 110 further comprises a wire set 226 having a connector 228. The connector 228 is configured to connect with the battery cell charging/monitoring connector 230 located on the circuit board 212 of the controller assembly 220.

The battery assembly 110 also comprises a battery temperature sensor having a wire set 232 having a connector 234. The connector 234 is configured to connect with the temperature sensor connector 236 located on the circuit board 212 of the controller assembly 220.

The circuit board 212 is provided with in charge power resistors 240 and an out relay 242, as shown in FIG. 11. Further, the lower casing portion 12a is provided with a main user out connector 244 having a wire set 246 connected to the circuit board 214,

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and a main user in connector 248 having a wire set 250 connected to the circuit board 214.

The battery assembly 110 is connected to battery jump starting device 10, as shown in FIG. 11. The battery connector device 110 is installed within the casing 12 of the battery jump starting device 10 when assembled.

ENHANCED CONDUCTIVITY

An enhanced conductivity battery connector device 400 is shown in FIGS. 13 – 25. The enhanced conductivity battery connector device 400 provides a significantly increased conductivity compared to the battery connector device 100, as shown in FIGS. 5 – 10.

The amount of power to be conducted from the battery 412 to the clamps can be enhanced as follows:

1) Increase Wire Gauge

e.g. change 4AWG (American Wire Gage) positive cable 18 and negative cable 22 (FIG. 9) to a 2AWG positive cable 318 and negative cable 322 (FIGS. 13 and 15).

2) Increase Conductivity of Negative Cable Connection

e.g. negative cable end 322a (FIG. 15) connection to the relays will extend all the way across the connector pins 422c of the relays 422.

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3) Increase Conductivity of Positive Cable Connection

e.g. the positive battery tab 414 is lengthened so that the positive cable 318 can be rolled up (FIGS. 17-22) in the positive battery tab 414 and soldered together thoroughly;

4) Increase Conductivity of Diode Connection

e.g. replace the diode connection 150 (FIG. 5) with the diode connection 450 (FIG. 23).

5) Redesign Resistor/Diode Printed Circuit Board (PCB)

e.g. replace the diode printed circuit board (PCB) 152 (FIG. 10) with the diode printed circuit board (PCB) 452 (FIG. 23).

6) Reconnect Resistors

e.g. reconnect resistors R134A&B, R135A&B located on the diode printed circuit board (PCB) 152 (FIG. 10) to be connected again.

A detailed description of each of these enhanced conductivity features or arrangement is set forth below.

1) Increase Wire Gauge

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The gauge of the positive cable 18 and negative cable 22 (FIG. 9), for example, can be increased from 4AWG (American Wire Gage) cable to a 2AWG cable for positive cable 318 and negative cable 322 (FIGS. 13 and 15). The comparative specifications of the 4AWG cable and 2AWG cable are as follows:

	2AWG	4AWG
Diameter	0.2576 in	0.2294 in
	(6.544 mm)	(5.189 mm)
Turns of wire	3.88/in	4.89/in
	(1.53/cm)	(1.93/cm)
Area	66.4 kcmil	41.7 kcmil
	(33.6 mm^2)	(21.2 mm^2)
Resistance/length	0.5127 mΩ/m	0.8152 mΩ/m
	(0.1563 mΩ/ft)	(0.2485 mΩ/m)
Ampacity	95 (60° C)	70 (60° C)
	115 (75° C)	85 (75° C)
	130 (90° C)	95 (90° C)
Fusing current	1.3 kA (10 s)	946 A (10 s)
	10.2 kA (1s)	6.4 kA (1 s)
	57kA (32 ms)	36 kA (32 ms)

The 2AWG cable provides a significant increase of conductivity (i.e. ampacity) compared to the 4AWG cable (i.e. approximately 36%).

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2) Increase Conductivity of Negative Cable Connection

The negative cable 322 (FIG. 15) can be connected to the battery 412 (FIG. 13) in a manner to increase the conductivity (i.e. ampacity) between the battery 412 and negative cable 322. For example, the negative cable end 322a can be directly connected (e.g. soldered) to the connector prongs 442c (FIG. 15) of the relays 442. Specifically, the negative cable end 322a can extend across and directly connect to all relays 342 of the smart switch battery interface 434, as shown in FIGS. 14 and 15. Further, the negative cable end 322a can be connected to a conductor loop 441 of the circuit board conductor bar 440.

The negative cable 322, for example, can be stranded wire comprising an inner electrical wire conductor 322b composed of an untwisted or twisted bundle of wires 322d disposed within an outer electrical insulating sheath 322c. The electrical insulating sheath 322c of the negative cable 322 can be removed from the negative cable end 322a exposing the inner electrical conductor 322b at the negative cable end 322a.

The exposed bundle of wires 322d of the electrical conductor 322b can be forced over the ends of the exposed connector pins 442c of the relays 442 so that strands of wires 322d are captured between the adjacent connector pins 442c. The exposed bundles of wires 332d can be further forced into contact with the conductor bar 440 (e.g. made of copper). Solder 423 is applied to this assembly so that the solder flows between the exposed bundles of wires 422d to the connector pins 442c and the conductor bar 440 to complete the electrical connection between the negative cable 322 and the smart switch battery interface 434 connected to the battery 412.

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The length of the exposed bundle of wires 322d is selected so that exposed bundle of wires 322d directly connects with each set of connector pins 442c of each and every relay 442 to provide the maximum electrical conductivity (i.e. maximum ampacity) between the negative cable 322 and the battery 412.

3) Increase Conductivity of Positive Cable Connection

The positive cable 318 can be connected to the battery 412 in a manner to increase the conductivity (i.e. ampacity) between the battery 412 and positive cable 318. For example, the positive cable 318 can be rolled up in the positive battery tab 414 and soldered together thoroughly. The connection between the positive cable 318 and battery 412 is shown in FIGS. 16-22.

The positive cable 318, for example, can be stranded wire comprising an inner electrical wire conductor 318b composed of an untwisted or twisted bundle of wires 318d disposed within an outer electrical insulating sheath 318c. The electrical insulating sheath 318c of the positive cable 318 can be removed from the positive cable end 318a exposing the inner electrical conductor 318b at the positive cable end 318a.

The battery 412 is provided with a positive battery tab 414. The positive battery tab 414 is a metal sheet (e.g. copper sheet) connected to the positive terminal tab 414 of the battery 412.

The exposed bundle of wires 318d of the inner electrical conductor 318b can be soldered with tin, and then rolled up within the positive battery tab 312a. Solder 415 (FIG. 21) is applied to the exposed bundle of wires 318d and the positive battery tab 312a.

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The length of the exposed bundle of wires 318d is selected so that exposed bundle of wires 318d directly connects with the full width of the positive battery tab 414 to provide the maximum electrical conductivity (i.e. maximum ampacity) between the battery 312 and the positive cable 318.

4) Increase Conductivity of Diode Connection

The positive cable 318 can be provided with a diode connection 450 configured to increase the conductivity along the positive cable 318, as shown in FIGS. 23 – 25.

The diode connection 450 comprises a plurality of diodes 454 connected between positive cable sections 318e and 318f (FIG. 25). For example, the diode connection 450 comprises six (6) back-charge type diodes (e.g. Schottky barrier diodes).

The diodes 454 are soldered between the positive cable sections 318e and 318f. Specifically, the diode conductor tabs 454a are soldered to the positive cable section 318e and the diode conductor prongs 454b are soldered to the positive cable section 318f. More specifically, the diode conductor prongs 454b of the diodes 354 extend through the diode circuit board 452, extend into the bundle of wires 318b, and then are soldered in place completing assembly of the diode connection 450.

The diode connection 450 is then insulated, for example, using a shrink wrap insulator 455 (FIG. 25), which is applied around the diode connection 450, and then shrunk by applying heat (e.g. using heat gun).

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5) Redesign Resistor/Diode Printed Circuit Board (PCB)

e.g. redesign of resistor/diode PCB to eliminate the diodes extending therefrom;

6) Reconnect Resistors

e.g. reconnect resistors R134A&B, R135A&B that are on the Resistor/Diode PCB to be connected again.

TEST #1

The battery connection device 100 shown in FIG. 5 was subjected to a 1250A Load Test. The results are shown in FIG. 27, and as follows:

Pulse #1 Average Power of 4799.01W

Pulse #2 Average Power of 5528.99W

Pulse #3 Average Power of 6101.63W

TEST #2

The battery connection device 400 shown in FIG. 13 was subjected to a 1250A Load Test. The results are shown in FIG. 28, and as follows:

Pulse #1 Average Power of 6584.61W

Pulse #2 Average Power of 7149.60W

Pulse #3 Average Power of 7325.91W

This results in a significant increase of approximately twenty percent (20%) for peak power compared to the results of TEST #1.

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Another enhanced conductivity battery conductor device 500 is shown in FIGS. 29 - 37. The enhanced conductivity battery connector device 500 provides a significantly increased conductivity compared to the battery connector device 100, as shown in FIGS. 5 – 10.

The battery conductor device 500 comprises the battery assembly 410, including the battery 512 connected to the positive cable 518 and the negative terminal conductor plate 530. A positive wire 519 is connected directly or indirectly to the positive tab or positive cable 518 of the battery 530, and a negative wire 523 is connected directly or indirectly to the negative tab or negative terminal conductor plate 530. The battery conductor device 500 can further include a bundle of wires 570 connected to or associated with the operation of the battery 512 (e.g. battery temperature sensor, power supply, etc.).

The battery 512 can comprise a single battery cell 512c (FIG. 30), or multiple battery cells 512C connected end-to-end in series. Three (3) separate battery cells 512c are shown in FIG. 30.

The battery cells 512c each have positive and negative tabs 512d located at opposite ends of each battery cell 512c. The battery cells 512c are connected together in series by welding (e.g. sonically and/or thermally welding) and/or soldering respective positive and negative tabs 512d together. For example, the tabs 512d are positioned so as to overlap each other (e.g. edges overlapping opposite tab 512d, or edge-to-edge).

The tabs 512d are metal plates (e.g. relative thin metal foils) extending outwardly from the body and opposite edges of each battery cell 512c. As shown in FIG. 30, the tabs 512d extend along opposite edges at the width of each battery cell 512c. The tabs

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512d are each centered and extend most of the width of each opposite edge of each battery cell 512c.

As shown in FIGS. 30 and 31, a separate tab 512e is added or connected to the right side of the battery cell 512c to extend the length of the tab 512d. The separate tab 512e is shown as having the same width as the tab 512d; however, this width can be different. To assemble the separate tab 512e to the tab 512d, for example, the separate tab 512e is positioned to overlap over the tab 512d, and then welded (e.g. sonically and/or thermally welded) and/or soldered together. The exposed end of the positive cable 518 is then wound up inside the separate tab, as shown in FIGS. 32 and 34. For example, the initially flat separate tab 512e is wrapped around the exposed end of the positive cable 518, and then connected to the exposed end by welding (e.g. sonically and/or thermally welding) and/or soldering. For example, a layer of solder is applied to one or both sides of the separate tab 512e, and then after wrapping the separate tab 512e around the exposed end of the positive wire 518, the assembly is heated to melt the layered solder and solder the assembly together.

The three (3) battery cells 512c once connected together, as shown in FIG. 32, are then folded over each other into the layered battery cell arrangement shown in FIG. 33. The layered battery cell arrangement can be packaged (e.g. the three (3) battery cells can be taped or shrink wrapped together), or placed within a battery cover or casing, as shown in FIG. 34.

As shown in FIG. 35, the negative tab 512d can be attached to the negative terminal conductor plate 530. For example, the negative tab 512d can be wrapped partially or fully, as shown, around the negative terminal conductor plate 530. The

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negative tab 512d can be provided with a plurality of through holes 512f to facilitate welding and/or soldering the negative tab 512d to the negative terminal conductor plate 530. For example, the through holes 512f can be square-shaped through holes arranged into a matrix, as shown in FIG. 35. The negative wire 523 is shown connected (e.g. soldered) to the negative tab 512d.

A separate tab 512e (see FIG. 30) can be connected to the negative tab 512d to lengthen same, so that the lengthened negative tab can be wrapped or wound around the negative terminal conductor plate 530 more than one time (e.g. 2, 3, 4, or more times). In this manner, the electrical connection between the negative tab 512d and the negative terminal conductor plate 530 can be enhanced. The separate tab 512e can be provided with a layer of solder on one or both sides, so that after the separate tab 512e is wrapped or wound around the negative terminal conductor plate 530, this assembly can be heated up to solder the separate tab 512e onto the negative terminal conductor plate 530.

The completed assembly of the battery conductor device 500 with the connected separate positive tab 512d ready to be wrapped or wound an exposed end of the positive cable 518 (FIG. 29) can be seen in FIG. 36. The bundle of wires 570 shown in FIG. 36, includes wires 572 for a temperature sensor embedded within the battery 512 (e.g. temperature sensor located near battery tab or between battery cells. The temperature sensor 574 having two (2) wires 572a, 572b is shown in FIG. 37.

The battery conductor device 500 can comprise a diode connector 550 connected inline or splice into the positive cable 518, as shown in FIG. 38.

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The battery conductor device 500 comprises a diode circuit board 552 having a plurality of diodes 454 assembled thereon. The diodes 454 each have a diode conductor tab 454a connected (e.g. soldered) to an exposed end of the positive cable 518. The prongs of the diodes 454 extend through holes in the diode circuit board 552, and are soldered to both the conductive traces and exposed end of the positive cable 518 along with a resistor 576 to complete the assembly.

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CLAIMS

1. A battery connector device for a battery jump starting device having a smart switch, the device comprising:

a battery comprising a positive terminal tab and a negative terminal tab;

a positive terminal conductor sheet connected to the positive terminal tab of the battery;

a negative terminal conductor bar connected to the negative terminal tab of the battery;

a positive cable connected to the positive terminal conductor sheet of the battery;

a smart switch interface connectable to the smart switch of the jump starting device, the smart switch interface comprising a circuit board having a first circuit board conductor bar spaced apart from a second circuit board conductor bar, the first circuit board conductor bar electrically connected to the negative terminal conductor bar of the battery, the smart switch interface further comprising one or more relays connected between the first circuit board conductor bar and the second circuit board conductor bar for providing isolation between the negative terminal tab of the battery and a battery being jump started; and

a negative cable connected to the second circuit board conductor bar.

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2. A battery connector device for a battery jump starting device having a smart switch, the device comprising:

a rechargeable battery comprising a positive terminal tab and a negative terminal tab;

a positive terminal conductor sheet connected to the positive terminal tab of the battery;

a negative terminal conductor bar connected to the negative terminal tab of the battery;

a positive cable connected to the positive terminal conductor sheet of the battery;

a smart switch interface connectable to the smart switch of the jump starting device, the smart switch interface comprising a circuit board having a first circuit board conductor bar spaced apart from a second circuit board conductor bar, the first circuit board conductor bar electrically connected to the negative terminal conductor bar of the battery, the smart switch interface further comprising a plurality of relays each connected between the first circuit board conductor bar and the second circuit board conductor bar for providing isolation between the negative terminal tab of the battery and a battery being jump started; and

a negative cable connected to the second circuit board conductor bar, the negative cable directly electrically connecting to each of the plurality of relays.

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3. A battery connector device for a battery jump starting device having a smart switch, the device comprising:

a rechargeable battery comprising a positive terminal tab and a negative terminal tab;

a positive terminal conductor sheet connected to the positive terminal tab of the battery;

a negative terminal conductor bar connected to the negative terminal tab of the battery;

a positive cable connected to the positive terminal conductor sheet of the battery;

a smart switch interface connectable to the smart switch of the jump starting device, the smart switch interface comprising a circuit board having a first circuit board conductor bar spaced apart from a second circuit board conductor bar, the first circuit board conductor bar electrically connected to the negative terminal conductor bar of the battery, the smart switch interface further comprising multiple relays each connected between the first circuit board conductor bar and the second circuit board conductor bar for providing isolation between the negative terminal tab of the battery and a battery being jump started;

a negative cable connected to the second circuit board conductor bar, the negative cable directly electrically connecting to each of the plurality of relays; and

a diode connection provided between a first section of the positive cable and a second section of the positive cable.

4. The device according to claim 1, wherein the one or more relays is multiple relays connected in parallel between the first circuit board conductor bar and the second circuit board conductor bar.

5. The device according to claim 1, wherein the negative terminal conductor bar is configured to mechanically and electrically connect the battery to the smart switch battery interface.

6. The device according to claim 5, wherein the negative terminal conductor bar is configured to position the smart switch battery above and adjacent to the battery.

7. The device according to claim 1, wherein the positive terminal conductor sheet wraps around one end of the positive cable to electrically connect the battery to the positive cable.

8. The device according to claim 1, wherein the positive terminal conductor bar is ultrasonically welded to the positive terminal tab of the battery and the negative terminal conductor bar is ultrasonically welded to the negative terminal tab of the battery.

9. The device according to claim 1, wherein the battery is rectangular-shaped and a width of the positive terminal conductor sheet of the battery is equal to the width of the battery, and the negative terminal conductor bar is L-shaped and configured to wrap around a respective corner of the battery.

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10. The device according to claim 9, wherein the battery tabs are mounted flush with a casing of the battery.

11. The device according to claim 1, wherein a diode connection is provided between a first section of the positive cable and a second section of the positive cable.

12. The device according to claim 11, wherein the diode connection comprises one or more diodes connected between the first section of the positive cable and the second section of the positive cable.

13. The device according to claim 12, wherein the diode connection comprises multiple diodes each connected between the first section of the positive cable and the second section of the positive cable.

14. The device according to claim 13, wherein conductor tabs of the multiple diodes are connected to the first section of the positive cable and the conductor prongs of the multiple diodes are connected to the second section of the positive cable.

15. The device according to claim 14, wherein the multiple diodes are connected to a printed circuit board.

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16. The device according to claim 15, wherein the conductor prongs of the multiple diodes extend through the printed circuit board and electrically connect with the second section of the conductor prongs.

17. The device according to claim 16, wherein the multiple diodes are arranged abutting each other along a single axis.

18. The device according to claim 13, wherein the diode connector is insulated with a heat shrink insulator.

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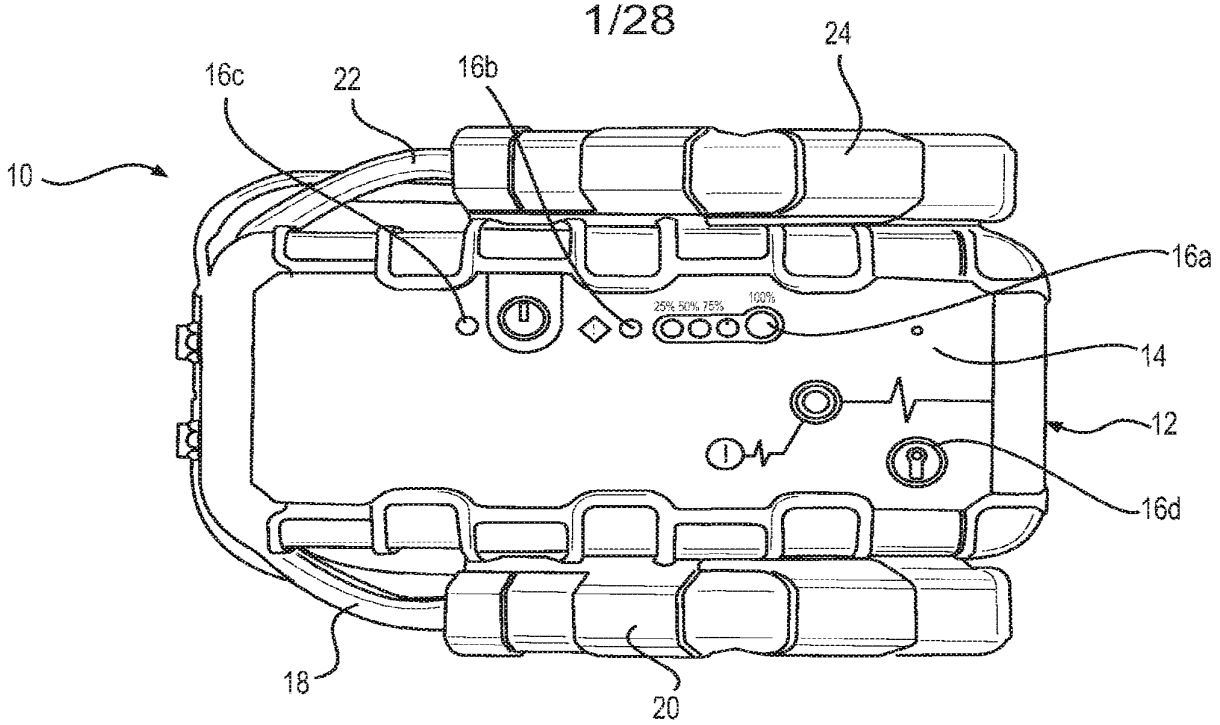


FIG. 1

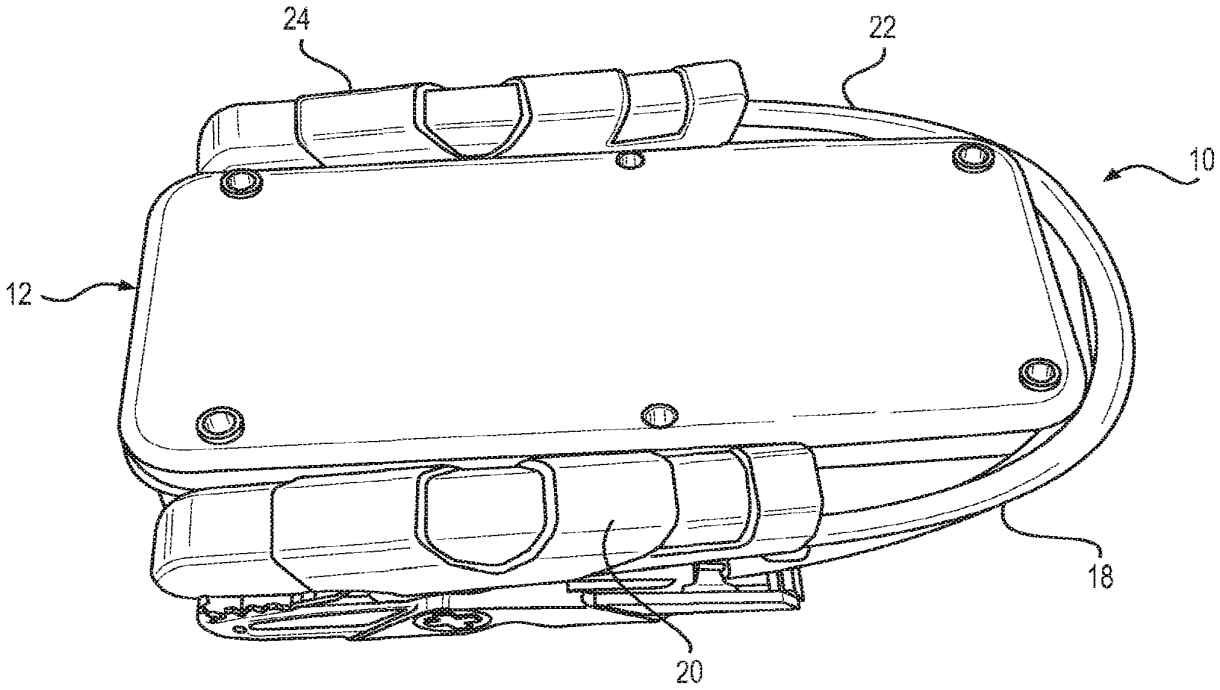


FIG. 2

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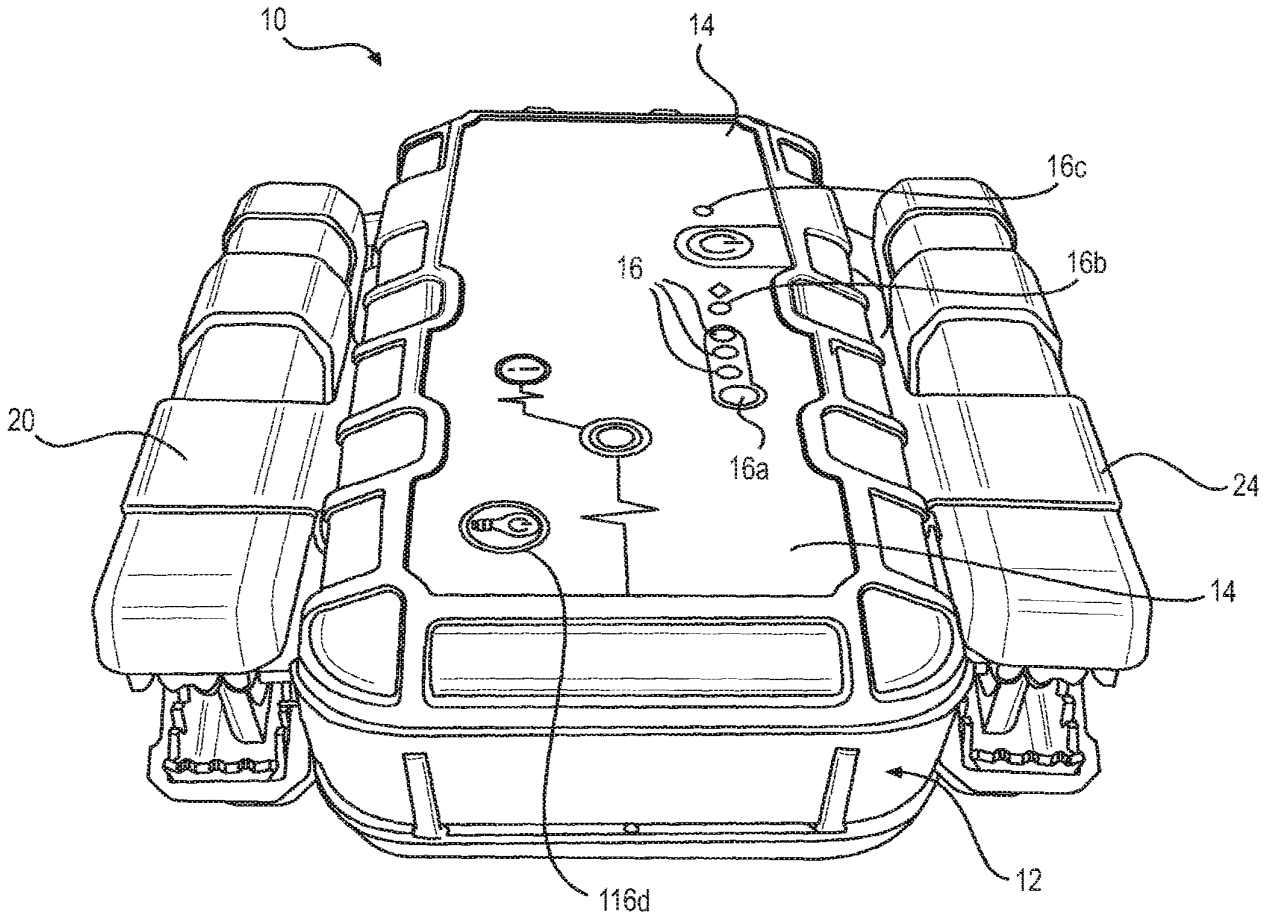


FIG. 3

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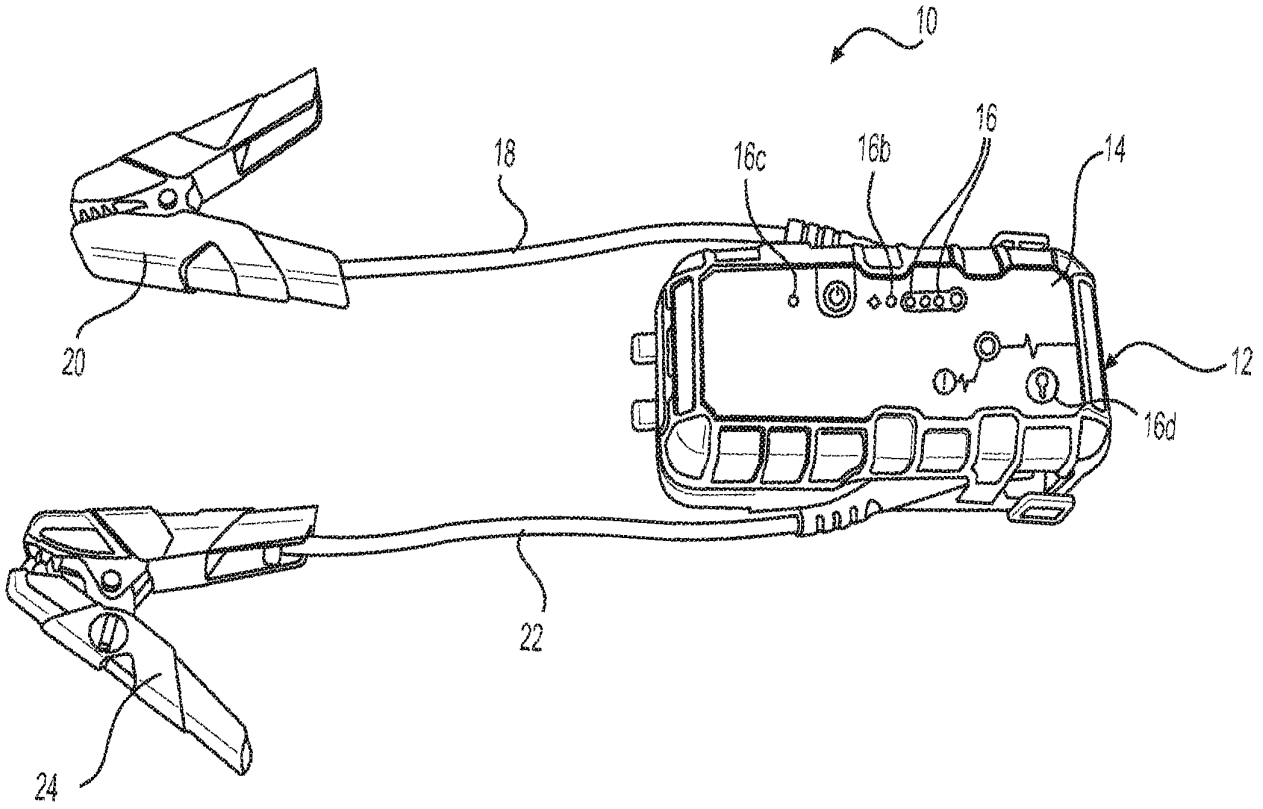


FIG. 4

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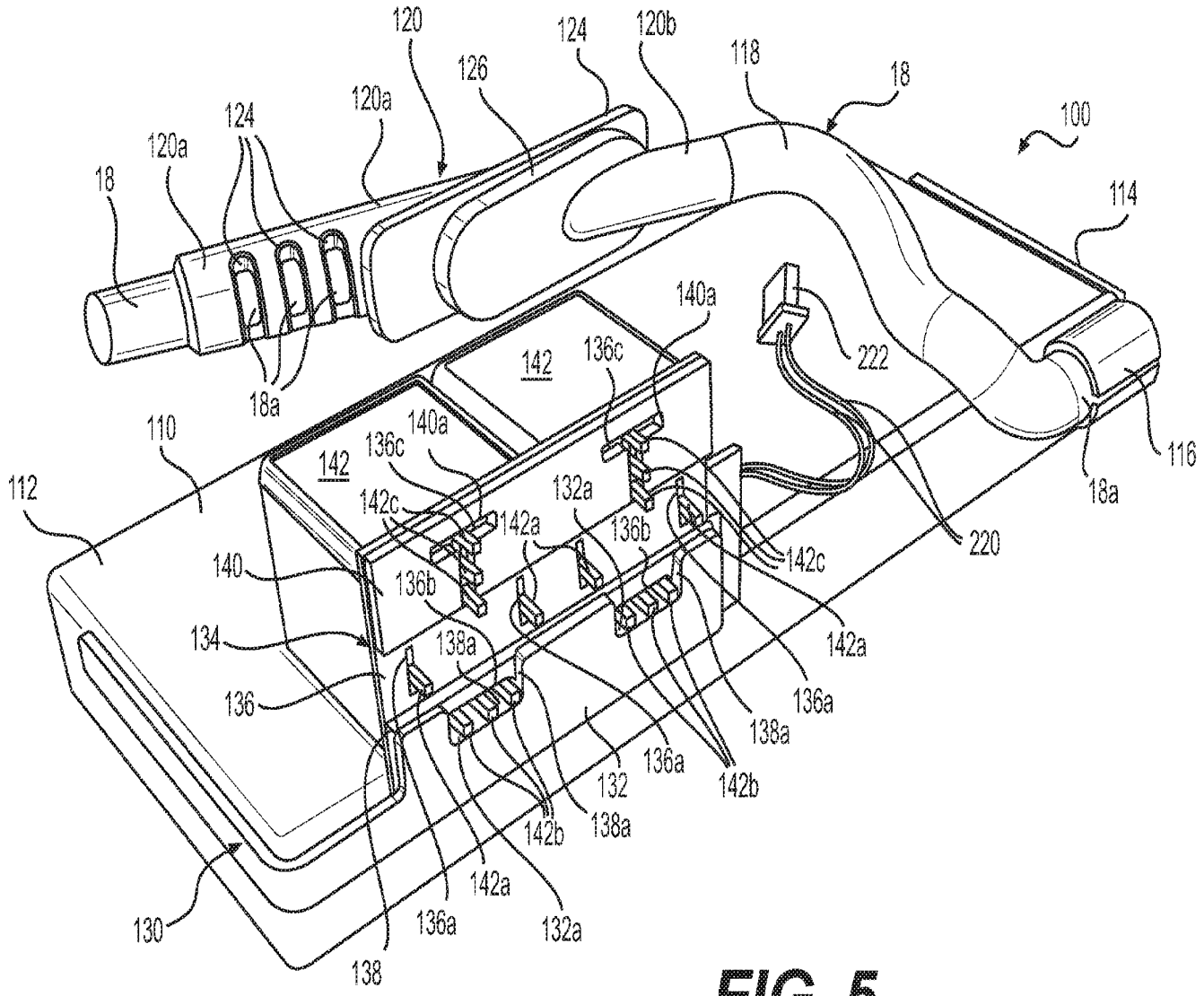

120
124
120b
126
118
18
100
120a
124
120a
18
114
140a
222
142
136c
18a
110
140a
136c
142
132a
116
112
142c
142a
136b
18a
220
140
136b
142c
134
138a
142a
136
136a
138a
136a
132
142b
142b
138a
142a
130
136a
132a
138

FIG. 5

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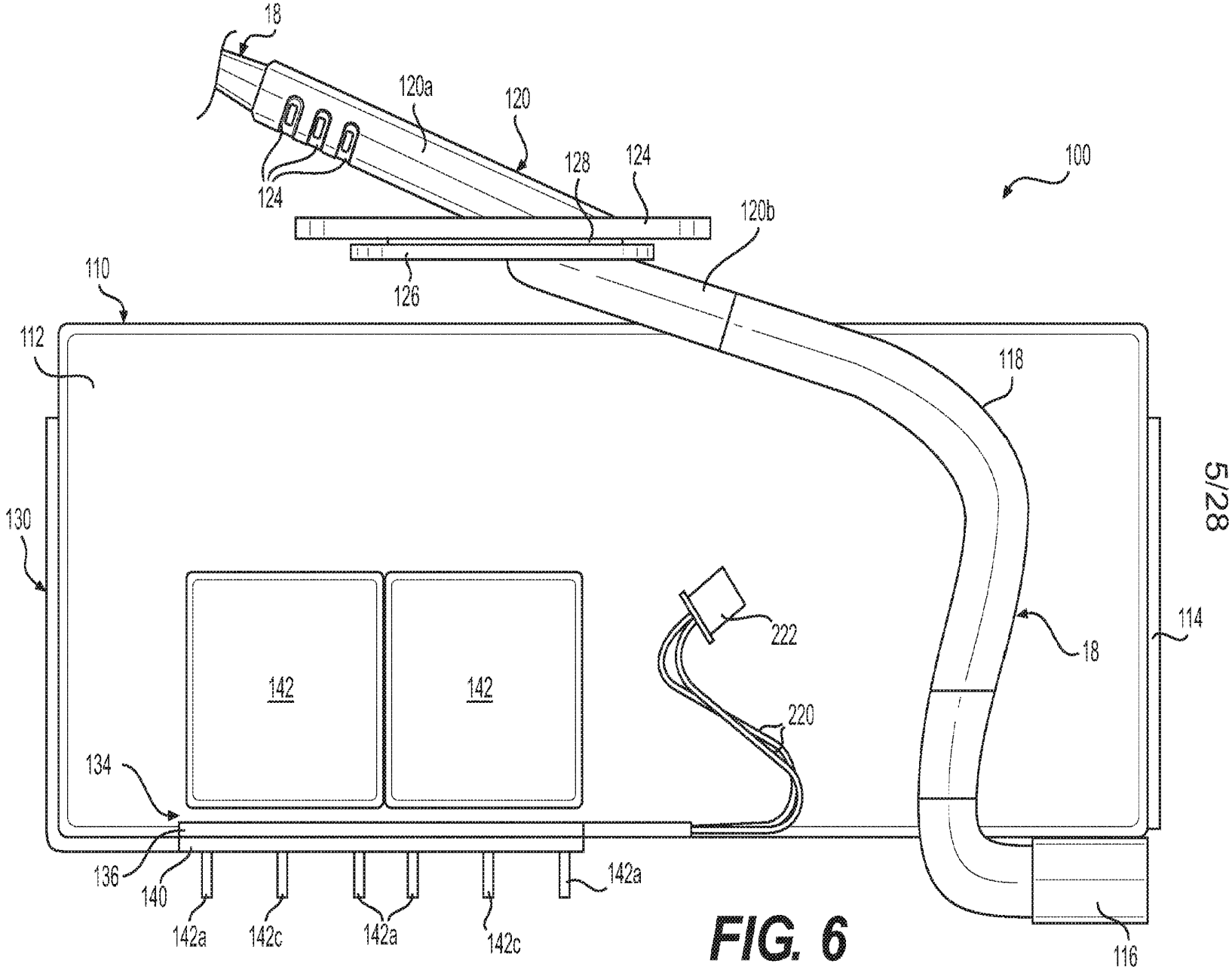
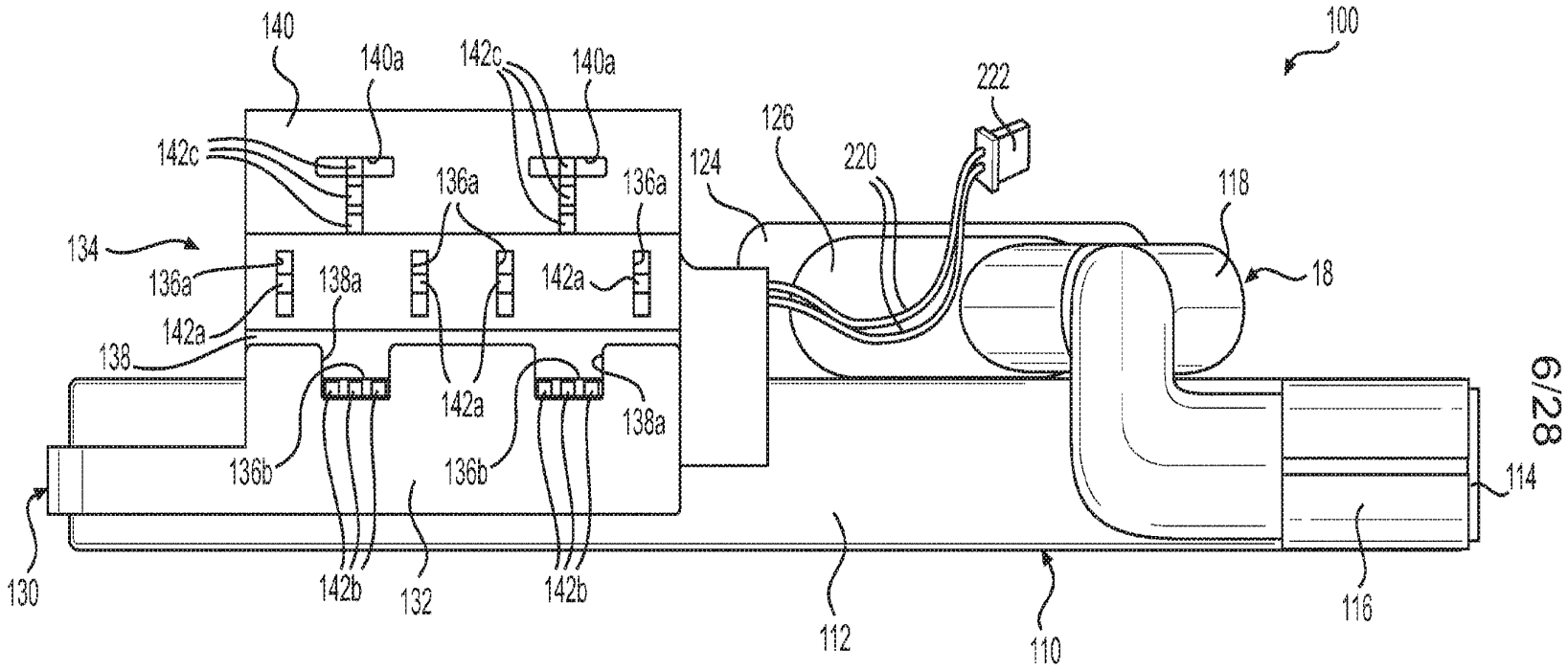


FIG. 6

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FIG. 7

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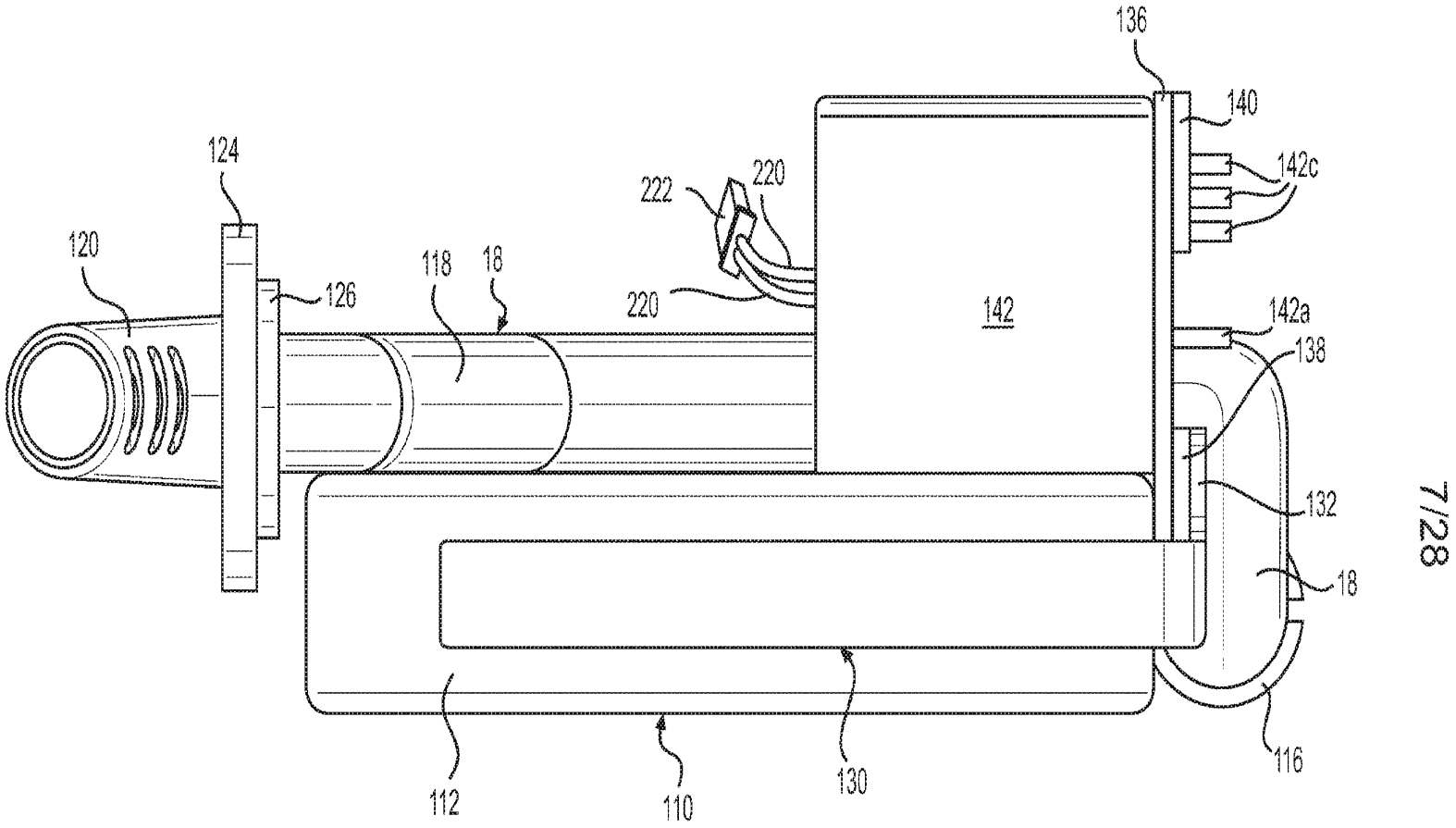


FIG. 8

EXHIBIT 1002
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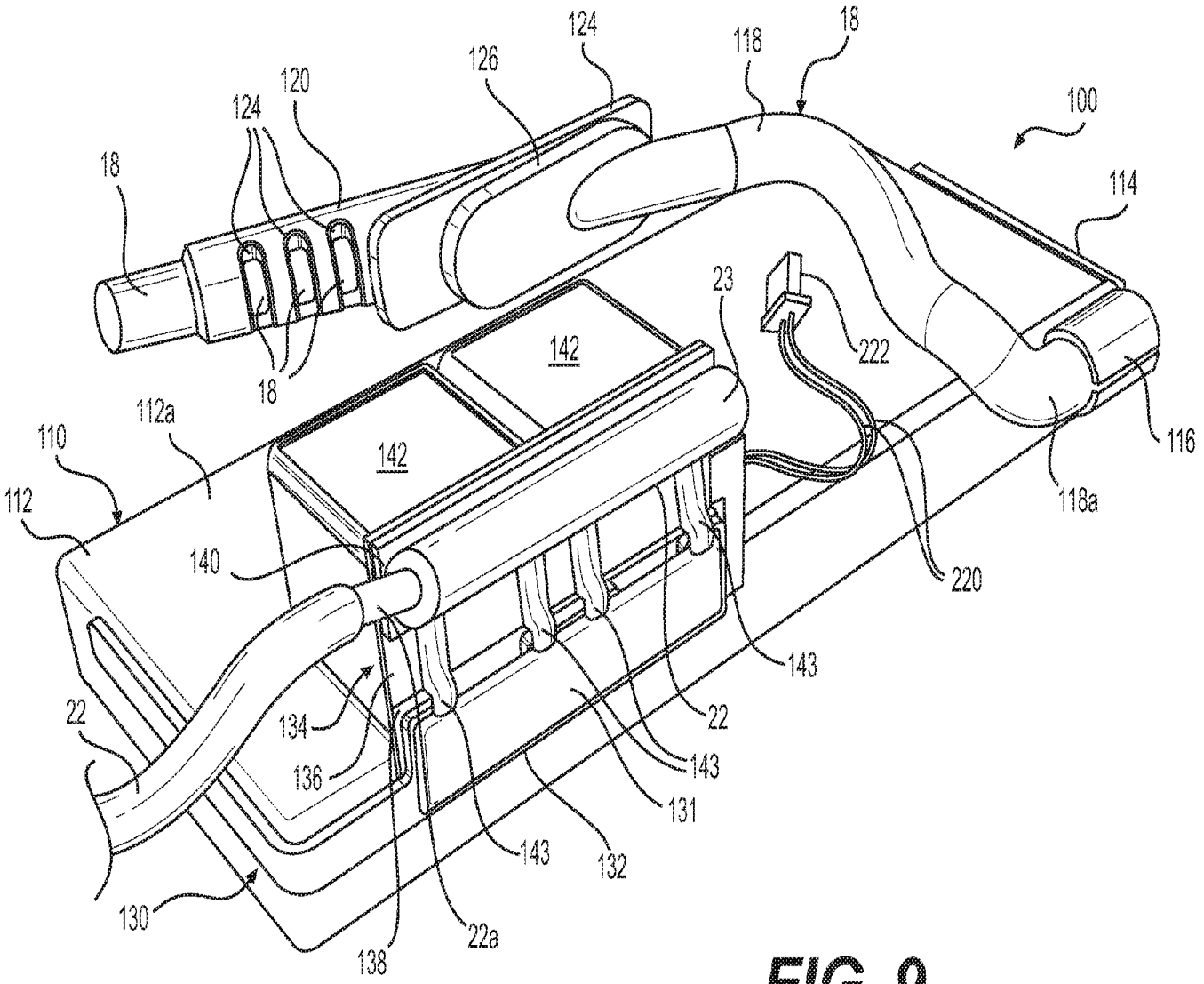


FIG. 9

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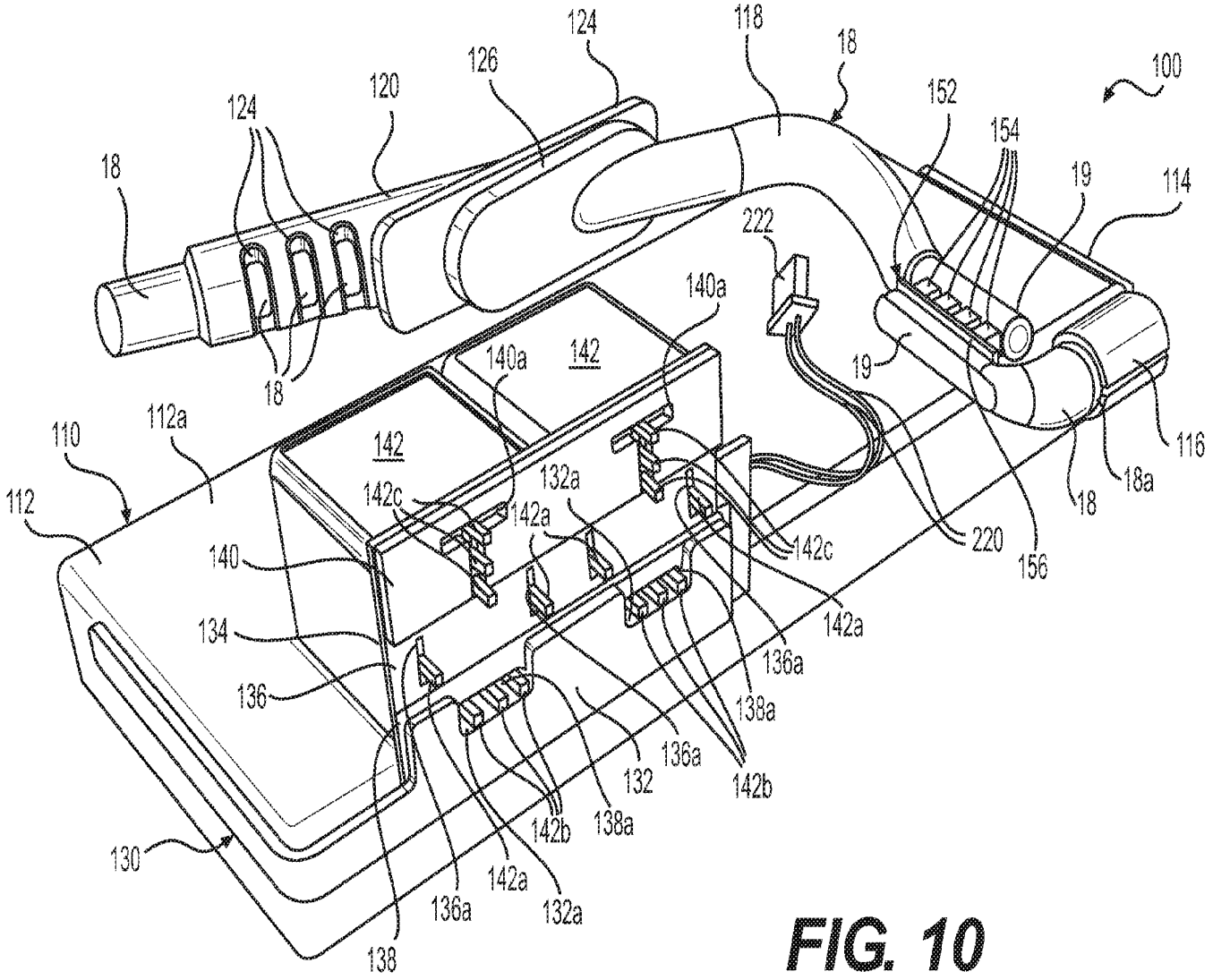


FIG. 10

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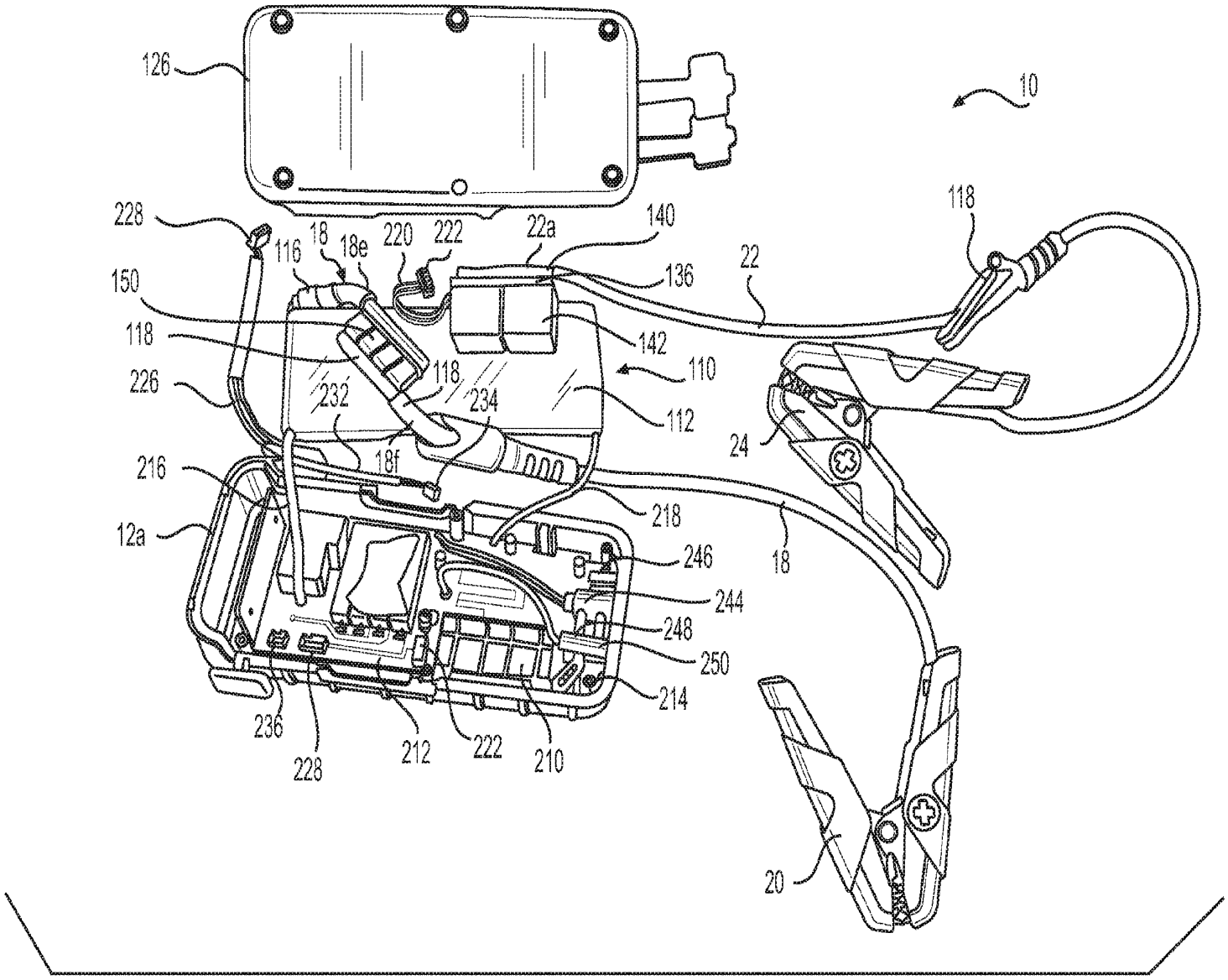


FIG. 11

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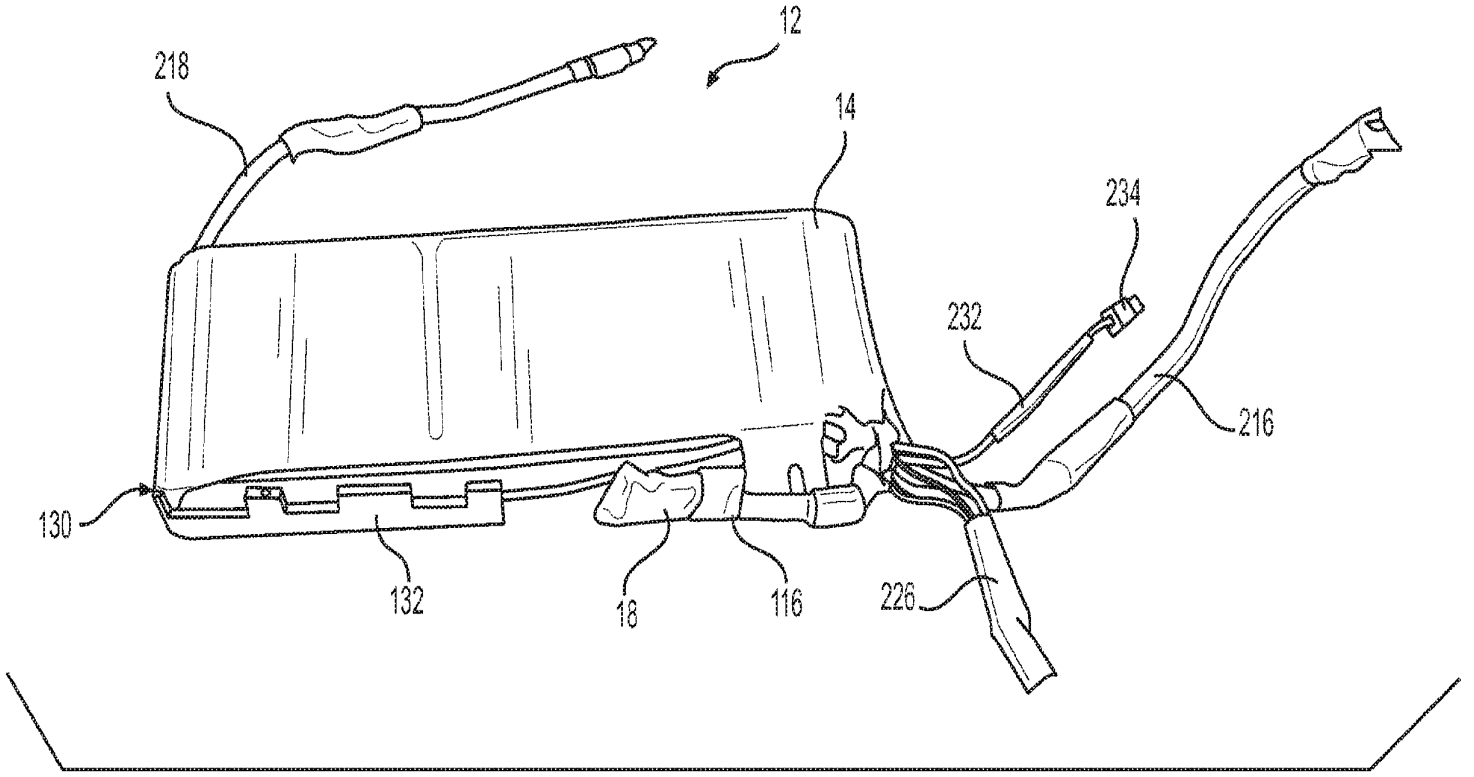


FIG. 12

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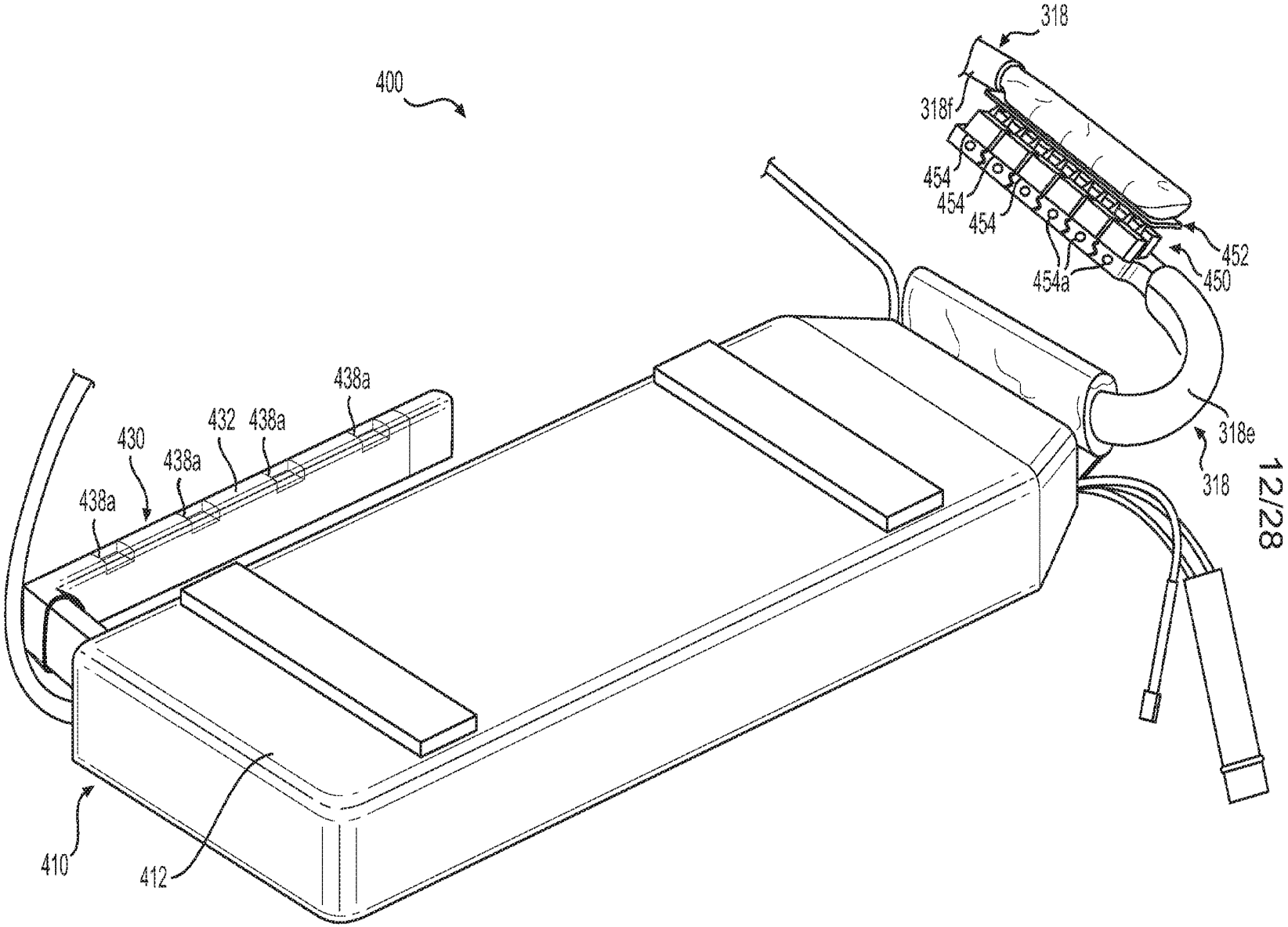


FIG. 13

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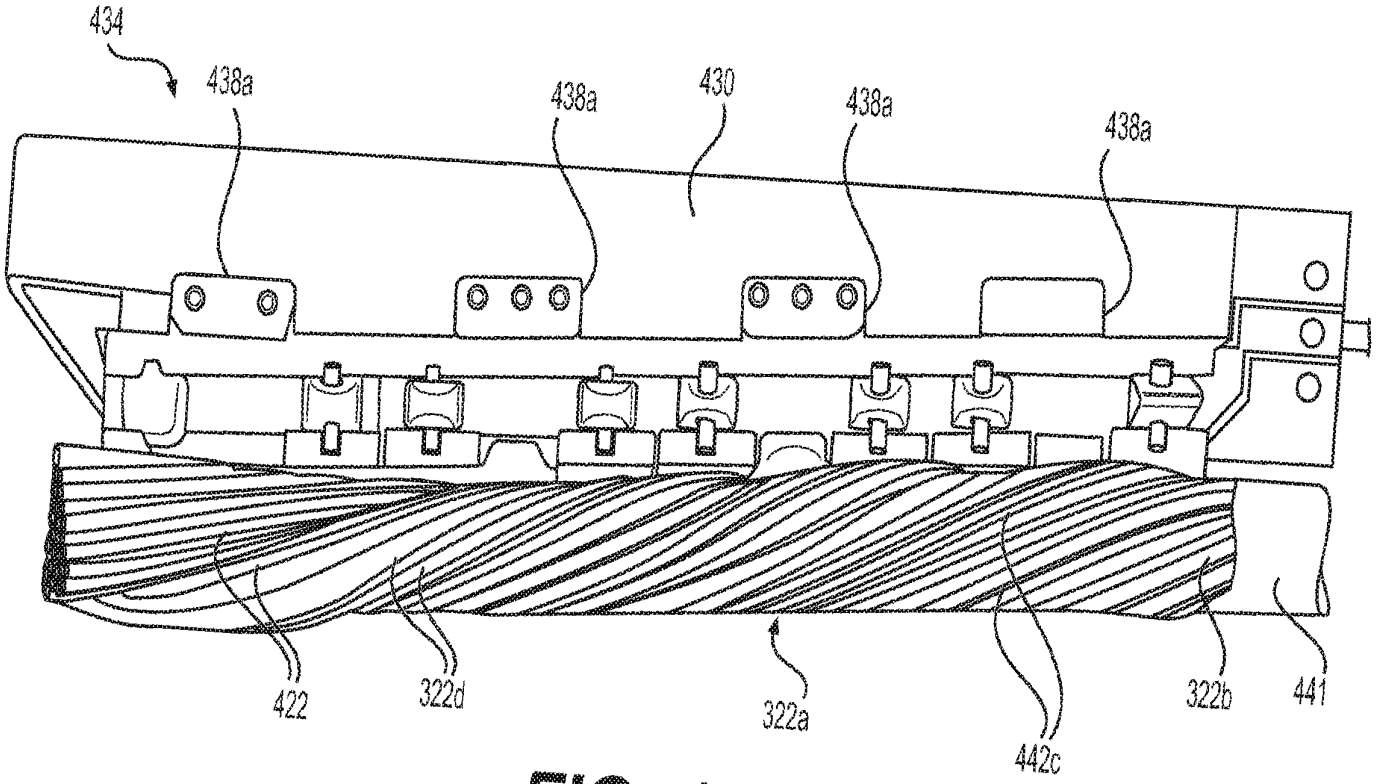


FIG. 14

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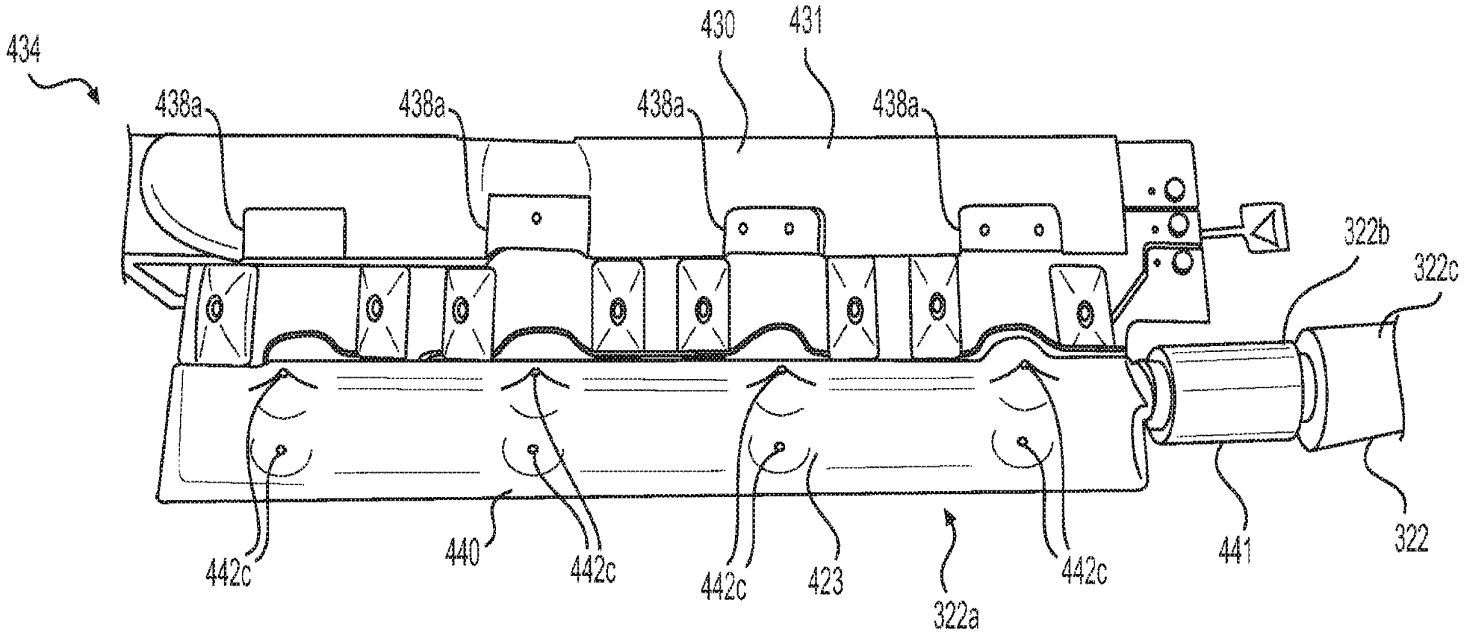


FIG. 15

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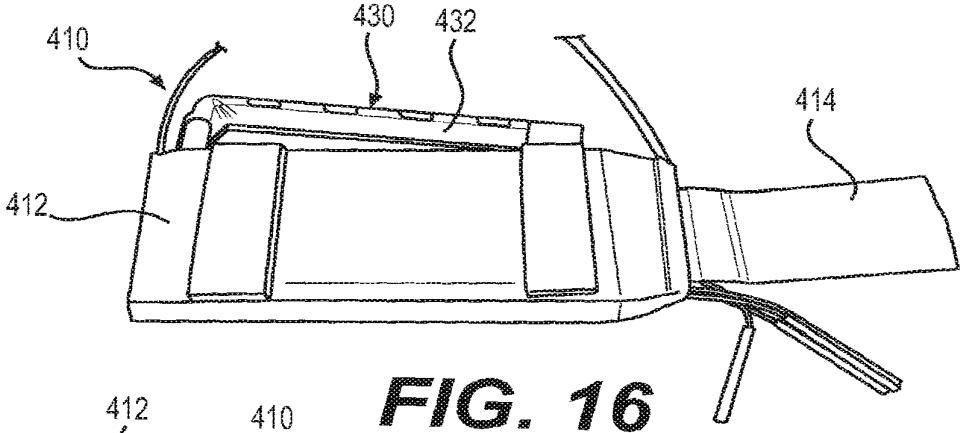


FIG. 16

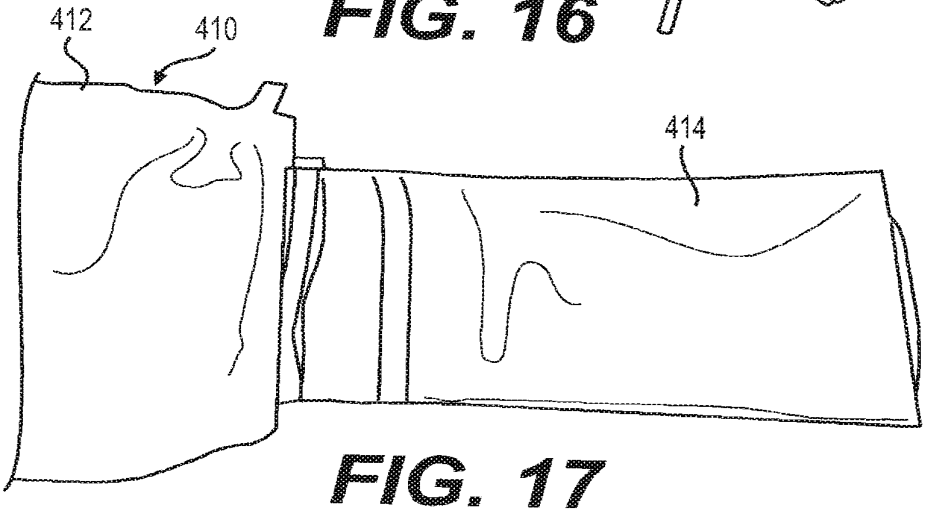


FIG. 17

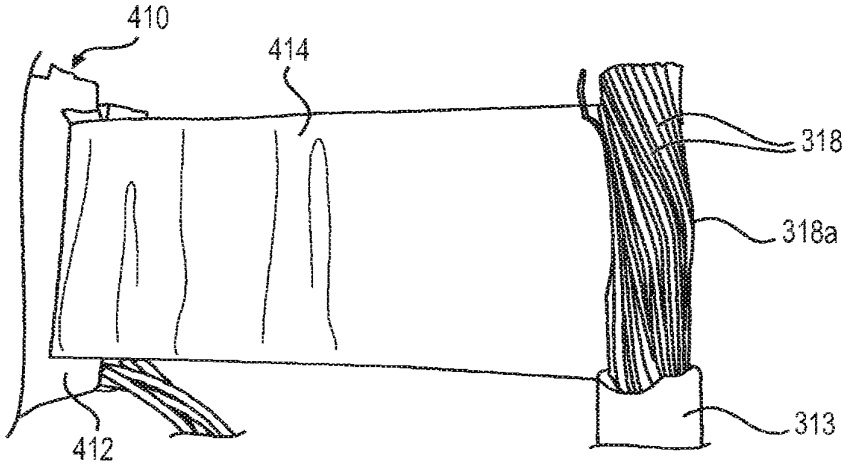


FIG. 18

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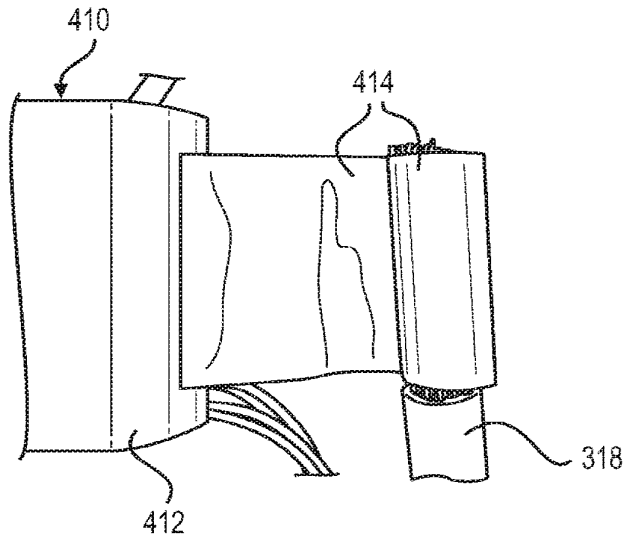


FIG. 19

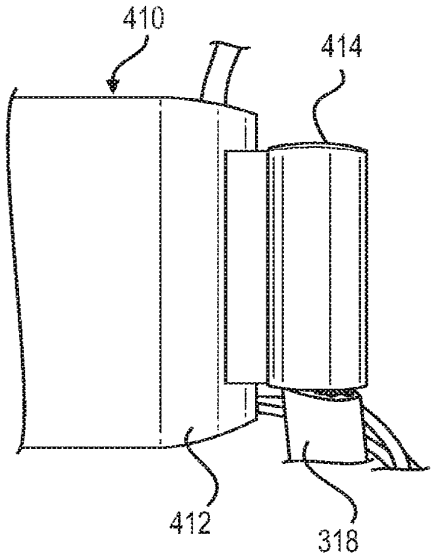


FIG. 20

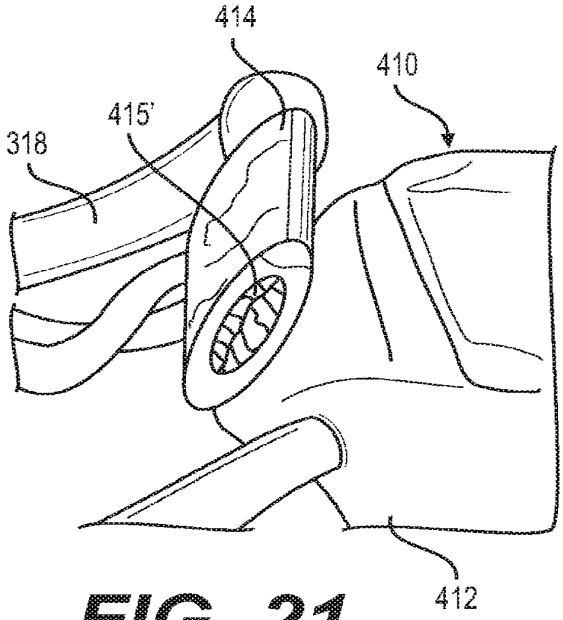


FIG. 21

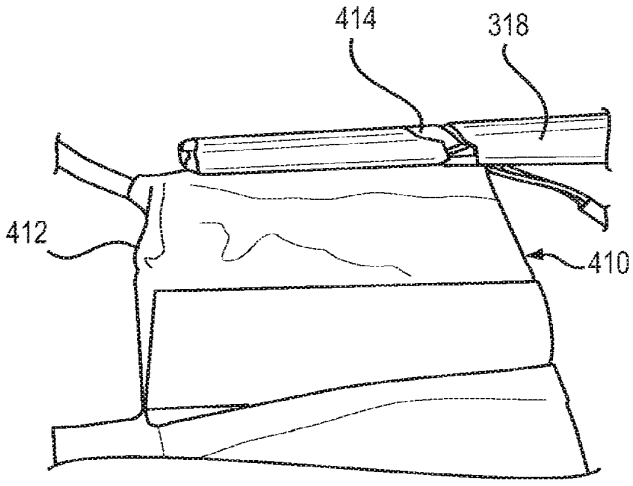


FIG. 22

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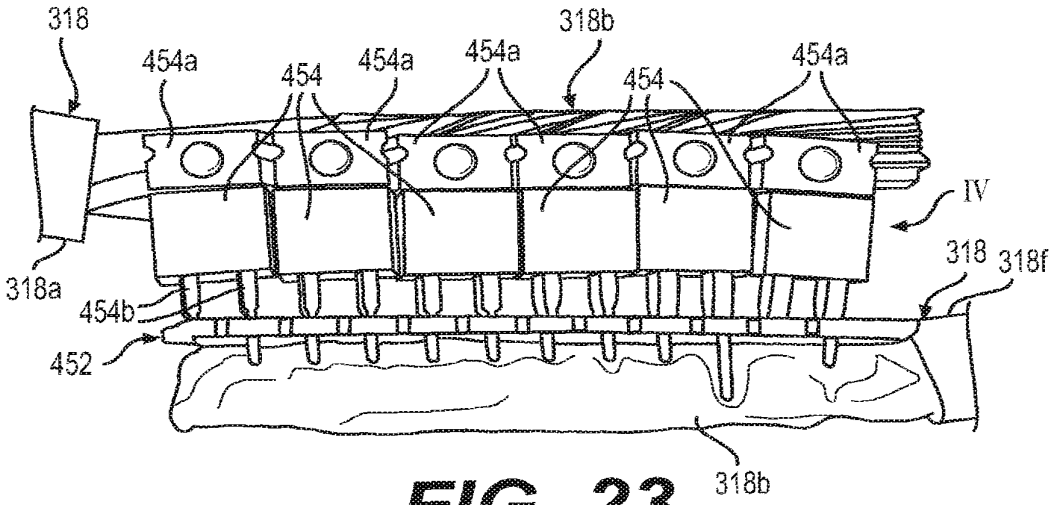


FIG. 23

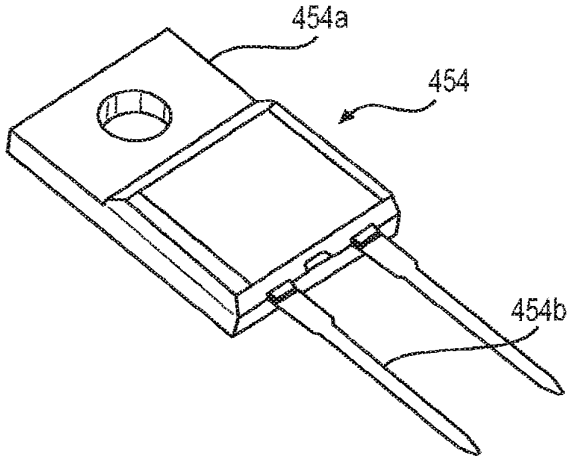


FIG. 24

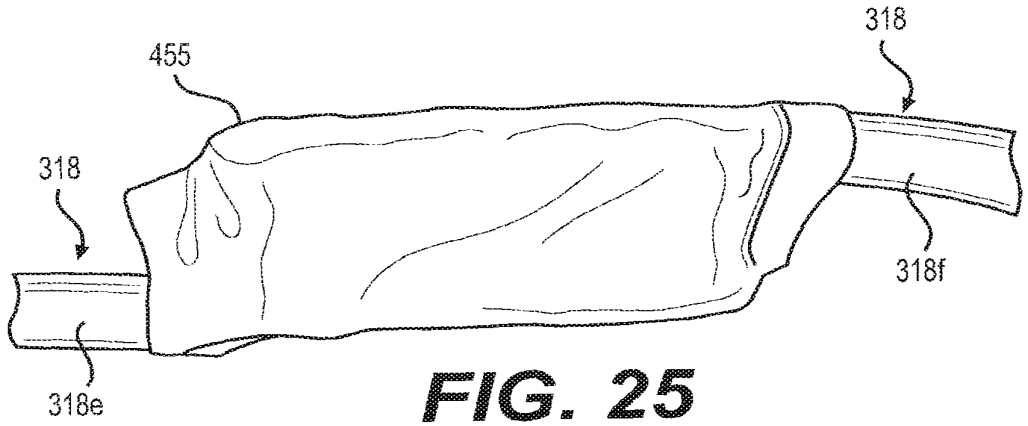
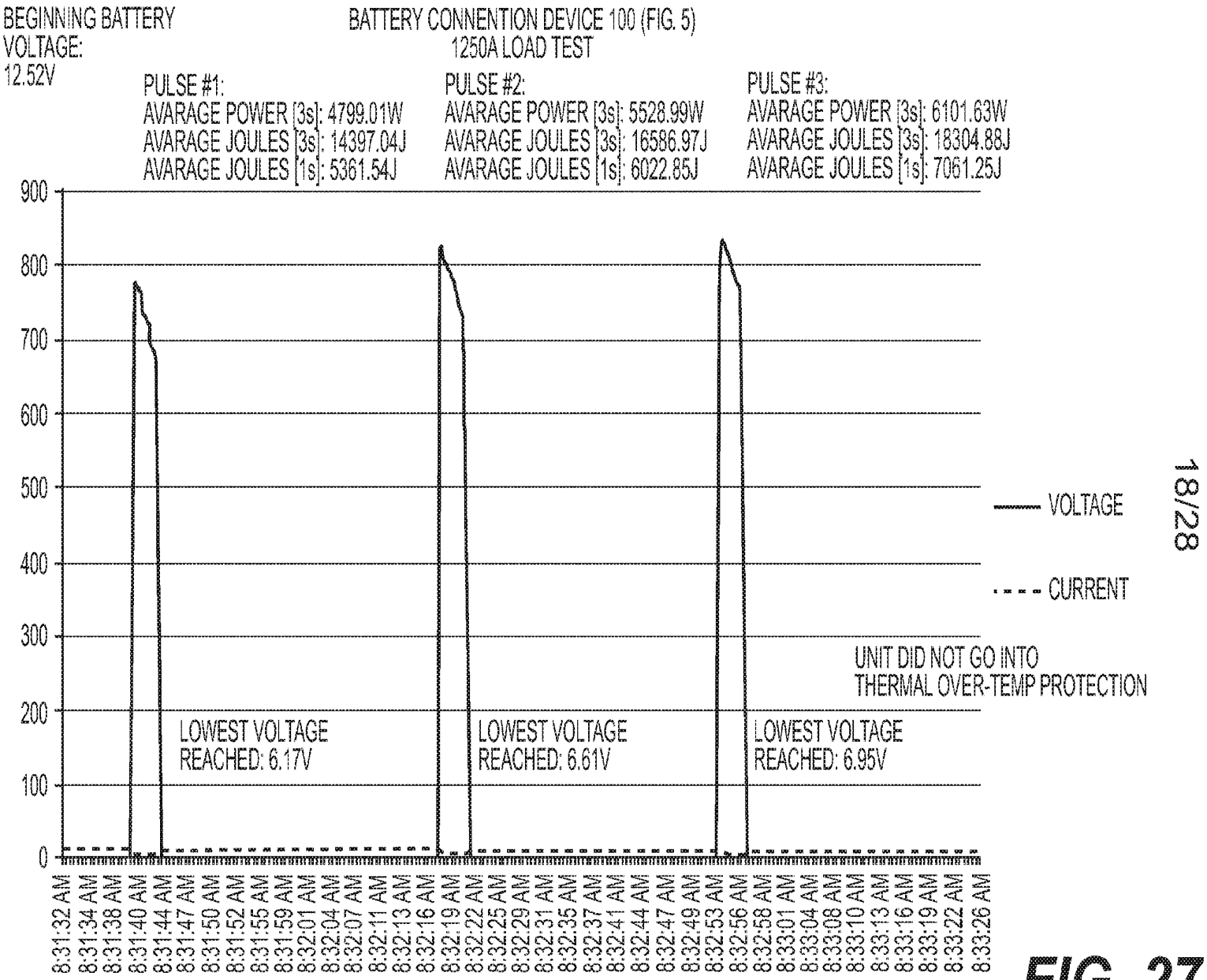


FIG. 25

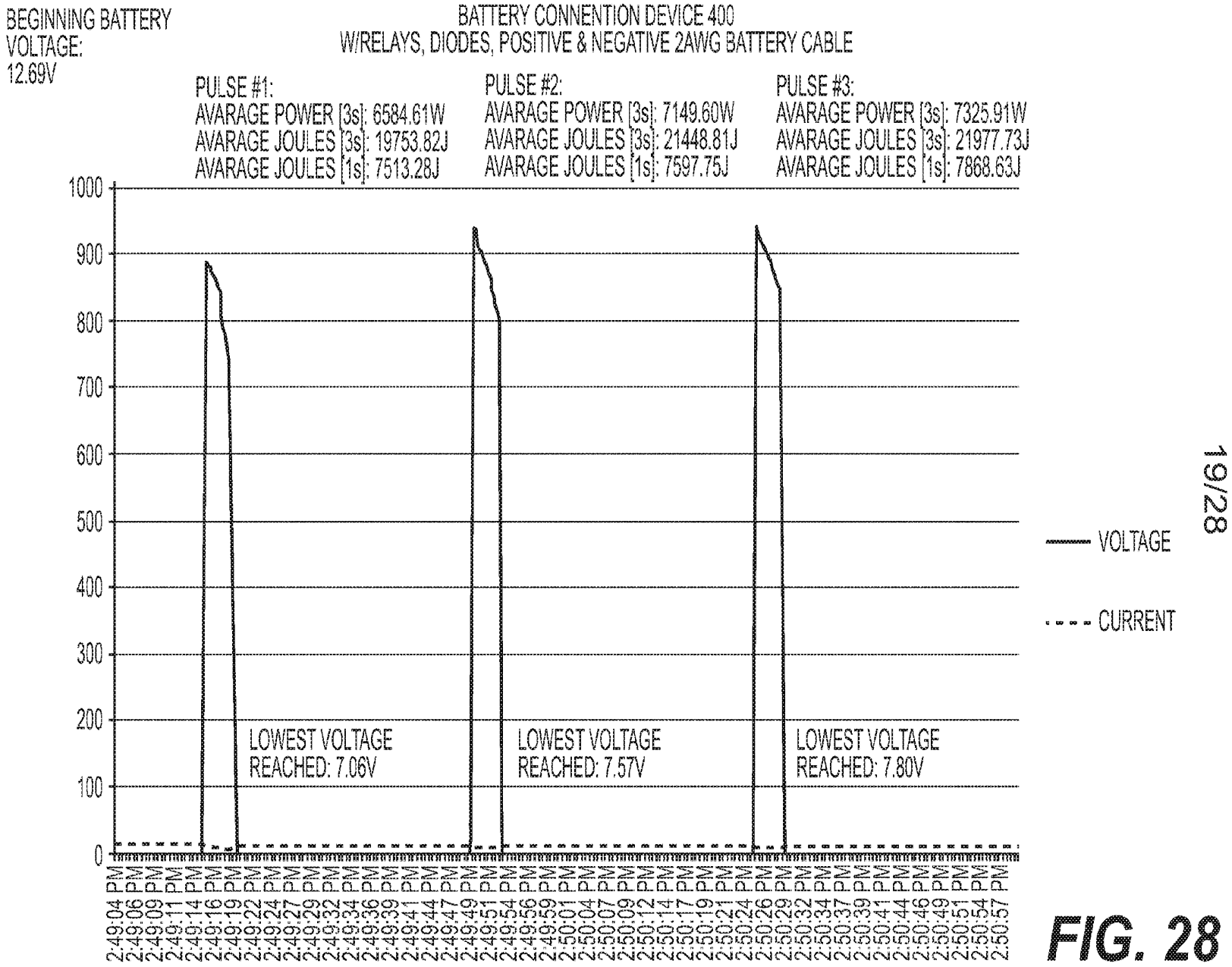
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FIG. 27

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FIG. 28

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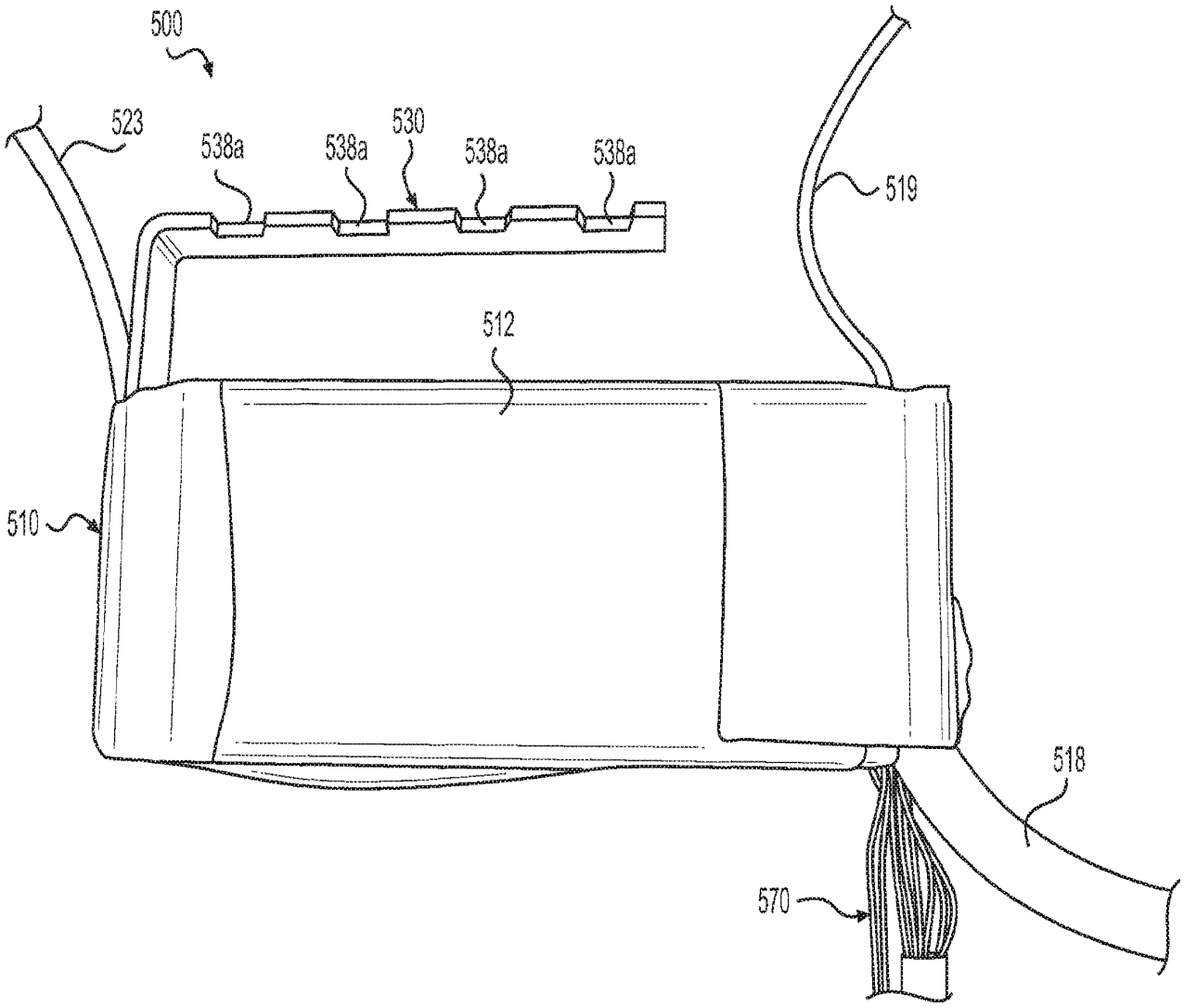


FIG. 29

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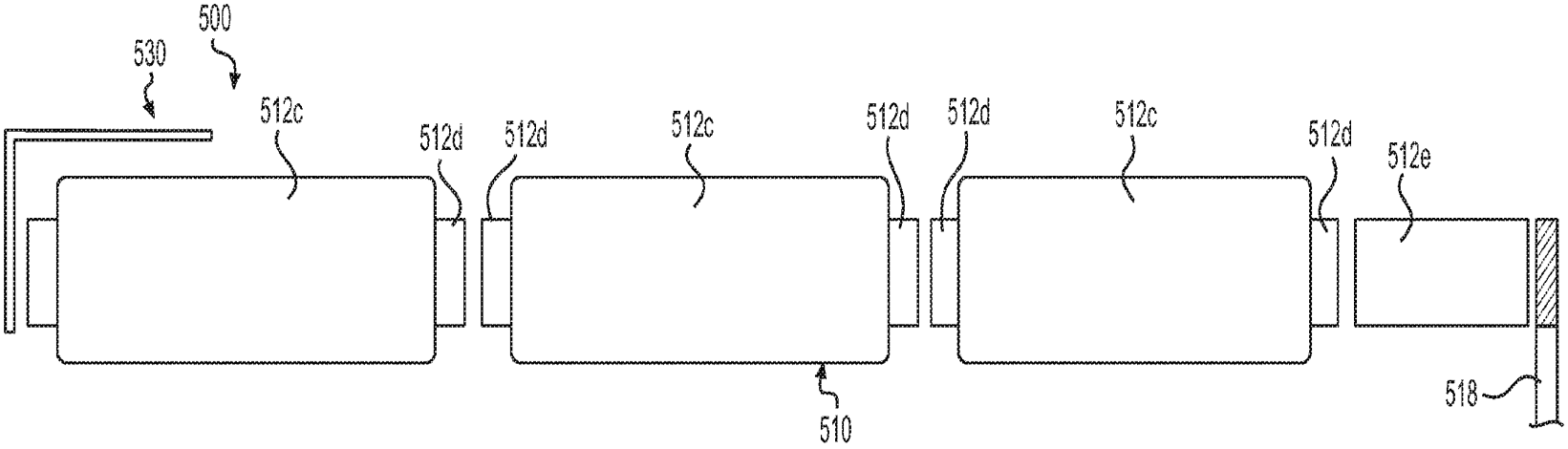


FIG. 30

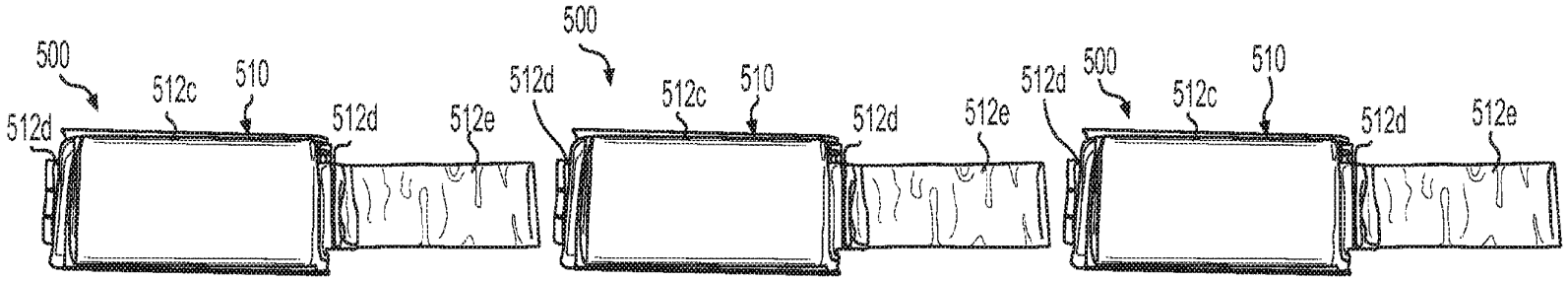


FIG. 31

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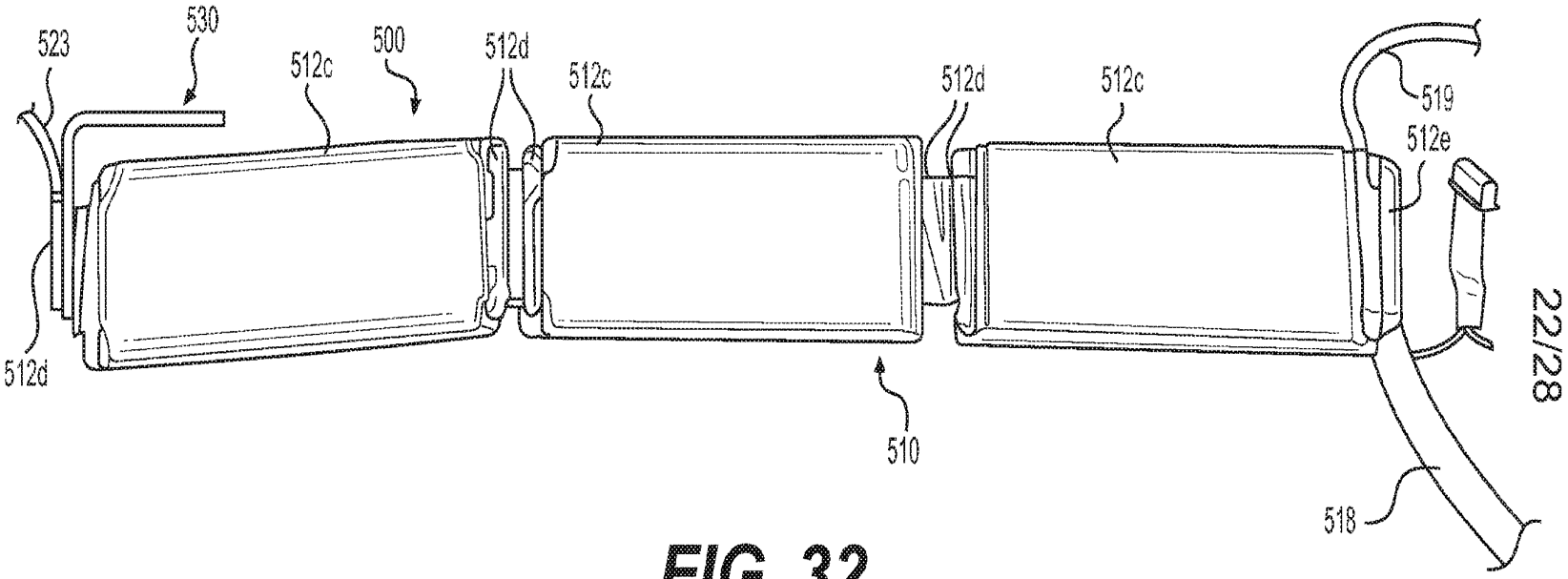


FIG. 32

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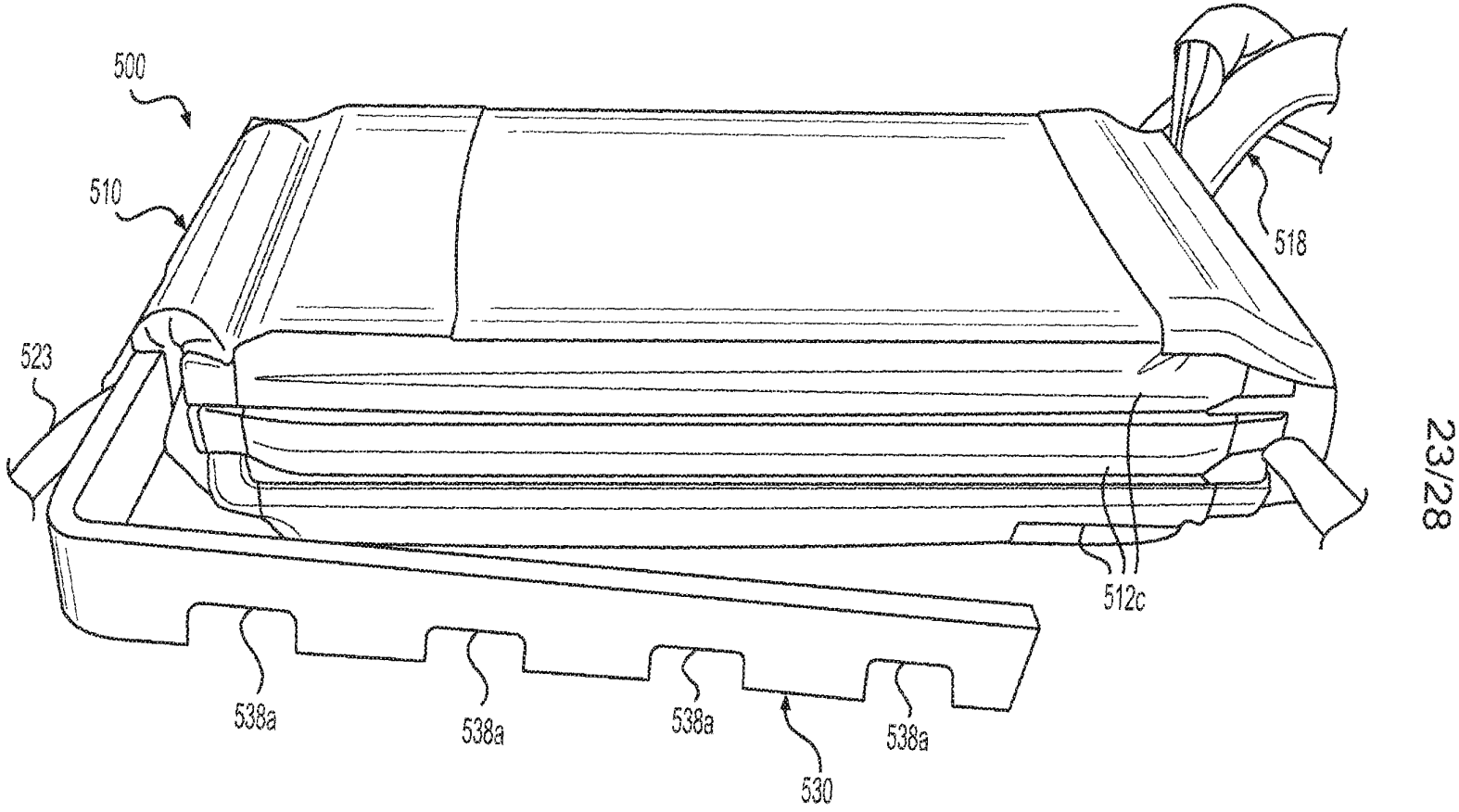


FIG. 33

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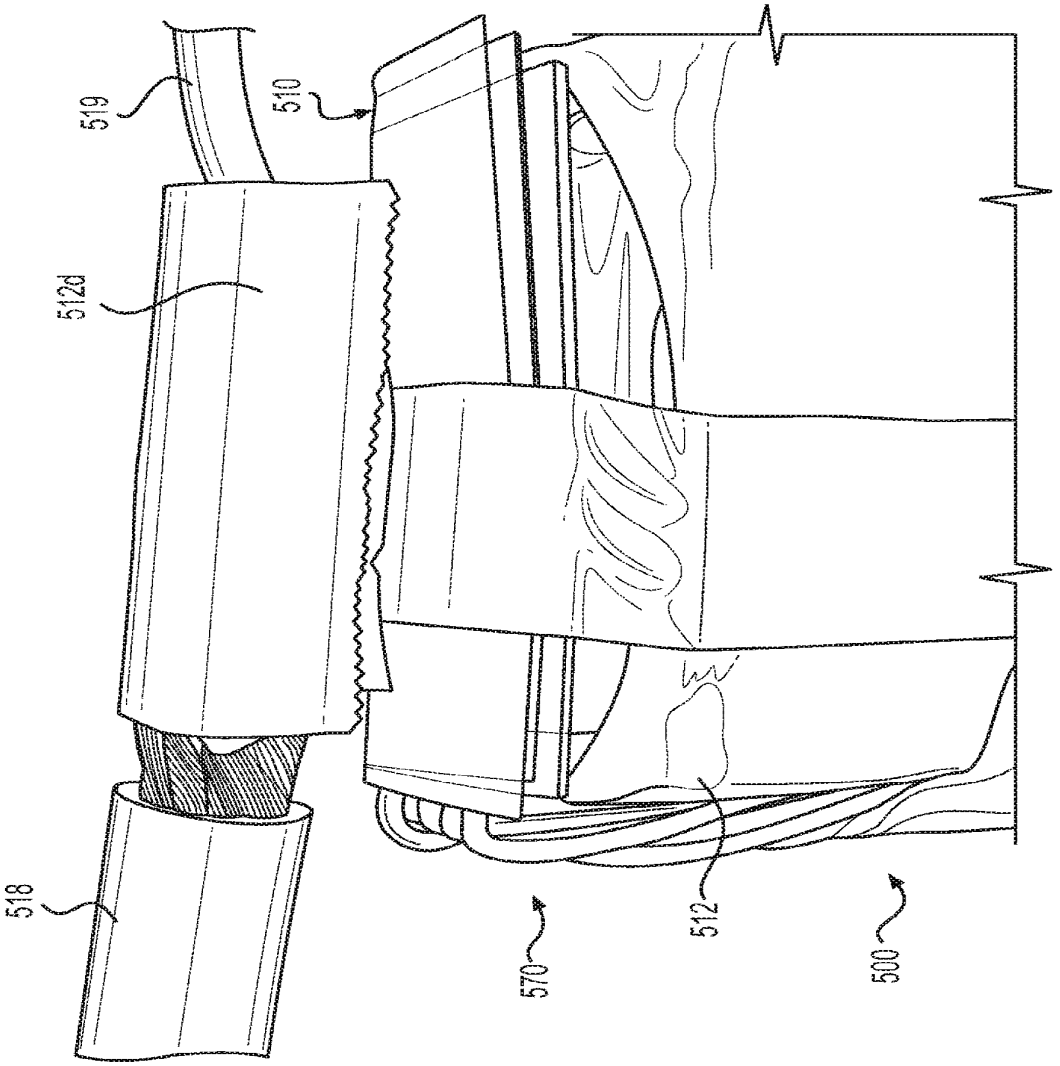


FIG. 34

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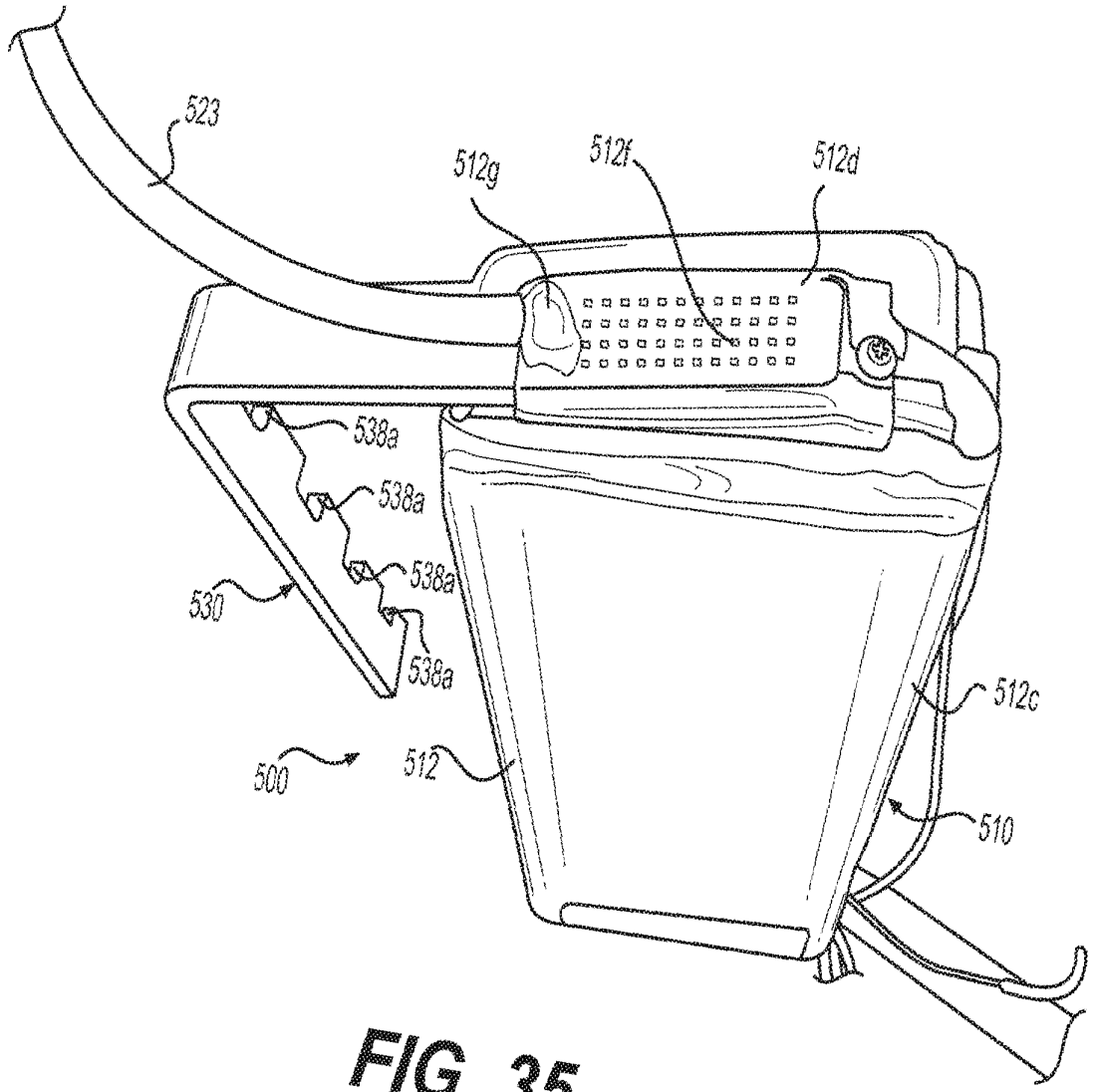


FIG. 35

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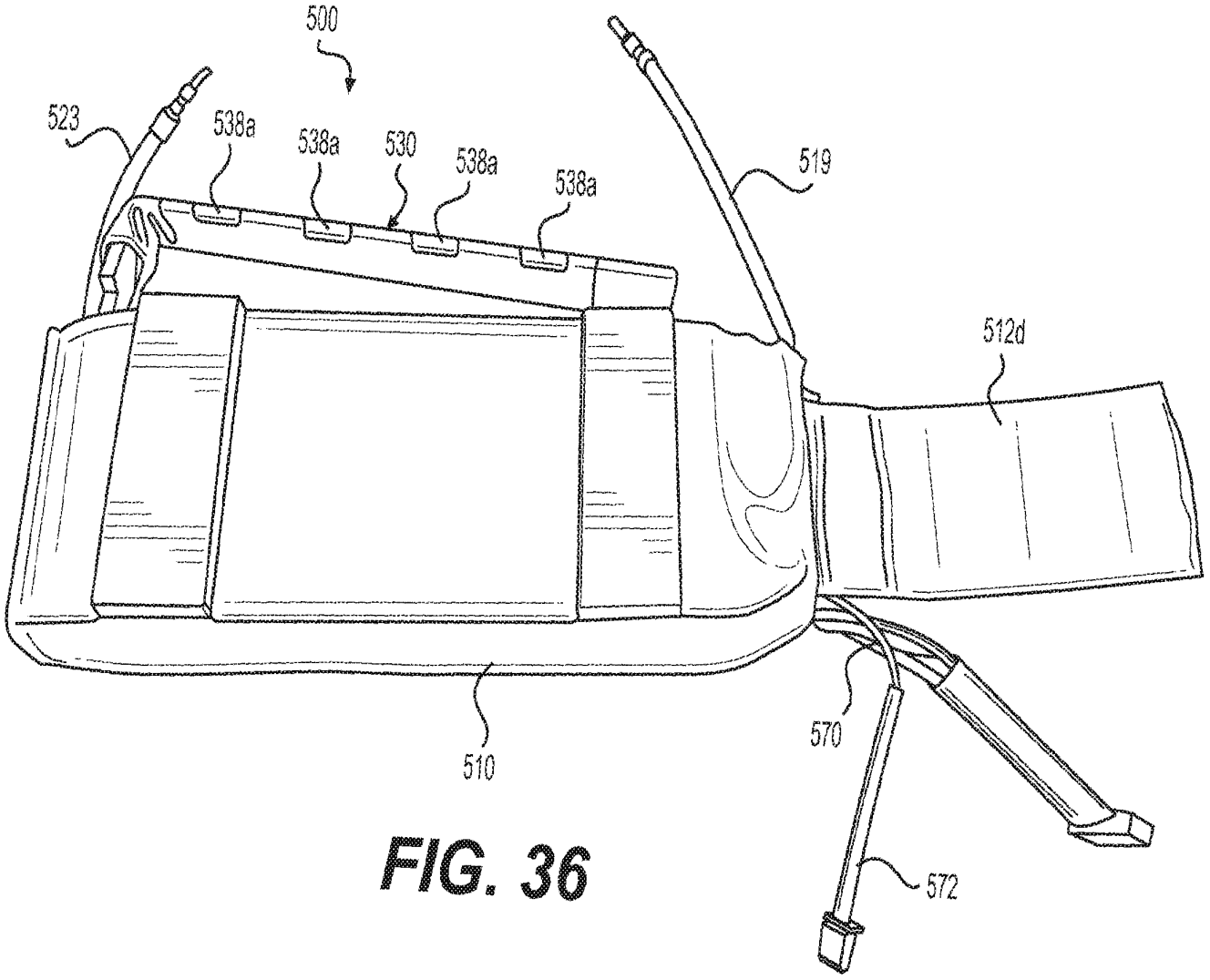


FIG. 36

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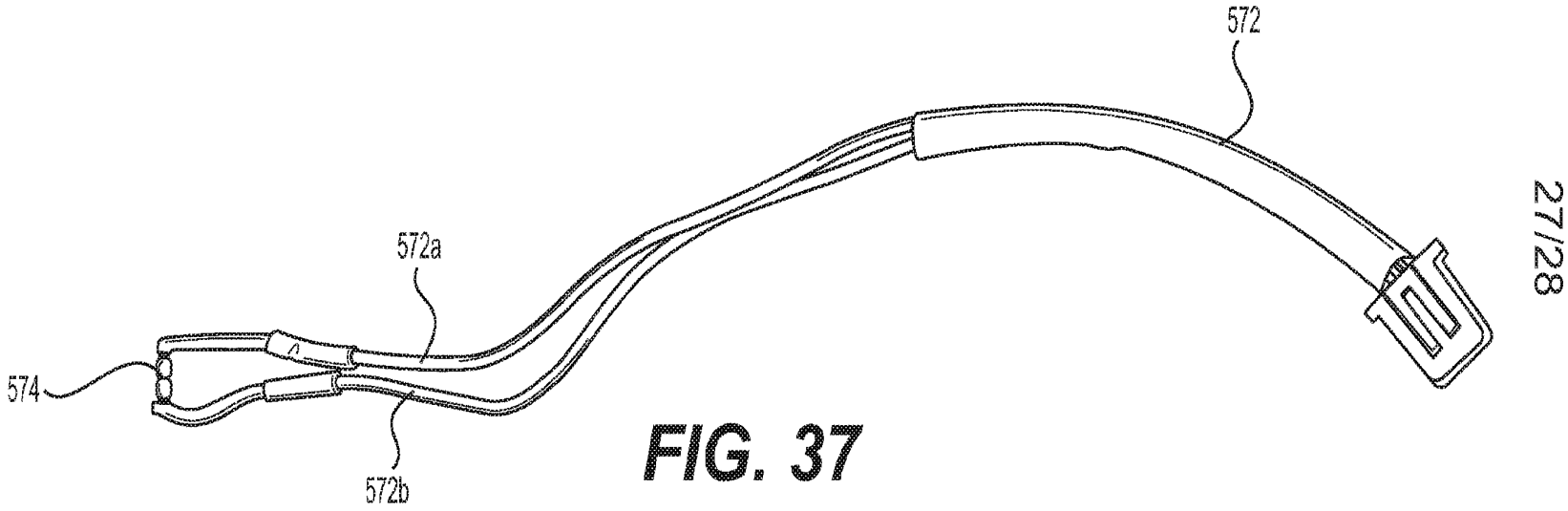


FIG. 37

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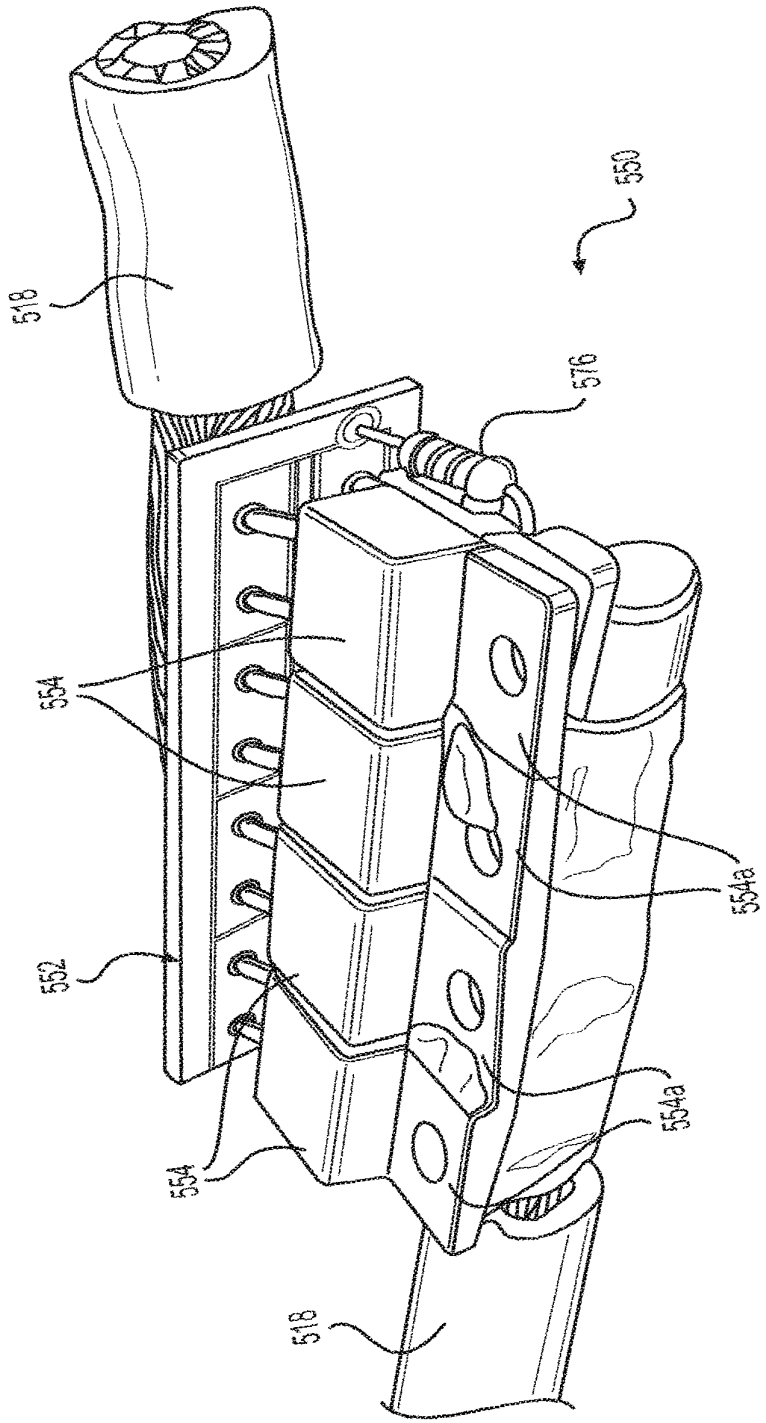


FIG. 38

(12) STANDARD PATENT APPLICATION (11) Application No. **AU 2016269555 A1**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Portable vehicle battery jump start apparatus with safety protection

(51) International Patent Classification(s)
H02J 7/14 (2006.01) ***H02J 1/00*** (2006.01)
B60R 16/00 (2006.01) ***H02J 7/00*** (2006.01)
B60R 16/03 (2006.01)

(21) Application No: **2016269555** (22) Date of Filing: **2016.12.09**

(43) Publication Date: **2017.01.05**
(43) Publication Journal Date: **2017.01.05**

(62) Divisional of:
2015258229

(71) Applicant(s)
The NOCO Company

(72) Inventor(s)
NOOK, Jonathan Lewis;NOOK, William Knight;STANFIELD, James Richard;UNDERHILL, Derek Michael

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ABSTRACT

A handheld device for jump starting a vehicle engine includes a rechargeable lithium ion battery pack (32) and a microcontroller (1). The lithium ion battery is coupled to a power output port of the device through a power switch circuit (15) actuated by the microcontroller. A vehicle battery isolation sensor (12) connected in circuit with positive and negative polarity outputs detects the presence of a vehicle battery (72) connected between the positive and negative polarity outputs. A reverse polarity sensor (10) 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

FIELD OF THE INVENTION

[0001] The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery.

BACKGROUND TO THE INVENTION

[0002] Prior art devices are known for jump-starting a vehicle, 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.

[0003] 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.

[0004] 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.

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[0005] 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 batteries. Therefore, the positive and negative terminals of the two batteries are correctly connected based on the detected result of the polarity detecting unit.

[0006] 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.

[0007] 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

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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.

[0008] 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 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.

[0009] 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.

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[0010] 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.

[0011] 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 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.

[0012] 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.

[0013] 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.

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SUMMARY OF THE INVENTION

[0014] In accordance with an aspect of the invention, an apparatus is provided 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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port; a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.

[0015] In accordance with an embodiment of the invention, the internal power supply is a rechargeable lithium ion battery pack.

[0016] A jumper cable device may also be provided, having a plug configured to plug into said output port; 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.

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[0017] Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Fig. 1 is a functional block diagram of a handheld vehicle battery boost apparatus in accordance with one aspect of the present invention;

[0019] 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;

[0020] Fig. 3 is a perspective view of a handheld jump starter booster device in accordance with one example embodiment of the invention; and

[0021] 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.

DETAILED DESCRIPTION OF THE INVENTION

[0022] 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).

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[0023] 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.

[0024] 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.

[0025] 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 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.

[0026] 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

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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.

[0027] 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).

[0028] 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 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

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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.

[0029] 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.

[0030] 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 microcontroller output is driven to a logic high, the FETs 16 (Q15, Q18, and Q19) are in a low resistant state, allowing current to flow

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freely from the internal lithium battery pack negative 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.

[0031] 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.

[0032] 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.

[0033] 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

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cannot back-charge (and thereby damage) the internal lithium battery, providing another level of safety.

[0034] 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 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.

[0035] 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.

[0036] 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

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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.

[0037] 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.

[0038] 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 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.

[0039] 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.

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[0040] 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.

[0041] 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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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port;

a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper 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.

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4. The apparatus of claim 1, wherein said power 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.

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.

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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.

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.

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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 and a battery terminal clamp.

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.

THE NOCO COMPANY

WATERMARK PATENT AND TRADE MARKS ATTORNEYS

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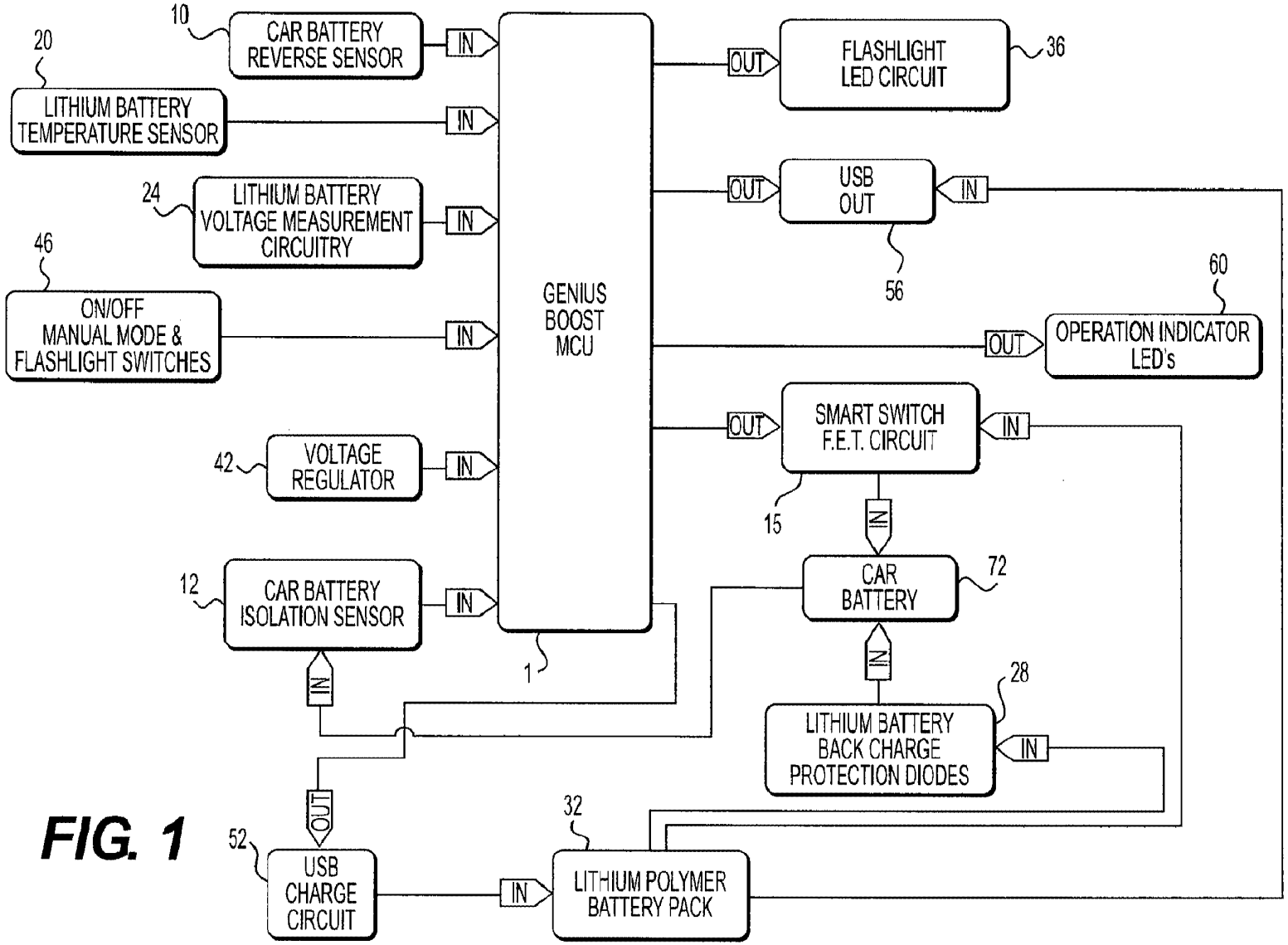


FIG. 1

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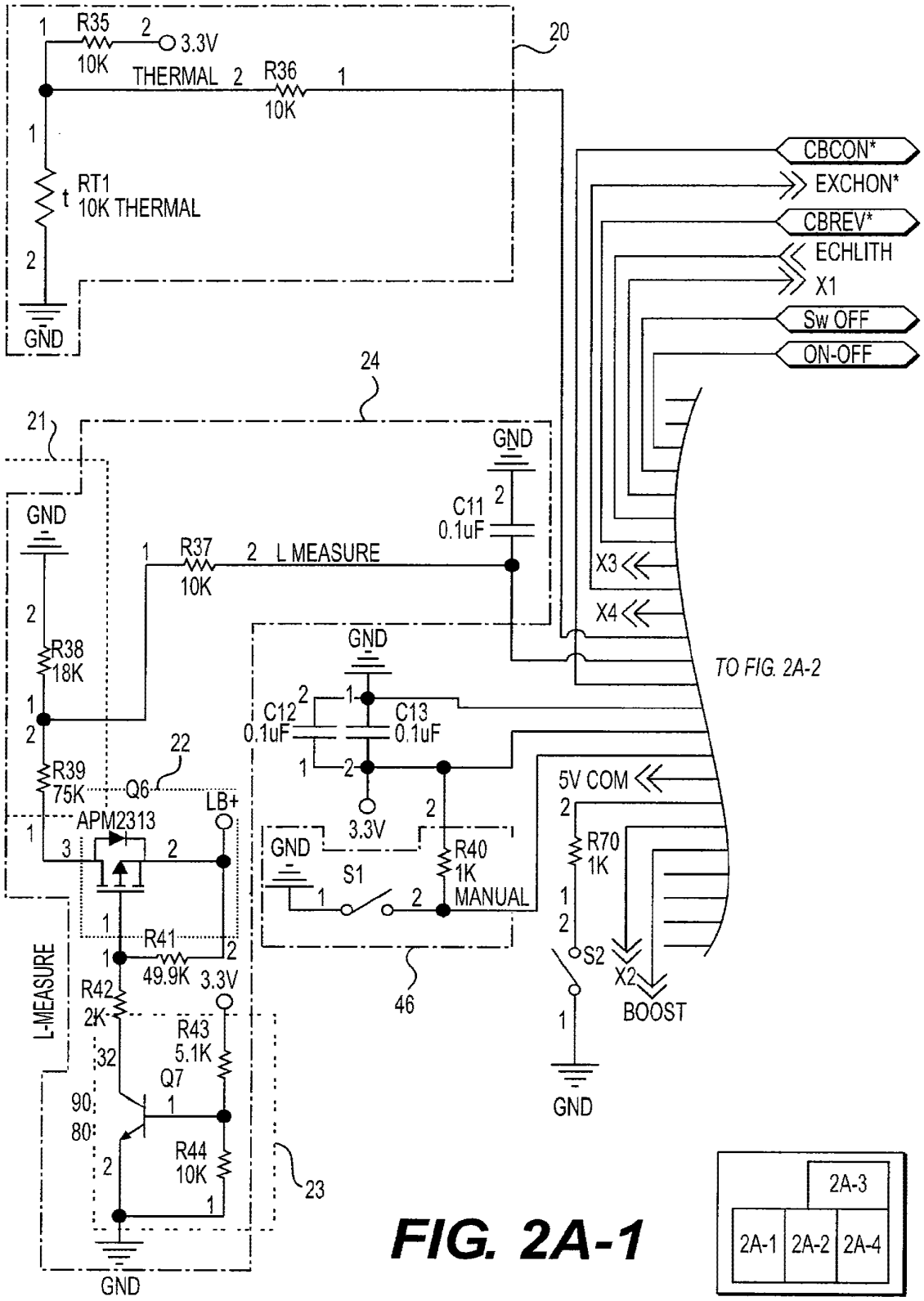
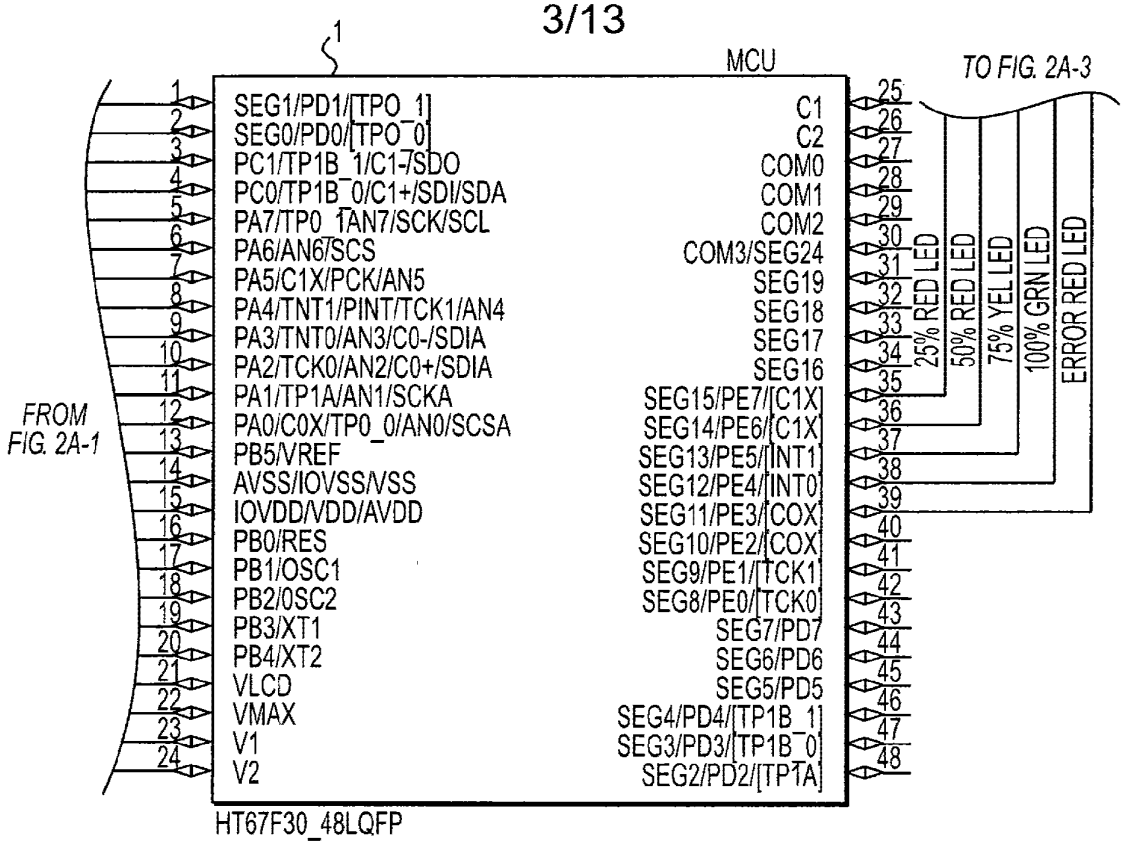
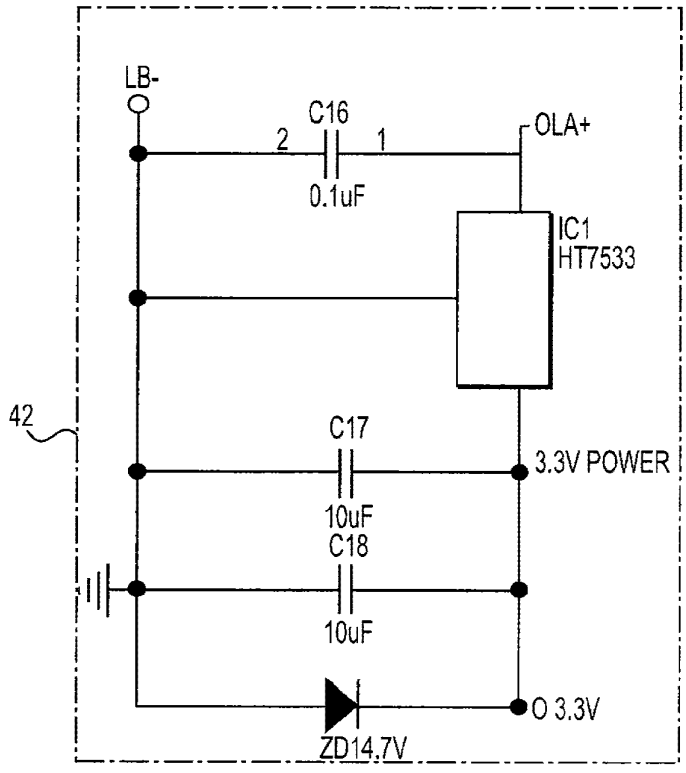


FIG. 2A-1

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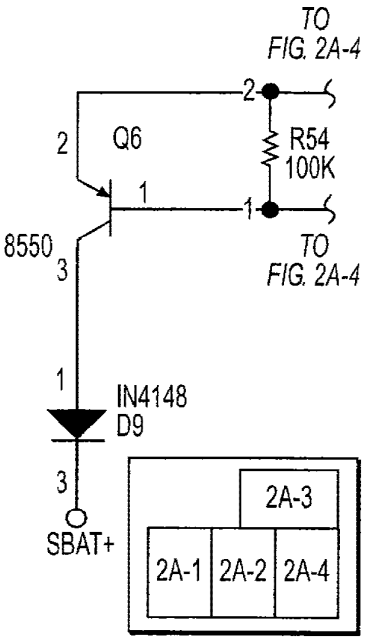


FIG. 2A-2

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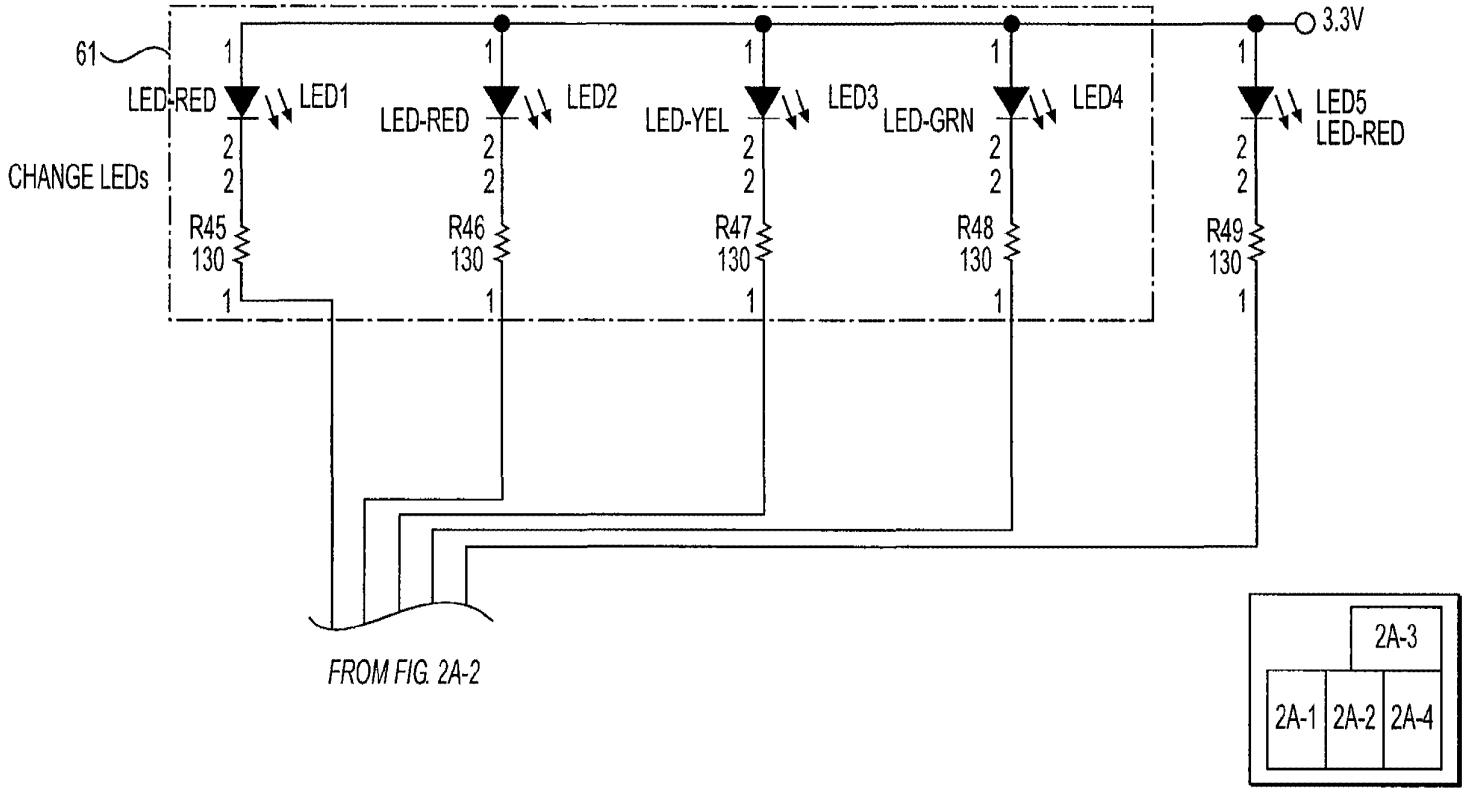


FIG. 2A-3

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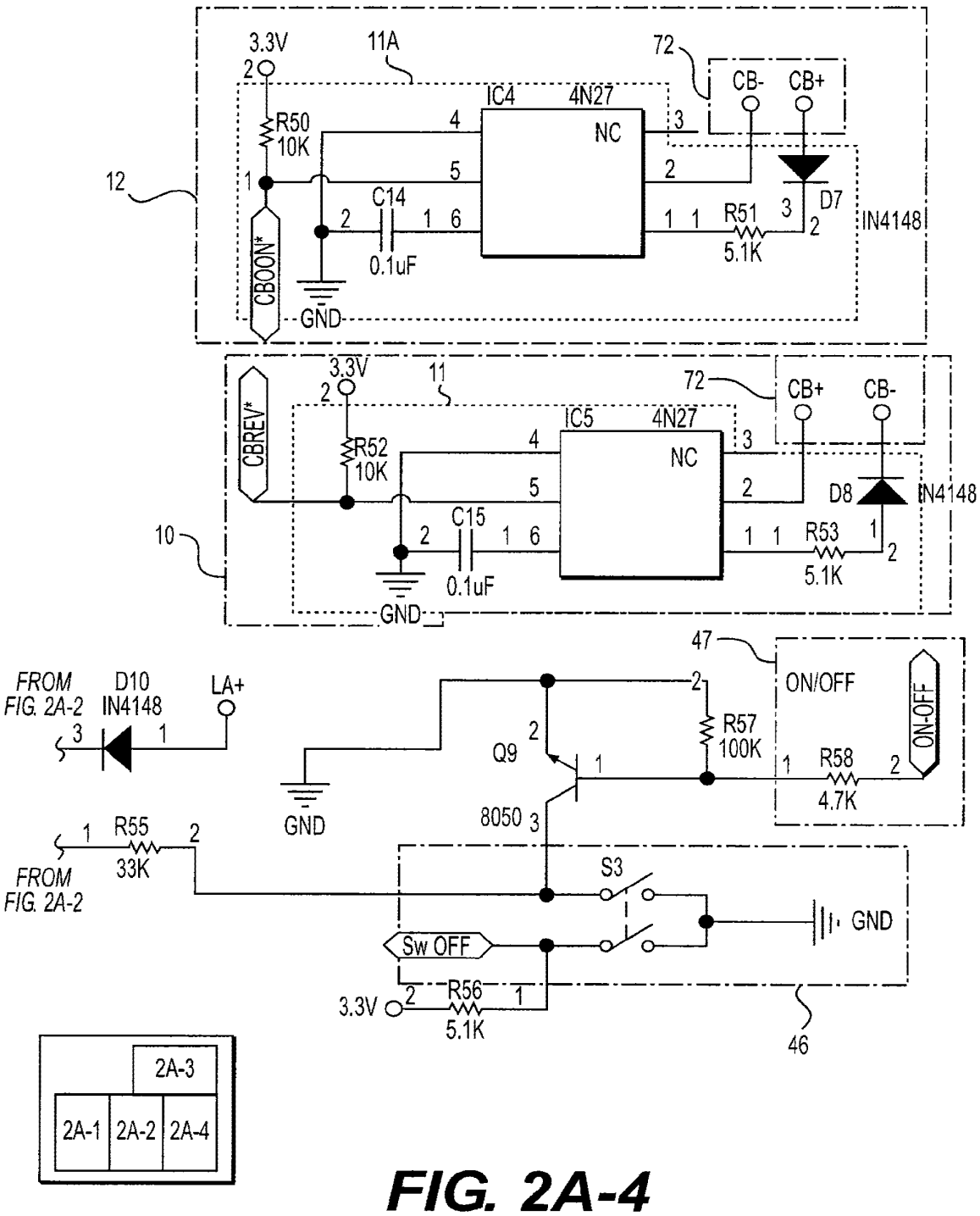


FIG. 2A-4

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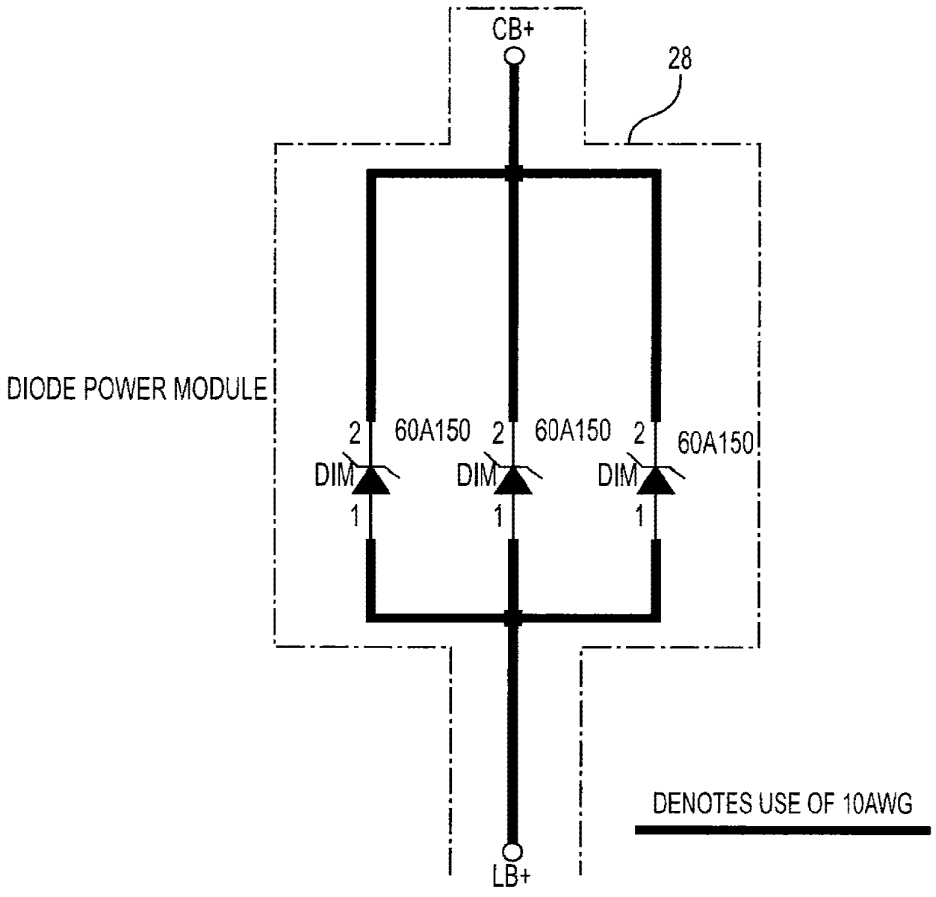


FIG. 2B-1

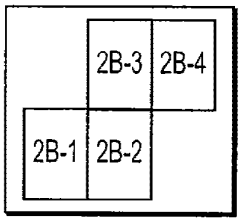


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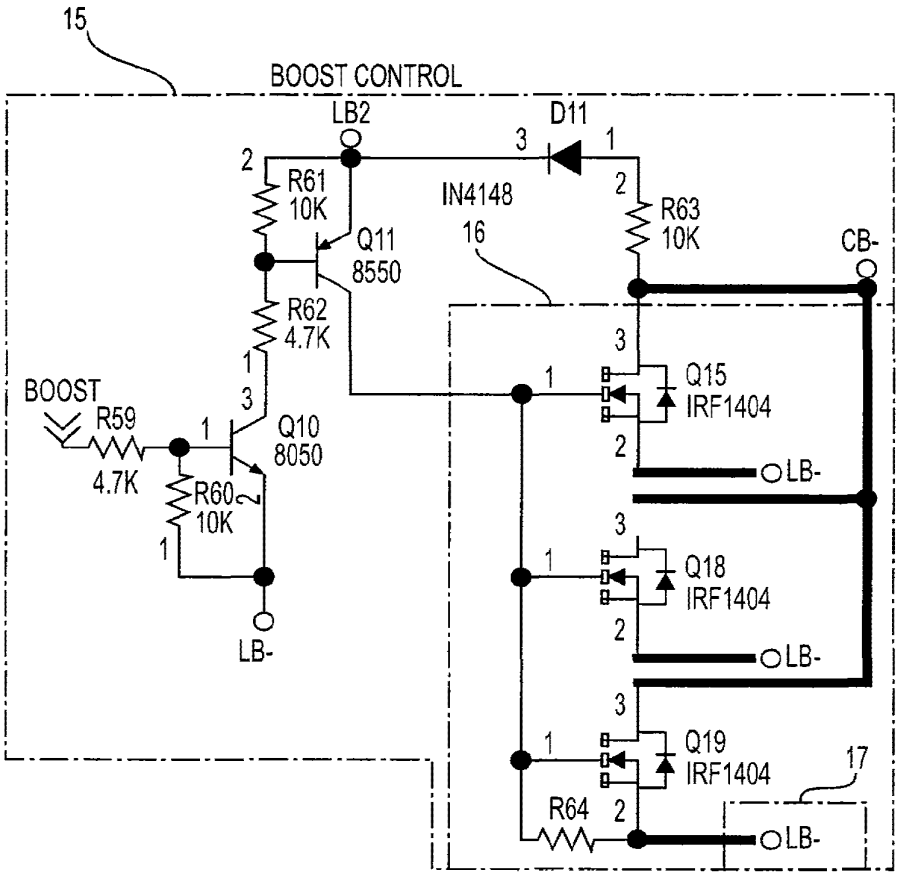


FIG. 2B-2

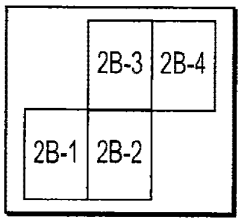


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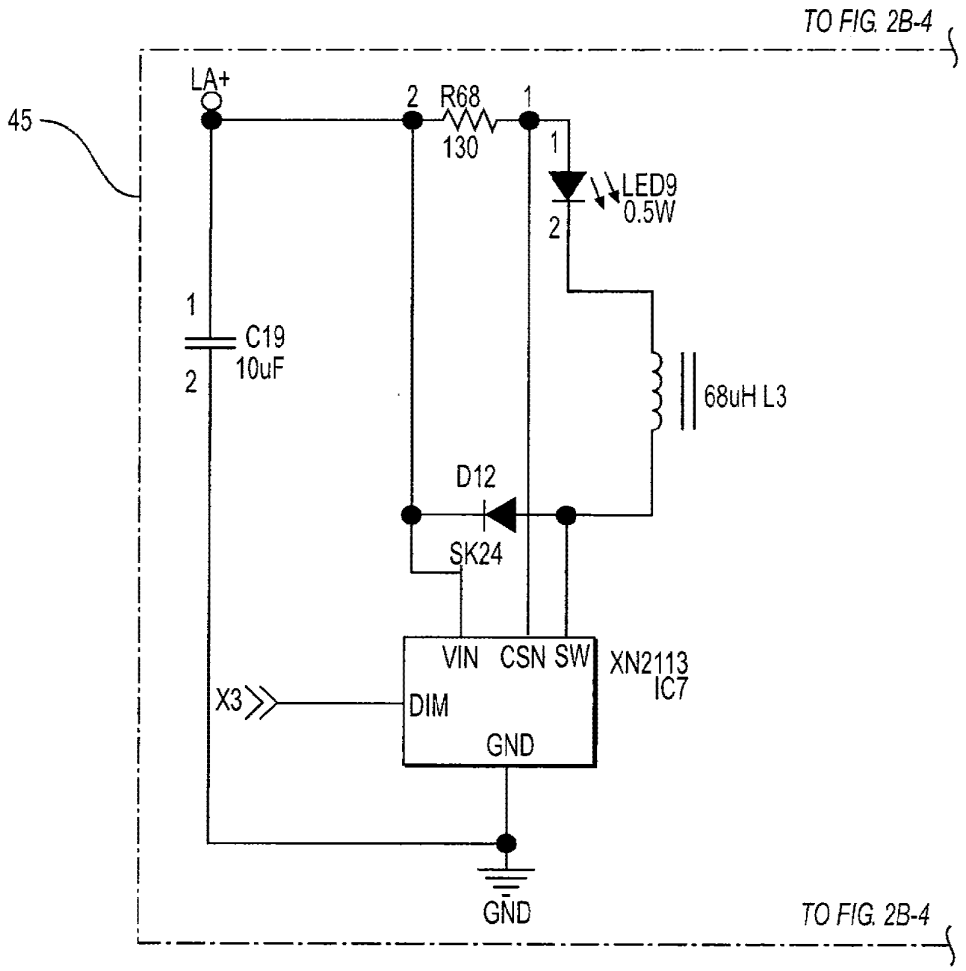


FIG. 2B-3

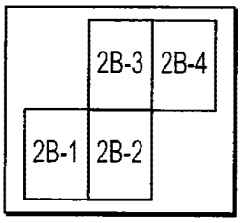


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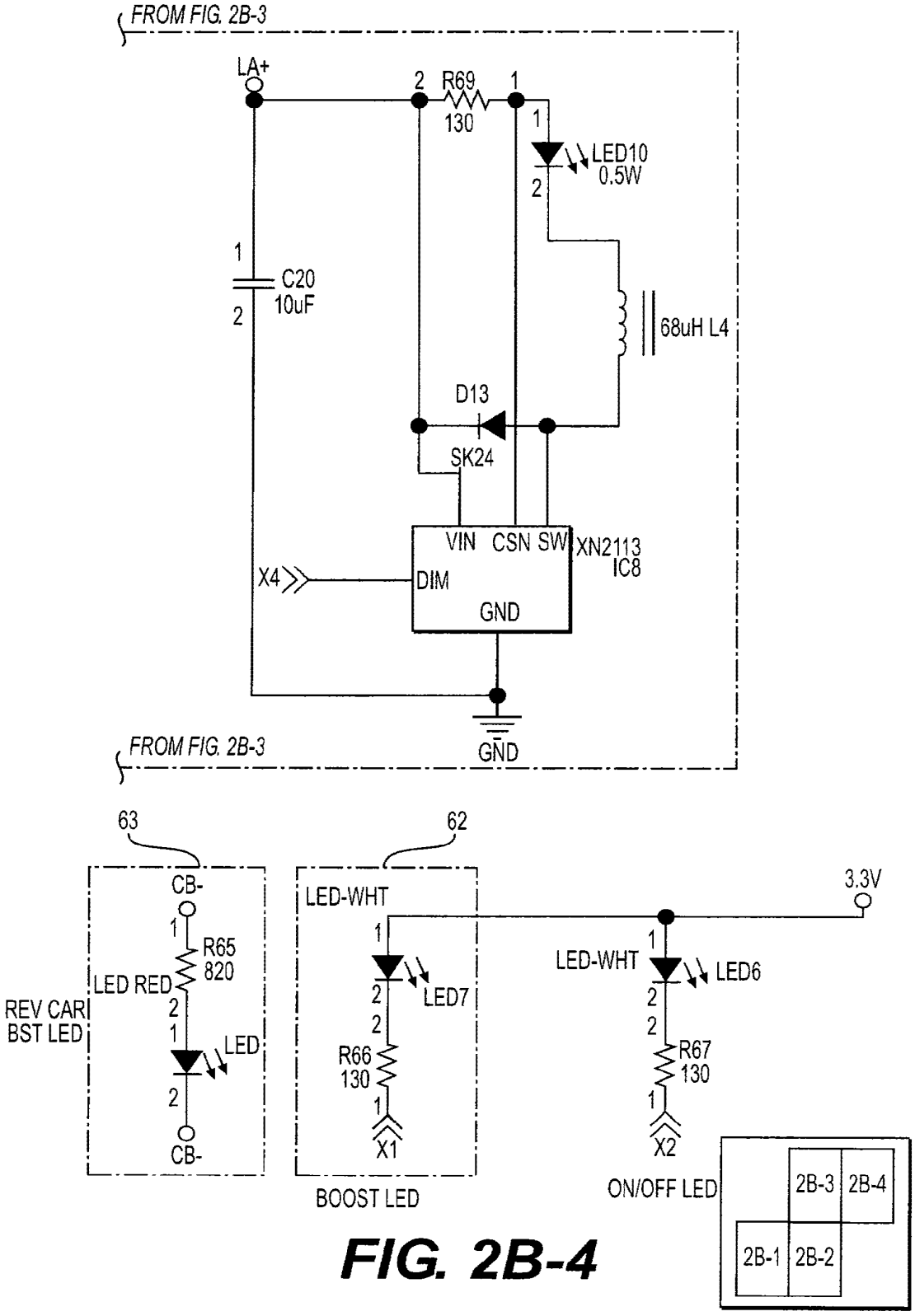


FIG. 2B-4

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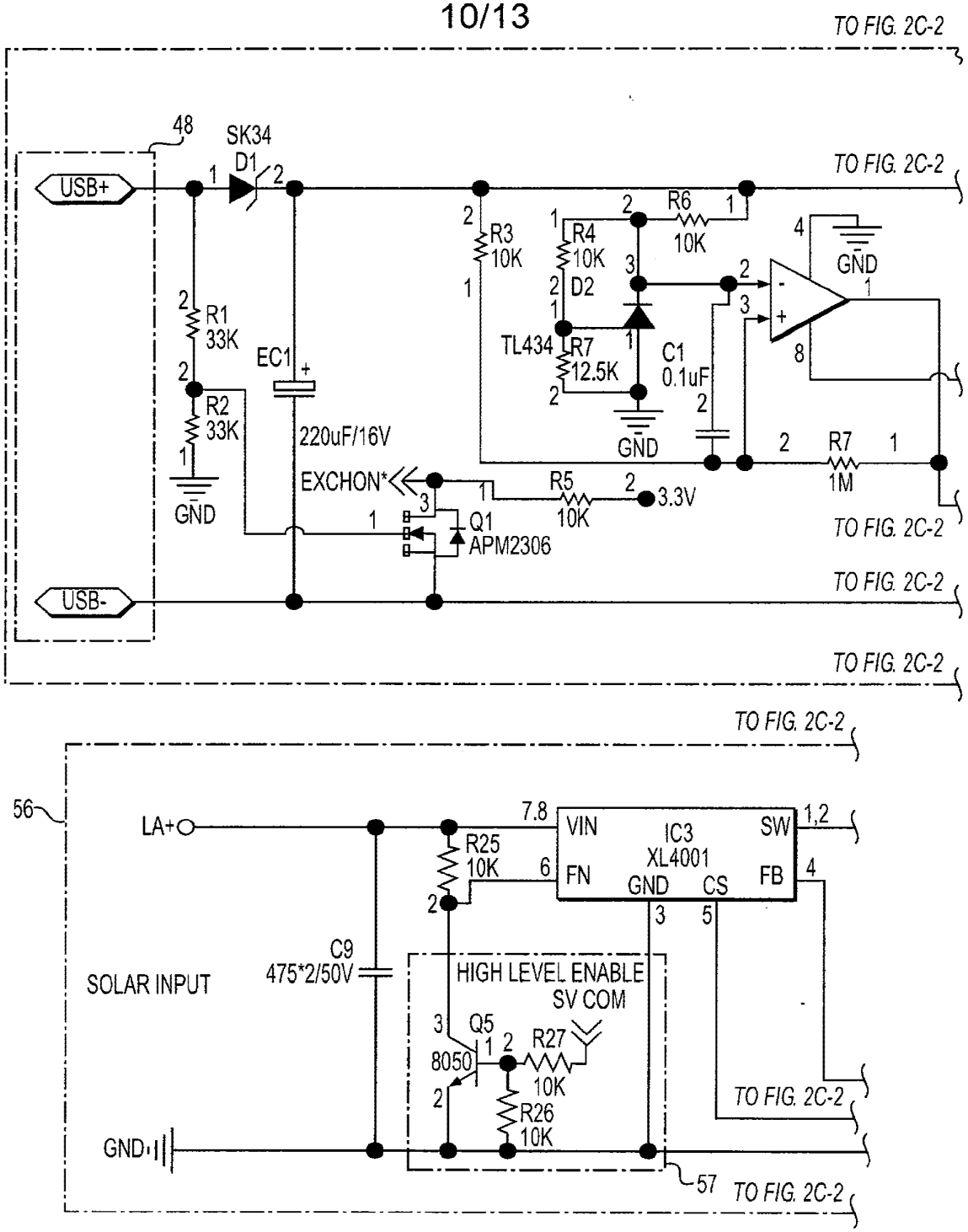


FIG. 2C-1

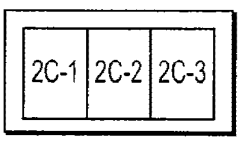


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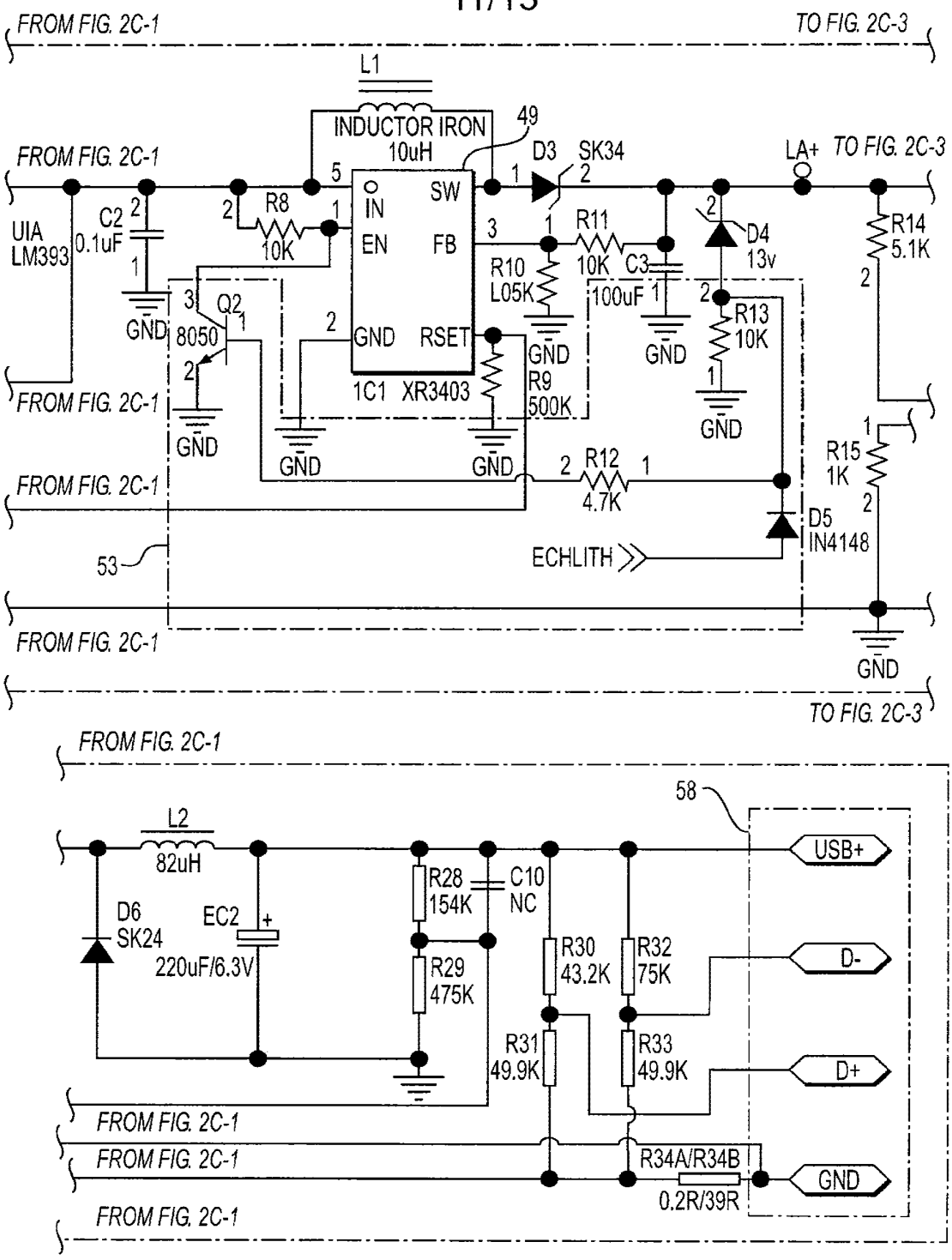
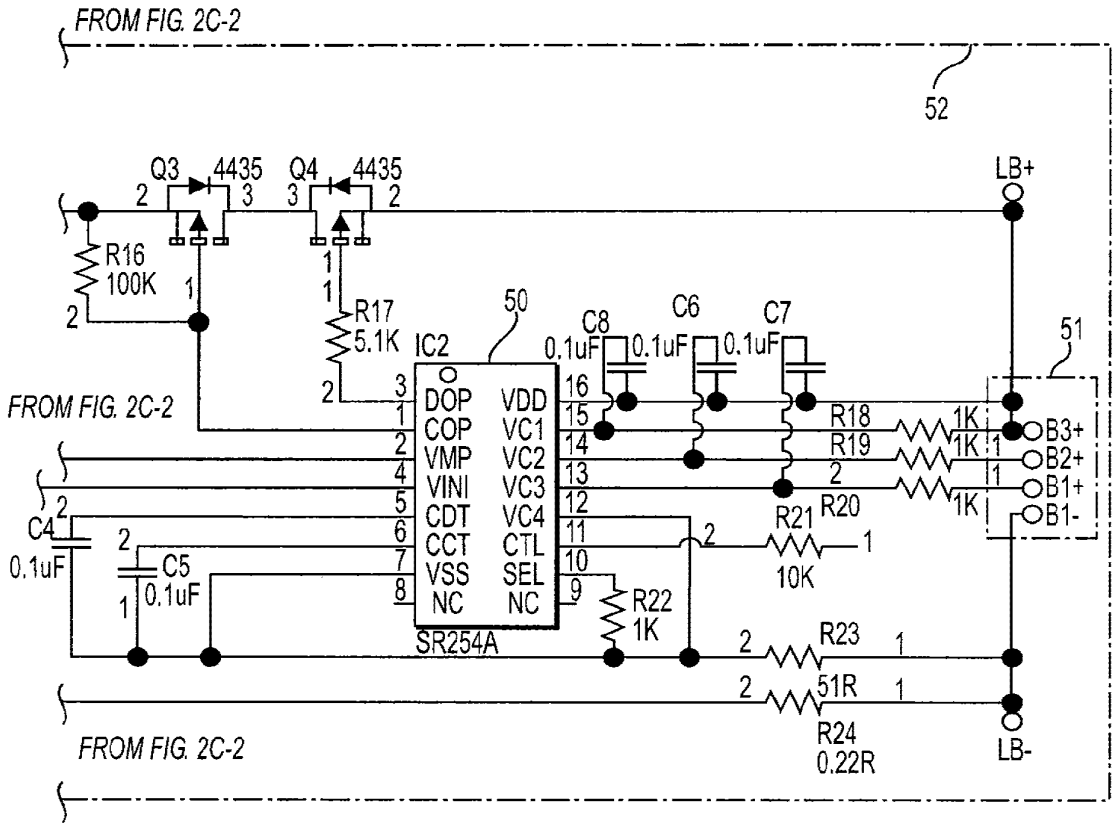


FIG. 2C-2

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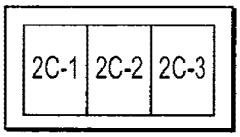


FIG. 2C-3

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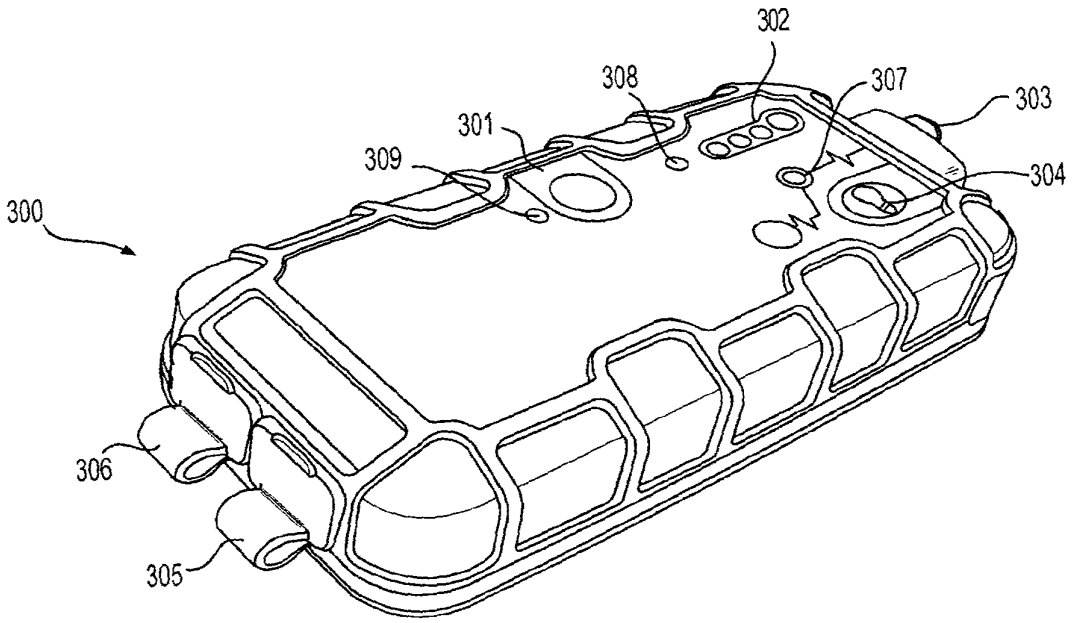


FIG. 3

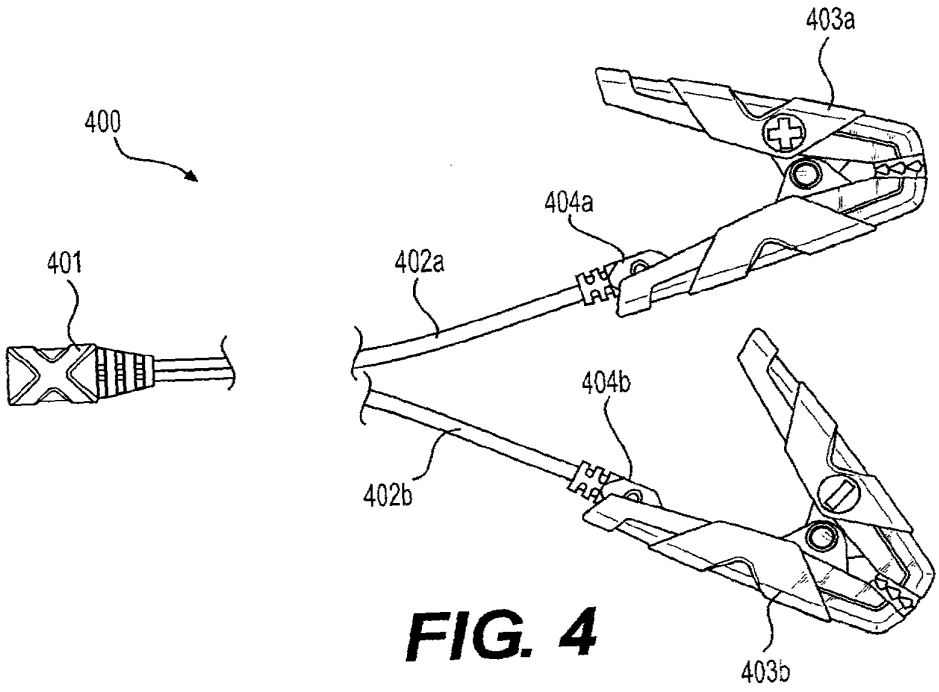


FIG. 4

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 054985.000055PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2014/045434	International filing date *(day/month/year)* 03 July 2014	(Earliest) Priority Date *(day/month/year)*
Applicant THE NOCO COMPANY		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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 Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. 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 contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK
Art Unit	2859
Examiner Name	M. Baye DIAO
Attorney Docket Number	054985-000055-US-02-02

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	3590357		1971-06-29	REID	
	2	3638108		1972-01-25	CHANNING	
	3	5194799		1993-03-16	TOMANTSCHGER	
	4	5281904		1994-01-25	TOMKINS	
	5	5319298		1994-06-07	WANZONG	
	6	5820407		1998-10-13	MORSE et al.	
	7	6344733		2002-07-30	CRASS	
	8	6424158		2002-07-23	KLANG	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	9	6650086		2003-11-18	CHANG	
	10	6679212		2004-01-20	KELLING	
	11	6759833		2004-07-06	CHEN	
	12	7345450		2008-03-18	KRIEGER et al.	
	13	7893657		2011-02-22	CHAVAKULA	
	14	8362745		2013-01-29	TINAPHONG	
	15	9153978		2015-10-06	READE	
	16	9243601		2016-01-26	REICHOW	
	17	9525297		2016-12-20	WANG	
	18	9809183		2014-03-27	WEFLEN	
	19	9954391		2018-04-24	LEI	

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	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	20	10328808		2019-06-25	NOOK ET AL.	
	21	10604024		2020-03-31	NOOK ET AL.	
	22	D597029		2009-07-28	LI	

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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
	1	20010025618	A1	2001-10-04	KELLING	
	2	20040066168	A1	2004-04-08	GEORGE	
	3	20040130298	A1	2004-07-08	KRIEGER	
	4	20030141845	A1	2003-07-31	KRIEGER	
	5	20040150373	A1	2004-08-05	CHAN	
	6	20040239290	A1	2004-12-02	KRIEGER	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	7	20050116688	A1	2005-06-02	YIN	
	8	20060176011	A1	2006-08-10	LUI	
	9	20060220610	A1	2006-10-05	SOLBERG	
	10	20060244412	A1	2006-11-02	BONZER	
	11	20080143290	A1	2008-07-19	CHAVAKULA	
	12	20110175461	A1	2011-07-21	TINAPHONG	
	13	20120025766	A1	2012-02-02	READE	
	14	20130162029	A1	2013-06-27	REICHOW	
	15	20140084844	A1	2014-03-27	WEFLEN	
	16	20140210399	A1	2014-07-31	URSCHEL	
	17	20140368155	A1	2013-12-18	CHEN	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	18	20150054336	A1	2015-02-26	LIU	
	19	20150340907	A1	2015-11-26	LEI	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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	2011/113734	WO		2011-09-22	REICHOW		
	2	2012/036556	WO		2012-03-22	EIDSVIG		
	3	2012/080996	WO		2012-06-21	TRACY		
	4	2014/106407	WO		2014-10-07	LEI		
	5	0616409	EP		2014-09-07	HERBERT		
	6	103066662	CN		2013-04-24	LEI	English abstract attached	X

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

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.	T5
	1	Copy of Exhibit 1008, www.xcar360.com	
	2	Copy of Exhibit 1009, www.electronicshub.org	
	3	Copy of Exhibit 1010, USB Battery Charging 1.2 Compliance Plan	
	4	Copy of the Petition for Inter Partes Review of U.S. Patent No. 9,007,015; IPR 2020-00944, filed May 14, 2020, 99 pages	
	5	Copy of Exhibit 1012, Model: Epower-20B brochure, 1 page	
	6	Copy of Exhibit 1013, Model: Epower-21 brochure, 1 page	
	7	Copy of Exhibit 1015, Fairchild Semiconductor brochure, MC78XX/LM78XX/MC78XXA, 28 pages	
	8	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen Valuelink E-Commerce Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division,1 page.	
	9	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen ChangXin Yang Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.	
	10	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. SZ Jingxinghui Electronics Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	11	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen Anband Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.
	12	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/30/17, The NOCO Company, Inc. v. Shenzhen Dika Na'er E-Commerce Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.
	13	Copy of PTAB notice regarding petition filed in Patent Number 9007015, Application Number 14/325938, filed on 01/15/2018, IPR2018-00503, 1 page
	14	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 09/13/18, The NOCO Company, Inc. v. Halo2 Cloud, LLC, QVC, Inc., U.S. District Court Delaware, 1 page.
	15	Copy of Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response, mailed May 21, 2020, Shenzhen Carku Technology Co., Ltd. v. The NOCO Company, IPR2020-00944, Patent 9,007,015, 4 pages.
	16	International Search Report in corresponding PCT/US2014/045434, November 3, 2014.
	17	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Statement of Grounds of Particulars, Brown & Watson International Pty Ltd., June 6, 2019, 6 pages; particular (e), the offering for sale and sale by Asia Bright Industrial (Hong Kong) Co, Ltd. of products identified as the JPS Jump Starter and the JPR Jump Starter prior to July 2014.
	18	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Evidence in Support, filed September 6, 2019, 24 pages.
	19	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Evidence in Support – Exhibits, filed September 6, 2019,166 pages; Annexure MD-1, early specification sheets for "the BW Jumpstarter", 4 pages; Annexure MD-2, product manual for "the BW Jumpstarter", PROJECTA; "2x22 Amp Hour High Performance Jumpstarter"; 2013; 20 pages.
	20	Australian Patent Opposition #2, Australian Patent Application No. 2019201559, Statement of Grounds and Particulars, filed May 21, 2020, 8 pages.
	21	THE NOCO COMPANY v. DELTONA TRANSFORMER CORPORATION and DELTRAN USA, LLC, Defendant Deltran USA, LLC's Invalidity Contentions, In the United States District Court for the Middle District of Florida, Orlando Division, USB Implementers Forum, Inc.,Battery Charging Specification, Revision 1.1, 04-15-2009 on page 8, Prior Art Offered for Sale or Publicly Used or Known on pages 8-10, MICRO-START/PPS, E-Power, Battery Tender Power Pack, PowerAll, and Electromate 400 on page 10; 141 pages.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

	22	THE NOCO CO., INC. v. SMARTECH PRODUCTS, INC., et al., Smartech, Inc.'s Invalidity and Unenforceability Contents, Bestek 2400A Peak Current Portable Car Jump Starter Power Bank with 1000mAh Capacity (SMARTECH 00062-00069)("Bestek") on page 2; HALO 7800 mAh Portable Charger for Cell Phones & Tablets (SMARTECH 00070-00071)("HALO") on page 2; Schumacher Lithium Iron Jump Starter – SL1 Red Fuel (SMARTECH 00072-00073)("Schumacher") on page 2, filed June 19, 2019, 8 pages.
	23	THE NOCO COMPANY v. SHENZHEN DIKA NA'ER E-COMMERCE (Lead Case No. 1:17-cv-02282), THE NOCO COMPANY v. SHENZHEN CHANGXINYANG TECHNOLOGY CO., LTD (Case No. 1:117-cv-02209). THE NOCO COMPANY v. SHENZHEN VALUELINK E-COMMERCES CO., LTD (Case No. 1:17-cv-02210), Defendants' Amended Final Invalidity and Unenforceability Contents, The Powerall PBJS12000RD Jump Starter ("Powerall Jump Starter"), offered for sale by Gryphon Mobile Electronics at least as early as November 5, 2013, on page 2, The Lightning 12V

If you wish to add additional non-patent literature document citation information please click the Add button Add

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	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

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	/William L. Klima/	Date (YYYY-MM-DD)	2020-07-23
Name/Print	William L. Klima	Registration Number	32422

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.

(12) STANDARD PATENT APPLICATION (11) Application No. **AU 2015258229 A1**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Portable vehicle battery jump start apparatus with safety protection

(51) International Patent Classification(s)
H02J 7/14 (2006.01) ***H02J 1/00*** (2006.01)
B60R 16/00 (2006.01) ***H02J 7/00*** (2006.01)
B60R 16/03 (2006.01)

(21) Application No: **2015258229** (22) Date of Filing: **2015.11.18**

(43) Publication Date: **2016.01.28**
(43) Publication Journal Date: **2016.01.28**

(62) Divisional of:
PCT/US2014/045434

(71) Applicant(s)
The NOCO Company

(72) Inventor(s)
NOOK, Jonathan Lewis;NOOK, William Knight;STANFIELD, James Richard;UNDERHILL, Derek Michael

(74) Agent / Attorney
Watermark Patent and Trade Marks Attorneys, 302 Burwood Road, Hawthorn, VIC, 3122

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

20152582229 18 Nov 2015

ABSTRACT

A handheld device for jump starting a vehicle engine includes a rechargeable lithium ion battery pack (32) and a microcontroller (1). The lithium ion battery is coupled to a power output port of the device through a power switch circuit (15) actuated by the microcontroller. A vehicle battery isolation sensor (12) connected in circuit with positive and negative polarity outputs detects the presence of a vehicle battery (72) connected between the positive and negative polarity outputs. A reverse polarity sensor (10) 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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

2015258229 18 Nov 2015

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

FIELD OF THE INVENTION

[0001] The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery.

BACKGROUND TO THE INVENTION

[0002] Prior art devices are known for jump-starting a vehicle, 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.

[0003] 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.

[0004] 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.

EXHIBIT 1002
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[0005] 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 batteries. Therefore, the positive and negative terminals of the two batteries are correctly connected based on the detected result of the polarity detecting unit.

[0006] 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.

[0007] 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

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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.

[0008] 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 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.

[0009] 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.

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[0010] 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.

[0011] 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 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.

[0012] 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.

[0013] 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.

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SUMMARY OF THE INVENTION

[0014] In accordance with an aspect of the invention, an apparatus is provided 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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port; a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.

[0015] In accordance with an embodiment of the invention, the internal power supply is a rechargeable lithium ion battery pack.

[0016] A jumper cable device may also be provided, having a plug configured to plug into said output port; 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.

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[0017] Comprises/comprising and grammatical variations thereof when used in this specification are to be taken to specify the presence of stated features, integers, steps or components or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Fig. 1 is a functional block diagram of a handheld vehicle battery boost apparatus in accordance with one aspect of the present invention;

[0019] 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;

[0020] Fig. 3 is a perspective view of a handheld jump starter booster device in accordance with one example embodiment of the invention; and

[0021] 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.

DETAILED DESCRIPTION OF THE INVENTION

[0022] 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).

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[0023] 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.

[0024] 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.

[0025] 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 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.

[0026] 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

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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.

[0027] 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).

[0028] 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 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

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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.

[0029] 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.

[0030] 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 microcontroller output is driven to a logic high, the FETs 16 (Q15, Q18, and Q19) are in a low resistant state, allowing current to flow

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freely from the internal lithium battery pack negative 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.

[0031] 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.

[0032] 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.

[0033] 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

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cannot back-charge (and thereby damage) the internal lithium battery, providing another level of safety.

[0034] 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 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.

[0035] 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.

[0036] 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

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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.

[0037] 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.

[0038] 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 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.

[0039] 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.

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[0040] 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.

[0041] 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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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

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 and to provide an output signal indicating whether positive and negative terminals of said vehicle battery are properly connected with said positive and negative polarity outputs of said output port;

a power 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 switch, such that said power switch is turned on to cause said internal power supply to be connected 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, and is not turned on when signals from said sensors indicate either the absence of a vehicle battery at said output port or improper 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.

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4. The apparatus of claim 1, wherein said power 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.

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.

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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.

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.

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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 and a battery terminal clamp.

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.

THE NOCO COMPANY

WATERMARK PATENT AND TRADE MARKS ATTORNEYS

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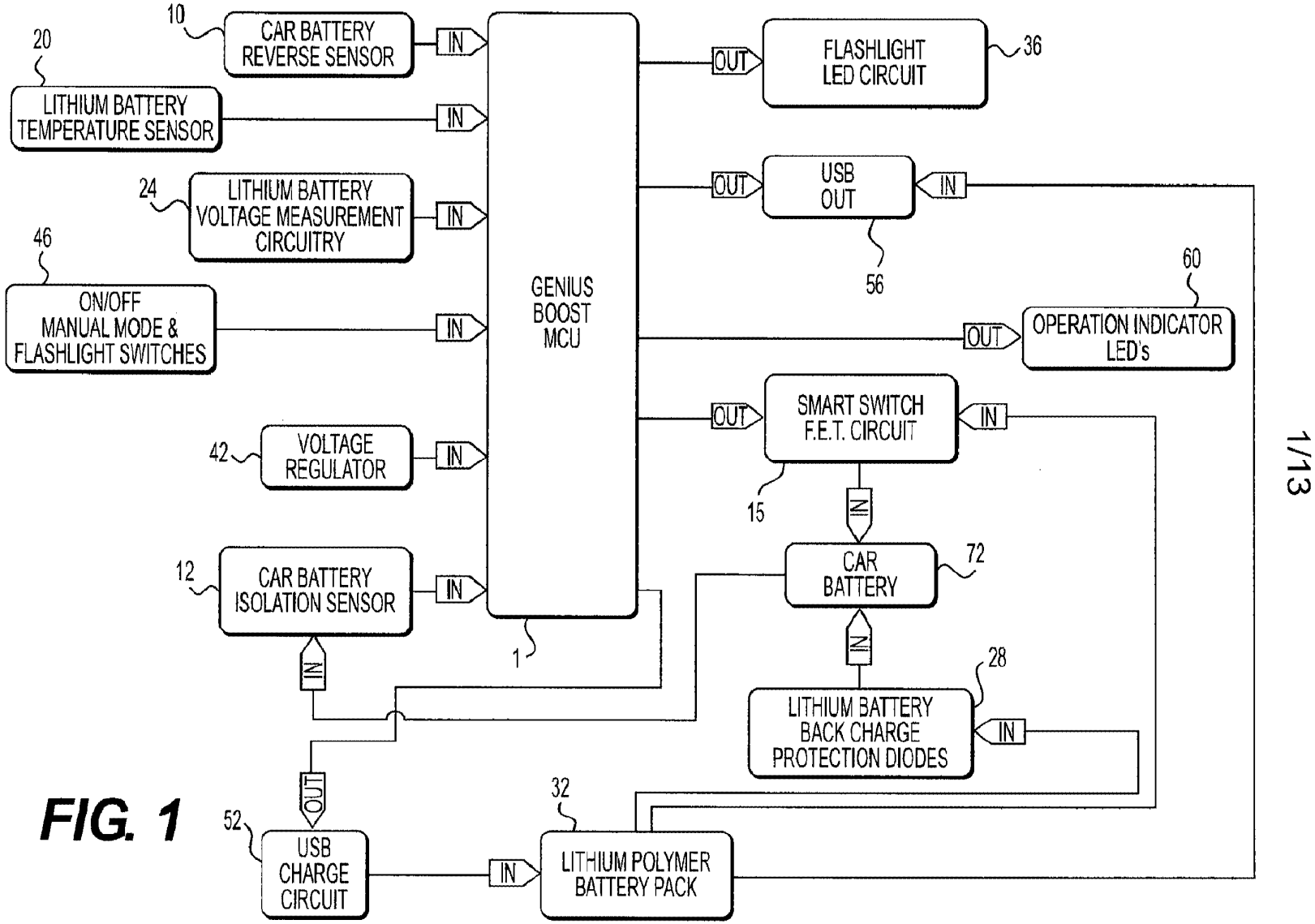


FIG. 1

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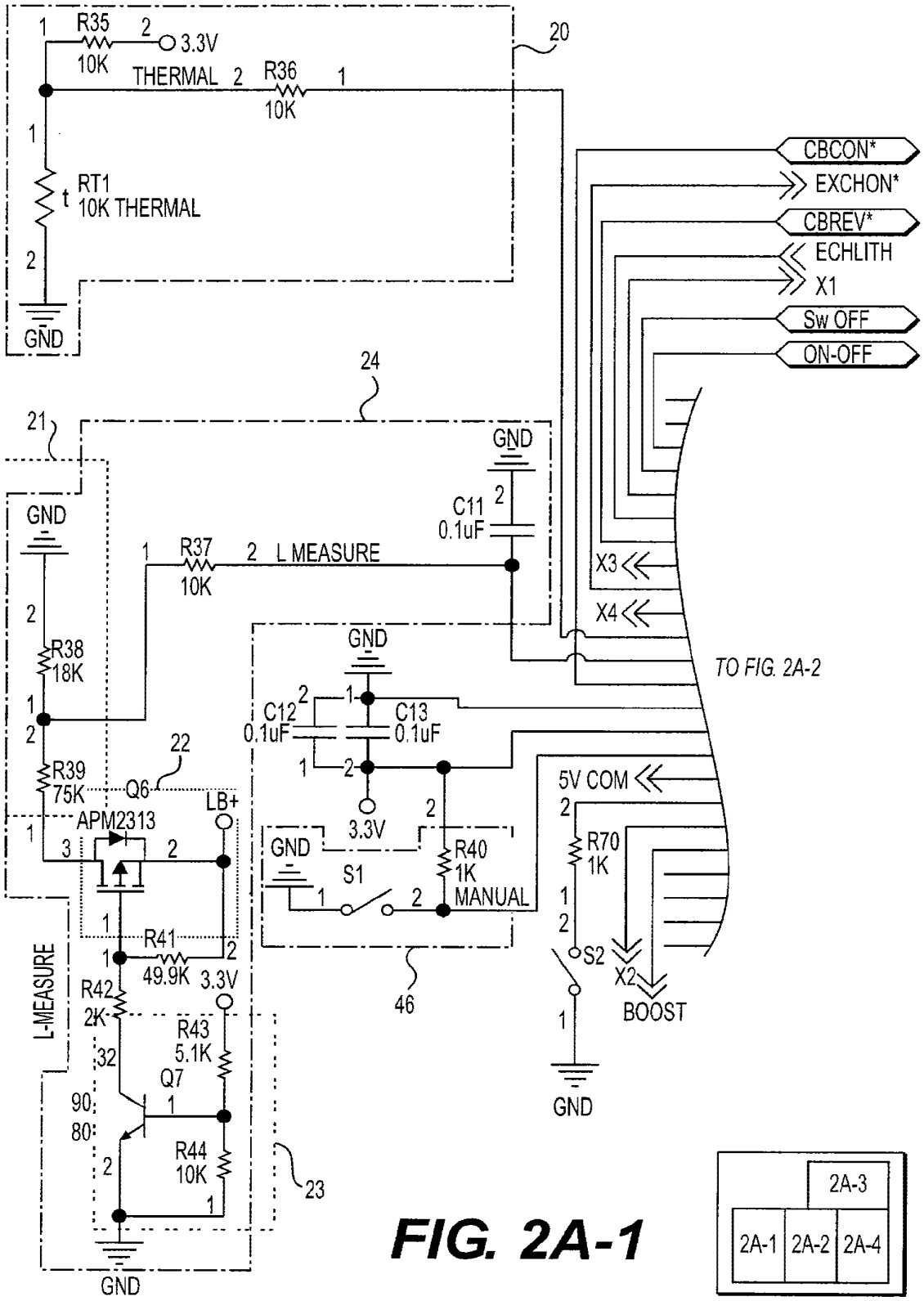
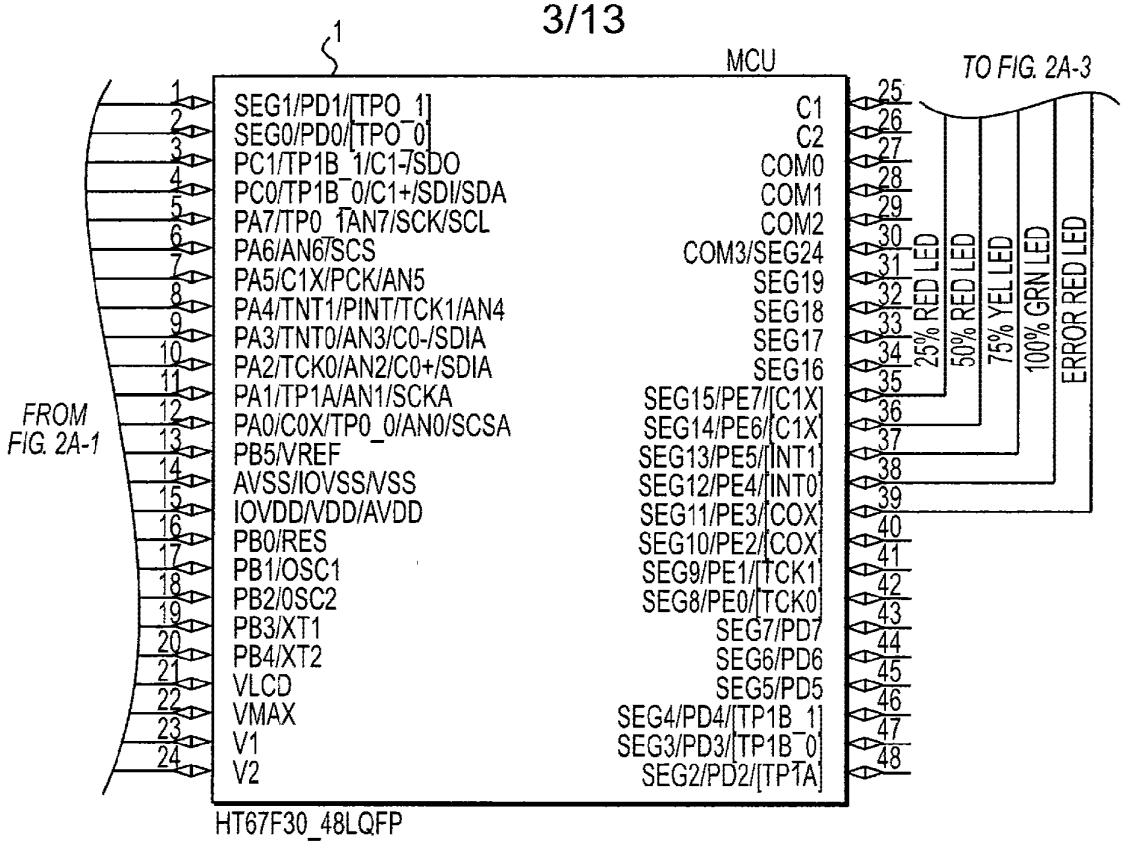
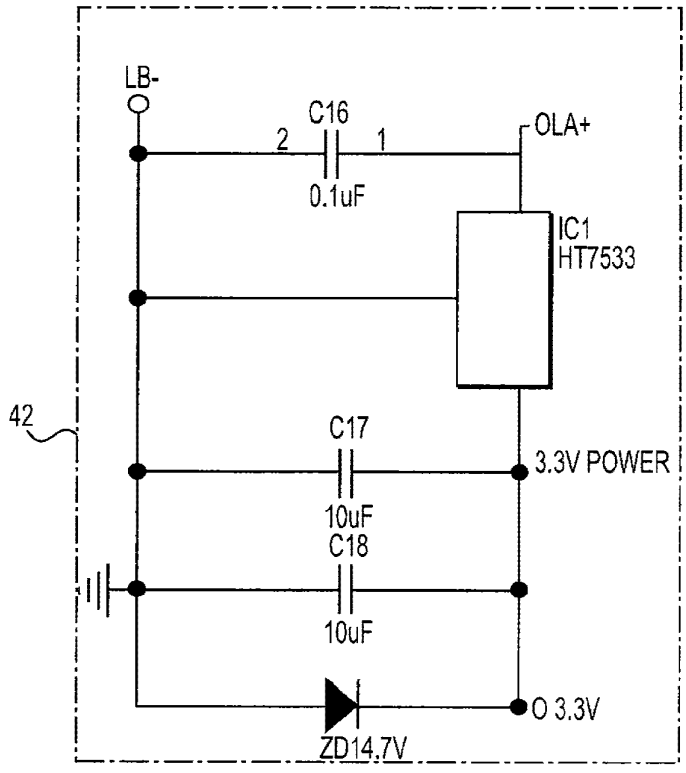


FIG. 2A-1

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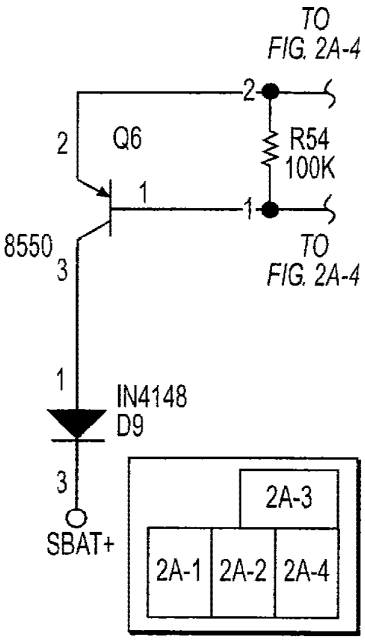


FIG. 2A-2

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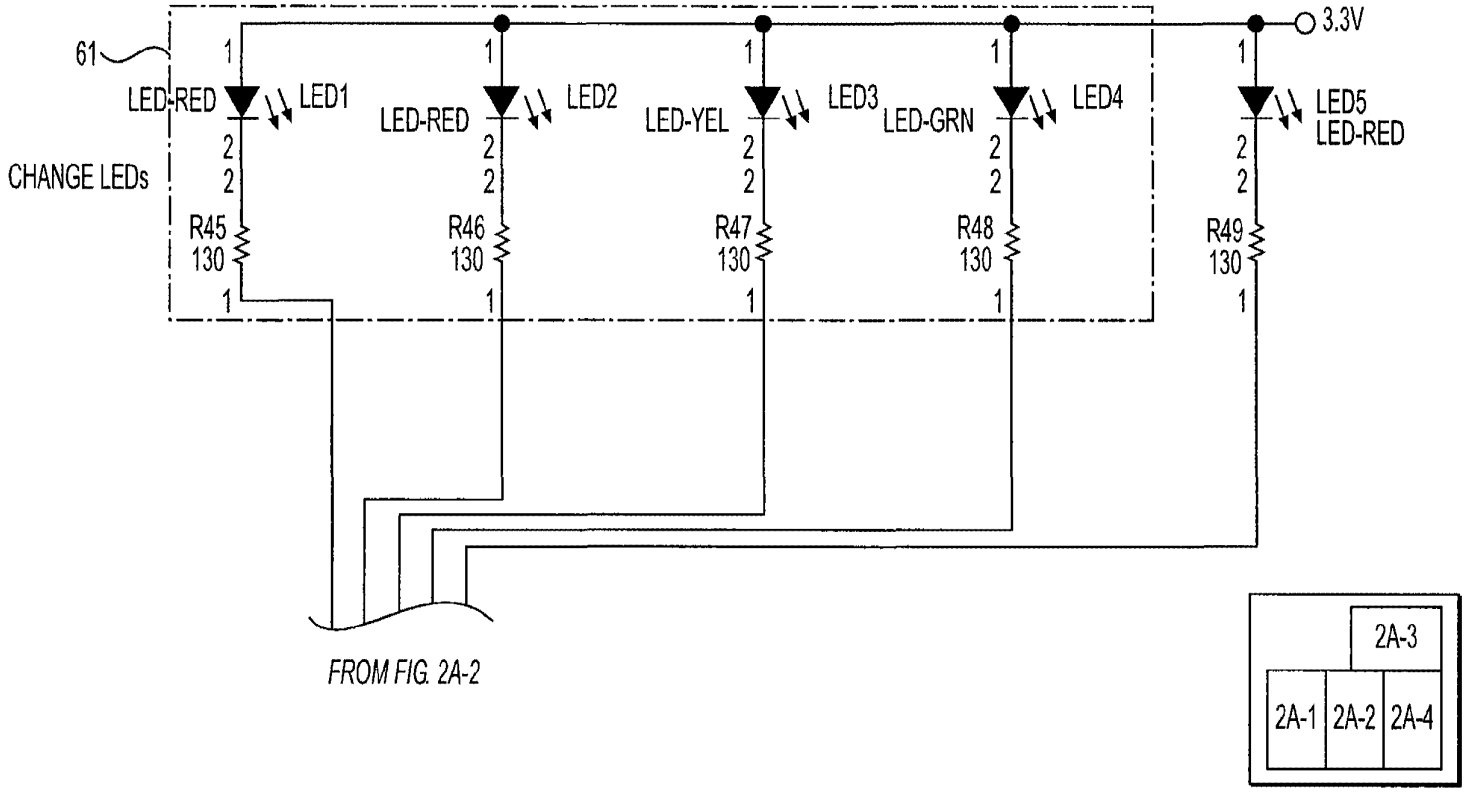


FIG. 2A-3

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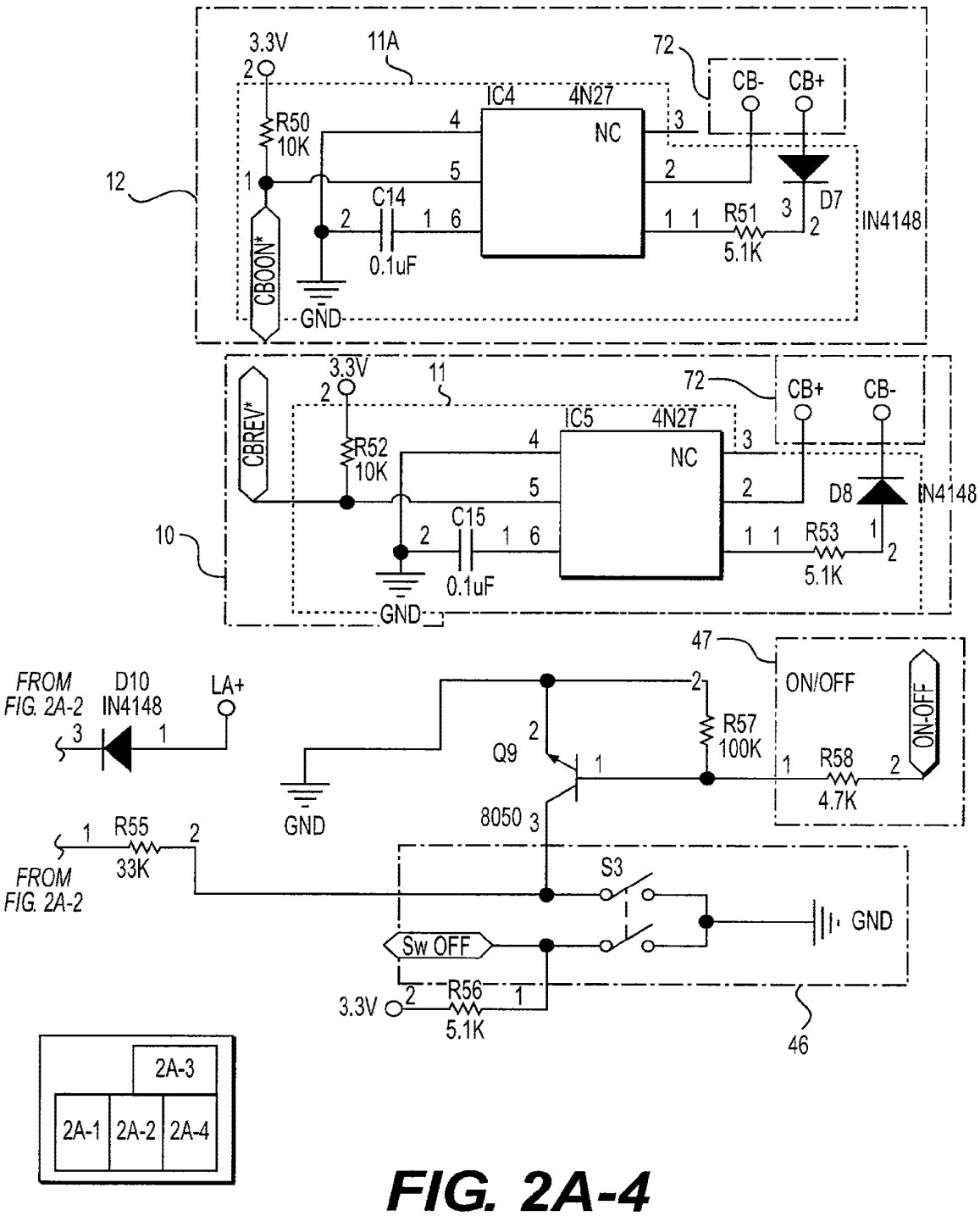


FIG. 2A-4

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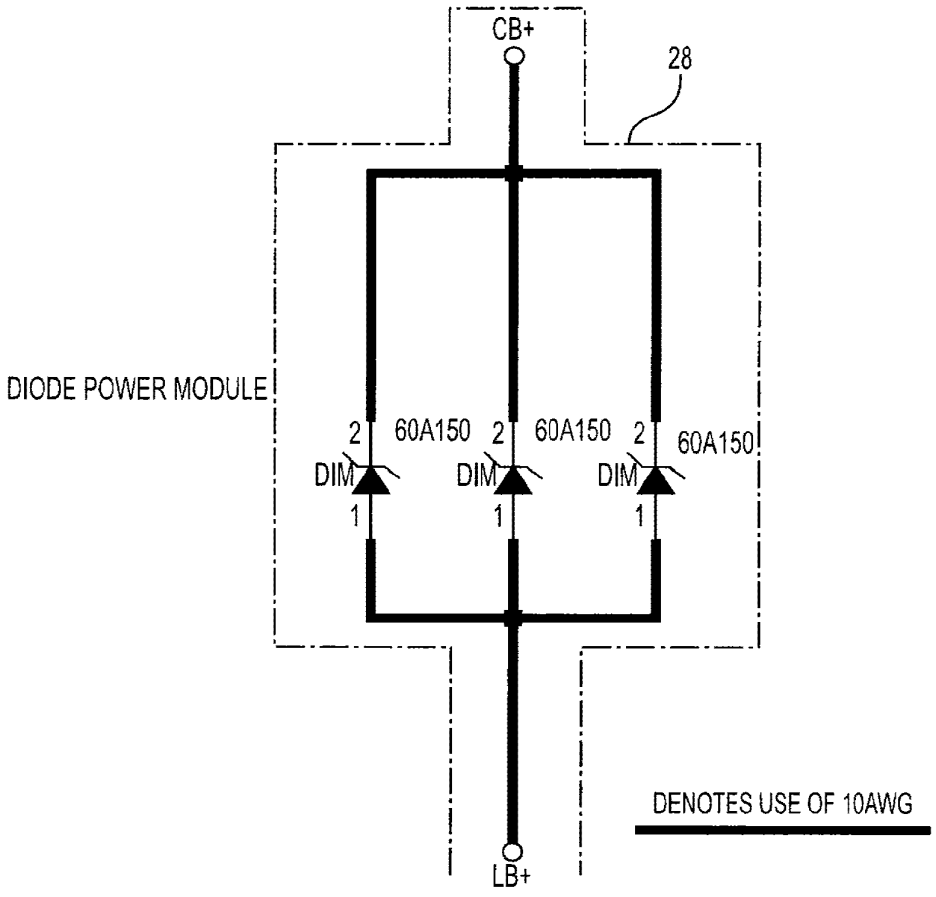


FIG. 2B-1

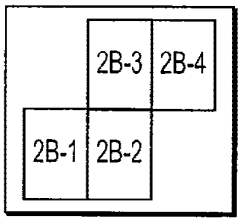


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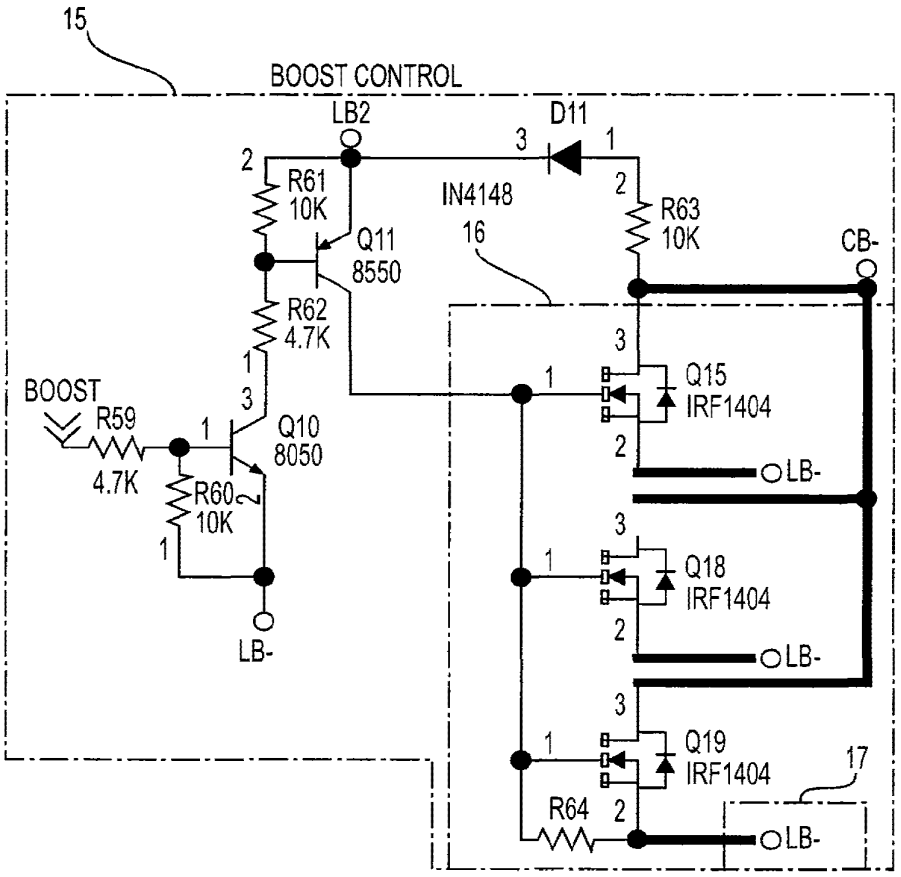


FIG. 2B-2

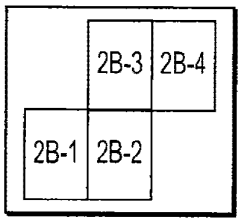


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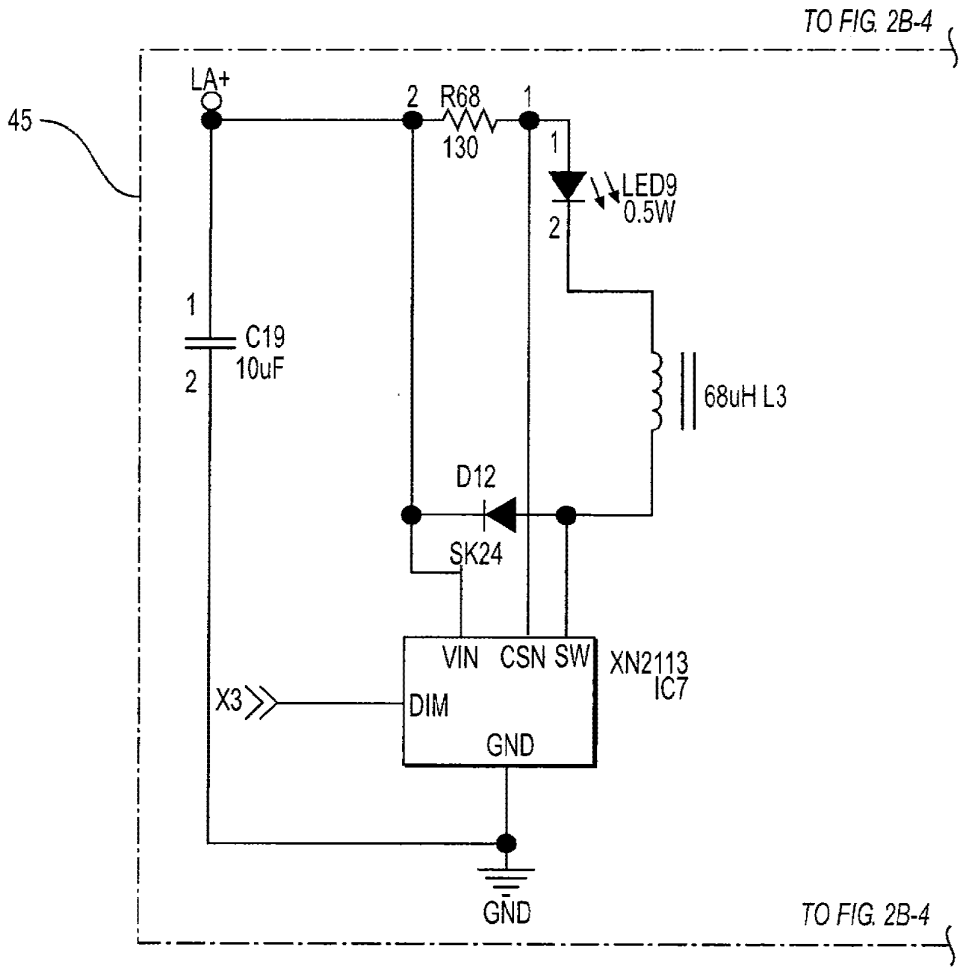


FIG. 2B-3

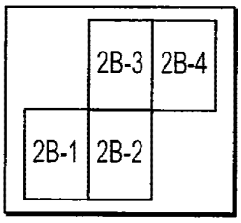


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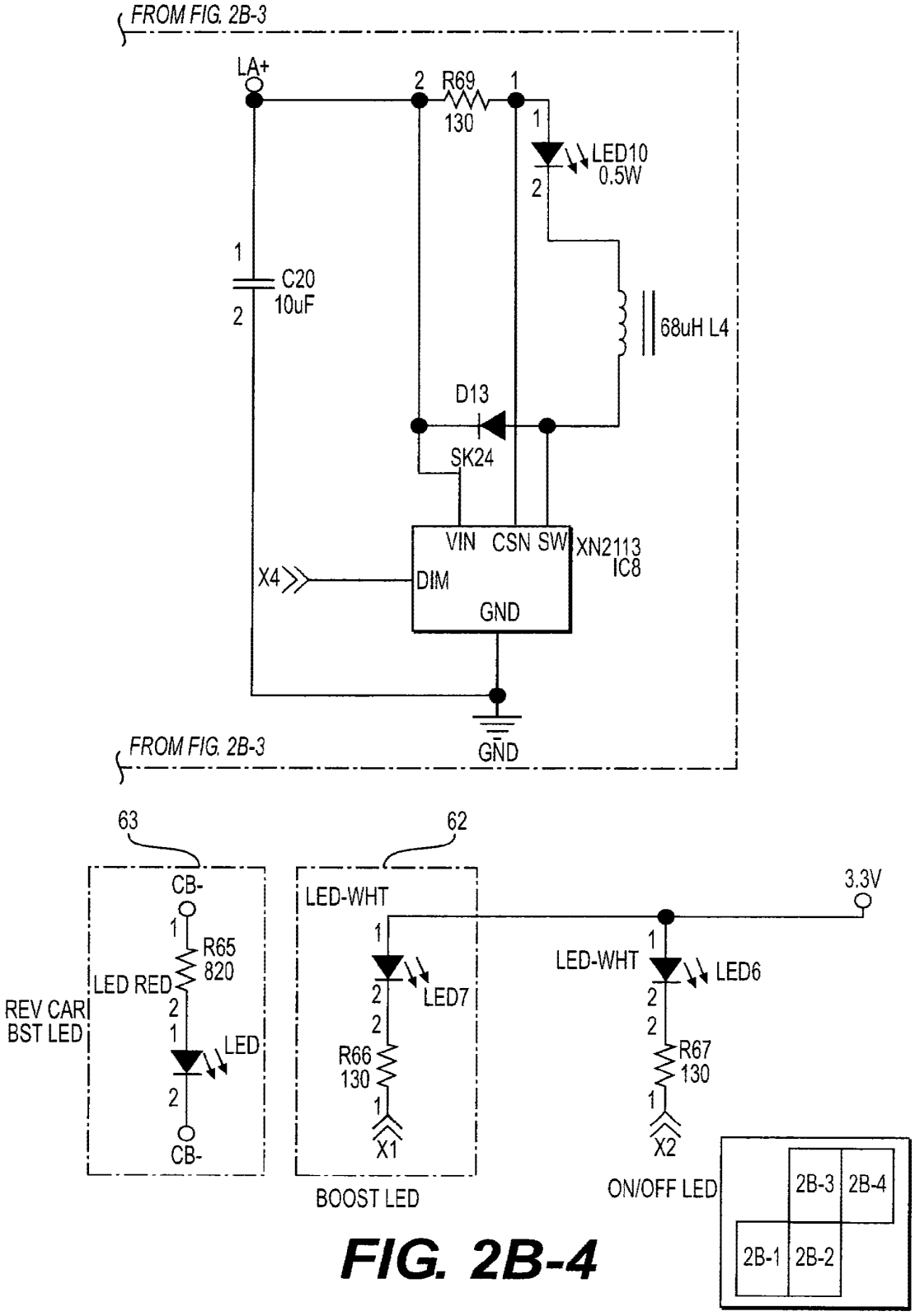


FIG. 2B-4

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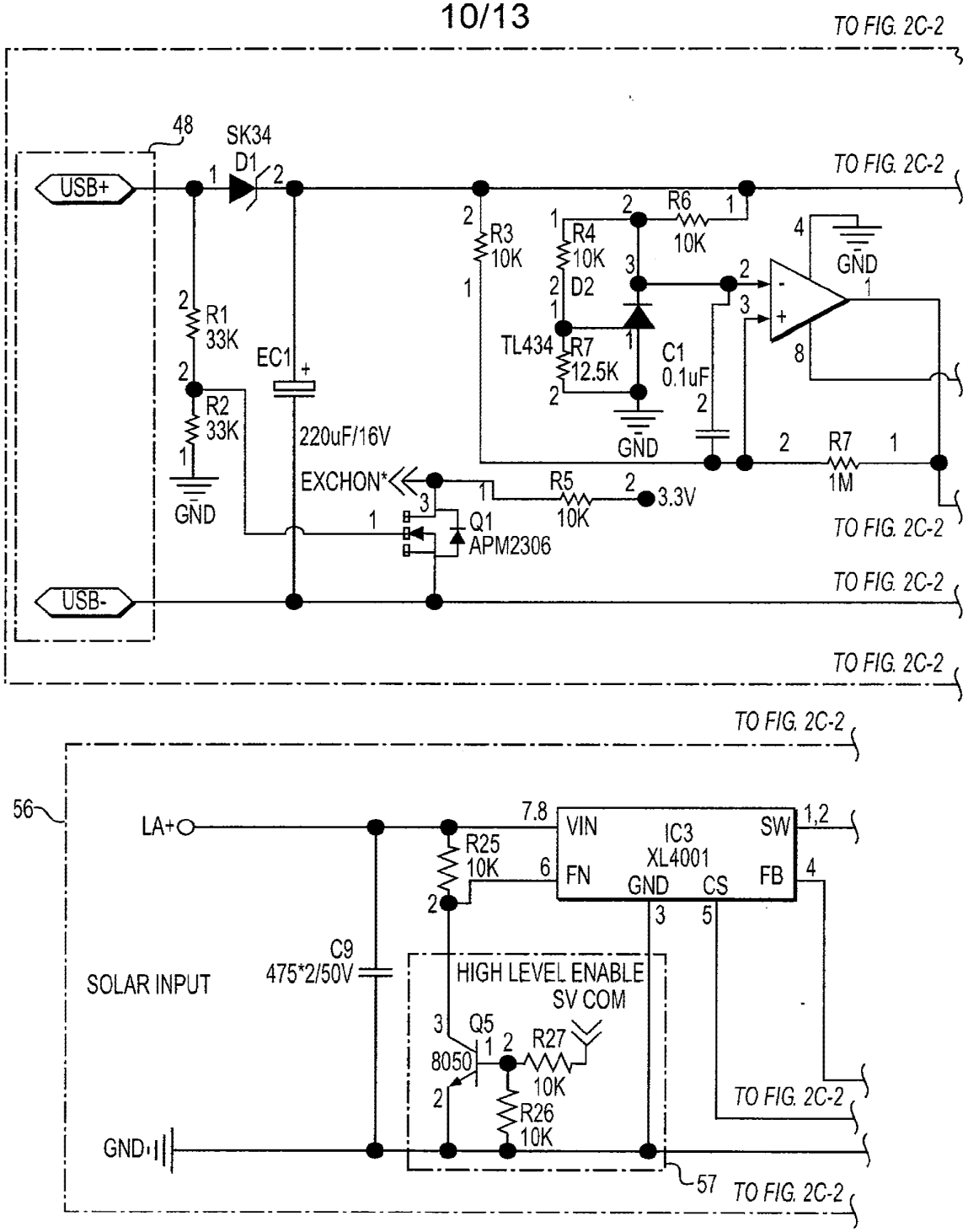


FIG. 2C-1

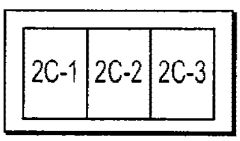


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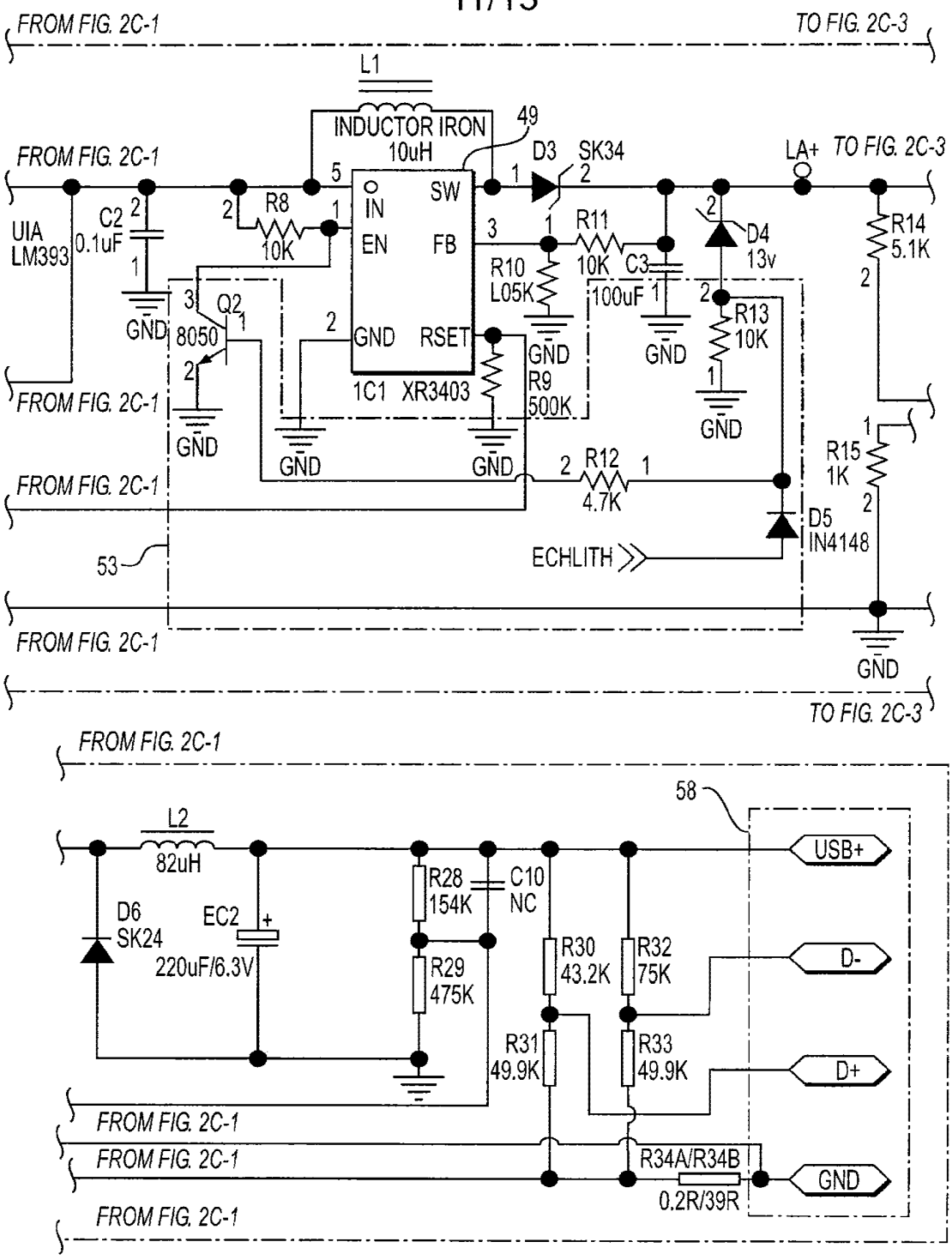


FIG. 2C-2

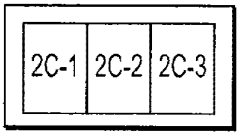
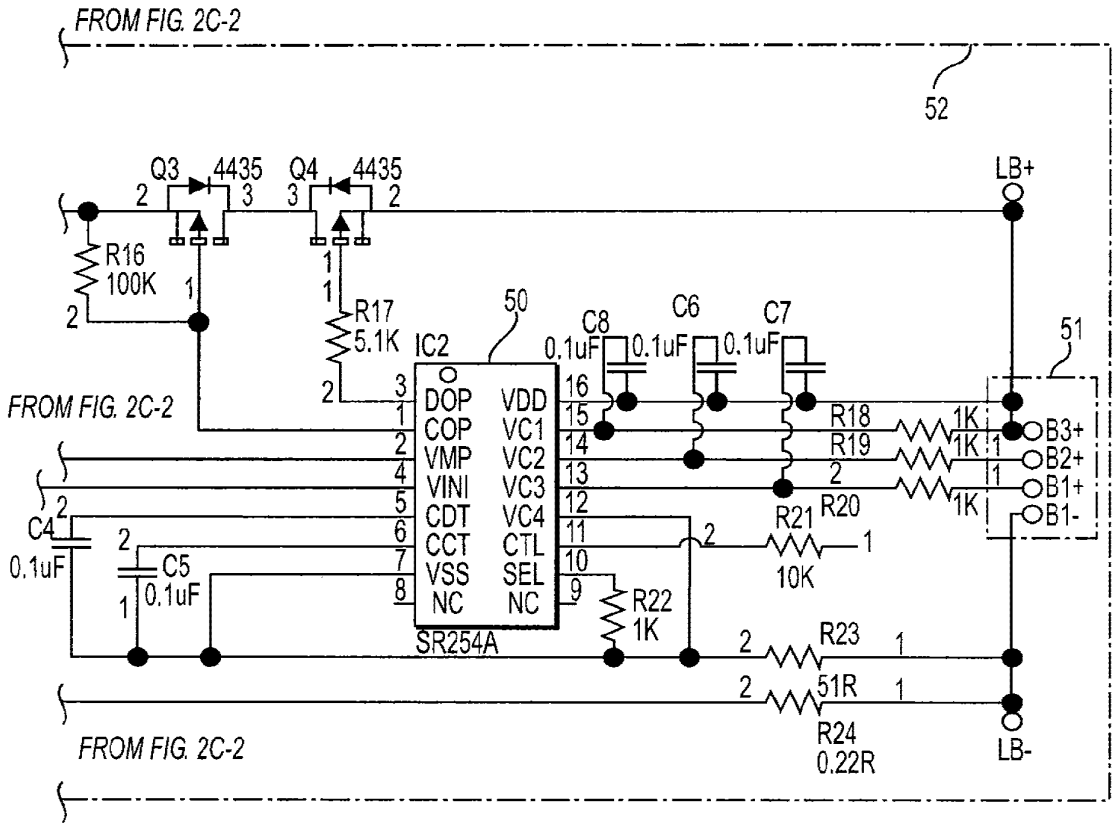


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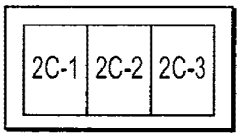


FIG. 2C-3

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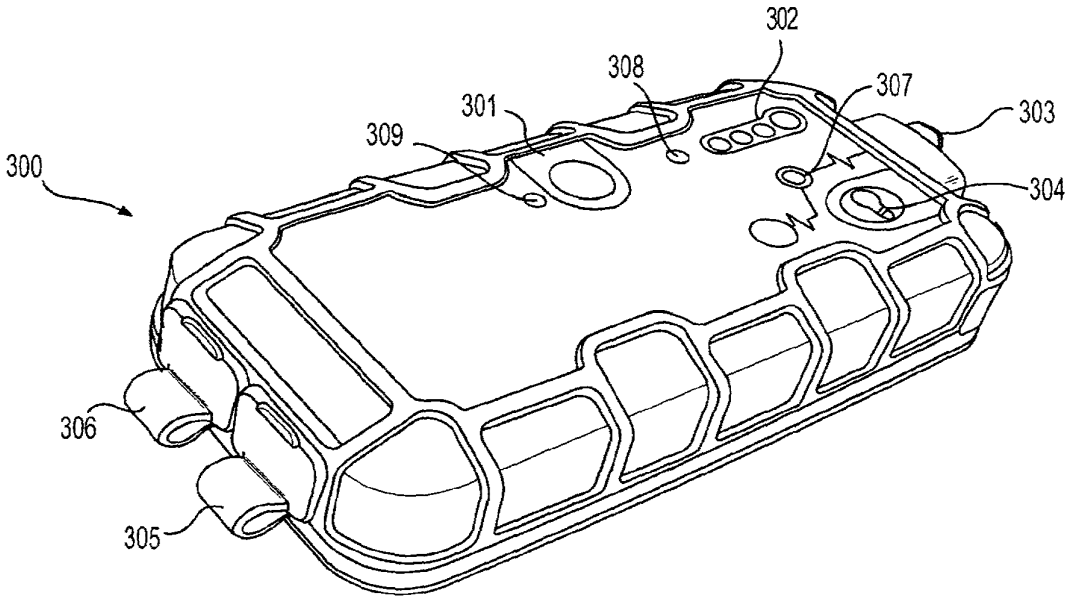


FIG. 3

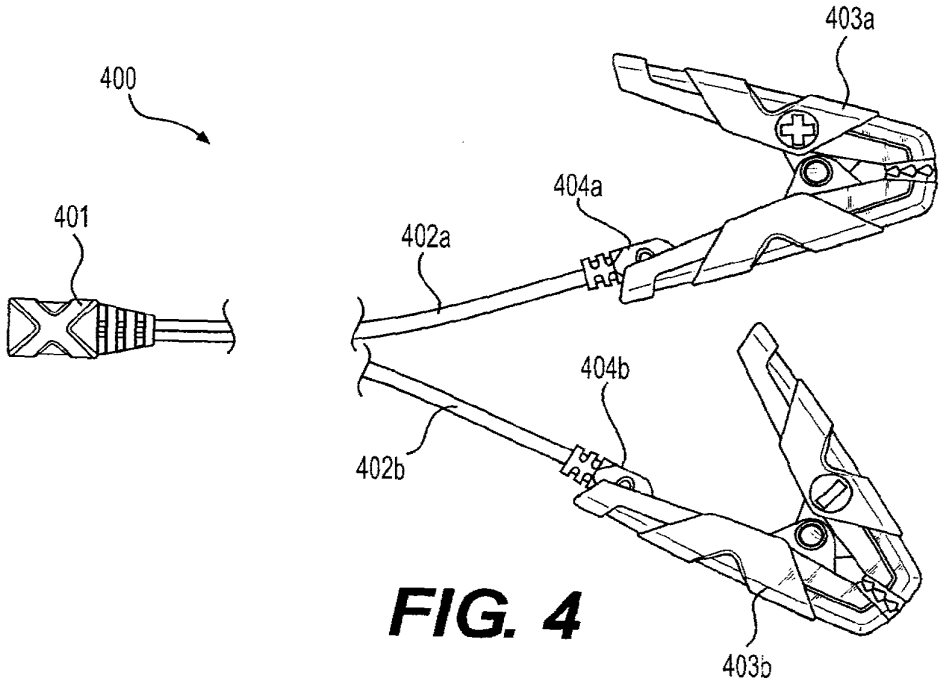


FIG. 4

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Jonathan NOOK et al.

Appl. No.:	16/820,040
Filing Date:	March 16, 2020
Exam:	M. Baye DIAO
Art Unit:	2859
Conf.:	1056
Title:	**PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION**

LETTER TO THE EXAMINER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Examiner:

The copies of the references cited with the Information Disclosure Statement filed herewith are not attached as allowed under CFR 1.98(d)(1)(2). **The earlier application is identified as US Patent Application No.: 15/691,884, filed on August 31, 2017, now granted as US Patent No.: 10,604,024, issued on March 11, 2020**.

The Examiner is invited to contact the undersigned attorney at the below-listed telephone number, with regard to any questions that may arise.

Respectfully submitted,
VORYS, SATER, SEYMOUR AND PEASE LLP

/William L. Klima/
William L. Klima, Reg. No.: 32422
Customer No.: 20230

Date: July 23, 2020
VORYS, SATER, SEYMOUR AND PEASE LLP
1909 K Street NW, Ninth Floor, Washington, D.C. 20006-1152
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E-mail: Patlaw@vorys.com

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Petitioner ADC (IPR2024-00671)

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
22. September 2011 (22.09.2011)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2011/113734 A1

(51) Internationale Patentklassifikation:
H02H 11/00 (2006.01) *F02N 11/08* (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2011/053575

(22) Internationales Anmeldedatum:
10. März 2011 (10.03.2011)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
10 2010 011 276.3 13. März 2010 (13.03.2010) DE

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(74) Gemeinsamer Vertreter: **CONTINENTAL AUTOMOTIVE GMBH**; Postfach 22 16 39, 80506 München (DE).

(81) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

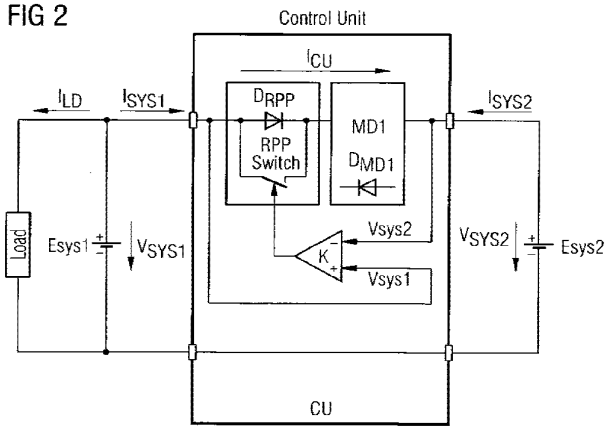
Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

(54) **Title**: ON-BOARD ELECTRICAL SYSTEM FOR A VEHICLE

(54) **Bezeichnung** : BORDNETZ FÜR EIN FAHRZEUG

FIG 2



(57) **Abstract**: In an on-board electrical system for a motor vehicle comprising: a first energy storage unit (Esys1) with a first voltage level (V_{SYS1}), a second energy storage unit (Esys2) with a second voltage level (V_{SYS2}); a control unit (CU) which controls the flow of current between the first energy storage unit (Esys1) and the second energy storage unit (Esys2) in both directions; a polarity-reversal protection diode (D_{RPP}) which connects the first energy storage unit (Esys1) for supplying operating voltage to the control unit (CU); and a switching element (Switch) for bridging the polarity-reversal protection diode (D_{RPP}) when the polarity of the first energy storage unit (Esys1) is correct; the first voltage level (V_{SYS1}) is compared with the second voltage level (V_{SYS2}) by means of a comparator (K) and the controllable switch (Switch) is moved to its open state when the first voltage level (V_{SYS1}) drops to a threshold voltage value (V_{sch}) which is below the second voltage level (V_{SYS2}).

(57) **Zusammenfassung**:

[Fortsetzung auf der nächsten Seite]

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Bei einem Bordnetz für ein Kraftfahrzeug umfassend: eine erste Energiespeichereinheit (Esys1) mit einem ersten Spannungsniveau (V_{SYS1}), eine zweite Energiespeichereinheit (Esys2) mit einem zweiten Spannungsniveau (V_{SYS2}); eine Steuereinheit (CU), die den Stromfluss zwischen der ersten Energiespeichereinheit (Esys1) und der zweiten Energiespeichereinheit (Esys2) in beiden Richtung steuert; eine Verpolschutzdiode (D_{RPP}), die die erste Energiespeichereinheit (Esys1) zur Betriebsspannungsversorgung mit der Steuereinheit (CU) verbindet; und ein Schaltelement (Switch) zur Überbrückung der Verpolschutzdiode (D_{RPP}) bei richtiger Polung der ersten Energiespeichereinheit (Esys1); wird mittels eines Komparators (K) das erste Spannungsniveau (V_{SYS1}) mit dem zweiten Spannungsniveau (V_{SYS2}) verglichen und bei Absinken des ersten Spannungsniveaus (V_{SYS1}) auf einen unter dem zweiten Spannungsniveau (V_{SYS2}) liegenden Spannungsschwellwert (V_{sch}) der steuerbare Schalter (Switch) in seinen geöffneten Zustand gesteuert.

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Beschreibung

Bordnetz für ein Fahrzeug

Die Erfindung betrifft ein Bordnetz für ein Fahrzeug, insbesondere ein Kraftfahrzeug gemäß Oberbegriff des Patentanspruchs 1.

Bordnetze heutiger Kraftfahrzeuge umfassen einen als Drehstrommaschine mit nachgeschalteter Gleichrichterschaltung ausgebildeten Generator als Energiewandler, eine oder mehrere Energiespeichereinheiten, bspw. Batterien sowie über das Bordnetz zu versorgende elektrische Verbraucher. Ein Verpolungsschutz wird bei solchen Bordnetzen durch die Gleichrichterdioden einer nachgeschalteten Gleichrichterschaltung realisiert.

Darüber hinaus sind auch Bordnetze mit zwei Energiespeichersystemen mit unterschiedlichen Nominalspannungen als Systemspannungen ohne Potentialtrennung bekannt, so zum Bsp. ein Energiespeichersystem, bspw. eine 12V-Batterie für Normalverbraucher des Kraftfahrzeugs und ein weiteres Energiespeichersystem, bspw. bestehend aus Doppelschichtkondensatoren (Ultra-caps) für Hochstromverbraucher.

Ein Batteriemanagement für Energiefluß- und Ruhestrommanagement zwischen diesen beiden Energiespeichersystemen wird von einer Steuereinheit bzw. einem Steuergerät bewirkt, wobei diese Steuereinheit von der 12V-Batterie mit einer Betriebsspannung versorgt wird. Als Verpolschutz dient ein Ventil, bspw. eine Verpolschutzdiode, die die 12V-Batterie mit der Steuereinheit verbindet.

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Nachteilig an einem solchen Bordnetz mit zwei Energiespeichersystemen ist ein Zustand, bei dem die Systemspannung der 12V-Batterie unter die Spannung der weiteren Energiespeichereinheit fällt und damit die Gefahr eines Ladungsabflusses in Richtung der 12V-Batterie aufgrund parasitärer Effekte in Halbleiter-Bauelementen der Steuereinheit besteht.

Aufgabe der Erfindung ist es daher, ein Bordnetz für ein Fahrzeug zu schaffen, bei dem ein solcher Ladungsabfluss verhindert wird.

Diese Aufgabe wird gelöst durch ein Bordnetz mit den Merkmalen des Patentanspruchs 1.

Hiernach ist bei einem Bordnetz für ein Fahrzeug, insbesondere ein Kraftfahrzeug, das
- eine erste Energiespeichereinheit mit einem ersten Spannungsniveau,
- eine zweite Energiespeichereinheit mit einem zweiten Spannungsniveau,
- eine Steuereinheit, die den Stromfluss zwischen der ersten Energiespeichereinheit und der zweiten Energiespeichereinheit in beiden Richtungen steuert, falls das zweite Spannungsniveau unter dem ersten Spannungsniveau liegt,
- eine Verpolschutzdiode, die die erste Energiespeichereinheit zur Betriebsspannungsversorgung mit der Steuereinheit verbindet, und
- ein Schaltelement zur Überbrückung der Verpolschutzdiode bei richtiger Polung der ersten Energiespeichereinheit umfasst,
erfindungsgemäß vorgesehen, dass

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- mittels einer Vergleichsschaltung, insbesondere eines Komparators das erste Spannungsniveau mit dem zweiten Spannungsniveau verglichen wird, und
- mittels Steuermittel, vorzugsweise des Komparators bei Absinken des ersten Spannungsniveaus auf einen unter dem zweiten Spannungsniveau liegenden Spannungsschwellwert der steuerbare Schalter in seinen geöffneten Zustand gesteuert wird.

Damit wird in einfacher und überraschender Weise der Verpolschutz für die Steuereinheit auch zur Verhinderung eines unerwünschten Ladungsaustausches zwischen den beiden Energiespeichereinheiten erzielt. Insbesondere sind keine zusätzlichen Leistungsbauelemente erforderlich. Ferner ist gemäß einer Weiterbildung der Erfindung mittels des vorgeschlagenen Komparators eine leichte Einstellmöglichkeit des Spannungsschwellwertes möglich.

Weitere vorteilhafte Ausgestaltungen der Erfindung sind mit den Merkmalen der abhängigen Patentansprüche gegeben.

Die Erfindung wird nachfolgend unter Bezugnahme auf die beigefügten Figuren näher erläutert. Es zeigen:

Figur 1 ein schematisches Blockschaltbild eines Ausführungsbeispiels des erfindungsgemäßen Bordnetzes für ein Kraftfahrzeug, und

Figur 2 ein detailliertes Blockschaltbild des Bordnetzes gemäß Figur 1.

Figur 1 zeigt ein Bordnetz, bestehend aus einer ersten Energiespeichereinheit Esys1 mit einer Nominalspannung V_{SYS1}, hier

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eine 12V-Batterie und einer zweiten Energiespeichereinheit Esys2 mit einer Nominalspannung V_{SYS2}, die ebenfalls eine Batterie, ein Doppelschichtkondensator oder ein anderes Speichermedium sein kann.

Die Nominalspannung V_{SYS1} der ersten Energiespeichereinheit Esys1, also deren Systemspannung ist größer als die Nominalspannung V_{SYS2} bzw. Systemspannung der zweiten Energiespeichereinheit Esys2: $V_{SYS1} > V_{SYS2}$.

Eine Steuereinheit CU verbindet die beiden nicht potentialgetrennten Energiespeichereinheiten Esys1 und Esys2 und steuert den Energieaustausch im Sinne eines Energiemanagements zwischen diesen beiden Energiespeichereinheiten Esys1 und Esys2, d. h. im Nominalzustand der beiden Systemspannungen ist sowohl ein Energieaustausch von der ersten Energiespeichereinheit Esys1 in Richtung der zweiten Energiespeichereinheit Esys2 als auch umgekehrt, von der zweiten Energiespeichereinheit Esys2 in Richtung der ersten Energiespeichereinheit Esys1 möglich.

Gemäß der detaillierten Darstellung nach Figur 2 sind an die erste Energiespeichereinheit Esys1 elektrische Verbraucher des Kraftfahrzeug angeschlossen, dargestellt als Systemlast Load, die von einem Laststrom I_{LD} versorgt werden. Der von der Steuereinheit CU gemanagte Energieaustausch zwischen den beiden Energiespeichereinheiten Esys1 und Esys2 erfolgt mittels der Systemströme I_{SYS1} und I_{SYS2}. Bei diesem Ausführungsbeispiel sind die beiden Energiespeichersysteme Esys1 und Esys2 nicht potentialgetrennt.

Die erste Energiespeichereinheit Esys1 liefert auch die Betriebsspannungsversorgung für die Steuereinheit CU, der zuge-

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hörige Laststrom ist mit I_{CU} bezeichnet, wobei zwischen der ersten Energiespeichereinheit Esys1 und der Steuereinheit CU eine Verpolschutzschaltung RPP (Reverse Polarity Protection) geschaltet ist, die bspw. aus einer Verpolschutzdiode D_{RPP} besteht und von einem steuerbaren Schalter Switch, bspw. einem Transistor oder einem mechanischen Schalter, wie einem Relais kurzgeschlossen werden kann.

Dieser Schalter Switch wird von einer Vergleichsschaltung, hier ein Komparator K angesteuert. Hierzu wird die Spannung V_{SYS1} der ersten Energiespeichereinheit Esys1 dem nicht invertierenden Eingang des Komparators K und die Spannung Esys2 der zweiten Energiespeichereinheit Esys2 dem invertierenden Eingang des Komparators K zugeführt.

Befinden sich die beiden Systemspannungen V_{SYS1} und V_{SYS2} auf ihrem Nominalwert, d.h. gilt $V_{SYS1} > V_{SYS2}$, so wird der Schalter Switch durch entsprechende Steuerung des Komparators K geschlossen, d.h. der Transistor in seinen leitenden Zustand gesteuert. So dass die Verpolschutzdiode D_{RPP} überbrückt wird.

Falls die Spannung V_{SYS1} der ersten Energiespeichereinheit Esys1 also bspw. eine 12V-Batterie aufgrund einer starken Entladung auf einen Spannungsschwellwert V_{sch} absinkt, der unter dem Spannungswert der Spannung V_{SYS2} der zweiten Energiespeichereinheit Esys2 liegt, also wenn $V_{SYS1} \leq V_{sch} < V_{SYS2}$ gilt, wird der Schalter Switch von dem Komparator K in seinen geöffneten Zustand gesteuert, so dass aufgrund der Verpolschutzdiode D_{RPP} ein Ladungsabfluss aus der zweiten Energiespeichereinheit Esys2 in Richtung der ersten Energiespeichereinheit Esys1 verhindert wird.

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Ein solcher Ladungsabfluss könnte aufgrund von parasitären Halbleiterelementen in der Steuereinheit CU entstehen, die in Figur 2 stellvertretend durch eine Diode D_{MD1} dargestellt sind. Ein solches parasitäres Halbleiterbauelement kann bspw. auch in einem von der Steuereinheit CU angesteuerten DC/DC-Wandler MD1 entstehen, bspw. als Bulk- oder Body-Diode eines High-Side-Transistors.

Der Spannungsschwellwert V_{sch} ist über die Steuereinheit CU einstellbar.

Falls die erste Energiespeichereinheit Esys1 mit falscher Polung an die Steuereinheit CU angeschlossen wird, ergibt sich für die Spannung V_{SYS1} der Energiespeichereinheit Esys1: $V_{SYS1} < 0$. Auch in diesem Zustand würde der Komparator K den Schalter Switch öffnen, d.h. den Transistor in seinen gesperrten Zustand steuern, so dass die Verpolschutzdiode D_{RPP} wirksam wird.

Der Komparator K kann mit einem zeitverzögerten Ansprechen ausgebildet werden, indem er bspw. mit einem Zeitglied verbunden wird. So erfolgt sowohl das Schließen des Schalters Switch als auch dessen Öffnen durch den Komparator K zeitverzögert.

Das oben erläuterte Ausführungsbeispiel zeigt ein erfindungsgemäßes Bordnetz ohne Potentialtrennung zwischen den beiden Energiespeichersystemen Esys1 und Esys2. Die Erfindung ist darauf natürlich nicht beschränkt, sondern kann ebenso für potentialgetrennte Systeme eingesetzt werden.

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Patentansprüche

1. Bordnetz für ein Fahrzeug, insbesondere ein Kraftfahrzeug umfassend
- eine erste Energiespeichereinheit (Esys1) mit einem ersten Spannungsniveau (V_{SYS1}),
- eine zweite Energiespeichereinheit (Esys2) mit einem zweiten Spannungsniveau (V_{SYS2}),
- eine Steuereinheit (CU), die den Stromfluss zwischen der ersten Energiespeichereinheit (Esys1) und der zweiten Energiespeichereinheit (Esys2) in beiden Richtungen steuert, falls das zweite Spannungsniveau (V_{SYS2}) unter dem ersten Spannungsniveau (V_{SYS1}) liegt,
- eine Verpolschutzdiode (D_{RPP}), die die erste Energiespeichereinheit (Esys1) zur Betriebsspannungsversorgung mit der Steuereinheit (CU) verbindet, und
- ein Schaltelement (Switch) zur Überbrückung der Verpolschutzdiode (D_{RPP}) bei richtiger Polung der ersten Energiespeichereinheit (Esys1),
dadurch gekennzeichnet dass,
- mittels einer Vergleichsschaltung (K), insbesondere eines Komparators das erste Spannungsniveau (V_{SYS1}) mit dem zweiten Spannungsniveau (V_{SYS2}) verglichen wird, und
- mittels Steuermittel (K), vorzugsweise des Komparators bei Absinken des ersten Spannungsniveaus (V_{SYS1}) auf einen unter dem zweiten Spannungsniveau (V_{SYS2}) liegenden Spannungsschwellwert (V_{sch}) der steuerbare Schalter (Switch) in seinen geöffneten Zustand gesteuert wird.

2. Bordnetz nach Anspruch 1,
dadurch gekennzeichnet, dass

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der Spannungsschwellwert (V_{sch}) einstellbar ist.

3. Bordnetz nach Anspruch 1 oder 2,
dadurch gekennzeichnet, dass
der Komparator (K) ein zeitverzögertes Ansprechverhalten aufweist.

4. Bordnetz nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass
der steuerbare Schalter (Switch) als Halbleiterschalter, insbesondere als Transistor oder als elektromechanischer Schalter ausgeführt ist.

5. Bordnetz nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass
das Bordnetz hinsichtlich der ersten und zweiten Energiespeichereinheit (Esys1, Esys2) ohne Potenzialtrennung ausgeführt ist.

6. Bordnetz nach einem der Ansprüche 1 bis 4,
dadurch gekennzeichnet, dass
das Bordnetz hinsichtlich der ersten und zweiten Energiespeichereinheit (Esys1, Esys2) mit Potenzialtrennung ausgeführt ist.

7. Bordnetz nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass
der erste Energiespeicher (Esys1) als Betriebsspannungsquelle für einen Laststromkreis mit elektrischen Verbrauchern (Load) dient.

8. Bordnetz nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass

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das erste bzw. zweite Spannungsniveau (V_{SYS1}, V_{SYS2}) jeweils die Nominalspannung der ersten bzw. zweiten Energiespeichereinheit (Esys1, Esys2) ist.

9. Bordnetz nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Steuereinheit (CU) mindestens ein elektrisches und/oder elektronisches Bauelement mit Durchlasseigenschaften umfasst.

10. Bordnetz nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Steuereinheit (CU) ein Batteriemanagement durchführt.

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FIG 1

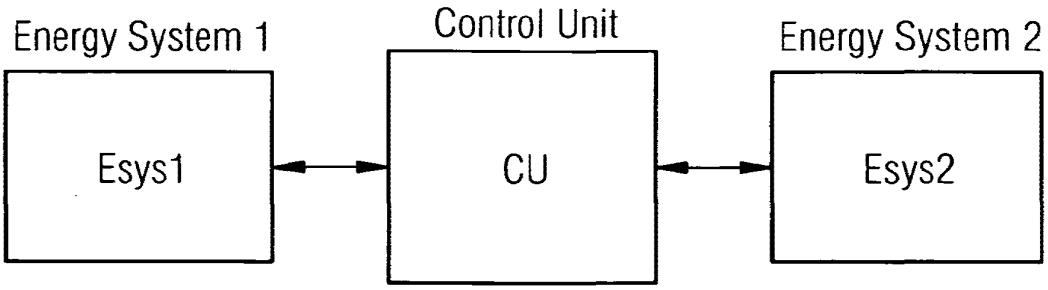
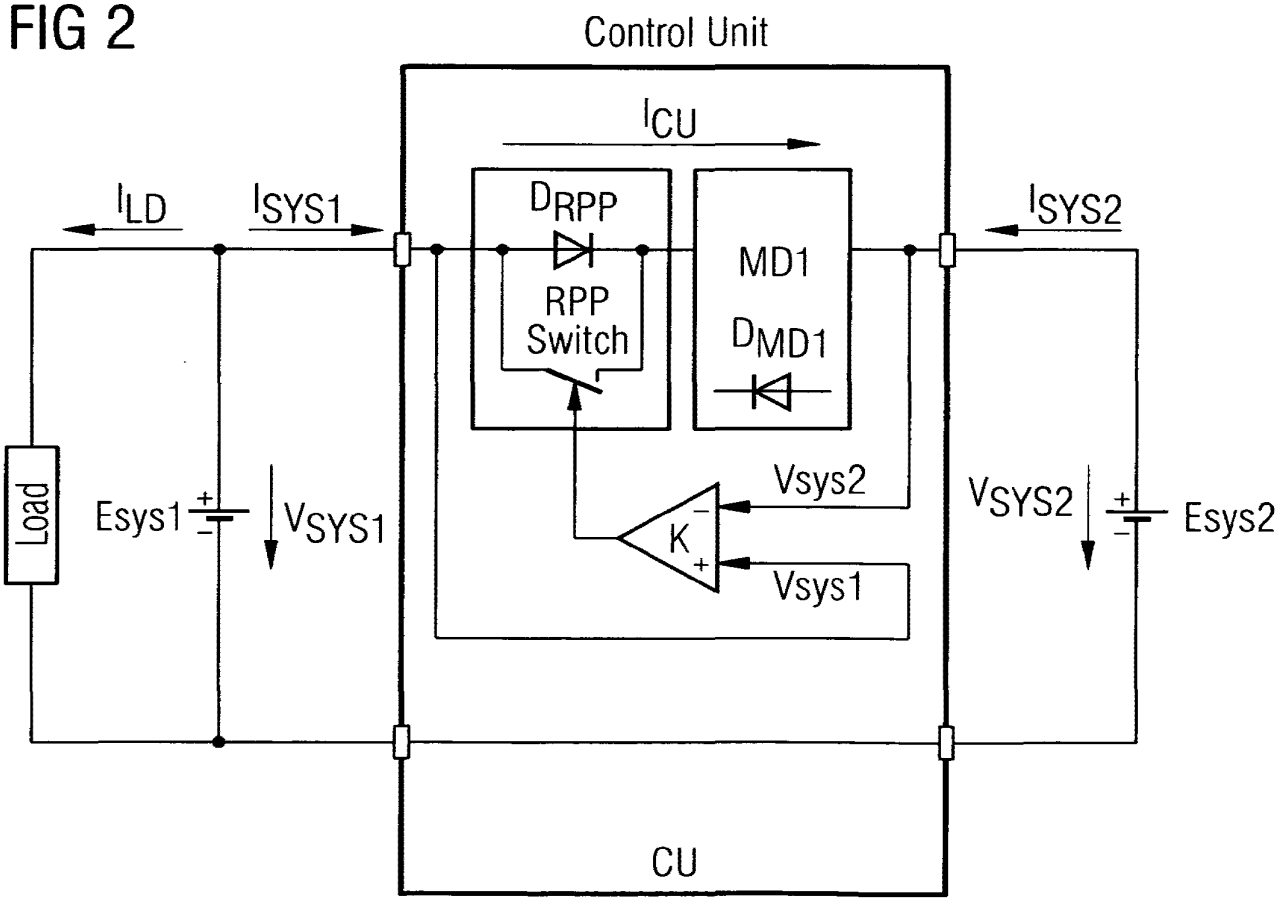

Energy System 1
Control Unit
Energy System 2
Esys1
CU
Esys2

FIG 2


Control Unit
ICU
ILD
ISYS1
ISYS2
DRPP
RPP
Switch
MD1
DMD1
Load
Esys1
VSYS1
Vsys2
K
Vsys1
VSYS2
Esys2
CU

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/053575

A. CLASSIFICATION OF SUBJECT MATTER
INV. H02H11/00 F02N11/08
ADD.

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)
H02H F02N B60L H02J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 39 30 091 A1 (STANDARD ELEKTRIK LORENZ AG [DE]) 14 March 1991 (1991-03-14) column 2, line 65 - column 3, line 51; figure	1,4
A	DE 10 2005 015993 A1 (BOSCH GMBH ROBERT [DE]) 19 October 2006 (2006-10-19) paragraphs [0013], [0014]; figure	1,5,7,8, 10
A	DE 41 38 943 C1 (BOSCH) 27 May 1993 (1993-05-27) abstract; figures 7,8	1,2,4,5, 7,10
A	DE 10 2006 036425 A1 (BAYERISCHE MOTOREN WERKE AG [DE]) 7 February 2008 (2008-02-07) the whole document	1,5,7,10

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"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
27 May 2011	08/06/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Krieger, Philippe

1

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/053575

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 102 22 149 A1 (SIEMENS AG [DE]) 11 December 2003 (2003-12-11) abstract; figures	1,3,4
A	DE 100 01 485 A1 (DAIMLER CHRYSLER AG [DE]) 26 July 2001 (2001-07-26) abstract; figures 1,5	1
A	DE 10 2007 027498 A1 (DAIMLER CHRYSLER AG [DE]) 24 January 2008 (2008-01-24) the whole document	1

1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

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Page 266 of 2306 Petitioner ADC (IPR2024-00671)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2011/053575

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3930091 A1	14-03-1991	NONE	
DE 102005015993 A1	19-10-2006	NONE	
DE 4138943 C1	27-05-1993	WO 9311003 A1	10-06-1993
		EP 0568655 A1	10-11-1993
		JP 3553932 B2	11-08-2004
		JP 6504832 T	02-06-1994
		US 5525891 A	11-06-1996
DE 102006036425 A1	07-02-2008	CN 101485062 A	15-07-2009
		EP 2047580 A2	15-04-2009
		WO 2008014945 A2	07-02-2008
		US 2010001581 A1	07-01-2010
DE 10222149 A1	11-12-2003	WO 03098765 A1	27-11-2003
		US 2005094332 A1	05-05-2005
DE 10001485 A1	26-07-2001	NONE	
DE 102007027498 A1	24-01-2008	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

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Petitioner ADC (IPR2024-00671)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2011/053575

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. H02H11/00 F02N11/08
ADD.

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
H02H F02N B60L H02J

Recherchierte, aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	DE 39 30 091 A1 (STANDARD ELEKTRIK LORENZ AG [DE]) 14. März 1991 (1991-03-14) Spalte 2, Zeile 65 - Spalte 3, Zeile 51; Abbildung	1,4
A	DE 10 2005 015993 A1 (BOSCH GMBH ROBERT [DE]) 19. Oktober 2006 (2006-10-19) Absätze [0013], [0014]; Abbildung	1,5,7,8, 10
A	DE 41 38 943 C1 (BOSCH) 27. Mai 1993 (1993-05-27) Zusammenfassung; Abbildungen 7,8	1,2,4,5, 7,10
A	DE 10 2006 036425 A1 (BAYERISCHE MOTOREN WERKE AG [DE]) 7. Februar 2008 (2008-02-07) das ganze Dokument	1,5,7,10

-/--

[X] Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen [X] Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
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"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
27. Mai 2011	08/06/2011

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Krieger, Philippe

1

Formblatt PCT/ISA/210 (Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2011/053575

C. (Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	DE 102 22 149 A1 (SIEMENS AG [DE]) 11. Dezember 2003 (2003-12-11) Zusammenfassung; Abbildungen -----	1,3,4
A	DE 100 01 485 A1 (DAIMLER CHRYSLER AG [DE]) 26. Juli 2001 (2001-07-26) Zusammenfassung; Abbildungen 1,5 -----	1
A	DE 10 2007 027498 A1 (DAIMLER CHRYSLER AG [DE]) 24. Januar 2008 (2008-01-24) das ganze Dokument -----	1

1

Formblatt PCT/ISA/210 (Fortsetzung von Blatt 2) (April 2005)

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INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP2011/053575

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
DE 3930091 A1	14-03-1991	KEINE	
DE 102005015993 A1	19-10-2006	KEINE	
DE 4138943 C1	27-05-1993	WO 9311003 A1	10-06-1993
		EP 0568655 A1	10-11-1993
		JP 3553932 B2	11-08-2004
		JP 6504832 T	02-06-1994
		US 5525891 A	11-06-1996
DE 102006036425 A1	07-02-2008	CN 101485062 A	15-07-2009
		EP 2047580 A2	15-04-2009
		WO 2008014945 A2	07-02-2008
		US 2010001581 A1	07-01-2010
DE 10222149 A1	11-12-2003	WO 03098765 A1	27-11-2003
		US 2005094332 A1	05-05-2005
DE 10001485 A1	26-07-2001	KEINE	
DE 102007027498 A1	24-01-2008	KEINE	

Espacenet

CN103066662A Emergency power supply

Applicants: LEI XINGLIANG

Inventors: LEI XINGLIANG

Classifications:

IPC ***H02J7/00; H02J9/00;***

CPC **B60L8/003 (EP,US); H02J1/00 (US); H02J1/122 (EP); H02J9/04 (US); H02J9/061 (EP,US);** H02J1/122 (US); Y02T10/7083 (EP,US); Y10T307/625 (EP,US);

Priorities: CN201310004817A 2013-01-07

Application: CN103066662A·2013-01-07

Publication: CN103066662A·2013-04-24

Published as: CN103066662A;**CN103066662B; EP2942852A1; EP2942852A4; EP2942852B1; ES2727664T3; US2015340907A1; US9954391B2; WO2014106407A1**

Emergency power supply

Abstract

The invention relates to an emergency power supply which comprises a shell body. A battery pack used for storing electric energy is arranged in the shell body, and an input end of the battery pack is connected with output ends of a charging circuit used for charging the battery pack and a solar panel input circuit. An output of the battery pack is connected with a large current output circuit used for outputting large currents when an automobile is started, and an externally connected battery intelligent detecting system is connected between the battery pack and the large current output circuit. The emergency power supply is convenient to charge, capable of outputting large currents for starting an automobile, and capable of accurately controlling current output.

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Page 271 of 2306 Petitioner ADC (IPR2024-00671)

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)授权公告号 CN 103066662 A
(43)申请公布日 2013.04.24

(21)申请号 201310004817.1

(22)申请日 2013.01.07

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(72)发明人 雷星亮

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代理人 胡彬

(51)Int.Cl.
H02J 7/00(2006.01)
H02J 9/00(2006.01)

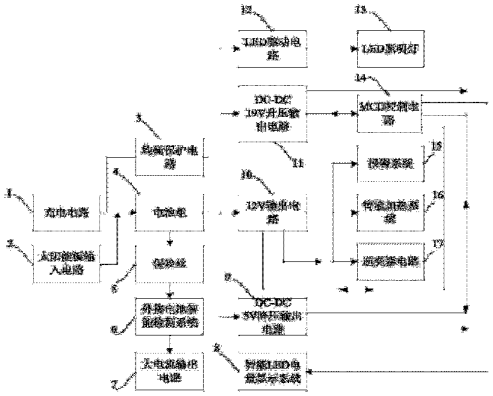
权利要求书3页 说明书7页 附图3页

(54)发明名称

应急电源

(57)摘要

本发明涉及一种应急电源，包括壳体，所述壳体的内部设置有用于储存电能的电池组，所述电池组的输入端与用于给所述电池组充电的充电电路、太阳能板输入电路的输出端连接，所述电池组的输出端连接有用于汽车启动时输出大电流的大电流输出电路，所述电池组与所述大电流输出电路之间连接有外接电池智能检测系统。该应急电源自身充电方便、可大电流输出用于汽车启动，并能准确控制大电流输出。



CN 103066662 A

EXHIBIT 1002
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1. 一种应急电源，包括壳体，所述壳体的内部设置有用于储存电能的电池组（4），其特征在于：所述电池组（4）的输入端与用于给所述电池组（4）充电的充电电路（1）、太阳能板输入电路（2）的输出端连接，所述电池组（4）的输出端连接有用于汽车启动时输出大电流的大电流输出电路（7），所述电池组（4）与所述大电流输出电路（7）之间连接有外接电池智能检测系统（6）。

2. 根据权利要求 1 所述的一种应急电源，其特征在于：所述电池组（4）由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路（12），每路所述 DC-DC 调压电路均与 MCU 控制电路（14）连接，所述 MCU 控制电路（14）还连接有用于显示该应急电源的电量的智能 LED 电量显示系统（8），所述 LED 驱动电路（12）的输出端连接有 LED 照明灯（13），所述电池组（4）的两端并联有用于保护所述电池组（4）的均衡保护电路（3）。

3. 根据权利要求 1 所述的一种应急电源，其特征在于：所述外接电池智能检测系统（6）包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的电压识别系统、及识别通过外接启动电路的电流的电流识别系统，所述继电器的线圈的两端连接所述电压识别系统，所述继电器的输入端连接电压识别系统，所述继电器的输出端连接所述大电流输出电路（7），所述红黑电瓶夹通过可插拔防反接插头连接或通过焊接于所述电池组（4）正负极两端的导线连接，所述可插拔防反接插头与所述电池组（4）的正负极连接，所述电压识别系统与所述红黑电瓶夹连接，所述继电器为 12V 或 24V 继电器，电流规格为 20A ～ 300A，脚位为 4 ～ 6 个，所述外接电池智能检测系统（6）设置于所述应急电源的外部，通过可插拔防反接插头与所述应急电源连接，或者设置于所述应急电源的内部、而红黑电瓶夹设置于所述应急电源的外部。

4. 根据权利要求 3 所述的一种应急电源，其特征在于：所述红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，所述电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，所述正的反馈电压为 a ～ b 的范围，所述 a 为 6 ～ 24V，b 为 9 ～ 30V，取值时，a 小于 b；当反馈电压为 a ～ b，且为正值时，所述继电器的线圈得到电信号，触点闭合，输出端与所述大电流输出电路（7）导通，该应急电源开始对外接的设备进行大电流供电，此时，所述电流识别系统检测经过所述大电流输出电路（7）的电流，若该电流小于 c 时，c 为 0.1 ～ 10A，所述继电器的线圈两端的电信号消失，触点断开，输出端断开与所述大电流输出电路（7）的连接，停止对外接的设备大电流放电，所述大电流输出电路（7）的输出电压为 DC12V 或 DC24V，瞬间电流为 100A ～ 600A。

5. 根据权利要求 2 所述的一种应急电源，其特征在于：所述 DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路（11）、输出电压为 12V 的 DC-DC12V 输出电路（10）以及输出电压为 5V 的 DC-DC5V 降压输出电路（9）。

6. 根据权利要求 5 所述的一种应急电源，其特征在于：所述 DC-DC12V 输出电路（10）的输出端连接有用于发出警报信号的报警系统（15）、用于将所述电池组（4）输出的直流电转换为交流电的逆变器电路（17）以及用于给所述电池组（4）加热的智能加热系统（16）。

7. 根据权利要求 6 所述的一种应急电源，其特征在于：所述逆变器电路（17）输出的交流电的电压为 110V ～ 220V，所述逆变器电路（17）内置于所述壳体的内部或者外接于所述壳体。

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8. 根据权利要求 6 所述的一种应急电源，其特征在于：所述智能加热系统（16）包括缠绕于所述电池组（4）的外侧的加热丝或者加热膜，贴附于所述电池组（4）的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统（16）的加热启动开关；所述的加热丝或加热膜的电阻值的范围为 0.1Ω ～ 10Ω；预先设定所述电池组（4）表面的升温上限温度为 t，t 的范围为 0 ～ 70℃，此时，打开加热启动开关，若通过所述热敏电阻反馈到所述 MCU 控制电路（14）的所述电池组（4）的表面温度小于 t，则加热启动开关打开，加热丝或加热膜的两端导通电流，开始对所述电池组（4）进行加热，预先设定加热的时间为一固定值 d，d 的范围为 10 ～ 300s，当所述电池组（4）的表面温度达到上限温度 t 时，加热启动开关自动断开，或者当加热的时间达到 d 时，智能加热系统的加热电路自动断开。

9. 根据权利要求 1 所述的一种应急电源，其特征在于：所述壳体为塑胶材质、铝合金材质或混合材质的外壳，所述太阳能板输入电路（2）设置于所述壳体的外侧，所述太阳能板输入电路（2）的功率为 0.5W ～ 50W，输入电压为 5V ～ 25V。

10. 根据权利要求 1 所述的一种应急电源，其特征在于：所述电池组（4）的输出端与所述外接电池智能检测系统（6）之间还连接有一次性或者可恢复的保险丝（5），所述保险丝（5）的电流为 50A ～ 500A。

11. 根据权利要求 3 所述的一种应急电源，其特征在于，所述电流识别系统的电路（62）包括：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，U3 的管脚 3 与 C12 的一端、RS 的一端、BT2 的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在一起。

12. 根据权利要求 11 所述的一种应急电源，其特征在于：所述电压识别系统的电路（61）包括：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

13. 根据权利要求 12 所述的一种应急电源，其特征在于：所述继电器的电路（63）包括：

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三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14 的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

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应急电源

技术领域

[0001] 本发明属于直流电源领域，具体涉及一种可为多种设备提供电源的应急电源。

背景技术

[0002] 随着科技的日新月异，人们生活水平的日益提高，汽车、手机、电脑、数码相机等成为人们生活、出游以及旅行必备的物品，它们均采用电池供电，一旦失去电源，将完全丧失其具有的功能，给人们的生活带来诸多不便。因此，对应每种产品，厂家均提供有相应的充电器，能够将 220v 的市电转换成相应电压的直流电源对其进行充电，但是这种充电器无法满足户外充电的需求。尤其对于汽车而言，常常会遇到打不着火的问题，特别是在旅途中的汽车，因电瓶电量不足或者温度过低很难打着火，给使用者带来很多不便。

[0003] 现有中国专利文献 CN101685974A 公开了一种移动电源，包括电池组、充电电路、MCU 微控制电路、DC-DC 调压输出电路，所述充电电路设有可与外部电源连接的输入端，所述充电电路设有的输出端与电池组电连接，电池组同时与 MCU 微控制电路和 DC-DC 调压输出电路电连接，MCU 微控制电路电连接并控制充电电路和 DC-DC 调压输出电路，采用上述技术方案的有益效果是：线路简洁、体积较小、轻巧便于携带、易操控、智能化、功率损耗低和多功能，既可以利用市电充电，又可以通过更换不同的输出转换头给多种电子产品供电或充电，管理、携带和使用方便。该申请专利解决了多种电压等级的输出且具有自充电功能，但其不具备大电流输出能力，不能作为汽车启动电源，另外，该申请文件中的电流输出后均为直流电，而在现实中，也有很多外部设备是需要输入交流电，所以该申请专利也无法解决这类设备的临时供电问题。

发明内容

[0004] 本发明的目的在于提出一种自身充电方便、可大电流输出用于汽车启动，并能准确控制大电流输出的应急电源。

[0005] 为达到此目的，本发明采用以下技术方案：

[0006] 一种应急电源，包括壳体，所述壳体的内部设置有用于储存电能的电池组，所述电池组的输入端与用于给所述电池组充电的充电电路、太阳能板输入电路的输出端连接，所述电池组的输出端连接有用于汽车启动时输出大电流的大电流输出电路，所述电池组与所述大电流输出电路之间连接有外接电池智能检测系统。

[0007] 其中，所述电池组由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路，每路所述 DC-DC 调压电路均与 MCU 控制电路连接，所述 MCU 控制电路还连接有用于显示该应急电源的电量的智能 LED 电量显示系统，所述 LED 驱动电路的输出端连接有 LED 照明灯，所述电池组的两端并联有用于保护所述电池组的均衡保护电路。

[0008] 其中，所述外接电池智能检测系统包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的

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电压识别系统、及识别通过外接启动电路的电流的电流识别系统，所述继电器的线圈的两端连接所述电压识别系统，所述继电器的输入端连接电压识别系统，所述继电器的输出端连接所述大电流输出电路，所述红黑电瓶夹通过可插拔防反接插头连接或通过焊接于所述电池组正负极两端的导线连接，所述可插拔防反接插头与所述电池组的正负极连接，所述电压识别系统与所述红黑电瓶夹连接，所述继电器为 12V 或 24V 继电器，电流规格为 20A ～ 300A，脚位为 4 ～ 6 个，所述外接电池智能检测系统设置于所述应急电源的外部，通过可插拔防反接插头与所述应急电源连接，或者设置于所述应急电源的内部、红黑电瓶夹设置于所述应急电源的外部。

[0009] 其中，所述红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，所述电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，所述正的反馈电压为 a ～ b 的范围，所述 a 为 6 ～ 24V，b 为 9 ～ 30V，取值时，a 小于 b ；当反馈电压为 a ～ b，且为正值时，所述继电器的线圈得到电信号，触点闭合，输出端与所述大电流输出电路的输入端导通，该应急电源开始对外接的设备进行大电流供电，此时，所述电流识别系统检测经过所述大电流输出电路的电流，若该电流小于 c 时，c 为 0.1 ～ 10A，所述继电器的线圈两端的电信号消失，触点断开，输出端断开与所述大电流输出电路的连接，停止对外接的设备大电流放电，所述大电流输出电路的输出电压为 DC12V 或 DC24V，瞬间电流为 100A ～ 600A。

[0010] 其中，所述 DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路、输出电压为 12V 的 DC-DC12V 输出电路以及输出电压为 5V 的 DC-DC5V 降压输出电路。

[0011] 其中，所述 DC-DC12V 输出电路的输出端连接有用于发出警报信号的报警系统、用于将所述电池组输出的直流电转换为交流电的逆变器电路以及用于给所述电池组加热的智能加热系统。

[0012] 其中，所述逆变器电路输出的交流电的电压为 110V ～ 220V，所述逆变器电路内置于所述壳体的内部或者外接于所述壳体。

[0013] 其中，所述智能加热系统包括缠绕于所述电池组的外侧的加热丝或者加热膜，贴附于所述电池组的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统的加热启动开关 ；所述的加热丝或加热膜的电阻值的范围为 0.1Ω ～ 10Ω ；预先设定所述电池组表面的升温上限温度为 t，t 的范围为 0 ～ 70℃，此时，打开加热启动开关，若通过所述热敏电阻反馈到所述 MCU 控制电路的所述电池组的表面温度小于 t，则加热启动开关打开，加热丝或加热膜的两端导通电流，开始对所述电池组进行加热，预先设定加热的时间为一固定值 d，d 的范围为 10 ～ 300s，当所述电池组的表面温度达到上限温度 t 时，加热启动开关自动断开，或者当加热的时间达到 d 时，智能加热系统的加热电路自动断开。

[0014] 其中，所述壳体为塑胶材质、铝合金材质或混合材质的外壳，所述太阳能板输入电路设置于所述壳体的外侧，所述太阳能板输入电路的功率为 0.5W ～ 50W，输入电压为 5V ～ 25V。

[0015] 其中，所述电池组的输出端与所述外接电池智能检测系统之间还连接有一次性或者可恢复的保险丝，所述保险丝的电流为 50A ～ 500A。

[0016] 其中，所述电流识别系统的电路包括 ：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，

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U3 的管脚 3 与 C12 的一端、RS 的一端、BT2 的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在一起。

[0017] 其中，所述电压识别系统的电路包括：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

[0018] 其中，所述继电器的电路包括：三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14 的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

[0019] 本发明的有益效果为：本发明的应急电源采用锂离子电池作为电池组，具有重量轻、体积小、耐用、瞬间放电电流大，能够反复充电的特点，可满足汽车启动的大电流需要，通过在大电流输出电路与电池组之间连接外接电池智能检测系统，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能。该应急电源的电池组又连接有可输出多种电压等级的调压电路，通过将各路调压电路输出端与 MCU 控制电路连接，可以满足手机、电脑、数码相机、车载打气泵、车载冰箱、车载吸尘器等设备的户外供电需要；LED 灯可提供户外照明；该应急电源本身可通过外部电源充电，也可以通过太阳能对其进行充电，这使得

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该应急电源在户外时，可以自动补充电能。另外，该应急电源自身设置有报警系统，当用户迷路或者出现状况时自行按下报警系统，报警系统会通过指示灯的显示或者报警系统发出声音提示周围，以达到求救的目的；该应急电源还连接有逆变器电路和智能加热系统，其中，逆变器电路可以将电池组输出的直流电转换为交流电，以便户外时需要交流电的设备电力不足时供电，而智能加热系统通过加热丝或加热膜以及热敏电阻，可以在外部环境温度较低影响电源正常供电的情况下，对电源的电池组进行加热，保证电池组在低温环境下也可以正常工作，向外部提供电能。同时，该应急电源设置有红黑电瓶夹，可有效防止在于外部需要救援的电池时将正负极接反，为使用者提供便利。

附图说明

[0020] 图 1 是本发明应急电源的原理示意图；

[0021] 图 2 是本发明应急电源的外接电池智能检测系统的电路原理图一；

[0022] 图 3 是图 2 中的外接电池智能检测系统的电路原理图二。

[0023] 图中：1- 充电电路；2- 太阳能板输入电路；3- 均衡保护电路；4- 电池组；5- 保险丝；6- 外接电池智能检测系统；7- 大电流输出电路；8- 智能 LED 电量显示系统；9-DC-DC5V 降压输出电路；10-12V 输出电路；11-DC-DC19V 升压输出电路；12-LED 驱动电路；13-LED 照明灯；14-MCU 控制电路；15- 报警系统；16- 智能加热系统；17- 逆变器电路；61- 电压识别系统的电路；62- 电流识别系统的电路；63- 继电器的电路。

具体实施方式

[0024] 下面结合附图和具体实施例对本发明作进一步说明。

[0025] 如图 1 至图 3 所示，一种应急电源，包括壳体，壳体的内部设置有用于储存电能的电池组 4，电池组 4 的输入端与用于给电池组 4 充电的充电电路 1、太阳能板输入电路 2 的输出端连接，电池组 4 的输出端连接有用于汽车启动时输出大电流的大电流输出电路 7，电池组 4 与大电流输出电路 7 之间连接有外接电池智能检测系统 6。进一步地，电池组 4 由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路 12，每路 DC-DC 调压电路均与 MCU 控制电路 14 连接，MCU 控制电路 14 还连接有用于显示该应急电源的电量的智能 LED 电量显示系统 8，LED 驱动电路 12 的输出端连接有 LED 照明灯 13，电池组 4 的两端并联有用于保护所述电池组 4 的均衡保护电路 3。其中，DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路 11、输出电压为 12V 的 DC-DC12V 输出电路 10 以及输出电压为 5V 的 DC-DC5V 降压输出电路 9。另外，本发明中的壳体为塑胶材质、铝合金材质或混合材质的外壳，太阳能板输入电路 2 设置于壳体的外侧，太阳能板输入电路 2 的功率为 0.5W ～ 50W，输入电压为 5V ～ 25V。

[0026] 该应急电源采用锂离子电池组成的电池组，具有重量轻、体积小、耐用、瞬间放电电流大，能够反复充电的特点，可满足汽车启动的大电流需要。该应急电源又通过在大电流输出电路与电池组之间连接外接电池智能检测系统，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能；其电池组又连接有可输出多种电压等级的调压电路，通过将各路调压电路输出端与 MCU 控制电路连接，可以满足手机、电脑、数码相机、车载打

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气泵、车载冰箱、车载吸尘器等设备的户外供电需要；LED 灯可提供户外照明；该应急电源本身可通过外部电源充电，在无外部电源的情况下，也可以通过太阳能对其进行充电，这使得该应急电源在户外时，可以自动补充电能。同时，通过智能 LED 电量显示系统 14，可以实时检测该应急电源的电池组 4 的电量使用状态。

[0027] DC-DC12V 输出电路 10 的输出端连接有用于发出警报信号的报警系统 15、用于将电池组 4 输出的直流电转换为交流电的逆变器电路 17 以及用于给电池组 4 加热的智能加热系统 16。该报警系统 15 可以在用户迷路或者出现状况时由用户自行按下，报警系统 15 会通过指示灯的显示或者报警系统 15 发出声音提示周围，以达到求救的目的。其中，逆变器电路 17 输出的交流电的电压为 110V ～ 220V，可以很方便地将该应急电源与需要交流电供电的外部设备连接，电压匹配，无需再次调压，便于这种设备在户外使用时，电力不足的情况下提供电能，保证设备的正常工作。该逆变器电路 17 可以内置于壳体的内部，也可以在该壳体上设置连接逆变器电路 17 的接口，当需要提供交流电时，直接将外部的逆变器与该接口连接，即可实现直流转换成交流的目的，操作方便。另外，智能加热系统 16 包括缠绕于电池组 4 的外侧的加热丝或者加热膜，贴附于电池组 4 的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统的加热启动开关；加热丝或加热膜的电阻值的范围为 0.1Ω ～ 10Ω；使用时，预先设定电池组 4 表面的升温上限温度为 t，t 的范围为 0 ～ 70℃，当外部环境温度较低，且已经影响电源的正常供电时，打开加热启动开关，若通过热敏电阻反馈到 MCU 控制电路 14 的电池组 4 的表面温度小于 t，则控制加热丝或者加热膜的加热启动开关打开，加热丝或加热膜的两端导通电流，该智能加热系统 16 便开始对电池组 4 进行加热；加热前，预先设定加热的时间为一固定值 d，d 的范围为 10 ～ 300s；在加热的过程中，当电池组 4 的表面温度达到上限温度 t 时，控制加热丝或者加热膜的加热启动开关自动断开，阻断通过加热丝或加热膜两端的电流的通过，或者当加热的时间达到 d，则智能加热系统 16 的加热电路自动断开，完成对电池组 4 的加热。该智能加热系统 16 通过热敏电阻自身对热的敏感特性，准确地控制智能加热系统 16 的加热电路的导通与断开，有效提高加热效率，并降低加热消耗的电能。通过增加该智能加热系统 16，该应急电源可以在外部环境温度较低影响电源正常供电的情况下，仍然能保证电池组正常工作，向外部提供电能，提高了整个系统的可靠性。

[0028] 外接电池智能检测系统 6 包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的电压识别系统、及识别通过外接启动电路的电流的电流识别系统，其中，继电器的线圈的两端连接电压识别系统，继电器的输入端连接电压识别系统，继电器的输出端连接大电流输出电路 7，红黑电瓶夹通过可插拔防反接插头连接或通过焊接于电池组 4 正负极两端的导线连接，若红黑电瓶夹与可插拔防反接插头连接时，该可插拔防反接插头与电池组 4 的正负极连接，电压识别系统与红黑电瓶夹连接。本发明中的继电器为 12V 或 24V 继电器，电流规格为 20A ～ 300A，脚位为 4 ～ 6 个，外接电池智能检测系统 6 设置于该应急电源的外部，通过可插拔防反接插头与该应急电源连接，或者设置于应急电源的内部、而红黑电瓶夹设置于应急电源的外部。优选的，在本发明中，外接电池智能检测系统 6 设置于应急电源的内部、而红黑电瓶夹设置于应急电源的外部。红黑电瓶夹与电池组 4 之间通过硅胶线或者其他导线连接，以供与外部设备连接，通过红黑电瓶夹与外部电池连接，也可以有效防止插反或者红

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黑电瓶夹碰撞造成的短路。

[0029] 当红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，正的反馈电压为 a ～ b 的范围，a 为 6 ～ 24V，b 为 9 ～ 30V，取值时，应使 a 小于 b ；若为接反状态，继电器不工作，大电流输出电路 7 处于断开状态。若当外接电池智能检测系统 6 失效，为保证该应急电源的安全性，本发明的应急电源电路中，在电池组 4 与外接电池智能检测系统 6 之间串联连接有一次性或者可恢复的保险丝 5，该保险丝 5 的电流为 50A ～ 500A。为确保电池组 4 的充放电安全，电池组 4 的两端连接有均衡保护电路 3，对电池组 4 进行过流过载过充过放保护。

[0030] 在本发明中，当电压识别系统的反馈电压为 a ～ b，且为正值时，继电器的线圈接收到该电压信号，触点闭合，输出端与大电流输出电路 7 导通，该应急电源开始对外接的设备进行大电流供电，此时，电流识别系统检测经过大电流输出电路 7 的电流，若该电流小于 c 时，c 为 0. 1 ～ 10A，继电器的线圈两端的电压信号消失，触点断开，输出端断开与大电流输出电路 7 的连接，停止对外接的设备大电流放电。该大电流输出电路 7 的输出电压为 DC12V 或 DC24V，瞬间电流为 100A ～ 600A，可以作为应急状态下汽车的启动电源使用。通过在大电流输出电路 7 与电池组 4 之间连接外接电池智能检测系统 6，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能。该外接电池智能检测系统 6 可以内置于壳体的内部，也可以外接于壳体。

[0031] 如图 2、图 3 所示为外接电池智能检测系统 6 的电路原理图，其中，BT1 为充电电池，即电池组 4，BT2 为被充电汽车电池。

[0032] 具体地，电流识别系统的电路 62 包括 ：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，U3 的管脚 3 与 C12 的一端、RS 的一端、BT2 的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在一起。

[0033] 具体地，电压识别系统的电路 61 包括 ：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管

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脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

[0034] 具体地，继电器的电路 63 包括：三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14 的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

[0035] 当该应急电源与外部充电电池的连接断开，或电流小于设定的电流值时，电流识别系统的电路 62 中的 R15 和 R16 提供给 U3 检测信号，此时 U3 根据该检测信号发出一个输出信号给 MCU 控制芯片，以供 MCU 控制芯片判断电路的连接或断开的状态，以做出合适的指示；当输出电压低于预定值，在本发明中该电压的预定值为 8.1V 时，电压识别系统的电路 61 中的电阻 R7、R8 会提供检测信号给 U2，U2 根据该检测信号发出一个输出信号给 IN1 端，MCU 控制芯片根据 IN1 端的信号，进而控制继电器的电路 63 中的控制开关 Q2；而当输出电压高于预定值，在本发明中，该电压的预定值为 12.6V 时，电压识别系统的电路 61 中的电阻 R9、R10 会提供检测信号给 U2，U2 根据该检测信号发出一个信号控制继电器的电路 63 中的控制开关 Q3。在本发明中，通过电压识别系统的电路 61，电流识别系统的电路 62 的共同作用，给予 MCU 控制芯片信号，可通过 MCU 控制芯片的判断，最终实现控制继电器的电路 63 中的 Q1、Q2 和 Q3 的目的，进而达到充电和保护的效果。

[0036] 以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

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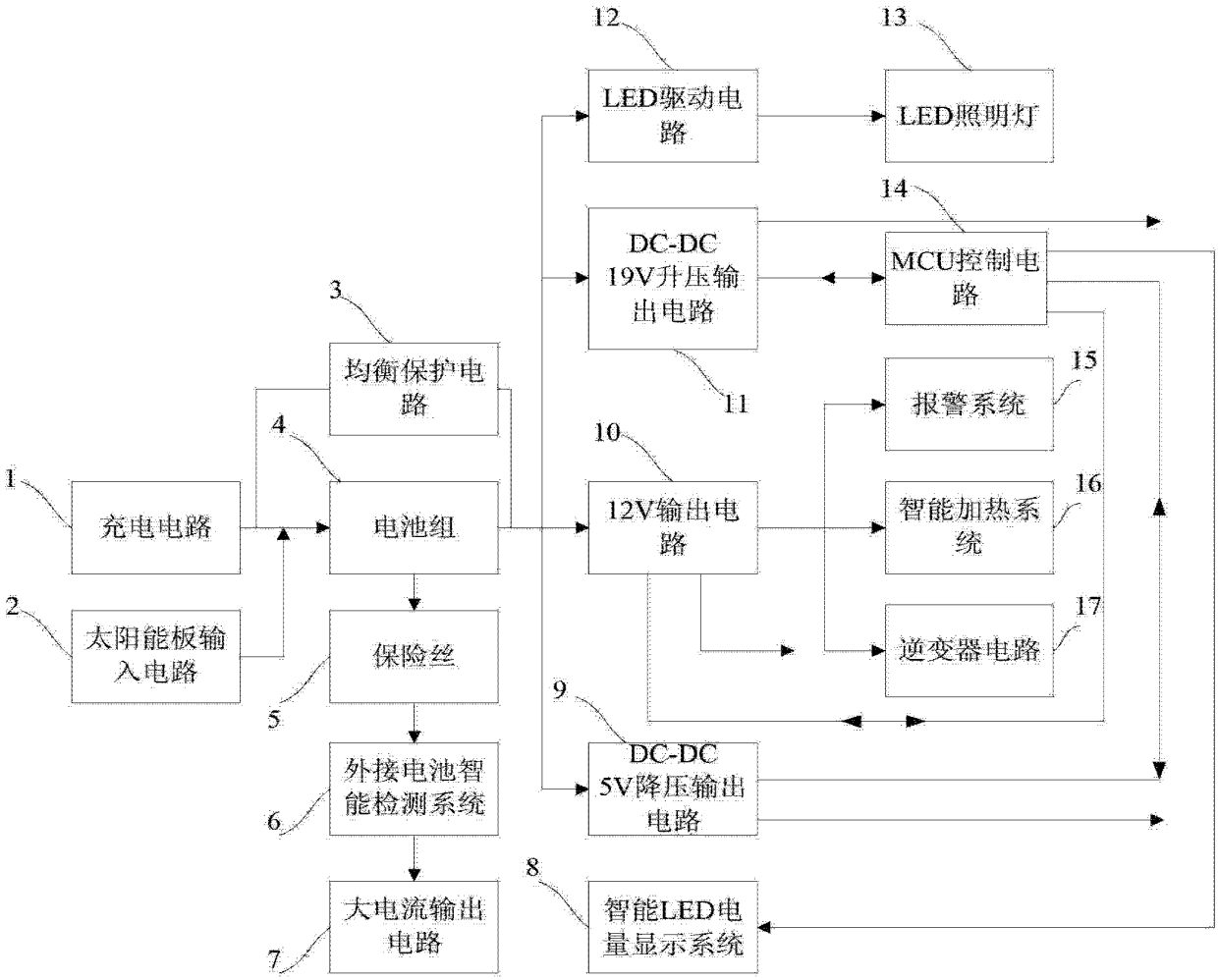


图 1

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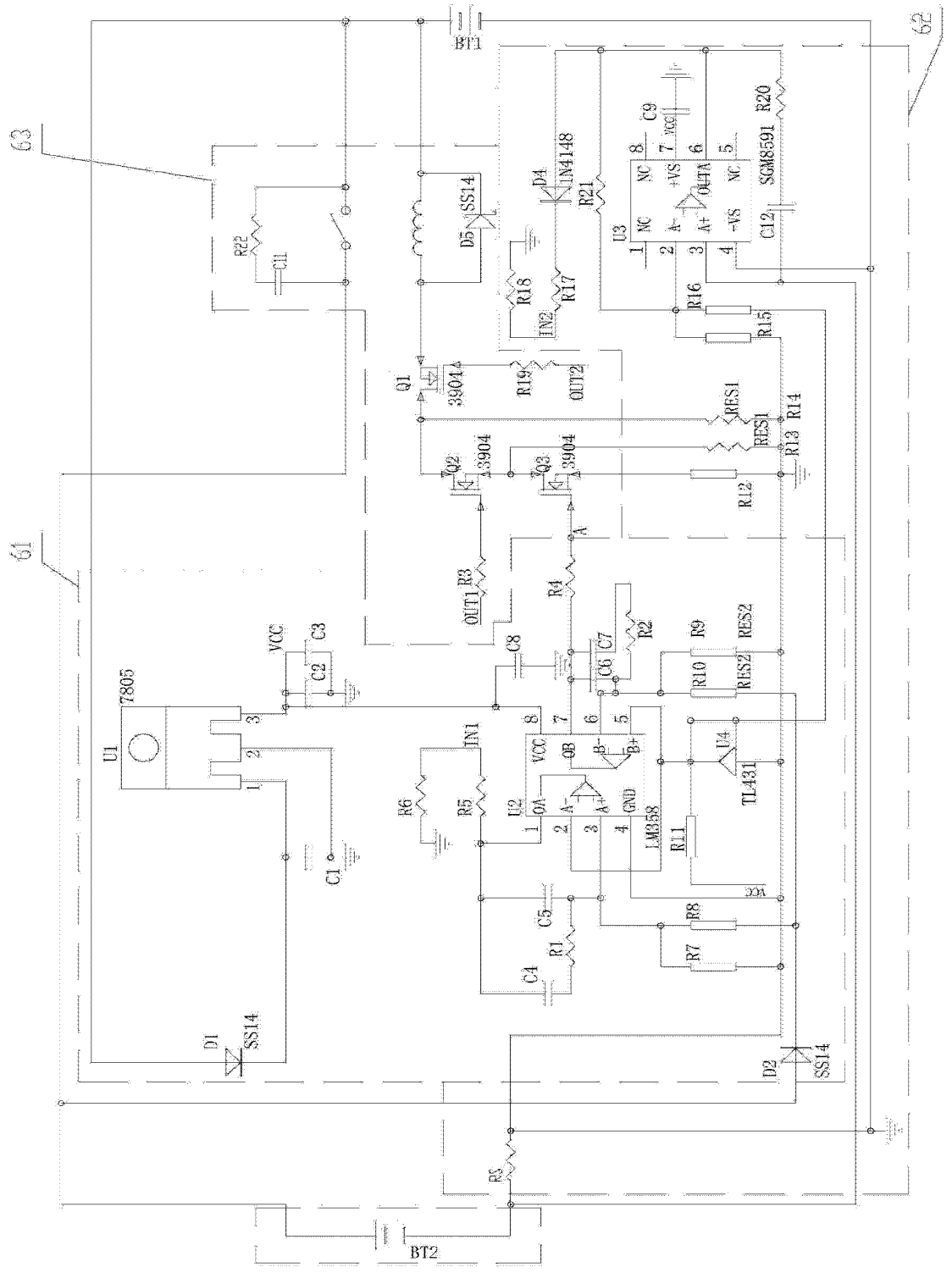


图 2

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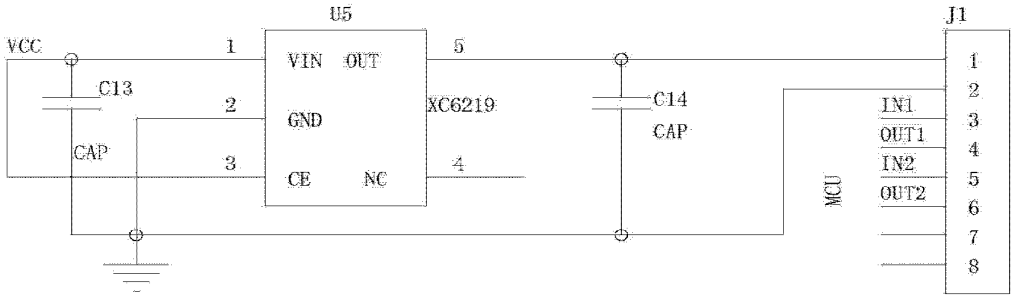


图 3

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/820,040	07/23/2020 09:59:12 PM ET	054985-000055-US-02-02

Title of Invention

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1056	FILED BY	Lisa Elliott
PATENT CENTER #	60058526	FILING DATE	03/16/2020
CUSTOMER #	20230	FIRST NAMED INVENTOR	Jonathan Lewis NOOK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	William Klima

Documents

TOTAL DOCUMENTS: 38

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IDS_TOBEFILED__02-02.pdf	10	Information Disclosure Statement (IDS) Form (SB08)	1056 KB
02-B_npl_ex 1013.PDF	1	Non Patent Literature	265 KB
05_npl_10-19-17.PDF	1	Non Patent Literature	31 KB
10_npl_05-21-20.PDF	4	Non Patent Literature	139 KB
CN103066662A.PDF	15	Foreign Reference	1714 KB
04_npl_10-19-17.PDF	1	Non Patent Literature	31 KB
06_npl_10-19-17.PDF	1	Non Patent Literature	31 KB

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

08_npl_01-15-2018.PDF	1	Non Patent Literature	21 KB
09_npl_09-13-18.PDF	1	Non Patent Literature	29 KB
11_npl_11-03-2014.PDF	2	Non Patent Literature	95 KB
20_npl_deltran_s invalidity contentions-C2_05-13-2020.PDF	141	Non Patent Literature	4969 KB
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14_npl_evidence in support_australian opposition #1.PDF	24	Non Patent Literature	5062 KB
WO2011113734A1.PDF	18	Foreign Reference	952 KB
Segment 002 of 01C_npl_ipr#1_ex1010.PDF	44	Non Patent Literature	24231 KB
12_npl_statement of grounds of particulars.PDF	6	Non Patent Literature	197 KB
18_npl_statement of grounds and particulars_australian opposition #2.PDF	8	Non Patent Literature	244 KB
23_npl_amended final invalidity contentions_09-23-2019.PDF	5	Non Patent Literature	154 KB
AU2015258229A1.PDF	32	Foreign Reference	1690 KB
AU2016269555A1.PDF	32	Foreign Reference	1689 KB
EP0616409A2.PDF	7	Foreign Reference	576 KB
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#1.PDF			
WO2012036556A1.PDF	19	Foreign Reference	1117 KB
WO2012080996A1.PDF	29	Foreign Reference	1641 KB
WO2014106407A1.PDF	30	Foreign Reference	2114 KB
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Segment 001 of 01C_npl_ipr#1_ex1010.PDF	42	Non Patent Literature	24368 KB
Letter_Examiner_re_IDS_filed_in_Parent 02-02.pdf	1	Miscellaneous Incoming Letter	116 KB
IDS_FILEDINPARENT__02-02.pdf	14	Information Disclosure Statement (IDS) Form (SB08)	1215 KB
02-A_npl_ipr#1_ex 1012.PDF	1	Non Patent Literature	235 KB
03_npl_10-19-17.PDF	1	Non Patent Literature	31 KB
AU2019201081A1.PDF	63	Foreign Reference	3438 KB
02-C_npl_ipr#2_ex 1015.PDF	28	Non Patent Literature	379 KB
02_npl_petition_ipr2020-00944_ipr#2.PDF	105	Non Patent Literature	1065 KB
07_npl_10-30-17.PDF	1	Non Patent Literature	31 KB
01-B_npl_ipr#1_ex1009.PDF	17	Non Patent Literature	2745 KB
22_npl_deltran USA LLC_s invalidity contentions_06-19-2019.PDF	8	Non Patent Literature	159 KB

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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Digest

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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.

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2014 年 7 月 10 日 (10.07.2014)

WIPO | PCT

(10) 国际公布号
WO 2014/106407 A1

(51) 国际专利分类号:
H02J 7/00 (2006.01) *H02J 9/00* (2006.01)

(21) 国际申请号: PCT/CN2013/086774

(22) 国际申请日: 2013 年 11 月 8 日 (08.11.2013)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
201310004817.1 2013 年 1 月 7 日 (07.01.2013) CN

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(81) 指定国 (除另有指明，要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

(84) 指定国 (除另有指明，要求每一种可提供的地区保护): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

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(54) **Title**: EMERGENCY POWER SOURCE

(54) **发明名称** : 应急电源

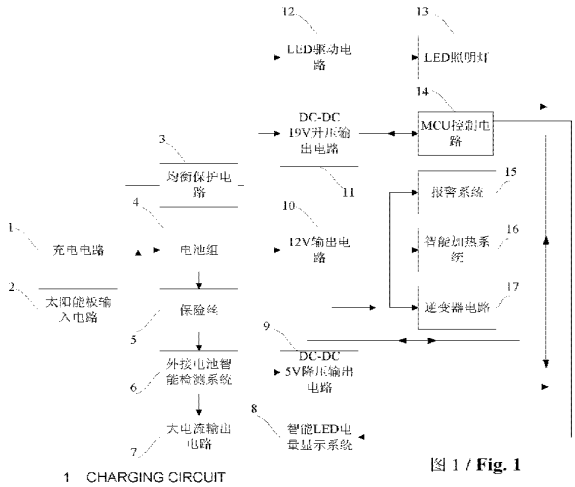


图 1 / **Fig. 1**

1 CHARGING CIRCUIT
2 SOLAR ENERGY PANEL INPUT CIRCUIT
3 EQUALIZATION PROTECTION CIRCUIT
4 BATTERY PACK
5 FUSE
6 EXTERNAL BATTERY INTELLIGENT DETECTION SYSTEM
7 HEAVY-CURRENT OUTPUT CIRCUIT
8 INTELLIGENT LED ELECTRIC-QUANTITY DISPLAY SYSTEM
9 DC-DC 5 V VOLTAGE-DROP OUTPUT CIRCUIT
10 12 V OUTPUT CIRCUIT
11 DC-DC 19 V VOLTAGE-BOOST OUTPUT CIRCUIT
12 LED DRIVE CIRCUIT
13 LED ILLUMINATION LAMP
14 MCU CONTROL CIRCUIT
15 ALARM SYSTEM
16 INTELLIGENT HEATING SYSTEM
17 INVERTER CIRCUIT

(57) Abstract: An emergency power source comprises a housing. A battery pack (4) is arranged in the housing for storing electric energy. The input end of the battery pack (4) is connected to a charging circuit (1) for charging the battery pack (4) and the output end of a solar energy panel input circuit (2), the output end of the battery pack (4) is connected to a heavy-current output circuit (7) for outputting a heavy current when an automobile starts, and an external battery intelligent detection system (6) is connected between the battery pack (4) and the heavy-current output circuit (7). The emergency power source is convenient for charging, can output a heavy current for starting an automobile, and can also accurately control heavy-current output.

(57) 摘要: 一种应急电源，包括壳体，壳体的内部设置有用于储存电能的电池组（4），电池组（4）的输入端与用于给电池组（4）充电的充电电路（1）和太阳能板输入电路（2）的输出端连接，电池组（4）的输出端连接有用于汽车启动时输出大电流的大电流输出电路（7），电池组（4）与大电流输出电路（7）之间连接有外接电池智能检测系统（6）。应急电源自身充电方便，可以大电流输出用于汽车启动，还能准确控制大电流输出。

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

本国际公布:

— 包括国际检索报告(条约第 21 条(3))。

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

应急电源

技术领域

本发明属于直流电源领域，具体涉及一种可为多种设备提供电源的应急电源。

背景技术

随着科技的日新月异，人们生活水平的日益提高，汽车、手机、电脑、数码相机等成为人们生活、出游以及旅行必备的物品，它们均采用电池供电，一旦失去电源，将完全丧失其具有的功能，给人们的生活带来诸多不便。因此，对应每种产品，厂家均提供有相应的充电器，能够将 220v 的市电转换成相应电压的直流电源对其进行充电，但是这种充电器无法满足户外充电的需求。尤其对于汽车而言，常常会遇到打不着火的问题，特别是在旅途中的汽车，因电瓶电量不足或者温度过低很难打着火，给使用者带来很多不便。

现有中国专利文献 CN 101685974 A 公开了一种移动电源，包括电池组、充电电路、MCU 微控制电路、DC-DC 调压输出电路，所述充电电路设有可与外部电源连接的输入端，所述充电电路设有的输出端与电池组电连接，电池组同时与 MCU 微控制电路和 DC-DC 调压输出电路电连接，MCU 微控制电路电连接并控制充电电路和 DC-DC 调压输出电路，采用上述技术方案的有益效果是：线路简洁、体积较小、轻巧便于携带、易操控、智能化、功率损耗低和多功能，既可以利用市电充电，又可以通过更换不同的输出转换头给多种电子产品供电或充电，管理、携带和使用方便。该申请专利解决了多种电压等级的输出且具有自充电功能，但其不具备大电流输出能力，不能作为汽车启动电源，另外，该申请文件中的电流输出后均为直流电，而在现实中，也有很多外部设备是需

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要输入交流电，所以该申请专利也无法解决这类设备的临时供电问题。

发明内容

本发明的目的在于提出一种自身充电方便、可大电流输出用于汽车启动，并能准确控制大电流输出的应急电源。

为达到此目的，本发明采用以下技术方案：

一种应急电源，包括壳体，所述壳体的内部设置有用于储存电能的电池组，所述电池组的输入端与用于给所述电池组充电的充电电路、太阳能板输入电路的输出端连接，所述电池组的输出端连接有用于汽车启动时输出大电流的大电流输出电路，所述电池组与所述大电流输出电路之间连接有外接电池智能检测系统。

其中，所述电池组由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路，每路所述 DC-DC 调压电路均与 MCU 控制电路连接，所述 MCU 控制电路还连接有用于显示该应急电源的电量的智能 LED 电量显示系统，所述 LED 驱动电路的输出端连接有 LED 照明灯，所述电池组的两端并联有用于保护所述电池组的均衡保护电路。

其中，所述外接电池智能检测系统包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的电压识别系统、及识别通过外接启动电路的电流的电流识别系统，所述继电器的线圈的两端连接所述电压识别系统，所述继电器的输入端连接电压识别系统，所述继电器的输出端连接所述大电流输出电路，所述红黑电瓶夹通过可插拔防反接插头连接或通过焊接于所述电池组正负极两端的导线连接，所述可插拔防反接插头与所述电池组的正负极连接，所述电压识别系统

与所述红黑电瓶夹连接，所述继电器为 12V 或 24V 继电器，电流规格为 20A～300A，脚位为 4～6 个，所述外接电池智能检测系统设置于所述应急电源的外部，通过可插拔防反接插头与所述应急电源连接，或者设置于所述应急电源的内部、红黑电瓶夹设置于所述应急电源的外部。

其中，所述红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，所述电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，所述正的反馈电压为 a～b 的范围，所述 a 为 6～24V，b 为 9～30V，取值时，a 小于 b；当反馈电压为 a～b，且为正值时，所述继电器的线圈得到电信号，触点闭合，输出端与所述大电流输出电路的输入端导通，该应急电源开始对外接的设备进行大电流供电，此时，所述电流识别系统检测经过所述大电流输出电路的电流，若该电流小于 c 时，c 为 0.1～10A，所述继电器的线圈两端的电信号消失，触点断开，输出端断开与所述大电流输出电路的连接，停止对外接的设备大电流放电，所述大电流输出电路的输出电压为 DC12V 或 DC24V，瞬间电流为 100A～600A。

其中，所述 DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路、输出电压为 12V 的 DC-DC12V 输出电路以及输出电压为 5V 的 DC-DC5V 降压输出电路。

其中，所述 DC-DC12V 输出电路的输出端连接有用于发出警报信号的报警系统、用于将所述电池组输出的直流电转换为交流电的逆变器电路以及用于给所述电池组加热的智能加热系统。

其中，所述逆变器电路输出的交流电的电压为 110V～220V，所述逆变器电路内置于所述壳体的内部或者外接于所述壳体。

其中，所述智能加热系统包括缠绕于所述电池组的外侧的加热丝或者加热

膜，贴附于所述电池组的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统的加热启动开关；所述的加热丝或加热膜的电阻值的范围为0.1Ω～10Ω；预先设定所述电池组表面的升温上限温度为 t，t 的范围为 0～70℃，此时，打开加热启动开关，若通过所述热敏电阻反馈到所述 MCU 控制电路的所述电池组的表面温度小于 t，则加热启动开关打开，加热丝或加热膜的两端导通电流，开始对所述电池组进行加热，预先设定加热的时间为一固定值 d，d 的范围为 10～300s，当所述电池组的表面温度达到上限温度 t 时，加热启动开关自动断开，或者当加热的时间达到 d 时，智能加热系统的加热电路自动断开。

其中，所述壳体为塑胶材质、铝合金材质或混合材质的外壳，所述太阳能板输入电路设置于所述壳体的外侧，所述太阳能板输入电路的功率为 0.5W～50W，输入电压为 5V～25V。

其中，所述电池组的输出端与所述外接电池智能检测系统之间还连接有一次性或者可恢复的保险丝，所述保险丝的电流为 50A～500A。

其中，所述电流识别系统的电路包括：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，U3 的管脚 3 与 C12 的一端、RS 的一端、BT2 的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在

一起。

其中，所述电压识别系统的电路包括：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

其中，所述继电器的电路包括：三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14

的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

本发明的有益效果为：本发明的应急电源采用锂离子电池作为电池组，具有重量轻、体积小、耐用、瞬间放电电流大，能够反复充电的特点，可满足汽车启动的大电流需要，通过在大电流输出电路与电池组之间连接外接电池智能检测系统，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能。该应急电源的电池组又连接有可输出多种电压等级的调压电路，通过将各路调压电路输出端与MCU控制电路连接，可以满足手机、电脑、数码相机、车载打气泵、车载冰箱、车载吸尘器等设备的户外供电需要；LED灯可提供户外照明；该应急电源本身可通过外部电源充电，也可以通过太阳能对其进行充电，这使得该应急电源在户外时，可以自动补充电能。另外，该应急电源自身设置有报警系统，当用户迷路或者出现状况时自行按下报警系统，报警系统会通过指示灯的显示或者报警系统发出声音提示周围，以达到求救的目的；该应急电源还连接有逆变器电路和智能加热系统，其中，逆变器电路可以将电池组输出的直流电转换为交流电，以便户外时需要交流电的设备电力不足时供电，而智能加热系统通过加热丝或加热膜以及热敏电阻，可以在外部环境温度较低

影响电源正常供电的情况下，对电源的电池组进行加热，保证电池组在低温环境下也可以正常工作，向外部提供电能。同时，该应急电源设置有红黑电瓶夹，可有效防止在于外部需要救援的电池时将正负极接反，为使用者提供便利。

附图说明

图 1 是本发明应急电源的原理示意图；

图 2 是本发明应急电源的外接电池智能检测系统的电路原理图一；

图 3 是图 2 中的外接电池智能检测系统的电路原理图二。

图中：1-充电电路；2-太阳能板输入电路；3-均衡保护电路；4-电池组；5-保险丝；6-外接电池智能检测系统；7-大电流输出电路；8-智能 LED 电量显示系统；9-DC-DC5V 降压输出电路；10-12V 输出电路；11-DC-DC19V 升压输出电路；12-LED 驱动电路；13-LED 照明灯；14-MCU 控制电路；15-报警系统；16-智能加热系统；17-逆变器电路；61-电压识别系统的电路；62-电流识别系统的电路；63-继电器的电路。

具体实施方式

下面结合附图和具体实施例对本发明作进一步说明。

如图 1 至图 3 所示，一种应急电源，包括壳体，壳体的内部设置有用于储存电能的电池组 4，电池组 4 的输入端与用于给电池组 4 充电的充电电路 1、太阳能板输入电路 2 的输出端连接，电池组 4 的输出端连接有用于汽车启动时输出大电流的大电流输出电路 7，电池组 4 与大电流输出电路 7 之间连接有外接电池智能检测系统 6。进一步地，电池组 4 由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路 12，每路 DC-DC 调压电路均与 MCU 控制电路 14 连接，MCU 控制电路 14 还连接有用于显示该

应急电源的电量的智能 LED 电量显示系统 8，LED 驱动电路 12 的输出端连接有 LED 照明灯 13，电池组 4 的两端并联有用于保护所述电池组 4 的均衡保护电路 3。其中，DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路 11、输出电压为 12V 的 DC-DC12V 输出电路 10 以及输出电压为 5V 的 DC-DC5V 降压输出电路 9。另外，本发明中的壳体为塑胶材质、铝合金材质或混合材质的外壳，太阳能板输入电路 2 设置于壳体的外侧，太阳能板输入电路 2 的功率为 0.5W～50W，输入电压为 5V～25V。

该应急电源采用锂离子电池组成的电池组，具有重量轻、体积小、耐用、瞬间放电电流大，能够反复充电的特点，可满足汽车启动的大电流需要。该应急电源又通过在大电流输出电路与电池组之间连接外接电池智能检测系统，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能；其电池组又连接有可输出多种电压等级的调压电路，通过将各路调压电路输出端与 MCU 控制电路连接，可以满足手机、电脑、数码相机、车载打气泵、车载冰箱、车载吸尘器等设备的户外供电需要；LED 灯可提供户外照明；该应急电源本身可通过外部电源充电，在无外部电源的情况下，也可以通过太阳能对其进行充电，这使得该应急电源在户外时，可以自动补充电能。同时，通过智能 LED 电量显示系统 14，可以实时检测该应急电源的电池组 4 的电量使用状态。

DC-DC12V 输出电路 10 的输出端连接有用于发出警报信号的报警系统 15、用于将电池组 4 输出的直流电转换为交流电的逆变器电路 17 以及用于给电池组 4 加热的智能加热系统 16。该报警系统 15 可以在用户迷路或者出现状况时由用户自行按下，报警系统 15 会通过指示灯的显示或者报警系统 15 发出声音提示周围，以达到求救的目的。其中，逆变器电路 17 输出的交流电的电压为 110V～220V，可以很方便地将该应急电源与需要交流电供电的外部设备连接，电压匹

配，无需再次调压，便于这种设备在户外使用时，电力不足的情况下提供电能，保证设备的正常工作。该逆变器电路 17 可以内置于壳体的内部，也可以在该壳体上设置连接逆变器电路 17 的接口，当需要提供交流电时，直接将外部的逆变器与该接口连接，即可实现直流转换成交流的目的，操作方便。另外，智能加热系统 16 包括缠绕于电池组 4 的外侧的加热丝或者加热膜，贴附于电池组 4 的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统的加热启动开关；加热丝或加热膜的电阻值的范围为 0.1Ω～10Ω；使用时，预先设定电池组 4 表面的升温上限温度为 t，t 的范围为 0～70℃，当外部环境温度较低，且已经影响电源的正常供电时，打开加热启动开关，若通过热敏电阻反馈到 MCU 控制电路 14 的电池组 4 的表面温度小于 t，则控制加热丝或者加热膜的加热启动开关打开，加热丝或加热膜的两端导通电流，该智能加热系统 16 便开始对电池组 4 进行加热；加热前，预先设定加热的时间为一固定值 d，d 的范围为 10～300s；在加热的过程中，当电池组 4 的表面温度达到上限温度 t 时，控制加热丝或者加热膜的加热启动开关自动断开，阻断通过加热丝或加热膜两端的电流的通过，或者当加热的时间达到 d，则智能加热系统 16 的加热电路自动断开，完成对电池组 4 的加热。该智能加热系统 16 通过热敏电阻自身对热的敏感特性，准确地控制智能加热系统 16 的加热电路的导通与断开，有效提高加热效率，并降低加热消耗的电能。通过增加该智能加热系统 16，该应急电源可以在外部环境温度较低影响电源正常供电的情况下，仍然能保证电池组正常工作，向外部提供电能，提高了整个系统的可靠性。

外接电池智能检测系统 6 包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的电压识别系统、及识别通过外接启动电路的电流的电流识别系统，其

中，继电器的线圈的两端连接电压识别系统，继电器的输入端连接电压识别系统，继电器的输出端连接大电流输出电路 7，红黑电瓶夹通过可插拔防反接插头连接或通过焊接于电池组 4 正负极两端的导线连接，若红黑电瓶夹与可插拔防反接插头连接时，该可插拔防反接插头与电池组 4 的正负极连接，电压识别系统与红黑电瓶夹连接。本发明中的继电器为 12V 或 24V 继电器，电流规格为 20A～300A，脚位为 4～6 个，外接电池智能检测系统 6 设置于该应急电源的外部，通过可插拔防反接插头与该应急电源连接，或者设置于应急电源的内部、而红黑电瓶夹设置于应急电源的外部。优选的，在本发明中，外接电池智能检测系统 6 设置于应急电源的内部、而红黑电瓶夹设置于应急电源的外部。红黑电瓶夹与电池组 4 之间通过硅胶线或者其他导线连接，以供与外部设备连接，通过红黑电瓶夹与外部电池连接，也可以有效防止插反或者红黑电瓶夹碰撞造成的短路。

当红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，正的反馈电压为 a～b 的范围，a 为 6～24V，b 为 9～30V，取值时，应使 a 小于 b；若为接反状态，继电器不工作，大电流输出电路 7 处于断开状态。若当外接电池智能检测系统 6 失效，为保证该应急电源的安全性，本发明的应急电源电路中，在电池组 4 与外接电池智能检测系统 6 之间串联连接有一次性或者可恢复的保险丝 5，该保险丝 5 的电流为 50A～500A。为确保电池组 4 的充放电安全，电池组 4 的两端连接有均衡保护电路 3，对电池组 4 进行过流过载过充过放保护。

在本发明中，当电压识别系统的反馈电压为 a～b，且为正值时，继电器的线圈接收到该电压信号，触点闭合，输出端与大电流输出电路 7 导通，该应急电源开始对外接的设备进行大电流供电，此时，电流识别系统检测经过大电流

输出电路 7 的电流，若该电流小于 c 时，c 为 0.1～10A，继电器的线圈两端的电压信号消失，触点断开，输出端断开与大电流输出电路 7 的连接，停止对外接的设备大电流放电。该大电流输出电路 7 的输出电压为 DC12V 或 DC24V，瞬间电流为 100A～600A，可以作为应急状态下汽车的启动电源使用。通过在大电流输出电路 7 与电池组 4 之间连接外接电池智能检测系统 6，可有效地控制对外接设备的大电流供电，准确可靠，有效利用电源的电能。该外接电池智能检测系统 6 可以内置于壳体的内部，也可以外接于壳体。

如图 2、图 3 所示为外接电池智能检测系统 6 的电路原理图，其中，BT1 为充电电池，即电池组 4，BT2 为被充电汽车电池。

具体地，电流识别系统的电路 62 包括：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，U3 的管脚 3 与 C12 的一端、RS 的一端、BT2 的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在一起。

具体地，电压识别系统的电路 61 包括：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，

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型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

具体地，继电器的电路 63 包括：三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14 的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连

接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

当该应急电源与外部充电电池的连接断开，或电流小于设定的电流值时，电流识别系统的电路 62 中的 R15 和 R16 提供给 U3 检测信号，此时 U3 根据该检测信号发出一个输出信号给 MCU 控制芯片，以供 MCU 控制芯片判断电路的连接或断开的状态，以做出合适的指示；当输出电压低于预定值，在本发明中该电压的预定值为 8.1V 时，电压识别系统的电路 61 中的电阻 R7、R8 会提供检测信号给 U2，U2 根据该检测信号发出一个输出信号给 IN1 端，MCU 控制芯片根据 IN1 端的信号，进而控制继电器的电路 63 中的控制开关 Q2；而当输出电压高于预定值，在本发明中，该电压的预定值为 12.6V 时，电压识别系统的电路 61 中的电阻 R9、R10 会提供检测信号给 U2，U2 根据该检测信号发出一个信号控制继电器的电路 63 中的控制开关 Q3。在本发明中，通过电压识别系统的电路 61，电流识别系统的电路 62 的共同作用，给予 MCU 控制芯片信号，可通过 MCU 控制芯片的判断，最终实现控制继电器的电路 63 中的 Q1、Q2 和 Q3 的目的，进而达到充电和保护的效果。

以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

权 利 要 求 书

1、一种应急电源，包括壳体，所述壳体的内部设置有用于储存电能的电池组（4），其特征在于：所述电池组（4）的输入端与用于给所述电池组（4）充电的充电电路（1）、太阳能板输入电路（2）的输出端连接，所述电池组（4）的输出端连接有用于汽车启动时输出大电流的大电流输出电路（7），所述电池组（4）与所述大电流输出电路（7）之间连接有外接电池智能检测系统（6）。

2、根据权利要求 1 所述的一种应急电源，其特征在于：所述电池组（4）由以磷酸铁锂、钴酸锂、镍钴锰三元锂或锰酸锂为正极，以人造或天然石墨为负极的锂离子电芯串联或并联组成，其输出端还连接有多路 DC-DC 调压电路以及 LED 驱动电路（12），每路所述 DC-DC 调压电路均与 MCU 控制电路（14）连接，所述 MCU 控制电路（14）还连接有用于显示该应急电源的电量的智能 LED 电量显示系统（8），所述 LED 驱动电路（12）的输出端连接有 LED 照明灯（13），所述电池组（4）的两端并联有用于保护所述电池组（4）的均衡保护电路（3）。

3、根据权利要求 1 所述的一种应急电源，其特征在于：所述外接电池智能检测系统（6）包括用于连接外接电池的红黑电瓶夹、根据检测信号控制电路导通或断开的继电器、用于识别外接铅酸电瓶或锂离子启动电池的电压的电压识别系统、及识别通过外接启动电路的电流的电流识别系统，所述继电器的线圈的两端连接所述电压识别系统，所述继电器的输入端连接电压识别系统，所述继电器的输出端连接所述大电流输出电路（7），所述红黑电瓶夹通过可插拔防反接插头连接或通过焊接于所述电池组（4）正负极两端的导线连接，所述可插拔防反接插头与所述电池组（4）的正负极连接，所述电压识别系统与所述红黑电瓶夹连接，所述继电器为 12V 或 24V 继电器，电流规格为 20A～300A，脚位为 4～6 个，所述外接电池智能检测系统（6）设置于所述应急电源的外部，通

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过可插拔防反接插头与所述应急电源连接，或者设置于所述应急电源的内部、而红黑电瓶夹设置于所述应急电源的外部。

4、根据权利要求 3 所述的一种应急电源，其特征在于：所述红黑电瓶夹分别与外部电池的正负极极柱连接时，若为接对状态，所述电压识别系统显示的反馈电压为正，否则反馈电压为负，其中，所述正的反馈电压为 a～b 的范围，所述 a 为 6～24V，b 为 9～30V，取值时，a 小于 b；当反馈电压为 a～b，且为正值时，所述继电器的线圈得到电信号，触点闭合，输出端与所述大电流输出电路（7）导通，该应急电源开始对外接的设备进行大电流供电，此时，所述电流识别系统检测经过所述大电流输出电路（7）的电流，若该电流小于 c 时，c 为 0.1～10A，所述继电器的线圈两端的电信号消失，触点断开，输出端断开与所述大电流输出电路（7）的连接，停止对外接的设备大电流放电，所述大电流输出电路（7）的输出电压为 DC12V 或 DC24V，瞬间电流为 100A～600A。

5、根据权利要求 2 所述的一种应急电源，其特征在于：所述 DC-DC 调压电路包括输出电压为 19V 的 DC-DC19V 升压输出电路（11）、输出电压为 12V 的 DC-DC12V 输出电路（10）以及输出电压为 5V 的 DC-DC5V 降压输出电路（9）。

6、根据权利要求 5 所述的一种应急电源，其特征在于：所述 DC-DC12V 输出电路（10）的输出端连接有用于发出警报信号的报警系统（15）、用于将所述电池组（4）输出的直流电转换为交流电的逆变器电路（17）以及用于给所述电池组（4）加热的智能加热系统（16）。

7、根据权利要求 6 所述的一种应急电源，其特征在于：所述逆变器电路（17）输出的交流电的电压为 110V～220V，所述逆变器电路（17）内置于所述壳体的内部或者外接于所述壳体。

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8、根据权利要求 6 所述的一种应急电源，其特征在于：所述智能加热系统（16）包括缠绕于所述电池组（4）的外侧的加热丝或者加热膜，贴附于所述电池组（4）的外表面并与加热丝或加热膜连接的热敏电阻，及启动智能加热系统（16）的加热启动开关；所述的加热丝或加热膜的电阻值的范围为 0.1Ω～10Ω；预先设定所述电池组（4）表面的升温上限温度为 t，t 的范围为 0～70℃，此时，打开加热启动开关，若通过所述热敏电阻反馈到所述 MCU 控制电路（14）的所述电池组（4）的表面温度小于 t，则加热启动开关打开，加热丝或加热膜的两端导通电流，开始对所述电池组（4）进行加热，预先设定加热的时间为一固定值 d，d 的范围为 10～300s，当所述电池组（4）的表面温度达到上限温度 t 时，加热启动开关自动断开，或者当加热的时间达到 d 时，智能加热系统的加热电路自动断开。

9、根据权利要求 1 所述的一种应急电源，其特征在于：所述壳体为塑胶材质、铝合金材质或混合材质的外壳，所述太阳能板输入电路（2）设置于所述壳体的外侧，所述太阳能板输入电路（2）的功率为 0.5W～50W，输入电压为 5V～25V。

10、根据权利要求 1 所述的一种应急电源，其特征在于：所述电池组（4）的输出端与所述外接电池智能检测系统（6）之间还连接有一次性或者可恢复的保险丝（5），所述保险丝（5）的电流为 50A～500A。

11、根据权利要求 3 所述的一种应急电源，其特征在于，所述电流识别系统的电路（62）包括：高精度运算放大器 U3，型号是 SGM8591，电阻 R12、R13、R14、R15、R16、R17、R18、R20、R21、RS，电容 C9、C12，开关二极管 D4，型号是 IN4148，U3 的管脚 1 悬空，U3 的管脚 2 与 R16 的一端、R15 的一端、R21 的一端连接在一起，U3 的管脚 3 与 C12 的一端、RS 的一端、BT2

的负极连接在一起，U3 的管脚 4 与 BT1 的负极、RS 的另一端一起接地，U3 的管脚 5 悬空，U3 的管脚 6 与 R20 的一端、R21 的另一端、D4 的正极连接在一起，R20 的另一端与 C12 的另一端连接，U3 的管脚 7 与 VCC 端、C9 的一端连接在一起，C9 的另一端接地，U3 的管脚 8 悬空，D4 的负极接 R17 的一端，R17 的另一端与 R18 的一端、IN2 端连接在一起，R18 的另一端接地，R15 的另一端与 R12 的一端、R13 的一端、R14 的一端连接在一起。

12、根据权利要求 11 所述的一种应急电源，其特征在于：所述电压识别系统的电路（61）包括：双运算放大器 U2，型号是 LM358，三端稳压电路 U1，型号是 7805，电阻 R1、R2、R4、R5、R6、R7、R8、R9、R10、R11，电容 C1、C2、C3、C4、C5、C6、C7、C8，肖特基二极管 D1、D2，型号是 SS14，三端可调分流基准源 U4，型号为 TL431，U2 的管脚 1 与 R5 的一端、C5 的一端、C4 的一端连接在一起，R5 的另一端与 R6 的一端、IN1 端连接在一起，R6 的另一端接地，U2 的管脚 2 与 U2 的管脚 5、R11 的一端、U4 的阴极、U4 的参考极、R16 的另一端连接在一起，R11 的另一端接 VCC 端，U2 的管脚 3 与 C5 的另一端、R1 的一端、R7 的一端、R8 的一端连接在一起，R1 的另一端接 C4 另一端，U2 的管脚 4 与 R7 的另一端、U4 的阳极、R9 的一端一起接地，R8 的另一端与 D2 的负极、R10 的一端连接在一起，D2 的正极接 BT2 的正极，U2 的管脚 6 与 R10 的另一端、R9 的另一端、C6 的一端、R2 的一端连接在一起，U2 的管脚 7 与 C6 的另一端、C7 的一端、R4 的一端连接在一起，R4 的另一端接 A 点，C7 的另一端接 R2 的另一端，U2 的管脚 8 与 C8 的一端、C2 的一端、C3 的一端、U1 的管脚 3、VCC 端连接在一起，C8 的另一端接地，C2 的另一端和 C3 的另一端一起接地，U1 的管脚 1 与 C1 的一端、D1 的负极连接在一起，U1 的管脚 2 与 C1 的另一端一起接地，D1 的正极接 BT1 的正极。

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13、根据权利要求 12 所述的一种应急电源，其特征在于：所述继电器的电路（63）包括：三端稳压芯片 U5，型号是 XC6219，电阻 R3、R19、R22，电容 C11、C13、C14，肖特基二极管 D5，型号是 SS14，MCU 控制芯片 J1，控制开关 Q1、Q2、Q3，型号是 SI2300，继电器，U5 的管脚 1 与 C13 的一端、U5 的管脚 3、VCC 端连接在一起，U5 的管脚 2 与 C13 的另一端、C14 的一端、J1 的管脚 2 一起接地，U5 的管脚 4 悬空，U5 的管脚 5 与 C14 的另一端、J1 的管脚 1 连接在一起，J1 的管脚 3 接 IN1 端，J1 的管脚 4 接 OUT1 端，J1 的管脚 5 接 IN2 端，J1 的管脚 6 接 OUT2 端，J1 的管脚 7 悬空，J1 的管脚 8 悬空，OUT1 端接 R3 的一端，R3 的另一端接 Q2 的栅极，Q2 的漏极与 Q3 的源极、R13 的另一端连接在一起，Q3 的漏极接 R12 的另一端，Q3 的栅极连接 A 点，Q2 的源极与 Q1 的源极、R14 的另一端连接在一起，Q1 的栅极接 R19 的一端，R19 的另一端接 OUT2 端，Q1 的漏极与 D5 的正极、继电器线圈的一端连接在一起，D5 的负极、继电器线圈的另一端、继电器的常开接点的一端、R22 的一端与 BT1 的正极连接在一起，R22 的另一端接 C11 的一端，C11 的另一端与继电器的常开接点的另一端、BT2 的正极连接在一起。

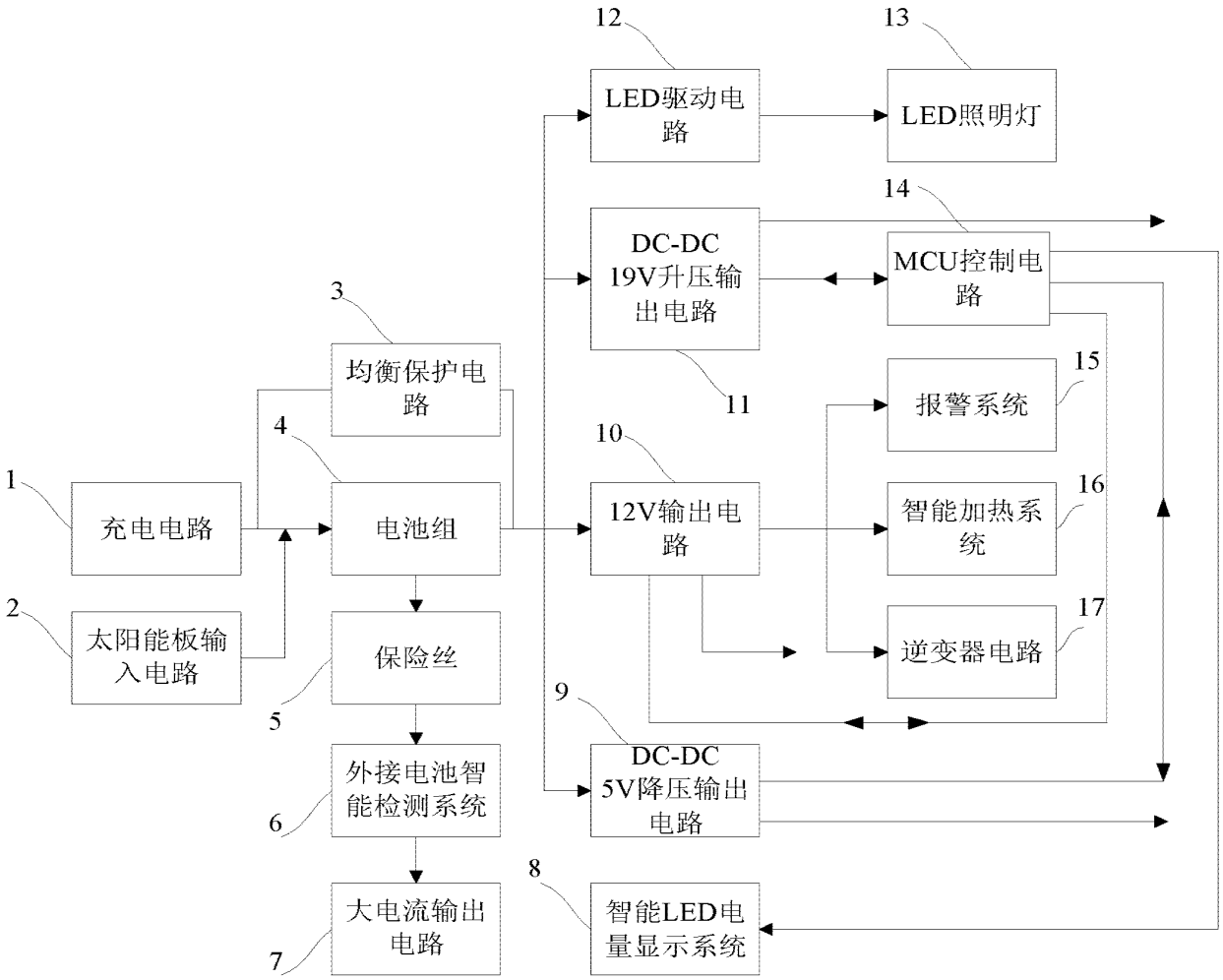


图 1

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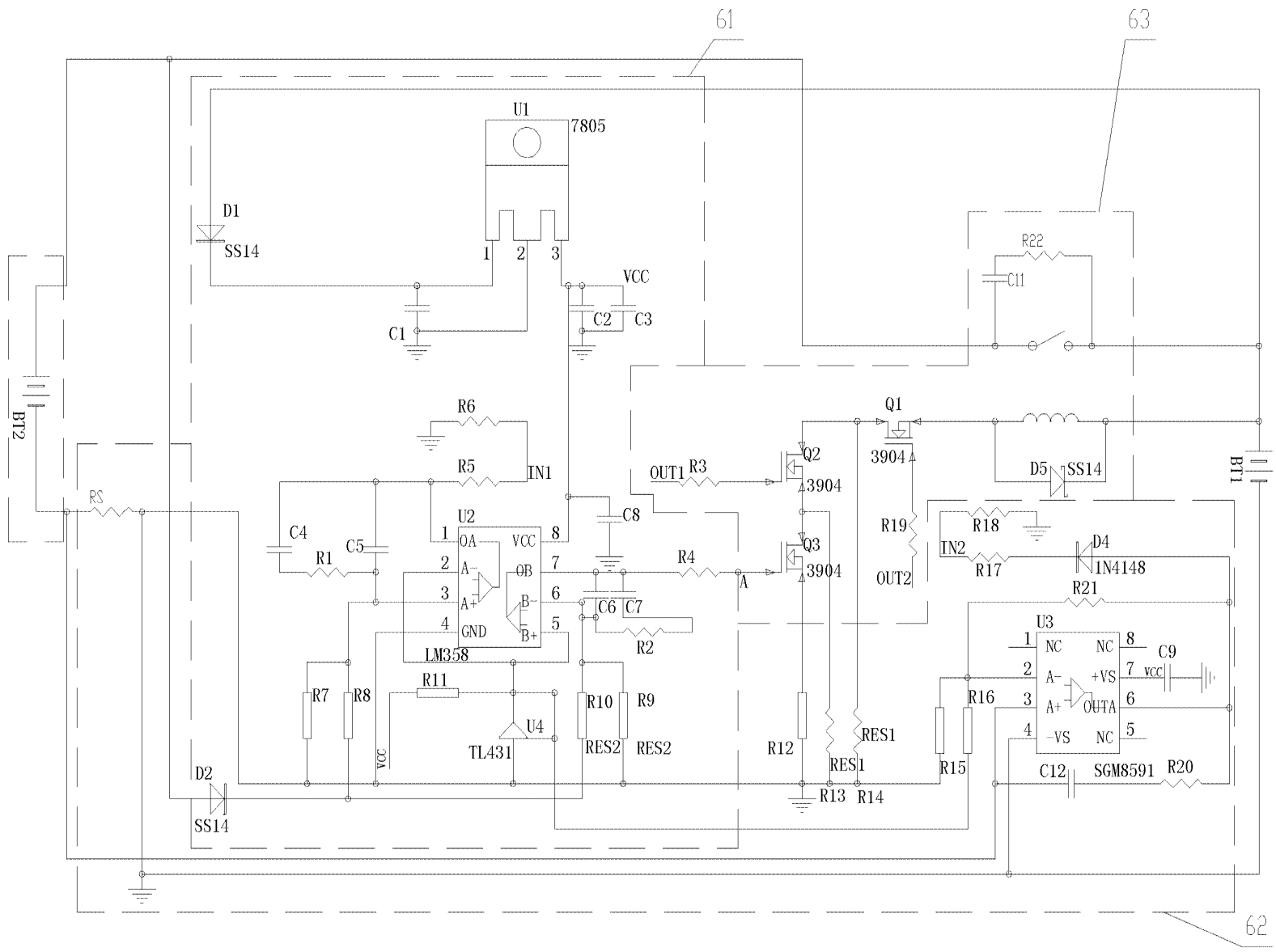


图 2

EXHIBIT 1002
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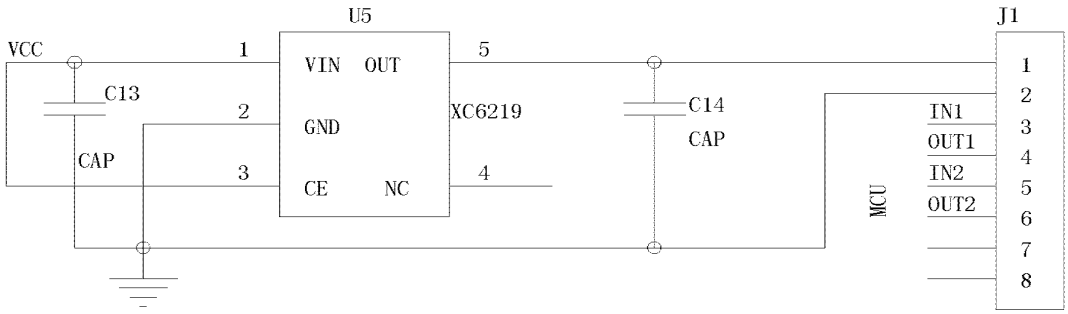


图 3

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/086774

A. CLASSIFICATION OF SUBJECT MATTER

See the extra sheet

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: H02J7/00; H02J9/00; H02J; B60R16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, EPODOC: emergency, power, supply, battery, control, identify, detect, temperature, Lei Xingliang

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 102496985 A (LEI, Xingliang) 13 June 2012 (13.06.2012) description, paragraphs [0005] to [0026] and figures 1 to 6	1-13
Y	CN 201766385 U (CHEN, De) 16 March 2011 (16.03.2011) description, paragraphs [0036] to [0062] and figures 1 to 3	1-13
Y	CN 202309139 U (SHANGHAI GUANGWEI ELECTRIC CO LTD et al.) 04 July 2012 (04.07.2012) description, paragraphs [0012] to [0034] and figures 1 to 6	1-13
Y	CN 202405344 U (SHAO, Hanqi) 29 August 2012 (29.08.2012) description, paragraphs [0004], [0047], [0056] and [0057]	6-8
P, X	CN 103066662 A (LEI, Xingliang) 24 April 2013 (24.04.2013) claims 1 to 13	1-13

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* 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
18 January 2014 (18.01.2014)	20 February 2014 (20.02.2014)
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer HUO, Yan Telephone No. (86-10) 62411950

Form PCT/ISA /210 (second sheet) (July 2009)

EXHIBIT 1002
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/086774

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	CN 203056633 U (LEI, Xingliang) 10 July 2013 (10.07.2013) claims 1 to 13	1-13
A	CN 2659752 Y (LONGSHENG WIRE & CABLE CO LTD) 01 December 2004 (01.12.2004)	1-13

Form PCT/ISA /210 (continuation of second sheet) (July 2009)

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Petitioner ADC (IPR2024-00671)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2013/086774

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 102496985 A	13.06.2012	WO 2013082982 A1	13.06.2013
CN 201766385 U	16.03.2011	None	
CN 202309139 U	04.07.2012	None	
CN 202405344 U	29.08.2012	None	
CN 103066662 A	24.04.2013	None	
CN 203056633 U	10.07.2013	None	
CN 2659752 Y	01.12.2004	None	

Form PCT/ISA /210 (patent family annex) (July 2009)

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/086774

Continuation of: A. CLASSIFICATION OF SUBJECT MATTER:

H02J 7/00 (2006.01) i

H02J 9/00 (2006.01) i

Form PCT/ISA /210 (extra sheet) (July 2009)

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国际检索报告

国际申请号 **PCT/CN2013/086774**

A. 主题的分类

参见附加页

按照国际专利分类(IPC)或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC: H02J7/00， H02J9/00，H02J，B60R16

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNPAT, WPI, EPODOC: 应急电源, 车, 救急, 电瓶, 检测, 温度, 雷星亮, emergency, power, supply, battery, control, identify

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
Y	CN 102496985 A (雷星亮) 13.6 月 2012 (13.06.2012) 说明书第[0005]-[0026]段，图 1-6	1-13
Y	CN 201766385 U (陈德) 16.3 月 2011 (16.03.2011) 说明书第[0036]-[0062]段，图 1-3	1-13
Y	CN 202309139 U (上海广为美线电源电器有限公司等) 04.7 月 2012 (04.07.2012) 说明书第[0012]-[0034]段，图 1-6	1-13
Y	CN 202405344 U (邵汉琦) 29.8 月 2012 (29.08.2012) 说明书第[0004]、[0047]、[0056]和[0057]段	6-8
P,X	CN 103066662 A (雷星亮) 24.4 月 2013 (24.04.2013) 权利要求 1-13	1-13
P,X	CN 203056633 U (雷星亮) 10.7 月 2013 (10.07.2013) 权利要求 1-13	1-13
A	CN 2659752 Y (龙口龙盛电线电缆有限公司) 01.12 月.2004 (01.12.2004) 全文	1-13

☐ 其余文件在 C 栏的续页中列出。 ☒ 见同族专利附件。

* 引用文件的具体类型：

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"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
18.1 月 2014 (18.01.2014)	**20.2 月 2014 (20.02.2014)**
ISA/CN 的名称和邮寄地址： 中华人民共和国国家知识产权局 中国北京市海淀区蓟门桥西土城路 6 号 100088 传真号： (86-10)62019451	受权官员 霍艳 电话号码：(86-10) **62411950**

PCT/ISA/210 表(第 2 页) (2009 年 7 月)

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国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2013/086774

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN 102496985 A	13.06.2012	WO 2013082982 A1	13.06.2013
CN 201766385 U	16.03.2011	无	
CN 202309139 U	04.07.2012	无	
CN 202405344 U	29.08.2012	无	
CN 103066662 A	24.04.2013	无	
CN 203056633 U	10.07.2013	无	
CN 2659752 Y	01.12.2004	无	

PCT/ISA/210 表(同族专利附件) (2009 年 7 月)

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续 A. 主题的分类

H02J 7/00 (2006.01) i

H02J 9/00 (2006.01) i

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

(11) Publication number : **0 616 409 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **94301838.2**

(51) Int. Cl.[5] : **H02J 7/00**

(22) Date of filing : **15.03.94**

(30) Priority : **17.03.93 GB 9305446**

(43) Date of publication of application :
21.09.94 Bulletin 94/38

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

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(54) Portable electrical power supply.

(57) A portable power supply is shown generally at 10. The power supply comprises a sealed rechargeable lead acid battery 11 to which is connected a charging circuit 12 for charging the battery 11.

A switching unit 13 controls the switching of power from the battery 11 either to accessory sockets 14 or to power output leads represented by 15.

Between the switching unit 13 and the power output leads 15 are a reverse-polarity protection circuit 16, a vehicle-start test/timer unit 17 and a stand by/monitor circuit 18, the operation of all of which will be described below.

The power supply apparatus 10 is primarily for use in the supply of 12 V dc electrical power at locations remote from conventional electricity supplies. The battery 11, at the heart of the apparatus, can be recharged from either a domestic mains electricity supply, using an integral mains charger unit 19, or from a 12-18 V dc source, such as a vehicle cigar lighter socket, a photovoltaic solar cell array, a wind-driven generator etc. using an integral 12 V dc charger lead 20.

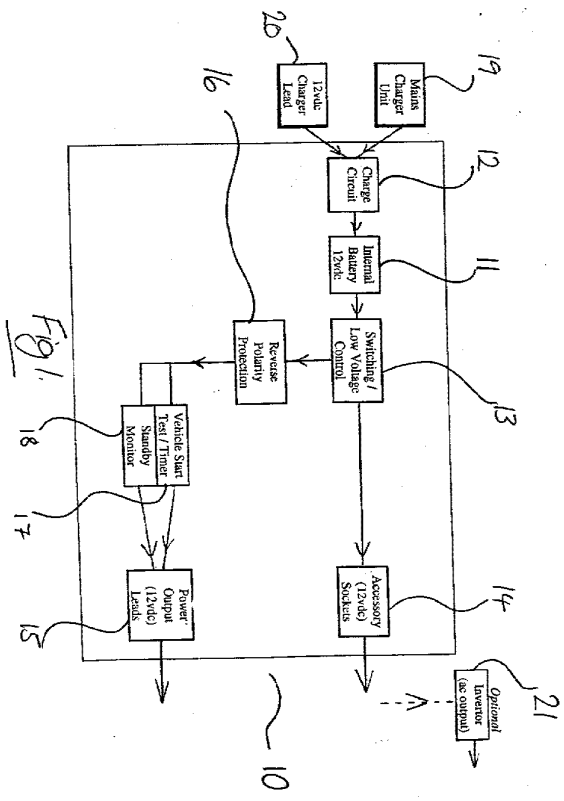


Fig 1.

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The present invention relates to a portable electrical power supply apparatus and to a method of supplying electrical power.

According to a first aspect of the present invention, there is provided portable apparatus for the supply of electrical power, the apparatus comprising rechargeable energy storage means arranged, in use, to store electrical energy, output means arranged, in use, to provide an output for electrical power from the storage means and charging means arranged, in use, to charge the storage means with electrical energy from an external source.

In a preferred arrangement the apparatus comprises a housing.

Preferably the storage means comprises at least one battery.

In a preferred arrangement, the charging means comprises an electrical charging circuit arranged, in use, to recharge the or each battery from an external source of electrical power.

The unit may be arranged to supply direct current electrical power. Alternatively or additionally, the apparatus may be arranged to supply alternating current electrical power.

The charging means may be arranged in use to recharge the or each battery from an external source of alternating current electrical power.

Preferably the charging means is arranged, in use, to recharge the or each battery from an external source of mains electrical power.

Alternatively or additionally, the charging means may be arranged in use to recharge the or each battery from an external source of direct current electrical power.

Preferably the charging means is arranged in use to recharge the or each battery from a direct current power source of a vehicle.

The apparatus preferably comprises a first monitor means arranged in use to monitor an external power supply. In a preferred arrangement, the apparatus is arranged in use to supply electrical power automatically to an external appliance according to the monitored condition of the external power supply.

The apparatus may be arranged in use to supply electrical power to an external appliance automatically, according to a condition of an external power supply to an external appliance, which condition is detected by the first monitor means.

The apparatus may comprise a second monitor means arranged, in use, to monitor a condition of an external appliance. Preferably, the apparatus is arranged in use to supply electrical power to an external appliance according to the monitored condition of the appliance, which condition is detected by the second monitoring means.

The first and second monitor means may comprise a common monitor means.

Preferably the apparatus comprises connection means for connection with an external battery. The connection means may comprise electrically conductive cables.

In a preferred arrangement, the apparatus comprises means to recharge a battery of a vehicle to which it is connected.

Alternatively or additionally, the apparatus may be arranged to supply electrical power to assist in the starting of a vehicle engine. Preferably, the apparatus is arranged in use to recharge to a predetermined extent a vehicle battery to which it is connected and to supply electrical power directly from its own battery for supplementing the vehicle battery during starting of the vehicle engine.

In a preferred arrangement the housing comprises a case. The case may comprise a closure member which is moveable between a first open position in which a user may gain access to one or more controls of the apparatus and a second closed position, in which the user may not so gain access.

The case may comprise a transparent window portion for enabling a user to see one or more controls of the apparatus.

In a preferred arrangement, the closure member comprises the transparent portion.

The case may be provided with at least one carrying handle.

Preferably the case comprises a bag.

According to a second aspect of the present invention, there is provided a method of starting an engine using a portable power supply apparatus, the method including electrically connecting the apparatus to terminals of a battery of the engine, supplying a charging current from a storage means of the apparatus to the battery of the engine to a predetermined extent, and subsequently switching on a starter motor of the engine whilst the apparatus is still electrically connected to the battery of the engine.

The method may comprise starting the engine using a portable power supply apparatus according to any statement herein.

According to a third aspect of the present invention, there is provided a method of supplying electrical power to an electrical appliance from portable supply apparatus, the method including supplying power from a rechargeable storage means to at least one output means, which output means is connected to the appliance.

Preferably the method includes recharging the storage means from either a mains electricity source or from a direct current power source.

The method may include supplying electrical power using apparatus according to any statement herein.

The invention may be carried into practice in various ways, but an embodiment will now be described by way of example with reference to the accompanying diagrammatic drawings in which:

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Figure 1 shows schematically a portable power supply apparatus according to one embodiment of the present invention, and

Figure 2 shows a carrying case for the apparatus of Figure 1.

Referring to Figure 1, a portable power supply is shown generally at 10. The power supply comprises a sealed rechargeable lead acid battery 11 to which is connected a charging circuit 12 for charging the battery 11.

A switching unit 13 controls the switching of power from the battery 11 either to accessory sockets 14 or to power output leads represented by 15.

Between the switching unit 13 and the power output leads 15 are a reverse-polarity protection circuit 16, a vehicle-start test/timer unit 17 and a stand by/monitor circuit 18, the operation of all of which will be described below.

The power supply apparatus 10 is primarily for use in the supply of 12 V dc electrical power at locations remote from conventional electricity supplies. The battery 11, at the heart of the apparatus, can be recharged from either a domestic mains electricity supply, using an integral mains charger unit 19, or from a 12-18 V dc source, such as a vehicle cigar lighter socket, a photovoltaic solar cell array, a wind-driven generator etc. using an integral 12 V dc charger lead 20.

For example, the mains charger unit 19 which is permanently attached to the apparatus on a short lead, permits full recharging of the battery 11 from a conventional mains electricity supply in around 15 hours. Alternatively, the 12 V dc lead permits recharging of the battery 11 from a vehicle's cigar lighter socket during a short journey.

The 12 V dc accessory sockets 14 comprise conventional vehicle cigar-lighter sockets which are protected by a 30 amp fuse (not shown). If it is required to operate a 12 V applicance in this way, the switch 13 is made to connect the sockets 14 to the battery 11 and the appliance is connected using a conventional cigar lighter plug, which fits into one of the sockets 14.

An optional inverter device 21 may be employed to provide a 240 V ac supply. This is achieved by connecting two cigar lighter plugs (not shown) of the device 21 into the two sockets 14.

In addition to supplying power to a range of 12 V appliances and a range of 240 V ac appliances the apparatus can also be used to assist the starting of a vehicle engine (not shown).

To do this, the switch unit 13 is made to connect the battery 11 to the leads 15. The leads 15 are then connected to terminals on the vehicle battery (not shown) and, for a predetermined time interval, the vehicle battery is charged from the internal battery 11 of the apparatus. Once the time interval has elapsed, the test/timer unit 17 provides a visual indication on the exterior of the apparatus to confirm this and the vehicle may be started. The leads 15 are left connected to the terminals of the vehicle battery so that the charge on the vehicle battery can be supplemented by the charge on the internal battery 11.

The reverse polarity protection circuit 16 is arranged to disconnect the internal battery 11 in the event that the leads 15 are connected to the wrong terminals on the battery, thereby avoiding damage to either the internal battery 11 or the vehicle battery (not shown).

The stand by/monitor 18 is used to monitor the charge on an external battery, for example, a caravan battery, which is being used to provide power for one or more appliances. In the event that the charge on the external battery falls below a predetermined level, the stand by/monitor unit detects this and begins to charge the external battery from the internal battery 11, thereby maintaining the operation of the appliances.

Additionally, the stand by/monitor unit can monitor a mains supply and, in the event of mains failure, can enable the internal battery 11 to provide a back up power supply for an appliance connected by the sockets 14.

In more detail, the switching unit 13 comprises a 3-way mechanical switch, the three positions of which correspond to: (1) output via the sockets 14, (2) off position, (3) output via the leads 15. In addition, the switching unit 13 comprises an energise switch, which electrically connects the sockets 14 to the internal battery 11 via a low voltage control circuit.

The accessory sockets are protected by a 30 amp fuse and are intended to deliver the 12 V output to a range of optional 12 V plug-in low current accessories. The low voltage control circuit operates via a small relay (not shown), which disconnects the output in order to prevent the output voltage from falling below a certain value, as power is drained by the accessory.

This prevents the internal battery 11 from going into deep-discharge from which it would be unlikely to recover.

The heavy duty power leads 15 are used in the engine's start facility and are capable of delivering up to around 200 amps. No fuse protection is provided for this output, but protection is obtained by use of a large relay (not shown), which disconnects the output leads 15 when the voltage falls to below a predetermined value (as it would if the leads 15 were accidentally shorted together).

When the apparatus is connected to an external 12 V battery (for example a caravan battery), the apparatus continuously monitors the voltage of that battery, and if it should fall below a predetermined level (for example 10.5 V), the apparatus automatically closes the contacts of a large relay so connecting the apparatus' internal battery 11 to the caravan battery.

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This results in the caravan battery being boosted for a short period of time until its voltage is recovered, at which time the apparatus disconnects the internal battery 11 from the load. This operation is repeated for as long as electrical charge remains in the apparatus' internal battery 11. The net result is that the caravan owner, for example, can arrange 12 V accessories in the caravan for longer than the caravan battery would permit.

The charge circuit 12 comprises a full-wave bridge rectifier (the input of which is 16.5 V ac from the mains charger unit 19), a smoothing and filtering circuit, a voltage regulator and an output protection diode (the output is 14.5 V dc) to charge the internal 12 V battery 11.

Referring to Figure 2, this shows a carrying case containing the apparatus of Figure 1. The case is in the form of a bag 22 having a zip-up flap 23 of transparent plastics material and a carrying strap 24 attached to each side of the bag 22 (only one attachment shown).

The transparent fold back flap 23 enables the user to see the controls without unzipping the flap 23. If, however, access to the controls is required, the flap 23 can be conveniently unzipped and folded back, for example to provide access to the accessory sockets 14 or to the three-position switch 25 of the switching unit 13 (see Figure 1).

The leads 15 (shown in Figure 1) are retained in internal compartments 26a and 26b, which are formed in cavities between an internal plastics box 28 in which the unit 10 is housed and the external canvas bag 22. Access to the leads 15 is obtained using a zipper 27, which extends around the side faces and bottom face of the bag 22.

The above-described invention provides a convenient fully portable and rechargeable power storage and supply unit. The canvas bag 22 is strong and weatherproof and is designed to be carried on the shoulder using the strap 24.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. Portable apparatus for the supply of electrical power characterised in that the apparatus comprises rechargeable energy storage means arranged, in use, to store electrical energy, output means arranged, in use, to provide an output for electrical power from the storage means and charging means arranged in use to charge the storage means with electrical energy from an external source.

2. Apparatus according to Claim 1, wherein the apparatus comprises a housing.

3. Apparatus according to Claim 1 or Claim 2, wherein the storage means comprises at least one battery.

4. Apparatus according to any of Claims 1 to 3, wherein the charging means comprises an electrical charging circuit arranged, in use, to recharge the or each battery from an external source of electrical power.

5. Apparatus according to any of Claims 1 to 4, wherein the unit is arranged to supply direct current electrical power.

6. Apparatus according to any of Claims 1 to 5, wherein the apparatus is arranged to supply alternating current electrical power.

7. Apparatus according to any of Claims 1 to 6, wherein the charging means is arranged in use to recharge the or each battery from an external source of alternating current electrical power.

8. Apparatus according to any of Claims 1 to 7, wherein the charging means is arranged, in use, to recharge the or each battery from an external source of mains electrical power.

9. Apparatus according to any of Claims 1 to 8, wherein the charging means is arranged in use to recharge the or each battery from an external

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source of direct current electrical power.

10. Apparatus according to any of Claims 1 to 9, wherein the charging means is arranged in use to recharge the or each battery from a direct current power source of a vehicle.

11. Apparatus according to any of Claims 1 to 10, wherein the apparatus comprises a first monitor means arranged in use to monitor an external power supply.

12. Apparatus according to Claim 11, wherein the apparatus is arranged in use to supply electrical power automatically to an external appliance according to the monitored condition of the external power supply.

13. Apparatus according to Claim 11 or Claim 12, wherein the apparatus is arranged in use to supply electrical power to an external appliance automatically, according to a condition of an external power supply to an external appliance, which condition is detected by the first monitor means.

14. Apparatus according to any of Claims 1 to 13, wherein the apparatus comprises a second monitor means arranged in use to monitor a condition of an external appliance.

15. Apparatus according to Claim 14, wherein the apparatus is arranged in use to supply electrical power to an external appliance according to the monitored condition of the appliance, which condition is detected by the second monitor means.

16. Apparatus according to Claim 11 and Claim 14, wherein the first and second monitor means comprise a common monitor means.

17. Apparatus according to Claim 2, wherein the housing comprises a case.

18. Apparatus according to Claim 17, wherein the case comprises a closure member which is moveable between a first open position in which a user may gain access to one or more controls of the apparatus and a second closed position in which the user may not so gain access.

19. Apparatus according to Claim 17 or 18 wherein the case comprises a transparent window portion for enabling a user to see one or more controls of the apparatus.

20. Apparatus according to Claim 19, wherein the closure member comprises the transparent portion.

21. Apparatus according to any of Claims 17 to 20, wherein the case comprises a bag.

22. A method of starting an engine using a portable power supply apparatus, the method including electrically connecting the apparatus to terminals of a battery of the engine, supplying a charging current from a storage means of the apparatus to the battery of the engine to a predetermined extent, and subsequently switching on a starter motor of the engine whilst the apparatus is still electrically connected to the battery of the engine.

23. A method of supplying electrical power to an electrical appliance from portable supply apparatus, the method including supplying power from a rechargable storage means to at least one output means, which output means is connected to the appliance.

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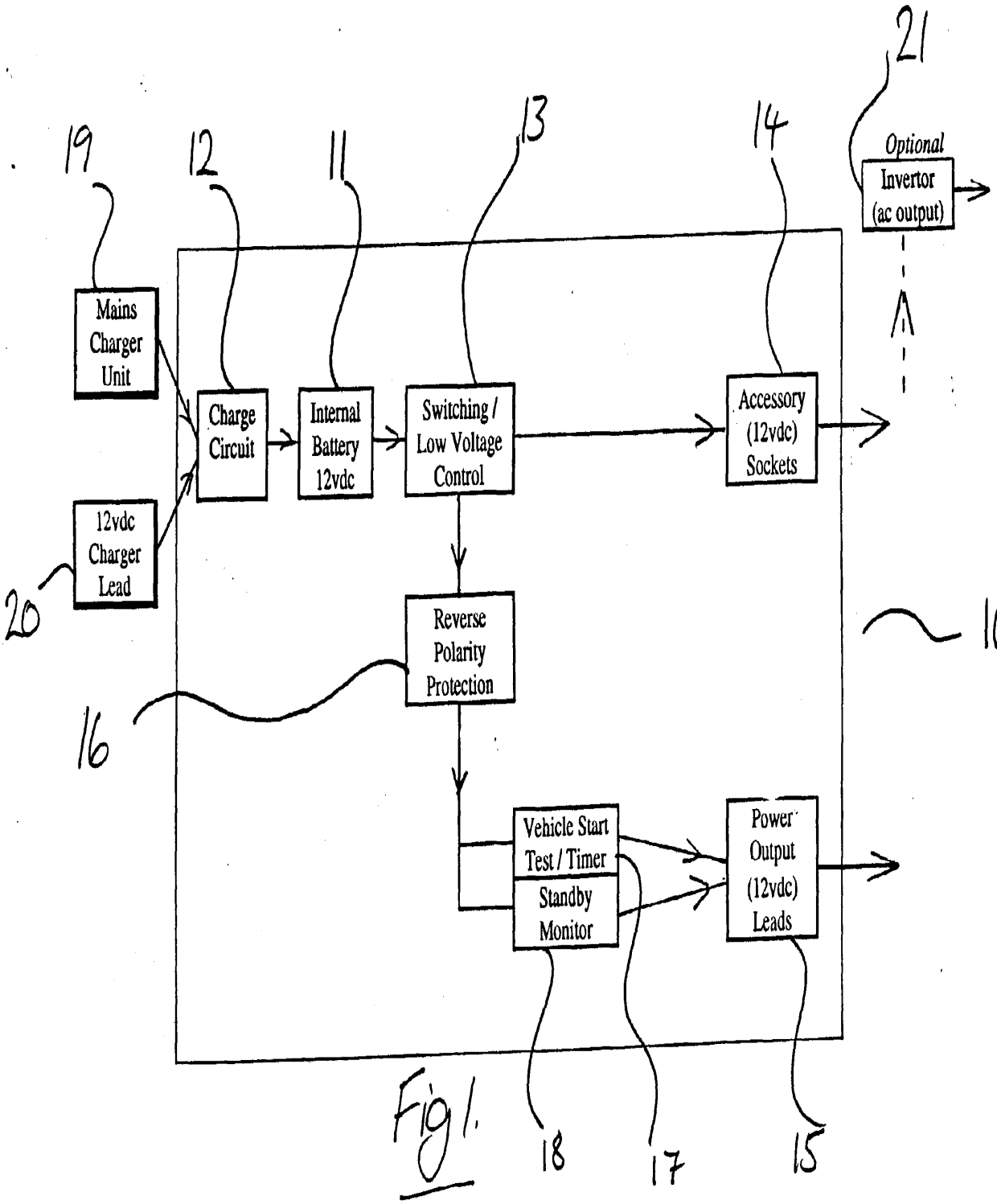


Fig 1.

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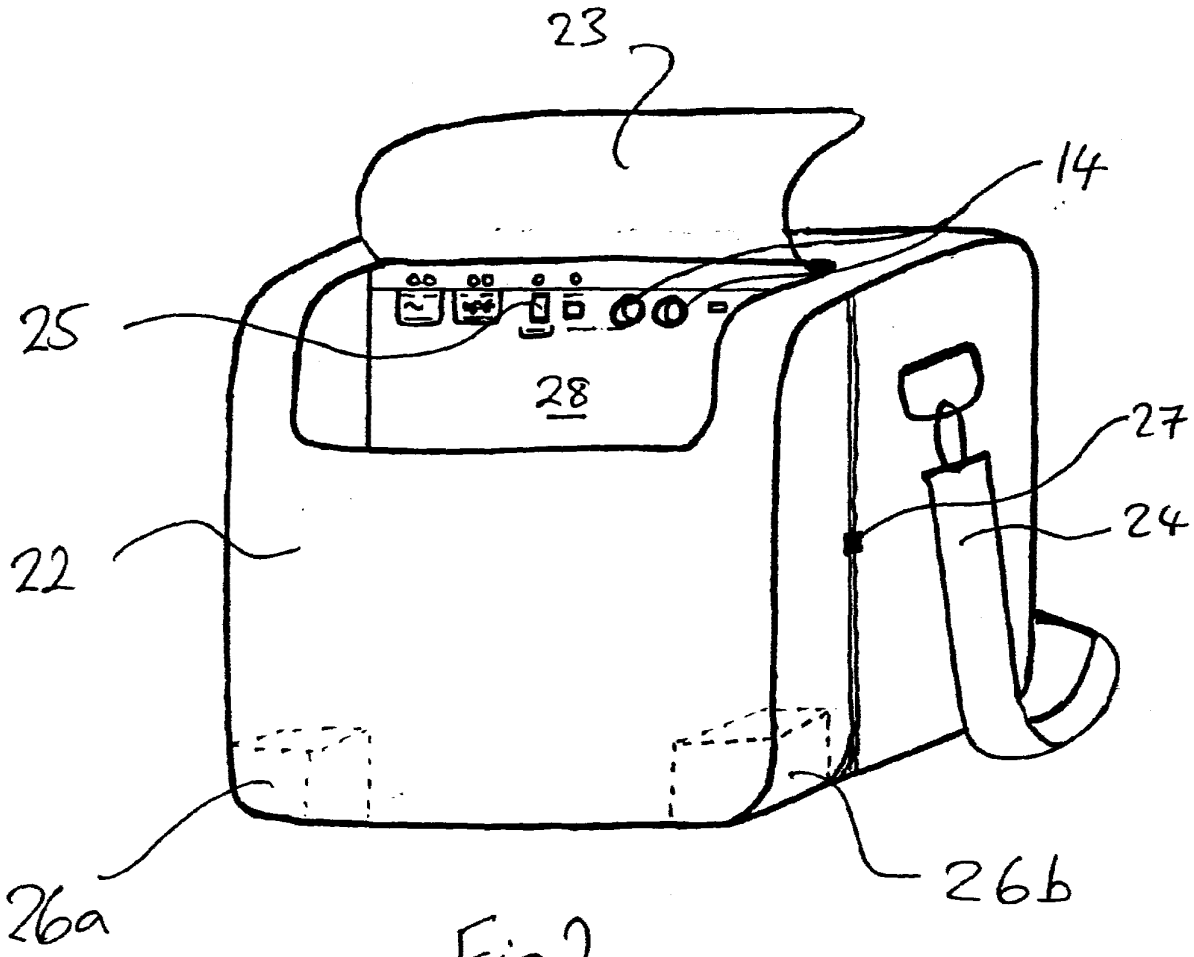


Fig2.

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 June 2012 (21.06.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/080996 A1

(51) International Patent Classification:
H01M 2/20 (2006.01) *H01M 10/052* (2010.01)
H01M 10/44 (2006.01) *H01R 11/24* (2006.01)
H01M 10/46 (2006.01) *H01M 4/58* (2010.01)

(21) International Application Number:
PCT/IE2011/000066

(22) International Filing Date:
14 December 2011 (14.12.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2010/0785 16 December 2010 (16.12.2010) IE

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) Title: A JUMP STARTER

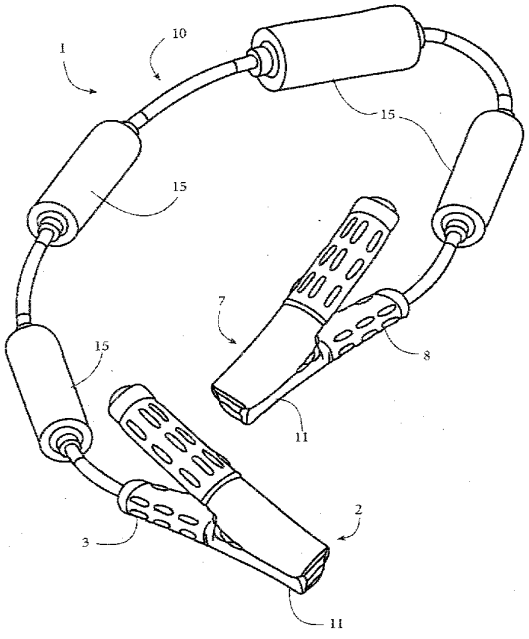


Fig.1

(57) Abstract: A jump starter (1, 30, 50) for a flat battery, such as a vehicle battery has a first clip (2, 20) having. a first handle (3, 25) for connection to one terminal (4) of a battery (5); a second clip (7, 21) having a second handle (15, 25) for connection to a second terminal of a battery, The clips are interconnected (10, 28, 53) and on-board starter batteries (15, 26) are provided along the interconnecting cable (10) and/or at least one of the clips (20, 21). The on-board starter battery (15, 26) may comprise a lithium iron phosphate battery. There may be a control circuit (100, 200) to prevent damage from events such as accidental shorting of the clips.

WO 2012/080996 A1

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GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

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"A Jump Starter"

INTRODUCTION

Field of the Invention

This invention relates to a jump starter system for a battery, especially a vehicle battery.

Prior Art Discussion

Jump starter systems for jump starting a flat vehicle battery comprise a pair of leads, each with a clip such as a crocodile clip at each end to connect with the terminals of the flat battery and a charged battery of another vehicle. One lead connects the positive terminal of the flat battery to the positive terminal of a charged battery and a second lead connects the negative terminal of the flat battery to the negative terminal of the charged battery.

Such systems are effective. However in many cases a vehicle with a charged battery is required and it is often difficult to arrange the vehicles to allow the leads to safely extend between the batteries.

It is also known to provide starter packs comprising a lead acid battery within a battery housing and leads for extending from the battery housing to the terminal of the flat battery. Such units are costly, bulky, and heavy, and can generally only be used for large scale commercial applications. Very often, the unit is not used for some time and the battery charge diminishes so that it is not effective when required.

US5607794, US6002235, US2006/0128209, and US2008/0241653 describe various portable starter systems. In these arrangements, starter cables are connected to a battery.

This invention is directed towards providing an engine jump starter system which will address these issues.

SUMMARY OF THE INVENTION

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According to the invention, there is provided a jump starter for a battery such as a vehicle battery, the jump starter comprising:-

a first clip having a first handle for connection to one terminal of a battery;

a second clip having a second handle for connection to a second terminal of a battery;

an interconnection means extending between the first clip and the second clip; and

an on-board starter battery means provided along the interconnection means and/or adjacent at least one of the clips.

In one embodiment, the on-board starter battery means comprises a lithium iron phosphate battery.

In one embodiment, there is a plurality of on-board starter batteries along the interconnection means.

In one embodiment, the on-board starter battery means comprises a plurality of separate batteries which are electrically interconnected.

In one embodiment, at least some of the battery means comprises batteries housed within at least one of the first and second handles.

Preferably, said batteries are housed within both the first handle and the second handle.

In one embodiment, the first clip and the second clip are configured to nest together for storage in compact manner.

In one embodiment, the first clip has a housing within which there is a battery, and a pair of jaws linked with the housing; and the second clip is configured to fit alongside the jaws of the first clip in a manner without protruding parts.

Preferably, the first clip has a groove to accommodate the interconnection means during storage.

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In one embodiment, the jump starter further comprises a control circuit having positive and negative leads connected between the on-board starter battery and the clips, and protection means to provide over-voltage and/or over-current protection.

In one embodiment, the protection means comprises a current-limiting component.

In one embodiment, the control circuit further comprises a switch in the negative lead which is turned on for use. In one embodiment, the switch is a solid state switch. In one embodiment, the switch comprises a MOSFET switch. In one embodiment, the switch is an SCR. In one embodiment, there is a plurality of switches arranged in parallel.

In one embodiment, a gate of the switch is connected to the positive lead by a user-activated switch. In one embodiment, the user-activated switch is of the type for momentary closing. In one embodiment, the user-activated switch is connected to the gate via a diode, preferably a Zener diode. In one embodiment, the switch is solid state and is reverse biased to prevent current flow if a system to which the clamps are connected attempts to return charge.

In one embodiment, the protection means comprises a circuit to short gate current to ground in the event of accidental reverse polarity connection.

In one embodiment, the positive lead includes one or more positive thermal coefficient fuses protecting against short circuit conditions and excessive power demands by achieving a very high resistance, thus limiting current flow, and once normal conditions are restored dropping to a low resistance.

In one embodiment, there is a resistor and an LED in parallel with the fuse such that if the fuse resistance goes high almost all of the battery voltage will appear across the resistor thus providing a current flow to illuminate the LED, and when the fuse is in a low resistance state and operating normally the resistor and the fuse are effectively short circuited, providing a visual indication of overload conditions.

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In one embodiment, the positive lead includes a bank of switches connected in such a way as to utilise their intrinsic diodes for the purposes of reverse blocking of current, in which gate to source is short circuited, thus holding the switches in a permanent OFF state.

In one embodiment, an RC time constant circuit is linked with the negative lead switch or switches, said time constant circuit being arranged to set the run time of the jump starter and preventing the jump starter from being left in a constant ON condition.

In one embodiment, the time constant circuit is arranged to provide a soft turn on of the jump starter power, preventing transient voltage damage as a result of arcing or high di/dt induced voltages in an electrical system to which the starter is connected.

DETAILED DESCRIPTION OF THE INVENTION

Brief Description of the Drawings

The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view of an engine jump starter system according to the invention;

Fig. 2 is an elevational view of the jump starter system of Fig. 1, in use;

Fig. 3 is a perspective view of another engine jump starter system according to the invention;

Fig. 4 is an enlarged view of the battery connection clips of the jump starter system of Fig. 3;

Fig. 5 is an elevational view of the starter system of Figs. 3 and 4, in use;

Figs. 6 and 7 are perspective views of an alternative starter system ready for use;

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Figs. 8 and 9 are perspective views of this system when in the storage position; and

Figs. 10 to 12 are circuit diagrams for circuits of starter systems of various embodiments.

Description of the Embodiments

Referring to Figs. 1 and 2 there is illustrated a jump starter system 1 according to the invention. The jump starter system comprises a first crocodile clip 2 having a first handle 3 for connection to one terminal 4 of a flat vehicle battery 5. The system also comprises a second crocodile clip 7 having a second handle 8 for connection to another terminal 9 of the flat vehicle battery 5. An electrical interconnection lead 10 extends between the first clip 2 and the second clip 7. Each clip has spring biased jaws 11. In the invention there is an on-board starter battery which comprises a plurality of interconnected batteries 15 which may be of the lithium iron phosphate type. The battery cells can be of either cylindrical, prismatic or pouch type. The voltage is between 3.2 and 3.7 V nominal and of lithium iron chemistry.

As illustrated, the on-board starter batteries 15 extend along the interconnection lead 10. They are relatively small and lightweight and can be readily interconnected to form the jump starter system as illustrated.

To jump start a flat battery only one jump lead is required with two simple clip connections 2, 7 to the flat battery 5. Immediate power is supplied to the flat battery 5 without the requirement of another vehicle with a charged battery. The unit is lightweight and easily stored, for example, in a vehicle boot or glove compartment. The system has superior starting ability, lifespan, and energy retention than other jump starter systems.

Referring now to Figs. 3 to 5 there is illustrated another jump starter system, 30, according to the invention. In this case, clips 20, 21 have the clip jaws 11 and have handles 25 of cylindrical shape. In this embodiment there are two batteries 26 housed within each handle 25, and finger-gripping features 27 are provided to aid user operation. The clips are interconnected by a cable 28, with no need for batteries along the length of the cable in this case.

Referring to Figs. 6 to 9 an alternative jump starter, 50, is shown. The jump starter 50 comprises a first clip 51 and a second clip 52 interconnected by a power cable 53. The first clip 51 has a

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housing 55 for a battery of sufficient capacity to provide the full starting power, in this embodiment of the lithium iron phosphate type. Also, the first clip 51 comprises a pair of jaws 56 having finger grips 57 for pressing together for opening and closing. The housing 55 has a groove along one side to accommodate the cable 53 during storage. The clip 52 has a similar pair of jaws 56 with finger grips 57.

The starter 50 is used with the clips 51 and 52 separate as shown in Figs. 6 and 7. Power is provided by the batteries within the housing 55. When not being used, the second clip 52 nests into the first clip 51 alongside the jaws 56 of the first clip 51, as shown in Figs. 8 and 9.

The jump starter 50 involves use of close-proximity high-power batteries of the lithium iron phosphate type. In this case it is more important to provide safety controls, and this is achieved by use of a control circuit in the housing 55. Figs. 10, 11, and 12 illustrate circuits 100, 200, and 300 respectively which may be used in the starter of any embodiment. In this case the starter 50 employs the circuit 300, however it may employ a different circuit depending on the safety requirements and battery types and capacities.

Referring to Fig. 10 the circuit 100 comprises batteries 102, a positive lead 103 with a clamp conductor 104, and a negative lead 105 with a clamp conductor 106. In the positive lead there is a light emitting diode LED2 and a resistor R3 in parallel with a positive thermal coefficient (PTC) resettable fuse 110.

An integrated circuit IC1 is connected via a resistor R2 to the positive lead 103 and is connected to the negative lead 105 via reverse polarity indicator (LED1). Also, a manual contact switch 115 (SW1) is connected on one side to the positive lead 3, and on the other to a Zener diode ZD1, a resistor R1, in turn linked with a bank of MOSFET switches Q1, Q2, and Q3.

The circuit of the jump starter circuit 100 protects from voltage mismatch, reverse polarity, short circuit, over-discharge, and over-use.

The over-current protection element PTC 110 comprises a number of parallel connected positive thermal coefficient PCB mounted resettable fuses. The number and type thereof is determined by the power output requirement. The PTC 110 enables normal usage but protects against short circuit conditions and excessive power demands by achieving a very high resistance, thus

limiting current flow. Once normal conditions are restored, the PTC 110 drops to a low resistance. Light emitting diode LED2 and 1k 0.25w resistor R3 provide an over-current indicator. When the PTC 110 goes high resistance, almost all of the jump starter battery 102 voltage will appear across this device thus providing a current flow to illuminate LED2. When the PTC 110 is in a low resistance state and operating normally, R3 and LED2 are effectively short circuited.

The battery 102 positive terminal is also connected to the momentary action single pole normally open switch SW1 115. This switch, the Zener diode ZD1, the resistor R1 and Metal Oxide Semiconductor Field Effect Transistors (MOSFETS) Q1 to Q3 comprise the power-switching and over-discharge elements.

To activate the jump-starter system it must be connected to a vehicle battery by means of the positive and negative jaws 56 linked to the conductors 104 and 106. The activation switch 115 (SW1) is then briefly depressed. This switch may be located at any convenient location of the housing Current flows from the battery (BAT) via ZD1 and R1 to the gates of International Rectifier IRF1324s MOSFETS (or alternates) Q1, Q2 and Q3 via their respective gate resistors R4, R5 and R6. Capacitor C1 is also charged. Once a Vgs of 10V is applied to the MOSFETS Q1, Q2, and Q3 they begin conducting from drain to source with a very low ON state resistance, typically about 0.00033 Ohms for three parallel connected parts.

After the PTC, the positive supply lead 103 is connected to another trio of International Rectifier IRF1324s MOSFETS (or alternates) Q4, Q5 and Q6. These devices are connected in such a way as to utilise their intrinsic diodes for the purposes of reverse blocking of current. The gate to source is short circuited, thus holding the devices in a permanent OFF state. Should the jump starter circuit 100 be connected to a vehicle with a greater voltage than the unit is intended for, the diodes become reverse biased and no current may flow. This feature protects the jump-starter's internal battery 102 from potentially dangerous overcharge conditions.

Once a successful start has been achieved, the vehicle alternator or charging system will attempt to return charge to the still-connected jump-starter battery 102 (BAT) via the crocodile clamp jaws 56. This could be undesirable for certain battery types. Should this situation occur, the intrinsic diodes in Q4, Q5 and Q6 will become reverse biased, thus preventing this condition

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A resistor R7 and a capacitor C1 form an RC time constant circuit. When the switch 15 (SW1) is depressed, C1 rapidly charges via R1. Once in an ON state the gate to source resistance of the MOSFETS is very high, in the order of tens of mega Ohms. Thus the run time of the jump starter circuit 100 can be configured by choice of C1 and R7. Once SW1 is released, C1 begins to discharge via R7. When the voltage across C1 drops below the gate threshold voltage of the MOSFETS, they will rapidly come out of conduction and switch off the output. This auto – off feature prevents the unit from being left in a constant ON condition with resultant live crocodile clamps.

The RC circuit of R7 and C1 provides another important element. As the voltage across C1 will require a certain time to reach the gate threshold voltage of the MOSFETS Q1, Q2, and Q3, they will spend a small amount of time in their active region and provide a soft turn on of the jump starter circuit 100 power. This prevents transient voltage damage as a result of arcing or high di/dt induced voltages in the vehicle electrical system.

The circuit also protects against accidental reverse polarity connection. Should the operator inadvertently connect the jump starter circuit 100 backwards to the vehicle battery (i.e. positive clamp 4 to negative terminal and vice versa), the system offers two levels of protection. The first level is passive. As the MOSFETS Q1 through Q3 are non-conductive, no current flow takes place upon connection. This eliminates any potentially dangerous and destructive electrical arcing at the vehicle battery terminals. Such arcing conditions have been linked with the destruction of modern vehicle electronic controls. Secondly, current from the vehicle battery flows via the resistor R2, reverse polarity indicator LED1 and the input side of the semiconductor photo-relay type TLP222 (IC1) thus illuminating LED1 and the input photo LED in IC1. Even if the vehicle battery is severely discharged, the current requirement of IC1 is very small and will in most cases be less than 5 mA. Should the user ignore the reverse polarity indicator LED1 and depress SW1, MOSFET gate current is shunted to ground via an output MOSFET in IC1 thus preventing the successful triggering of Q1-Q3 and damage to the vehicle or to the jump starter 1.

The Zener diode ZD1 in the gate trigger circuit protects against excessive discharge of the jump starter battery 102 (BAT). If the battery has been drained past an acceptable point its potential is no longer sufficient to overcome ZD1 and thus no gate current reaches the MOSFETS Q1-Q3.

The jump starter circuit 100 may not then be used until it has been recharged, thus preserving the life of the battery 102.

Unlike other jump starter protection circuits that require a vehicle battery to be present for correct operation, this jump starter circuit 100 can operate with a completely dead battery or none at all. However in this case, reverse polarity detection is not available.

The following are advantageous aspects of the invention.

- Solid state switching. There are no contacts to weld, burn out, or arc.
- Soft switching.
- Electrical transient protection for modern motor vehicle electronics.
- Operator protection from arcing, explosion etc.
- Jump starter product protection from misuse.
- Battery protection. Ensures long life.
- Low component count
- Cost effective
- Passive safety
- Visual indicators of fault conditions
- No possibility of damage through operator error such as short circuit etc.
- Low power dissipation. Can be used with traditional lead acid batteries without power loss.

In other embodiments the role of the switches Q1-Q3 may alternatively be performed by a device such as s silicon controlled rectifier for example. This is a simpler circuit, and also would have the benefit of automatic power off upon disconnection and automatic reverse blocking. Referring to Fig. 11 a circuit 200 has a positive lead 203 with a clamp conductor 204 and a negative lead 205 with a clamp conductor 206. There are a PTC fuse 210, a battery 212, and a momentary switch 215 for performing the same functions as for the circuit 100. However, in this case the switch 215 is linked with an SCR. Other alternatives may include use of insulated gate bipolar transistors (IGBTs) or standard bipolar transistors.

In a still further embodiment, referring to Fig. 12, a 4-cell Lithium iron battery is connected to a positive jump-starter clamp by means of a number of parallel connected positive thermal coefficient (PTC) type resettable fuses. The negative battery lead is directly connected to the

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negative jump starter clamp. A warning light emitting diode LED1 and its associated series limiting resistor are connected in parallel with the PTC devices. During normal engine starting operation the PTC devices are cold and exhibit a low resistance thus permitting normal current flow. As there is little voltage drop across the devices in this state, LED1 is extinguished.

Should any of the following fault conditions occur: clamp short circuit, reverse connection to vehicle or incorrect voltage selection, then a larger than normal current flow will result causing the PTC devices to rapidly warm up and exhibit a high resistance thus limiting current flow to a very low level and preventing damage to the jump starter unit or the flat battery. As most of the battery (BAT1) voltage will now be developed across the PTC devices, LED1 is illuminated thus informing the user that a fault condition has occurred. Once the fault is removed, LED1 is extinguished and after a short delay the PTCs return to normal temperature and resistance and normal operation is resumed.

Transient voltage suppression diodes (TVS) D1 and D2 are connected across the output leads. These devices (typical rating of 5kW each) prevent any transient or induced voltages from damaging the vehicle or the starter. Unlike the typical sure protection employed in a traditional jump starter which employs voltage dependent resistor (VDR) type devices, the TVS can respond much quicker and quench much more energy thus providing a better solution.

It will be appreciated that the invention provides for much more convenient jump starting. It allows a user to carry the starter in the vehicle, and avoids need to hook up to another vehicle and all of the attendant disadvantages.

The invention is not limited to the embodiments described but may be varied in construction and detail.

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Claims

1. A jump starter for a battery such as a vehicle battery, the jump starter comprising:-

a first clip (2, 20) having a first handle (3, 25) for connection to one terminal (4) of a battery (5);

a second clip (7, 21) having a second handle (15, 25) for connection to a second terminal of a battery;

an interconnection means (10, 28) extending between the first clip and the second clip; and

an on-board starter battery means (15, 26) provided along the interconnection means (10) and/or adjacent at least one of the clips (20, 21).

2. A jump starter as claimed in claim 1, wherein the on-board starter battery means (15, 26) comprises a lithium iron phosphate battery.

3. A jump starter as claimed in claims 1 or 2, wherein there is a plurality of on-board starter batteries (15) along the interconnection means.

4. A jump starter as claimed in claim 1 or 2 or 3, wherein the on-board starter battery means (15, 26) comprises a plurality of separate batteries which are electrically interconnected.

5. A jump starter as claimed in claim 4, wherein at least some of the battery means comprises batteries (26) housed within at least one of the first and second handles.

6. A jump starter as claimed in claim 5, wherein said batteries are housed within both the first handle (25) and the second handle (25).

7. A jump starter as claimed in claims 5 or 6, wherein the first clip (56) and the second clip (56) are configured to nest together for storage in compact manner.

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8. A jump starter as claimed in claim 7, wherein the first clip (51) has a housing (55) within which there is a battery, and a pair of jaws (56) linked with the housing; and the second clip (52) is configured to fit alongside the jaws of the first clip in a manner without protruding parts.

9. A jump starter as claimed in claim 8, wherein the first clip (51) has a groove (60) to accommodate the interconnection means (53) during storage.

10. A jump starter as claimed in any preceding claims, further comprising a control circuit having positive and negative leads connected between the on-board starter battery and the clips, and protection means to provide over-voltage and/or over-current protection.

11. A jump starter as claimed in claim 10, wherein the protection means comprises a current-limiting component.

12. A jump starter as claimed in claims 10 or 11, wherein the control circuit further comprises a switch (Qi-Q3) in the negative lead which is turned on for use.

13. A jump starter as claimed in claim 12, wherein the switch is a solid state switch.

14. A jump starter as claimed in claims 12 or 13, wherein the switch comprises a MOSFET switch.

15. A jump starter as claimed in claim 13, wherein the switch is an SCR.

16. A jump starter as claimed in any of claims 12 to 15, wherein there is a plurality of switches (Q1-Q3) arranged in parallel.

17. A jump starter as claimed in any of claims 12 to 16, wherein a gate of the switch is connected to the positive lead by a user-activated switch (115, 215).

18. A jump starter as claimed in claim 17, wherein the user-activated switch is of the type for momentary closing.

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19. A jump starter as claimed in claims 17 or 18, wherein the user-activated switch is connected to the gate via a diode (ZD1), preferably a Zener diode.

20. A jump starter as claimed in any of claims 12 to 19, wherein the switch is solid state and is reverse biased to prevent current flow if a system to which the clamps are connected attempts to return charge.

21. A jump starter as claimed in any of claims 17 to 20, wherein the protection means comprises a circuit to short gate current to ground in the event of accidental reverse polarity connection.

22. A jump starter as claimed in any of claims 10 to 21, wherein the positive lead includes one or more positive thermal coefficient fuses (10, 110) protecting against short circuit conditions and excessive power demands by achieving a very high resistance, thus limiting current flow, and once normal conditions are restored dropping to a low resistance.

23. A jump starter as claimed in claim 22, wherein there is a resistor and an LED in parallel with the fuse such that if the fuse resistance goes high almost all of the battery voltage will appear across the resistor thus providing a current flow to illuminate the LED, and when the fuse is in a low resistance state and operating normally the resistor and the fuse are effectively short circuited, providing a visual indication of overload conditions.

24. A jump starter as claimed in any of claims 10 to 23, wherein the positive lead includes a bank of switches connected in such a way as to utilise their intrinsic diodes for the purposes of reverse blocking of current, in which gate to source is short circuited, thus holding the switches in a permanent OFF state.

25. A jump starter as claimed in any of claims 10 to 24, wherein an RC time constant circuit is linked with the negative lead switch or switches, said time constant circuit being arranged to set the run time of the jump starter and preventing the jump starter from being left in a constant ON condition.

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26. A jump starter as claimed in claim 25, wherein the time constant circuit is arranged to provide a soft turn on of the jump starter power, preventing transient voltage damage as a result of arcing or high di/dt induced voltages in a electrical system to which the starter is connected.

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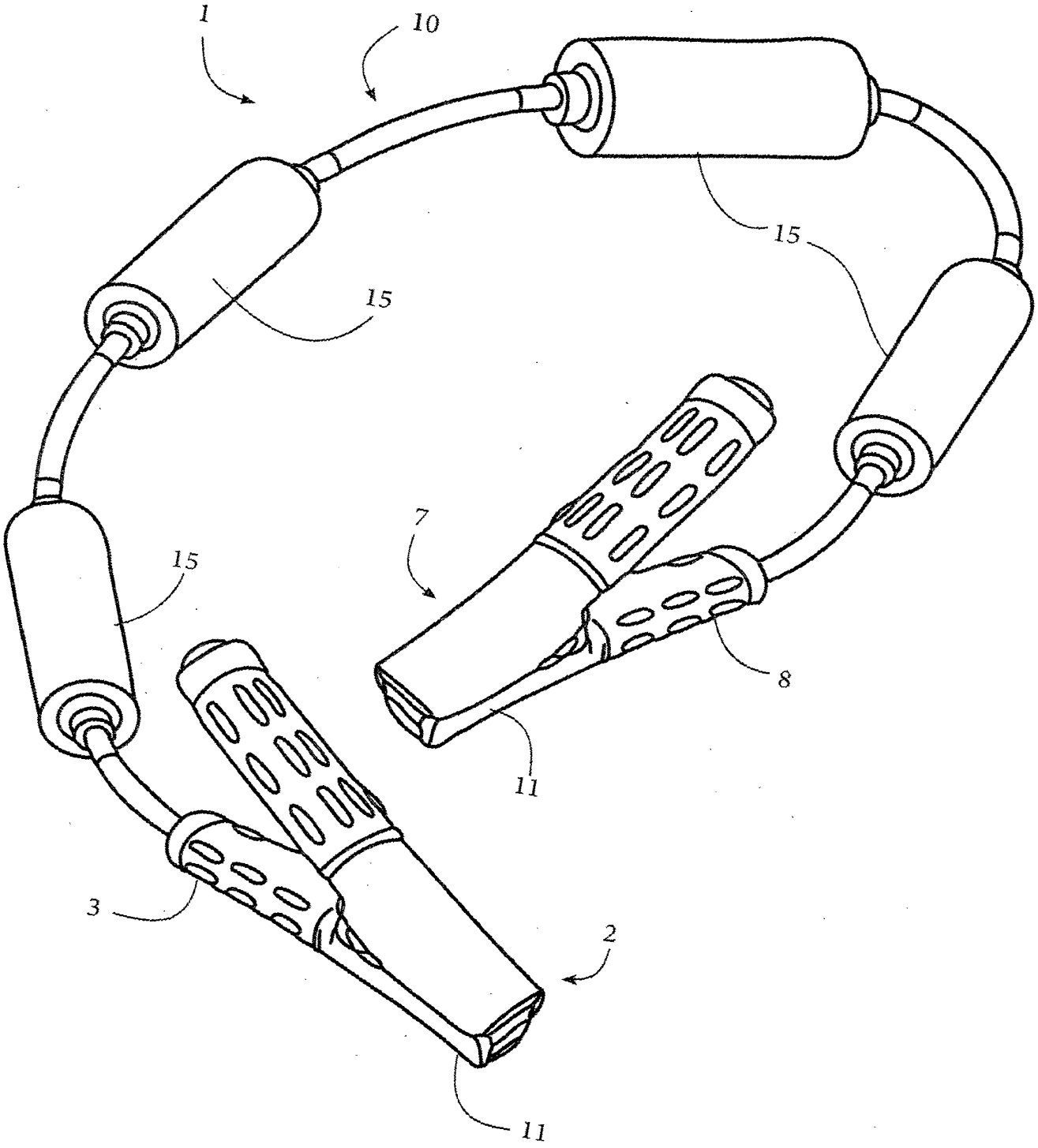


Fig.1

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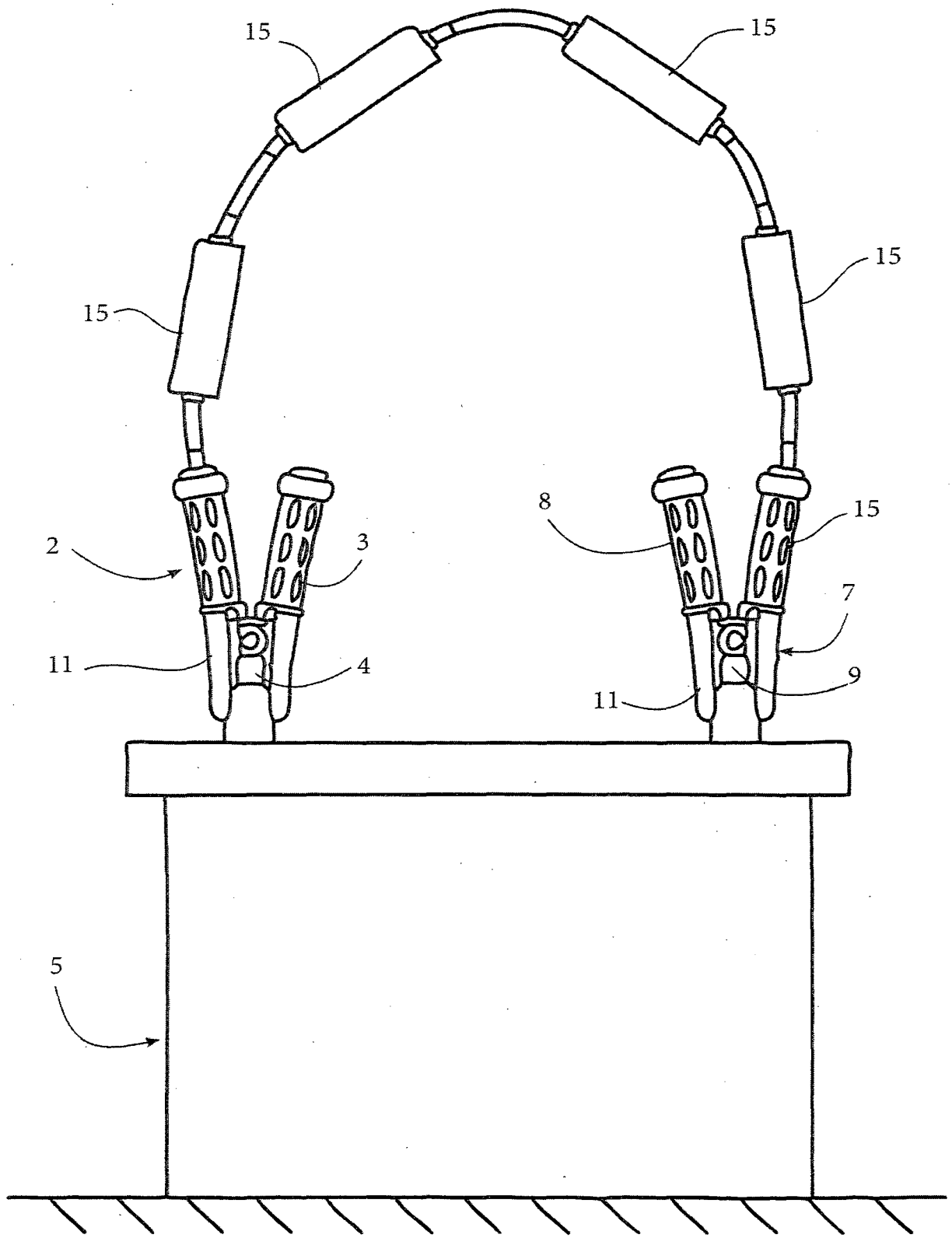


Fig.2

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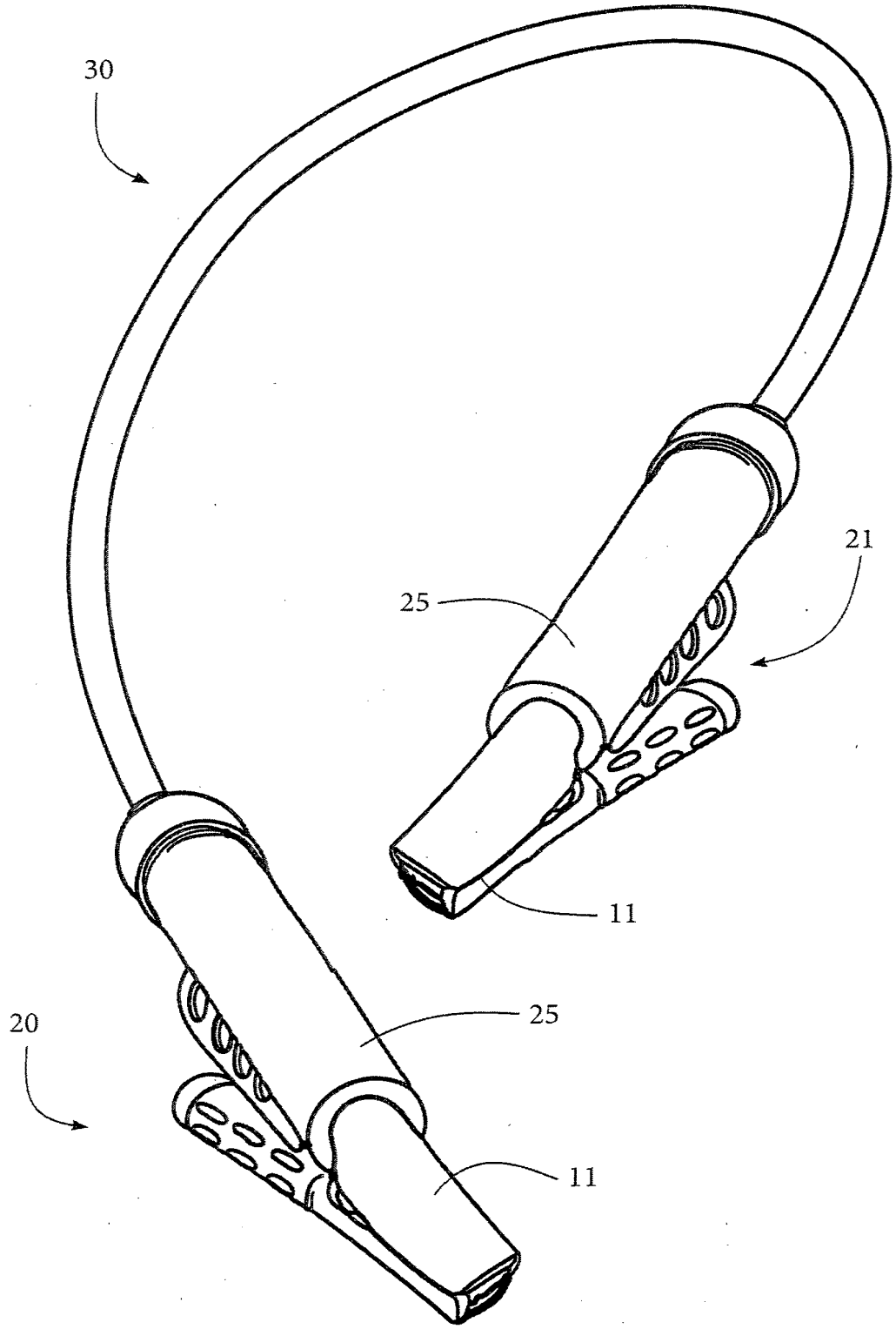


Fig.3

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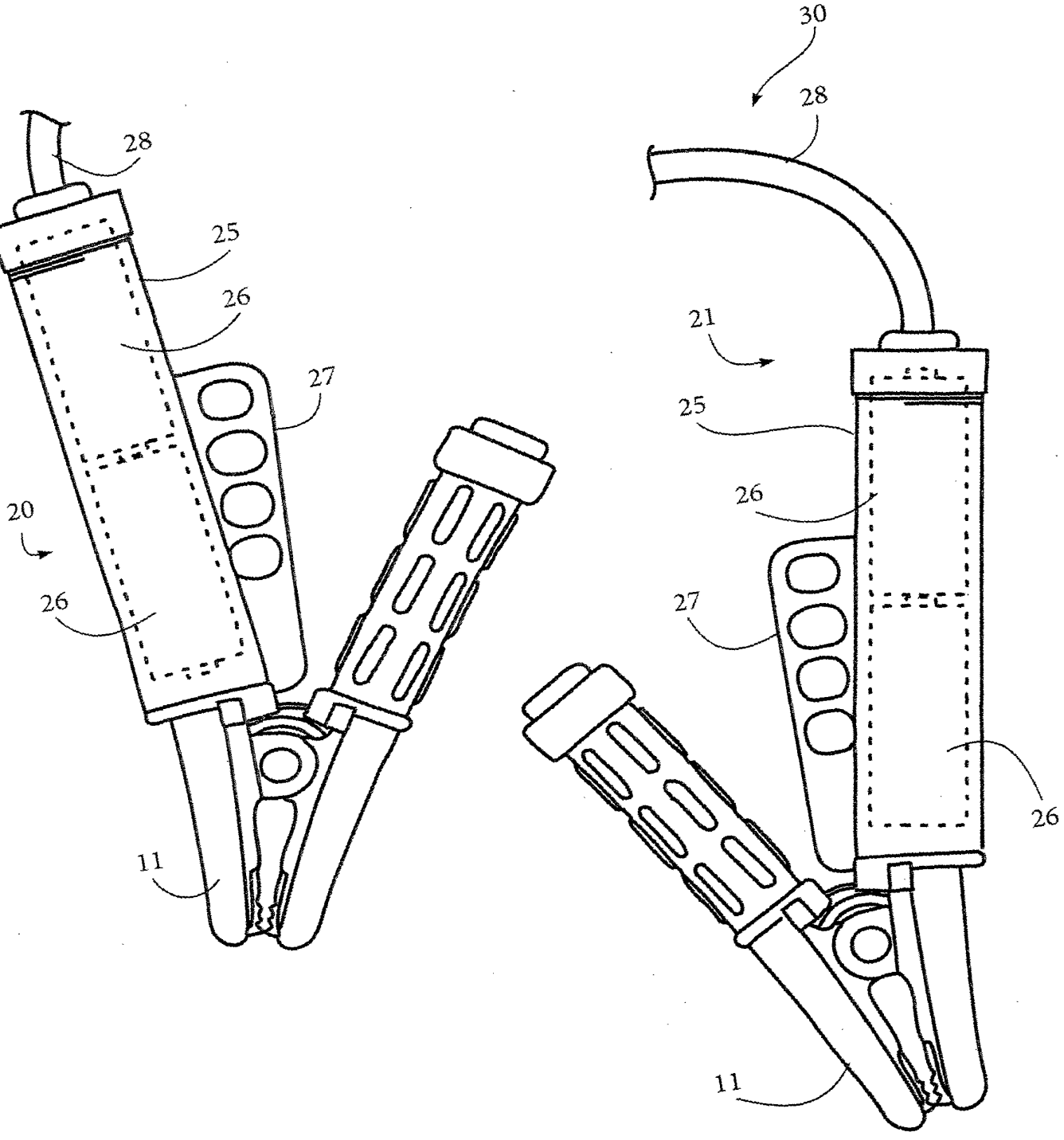


Fig.4

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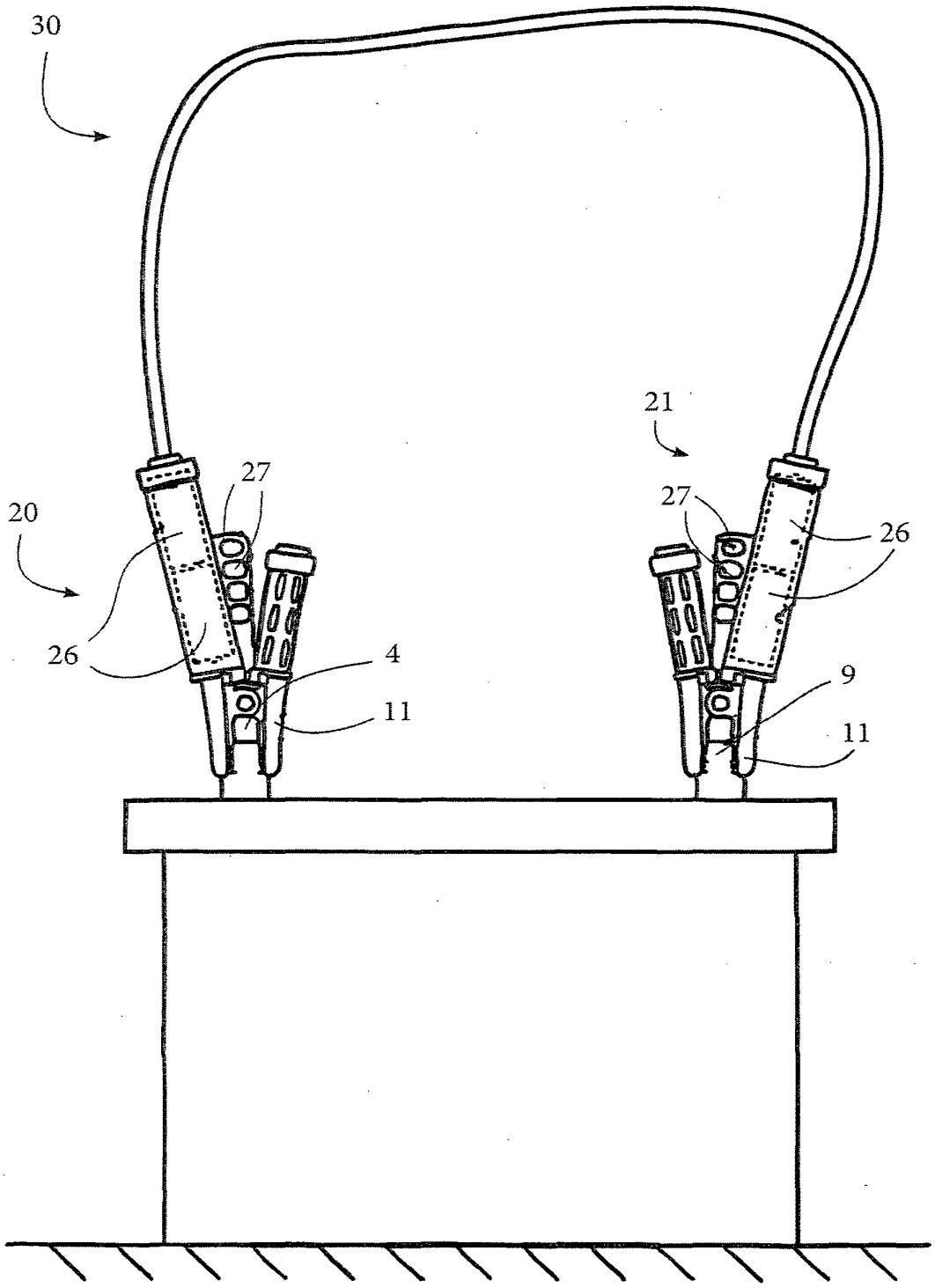


Fig.5

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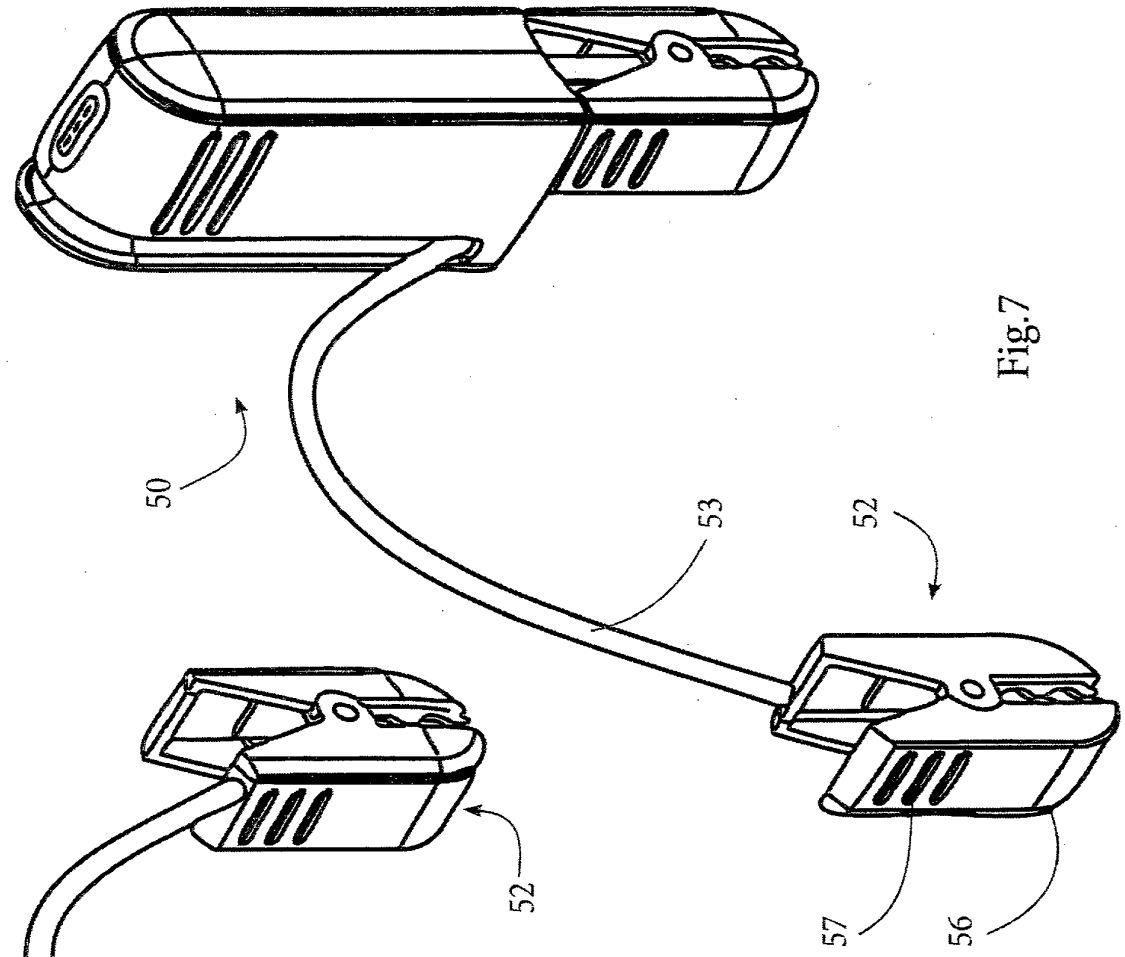


Fig.7

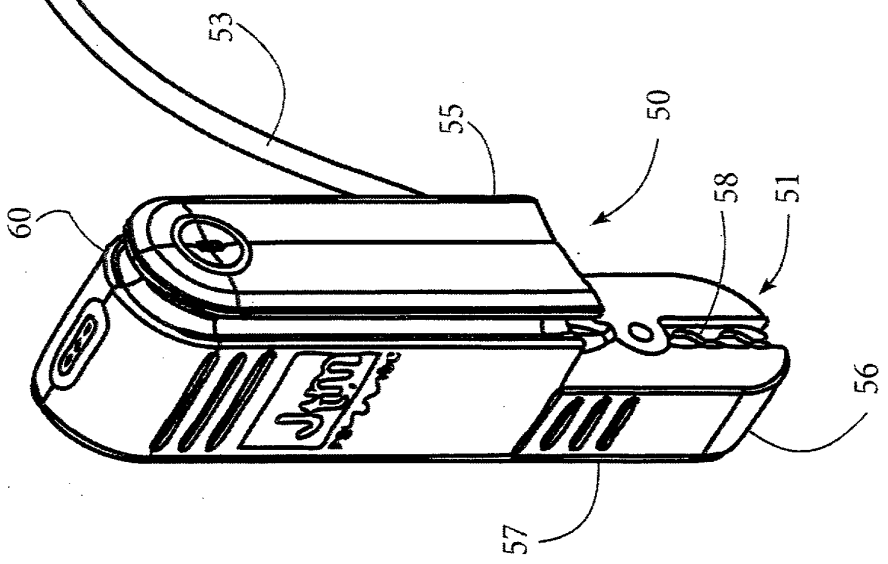


Fig.6

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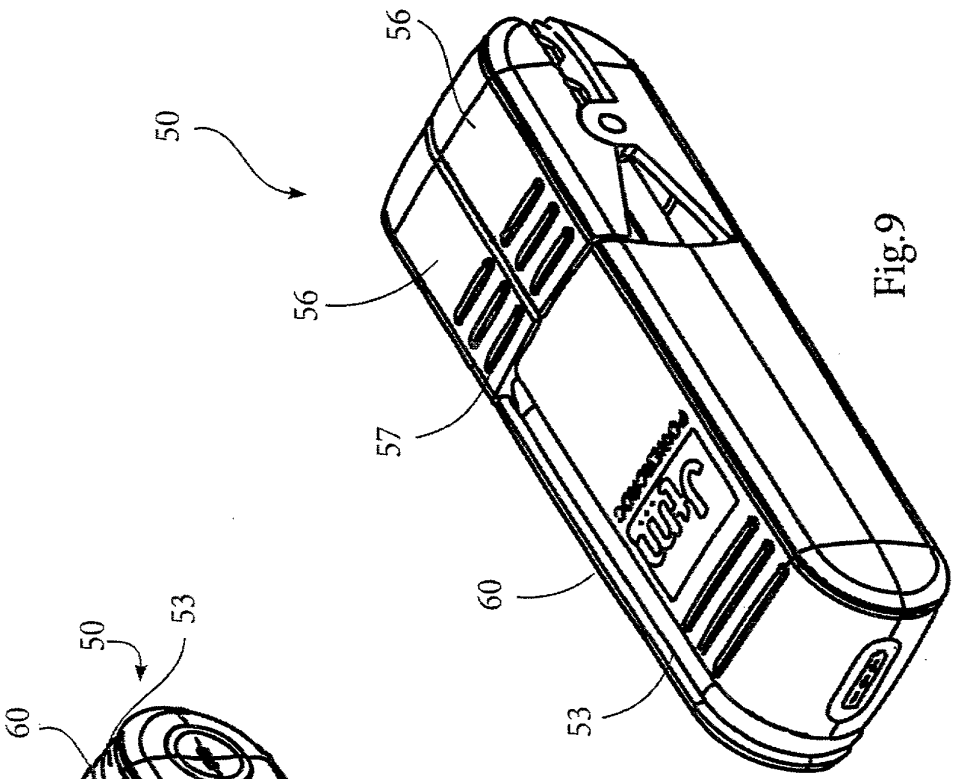


Fig.9

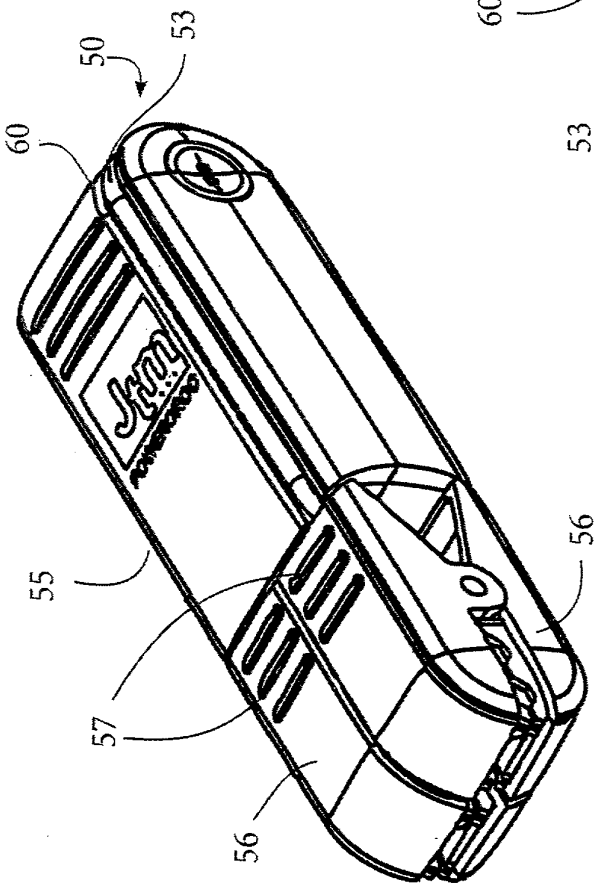


Fig.8

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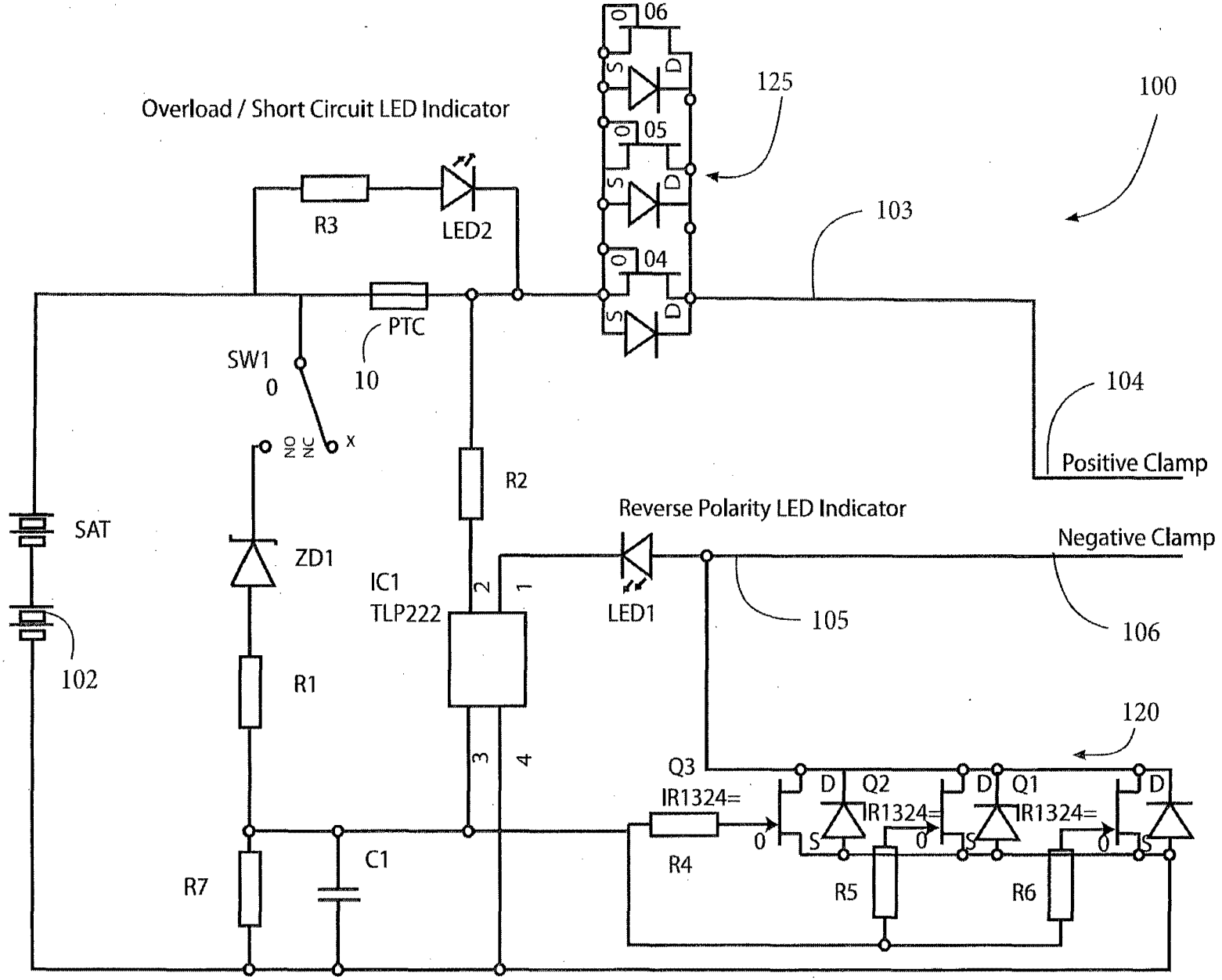


Fig.10

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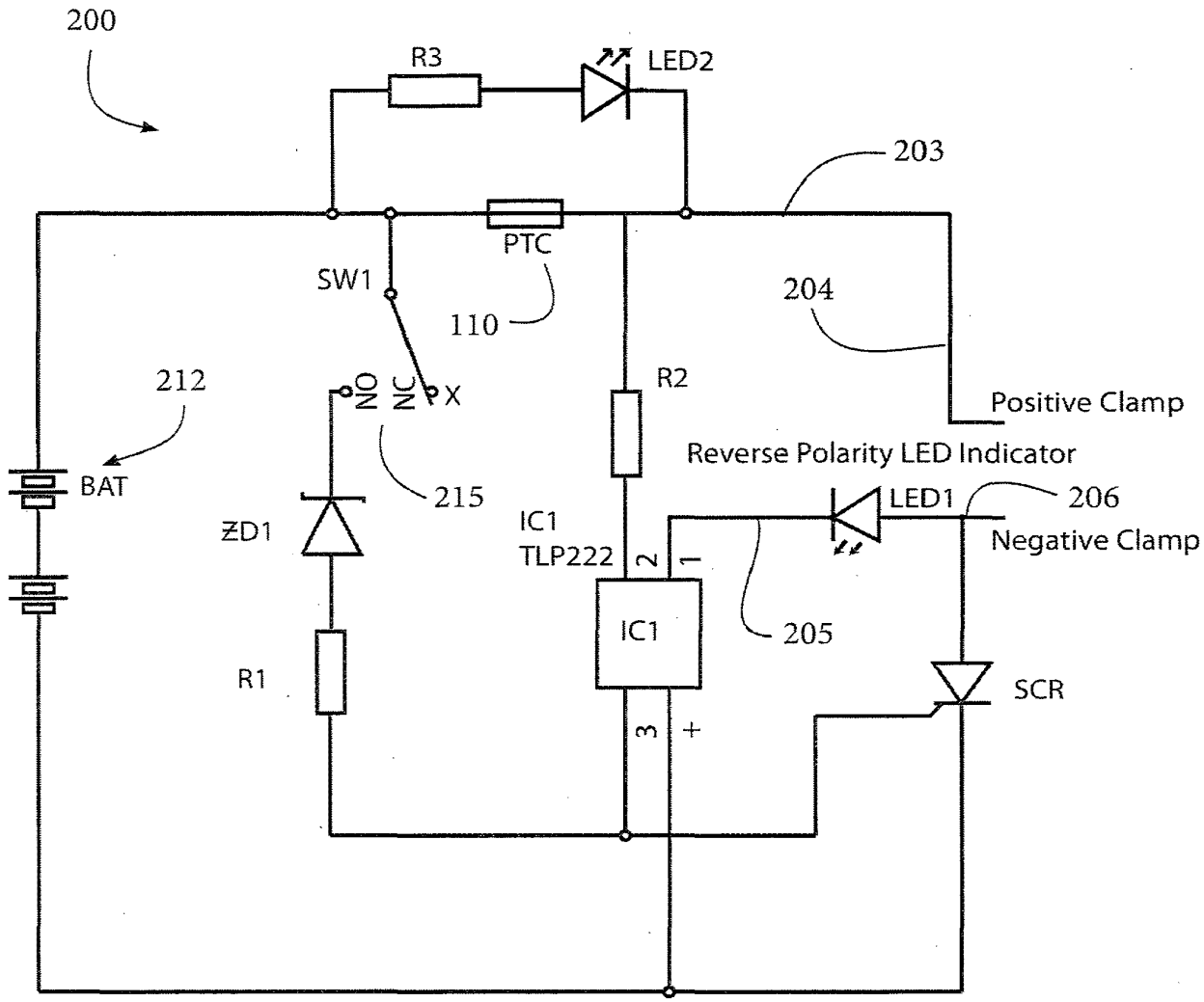


Fig.11

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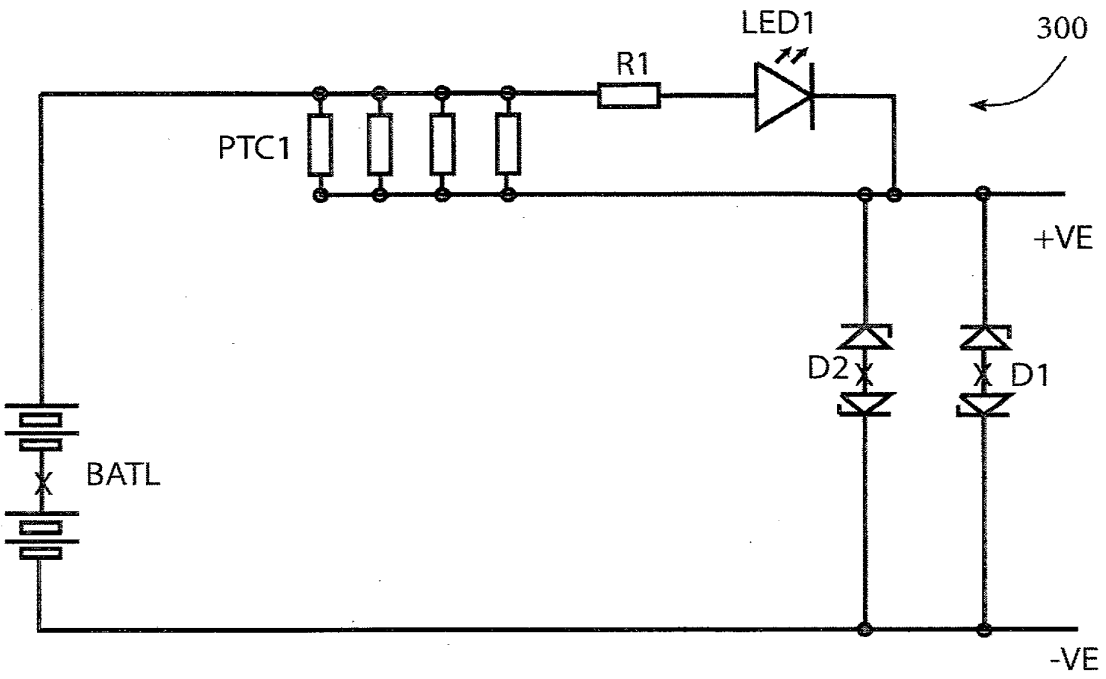


Fig.12

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IE2011/000066

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01M2/20 H01M10/44 H01M10/46 H01M10/052 H01R11/24
H01M4/58
ADD.
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)
H01R H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 002 235 A (CLORE KEVIN L [US]) 14 December 1999 (1999-12-14) cited in the application	1-4, 10-26
A	abstract column 2, lines 23-59 figures 1-6	5-9

X	US 5 985 481 A (CHAMPAGNE RICHARD F [US] ET AL) 16 November 1999 (1999-11-16)	1-4, 10-26
A	column 2, line 39 - column 4, line 55 figures 1-10	5-9

A	US 5 083 076 A (SCOTT CLYDE A [US]) 21 January 1992 (1992-01-21) abstract figures 1-9 column 1, line 45 - column 2, line 29	1-26

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
21 February 2012	29/02/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kelly, Michael

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 840 583 A (MOORE DONALD M [US]) 20 June 1989 (1989-06-20) figures 1-4 abstract column 2, line 6 - column 3, line 44	1-26
A	US 4 163 134 A (BUDROSE CHARLES R [US]) 31 July 1979 (1979-07-31) abstract figures 1-9 column 1, line 43 - column 2, line 29	1-26
A	EP 2 209 153 A1 (HENGDIAN GROUP DMEGC MAGNETIC [CN] HENGDIAN GROUP DMEGC MAGNETIC LTD C) 21 July 2010 (2010-07-21) page 2, paragraph 0001-0005	1-26
A	US 6 254 426 B1 (IACOVELLI MARC [US] ET AL) 3 July 2001 (2001-07-03) column 1, line 48 - column 3, line 14 figures 1-2	1-26

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IE2011/000066

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6002235 A	14-12-1999	NONE	
US 5985481 A	16-11-1999	NONE	
US 5083076 A	21-01-1992	NONE	
US 4840583 A	20-06-1989	NONE	
US 4163134 A	31-07-1979	NONE	
EP 2209153 A1	21-07-2010	AT 543227 T	15-02-2012
		EP 2209153 A1	21-07-2010
		US 2010167127 A1	01-07-2010
US 6254426 B1	03-07-2001	CN 1264191 A	23-08-2000
		DE 19957873 A1	03-08-2000
		GB 2347562 A	06-09-2000
		US 6254426 B1	03-07-2001

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 March 2012 (22.03.2012)

PCT

(10) International Publication Number
WO 2012/036556 A1

(51) International Patent Classification:
H02J 7/00 (2006.01) *H01R 13/72* (2006.01)
H01R 13/60 (2006.01)

(21) International Application Number:
PCT/NO2011/000245

(22) International Filing Date:
13 September 2011 (13.09.2011)

(25) Filing Language: Norwegian

(26) Publication Language: English

(30) Priority Data:
20101286 13 September 2010 (13.09.2010) NO

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(74) Agent: **PROTECTOR IP CONSULTANTS AS**; Oscarsgate 20, N-0352 Oslo (NO).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

[Continued on next page]

(54) **Title**: DEVICE FOR CHARGING OF RECHARGEABLE BATTERIES

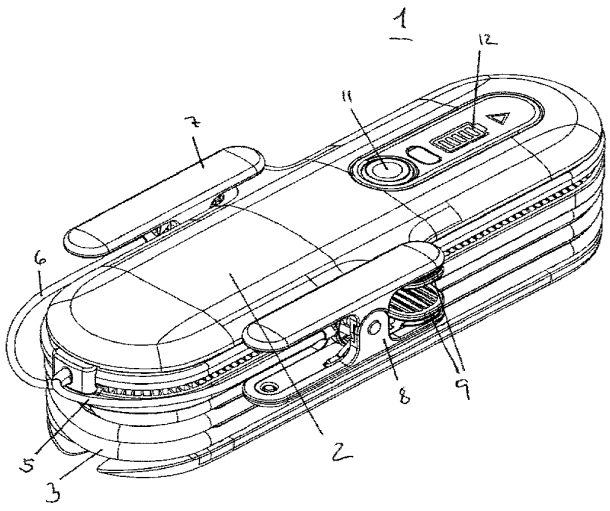


FIG. 1

(57) **Abstract**: Present invention relates to a device (1) for charging of rechargeable batteries, comprising a house (2) with a transformer, cable (3) with a plug (4) for mains input, cables (5, 6) for supplying electric power to the battery, clamping devices (7, 8) for connection to the poles of a battery, switch (11) for activation and deactivation of the charging device (1) and at least one visual indicator (12) to give the user an indication of the charging progress, said house (2) has such a design that the cables (3,5,6) and the plug (4) are completely or partially situated in the house (2), and the clamping devices (7, 8) are attached to holding means (9, 10) which protrude from the house (2), said holding means (9, 10) comprise two protruding elements, said cables (5, 6) for are winded around the circumference of the house (2) between each of the protruding elements of respective holding means.

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DEVICE FOR CHARGING OF RECHARGEABLE BATTERIES

The present invention relates to a charging device for charging of lead batteries and other rechargeable battery types. The invention relates in particular to so called "domestic chargers" which can be used especially for the charging of lead batteries for vehicles.

Many different types of devices for charging of lead batteries and other batteries are known. What is common for many of these chargers is that the charging device is fitted with a long row of buttons/switches, where the user is faced with a number of choices that must be made to start the charging process. Furthermore, a well known problem with many chargers is that sparks are generated when making the connection to the battery. Another problem is that the cable ends, both for connection to the battery and to the mains, are not easily handled in a simple and sensible way when the product shall be tidied away and be stored after use.

Therefore, the inventor has provided a charging device where focus is given to the user and to the ease of operation. The charging device is characterised in that a simple, clean and functional design which takes into consideration that the connection cables are coiled and fastened to the product housing. The coiling and fastening steps are integrated in a new and innovative way. The user only needs to uncoil the cables and then to connect the crocodile clamps to the battery and make the connection to the mains. Thereafter the charging is initiated by pushing the on/off button. This will be regarded as very safe as the user is not exposed to unnecessary sparks and the like in the connection process. The charger will itself detect and adjust the charging process according to the size of the battery and the surrounding temperature. During charging and after completion of the charging the indicator on the charger will, at any time, give the status of the charging. The charging will finish on its own or in that the user presses stop to terminate.

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For this purpose a software program is developed that is adapted to a charging process for batteries of any size and condition. In addition, attention is given to a simple, clear and, not least, user-friendly interface with the help of the on/off button of the unit and the display.

The form of the charging device and the mechanical design of its components are very demanding as both the mains cable and the battery cables are easily coiled round after use and fastened to the product so that these are firmly secured during storage. Both the clamps and the mains plug are fastened to the housing. These considerations mean that special adaptations are made on the electronic components and the edb board.

It has also been an assumption that in the design a compact unit is made with corresponding layout and choice of components so that the unit is as small as possible. This means that the heat loss through the housing of the product has been a critical parameter. The collaboration between electronics and mechanics is carried out in such a way that it does not lead to overheating of the electronic parts.

In addition, some extra equipment for connecting has been developed. For this purpose a watertight plug that can be taken out and inserted again is formed on the battery cable. This gives the possibility of connection of the additional equipment that, among other things, comprises cables with eyelet terminals and a plug to the battery charger. This means that the user can fit a series of permanent cables, with a corresponding plug on the batteries, to a part of the motorised equipment that requires regular charging. The charger can then be easily transported from location to location to carry out the charging job. A small, removable battery indicator is also developed that can be connected to this equipment to indicate whether a battery needs charging or not.

These, and other aims and advantages are achieved with a charging device for charging of lead batteries and other rechargeable battery types, encompassing

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a housing with a transformer, cable with a plug for connection to the mains, cables for supply of electric power to the battery, clamping means for connection to the poles of a battery, a switch for the activation and deactivation of the charging device and at least one visual indicator to give the user an indication of the charging progress, characterised in that the housing has a shape so that the cables and the plug are completely, or partly, lying in the housing and the clamping devices are fastened to the holding means that protrudes from the housing, when the device is not in use, as each holding means comprises two protruding elements, that the cables for the connection of the battery are coiled around the circumference of the housing between each of the protruding elements of the respective holding means.

The cable for connection to the mains is preferably coiled around the periphery of the housing and the plug is preferably placed in a recess in the housing when the device is not in use.

The paths of the coiling of the cable with the plug and the cables for connection to the battery are preferably, in the main, in parallel and axially displaced in relation to each other.

Furthermore, the device preferably comprises an electronic unit that measures/senses which type of battery that is to be charged, the surrounding temperature and the battery capacity.

The electronic unit preferably controls the charging voltage and the charging process as a function of the measured parameters.

The device comprises an indicator that gives the user a visual indication of the charging process.

The charging device is preferably adapted to charging open and closed lead batteries, AMG batteries and gel batteries with a capacity of 4-225 Ah.

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The indicator preferably comprises at least one LED.

The invention will now be explained in more detail with the help of an embodiment example with reference to the enclosed figures, where:

Figs. 1-3 show a charging device according to the present invention, seen in perspective from different directions.

Fig. 4 shows an example of a typical course of charging at a charge current of 4 A.

An embodiment of the charging unit according to the present invention is shown in the figures 1-3.

The charging unit, referred to as 1, comprises a housing 2, connected to said housing 2 is a mains cable 3 with a plug 4 for connection to a mains socket, and two cables 5, 6, for connection to respective battery poles. The cables 5, 6 are connected to their own clamping device 7, 8. The clamping devices 7, 8 are shaped so that they can engage with respective poles on a battery. Furthermore, the clamping devices 7, 8 are formed so that they can be fastened to respective holding means 9, 10 on the housing 2 when the charging unit 1 is not in use. Each holding means 9, 10 comprises two protruding elements, to which elements respective clamping devices can be fastened when the device is not in use. The cable 3 for connection to the mains is coiled around the periphery of the housing 2 and the plug 4 is placed in a recess in the housing 2 when the device is not in use. The coil paths of the cable 3 for connection to the mains and the cables 5, 6 for connection to the battery are, in the main, in parallel and axially displaced with respect to each other.

This means that the device will be very compact and all cables will be kept in place when the device is not in use, so that it is simple to store the device and it

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will be very simple to remove the cables and the clamping devices when the charging unit is to be used.

Furthermore, a switch 11 is arranged on the housing 2 with which the charging unit can be activated. Furthermore, the charging unit 2 is fitted with an indicator 12 that shows the operating state of the charging device.

Furthermore, an electronic unit (not shown) is placed in the housing 2 that measures/senses the type of battery which is to be charged, controls the charging process and switches off the device after the charging is completed.

The electronic unit will automatically detect the size of the battery (battery capacity) and find a suitable charge voltage. Furthermore, the surrounding temperature will be detected and the electronic unit will compensate the charge voltage accordingly.

The charging device can be used for batteries with a capacity of 4 – 225 Ah and battery types that can be charged with the help of the device are open and closed lead batteries, so called AGM batteries and gel batteries.

The charging device according to the invention functions as follows:

The charger is connected to the battery that is to be charged with the help of the clamping devices 8, 9 and the plug 4 is placed in a wall socket or the like, which supplies a voltage of 230V. The charging commences when the switch 11 is activated. The charging device can also be used as a current supply for a limited period, and this time period is determined by the electronic unit.

Example

A typical course of charging at 4 A is shown in fig. 4.

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The X-axis gives the different steps described below, while the Y-axis gives the current in A.

	4 amp
Charging step	
1) Analyse the state	Measure the voltage at I=0 1 second 5 sec. Batt. Stat. ind. Time
2) Soft start Find battery size (Ah capacity)	Start charging at constant current 1, 2, 4 A measure voltage Increase current if $\Delta V < 0.2V$ 15 sec on (always wait 15 sec to the next current level) 15 sec off x3 If $\Delta V >= 0.2V$ charge directly with existing current 1-2-4 A
3) Main charging	Start main charging at correct current level according to battery size. Max time 4 amp 12 h 2 amp 8 h 1 amp 2 h
4) Top charging	Constant. Voltage 14.4 V until I<1A Max time 4 amp 6 h 2 amp 4 h 1 amp 3 h
5) Maintenance charging	13.8 V min at 4 h max 24 h from step 1
6) Analyse	Turn off charging measure voltage
7) Rest mode	Rest until next week If Vbat < 12.7 V go to step 8
8) Waking	Waking, start new charge cycle

In this embodiment example the indicator comprises five LED lamps and one warning lamp. These will give the user the following indications:

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Step 0 Check output charge line
1st the crocodile
2nd the 12 V plug

Step 1 Analyse
Start timer counter
Measure battery voltage
Indicate battery status green light

>12.65 V	all five segments light up
12.55 V -12.65 V	four segments light up
12.45 V - 12.55 V	three segments light up
12.35 V - 12.45 V	two segments light up
3.5 V - 12.35 V	one segment lights up

< 3.5 V Error mode Warning Triangle red light

Step 2 Soft Start
LED indication
1 amp: one LED blinking
2 amp: two LEDs blinking
4 amp: three LEDs blinking

Step 3 Main Charge
1st, 2nd, 3rd LEDs/charging indication

If battery not connected the warning light will light up.
If wrong polarity the warning light will light up.

Step 4 Top Charge
1st, 2nd, 3rd, 4th LEDs/charging indication

Step 5 Maintain charge

All five segments light Green (no blinking)
After 24 h Go to sleep I=0A Step 7

All segments pulsing from low to high intensity.
2 sec increase intensity
Turn off 1sec
and so on

Step 6 Analyse

1st, 2nd 3rd, 4th, 5th LEDs/charging indication

Measure the voltage after 2 mins, I=0A
If Vbat > 13.0 V after 2 mins OK Go to step 6

If Vbat < 13.0 V after 2 mins OK Go to Error RED warning

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turns on (no blinking)

Step 7 Sleep

No special indication

Step 8 Wake up

Go to Step 1 for new charging cycle.

14.7 V Button

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Claims

1.

Charging device (1) for charging of lead batteries and other rechargeable battery types, encompassing a housing (2) with a transformer, cable (3) with a plug (4) for connecting to the mains, cables (5, 6) for supply of electric power to a battery, clamping devices (7, 8) for connection to the poles of a battery, switch (11) for the activation and deactivation of the charging device (1) and at least one visual indicator (12) to give the user an indication of the charging progress, characterised in that the housing (2) is of such design that the cables (3, 5, 6) and the plug (4) are completely or partly lying inside the housing (2) and the clamping devices (7, 8) are fastened to the holding means (9, 10) that protrude from the housing when the device is not in use, as each holding means (9, 10) encompasses two protruding elements, that the cables (5, 6) for connection to the battery are coiled around the circumference of the housing (2) between each of the protruding elements of the respective holding means (9, 10).

2.

Charging device according to claim 1,
characterised in that the cable (3) for connecting to the mains is coiled around the periphery of the housing (2) and that the plug (4) is placed in a recess in the housing (2) when the device is not in use.

3.

Charging device (1) according to any of the preceding claims,
characterised in that the path of the coiling of the cable (3) with the plug (4) and the cables (5, 6) for connection to the battery are, in the main, in parallel and axially displaced in relation to each other.

4.

Charging device (1) according to any of the preceding claims,

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characterised in that the device (1) further incorporates an electronic unit that measures/senses which type of battery that is to be charged, the surrounding temperature and the capacity of the battery.

5. Charging device (1) according to claim 3, characterised in that the electronic unit controls the charging voltage and the charging process as a function of the measured parameters.

6. Charging device (1) according to any of the preceding claims, characterised in that the device (1) encompasses an indicator (12) that gives the user a visual indication of the charging process.

7. Charging device (1) according to any of the preceding claims, characterised in that it is adapted to charging of open and closed lead batteries, AMG batteries and gel batteries with a capacity of 4-225 Ah.

8. Charging device (1) according to any of the preceding claims, characterised in that the indicator (12) comprises at least one LED.

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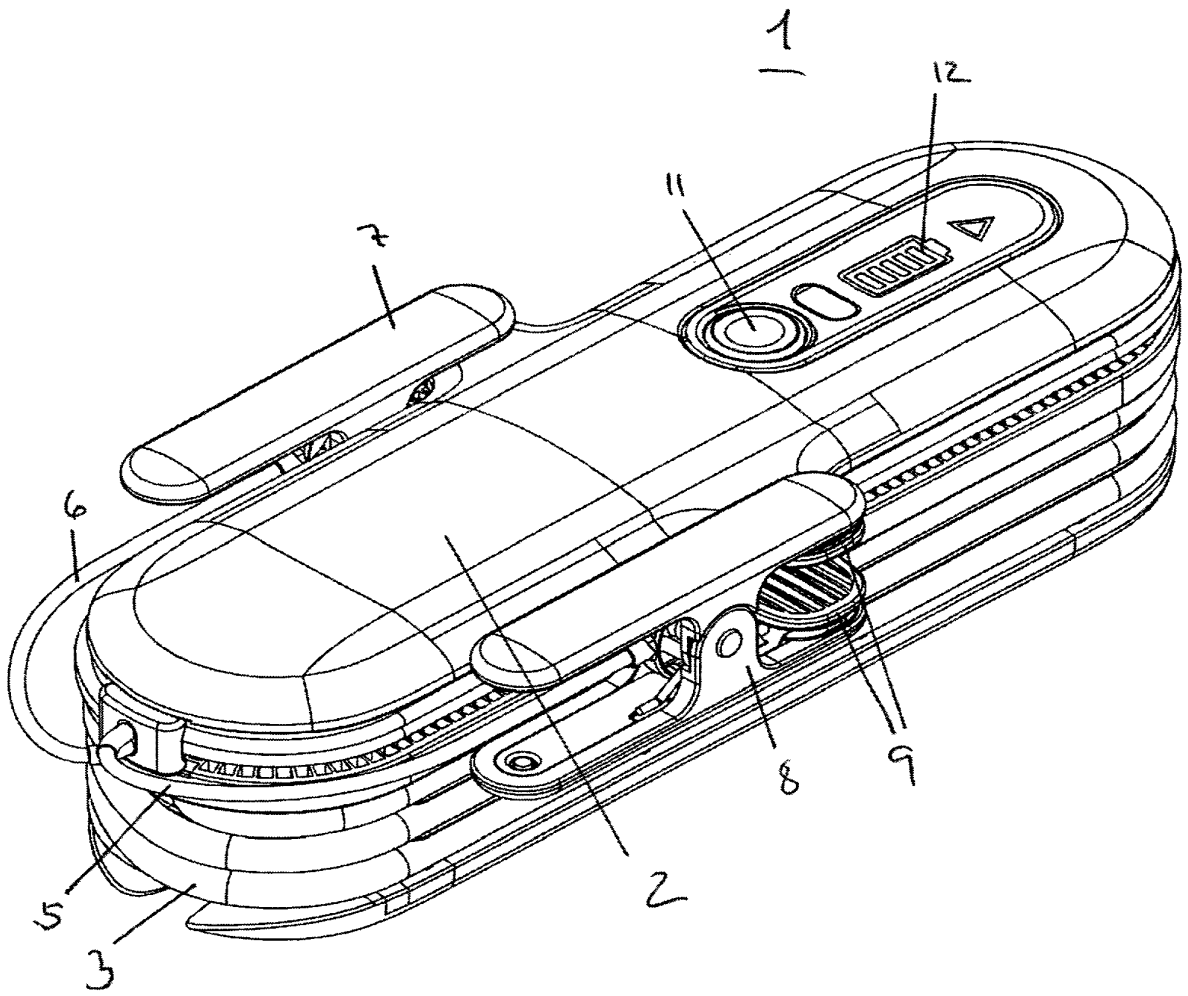


FIG. 1

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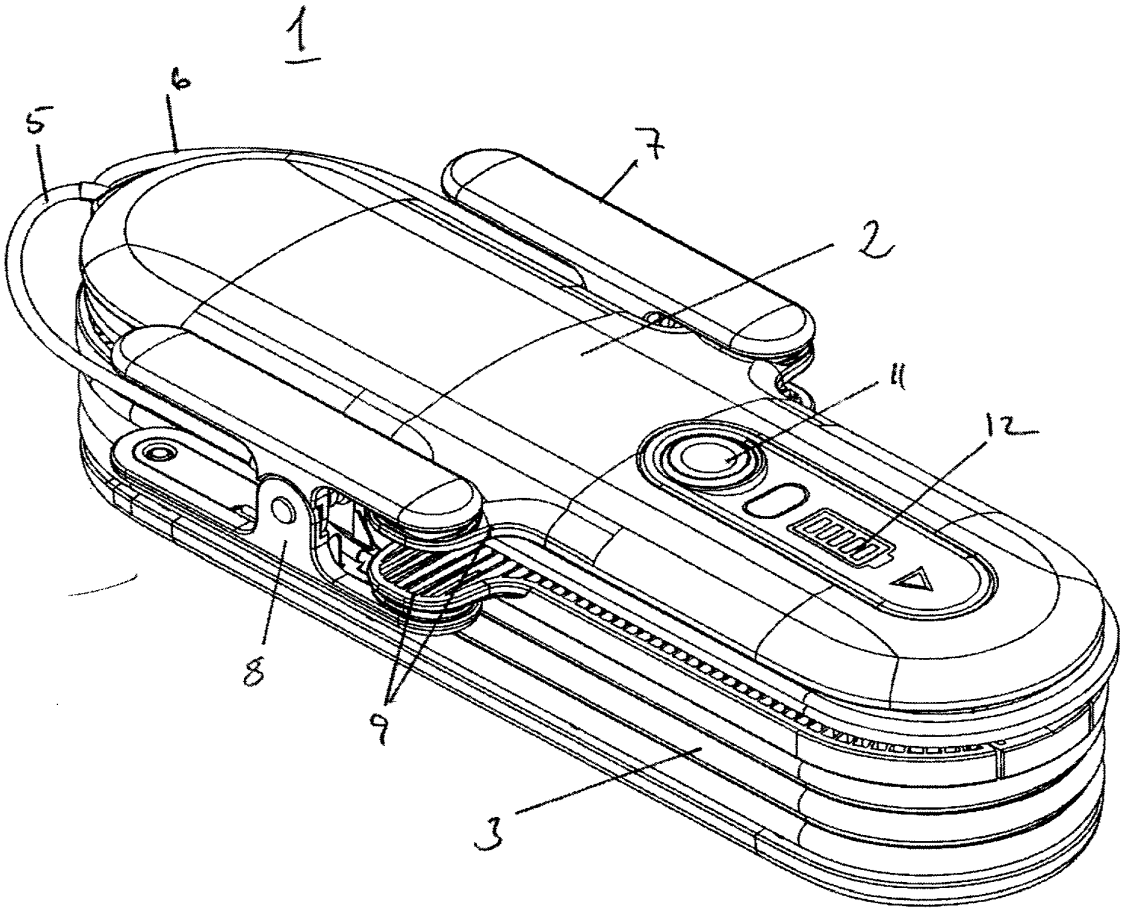


FIG. 2

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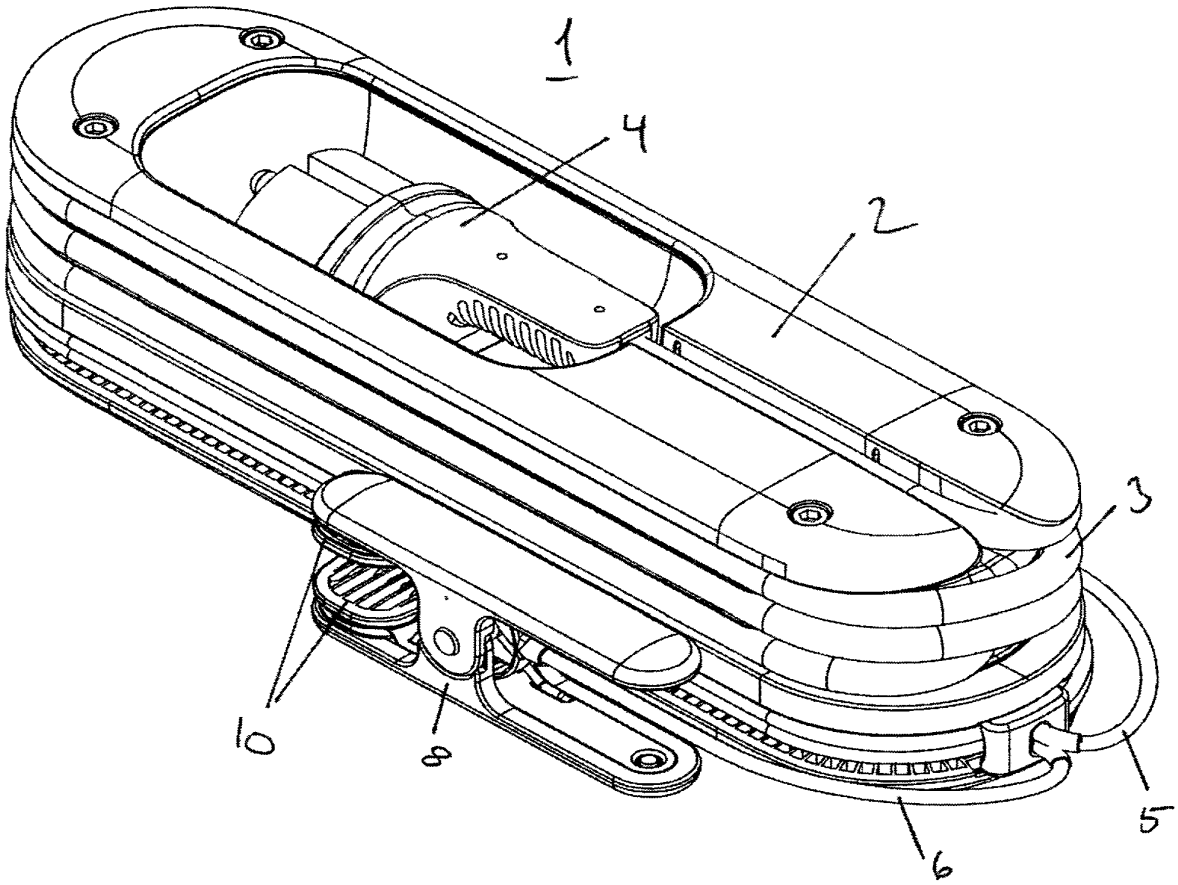


FIG. 3

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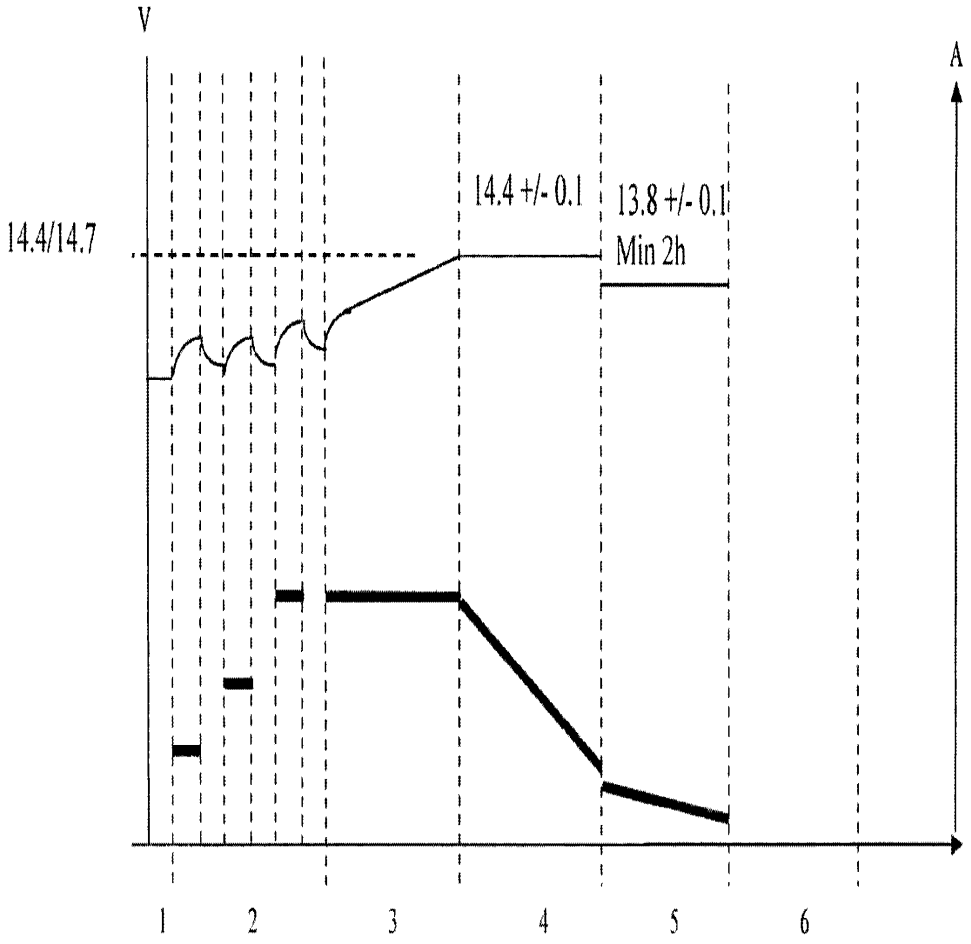


FIG. 4

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2011/000245

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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: H01R, H02J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 4026020 C (HELLA KG HUECK & CO), 12 December 1991 (1991-12-12); abstract; figures 1-3 --	1-8
A	FR 2501932 A (BOSCH GMBH ROBERT), 17 September 1982 (1982-09-17); abstract; figure 1 --	1-8
A	US 4396881 A (COOK GARY L ET AL), 2 August 1983 (1983-08-02); figure 1 --	1-8
A	EP 0293664 A (POWER TECH SYSTEMS CORP), 7 December 1988 (1988-12-07); abstract -- --------	4-8

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
09-12-2011	15-12-2011
Name and mailing address of the ISA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer Tomas Erlandsson Telephone No. + 46 8 782 25 00

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Continuation of: second sheet

International Patent Classification (IPC)

H02J 7/00 (2006.01)
H01R 13/60 (2006.01)
H01R 13/72 (2006.01)

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Petitioner ADC (IPR2024-00671)

DE	4026020	C	12/12/1991	NONE			
FR	2501932	A	17/09/1982	DE	8107234	U1	02/09/1982
				ES	263872	U	01/11/1982
				IT	8221016	V0	03/03/1982
US	4396881	A	02/08/1983	NONE			
EP	0293664	A	07/12/1988	AU	596341	B2	26/04/1990
				AU	1690188	A	01/12/1988
				BR	8802655	A	27/12/1988
				JP	63305721	A	13/12/1988
				US	4843299	A	27/06/1989

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9007015 99
9770992 99
10328808 99
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20160001666 99
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20180215274 99
20180345803 99
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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

9318748 82
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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PLUS Search Results for S/N 16820040, Searched Thu Oct 22 10:10:47 EDT 2020

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.

5793185 99	4346335 97	4924176 97
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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PLUS Search Results for S/N 16820040, Searched Thu Dec 31 08:21:55 EST 2020

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.

9007015 99
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9252452 82
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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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9379418 82

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Search History_16820040

Report Run Date: 2021-08-31 UTC
Queries: 2
Markers: 0

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Query #	Timestamp	Results	Page
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2	2021-08-31 22:38 UTC	692,561	4

Content: Patent Publications (164)

US Patents | US Designs | US Applications | EPO Patents | EPO Applications | China Patents | China Applications | Japan Patents | Japan Applications | Korea Patents | Korea Applications | WIPO Applications | Argentina Patents | Argentina Applications | Brazil Patents | Brazil Applications | Canada Patents | Canada Applications | Chile Patents | Chile Applications | Colombia Applications | Costa Rica Applications | Cuba Patents | Cuba Applications | Dominican Republic Applications | Ecuador Patents | Ecuador Applications | El Salvador Applications | Guatemala Applications | Honduras Applications | Mexico Patents | Mexico Applications | Nicaragua Patents | Panama Applications | Peru Applications | Trinidad & Tobago Patents | Uruguay Applications | Austria Patents | Austria Applications | Belarus Patents | Belgium Patents | Belgium Applications | Bosnia & Herzegovina Patents | Bosnia & Herzegovina Applications | Bulgaria Patents | Bulgaria Applications | Croatia Patents | Croatia Applications | Czech Republic Patents | Czech Republic Applications | Czechoslovakia Patents | Czechoslovakia Applications | Denmark Patents | Denmark Applications | Estonia Patents | Estonia Applications | EUIPO Patents | Finland Patents | Finland Applications | France Patents | France Applications | Germany Patents | Germany Applications | Great Britain Patents | Great Britain Applications | Greece Patents | Greece Applications | Hungary Patents | Hungary Applications | Iceland Patents | Iceland Applications | Ireland Patents | Ireland Applications | Italy Patents | Italy Applications | Latvia Patents | Latvia Applications | Lithuania Patents | Lithuania Applications | Luxembourg Patents | Malta Patents | Monaco Patents | Montenegro Patents | Montenegro Applications | Netherlands Patents | Netherlands Applications | Norway Patents | Norway Applications | Poland Patents | Poland Applications | Portugal Patents | Portugal Applications | Republic of Moldova Patents | Republic of Moldova Applications | Romania Patents | Romania Applications | San Marino Patents | San Marino Applications | Serbia Patents | Serbia Applications | Slovakia Patents | Slovakia Applications | Slovenia Patents | Spain Patents | Spain Applications | Sweden Patents | Sweden Applications | Switzerland Patents | Switzerland Applications | Ukraine Patents | Yugoslavia/Serbia and Montenegro Patents | Yugoslavia/Serbia and Montenegro Applications | Armenia Patents | Australia Patents | Australia Applications | Cyprus Patents | Gulf Cooperation Council Patents | Hong Kong Patents | India Patents | India Applications | Indonesia Patents | Indonesia Applications | Israel Applications | Jordan Patents | Kyrgyzstan Patents | Macao Applications | Malaysia Patents | Mongolia Patents | New Zealand Patents | Philippines Patents | Philippines Applications | Saudi Arabia Patents | Singapore Patents | Singapore Applications | Taiwan Patents | Taiwan Applications | Tajikistan Patents | Tajikistan Applications | Thailand Applications | Uzbekistan Patents | Vietnam Patents | Algeria Patents | ARIPO Patents | ARIPO Applications | Egypt Patents | Kenya Patents | Malawi Patents | Morocco Patents | Morocco Applications | OAPI Patents | South Africa Patents | Tunisia Applications | Zambia Patents | Zimbabwe Patents | EAPO Patents | EAPO Applications | Georgia Patents | Georgia Applications | Kazakhstan Patents | Kazakhstan Applications | Russia Patents | Russia Applications | Turkey Patents | Turkey Applications

1 **2021-08-31 22:38 UTC | 10,190,528 results from**

De-Dup: None | **Cut-off:** None | **Sort:** Relevance

Main Concept: Text

A jump starting device for boosting or charging a depleted or discharged battery having a positive battery terminal and a negative battery terminal, the jump starter device comprising: a power supply; a positive battery connector for connecting the jump starter device to the positive battery terminal of the depleted or discharged battery; a negative battery connector for connecting the jump starter device to the negative battery terminal of the depleted or discharged battery; a power switch connected in circuit with the power supply and the positive and negative battery connectors, the power switch configured to switch power on or off from the power supply to the depleted or discharged battery, the power switch configured to switch power on only when properly connected to the positive and negative battery connectors; and a USB charging input configured to provide charging power from an external power source to the power supply.

Concept Modifiers: None

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Filters: None

Content: Non-Patent Literature (23)

IEEE Xplore Publications: IEEE Periodicals | IEEE Xplore Publications: IEEE Conferences | IEEE Xplore Publications: IEEE Standards | IEEE Xplore Publications: IEEE Early Access | IEEE Xplore Publications: SMPTE Periodicals | IEEE Xplore Publications: SMPTE Conferences | IEEE Xplore Publications: SMPTE Standards | IEEE Xplore Publications: MIT Press eBooks | IEEE Xplore Publications: Wiley-IEEE eBooks | IEEE Xplore Publications: IBM Periodicals | IEEE Xplore Publications: URSI Periodicals | IEEE Xplore Publications: VDE Conferences | IEEE Xplore Publications: Periodicals from China | IP.com Prior Art Database: The IP.com Journal | IP.com Prior Art Database: Internet Society RFC | IP.com Prior Art Database: IBM TDB Archive | IP.com Prior Art Database: Legacy Journals | IP.com Prior Art Database: Software Patent Institute | OnePetro.org: Periodicals at OnePetro.org | OnePetro.org: Conferences at OnePetro.org | Other Literature: IBM Redbooks | Other Literature: PubMed Central | Other Literature: arXiv.org

2 **2021-08-31 22:38 UTC | 692,561 results from**

De-Dup: None | **Cut-off:** None | **Sort:** Relevance

Main Concept: Text

A jump starting device for boosting or charging a depleted or discharged battery having a positive battery terminal and a negative battery terminal, the jump starter device comprising: a power supply; a positive battery connector for connecting the jump starter device to the positive battery terminal of the depleted or discharged battery; a negative battery connector for connecting the jump starter device to the negative battery terminal of the depleted or discharged battery; a power switch connected in circuit with the power supply and the positive and negative battery connectors, the power switch configured to switch power on or off from the power supply to the depleted or discharged battery, the power switch configured to switch power on only when properly connected to the positive and negative battery connectors; and a USB charging input configured to provide charging power from an external power source to the power supply.

Concept Modifiers: None

Filters: None

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK
Art Unit	2859
Examiner Name	M. Baye DIAO
Attorney Docket Number	054985-000055-US-02-02

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
/M.D/	1	3590357		1971-06-29	REID	
	2	3638108		1972-01-25	CHANNING	
	3	5194799		1993-03-16	TOMANTSCHGER	
	4	5281904		1994-01-25	TOMKINS	
	5	5319298		1994-06-07	WANZONG	
	6	5820407		1998-10-13	MORSE et al.	
	7	6344733		2002-07-30	CRASS	
	8	6424158		2002-07-23	KLANG	

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

/M.D/	9	6650086		2003-11-18	CHANG	
	10	6679212		2004-01-20	KELLING	
	11	6759833		2004-07-06	CHEN	
	12	7345450		2008-03-18	KRIEGER et al.	
	13	7893657		2011-02-22	CHAVAKULA	
	14	8362745		2013-01-29	TINAPHONG	
	15	9153978		2015-10-06	READE	
	16	9243601		2016-01-26	REICHOW	
	17	9525297		2016-12-20	WANG	
	18	9809183		2014-03-27	WEFLEN	
	19	9954391		2018-04-24	LEI	

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

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	Attorney Docket Number	054985-000055-US-02-02

/M.D/	20	10328808		2019-06-25	NOOK ET AL.	
	21	10604024		2020-03-31	NOOK ET AL.	
	22	D597029		2009-07-28	LI	

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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	20010025618	A1	2001-10-04	KELLING	
	2	20040066168	A1	2004-04-08	GEORGE	
	3	20040130298	A1	2004-07-08	KRIEGER	
	4	20030141845	A1	2003-07-31	KRIEGER	
	5	20040150373	A1	2004-08-05	CHAN	
	6	20040239290	A1	2004-12-02	KRIEGER	

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

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/M.D/	7	20050116688	A1	2005-06-02	YIN	
	8	20060176011	A1	2006-08-10	LUI	
	9	20060220610	A1	2006-10-05	SOLBERG	
	10	20060244412	A1	2006-11-02	BONZER	
	11	20080143290	A1	2008-07-19	CHAVAKULA	
	12	20110175461	A1	2011-07-21	TINAPHONG	
	13	20120025766	A1	2012-02-02	READE	
	14	20130162029	A1	2013-06-27	REICHOW	
	15	20140084844	A1	2014-03-27	WEFLEN	
	16	20140210399	A1	2014-07-31	URSCHEL	
	17	20140368155	A1	2013-12-18	CHEN	

EFS Web 2.1.18

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

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/M.D/	18	20150054336	A1	2015-02-26	LIU	
	19	20150340907	A1	2015-11-26	LEI	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

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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	2011/113734	WO		2011-09-22	REICHOW		
	2	2012/036556	WO		2012-03-22	EIDSVIG		
	3	2012/080996	WO		2012-06-21	TRACY		
	4	2014/106407	WO		2014-10-07	LEI		
	5	0616409	EP		2014-09-07	HERBERT		
	6	103066662	CN		2013-04-24	LEI	English abstract attached	X

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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]
/M.D/	1	Copy of Exhibit 1008, www.xcar360.com	
	2	Copy of Exhibit 1009, www.electronicshub.org	
	3	Copy of Exhibit 1010, USB Battery Charging 1.2 Compliance Plan	
	4	Copy of the Petition for Inter Partes Review of U.S. Patent No. 9,007,015; IPR 2020-00944, filed May 14, 2020, 99 pages	
	5	Copy of Exhibit 1012, Model: Epower-20B brochure, 1 page	
	6	Copy of Exhibit 1013, Model: Epower-21 brochure, 1 page	
	7	Copy of Exhibit 1015, Fairchild Semiconductor brochure, MC78XX/LM78XX/MC78XXA, 28 pages	
	8	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen Valuelink E-Commerce Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division,1 page.	
	9	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen ChangXin Yang Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.	
	10	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. SZ Jingxinghui Electronics Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page	

EFS Web 2.1.18

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First Named Inventor	Jonathan Lewis NOOK
Art Unit	2859
Examiner Name	M. Baye DIAO
Attorney Docket Number	054985-000055-US-02-02

/M.D/	11	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/19/17, The NOCO Company, Inc. v. Shenzhen Anband Technology Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.
	12	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 10/30/17, The NOCO Company, Inc. v. Shenzhen Dika Na'er E-Commerce Co., Ltd., U.S. District Court for the Northern District of Ohio, Eastern Division, 1 page.
	13	Copy of PTAB notice regarding petition filed in Patent Number 9007015, Application Number 14/325938, filed on 01/15/2018, IPR2018-00503, 1 page
	14	Copy of Report on the filing or determination of an action regarding a patent or trademark, filed 09/13/18, The NOCO Company, Inc. v. Halo2 Cloud, LLC, QVC, Inc., U.S. District Court Delaware, 1 page.
	15	Copy of Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response, mailed May 21, 2020, Shenzhen Carku Technology Co., Ltd. v. The NOCO Company, IPR2020-00944, Patent 9,007,015, 4 pages.
	16	International Search Report in corresponding PCT/US2014/045434, November 3, 2014.
	17	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Statement of Grounds of Particulars, Brown & Watson International Pty Ltd., June 6, 2019, 6 pages; particular (e), the offering for sale and sale by Asia Bright Industrial (Hong Kong) Co, Ltd. of products identified as the JPS Jump Starter and the JPR Jump Starter prior to July 2014.
	18	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Evidence in Support, filed September 6, 2019, 24 pages.
	19	Australian Patent Opposition #1, Australian Patent Application No. 2016269555, Evidence in Support – Exhibits, filed September 6, 2019,166 pages; Annexure MD-1, early specification sheets for "the BW Jumpstarter", 4 pages; Annexure MD-2, product manual for "the BW Jumpstarter", PROJECTA; "2x22 Amp Hour High Performance Jumpstarter"; 2013; 20 pages.
	20	Australian Patent Opposition #2, Australian Patent Application No. 2019201559, Statement of Grounds and Particulars, filed May 21, 2020, 8 pages.
	21	THE NOCO COMPANY v. DELTONA TRANSFORMER CORPORATION and DELTRAN USA, LLC, Defendant Deltran USA, LLC's Invalidity Contentions, In the United States District Court for the Middle District of Florida, Orlando Division, USB Implementers Forum, Inc.,Battery Charging Specification, Revision 1.1, 04-15-2009 on page 8, Prior Art Offered for Sale or Publicly Used or Known on pages 8-10, MICRO-START/PPS, E-Power, Battery Tender Power Pack, PowerAll, and Electromate 400 on page 10; 141 pages.

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16820040
	Filing Date	2020-03-16
	First Named Inventor	Jonathan Lewis NOOK
	Art Unit	2859
	Examiner Name	M. Baye DIAO
	Attorney Docket Number	054985-000055-US-02-02

/M.D/	22	THE NOCO CO., INC. v. SMARTECH PRODUCTS, INC., et al., Smartech, Inc.'s Invalidity and Unenforceability Contents, Bestek 2400A Peak Current Portable Car Jump Starter Power Bank with 1000mAh Capacity (SMARTECH 00062-00069)("Bestek") on page 2; HALO 7800 mAh Portable Charger for Cell Phones & Tablets (SMARTECH 00070-00071)("HALO") on page 2; Schumacher Lithium Iron Jump Starter – SL1 Red Fuel (SMARTECH 00072-00073)("Schumacher") on page 2, filed June 19, 2019, 8 pages.
	23	THE NOCO COMPANY v. SHENZHEN DIKA NA'ER E-COMMERCE (Lead Case No. 1:17-cv-02282), THE NOCO COMPANY v. SHENZHEN CHANGXINYANG TECHNOLOGY CO., LTD (Case No. 1:117-cv-02209). THE NOCO COMPANY v. SHENZHEN VALUELINK E-COMMERCES CO., LTD (Case No. 1:17-cv-02210), Defendants' Amended Final Invalidity and Unenforceability Contents, The Powerall PBJS12000RD Jump Starter ("Powerall Jump Starter"), offered for sale by Gryphon Mobile Electronics at least as early as November 5, 2013, on page 2, The Lightning 12V

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Examiner Signature	/M BAYE DIAO/	Date Considered	08/31/2021

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[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.

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	08/31/2021								
	1	-								
	2	-								
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	40	✓								
	41	✓								
	42	✓								

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	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

CLAIM		DATE								
Final	Original	08/31/2021								
	43	✓								
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	47	✓								
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	70	✓								

Bibliographic Data

Application No: 16/820,040

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /M BAYE DIAO/ Examiner's Signature | Initials

Title: PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/16/2020	320	2859	054985-000055-US-02-02
RULE			

APPLICANTS

THE NOCO COMPANY, Glenwillow, OH, UNITED STATES

INVENTORS

Jonathan Lewis NOOK, Gates Mills, OH, UNITED STATES

William Knight NOOK, Shaker Heights, OH, UNITED STATES

James Richard STANFIELD, Glendale, AZ, UNITED STATES

Derek Michael UNDERHILL, Tempe, AZ, UNITED STATES

CONTINUING DATA

This application is a CON of 15691884 08/31/2017 PAT 10604024

15691884 is a CON of 14619655 02/11/2015 PAT 9770992

14619655 is a DIV of 14325938 07/08/2014 PAT 9007015

14325938 is a CON of PCT/US14/45434 07/03/2014

FOREIGN APPLICATIONS

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03/30/2020

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Washington, DC 20006-1152

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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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
/M.D/	1	3933140	A	1976-01-20	Gynn	
	2	4041445	A	1977-08-09	Carter	
	3	4885524	A	1989-12-05	Wilburn	
	4	4910628	A	1990-03-20	Minagawa ET AL.	
	5	4931731	A	1990-06-05	Jenks	
	6	5083076	A	1992-01-21	Scott	
	7	5111130	A	1992-05-05	Bates	
	8	5189359	A	1993-02-23	Kronberg	

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/M.D/	9	5486434	A	1996-01-23	Aoyama	
	10	5635817	A	1997-06-03	Shiska	
	11	5635818	A	1997-06-03	Quintero	
	12	5650974	A	1997-07-22	Yoshimura	
	13	5793185	A	1998-08-11	Prelec ET AL.	
	14	5795182	A	1998-08-18	Jacob	
	15	5921809	A	1999-07-13	Fink	
	16	5953681	A	1999-09-14	Cantatore	
	17	5965998	A	1999-10-12	Whiting ET AL.	
	18	6054779	A	2000-04-25	Zubko	
	19	6130519	A	2000-10-10	Whiting ET AL.	

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/M.D/	20	6140796	A	2000-10-31	Martin ET AL.	
	21	6147471	A	2000-11-14	Hunter	
	22	6212054	B1	2001-04-03	Chan	
	23	6262492		2001-07-17	Sheng	
	24	6262559		2001-07-17	Eggert ET AL.	
	25	6362599	B1	2002-03-26	Turner ET AL.	
	26	6386907	A	2002-05-14	Ruffa	
	27	6426606	B1	2002-07-30	Purkey	
	28	6632103		2003-10-14	Liu	
	29	6648701	B2	2003-11-18	Mouissie	
	30	6756764		2004-06-29	Smith ET AL.	

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/M.D/	31	6803743	B2	2004-10-12	George ET AL.	
	32	6822425	B2	2004-11-23	Krieger ET AL.	
	33	7148580	B2	2006-12-12	Sodemann ET AL.	
	34	7301303		2007-11-27	Hulden	
	35	7749031	B2	2010-07-06	Detter	
	36	7872361		2011-01-18	Mcfadden	
	37	8076900	B1	2011-12-13	Brown	
	38	8172603	B1	2012-05-08	Richardet, Jr.	
	39	8199024		2012-06-12	Baxter ET AL.	
	40	8376775		2013-02-19	Rinhardt	
	41	8493021	B2	2013-07-23	Richardson ET AL.	

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/M.D/	42	9007015	B1	2015-04-14	Nook ET AL.	
	43	9041244		2015-05-26	Graf	
	44	9506446	B2	2016-11-29	Liu	
	45	9770992	B2	2017-09-26	Nook ET AL.	
	46	D625265	S	2010-10-12	Dumelle ET AL.	
	47	D649116	S	2011-11-22	Nakatsuka	
	48	D689020	S	2013-09-03	Demirjian ET AL.	
	49	D726109	S	2015-04-07	Nook ET AL.	
	50	D726114	S	2015-04-07	Nook ET AL.	
	51	D726121	S	2015-04-07	Nook ET AL.	
	52	D735665	S	2015-08-04	Nook ET AL.	

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/M.D/	53	D746774	S	2016-01-05	Nook ET AL.	

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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	20020041174	A1	2002-04-11	PURKEY	
	2	20040066168	A1	2004-04-08	GEORGE ET AL.	
	3	20040130298	A1	2004-07-08	KRIEGER ET AL.	
	4	20050040788	A1	2005-02-24	TSENG	
	5	20050110467	A1	2005-05-26	THOMASON	
	6	20050252573	A1	2005-11-17	MONTANI	
	7	20070278990	A1	2007-12-06	RAICHLE	
	8	20070285049	A1	2007-12-13	KRIEGER ET AL.	

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/M.D/	9	20100301800	A1	2010-12-02	INSKEEP	
	10	20110068734	A1	2011-03-24	WALDRON	
	11	20120091944	A1	2012-04-19	ROGERS	
	12	20120319487	A1	2012-12-20	SHAH	
	13	20130154543	A1	2013-06-20	RICHARDSON ET AL.	
	14	20130241488	A1	2013-09-19	DAO	
	15	20130314041	A1	2013-11-28	PROEBSTLE	
	16	20140159509	A1	2014-06-12	INSKEEP	
	17	20150137740	A1	2015-05-21	ALLOS	
	18	20150306964	A1	2015-10-29	WANG	
	19	20160001666	A1	2016-01-07	NOOK ET AL.	

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/M.D/	20	20180111491	A1	2018-04-26	NOOK ET AL.	
	21	20180215274	A1	2018-08-02	NOOK ET AL.	
	22	20180269703	A1	2018-09-20	NOOK ET AL.	
	23	20180342891	A1	2018-11-29	NOOK ET AL.	
	24	20180345803	A1	2018-12-06	NOOK ET AL.	
	25	20190308518	A1	2019-10-10	NOOK ET AL.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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	2015258229	AU	A1	2016-01-28	THE NOCO COMPANY		
	2	2016269555	AU	B2	2017-01-05	THE NOCO COMPANY		
	3	2016392707	AU	A1	2017-11-30	THE NOCO COMPANY		

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/M.D/	4	2017217661	AU	B2	2018-11-15	THE NOCO COMPANY		
	5	2019201081	AU	A1	2019-03-07	THE NOCO COMPANY		
	6	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		
	7	2916782	CA	A1	2016-01-07	THE NOCO COMPANY		
	8	2957431	CA	A1	2017-08-11	THE NOCO COMPANY		
	9	3005971	CA	A1	2017-08-17	THE NOCO COMPANY		
	10	107852004	CN	A	2018-03-27	THE NOCO COMPANY		☒
	11	108884801	CN	A	2018-11-23	THE NOCO COMPANY		☒
	12	29507501	DE	U1	1995-06-29	SEO SOLAR SONNENENERGIE OPPACH		☒
	13	102014114997	DE	A1	2016-01-07	THE NOCO COMPANY		☒
	14	112016002206	DE	T5	2018-03-15	THE NOCO COMPANY		☒

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/M.D/	15	202009016260	DE	U1	2010-03-25	TSAI MING WEI		☐
	16	202013102599	DE	U1	2013-08-13	ASIA BRIGHT INDUSTRIAL HONG KONG CO	Abstract	☒
	17	2472698	EP	A2	2012-07-04	IFINEON TECHNOLOGIES		☐
	18	3286429	EP	A1	2018-02-28	THE NOCO COMPANY		☐
	19	3308446	EP	A1	2018-04-18	THE NOCO COMPANY		☐
	20	3407405	EP	A1	2018-11-28	THE NOCO COMPANY		☐
	21	2527848	GB	A	2016-01-06	THE NOCO COMPANY		☐
	22	2557733	GB	A	2018-06-27	THE NOCO COMPANY		☐
	23	2562950	GB	A	2018-11-28	THE NOCO COMPANY		☐
	24	2018534892	JP	A	2018-11-22	THE NOCO COMPANY		☒
	25	2018536789	JP	A	2018-12-13	THE NOCO COMPANY		☒

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/M.D/	26	2004036714	WO	A1	2004-04-29	VECTOR PRODUCTS, INC.		☐
	27	2010129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES, INC.		☐
	28	2013137873	WO	A1	2013-09-19	DAO		☐
	29	2016003471	WO	A1	2016-01-07	THE NOCO COMPANY		☐
	30	2017138963	WO	A1	2017-08-17	THE NOCO COMPANY		☐
	31	2017139524	WO	A1	2017-08-17	THE NOCO COMPANY		☐

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	1	copy of the Petition for Inter Partes Review of US Patent No. 9,007,015; 49 pages; filed January 15, 2018.	
	2	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on October 23, 2018; 1 page	
	3	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on September 21, 2018; 1 page	

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	5	copy of Report on the filing or determination of an action regarding a patent; U.S. Patent 9,007,015; issued on December 5, 2017; 1 page
	6	PROJECTA; "2x22 Amp Hour High Performance Jumpstarter"; 2013; pages 1-20

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Attorney Docket Number	054985.000055-US-02-01

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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
/M.D/	1	8493021	B2	2013-07-23	RICHARDSON et al.	
	2	D746774	S	2016-01-05	NOOK et al.	
	3	D735665	S	2015-08-04	NOOK et al.	
	4	D726121	S	2015-04-07	NOOK et al.	
	5	6822425	B2	2004-11-23	KRIEGER et al.	
	6	6147471	A	2000-11-14	HUNTER; ALTON G.	
	7	6054779	A	2000-04-25	ZUBKO; RONALD L.	
	8	6212054	B1	2001-04-03	CHAN; SING	

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16820040
Filing Date	2020-03-16
First Named Inventor	Jonathan Lewis NOOK et al.
Art Unit	2859
Examiner Name	"NOT YET ASSIGNED"
Attorney Docket Number	054985.000055-US-02-01

/M.D/	9	6362599	B1	2002-03-26	Turner et al.	
	10	6803743	B2	2004-10-12	George et al.	
	11	5965998		1999-10-12	Whiting et al.	
	12	4885524		1989-12-05	Wilburn	
	13	5083076		1992-01-21	Scott	
	14	6130519		2000-10-10	Whiting et al.	
	15	6262559		2001-07-17	Eggert et al.	
	16	5111130		1992-05-05	Bates	
	17	5189359		1993-02-23	Kronberg	
	18	5635817		1997-06-03	Shiska	
	19	5635818		1997-06-03	Quintero	

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/M.D/	20	5793185		1998-08-11	PRELEC et al.	
	21	5795182		1998-08-18	JACOB	
	22	5921809		1999-07-13	FINK	
	23	6140796		2000-10-31	MARTIN et al.	
	24	6212054		2001-04-03	CHAN	
	25	6262492		2001-07-17	SHENG	
	26	6632103		2003-10-14	LIU	
	27	6756764		2004-06-29	SMITH et al.	
	28	7301303		2007-11-27	HULDEN	
	29	7872361		2011-01-18	MCFADDEN	
	30	8199024		2012-06-12	BAXTER et al.	

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

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/M.D/	31	8376775		2013-02-19	RINEHARDT	
	32	3933140	A	1976-01-20	GYNN; GEORGE E.	
	33	4041445	A	1977-08-09	CARTER; REID F.	
	34	4931731	A	1990-06-05	JENKS; WILLIAM C.	
	35	5486434	A	1996-01-23	AOYAMA; MASAHIKO	
	36	6648701	B2	2003-11-18	MOUISSIE; BOB	
	37	7749031	B2	2010-07-06	DETTER; GARY C	
	38	8076900	B1	2011-12-13	BROWN AUDLEY	
	39	6386907	A	2002-05-14	RUFFA	
	40	6426606	B1	2002-07-30	PURKEY	
	41	9506446	b2	2016-11-29	XINFANG	

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/M.D/	42	9770992	B2	2017-09-26	NOOK et al.	
	43	D625265	S	2010-10-12	DUMELLE et al.	
	44	D649116	S	2011-11-22	NAKATSUKA	
	45	D689020	S	2013-09-03	DEMIRJIAN et al.	
	46	D726109	S	2015-04-07	NOOK et al.	
	47	D726114	S	2015-04-07	NOOK et al.	
	48	9007015	B1	2015-04-14	NOOK et al.	

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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	20130154543	A1	2013-06-20	RICHARDSON et al.	
	2	20040130298	A1	2004-07-08	KRIEGER et al.	

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/M.D/	3	20020041174	A1	2002-04-11	PURKEY	
	4	20100301800	A1	2010-12-02	INSKEEP	
	5	20140159509	A1	2014-06-12	INSKEEP	
	6	20050110467	A1	2005-05-26	Thomason	
	7	20050040788	A1	2005-02-24	Tseng	
	8	20050252573	A1	2005-11-17	Montani	
	9	20070285049	A1	2007-12-13	Krieger et al.	
	10	20120091944	A1	2012-04-19	Rogers	
	11	20130314041	A1	2013-11-28	Proebstle	
	12	20110068734	A1	2011-03-24	WALDRON; JOHN F.	
	13	20040066168	A1	2004-04-08	GEORGE et al.	

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

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/M.D/	14	20150306964	A1	2015-10-29	WANG	
	15	20160001666	A1	2016-01-07	NOOK et al.	
	16	20180342891	A1	2018-11-29	NOOK et al.	
	17	20180111491	A1	2018-04-26	NOOK et al.	
	18	20180215274	A1	2018-08-02	NOOK et al.	
	19	20180269703	A1	2018-09-20	NOOK et al.	
	20	20180345803	A1	2018-12-06	NOOK et al.	
	21	20190308518	A1	2019-10-10	NOOK 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	2010/129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES		

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/M.D/	2	2013/137873	WO	A1	2013-09-19	DAO		☒
	3	2004/036714	WO	A1	2004-04-29	VECTOR PRODUCTS, INC.		☐
	4	2016/003471	WO	A1	2016-01-07	THE NOCO COMPANY		☐
	5	2 916 782	CA	A1	2016-01-07	THE NOCO COMPANY		☐
	6	2018-534892	JP	A	2018-11-22	THE NOCO COMPANY		☒
	7	107852004	CN	A	2018-03-27	THE NOCO COMPANY		☒
	8	3308446	EP	A1	2018-04-18	THE NOCO COMPANY		☐
	9	3286429	EP	A1	2018-02-28	THE NOCO COMPANY		☐
	10	2017/139524	WO	A1	2017-08-17	THE NOCO COMPANY		☐

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	Examiner M'BAYE DIAO	Art Unit 2859	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-9601800-B2	03-2017	Nakamoto; Takeshi	H01M10/441	1/1
*	B	US-9041244-B2	05-2015	Graf; Alfons	B60R16/03	307/10.7
*	C	US-8172603-B1	05-2012	Richardet, Jr.; David	H01R11/24	439/504
*	D	US-6262559-B1	07-2001	Eggert; Daniel M.	H02J7/342	320/103
*	E	US-6215273-B1	04-2001	Shy; Jack	H01M50/20	320/105
*	F	US-6130519-A	10-2000	Whiting; John S.	H02J7/0034	320/105
*	G	US-5965998-A	10-1999	Whiting; John S.	H02J7/0034	320/165
*	H	US-5953681-A	09-1999	Cantatore; Luigi	G01N15/14	702/31
*	I	US-5650974-A	07-1997	Yoshimura; Yoshimasa	G11C5/141	365/228
*	J	US-5083076-A	01-1992	Scott; Clyde A.	H02J7/0034	320/105
*	K	US-4885524-A	12-1989	Wilburn; William M.	H01M10/44	320/105
*	L	US-20190081472-A1	03-2019	GUO; Weilong	H02J7/0034	1/1
*	M	US-20180369599-A1	12-2018	Smith; John S.	F16M11/10	1/1

FOREIGN PATENT DOCUMENTS

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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20160181587-A1	06-2016	KOEBLER; MARTIN	H01M50/213	429/7
*	B	US-20150137740-A1	05-2015	Allos; Khalid Mike	H02J7/0034	320/107
*	C	US-20130314041-A1	11-2013	PROEBSTLE; Hartmut	F02N11/087	320/109
*	D	US-20130241488-A1	09-2013	Dao; Yuan	H02J7/0013	320/111
*	E	US-20120319487-A1	12-2012	Shah; Rakesh	H02J9/062	307/66
*	F	US-20120091944-A1	04-2012	Rogers; Chad	H02J7/0042	320/105
*	G	US-20110175461-A1	07-2011	Tinaphong; Prapan Paul	H02J50/402	307/149
*	H	US-20070285049-A1	12-2007	Krieger; Michael	H01M50/213	320/105
*	I	US-20050252573-A1	11-2005	Montani, Mark A.	B67D7/04	141/98
*	J	US-20050040788-A1	02-2005	Tseng, Wen Ing	H02J7/0042	320/111
*	K	US-10981452-B2	04-2021	Nook; Jonathan Lewis	H02J1/122	1/1
*	L	US-9748541-B2	08-2017	Burke; Edmund David	H01M50/572	1/1
*	M	US-8076900-B1	12-2011	Brown; Audley	F02N11/14	320/105

FOREIGN PATENT DOCUMENTS

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U.S. PATENT DOCUMENTS

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*	A	US-20110068734-A1	03-2011	Waldron; John F.	H02J7/0042	320/107
	B					
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	K					
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	P					
	Q					
	R					
	S					
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/M.D/	1	2018-536789	JP	A	2018-12-13	THE NOCO COMPANY		☒
	2	108884801	CN	A	2018-11-23	THE NOCO COMPANY		☒
	3	3407405	EP	A1	2018-11-28	THE NOCO COMPANY		☐

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/M.D/	4	2527858	GB	A	2016-01-06	THE NOCO COMPANY		☐
	5	2010/129723	WO	A2	2010-11-11	ENERGY SAFE TECHNOLOGIES, INC.		☐
	6	2017/138963	WO	A1	2017-08-17	THE NOCO COMPANY		☐
	7	20 2013 102 599	DE	U1	2013-08-13	ASIA BRIGHT INDUSTRIAL HONG KONG CO		☒
	8	295 07 501	DE	US	1995-06-29	SEO SOLAR SONNENENERGIE OPPACH		☒
	9	20 2009 016 260	DE	U1	2010-03-25	TSAI MING WEI		☒
	10	10 2014 114 997	DE	A1	2016-01-07	THE NOCO COMPANY		☒
	11	2015258229	AU	A1	2016-01-28	THE NOCO COMPANY		☐
	12	2557733	GB	A	2018-06-27	THE NOCO COMPANY		☐
	13	2016392707	AU	A1	2017-11-30	THE NOCO COMPANY		☐
	14	11 2016 002 206	DE	T5	2018-03-15	THE NOCO COMPANY		☒

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/M.D/	15	2 957 431	CA	A1	2017-08-11	THE NOCO COMPANY		☐
	16	2016269555	AU	B2	2017-01-05	THE NOCO COMPANY		☐
	17	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		☐
	18	3 005 971	CA	A1	2017-08-17	THE NOCO COMPANY		☐
	19	2562950	GB	A	2018-11-28	THE NOCO COMPANY		☐
	20	2019201081	AU	A1	2019-03-07	THE NOCO COMPANY		☐
	21	2017217661	AU	B2	2018-11-15	THE NOCO COMPANY		☐
	22	2019201559	AU	A1	2019-03-28	THE NOCO COMPANY		☐

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	Attorney Docket Number	054985.000055-US-02-01

EXAMINER SIGNATURE			
Examiner Signature	/M BAYE DIAO/	Date Considered	08/31/2021

*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.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.D/

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L165	331	(reverse reversed) adj polarity adj (sens$3 detect$3)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:32 PM
L168	0	L163 and (L165 L166) and L160	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:34 PM
L169	10	L163 and (L165 L166) and L164	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:34 PM
L170	4639064	(microcontroller microcomputer microprocessor processor controller)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:35 PM
L171	10	L169 and L170	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:35 PM
L172	38	((("THE") near3 ("NOCO") near3 ("COMPANY"))).AS,AANM.	(USPAT)	OR	ON	ON	2019/10/07 01:48 PM
L173	87	((("NOOK") near3 ("Jonathan")) OR (("NOOK") near3 ("William")) OR (("STANFIELD") near3 ("James")) OR (("UNDERHILL") near3 ("Derek"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/10/07 01:48 PM
L174	68	("20020041174"|"20040066168"|"20040130298"|"20050040788"|"20050110467"|"20050252573"|"20070285049"|"20100301800"|"20110068734"|"20120091944"|"20130154543"|"20130314041"|"20140159509"|"20150306964"|"20160001666"|"20180111491"|"20180215274"|"20180269703"|"20180342891"|"20180345803"|"20190308518"|"3933140"|"4041445"|"4885524"|"4931731"|"5083076"|"5111130"|"5189359"|"5486434"|"5635817"|"5635818"|"5793185"|"5795182"|"5921809"|"5965998"|"6054779"|"6130519"|"6140796"|"6147471"|"6212054"|"6262492"|"6262559"|"6362599"|"6386907"|"6426606"|"66321	(US-PGPUB; USPAT)	OR	ON	ON	2019/11/20 07:47 PM

		03"|"6648701"|"6756764"|"6803743"|"6822425"|"7301303"|"7749031"|"7872361"|"8076900"|"8199024"|"8376775"|"8493021"|"9007015"|"9506446"|"9770992"|"D625265"|"D649116"|"D689020"|"D726109"|"D726114"|"D726121"|"D735665"|"D746774").PN.					
L175	1	"10328808".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:01 PM
L176	1	"9770992".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:03 PM
L177	9696	(isolat$3 (batter$3 adj presence)) adj sens$3	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L178	279	reverse adj polarity adj (detect$3 sens$3)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L179	11	L177 and L178	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L180	7	L174 and L179	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:38 PM
L182	1	"10604024".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2020/07/01 07:06 PM
L336	0	L345 and (L347 L348) and L342	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:34 PM
L337	10	L345 and (L347 L348) and L346	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:34 PM
L338	4639064	(microcontroller microcomputer microprocessor processor controller)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:35 PM
L339	10	L351 and L352	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/10/07 01:35 PM
L340	38	((("THE") near3 ("NOCO") near3 ("COMPANY"))).AS,AANM.	(USPAT)	OR	ON	ON	2019/10/07 01:48 PM
L341	87	((("NOOK") near3 ("Jonathan")) OR (("NOOK") near3 ("William")) OR (("STANFIELD") near3 ("James")) OR (("UNDERHILL") near3 ("Derek"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/10/07 01:48 PM
L342	68	("20020041174"|"20040066168"|"20040130298"|"20050040788"|"20050110467"|"20050252573"|"20070285049"|"20100301800"|"201100687	(US-PGPUB; USPAT)	OR	ON	ON	2019/11/20 07:47 PM

		34"|"20120091944"|"20130154543"|"20130314041"|"20140159509"|"20150306964"|"20160001666"|"20180111491"|"20180215274"|"20180269703"|"20180342891"|"20180345803"|"20190308518"|"3933140"|"4041445"|"4885524"|"4931731"|"5083076"|"5111130"|"5189359"|"5486434"|"5635817"|"5635818"|"5793185"|"5795182"|"5921809"|"5965998"|"6054779"|"6130519"|"6140796"|"6147471"|"6212054"|"6262492"|"6262559"|"6362599"|"6386907"|"6426606"|"6632103"|"6648701"|"6756764"|"6803743"|"6822425"|"7301303"|"7749031"|"7872361"|"8076900"|"8199024"|"8376775"|"8493021"|"9007015"|"9506446"|"9770992"|"D625265"|"D649116"|"D689020"|"D726109"|"D726114"|"D726121"|"D735665"|"D746774").PN.				
L343	1	"10328808".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:01 PM
L344	1	"9770992".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:03 PM
L345	9696	(isolat$3 (batter$3 adj presence)) adj sens$3	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L346	279	reverse adj polarity adj (detect$3 sens$3)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L347	11	L359 and L360	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:25 PM
L348	7	L356 and L361	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2019/11/20 08:38 PM
L349	1	"10604024".pn.	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2020/07/01 07:06 PM
L365	2	"10604024".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/26 11:15 PM
L366	19947	(USB (universal NEAR serial NEAR bus)) NEAR ((charg$3 NEAR input NEAR port) (input charg$3) NEAR port)	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/26 11:33 PM

L367	30	L233 L232 L366	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2021/08/26 11:35 PM
L368	33	L346 L366 L333 L330	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2021/08/26 11:42 PM
L369	199	(jump boost) NEAR start$3 NEAR (device apparatus instrument module)	(US-PGPUB; USPAT; EPO)	OR	ON	ON	2021/08/26 11:44 PM
L370	25	L369 L366	(US-PGPUB; USPAT; EPO)	AND	ON	ON	2021/08/26 11:45 PM
L371	921407	"705"	(US-PGPUB; USPAT; EPO)	AND	ON	ON	2021/08/26 11:52 PM
L372	2	("2019/0081472").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	AND	ON	ON	2021/08/27 12:19 AM
L373	15	("2479705" | "4895530" | "5367243" | "6215273" | "6222342" | "6623315" | "20020195995" | "20030141842" | "20080185996" | "20150054460" | "20150377808" | "20160049819" | "20160329731" | "20190081472").pn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	AND	ON	ON	2021/08/27 12:20 AM
L374	555	(Lithium NEAR battery) WITH (cell NEAR (balanc$3 equaliz$5))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/30 06:48 PM
L375	1219412	mini	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2021/08/30 07:34 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L376	26965543	10	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/30 11:27 PM
L377	2	"20090174362".pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/30 11:38 PM
L378	5	"5867007".pn.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2021/08/31 11:34 AM

			JPO; DERWENT; IBM_TDB)				
L379	2	"20090174362".pn.period	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/31 03:23 PM
L380	2	"8076900".pn.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/31 03:41 PM
L381	4	"20110068734".pn.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/31 03:45 PM
L382	684307	(B60L53/14 OR H02J7/342 OR H02J7/0047 OR H02J7/0034 OR H02J7/0029 OR H02J1/122 OR H02J7/00 OR	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2021/08/31 05:56 PM

		H02J7/0048 OR H02J7/00302 OR H02J7/00309 OR H02J7/00306 OR Y02T90/14 OR Y02T10/7072 OR Y02T10/70 OR H02J2310/46).cpc. 320/105.ccls.	IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L383	2	L382 L369 L374 L346 L366	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	AND	ON	ON	2021/08/31 05:58 PM
L384	135	((("NOOK") near3 ("Jonathan")) OR (("NOOK") near3 ("William")) OR (("STANFIELD") near3 ("James")) OR (("UNDERHILL") near3 ("Derek"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	AND	ON	ON	2021/08/31 05:59 PM
L385	135	((("NOOK") near3 ("Jonathan")) OR (("NOOK") near3 ("William")) OR (("STANFIELD") near3 ("James")) OR (("UNDERHILL") near3 ("Derek"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	AND	ON	ON	2021/08/31 06:00 PM
L386	0	L338 L346 L369 L313	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	AND	ON	ON	2021/08/31 06:01 PM
L387	117	("10328808" OR "10604024" OR "20010025618" OR "20020041174" OR "20030141845" OR "20040066168" OR "20040130298" OR "20040150373" OR "20040239290" OR "20050040788" OR "20050110467" OR "20050116688" OR	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/31 06:04 PM

		"20050252573" OR "20060176011" OR "20060220610" OR "20060244412" OR "20070278990" OR "20070285049" OR "20080143290" OR "20100301800" OR "20110068734" OR "20110175461" OR "20120025766" OR "20120091944" OR "20120319487" OR "20130154543" OR "20130162029" OR "20130241488" OR "20130314041" OR "20140084844" OR "20140159509" OR "20140210399" OR "20140368155" OR "20150054336" OR "20150137740" OR "20150306964" OR "20150340907" OR "20160001666" OR "20180111491" OR "20180215274" OR "20180269703" OR "20180342891" OR "20180345803" OR "20190308518" OR "3590357" OR "3638108" OR "3933140" OR "4041445" OR "4885524" OR "4910628" OR "4931731" OR "5083076" OR "5111130" OR "5189359" OR "5194799" OR "5281904" OR "5319298" OR "5486434" OR "5635817" OR "5635818" OR "5650974" OR "5793185" OR "5795182" OR "5820407" OR "5921809" OR "5953681" OR "5965998" OR "6054779" OR "6130519" OR "6140796" OR					

		"6147471" OR "6212054" OR "6262492" OR "6262559" OR "6344733" OR "6362599" OR "6386907" OR "6424158" OR "6426606" OR "6632103" OR "6648701" OR "6650086" OR "6679212" OR "6756764" OR "6759833" OR "6803743" OR "6822425" OR "7148580" OR "7301303" OR "7345450" OR "7749031" OR "7872361" OR "7893657" OR "8076900" OR "8172603" OR "8199024" OR "8362745" OR "8376775" OR "8493021" OR "9007015" OR "9041244" OR "9153978" OR "9243601" OR "9506446" OR "9525297" OR "9770992" OR "9809183" OR "9954391" OR "D597029" OR "D625265" OR "D649116" OR "D689020" OR "D726109" OR "D726114" OR "D726121" OR "D735665" OR "D746774").pn.					
L388	0	L387 L374 L369 L366	(US-PGPUB; USPAT)	AND	ON	ON	2021/08/31 06:04 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N181	5	(supply and output$4 and isolat$3 and sensor and revers$3 and	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/11/20 09:46 PM

		polarity and switch$3 and microcontrol$3 and signal$1).clm.					
N195	5	(supply and output$4 and isolat$3 and sensor and revers$3 and polarity and switch$3 and microcontrol$3 and signal$1).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/11/20 09:46 PM

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/820,040	03/16/2020	Jonathan Lewis NOOK	054985-000055-US-02-02	1056

20230 7590 09/07/2021

Vorys, Sater, Seymour and Pease LLP
1909 K St., NW
9th Floor
Washington, DC 20006-1152

EXAMINER	
DIAO, M BAYE	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
09/07/2021	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):

patlaw@vorys.com

PTOL-90A (Rev. 04/07)

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Office Action Summary	Application No. 16/820,040	Applicant(s) NOOK et al.	
	Examiner M'BAYE DIAO	Art Unit 2859	AIA (FITF) 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 03/16/2020.

☐ 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) 24-70 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) 24-70 is/are rejected.

8) ☐ Claim(s) _____ 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 03/16/2020 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 03/17/2020;07/23/2020.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

2. Acknowledgment is made of application #16/820,040 filed on 03/16/2020 in which claims 1-23 have been presented for examination.

Response to Amendment

3. Acknowledgement is made of preliminary amendment filed on 03/17/2020 in which claims 1-23 have been canceled while claims 24-70 have been newly added. By this amendment, claims 24-70 are now pending in the application for prosecution in a first action on the merits.

Claim Objections

4. Claim 48 is objected to because of the following informalities: At the end of claim 48, **delete, ";" and replace it with --.--**. Appropriate correction is required.

Information Disclosure Statement

5. The information disclosure statements (IDS) filed on 03/17/2020 and 07/23/2020 have been considered and placed of record. Initialed copies are attached herewith.

Claim Rejections - 35 USC § 103

6. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

7. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

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> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

10. **Claims 24-28,30-32,35-58,60,63-70 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461**.

4. Regarding claim 24, Richardson discloses a jump starting device**(10)(Abstract; ¶[0001])** for boosting or charging a depleted or discharged battery **(battery of vehicle 28)(¶[0006])** having a positive battery terminal **(Red clamp; Fig. 2.C)** and a negative battery terminal **(black clamp)(Note-jumper cable 60 has red (positive) and black (negative) clamps. EX1010 at**

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¶[0020]); Richardson discloses "a pair of conductive leads for connecting the supplemental power to an engine electrical system), the jump starter device(**10**) comprising: a power supply **(jump starter batteries 22 provide power to the battery of the vehicle(28) to be jump started; see ¶[0006] and Fig. 2C**); a positive battery connector **(labeled Red clamp; Fig. 2.C)** for connecting(**via cables 60**) the jump starter device(**10**) to the positive battery terminal of the depleted or discharged battery(**battery of vehicle 28**); a negative battery connector **(labeled black clamp; Fig. 2.C)** for connecting(**via cables 60**) the jump starter device(**10**) to the negative battery terminal of the depleted or discharged battery(**battery of vehicle 28**); a power switch **((contact relay 34); see Figs. 1 and 2C)** connected in circuit with the power supply(**jump starter batteries 22**) and the positive and negative battery connectors(**Red and Black clamps; see Figs. 1 and 2C**), the power switch(**contact relay 34**) configured to switch power on or off from the power supply(**jump starter batteries 22**) to the depleted or discharged battery(**battery of vehicle 28**), the power switch(**34**) configured(**under the control of the microprocessor 12**) to switch power on only when properly connected to the positive and negative battery **connectors(note-Only after the reverse polarity and battery presence tests have been conducted at steps 214 and 252 does the process proceed to step 268 where microprocessor 12 sends a signal to close contact relay 34. (See also Fig. 3, Fig. 6, ¶[0014] and [0027] to turning on the power switch or circuit(34)(see ¶[0014])(note- Richardson also makes clear that the microcontroller only closes relay 34 if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity. For example, Richardson states that "when the jump starter 10 is initially powered on 200, the microprocessor initializes the hardware . . . . then performs a self-test operation 208 where . . . all sensors 20, 24, 30, 32, 38, 40 . . . are tested". Richardson further discloses The**

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process of measuring the vehicle battery voltage necessarily entails detecting the presence of a vehicle battery connected to the positive and negative output ports since reading a sufficiently low voltage would indicate either the absence of a vehicle battery or a battery with a voltage below a required threshold for detection. Only after the reverse polarity and battery presence tests have been conducted at steps 214 and 252 does the process proceed to step 268 where microprocessor 12 sends a signal to close contact relay 34. (See also Fig. 3, Fig. 6, see also ¶[0014] and [0027]).

11. Richardson does not expressly teach the limitations of,

- and a USB charging input configured to provide charging power from an external power source to the power supply

12. However,Tinaphong discloses at least a USB charging input **(input of first stage DC-DC-converter circuit 20 at USB charger port or connector 24)** configured to provide charging power from an external power**(the energy harvesting device of the present invention may include an input connector for receiving a charging voltage from an external power source, such as another electronic device, or a power transformer for such device which is connected to a cigarette lighter of an automobile, or to an AC/DC adapter for connection to a 110 volt AC wall power receptacle, for example. The power signal from this external electrical power source is provided to the lithium battery or other storage device internal to the energy harvesting circuit so that the lithium battery or storage device may be charged thereby source; see ¶[0015], [0039]-[0040],[0072]-[0073],[0075])(note- input of first stage DC-DC-converter circuit 20 configured for converting via element 20 which is a first DC-DC converter power from a USB charger (24) to charge the internal second storage device 18, see ¶[0039] and [0107])** to the power supply**(18).**

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13. Richardson and Tinaphong are jump start devices analogous art **(Tinaphong; paragraph [0054]).** It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teachings of Tinaphong by incorporating a USB charging input configured to provide charging power from an external power source to the power supply in the apparatus of Richardson, as recited, so as to provide both 5 volt DC signal provided on the USB charger connector from an external source to a 3.7 volt DC signal on the output of the second DC-to-DC converter circuit which in turn is provided to the positive side of a lithium polymer battery, as per the teachings of Tinaphong **([0040])**. Having a USB input connector provide connection to an external source of voltage (preferably, about 5 volts DC), to charge the internal second storage device polymer battery. Furthermore, having a USB input charge circuit connected to the power supply, the USB input charge circuit configured for converting power from a USB charger to charge voltage and current for charging the power supply,will also enable an external electronic or electrical device, such as a cellular phone, PDA, MP3 player, camera or the like, to be connected to the USB output connector of the energy harvesting circuit using a standard USB cable so that the energy harvesting circuit of the present invention may charge the batteries of the external electronic device or power the external electronic device connected to the energy harvesting circuit by the user, as per the teachings of Tinaphong **([0042]).**

14. Accordingly claim 24 would have been obvious.

15. Regarding claim 25, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, wherein the USB charging input comprises a USB charging port**(24)(Fig. 2 shows the energy harvesting circuit**

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also includes a USB charger port or connector 24 for providing a connection to an external source of voltage).

16. Regarding claim 26, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, wherein the USB charging input comprises a USB charging circuit(**(input of first stage DC-DC-converter circuit 22 at USB charger port or connector 24 constitutes a charging circuit; see Fig. 2; ¶[0039]-[0041]).**

17. Regarding claim 27, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, wherein the USB charging input comprises a USB charging port(**USB charger port or connector 24**) connected to the power supply(**18**) by a USB charging circuit(**DC-DC converter circuit 22**)(**see Fig. 2**).

18. Regarding claim 28, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, wherein the USB charging circuit comprises a DC-DC converter **(DC-DC converter circuits (20) and (22); ¶[0039]).**

19. Regarding claim 30, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 27. Tinaphong further teaches, wherein the USB charging circuit(**24**) is configured to convert power from any USB charger power source(**such as a 5V input into 3.7 volt DC signal on the output of the second DC-DC converter circuit 22 which is provided to the positive side of a lithium polymer battery 18; see ¶[0040]**) to charge voltage and current for charging the power supply(**18**).

20. Regarding claim 31, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 28. Tinaphong further teaches, wherein the DC-DC

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converter(**20**) is configured to be turned on and off via a circuit(**charge circuit ¶[0035], [0037], [0099]**) by an output from a microcontroller(**16**).

21. Regarding claim 32, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 31. Tinaphong further discloses, wherein the power source is a rechargeable battery(**Lithium polymer battery 18 is rechargeable; see ¶[0039]**), and wherein microcontroller software(**as embedded into microcontroller 16**) can turn charge off if the rechargeable battery voltage is measured to be too high by an A/D input(**When the voltage on the feedback input of the microcontroller 16 reaches a predetermined threshold voltage, such as 3.7 volts, the microcontroller 16 ceases providing a pulsed signal on its output (Pin 5) connected to the enable input on the first stage DC-to-DC converter circuit 20 so as to prevent the first stage DC-to-DC converter circuit 20 from operating as a charge pump beyond a predetermined voltage conversion limit; see ¶[0041]**).

22. Regarding claim 35, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 25. Tinaphong further discloses, wherein the USB port is a micro-USB connector(**24**)(**note-Figs. 2 and 9 show a mini USB connector 24; see ¶[0073]-[0074]**).

23. Regarding claim 36, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, further comprising a USB output(**24**) configured to provide charging power from the power supply(**18**) to a USB-chargeable device(**electronic device 8 via USB output 30; see ¶[0070]**).

24. Regarding claim 37, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 36. Tinaphong further discloses, wherein the USB output comprises a USB output port(**output USB connector 30; see ¶[0070],[0073],[0075]).**

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25. Regarding claim 38, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 36. Tinaphong further discloses, wherein the USB output comprises a USB output circuit**(output USB connector 30; see Figs. 2 and 10)(note- with an external power source connected to the input USB connector 24, and with switch SW1 in a closed position, the external power source will provide power to the output USB connector 30 and to an external electronic device 8 coupled thereto; ¶[0075]).**

26. Regarding claim 39, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 36. Tinaphong further discloses, wherein the USB output comprises a USB output port**(30)** connected to the power supply**((18) or (8))** by a USB output circuit**(third stage DC-DC converter 28 with series On/Off switch 26; see Figs. 2, 3B, and 9; see ¶[0099]**).

27. Regarding claim 40, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Tinaphong further discloses, wherein the USB output is configured to provide a portable charger for charging smartphones, tablets, music players, and other rechargeable electronic devices**(8)(see ¶[0070]-[0071]**).

28. Regarding claim 41, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 39. Tinaphong further discloses, further comprising a microcontroller**(16)(Fig. 2)** and a control circuit, the control circuit from the microcontroller allows the USB output circuit to be turned on and off by software control to prevent the power supply getting too low in capacity**(see ¶[0041]**).

29. Regarding claim 42, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 30. Tinaphong further discloses, wherein the USB

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output is brought to an outside of the jump charge device(**combination of 6 and 10 operates as a jump charge device; see ¶[0042]**) with a USB connector((**24**),(**30**)).

30. Regarding claim 43, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 42. Tinaphong further discloses, wherein the USB connector includes a voltage divider configured to enable charge to certain smartphones that require it(**see ¶[0042], [0065], and [0067]).**

31. Regarding claim 44, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the power supply(**22**) is a rechargeable battery disposed within the jump starter device(**10**)(**Richardson; ¶[0014]**).

32. Regarding claim 45, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the power switch(**34**) comprises a power switch control system or circuit(**12**) configured to control the power switch and turn power on or off from the power supply(**22**) to the depleted or discharged battery(**battery of vehicle 28**) when connected to the positive and negative battery connectors(**Red and Black clamps**)((**see¶[0012],[0014]**)(**Note- Richardson discloses that the power switch is turned on to cause the internal power supply to be connected to the output port in response to signals from the sensors indicating (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. Richardson also discloses or teaches that the power switch is not turned on when signals from the sensors indicate either the absence of a vehicle battery at the output port or improper polarity connection of positive and negative terminals of the vehicle battery with the positive and**

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negative polarity outputs. Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs).

33. Regarding claim 46, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 45. Richardson further discloses, wherein the power switch control system or circuit**(12)** comprises one or more sensors**(30,24)** configured to detect whether the positive and negative battery connectors are properly connected to the depleted or discharged battery prior to switching on the power switch**(Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. 77. Richardson discloses that the reverse voltage sensor 24 detects whether jumper cables that have been manually connected to the vehicle battery have been properly connected or if there is a reverse connection. Richardson discloses or teaches that the power switch for charging the vehicle battery cannot be turned on unless there is a proper connection of the cables. For example, referring to FIG. 3 (a portion of which is reproduced below), Richardson states: If the**

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system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214. If the voltage measured is significantly less than the voltage of the jump starter capacitors 21 and batteries 22, then a reverse polarity connection of the jumper cables to the vehicle is determined and an error flag is set and the event saved in nonvolatile memory 216. A "Reverse Polarity" error message is displayed 218 on the LCD 46, and the reverse voltage LED 48 is illuminated 216. Any further jump starter action by the operator is ignored until the reverse polarity. Furthermore, Richardson further discloses (see ¶[0015]) that the microcontroller receives signals from the vehicle voltage sensor 30 and the reverse voltage sensor 24 and that it generates a control signal 58(activated output signal, as per claim 11) which controls the contact relay 34 to connect the jump starter batteries 22 to the vehicle to be started 28. Richardson also makes clear that the microcontroller only closes relay 34(activate switch or turn on switch) if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity

34. Regarding claim 47, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch control system or circuit(**12**) is configured to detect presence(**via vehicle voltage sensor 30 and reverse polarity sensor 24 which indicate the presence of a vehicle battery connected with proper polarity**) of the depleted or discharged battery(**battery of vehicle 28**) when connected between the positive and negative battery connectors(**Red and Black clamps**) **(see also Fig. 3, Fig. 6, ¶[0014] and [0027])**.

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35. Regarding claim 48, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch system or circuit is configured to detect polarity**(via reverse polarity detection sensor 24 ; see also Fig. 3, Fig. 6, ¶[0014] and [0027])** of the depleted or discharged battery**(battery of vehicle 28)** when connected between the positive and negative battery connectors**(Black and Red clamps).**

36. Regarding claim 49, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch control system or circuit is configured to detect presence **(via voltage sensor 30)**of the depleted or discharged battery**(vehicle of battery 28)** when connected between the positive and negative battery connectors**(Red and Black clamps)**, and configured to detect polarity**(via reverse polarity detection 24)** of the depleted or discharged battery when connected between the positive and negative battery connectors, wherein the power switch control system or circuit**(12)** switches on **(by closing relay 34)** the power supply**(22)** to connect the power supply to the depleted or discharged battery only when the depleted or discharged battery is present when connected between the positive and negative battery connectors and the depleted or discharged battery is connected with correct polarity between the positive and negative battery terminals**(note-((see¶[0012],[0014])(Note- Richardson discloses that the power switch is turned on to cause the internal power supply to be connected to the output port in response to signals from the sensors indicating (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. Richardson also discloses or teaches that the power switch is not turned on when signals from the sensors indicate either**

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the absence of a vehicle battery at the output port or improper polarity connection of positive and negative terminals of the vehicle battery with the positive and negative polarity outputs. Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. 77. Richardson discloses that the reverse voltage sensor 24 detects whether jumper cables that have been manually connected to the vehicle battery have been properly connected or if there is a reverse connection. Richardson discloses or teaches that the power switch for charging the vehicle battery cannot be turned on unless there is a proper connection of the cables. For example, referring to FIG. 3 (a portion of which is reproduced below), Richardson states: If the system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214. If the voltage measured is significantly less than the voltage of the jump starter capacitors 21 and batteries 22, then a reverse polarity connection of the jumper cables to the vehicle is determined and an error flag is set and the event saved in nonvolatile memory 216. A "Reverse Polarity" error message is displayed 218 on the LCD 46, and the reverse voltage LED 48 is illuminated 216. Any further jump starter action by the operator is ignored until the reverse polarity condition is corrected 220, at which point processing returns to the start of the main

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processing loop 210." Richardson, ¶([0014],[0020]). Thus, the "Reverse Polarity" error message on the LCD 46 and illuminated LED 48 warn a user when a vehicle battery is connected with reverse polarity, prompting the user to correct the connection). Additionally, Richardson discloses (see ¶[0015]) that the microcontroller receives signals from the vehicle voltage sensor 30 and the reverse voltage sensor 24 and that it generates a control signal 58(activated output signal, as per claim 11) which controls the contact relay 34 to connect the jump starter batteries 22 to the vehicle to be started 28. Richardson also makes clear that the microcontroller only closes relay 34(activate switch or turn on switch) if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity).

37. Regarding claim 50, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 45. Richardson further discloses, wherein the power switch control system or circuit comprises a microcontroller(**microcontroller 12**) configured for providing an output(**contact relay control output 58**) controlling the power switch(**34**)(**see Fig. 1**)(**see Exhibit 1010, ¶[0014]**).

38. Regarding claim 51, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller(**12**) receives input from one or more sensors(**battery presence sensor 30; reverse polarity sensor 24; 20,32,temperature sensor 38, and 40**) configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors(**Richardson ¶[0010]-[0015] and [0027]**).

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39. Regarding claim 52, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 51. Richardson further discloses, wherein the one or more sensors(**battery presence sensor 30; reverse polarity sensor 24; 20,32,temperature sensor 38, and 40**) includes one sensor(**30**) configured to detect presence of the depleted or discharged battery(**battery of vehicle 28**) when connected between the positive and negative battery connectors(**Red and Black clamps**), and another sensor(**24**) configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors (**Richardson ¶[0010]-[0015],[0020] and [0027]-[0028]**).

40. Regarding claim 53, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 52. Richardson further discloses, wherein the one or more sensors(**24,30,38,40**) is one or more sensing circuits(**see circuits in Fig. 2B).**

41. Regarding claim 54, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller(**12**) switches the power switch(**contact relay 34**) on to provide power from the power supply(**22**) to the depleted or discharged battery(**battery of vehicle 28**) only when the depleted or discharged battery is determined by the microcontroller to be present and connected with the correct polarity(**Richardson ¶[0010]-[0015] and [0027]**).

42. Regarding claim 55, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller(**12**) is a programmable microcontroller configured to allow updates in functionality and system parameters(**Richardson ;¶[0011]**).

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43. Regarding claim 56, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 55. Richardson further discloses, wherein the programmable microcontroller**(12)** comprises a memory**(see Richardson; ¶[0011])**.

44. Regarding claim 57, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the positive battery connector comprises a positive battery cable**(cable 60 has Red(positive battery cable) and Black(negative battery cable); see Fig. 2C)**, and the negative battery connector comprises a negative battery cable.

45. Regarding claim 58, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the positive battery cable comprises a positive battery clamp**(Red clamp of 60; see Fig. 2C))** and the negative battery cable comprises a negative battery clamp**(Black clamp of 60; see Fig. 2C))**.

46. Regarding claim 60, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 51. Richardson further discloses, wherein the one sensor**(30)** is configured for detecting presence of the depleted or discharged battery**(battery of vehicle 28)** when connected between the positive and negative battery connections**(Red and Black clamps)**, and the other sensor is a reverse polarity sensor**(24) (see ¶[0011],[0014]-[0015]).**

47. Regarding claim 63, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson discloses, further comprising an output port**(see annotated Fig. 2C below)** providing positive and negative polarity outputs**(as respectively corresponding to Red and Black clamps of cable 60; see Fig. 2C below)** to the positive and negative battery connectors.

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48. Regarding claim 64, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses further comprising a temperature sensor**(38)(see ¶[0013] and Fig. 1)** configured to detect temperature of the power supply**(22)** and to provide a temperature signal to the microcontroller**(12)**.

49. Regarding claim 65, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, a voltage measurement circuit**(20)** configured to measure output voltage of the power supply**(22)** and to provide a voltage measurement signal to the microcontroller**(12) (12)(see ¶[0012] and Fig. 1)**.

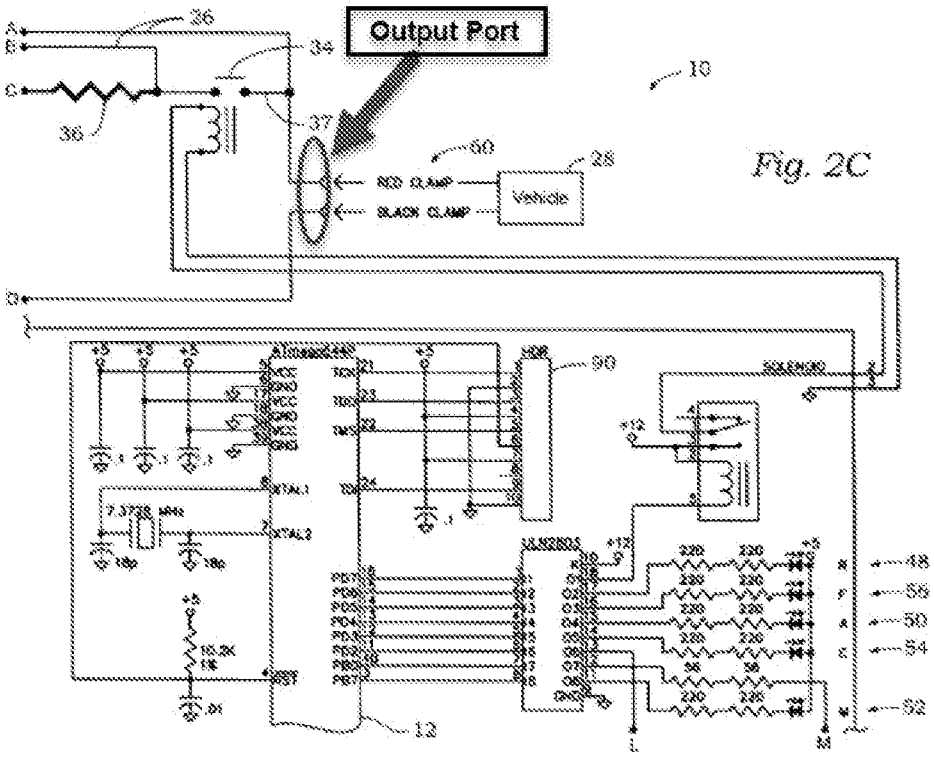
50. Regarding claim 66, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. Richardson discloses, further comprising a voltage regulator configured to convert output voltage of the power supply to a voltage level appropriate to provide operating power to internal components of the device**(10)(note-(Fig. 2A; regulator LM7805 is a 5V regulator although not labeled)**.

51. Regarding claim 67, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 60. Richardson discloses, further comprising a manual override switch**(push button switch 44)** configured to activate a manual override mode to enable a user to connect jump start power to the positive and negative battery connectors when the one sensor**(30)** configured for detecting presence of the depleted or discharged battery**(battery of vehicle 28)** is unable to detect presence of the depleted or discharged battery**(see ¶[0013]-[0015],[0026])**.

52. Regarding claim 68, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 67. Richardson discloses, wherein the

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microcontroller(**12**) is configured to detect actuation of the manual override switch(**44**) for at least a predetermined period of time before activation of the manual override mode(**see ¶[0039]**).



53. **Claims 69-70 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461 and Brown USPAT 8,076,900 and in further view of Waldron US 2011/0068734.**

54. Regarding claim 69, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. However the combination of Richardson and Tinaphong fails to expressly teach the limitations of, “wherein the positive and negative battery

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connectors are defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof".

55. Brown discloses and shows in **Figs. 1-2**, factual evidence of, wherein the positive**(94)** and negative battery connectors**(96)** are defined by a jumper cable device**(90)** including a plug**(92)** configured to plug into an output port**(84)** of the device**(handheld battery charger booster device (10))**, a pair of cables**(booster cable 90)** integrated with the plug**(92)(see Figs. 1-2)** at one respective end thereof and being configured to be connected to positive and negative battery terminals**((94) and (96) respectively)** of the depleted or discharged battery at another respective end thereof**(at the size of the alligators clips)(see col. 4, lines 22-41).**

56. Richardson and Brown are battery charger analogous art. It would have been obvious to one having ordinary skill in the art to incorporate the teachings of Brown into the device of Richardson as modified by Tinaphong, wherein the positive and negative battery connectors are defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof, as recited, so as to tethered the cable to one end of the plug. The advantage for doing so is to improve portability and decrease the chance of having the cables entangled with each other and to fit to the compartment of the carrying case.

57. The combination of Richardson, Tinaphong and Brown does not expressly teach, the limitations of:

58. a pair of cables having cable ends integrated with the plug at one respective end thereof.

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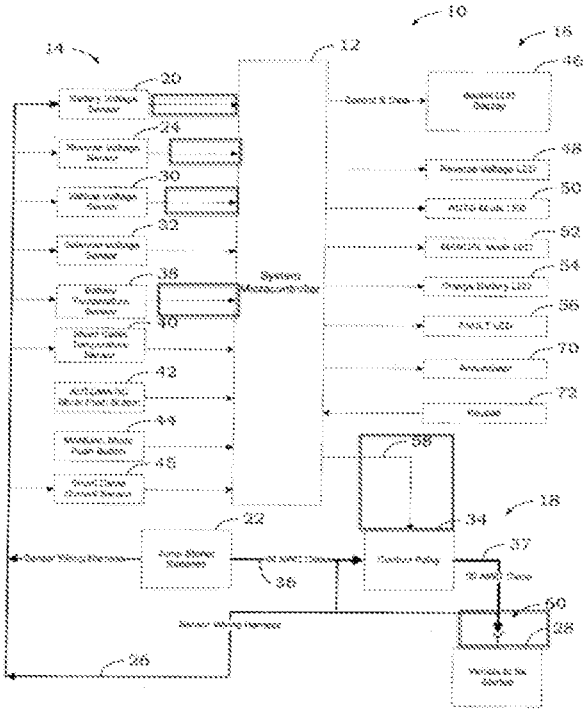
59. Waldron is an analogous art and pertains to the same field of endeavor, namely battery jumping devices. Waldron discloses factual evidence of a pair of cables **(44)** having cable ends integrated with the plug **(46)** at one respective end thereof **([0023]; Fig. 1).**

60. Therefore it would have been obvious to one having ordinary skill in the art at the time of the effective filing date of the claimed invention to have had the pair of cables ends of the jumper cable device of Richardson as modified by Tinaphong and Brown integrated with the plug at one respective thereof so as to tethered the cable to one end of the plug. The advantage for doing so is to improve portability and decrease the chance of having the cables entangled with each other and to fit to the compartment of the carrying case, in which some items are form fitting compartments and are thus configured to the shape of the item to be carried, as per the teachings of Waldron **([0012]).**

61. Regarding claim 70, Richardson as modified by Tinaphong and Brown discloses all the claimed invention as set forth and discussed above in claim 69. Brown further discloses, wherein the output port**(84)** and the plug**(92)** are dimensioned so that the plug will fit into the output port only in one specific orientation**(see Figs. 1-2)**.

62. Accordingly, claims 69-70 would have been obvious.

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Richardson's *Fig. 1* reproduced above

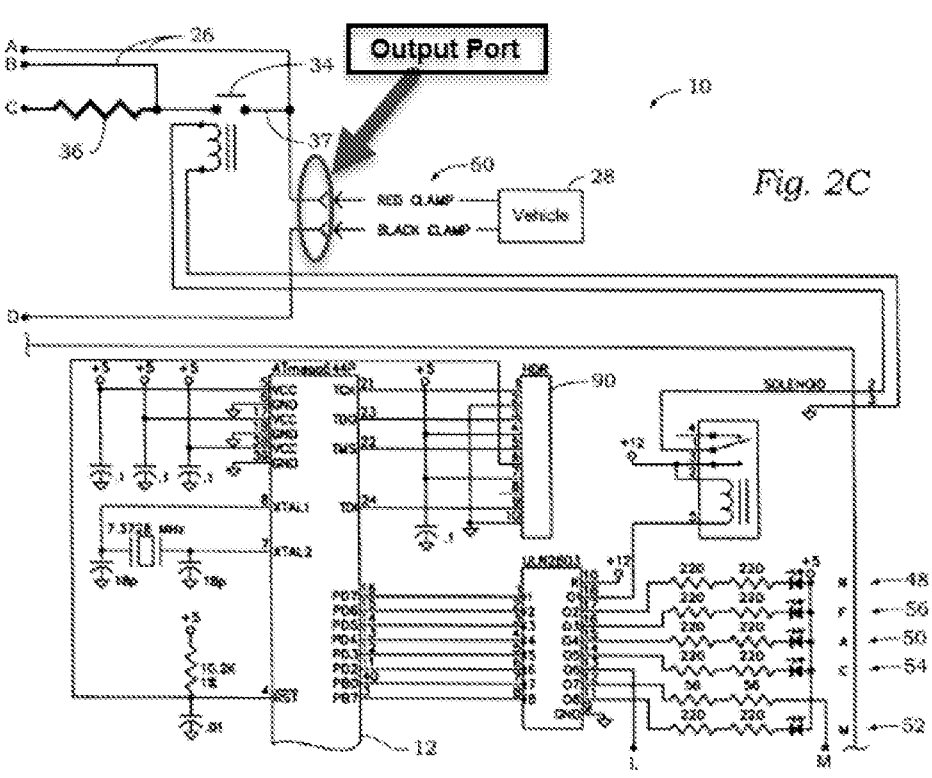


Fig. 2C

Patent Application Publication Jul. 9, 2009 Sheet 4 of 12 US 2009/0174362 A1

63. **Claim 29 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US**

2011/0175461 and in further view of Xinfang USPAT 9,506,446 (Exhibit 1008 IPR2020-01387).

64. Regarding claim 29, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 28. However, the combination of Richardson and Tinaphong does not expressly teach, "wherein the DC-DC converter is configured to convert 5V potential provided from a USB charger to 12.4VDC".

65. However, Xinfang discloses factual evidence of, wherein the DC-DC converter is configured for up-converting the input voltage received by the USB connector**(38,40) (included in battery circuit board 44)(note- The battery circuit board 44 may be provided with voltage boosting circuitry to step up the output voltage from the battery cell 42 to the ignition output port 46 to provide an output voltage higher than about 13.6V; see col. 5, lines 29-40 and Fig. 2)**.

66. Xinfang further discloses, wherein the input voltage is 5V**(inherent for a standard USB connector)** that is up-converted to 13.6 VDC for charging the power supply. Richardson in view Tinaphong and Xinfang differs from the claimed invention in that the input voltage is up-converted 13.6V to instead of 12.4V. It would have been an obvious matter of design choice to configure the output of the voltage boosting circuit of Xinfang to up-convert the 5V input of the USB connector to 12.4V as recited since such modification is an obvious matter of design choice to meet load power requirements. Furthermore, when a device or technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or in a different one, so that if a person of ordinary skill can implement a predictable variation, the variation is likely obvious.

67. Accordingly claim 29 would have been obvious.

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68. **Claim 33 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461 and in further view of Nakamoto et al., (Nakamoto) USPAT 9,601,800**

69. Regarding claim 33, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim32. Tinaphong further discloses, wherein the rechargeable battery**(18)** is a lithium battery**(see ¶[0039]-[0041]**,

70. However, the combination of Richardson and Tinaphong does not expressly teach:

- and further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells of the lithium battery.

71. Nakamoto discloses factual evidence of, further comprising a lithium battery charge controller**(5)** configured to provide charge balance**(via balance circuit 6)** to internal lithium battery cells**(100A)(see Fig. 9)** of the lithium battery**(100)(see col. 10, line 49 to col. 11, line 14).**

72. Therefore it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teachings of Nakamoto by having the lithium battery of Richardson as modified by Tinaphong further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells, as recited, so as to reduce variations in battery voltage between the electric cells.

73. Accordingly claim 33 would have been obvious.

74. **Claims 59,61 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461 and in further view of Krieger US 2004/0130298(Exhibit 1009 on IPR2020-00944).**

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75. Regarding claim 59, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24. However, the combination of Richardson and Tinaphong does not expressly teach, wherein said power switch comprises a plurality of FETs in parallel.

76. Krieger discloses factual evidence of, wherein said power switch comprises a plurality of FETs in parallel(**12a,12b,12c,12d**).

77. Richardson and Krieger are battery jump starter apparatus analogous art.

78. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to have substituted the relay of Richardson by a plurality of FETs in parallel as disclosed by Krieger for the advantages of their fast switching speed, their low loss and their low on-resistance type that FETs present over relay switches.

79. Accordingly claim 58 would have been obvious.

80. Regarding claim 59, Richardson in view of Krieger discloses all the claimed invention as set forth and discussed above in claim 58. Krieger further discloses, wherein the FET switch **(12)** comprises a plurality of FETs in parallel**(12a,12b,12c,12d).**

81. Regarding claim 61, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 60. However the combination of Richardson and Tinaphong fails to expressly disclose, wherein the one sensor configured for detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors.

82. Krieger teaches factual evidence of, wherein the presence circuit(**16**)comprises a first optically coupled isolator phototransistor(**22**) and the polarity circuit(**also performed by 16**) comprises a second optically coupled isolator phototransistor(**22**)(**[0033]**)(**note- the opto-**

isolator (16) only turns on when it is properly biased "as a result of a correct polarity connection being made between the boosting battery (2) and the depleted battery (11). By detecting the correct connection of the depleted battery (11), Krieger also necessarily and implicitly detects that the depleted battery (11) is present; See [0033]-[0034],[0038],[0048]).

83. Richardson and Krieger are battery jump starter apparatus analogous art.

84. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teaching of Krieger into the jump starter apparatus of Richardson, wherein the one sensor configured for detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors, as recited, so as to prevent the battery assembly from providing a discharge output to the external load, as recited, for the advantages of providing a safe delivery of power to the depleted battery of the vehicle that need to be jump started while preventing a potentially dangerous situation that could result when an improper polarity connection is made between the boosting battery and the depleted battery, as per the teachings of Krieger (**¶[0034]).** It would have further been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention was made to include in the jump starter apparatus of Richardson, wherein the presence circuit that comprises a first optically coupled isolator phototransistor and the polarity circuit comprises a second optically coupled isolator phototransistor since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

85. **Claims 62 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461 and in further view of Kim USPAT 5,867,007.**

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86. Regarding claim 62, Richardson in view of Tinaphong discloses all the claimed invention as set forth and discussed above in claim 24, but fails to expressly teach the limitations of, further comprising a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery.

87. Kim teaches**(col. 3, lines 46-55)** and shows in **Fig. 1,** factual evidence of, further comprising a plurality of power diodes**(31)(which comprises diodes D1 and D2)** coupled between the positive and negative battery connectors**((10) and (20)** and the power supply**(32)** to prevent back-charging of the power supply from an electrical system**(33)** connected to the depleted or discharged battery.

88. Richardson, Tinaphong, and Kim are battery powered devices analogous art.

89. Therefore it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate in the device of Richardson as modified by Tinaphong, a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery, as recited, so as to provide a safety measure and protection to the battery by preventing a reverse current flow back to the power supply which might damage both the batteries and the connected load.

Citation of Prior Art

90. For a list of related prior art references not mentioned above but disclose related apparatus or method, see Form PTO-892.

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Conclusion

91. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M'BAYE DIAO whose telephone number is (571)272-6127. The examiner can normally be reached on M-F; 9:00AM-6:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DREW A DUNN can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

92. 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 https://ppair-my.uspto.gov/pair/PrivatePair. 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

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M'BAYE DIAO
Primary Examiner
Art Unit 2859

/M BAYE DIAO/
Primary Examiner, Art Unit 2859
August 31, 2021

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Petitioner ADC (IPR2024-00671)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

CPC - Searched*		
Symbol	Date	Examiner
B60L53/14 H02J7/342 H02J7/0047 H02J7/0034 H02J7/0029 H02J1/122 H02J7/00 H02J7/0048 H02J7/00302 H02J7/00309 H02J7/00306 Y02T90/14 Y02T10/7072 Y02T10/70 H02J2310/46	08/31/2021	MD

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
320	105	08/31/2021	MD

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/M BAYE DIAO/ Primary Examiner, Art Unit 2859	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

Search Notes		
Search Notes	**Date**	**Examiner**
SEARCH(SEARCH Notes Attached)	08/31/2021	MD
Inventor Name and Assignee Search (SEARCH).	08/31/2021	MD
Parent Applications Noted.	08/31/2021	MD
IPR2018-00503 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2020-00944 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2020-01387 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2021-00309 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
(307/150 Text Search Only -- see attached Search Printout).	08/31/2021	MD
IP.com PAT and NPL Search Conducted.	08/31/2021	MD

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/M BAYE DIAO/ Primary Examiner, Art Unit 2859	

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1909 K St., NW
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Washington, DC 20006-1152

Courtesy Reminder for
Application Serial No: 16/820,040

Attorney Docket No: 054985-000055-US-02-02
Customer Number: 20230
Date of Electronic Notification: 09/07/2021

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
patlaw@vorys.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
NOOK et al.
Appl. No.: 16/820,040
Filing Date: March 16, 2020
Exam: DIAO
Art Unit: 2859
Conf.: 1056
Title: **PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION**

AMENDMENT AND RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22315

Dear Commissioner:

This paper is submitted in response to the Non-Final Office Action dated September 7, 2021, along with an Extension of Time, making a response due on or before February 7, 2022. Accordingly, this paper is timely filed.

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Remarks

Upon entry of the above amendments, claims 24-70 are pending in the present application.

Claims 1-23 have previously been cancelled without prejudice or disclaimer of the subject matter contained therein.

Claims 24, 26-32, 38, 42, and 48 are amended above, and claim 71 is newly added. No new matter has been added.

Applicant, by amending any claims and/or canceling any claims, makes no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicant reserves the right to reassert any of the claims canceled or the original or previous claim scope of any claim amended, during the prosecution of this application, in a continuing application. Further, Applicant acknowledges but does not acquiesce or agree with any Examiner assertion regarding this application and expressly reserves the right to rebut or otherwise address any such assertion.

In view of the following, further and favorable consideration is respectfully requested.

I. Objection to Claim 48, beginning on page 2

Examiner objects to Claim 48 due to informality.

Please find amendments to the claims filed herein.

In view of the foregoing, it is submitted that claims are no longer objectionable. Accordingly, reconsideration and withdrawal of this objection is respectfully requested.

II. Rejection under 35 USC § 103: Claims 24-28,30-32,35-58,60,63-70 are rejected as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Tinaphong US 2011/0175461, beginning on page 3.

The Office Action asserts that "[I]t would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teaching of Tinaphong by incorporating a USB charging input configured to provide charging power from an external power source to the power supply in the apparatus of

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Richardson, . . ."

In view of the following, this rejection is respectfully traversed.

Regarding motivation to modify properly combined references, **MPEP 2143.01** states that a proposed modification cannot render the prior art unsatisfactory for its intended purpose. If it does, then there is no suggestion or motivation to make the proposed modification. Further, the proposed modification cannot change the principle operation of a reference.

Regarding teaching away, **MPEP 2141.02** states that prior art must be considered in its entirety, including disclosures that teach away from the claims. See also **MPEP 2145(X)(D)**.

Richardson discloses a "method and apparatus [that] provides supplemental power to an engine" (see Abstract).

Richardson discloses "a portable power source for a motor vehicle and, more particularly, to a method and apparatus to provide supplemental power to start internal combustion and turbine engines" (see paragraph [0001]).

Richardson discloses that the "present invention monitors the voltage of the battery of the 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. For safety purposes, 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" (see paragraph [0006]).

Richardson does not disclose a USB charge input and a USB input charge circuit, let alone the claimed subject matter, including "a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and a USB charging input connected to the USB input charge circuit, the USB charging input configured for electrically connecting to the USB charger and providing charging input from the USB charger through the USB charging input and the USB input charge circuit to the power supply."

Tinaphong discloses an "energy harvesting circuit [that] includes one or more broadband or narrow band antennas to detect WIFI (wireless fidelity) or other RF (radio frequency) signals. The signals are rectified and voltage multiplied, and the resultant DC voltage is provided to a power management circuit. The output of the power management circuit charges a lithium battery or other storage device within the energy harvesting circuit. The energy stored in the battery or storage device is provided through a DC/DC converter circuit to a USB output connector to power or recharge the batteries of an external electronic device connected to the USB output connector of the energy harvesting circuit" (see Abstract).

The apparatus of ***Tinaphong*** is an energy harvesting apparatus, and not disclosed as being a jump starter or for use as a jump starting apparatus. Further, the apparatus of ***Tinaphong*** cannot be practically used as a jump starting device due to the low voltage output (i.e. 5 volts) of the apparatus (see paragraph [0042]), which is too low to effectively provide power to a depleted or discharged 12V battery (e.g. the charging rate would be

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too slow to charge the 12V vehicle battery to jump start a vehicle). Thus, ***Tinaphong*** is clearly non-analogous prior art, and one skilled in the art would not turn to ***Tinaphong*** to attempt to modify and/or improve the jump starter of ***Richardson***.

Furthermore, ***Tinaphong*** in fact teaches away from attempting to modify the jump starter of ***Richardson*** with the USB input connector and USB input charge circuit of ***Tinaphong***. Specifically, ***Tinaphong*** teaches applying a second stage DC-to-DC converter circuit 22 acting as a low drop out, step down voltage converter/regulator to convert the 5 volt DC signal provided on the USB charger input connector 24 from an external source to a 3.7 volt DC signal on the output of the second DC-to-DC converter circuit used to charge the lithium polymer battery 18 (see paragraph [0040]).

Dropping down the voltage as taught by ***Tinaphong*** is the exact opposite and wrong direction to the requirement of stepping up or increasing the charging voltage to charge the internal lithium polymer battery 18 of ***Tinaphong*** to at least 12 V so that the apparatus could be modified to become or be used as a jump starter as asserted in this rejection. Applicant disagrees with the rejection in attempting to use the teaching of ***Tinaphong*** to further modify ***Richardson***, since again ***Richardson*** does not disclose a USB input charge input and USB input charge circuit***.***

In view of the foregoing, it is submitted that nothing in Richardson and Tinaphong, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

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III. Rejection under 35 USC § 103: Claims 69-70 are rejected as being unpatentable over Richardson in view of Tinaphong and Brown USPAT 8,076,900 and in further view of Waldron US 2011/0068734, beginning on page 19.

The Office Action asserts that "[I]t would have been obvious to one having ordinary skill in the art to incorporate the teachings of Brown into the device of Richardson as modified by Tinaphong, wherein the positive and neative battery connectors are defined by a jump cable device including a plug . . ."

In view of the following, this rejection is respectfully traversed.

Appropriate legal precedent is discussed above and is incorporated herein in its entirety by reference.

Richardson and Tinaphong have been discussed above, which discussions are incorporated herein in their entirety. As discussed above, Richardson and Tinaphong, taken alone or together, fail to teach or suggest all of the limitations of the claims as required by In re Vaeck, because none of the foregoing references, taken alone or together, teach or suggest the base claimed subject matter of independent claim 24.

Brown is cited in the rejection only for the purpose of disclosing positive and negative battery connectors including a plug.

Waldron is cited in the rejection only for the purpose of disclosing a pair of cables having cable ends integrated within the plug.

Brown and Waldron do not add anything relevant to cure the deficiencies of Richardson and Tinaphong, because Brown and Waldron also does not teach or suggest the base claimed subject matter of independent claim 24.

In view of the foregoing, it is submitted that nothing in Richardson, Tinaphong, Brown, and Waldron, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

IV. Rejection under 35 USC § 103: Claim 29 is rejected as being unpatentable over Richardson in view of Tinaphong and in further view of Xinfang USPAT 9,506,446 (Exhibit 1008 IPR2020-01387), beginning on page 22.

In view of the following, this rejection is respectfully traversed.

Appropriate legal precedent is discussed above and is incorporated herein in its entirety by reference.

Richardson and Tinaphong have been discussed above, which discussions are incorporated herein in their entirety. As discussed above, ***Richardson and Tinaphong***, taken alone or together, fail to teach or suggest all of the limitations of the claims as required by In re Vaeck, because none of the foregoing references, taken alone or together, teach or suggest the base claimed subject matter of independent claim 24.

Xinfang discloses "a mobile power bank capable of charging electronic devices, jump starting an ignition system of a vehicle with a weak or dead battery" (see column 1, lines 19 to 22.

Xinfang discloses a charging port 34 (i.e. a non-USB female barrel jack receiver acting as a power input connector) and a USB output module 36 comprising two USB interfaces, including a first USB interface 38 and a second USB interface 40 (see column 4, lines 36 to 44 and FIGS. 1, 2, and 6).

Importantly, is noted that the USB output module 36 comprises the first USB interface 38 and the second USB interface 40, which are both output ports (i.e. not input ports) for charging and/or powering external devices (see column 4, line 59 to column 5, line 3). Specifically, ***Xinfang*** factually does not disclose a USB input port.

Xinfang disclose the "charging port 34 may be an AC or DC charging port and is connectable to an external charging circuit adaptor for charging the battery module 16. The charging port 34 may be connected to a 110V AC adaptor or a 12V DC adaptor to charge the battery" (see column 4, lines 52 to 56). The charging port 34 is connected to

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the charging module 52, which may include a constant current and constant voltage input circuit 60 to charge the battery module 16 (see column 6, lines 11 to 24).

Xinfang discloses a 110V external charging adaptor having a male barrel jack, as shown in FIGS. 3B and 3C.

Xinfang discloses that the "discharge module 54 is connected to the USB (Universal Serial Bus) output module 36. In an embodiment, the discharge module 54 includes a constant current and constant voltage output circuit 66, a discharge module over-discharge protection circuit 68, and a discharge module power test circuit 70. The constant current and constant voltage output circuit 66 is coupled to the USB output module 36, so that the first USB interface 38 and the second USB interface 40 maintain a constant charging current and constant voltage" (see column 6, line 25 to 34).

Thus, ***Xinfang*** discloses a female barrel type power input connector instead of a USB input port (i.e. non-USB type power input connector) for charging the battery module 16 and a USB output module 36 comprising two USB interfaces, including a first USB interface 38 and a second USB interface 40 acting as two separate USB output connectors.

Xinfang does not disclose a USB charging input and a USB input charge circuit, let alone the claimed subject matter, including "a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and a USB input connector connected to the USB input charge circuit, the USB input connector configured for connecting to the USB charger and providing charge input from the USB charger through the USB input

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connector and the USB input charge circuit to the power supply."

Richardson and Xinfang factually do not disclose a USB input connector and USB input charge circuit.

Specifically, again both ***Richardson and Xinfang*** do not disclose a USB input connector and USB input charge circuit, let alone the base claimed subject matter.

Xinfang does not add anything relevant to cure the deficiencies of Richardson and Tinaphong, because Xinfang also does not teach or suggest the base claimed subject matter of independent claim 24.

In view of the foregoing, it is submitted that nothing in Richardson, Tinaphong, and Xinfang, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

V. Rejection under 35 USC § 103: Claim 33 is rejected as being unpatentable over Richardson in view of Tinaphong and in further view of Nakamoto et al., (Nakamoto) USPAT 9,601,800, beginning on page 24.

In view of the following, this rejection is respectfully traversed.

Appropriate legal precedent is discussed above and is incorporated herein in its entirety by reference.

Richardson and Tinaphong have been discussed above, which discussions are incorporated herein in their entirety. As discussed above, ***Richardson and Tinaphong***, taken alone or together, fail to teach or suggest all of the limitations of the claims as required by In re Vaeck, because none of the foregoing references, taken alone or together, teach or suggest the base claimed subject matter of independent claim 24.

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Nakamoto is cited in the rejection only for the purpose of disclosing a lithium battery charge controller configured to provide charge balance to internal lithium ion battery cells of the lithium battery.

Nakamoto does not add anything relevant to cure the deficiencies of ***Richardson and Tinaphong***, because ***Nakamoto*** also does not teach or suggest the base claimed subject matter of independent claim 24.

In view of the foregoing, it is submitted that nothing in Richardson, Tinaphong, and Nakamoto, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

VI. Rejection under 35 USC § 103: Claims 59 and 61 are rejected as being unpatentable over Richardson in view of Tinaphong and in further view of Krieger US 2004/0130298 (Exhibit 1009 on IPR2020-00944), beginning on page 24.

In view of the following, this rejection is respectfully traversed.

Appropriate legal precedent is discussed above and is incorporated herein in its entirety by reference.

Richardson and Tinaphong have been discussed above, which discussions are incorporated herein in their entirety. As discussed above, ***Richardson and Tinaphong***, taken alone or together, fail to teach or suggest all of the limitations of the claims as required by In re Vaeck, because none of the foregoing references, taken alone or together, teach or suggest the base claimed subject matter of independent claim 24.

Krieger is only cited in the rejection for the purpose of disclosing a power switch comprising one or more FETs.

Krieger does not add anything relevant to cure the deficiencies of ***Richardson and Tinaphong***, because ***Krieger*** also does not teach or suggest the base claimed subject matter of independent claim 24.

In view of the foregoing, it is submitted that nothing in ***Richardson, Tinaphong, and Krieger***, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

VII. Rejection under 35 USC § 103: Claim 62 is rejected as being unpatentable over Richardson in view of Tinaphong and in further view of Kim USPAT 5,867,007, beginning on page 26.

In view of the following, this rejection is respectfully traversed.

Appropriate legal precedent is discussed above and is incorporated herein in its entirety by reference.

Richardson and Tinaphong have been discussed above, which discussions are incorporated herein in their entirety. As discussed above, Richardson and Tinaphong, taken alone or together, fail to teach or suggest all of the limitations of the claims as required by In re Vaeck, because none of the foregoing references, taken alone or together, teach or suggest the base claimed subject matter of independent claim 24.

Kim is cited in the rejection only for the purpose of disclosing a plurality of power diodes couple between the positive and negative battery connectors and the power supply to prevent back-charging the power supply from the electrical system connect to the depleted or discharged battery.

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Kim does not add anything relevant to cure the deficiencies of Richardson and Tinaphong, because Kim also does not teach or suggest the base claimed subject matter of independent claim 24.

In view of the foregoing, it is submitted that nothing in ***Richardson, Tinaphong, and Kim***, taken alone or together, renders the presently claimed subject matter obvious within the meaning of 35 USC § 103. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

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Petitioner ADC (IPR2024-00671)

Conclusion

In view of the foregoing, Applicant submits that the application is in condition for immediate allowance. Early notice to that effect is earnestly solicited. The Examiner is invited to contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

In the event this paper is not timely filed, Applicant petitions for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 22-0585.

Respectfully submitted,

VORYS, SATER, SEYMOUR and PEASE LLP

/William L. Klima/
William L. Klima, Registration No.: 32422
Customer No.: 20230

Date: February 7, 2022

VORYS, SATER, SEYMOUR and PEASE LLP
1909 K Street, NW, 9th Floor
Washington, DC 20006-1152
Tel: (202) 467-8800

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Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1.-23. (Cancelled)

24. (Currently amended) A jump starting device for boosting or charging a depleted or discharged battery having a positive battery terminal and a negative battery terminal, the jump starter device comprising:

a power supply;

a positive battery connector for electrically connecting the jump starter device to the positive battery terminal of the depleted or discharged battery;

a negative battery connector for electrically connecting the jump starter device to the negative battery terminal of the depleted or discharged battery;

a power switch connected in circuit with the power supply and the positive and negative battery connectors, the power switch configured to switch power on or off from the power supply to the depleted or discharged battery, the power switch configured to switch power on ~~only~~ when ~~properly~~ the jump starting device is connected to the ~~positive and negative battery connectors~~ the depleted or discharged battery; and

a USB ~~charging~~ input ~~configured to provide charging power from an external power source~~ charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and

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a USB charging input connected to the USB input charge circuit, the USB charging input configured for electrically connecting to the USB charger and providing charging input from the USB charger through the USB charging input and the USB input charge circuit to the power supply.

25. (Previously presented) The device according to claim 24, wherein the USB charging input comprises a USB charging port.

26. (Currently amended) The device according to claim 24, wherein ~~the USB charging input comprises~~ [[a]] the USB charging circuit is located internally within the jump starting device

27. (Currently amended) The device according to claim 24, wherein the USB charging input comprises a USB ~~charging port~~ connector ~~connected to the power supply by a USB charging circuit~~.

28. (Currently amended) The device according to claim 27, wherein the USB charging circuit comprises [[a]] one or more DC-DC ~~converter~~ converters.

29. (Currently amended) The device according to claim 28, wherein the DC-DC converter is configured to convert about 5VDC ~~provided~~ from [[a]] the USB charger to about 12VDC provided to the power supply.

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30. (Currently amended) The device according to claim [[27]] 24, wherein the USB input charging circuit is configured to convert power from any USB charger ~~power source~~ to charge voltage and current for charging the power supply.

31. (Currenlty amended) The device according to claim [[28]] 24, wherein the DC-DC converter is configured to be turned on and off via a circuit by an output from a microcontroller.

32. (Currently amended) The device according to claim 31, wherein the power source is a rechargeable battery, and wherein the microcontroller software can turn charge off if the rechargeable battery voltage is measured to be too high by an A/D input.

33. (Previously presented) The device according to claim 32, wherein the rechargeable battery is a lithium battery, and further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells of the lithium battery.

34. (Previously presented) The device according to claim 33, wherein the lithium battery charge controller is also configured to provide safety redundancy for eliminating over discharge of the lithium battery.

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35. (Previously presented) The device according to claim 25, wherein the USB port is a micro-USB connector.

36. (Previously presented) The device according to claim 24, further comprising a USB output configured to provide charging power from the power supply to a USB-chargeable device.

37. (Previously presented) The device according to claim 36, wherein the USB output comprises a USB output port.

38. (Currently amended) The device according to claim 36, wherein the USB output comprises a USB output ~~circuit~~ connector.

39. (Previously presented) The device according to claim 36, wherein the USB output comprises a USB output port connected to the power supply by a USB output circuit.

40. (Previously presented) The device according to claim 24, wherein the USB output is configured to provide a portable charger for charging smartphones, tablets, music players, and other rechargeable electronic devices.

41. (Previously presented) The device according to claim 39, further comprising a microcontroller and a control circuit, the control circuit from the microcontroller allows

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the USB output circuit to be turned on and off by software control to prevent the power supply getting too low in capacity.

42. (Currently amended) The device according to claim [[30]] 39, wherein the USB output is brought to an outside of the jump charge device with a USB connector.

43. (Previously presented) The device according to claim 42, wherein the USB connector includes a voltage divider configured to enable charge to certain smartphones that require it.

44. (Previously presented) The device according to claim 24, wherein the power supply is a rechargeable battery disposed within the jump starter device.

45. (Previously presented) The device according to claim 24, wherein the power switch comprises a power switch control system or circuit configured to control the power switch and turn power on or off from the power supply to the depleted or discharged battery when connected to the positive and negative battery connectors.

46. (Previously presented) The device according to claim 45, wherein the power switch control system or circuit comprises one or more sensors configured to detect whether the positive and negative battery connectors are properly connected to the depleted or discharged battery prior to switching on the power switch.

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47. (Previously presented) The device according to claim 46, wherein the power switch control system or circuit is configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors.

48. (Currently amended) The device according to claim 46, wherein the power switch system or circuit is configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors[[;]].

49. (Previously presented) The device according to claim 46, wherein the power switch control system or circuit is configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors,

wherein the power switch control system or circuit switches on the power supply to connect the power supply to the depleted or discharged battery only when the depleted or discharged battery is present when connected between the positive and negative battery connectors and the depleted or discharged battery is connected with correct polarity between the positive and negative battery terminals.

50. (Previously presented) The device according to claim 45, wherein the power switch control system or circuit comprises a microcontroller configured for providing an output controlling the power switch.

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51. (Previously presented) The device according to claim 50, wherein the microcontroller receives input from one or more sensors configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors.

52. (Previously presented) The device according to claim 51, wherein the one or more sensors includes one sensor configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and another sensor configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors.

53. (Previously presented) The device according to claim 52, wherein the one or more sensors is one or more sensing circuits.

54. (Previously presented) The device according to claim 50, wherein the microcontroller switches the power switch on to provide power from the power supply to the depleted or discharged battery only when the depleted or discharged battery is determined by the microcontroller to be present and connected with the correct polarity.

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55. (Previously presented) The device according to claim 50, wherein the microcontroller is a programmable microcontroller configured to allow updates in functionality and system parameters.

56. (Previously presented) The device according to claim 55, wherein the programmable microcontroller comprises a memory.

57. (Previously presented) The device according to claim 24, wherein the positive battery connector comprises a positive battery cable, and the negative battery connector comprises a negative battery cable.

58. (Previously presented) The device according to claim 57, wherein the positive battery cable comprises a positive battery clamp and the negative battery cable comprises a negative battery clamp.

59. (Previously presented) The device according to claim 24, wherein said power switch comprises a plurality of FETs in parallel.

60. (Previously presented) The device according to claim 51, wherein the one sensor is configured for detecting presence of the depleted or discharged battery when connected between the positive and negative battery connections, and the other sensor is a reverse polarity sensor.

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61. (Previously presented) The device according to claim 60, wherein the one sensor configured for detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors.

62. (Previously presented) The device according to claim 24, further comprising a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery.

63. (Previously presented) The device according to claim 24, further comprising an output port providing positive and negative polarity outputs to the positive and negative battery connectors.

64. (Previously presented) The device according to claim 50, further comprising a temperature sensor configured to detect temperature of the power supply and to provide a temperature signal to the microcontroller.

65. (Previously presented) The device according to claim 50, further comprising a voltage measurement circuit configured to measure output voltage of the power supply and to provide a voltage measurement signal to the microcontroller.

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66. (Previously presented) The device according to claim 24, further comprising a voltage regulator configured to convert output voltage of the power supply to a voltage level appropriate to provide operating power to internal components of the device.

67. (Previously presented) The device according to claim 60, further comprising a manual override switch configured to activate a manual override mode to enable a user to connect jump start power to the positive and negative battery connectors when the one sensor configured for detecting presence of the depleted or discharged battery is unable to detect presence of the depleted or discharged battery.

68. (Previously presented) The device according to claim 67, wherein the microcontroller is configured to detect actuation of the manual override switch for at least a predetermined period of time before activation of the manual override mode.

69. (Previously presented) The device according to claim 24, wherein the positive and negative battery connectors are defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof.

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70. (Previously presented) The device according to claim 69, wherein the output port and the plug are dimensioned so that the plug will fit into the output port only in one specific orientation.

71. (New) The device according to claim 24, wherein the power switch is configured to switch power on only when the jump starting device is properly connected to the depleted or discharged battery.

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Electronic Acknowledgement Receipt

EFS ID:	44937420
Application Number:	16820040
International Application Number:	
Confirmation Number:	1056
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Customer Number:	20230
Filer:	William Leonard Klima/Lisa Elliott
Filer Authorized By:	William Leonard Klima
Attorney Docket Number:	054985-000055-US-02-02
Receipt Date:	07-FEB-2022
Filing Date:	16-MAR-2020
Time Stamp:	20:56:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$320
RAM confirmation Number	E202227K56254978
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	2022_02_07_RNFOA.pdf	194986 1383605e321849306b4f0be96405660718acec4e	no	24
Warnings:					
Information:					
2	Extension of Time	EOT_____x2-small.pdf	172133 a796d3c21bd1aa52777979ac0297983aa98717f1	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38240 5c67d4d580cb70a19a7f33d51aae24dee42f0a7a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	405359		

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTO/AIA/22 (10-20)
Approved for use through 11/30/2020. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 054985-000055-US-02-02

Application Number: 16/820,040

Filed: March 16, 2020

For: PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Art Unit: 2859

Examiner: DIAO

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$220	$110	$55	$
☑ Two months (37 CFR 1.17(a)(2))	$640	$320	$160	$ 320
☐ Three months (37 CFR 1.17(a)(3))	$1,480	$740	$370	$
☐ Four months (37 CFR 1.17(a)(4))	$2,320	$1,160	$580	$
☐ Five months (37 CFR 1.17(a)(5))	$3,160	$1,580	$790	$

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☐ attorney or agent of record. Registration number _____.

☑ attorney or agent acting under 37 CFR 1.34. Registration number 32422.

/Wiliam L. Klima/ — Signature

February 7, 2022 — Date

William L. Klima — Typed or printed name

202-467-8800 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 and 1.14. This collection is estimated to take 6 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: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

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:	16820040
Filing Date:	16-Mar-2020
Title of Invention:	PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION
First Named Inventor/Applicant Name:	Jonathan Lewis NOOK
Filer:	William Leonard Klima/Lisa Elliott
Attorney Docket Number:	054985-000055-US-02-02

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:				
Extension-of-Time:				

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Petitioner ADC (IPR2024-00671)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 2 months with $0 paid	2252	1	320	320
Miscellaneous:				
			Total in USD ($)	**320**

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Petitioner ADC (IPR2024-00671)

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/820,040	Filing Date 03/16/2020	☐ 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 $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	02/07/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 48	Minus	** 47	= 1		x $50 =	50
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	50

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/DEBORAH D SCOTT/
*** 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.	

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.

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Notice of References Cited	Application/Control No. 16/820,040	Applicant(s)/Patent Under Reexamination NOOK et al.	
	Examiner M'BAYE DIAO	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-20130154550-A1	06-2013	Balmefrezol; Alexandre	H02J1/102	320/107
*	B	US-9748778-B2	08-2017	Toya; Shoichi	H02J7/0045	1/1
*	C	US-9048666-B2	06-2015	Su; Ching-Fang	H02J7/0013	1/1
*	D	US-7893655-B2	02-2011	Veselic; Dusan	H02J7/00	320/112
*	E	US-7893558-B2	02-2011	Lee; Yu-Lung	H02J9/061	307/64
*	F	US-7017055-B1	03-2006	Ho; Lien-Hsun	G06F1/266	713/300
*	G	US-20160111914-A1	04-2016	Willard; Hugh C.	H02J9/061	307/66
*	H	US-20100052620-A1	03-2010	WONG; CHUCK	H02J7/0036	320/137
*	I	US-20090026837-A1	01-2009	LEE; YU-LUNG	H02J9/061	363/24
*	J	US-10218172-B2	02-2019	Chen; Ming-Hsien	H02J9/062	1/1
*	K	US-20150015184-A1	01-2015	SU; Ching-Fang	H02J7/0013	320/107
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	AU-2011334615-B2	12-2015	AU	DE MAN G	H01R27/02
	O	PH-12013500793-B1	01-2017	PH	DE MAN G	H01R27/02
	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.

(12) STANDARD PATENT (11) Application No. **AU 2011334615 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
USB outlet charger

(51) International Patent Classification(s)
H01R 13/648 (2006.01) ***H02J 7/00*** (2006.01)
H01R 31/06 (2006.01) ***H05K 5/04*** (2006.01)

(21) Application No: **2011334615** (22) Date of Filing: **2011.11.25**

(87) WIPO No: **WO12/068635**

(30) Priority Data

(31) Number	(32) Date	(33) Country
2010905218	**2010.11.25**	**AU**

(43) Publication Date: **2012.05.31**
(44) Accepted Journal Date: **2015.12.24**

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(56) Related Art
CN 201213213

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Petitioner ADC (IPR2024-00671)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
31 May 2012 (31.05.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/068635 A1

(51) International Patent Classification:
H01R 13/648 (2006.01) *H01R 31/06* (2006.01)
H02J 7/00 (2006.01) *H05K 5/04* (2006.01)

(21) International Application Number:
PCT/AU2011/001532

(22) International Filing Date:
25 November 2011 (25.11.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2010905218 25 November 2010 (25.11.2010) AU

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: USB OUTLET CHARGER

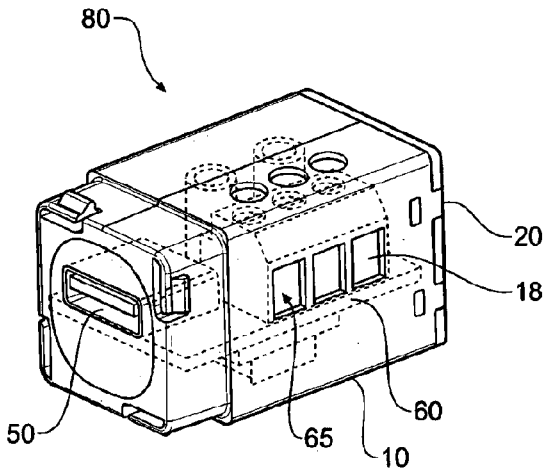


Figure 8

(57) **Abstract**: Disclosed is a Universal Serial Bus (USB) charging module for installation with a surface mounted power outlet. The charging module allows convenient and flexible installation in certain new and already installed power outlets to provide a convenient charging facility of devices with USB connection. Also disclosed is a housing for the charging module, a charging circuit and a method of installation.

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USB OUTLET CHARGER

FIELD OF THE INVENTION

The present invention relates to an electrical power outlet in a building such as a hotel, office or home. In a particular form, the invention relates to a power outlet providing an interface for charging Universal Serial Bus (USB) compatible devices.

PRIORITY

The present application claims priority from Australian Provisional Patent Application No. 2010905218 entitled "USB Outlet Charger" filed on 25 November 2010.

The entire contents of this document are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Many electronic devices such as mobile phones, mp3 players and digital cameras are charged through USB ports in either a computer or a USB Alternating Current (AC) adaptor which may be plugged into a wall socket or power outlet. Charging devices through a USB port on a computer requires the computer to be switched on and also prevents other peripheral devices such as mice and memory devices from accessing the port while in use. By using a USB AC adaptor the electronic device may be charged at a wall socket or power outlet. One portion of the adaptor has AC prongs which engage into AC receptacles of the wall socket while another portion of the adaptor has a USB port to interface with a USB connector of an appliance or electronic device to be charged. The disadvantage with this arrangement is that the USB AC adaptor is a separate component that must be purchased and carried around and also that the AC prongs will only be suitable for a particular country or region. This leads to another drawback with using USB AC adaptors in foreign countries, namely that additional AC adaptors are necessary to engage with sockets found in different areas around the world.

There are also USB wall outlets wherein the USB charger is integral with the power outlet. Having the USB charger integral with the power outlet can lead to increased complexity during installation and costly repair and replacement of parts.

An object of the present invention is to ameliorate one or more of the above described difficulties or at least provide a useful alternative for charging USB compatible devices.

Other advantages of the present invention will become apparent from the following description, taken in connection with the accompanying drawings, wherein, by way of illustration and example, several aspects and embodiments of the present invention are disclosed.

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SUMMARY

According to a first aspect, there is provided a Universal Serial Bus (USB) port housed in a housing including an engaging portion, the engaging portion including at least two deflectable clips, each for engaging with a corresponding recessed surface of a corresponding mating interface of a supporting portion disposed at the rear of a power outlet for retaining the USB port to the power outlet, upon insertion of the engaging portion into the supporting portion from the rear of the power outlet.

In one form, the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

In one form, the at least two deflectable clips each includes a face for engaging with the corresponding recessed surface of the supporting portion for thereby retaining the USB port to the power outlet.
In one form, the aperture is covered by a removable portion.

In one form, the engaging portion includes four deflectable clips for engaging with the supporting portion.

According to a second aspect, there is provided a Universal Serial Bus (USB) charging module including: a housing; a USB port; an engaging portion including at least two deflectable clips, each for engaging with a recessed surface of a corresponding mating interface of a supporting portion of a power outlet disposed at the rear of the power outlet for retaining the USB port to the power outlet upon the at least two deflectable clips being inserted into the supporting portion from the rear of the power outlet; and a USB charging circuit housed in the housing and electrically connected to the USB port at an output and for connection to mains power at an input.

In one form, the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

In one form, the engaging portion includes four deflectable clips for connecting the USB charging module to the supporting portion.

In another form, the USB charging module is removable from the supporting portion once connected to the supporting portion

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In one form, the USB charging circuit, in use, converts mains power input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

According to a third aspect, there is provided a method of connecting a Universal Serial Bus (USB) housing to a power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the USB housing housing a USB port and including an engaging portion, the method including: engaging the engaging portion of the USB housing with a supporting portion located at a rear side of the power outlet by inserting the engaging portion into the supporting portion from the rear side of the power outlet, thereby retaining the USB housing to the power outlet.

In one form, the step of engaging the engaging portion of the USB housing with the supporting portion includes causing at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion upon inserting the engaging portion into the supporting portion and then causing the at least two clips to each assume an undeflected position upon further inserting the engaging portion into the supporting portion.

In one form, the step of inserting the engaging portion into the supporting portion also causes the USB port to be located within an aperture in the power outlet to allow access to the USB port by a user via the aperture.

In one form, the method further includes the step of connecting one or more electrical terminals of the USB housing to mains power.

According to a fourth aspect, there is provided a power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the power outlet including: an aperture for receiving a switch; and a USB port housed in a housing according to the first aspect, for receiving the USB connector; wherein the USB port is disposed in the aperture and is connected to the power outlet at the supporting portion located at the rear of the power outlet.

In one form, the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mains power.

In one form, the power outlet further includes a second aperture in which is disposed a switch for controlling mains power supplied to the USB charging circuit.

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In one form, in use, the USB charging circuit converts mains power received at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

According to a fifth aspect, there is provided a power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device and for allowing the user to provide mains power to a further device via an alternating current (AC) connector, the power outlet having a front side accessible by a user, and the power outlet including: at least one power socket for connection to mains power and for receiving the AC connector; an aperture for receiving a switch; and a Universal Serial Bus (USB) port housed in a housing according to the first aspect, for receiving the USB connector.

In one form, the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mains power.

In one form, in use, the USB charging circuit converts mains power at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

In one form, the engaging portion is provided by four deflectable clips for connecting the USB charging module to the supporting portion of the power outlet.

In one form, the power outlet includes a second power socket and two switches, at least one switch for controlling mains power supplied to at least one of the power sockets.

According to a sixth aspect, there is provided a method of installing a Universal Serial Bus (USB) charging module according to the second aspect, in a power outlet, the method including: connecting the USB charging module to the power outlet from a rear of the power outlet by connecting the engaging portion to a supporting portion at the rear of the power outlet so that the USB port is accessible via an aperture in the power outlet; connecting the input of the USB charging circuit to mains power; and mounting the power outlet to a mounting surface.

In one form, the step of connecting the USB charging module to the power outlet includes inserting the engaging portion of the USB charging module into the supporting portion of the power outlet causing the at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion and then causing the at least two clips to each

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assume an undeflected position upon further inserting the engaging portion into the supporting portion, to thereby retain the engaging portion to the supporting portion.

In one form, the step of connecting the input of the USB charging circuit to mains power includes connecting an active wire and a neutral wire of the USB charging module to mains power.

In one form, the step of connecting the input of the USB charging circuit to mains power occurs after the step of connecting the USB charging module to the power outlet.

In one form, the step of mounting the power outlet to a mounting surface includes mounting the power outlet to a wall around an aperture in the wall, and wherein the USB charging module is thereby retained within a cavity behind the wall.

According to a seventh aspect, there is provided an interface between a supporting portion located at a rear of a power outlet and a USB port, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, and the interface including at least two mating interfaces of the supporting portion, each engaging with a corresponding deflectable clip of an engaging portion disposed about the USB port to thereby retain the USB port to the power outlet, the interface having been formed by inserting the engaging portion into the supporting portion from a rear side of the power outlet.

It will be understood that the term "comprise" and any of its derivatives (e.g. comprises, comprising) as used in this specification is to be taken to be inclusive of features to which it refers, and is not meant to exclude the presence of any additional features unless otherwise stated or implied.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that such prior art forms part of the common general knowledge of the technical field.

DRAWINGS

Various aspects of the present invention will be described in detail with reference to the following drawings in which:

FIGURE 1 is a front perspective view of a USB charging module housing according to a first aspect of the present invention;

FIGURE 2 is a rear perspective view of the USB charging module housing of Figure 1;

FIGURE 3 is a detailed view of part of an engaging portion of the USB charging module housing as shown in Figure 1;

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FIGURE 4 is a view of a removable cover that fits into the rear opening of a USB charging module housing;

FIGURE 5 shows an embodiment of a supporting portion of a surface mountable power outlet adapted to engage with a USB charging module housing;

FIGURE 6 is a detailed view of the mating interface of the supporting portion shown in Figure 5;

FIGURE 7 is a perspective view of a USB charging module according to an embodiment of a second aspect of the present invention;

FIGURE 8 is a perspective view of a USB charging module according to another embodiment of the second aspect of the present invention;

FIGURE 9 is a side view of the USB charging module shown in Figure 8;

FIGURE 10 is an end or rear view of the USB charging module shown in Figure 7 (wires not shown);

FIGURE 11 is a view of a USB charging module engaged with a grid or face plate of a surface mountable power outlet according to an embodiment of the present invention;

FIGURE 12 is a view of a USB charging module engaged with a grid or face plate of a surface mountable power outlet according to another embodiment of the present invention;

FIGURE 13 is a surface mountable power outlet according to an embodiment of a third aspect of the present invention;

FIGURE 14 shows a surface mountable power outlet according to another embodiment of the third aspect of the present invention;

FIGURE 15 is a circuit schematic depicting an embodiment of the AC mains voltage step down and regulation component of the USB charging circuit;

FIGURE 16 is a circuit schematic of a power conditioning circuit with a DC-DC converter to regulate the current and voltage suitable for the USB charging module;

FIGURE 17 is a top view of a USB charging circuit adapted to fit inside the USB charging module housing of Figure 1;

FIGURE 18 is a perspective view of the USB charging circuit as shown in Figure 17;

FIGURES 19a-19c depict a sequential series of views of a method of installing a USB charging module to a surface mountable power outlet according to a fourth aspect of the present invention; and

FIGURE 20 shows a flow diagram illustrating a general method of installing a USB charging module into a surface mountable power outlet according to a fourth aspect of the present invention.

FIGURE 21 is a perspective view of an embodiment of a USB charging module suitable for front entry engagement with a power outlet.

FIGURE 22 is a section view through A-A of the engaging portion of the USB charging module housing of Figure 23;

FIGURE 23 is a front view of the USB charging module housing as depicted in Figure 21;

FIGURE 24 is a section view B-B of the supporting portion of the grid or face plate depicted in Figure 25;

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FIGURE 25 is a front view of a grid or face plate suitable for engagement with the USB charging module of Figure 21;

FIGURE 26 shows the USB charging module of Figure 21 to be connected from the front of the grid or face plate according to an embodiment of the present invention; and

FIGURE 27 shows the USB charging module of Figure 21 to be connected from the front of the grid or face plate according to another embodiment of the present invention.

In the following description, like reference characters designate like or corresponding parts throughout the several views of the drawings.

DESCRIPTION

Referring now to Figures 1-4, there is shown a USB charging module housing 10 according to a first aspect of the present invention. The housing 10 has an aperture 12 through a front face 11 that is large enough to provide access for a USB connector to plug into a USB port or socket 50 enclosed within the housing (see Figure 7). At the rear of the housing 10 (see Figure 2) is an opening or aperture 13 which enables access for inserting a USB charging circuit 60 (see Figure 7) into the housing 10. Although this embodiment shows the rear of the housing as being open to provide an access means for the USB charging circuit 60, it is possible that the opening 13 could be located on a different face and may constitute an entire face or a part thereof. Figure 4 shows a removable cover 20 that engages with the rear of the housing 10 to substantially seal the enclosure from dust and ingress. The removable cover 20 has angled clips 26 and 27 that engage into mating apertures 16 and 15 respectively of the housing 10 in a snap fit arrangement. The lip of the angled clips 27 are inserted directly into apertures 15 and then the cover 20 is closed by applying force proximate the clips 26 until they snap into apertures 16. The clips 26, 27 are flexible and resilient so that they may bend sufficiently to allow fitment into the apertures 15, 16 whereupon they return to their undeformed positions.

In one embodiment, a feature of the housing 10 is the clip interface comprising four clips 14 that are positioned around the four side faces of the housing 10. These clips form an engaging portion that connects the housing 10 to a supporting portion 30 (see Figure 5) of a surface mountable power outlet. The supporting portion 30 may be integral with a grid or face plate of the power outlet or located on a mounting plate that is adapted to be connected to the rear of a grid or face plate. Figure 3 shows a detailed view of a clip 14, in particular illustrating a type of clip with a tapered front face 14b and substantially vertical rear face 14a. These clips are designed to engage with the mating interface 34 of the supporting portion 30 which is most clearly illustrated in Figure 6. Figure 6 shows detail of a typical mating interface 34 which will connect to a USB charging module housing 10. As the housing 10 is inserted into the supporting portion 30, the tapered surface 14b of the clip 14 will engage a corresponding tapered surface 35 of the supporting portion 30. As more insertion force is applied, the

clip 14 will deflect slightly as it passes the vertical surface 37 of the supporting portion 30. The substantially vertical rear face 14a of the clip 14 will eventually pass the lowest point of the vertical surface 37, upon which it reaches the recessed horizontal surface 36 of the supporting portion 30. The compression force acting on the clip 14 is then released and it deflects back to its undeformed position and the substantially vertical rear face 14a engages in surface to surface contact with the horizontal recessed surface 36 of the supporting portion 30 to thereby retain housing 10 to the supporting portion 30. In the embodiment shown in Figure 5, the supporting portion 30 has only two mating interfaces 34 requiring that only two of the four clips 14 be used to connect the housing 10 to the supporting portion 30. In practice, two or more of the clips 14 may be used to secure the housing, and the supporting portion 30 may also have two or more mating interface 34.

Referring now to Figure 7, there is shown a USB charging module 40 according to an embodiment of a second aspect of the present invention. Enclosed inside the housing 10 is a USB port 50 and a USB charging circuit 60. Wires 70, 71 to be connected to mains power are soldered directly onto a printed circuit board (PCB) 62 of the charging circuit 60 (see Figure 16). The wires 70, 71 exit the housing 10 through apertures 22 located through the removable cover 20 (see Figure 10). During installation these wires may be connected to mains power either directly or via a switch. In other embodiments, there may be simply provided screwed terminals for wire termination instead of a terminal block.

Referring now to Figures 8 and 9, there is shown a USB charging module 80 according to another embodiment of the second aspect of the present invention. Enclosed inside the housing 10 is USB port 50 and USB charging circuit 60 with a terminal block 65 to be connected to mains power. During installation, wires carrying mains power either directly or via a switch are connected to the terminal block 65 to power the USB charging circuit 60. The wires enter the housing 10 through apertures 18 located on one side of the housing 10.

In the USB charging module embodiments described above, the power input to the module is mains power (also known as household, supply or grid power) supplied between about 100-240V alternating current (AC). The USB charging circuit 60 regulates the voltage and steps it down to a usable 4.75-5.25V direct current (DC) which is typically required to charge many electronic devices.

Referring now to Figures 11-14, there are shown various embodiments of the USB charging module 40 or 80 connected to a grid or face plate of a surface mountable power outlet. Figure 11 shows USB charging module 40 engaged with a supporting portion 30 which is integral with a grid or face plate 100. In one example, the supporting portion 30 is integrally machined into the grid or face plate 100 during manufacture. In other embodiments, the supporting portion 30 is provided as a separate piece and is attached to the grid or faceplate during or before installation. The grid or face plate 100 can be

constructed from plastic, metal or any other suitable materials. Figure 11 shows a grid or face plate 100 with two apertures 102 (only one visible in this view) capable of receiving switches or other electrical connectors in addition to USB ports. Further, as the USB charging module is modular in design, it can always be easily interchanged for a switch or other desired user interface. The grid or face plate 100 shown in Figure 11 may be adapted in many ways such as providing for AC receptacles as commonly found in most household power outlets. The grid or face plate 100 is fastened to a wall by screws or other suitable fasteners through mounting lugs 101. These may be arranged in any suitable position on the grid or face plate 100 and may vary in quantity.

Figure 12 shows a USB charging module 80 engaged with a supporting portion 30 located in a mounting plate 200 that is adapted to be inserted into the rear of a grid or face plate 110. In this arrangement the supporting portion 30 is integrally machined into mounting plate 200. Such a mounting plate 200 (also known as a base or base plate) in standard power outlets, commonly includes electrical contacts for AC receptacles, switch mounting and terminals to connect mains power wiring. The mounting plate 200 is designed to be received by the rear of a grid or face plate 110. As shown in Figure 12, the mounting plate 200 is fastened to the grid or face plate 110 by screws at mounting positions 201. The grid or face plate 110 is mounted onto a wall by screws at mounting locations 111, 112.

Figure 13 more specifically shows a surface mountable power outlet 500 according to a third aspect of the present invention allowing a user to charge USB compatible devices. In this arrangement the USB charging module 40 or 80 is connected to a supporting portion 30 that may either by integral with the grid or face plate or located on a mounting plate adapted to be connected to the rear of the grid or face plate. In this embodiment the power outlet 500 has a pair of switches and AC receptacles in addition to the USB charging module 40 or 80. A power outlet 500 such as this allows a user to plug in normal AC type connectors with power switched on or off and advantageously also provides a user with access to a USB port 50 for charging electronic devices. If the USB charging module 40 or 80 is wired directly to mains without a switch then the charging module 40 or 80 is constantly connected to mains power so that when a user connects their device into the USB port; charging will begin automatically. If the USB charging module 40 or 80 is wired to mains via a switch, then power will not be drawn until the user engages the switch to an "ON" position. As shown in Figure 14 in another embodiment of a wall mounted power outlet 510, there is a USB charging module 40 or 80 provided additionally with LED status lights 55 that indicate whether the device connected to the port is charging or not. In both Figures 13 and 14 there is also shown a cover plate 90, 91 that is adapted to fit around the periphery of the power outlet. The cover plate 90, 91 usually snap fits around the grid or face plate and is provided primarily for aesthetics when the power outlet is mounted to a surface such a wall or floor.

It will be appreciated by those skilled in the art that the surface mountable power outlet embodiments illustrated in this text are by no means limiting to how the invention may be performed. The geometric arrangement of switches, AC receptacles, USB ports or other network connection ports may be customised to suit a particular application. The supporting portion 30 also need not necessarily be limited to being an integral portion of a grid or face plate or located on a mounting plate adapted to be inserted into the rear of a grid or face plate. The supporting portion 30 could be mounted or machined into almost any structure, including a box or other structural housing. Further, the engaging portion of the USB charging module housing and supporting portion of the power outlet may be designed with alternative interfaces to the clip arrangement shown which achieves the principle aim of the invention in providing a modular USB housing which is adapted to be installed in a surface mountable power outlet thereby allowing a user to charge USB compatible devices.

Referring now to Figures 15-19, there is shown the USB charging circuit 60 that receives a 240V AC mains power input and provides a 5V DC output to the USB port 50, suitable for charging USB compatible electronic devices. The USB charging circuit 60 comprises the following stages. In the first stage, shown in Figure 15, the 240V AC mains input is first stepped down using a transformer 61 to reduce the high AC voltage to a low AC voltage (e.g. 15V, 1.2A). This stepped down AC voltage is then passed through a rectifier circuit 63 (e.g. bridge rectifier) that outputs a full wave varying rectified voltage shown as the output across load R_L. As shown in Figure 16, this varying voltage is then smoothed with a capacitor to produce a relatively smooth DC voltage with a small ripple. A voltage regulator (e.g. 7812 Integrated Circuit (IC)) is then used to output a regulated 12V DC output as will be understood by the person skilled in the art.

In the second stage, an embodiment of which is shown in Figure 16, a DC-DC converter (e.g. Texas Instruments TPS40210 current mode boost controller) is then used to regulate the output suitable for the USB charger. The TPS40210 implements a DC-DC single-ended primary inductance converter (SEPIC) with input and output current regulation, as well as output voltage regulation implemented by closed loop feedback control. The TPS40210 ensures that the output voltage of the USB charger is between about 4.75 and 5.25 V (nominally 5V DC) with an operating current of about 1A and also prevents overcharging. The voltage input in Figure 16 is the regulated 12V from the first stage, which is converted to a regulated 5V DC voltage output by the circuit shown. It should be understood that this is just one example of how a USB charging circuit may be implemented and any other suitable circuit arrangement may be used.

Referring specifically to Figures 17 and 18 there is shown an embodiment of the physical circuit layout of the USB charging circuit 60. A double layered PCB 62 is used which provides a compact

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and efficient way to house all of the components inside the housing 10. On one layer of the PCB 62 there is mounted the USB port 50, an optional terminal block 65 and the circuit components for the AC mains voltage step down and first stage regulation (including transformer, capacitors, 7812 IC voltage regulator and rectifier circuit). On the second layer of the PCB 62 there is provided the power conditioning circuitry for the USB charger output (including the TPS40210 and various other capacitors, inductors, resistors and diodes).

In other embodiments, there is provided 2 or 3 or more PCBs over which the circuit components are arranged, rather than (or as well as) a double layered arrangement.

Referring now to Figures 19a-19c there is shown a sequential series of views of a method of installing the USB charging module 80 to a surface mountable power outlet according to a fourth aspect of the present invention. In this embodiment, the mounting surface is a wall 90. In Figure 19a there is shown the step of connecting the engaging portion of the USB charging module housing 10 to a supporting portion 30 of the power outlet. Figure 19a shows the USB charging module 80 already having been engaged with the supporting portion 30. Figure 19b illustrates the next step of connecting the mains power to the USB charging circuit 60. The USB charging module 80 and grid or face plate assembly is held in close proximity to a wall opening where the power outlet is to be located. The wiring from the mains (typically active and neutral wires, with earth optional) is physically connected to the USB charging circuit 60. The particular embodiment illustrated in Figures 19a-19c shows a USB charging module 80 with a terminal block 65 for terminating the mains wires. The final step in the installation is to attach or mount the power outlet to the wall 90 as illustrated in Figure 19c. The grid or face plate is held flat against the wall 90 and screws or other suitable fastening means are inserted through mounting apertures in the grid or face plate and fastened securely to the wall 90. In another example, the USB charging module 40 may be connected using wires 70, 71 as previously described.

Figure 20 illustrates a flow diagram of a method of installing the USB charging module 40 or 80 to a surface mountable power outlet. In step 600, the installer begins with the USB charging module. In step 601, the engaging portion of the USB charging module housing 10 is connected to the supporting portion 30 of the power outlet. In step 602, a determination is made as to whether the supporting portion is located in a mounting plate that is not integral with the grid or faceplate. If the supporting portion 30 is integral with the grid or face plate, the mains power is connected to the USB charging circuit 60 and the power outlet is attached or mounted to the mounting surface (which may be a wall or floor or other appropriate surface) in step 604. If the supporting portion 30 is located in a mounting plate that is not integral with the grid or face plate, then there is an additional step 603 of connecting the mounting plate to the grid or face plate.

In step 605, the installer then connects the AC mains power to the USB and then in step the power outlet assembly is mounted or attached to the mounting surface such as the wall 90 or a floor. In step 606, the resulting product of the method is a surface mounted USB power or charging outlet.

Once installation is complete, the power outlet provides an interface to charge USB compatible devices. The USB charging module 40,80 receives a mains input power between about 100-240V AC and converts this to a regulated 5V DC output suitable for charging USB compatible electronic devices. The modular housing 10 enables the power outlet to have interchangeable interfaces to suit operational requirements. The USB charging module 40,80 may be removed from the power outlet and replaced with a switch or any other interface without having to replace the entire power outlet.

Referring now to Figures 21-27, there is shown a further embodiment whereby the USB charging module 40,80 is connected to the supporting portion 130 of a grid or face plate 120 of a surface mountable power outlet from the front thereby providing a 'front entry' insertion option. Whereas previously described the USB charging module 40,80 is connected into a supporting portion 30 in the rear of the grid or face plate, it is also desirable to be able to insert the module from the front of the grid or face plate. It will be appreciated that this connection may be facilitated in many ways, an example of which is shown in Figures 21-27. Figure 21 generally shows a USB charging module 40,80 which can be connected to mains power as previously described. In one form, the module may have a clip interface comprising clips 18 as shown in more detail in Figures 22-23. Figure 23 is a front view of a USB charging module housing 10 showing the location of two clips 18 suitable for front entry connection of the module. Figure 22 is a sectional view through A-A of Figure 23 providing detail of a possible clip arrangement. This clip arrangement allows the housing 10 to engage with a supporting portion 130 of a grid or face plate 120 as shown in Figure 25. Figure 24 shows as a sectional view through B-B of Figure 25 which generally shows the supporting portion 130 in more detail. The housing 10 of the USB charging module 40,80 is inserted through aperture 132 of the supporting portion 130. The clip arrangement facilitates a snap-fit connection between the clips 18 and the supporting portion 130. As the module is inserted into the grid or face plate, the resilient clips 18 bend slightly as force is applied such that the outer most surface 18b of the clips 18 can pass the inner most surface 133 of the supporting portion 130.Once engaged, surface 19 of the housing 10 mates with recessed surface 131 of the supporting portion 130 and surface 18a of the clips 18 is in contact with surface 134 of the supporting portion 130.

Figures 26-27 show exploded views of the USB charging module 40,80 and grid or face plate front entry installation. Figure 26 shows a grid or face plate 120 with two apertures 132 which enables more than one USB charging module 40,80 to be inserted. Figure 27 shows a grid or face plate 140 with a single aperture 132 for receiving a USB charging module 40,80 from the front. In addition, Figure 27

shows a cover plate 145 that is attached or mounted to the grid or face plate after the USB charging module 40,80 has been connected and screws 146 for attaching or mounting the grid or face plate to a surface such as a wall or floor.

Although various illustrative embodiments of the present invention have been described in the foregoing detailed description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the scope of the invention as set forth and defined by the following claims.

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CLAIMS

1. A Universal Serial Bus (USB) port housed in a housing including an engaging portion, the engaging portion including at least two deflectable clips, each for engaging with a corresponding recessed surface of a corresponding mating interface of a supporting portion disposed at the rear of a power outlet for retaining the USB port to the power outlet, upon insertion of the engaging portion into the supporting portion from the rear of the power outlet.

2. A Universal Serial Bus (USB) port housed in a housing as claimed in claim 1, wherein the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

3. A Universal Serial Bus (USB) port housed in a housing as claimed in claim 2 wherein the at least two deflectable clips each includes a face for engaging with the corresponding recessed surface of the supporting portion for thereby retaining the USB port to the power outlet.

4. A Universal Serial Bus (USB) port housed in a housing as claimed in any one of claims 1 to 3 wherein the engaging portion includes four deflectable clips for engaging with the supporting portion.

5. A Universal Serial Bus (USB) charging module including:

   a housing;

   a USB port;

   an engaging portion including at least two deflectable clips, each for engaging with a recessed surface of a corresponding mating interface of a supporting portion of a power outlet disposed at the rear of the power outlet for retaining the USB port to the power outlet upon the at least two deflectable clips being inserted into the supporting portion from the rear of the power outlet; and

   a USB charging circuit housed in the housing and electrically connected to the USB port at an output and for connection to mains power at an input.

6. A Universal Serial Bus (USB) charging module as claimed in claim 5 wherein the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of

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the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

7. A Universal Serial Bus (USB) charging module as claimed in any one of claims 5 or 6 wherein the engaging portion includes four deflectable clips for connecting the USB charging module to the supporting portion.

8. A Universal Serial Bus (USB) charging module as claimed in any one of claims 5 to 7 wherein the USB charging module is removable from the supporting portion once connected to the supporting portion.

9. A Universal Serial Bus (USB) charging module as claimed in any one of claims 5 to 8 wherein the USB charging circuit, in use, converts mains power input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

10. A method of connecting a Universal Serial Bus (USB) housing to a power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the USB housing housing a USB port and including an engaging portion, the method including:

engaging the engaging portion of the USB housing with a supporting portion located at a rear side of the power outlet by inserting the engaging portion into the supporting portion from the rear side of the power outlet, thereby retaining the USB housing to the power outlet.

11. A method of connecting a Universal Serial Bus (USB) housing as claimed in claim 10 wherein the step of engaging the engaging portion of the USB housing with the supporting portion includes causing at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion upon inserting the engaging portion into the supporting portion and then causing the at least two clips to each assume an undeflected position upon further inserting the engaging portion into the supporting portion.

12. A method of connecting a Universal Serial Bus (USB) housing as claimed in any one of claims 10 or 11 wherein the step of inserting the engaging portion into the supporting portion also causes the USB port to be located within an aperture in the power outlet to allow access to the USB port by a user via the aperture.

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13. A method of connecting a Universal Serial Bus (USB) housing as claimed in any one of claims 10 to 12 further including the step of connecting one or more electrical terminals of the USB housing to mains power.

14. A power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the power outlet including:

an aperture for receiving a switch; and

a USB port housed in a housing as claimed in any one of claims 1 to 4, for receiving the USB connector; wherein

the USB port is disposed in the aperture and is connected to the power outlet at the supporting portion located at the rear of the power outlet.

15. A power outlet as claimed in claim 14 wherein the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mains power.

16. A power outlet as claimed in claim 15 further including a second aperture in which is disposed a switch for controlling mains power supplied to the USB charging circuit.

17. A power outlet as claimed in any one of claims 15 or 16 wherein, in use, the USB charging circuit converts mains power received at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

18. A power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device and for allowing the user to provide mains power to a further device via an alternating current (AC) connector, the power outlet having a front side accessible by a user, and the power outlet including:

at least one power socket for connection to mains power and for receiving the AC connector;

an aperture for receiving a switch; and

a Universal Serial Bus (USB) port housed in a housing as claimed in claim 1, for receiving the USB connector.

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19. A power outlet as claimed in claim 18 wherein the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mains power.

20. A power outlet as claimed in claim 19 wherein, in use, the USB charging circuit converts mains power at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

21. A power outlet as claimed in any one of claims 18 to 20 wherein the engaging portion is provided by four deflectable clips for connecting the USB charging module to the supporting portion of the power outlet.

22. A power outlet as claimed in any one of claims 18 to 21 including a second power socket and two switches, at least one switch for controlling mains power supplied to at least one of the power sockets.

23. A method of installing a Universal Serial Bus (USB) charging module as claimed in claim 5, in a power outlet, the method including:

    connecting the USB charging module to the power outlet from a rear of the power outlet by connecting the engaging portion to a supporting portion at the rear of the power outlet so that the USB port is accessible via an aperture in the power outlet;
    connecting the input of the USB charging circuit to mains power; and
    mounting the power outlet to a mounting surface.

24. A method of installing a Universal Serial Bus (USB) charging module as claimed in claim 23 wherein the step of connecting the USB charging module to the power outlet includes inserting the engaging portion of the USB charging module into the supporting portion of the power outlet causing the at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion and then causing the at least two clips to each assume an undeflected position upon further inserting the engaging portion into the supporting portion, to thereby retain the engaging portion to the supporting portion.

25. A method of installing a Universal Serial Bus (USB) charging module as claimed in any one of claims 23 to 24 wherein the step of connecting the input of the USB charging circuit to mains power includes connecting an active wire and a neutral wire of the USB charging module to mains power.

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26. A method of installing a Universal Serial Bus (USB) charging module as claimed in any one of claims 23 to 25 wherein the step of connecting the input of the USB charging circuit to mains power occurs after the step of connecting the USB charging module to the power outlet.

27. A method of installing a Universal Serial Bus (USB) charging module as claimed in any one of claims 23 to 26 wherein the step of mounting the power outlet to a mounting surface includes mounting the power outlet to a wall around an aperture in the wall, and wherein the USB charging module is thereby retained within a cavity behind the wall.

28. An interface between a supporting portion located at a rear of a power outlet and a USB port, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, and the interface including at least two mating interfaces of the supporting portion, each engaging with a corresponding deflectable clip of an engaging portion disposed about the USB port to thereby retain the USB port to the power outlet, the interface having been formed by inserting the engaging portion into the supporting portion from a rear side of the power outlet.

29. An interface as claimed in claim 28 wherein the at least two mating interfaces each includes a recessed surface engaging with a face of the corresponding deflectable clip.

30. An interface as claimed in claim 29 wherein the at least two mating interfaces each includes a tapered surface for engaging a tapered surface of the corresponding clip upon insertion of the corresponding clip into the at least two mating interfaces.

31. An interface as claimed in any one of claims 28 to 30 wherein the supporting portion is disposed about an aperture in the power outlet.

32. An interface as claimed in claim 31 wherein the USB port is disposed within the switch aperture and is accessible via the aperture.

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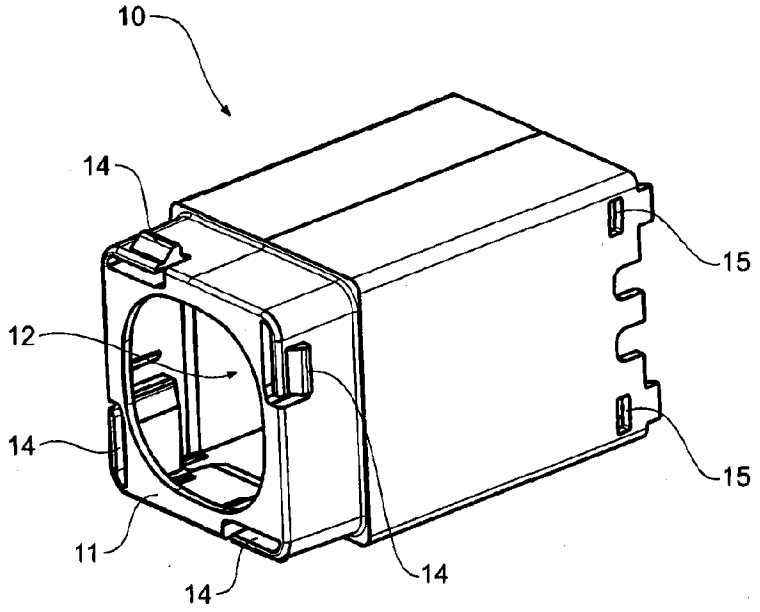


Figure 1

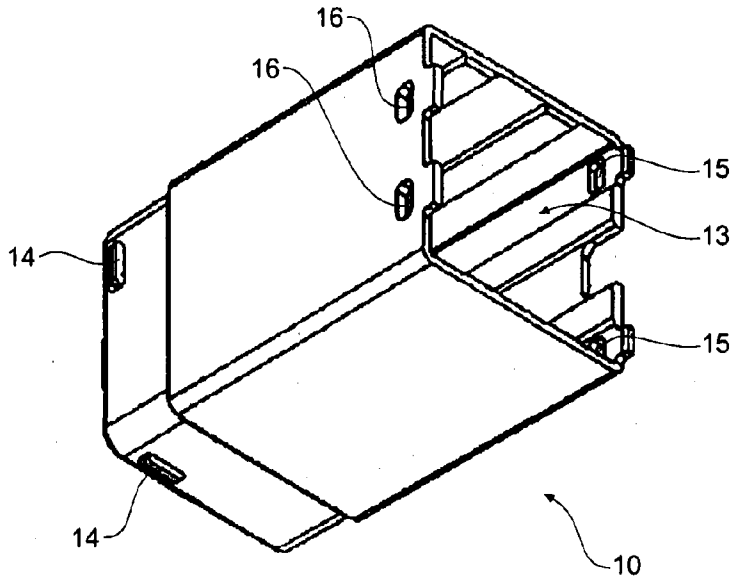


Figure 2

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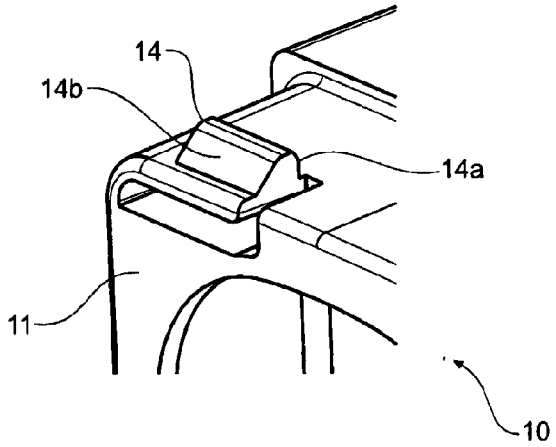


Figure 3

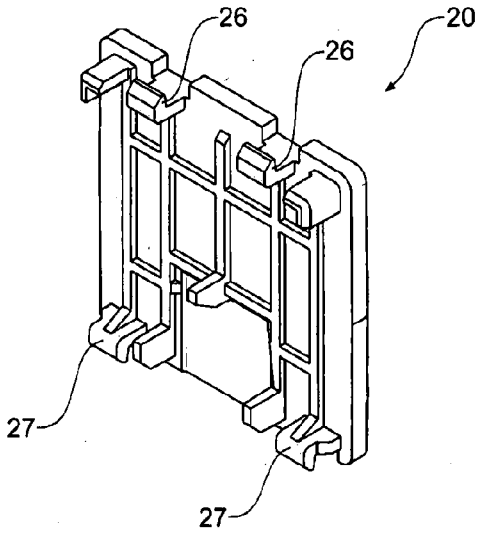


Figure 4

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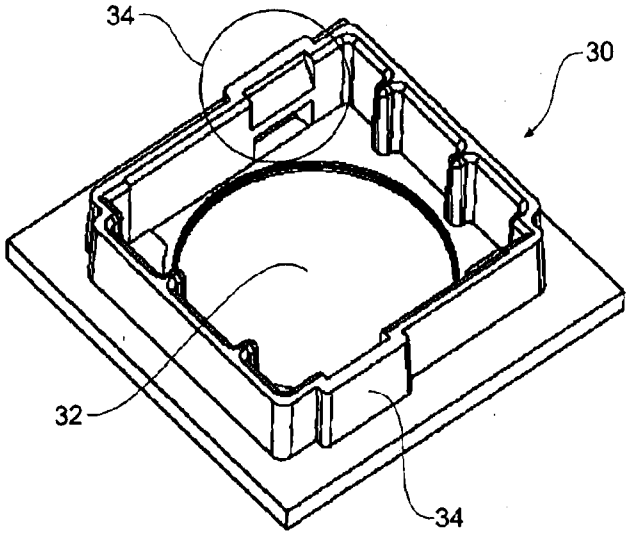


Figure 5

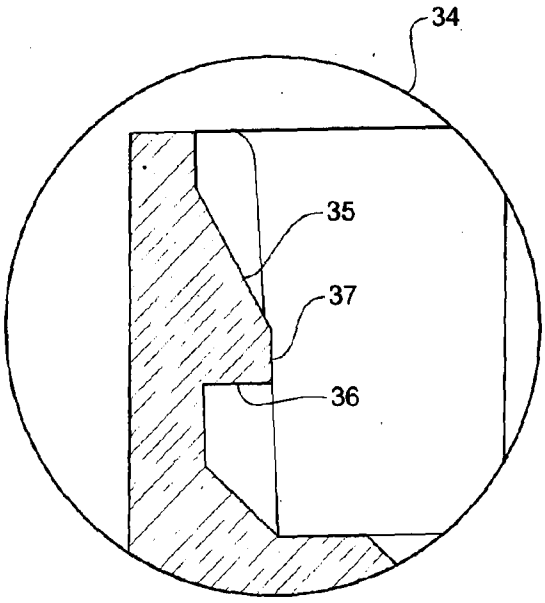


Figure 6

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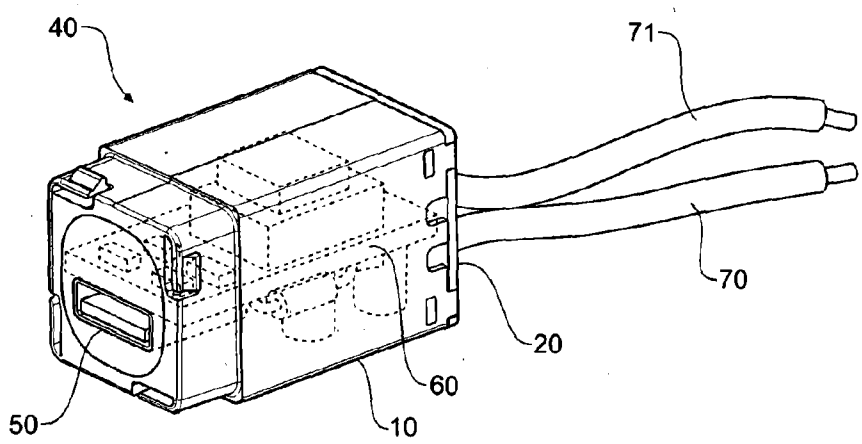


Figure 7

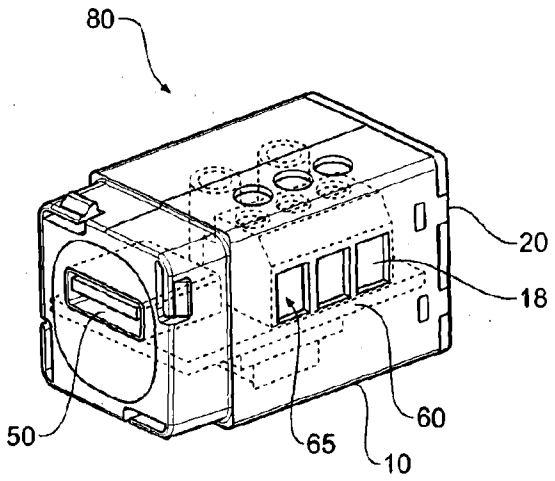


Figure 8

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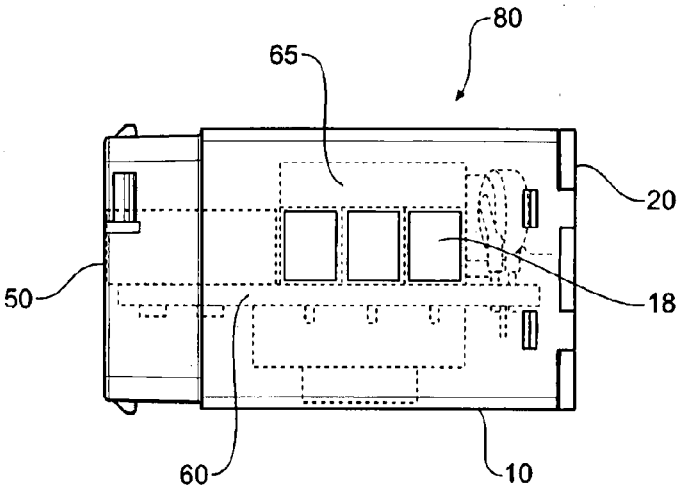


Figure 9

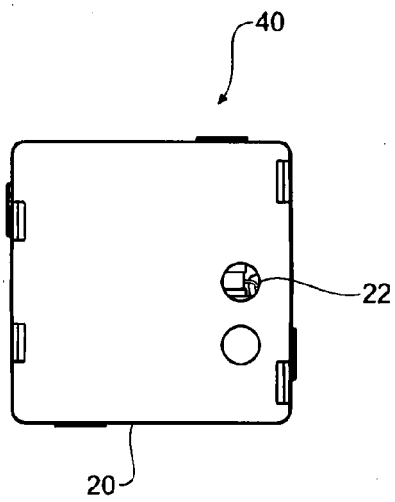


Figure 10

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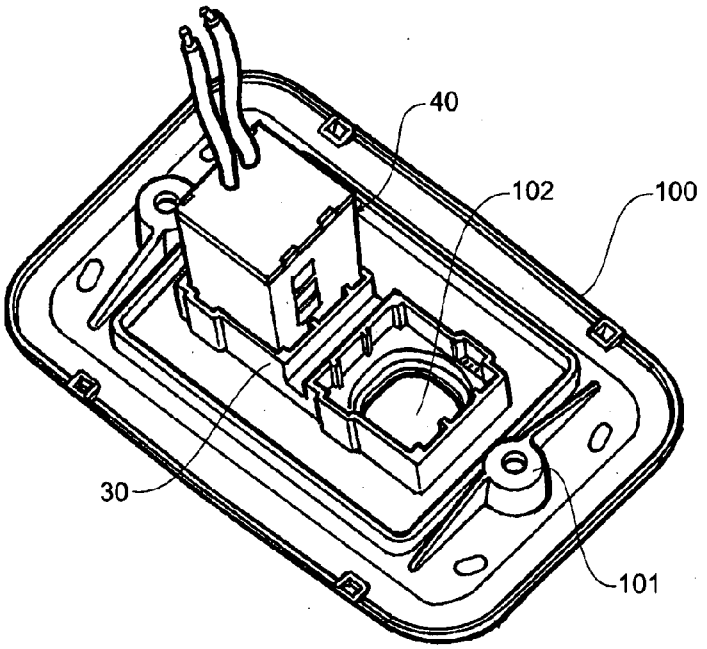


Figure 11

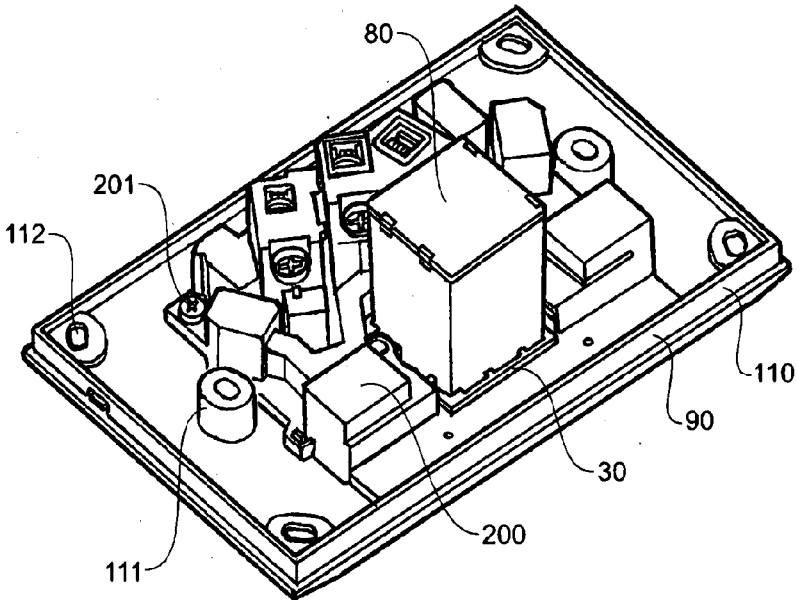


Figure 12

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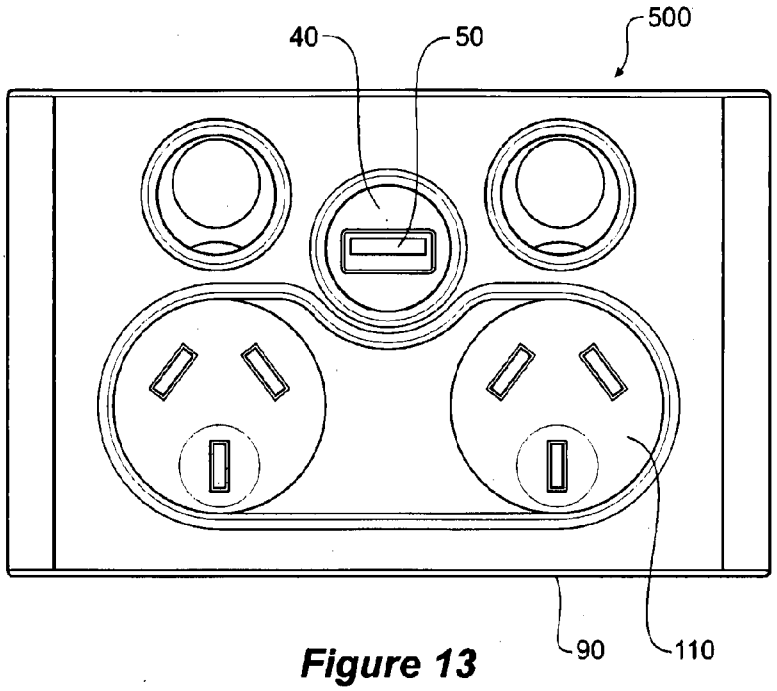


Figure 13

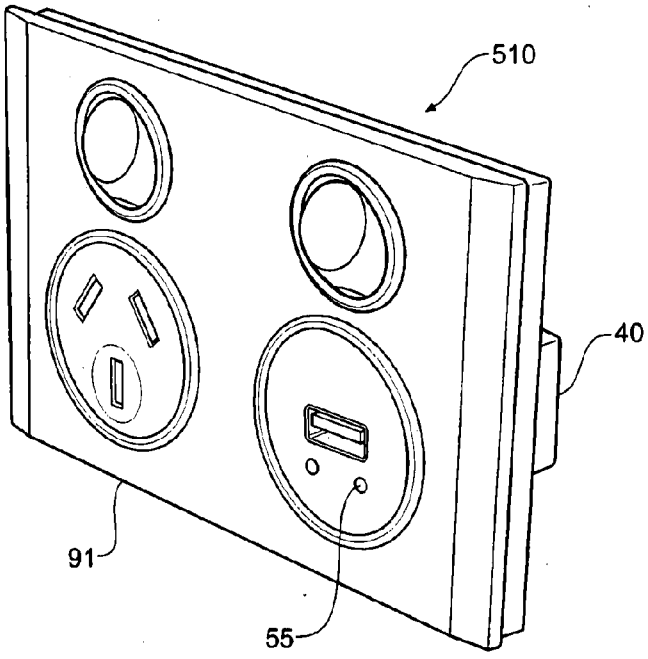


Figure 14

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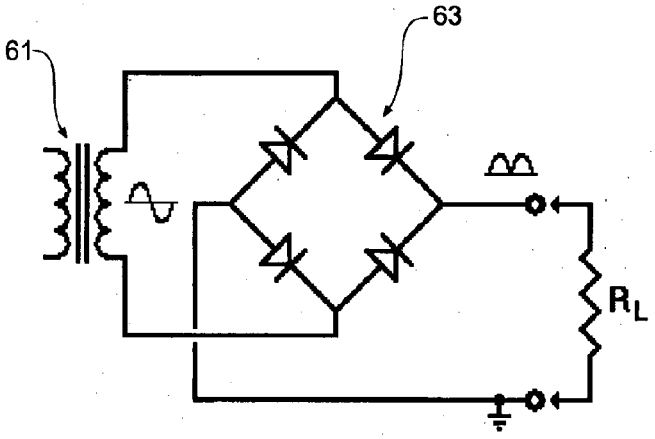


Figure 15

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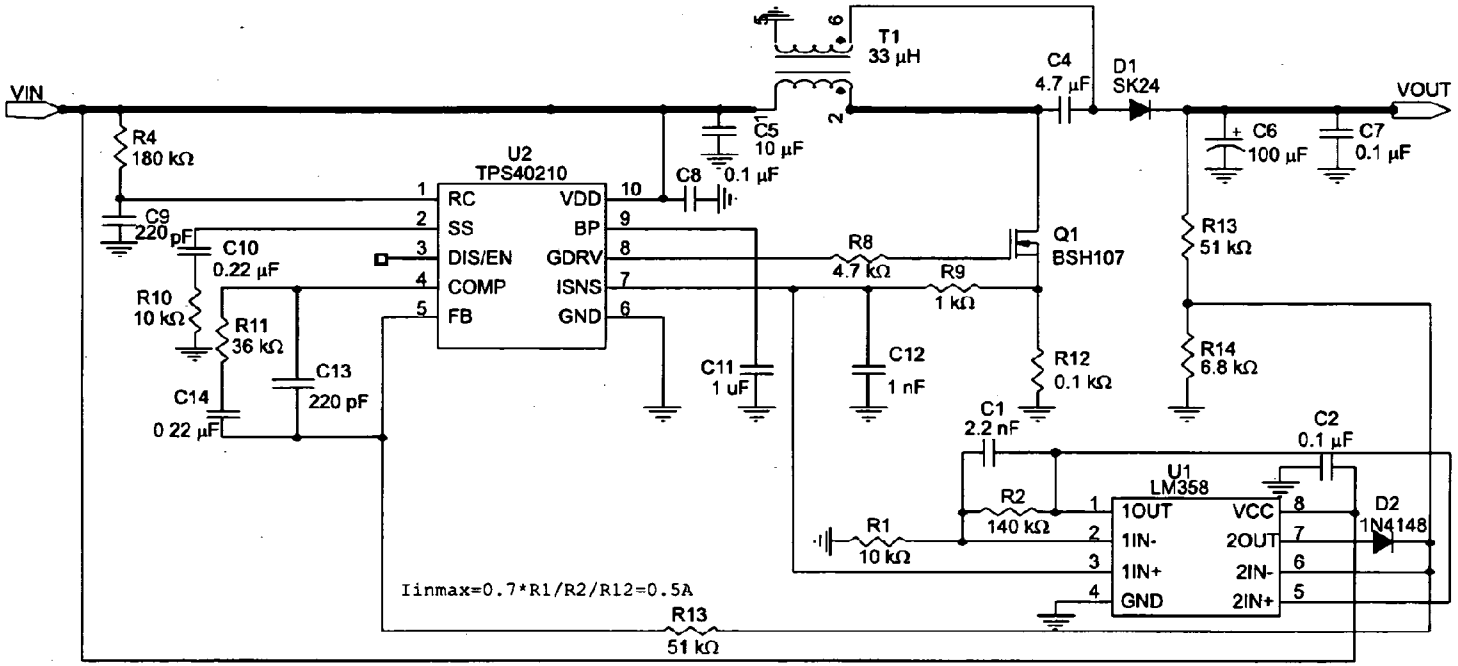


Figure 16

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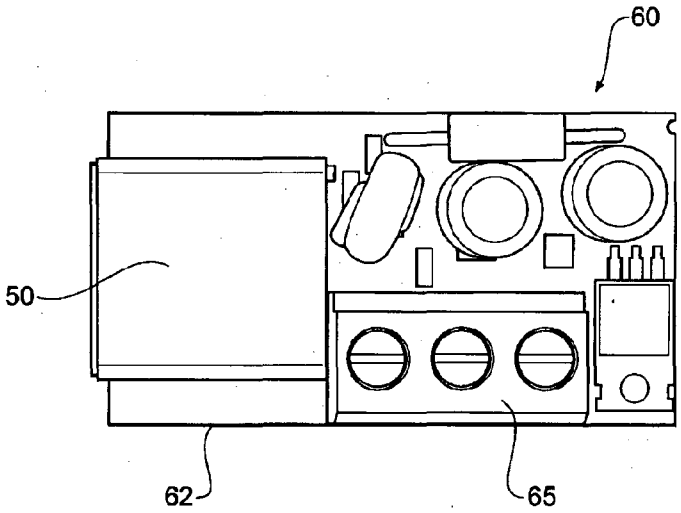


Figure 17

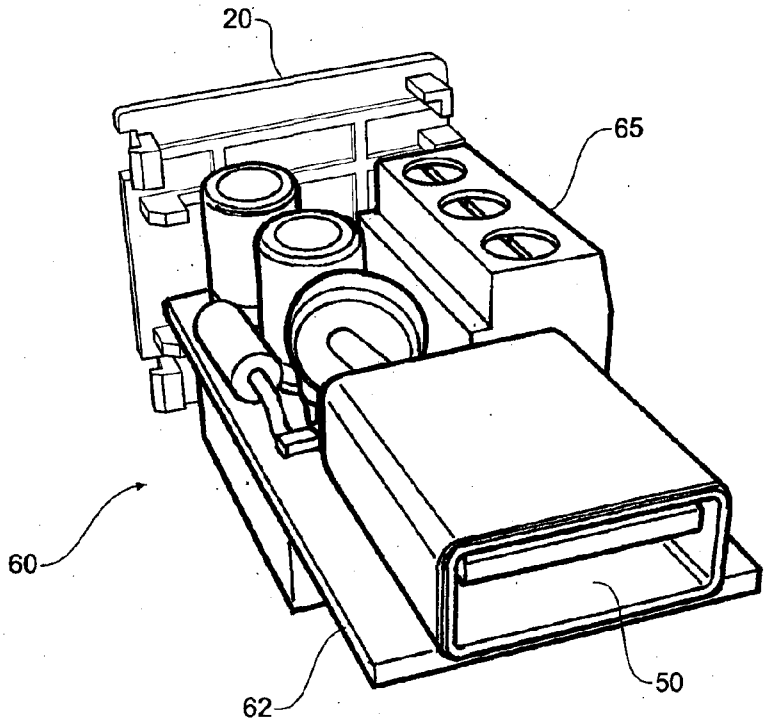


Figure 18

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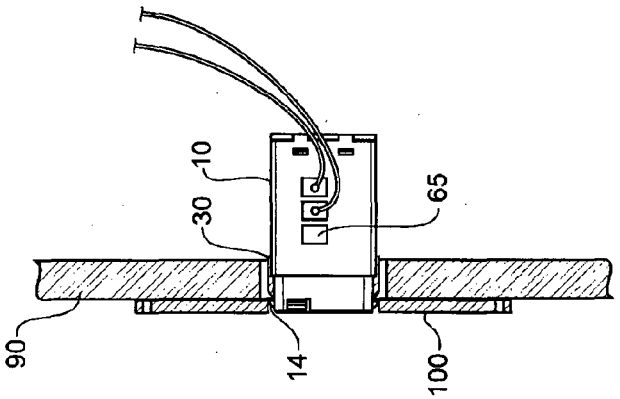


Figure 19c

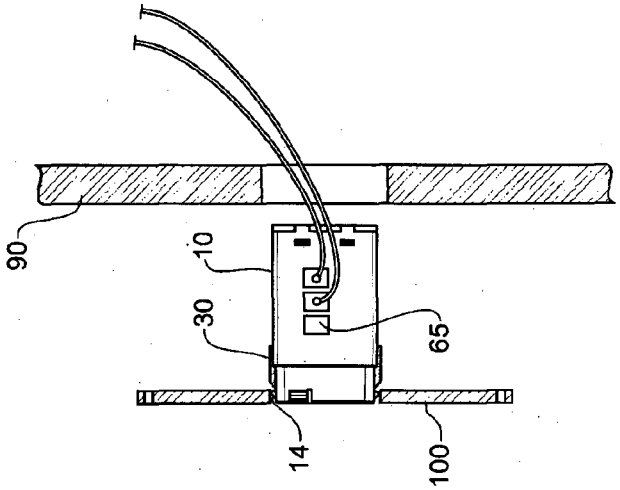


Figure 19b

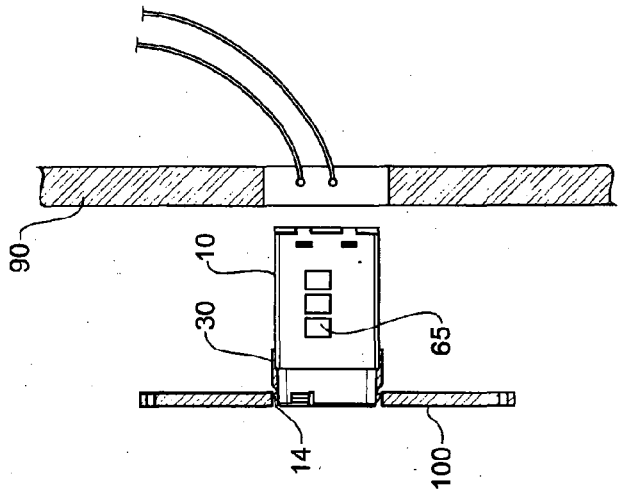


Figure 19a

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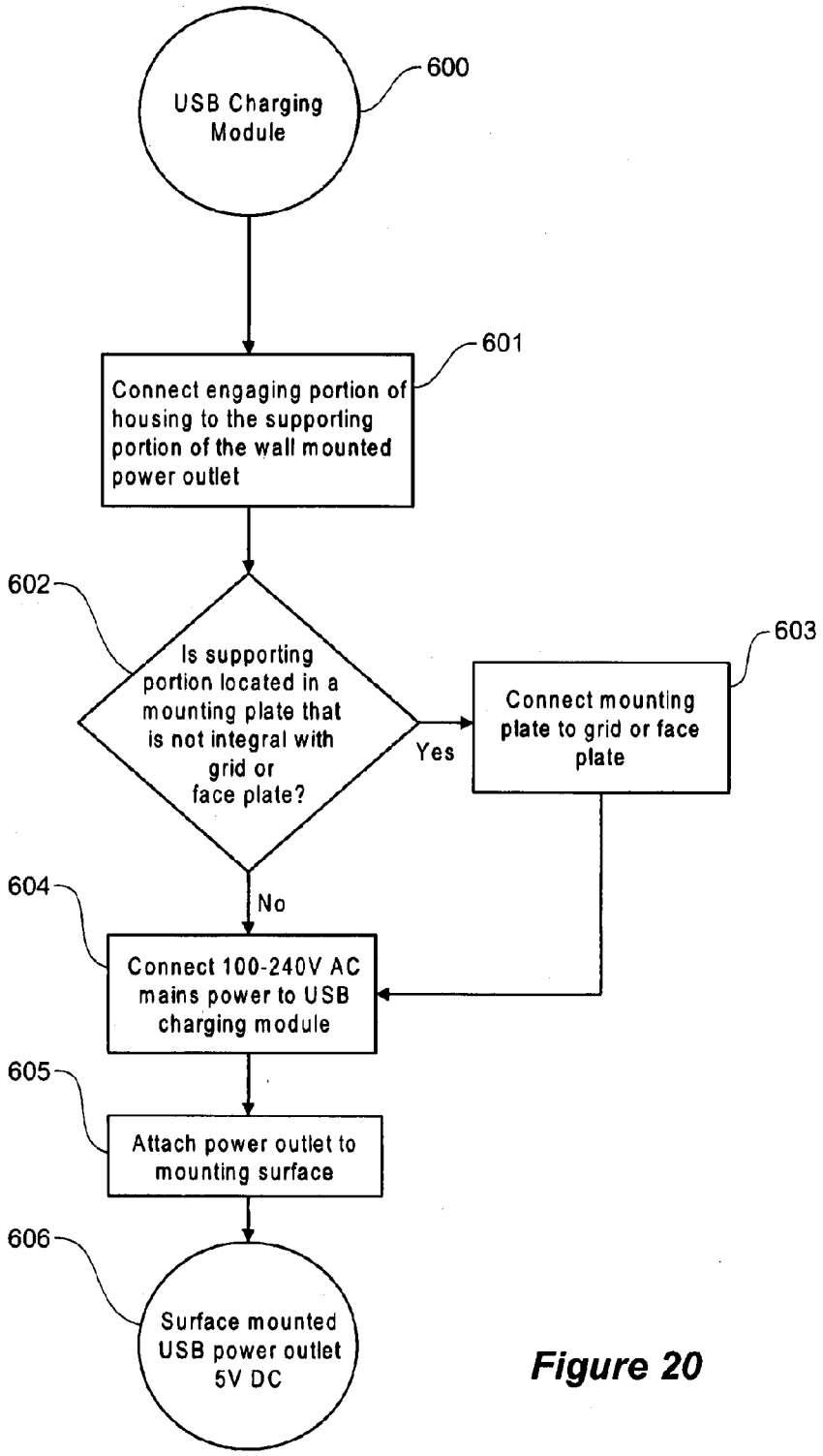


Figure 20

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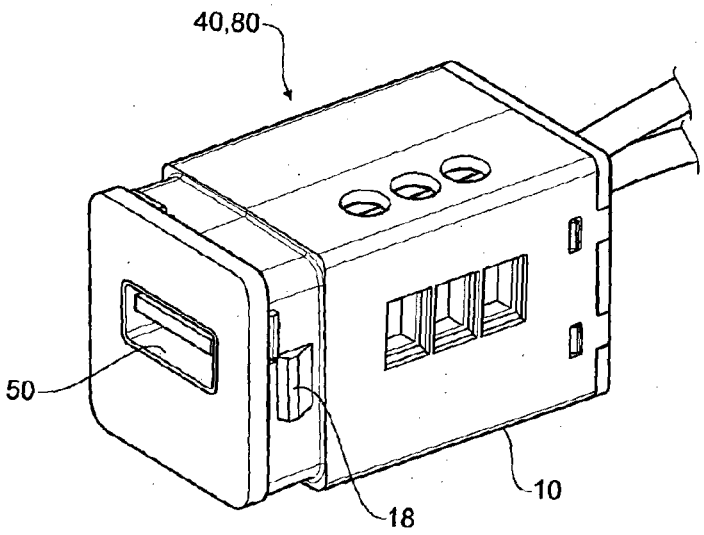


Figure 21

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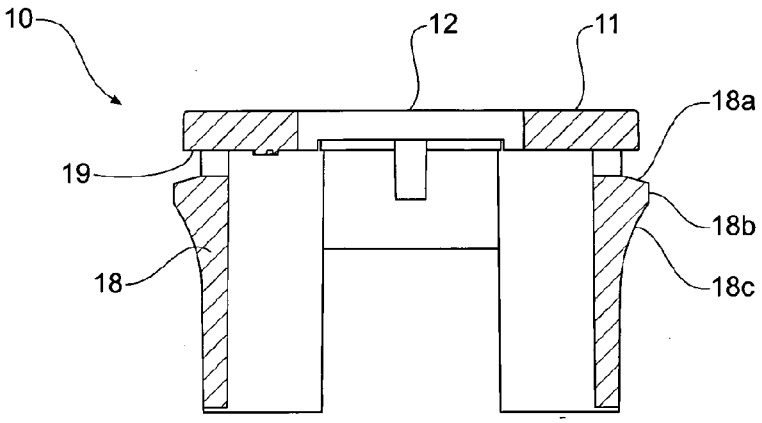


Figure 22

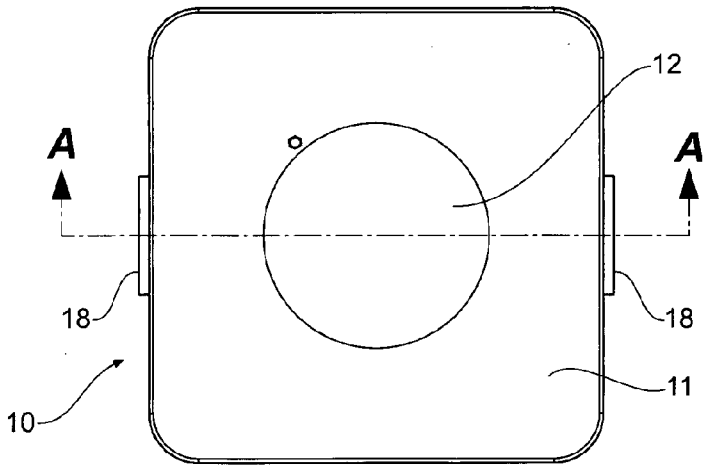


Figure 23

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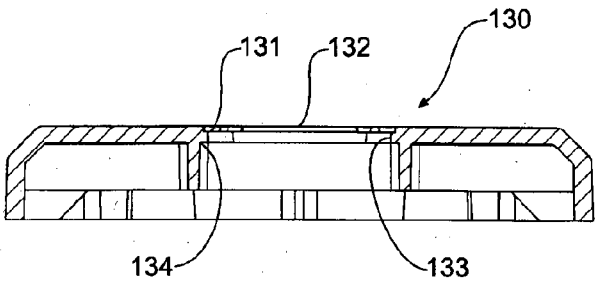


Figure 24

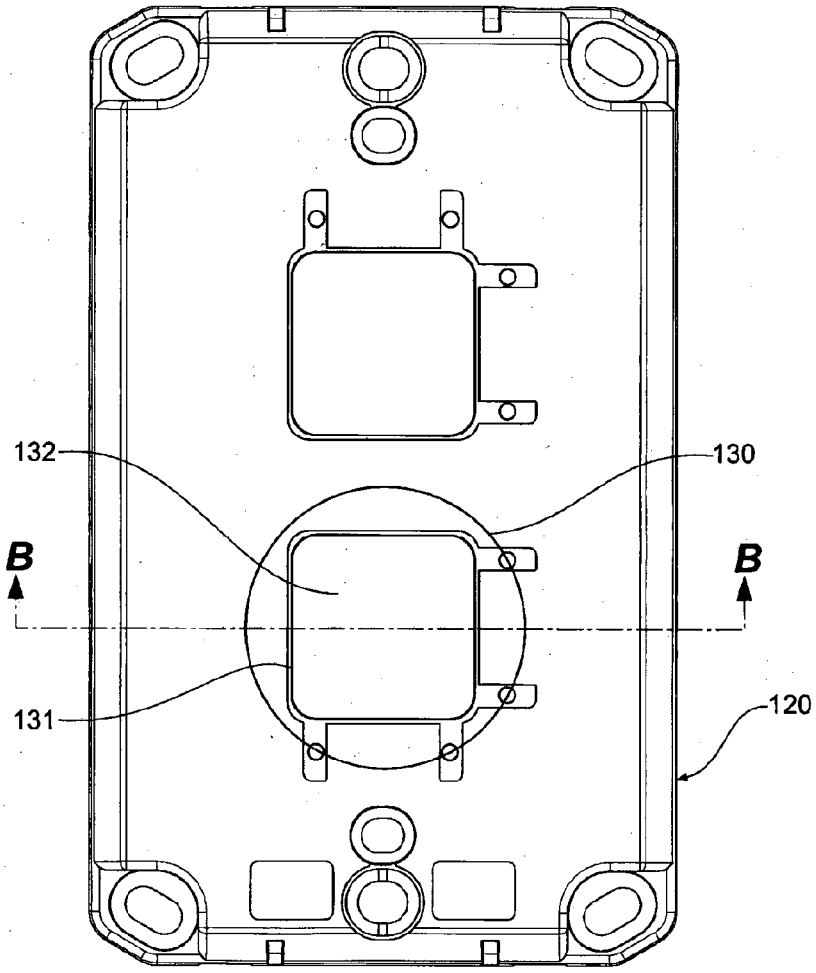


Figure 25

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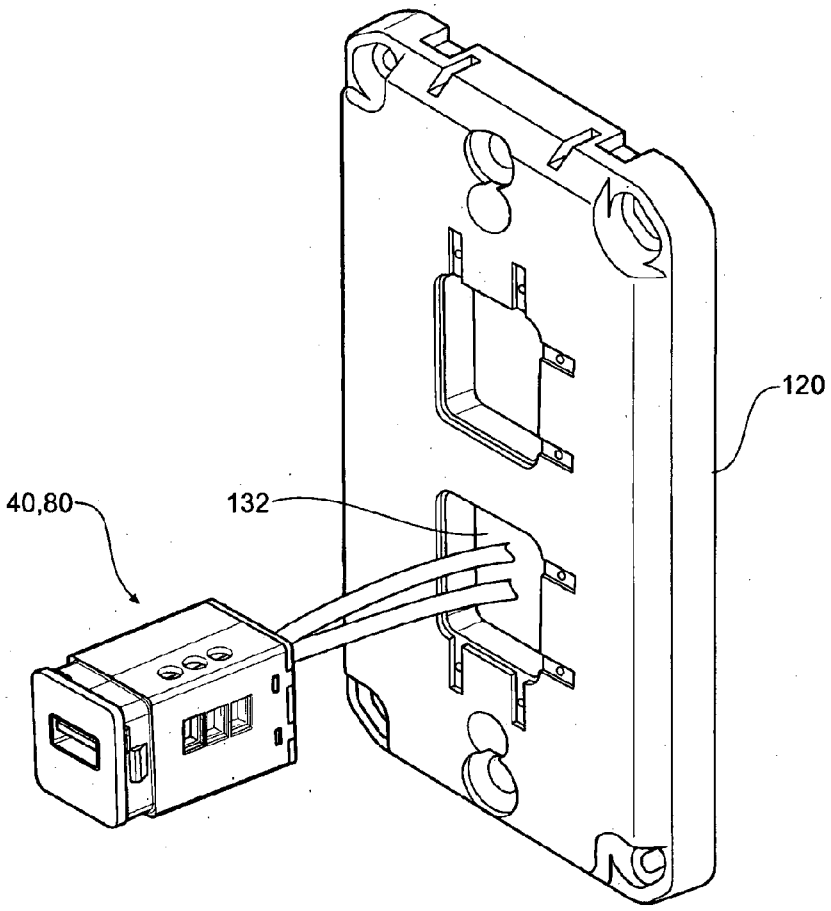


Figure 26

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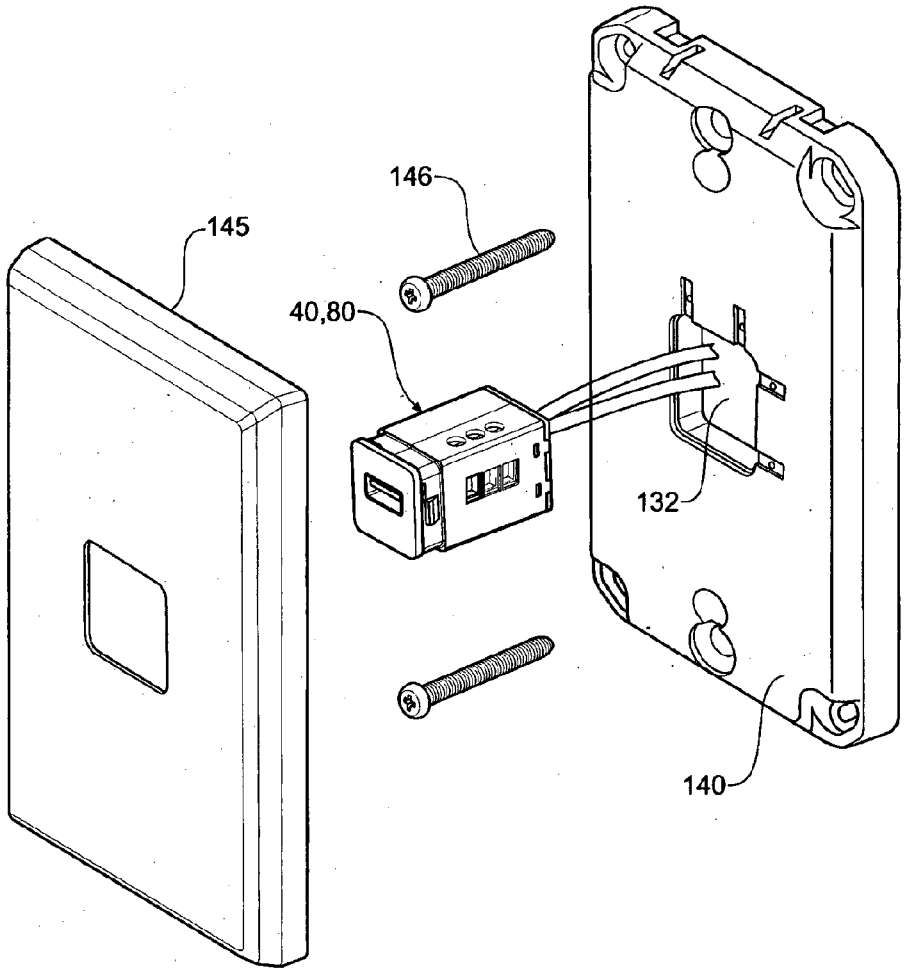


Figure 27

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PE2E SEARCH - Search History (Prior Art)

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L389	34	(USB (universal NEAR serial NEAR bus)) NEAR charg$3 NEAR (circuit$2) WITH (USB (universal NEAR serial NEAR bus)) NEAR input	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/08 12:43 PM
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PE2E SEARCH - Search History (Interference)

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N364	18	(power AND supply AND switch$3 AND battery AND connect$3 AND USB AND input AND charg$3 AND circuit$2 AND DC$1DC AND convert$2).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/03/08 08:02 PM
N365	11	(USB NEAR circuit$2) WITH (DC/DC boost up) NEAR converter	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/03/08 10:09 PM
N366	1	"20200215926".pn.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/03/09 12:36 PM

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Search Strategy from Dialog

March 08 2022 19:38

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Search Strategy

Databases: ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, ClinicalTrials.gov, Current Contents® Search, Derwent Drug File, Derwent Drug Registry, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, EconLit, Ei Compendex®, Ei EnCompassLIT, Embase®, EMCare®, ERIC, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE, GeoRef, Global Health, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund, KOSMET: Cosmetic Science, Lancet Titles, Material Safety Datasheets - OHS™, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geoastrophysical Abstracts, Morressier Life Science Conference Abstracts and Posters, New England Journal of Medicine, Northern Light Life Sciences Conference Abstracts, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Dissertations and Theses Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Prous Science Daily Essentials, Prous Science Drug Data Report, Prous Science Drugs Of The Future™, Publicly Available Content, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®, Zoological Record

Set#	Searched for	Results
S1	((jump or boost) near/0 start[*3]) near/0 (device or apparatus or instrument or module)	185°
S2	(((USB or ((universal near/0 serial) near/0 bus)) near/0 charg[*3]) near/0 (circuit[*2])) near/15 ((USB or ((universal near/0 serial) near/0 bus)) near/0 input)	2°
S3	(jump?start[*3] near/3 (vehicle or automobile or car or truck)) near/15 ((discharged or depleted or drained or empty or dead) near/0 battery)	0°
S4	(jump[*1]start[*3] near/3 (vehicle or automobile or car or truck)) near/15 ((discharged or depleted or drained or empty or dead) near/0 battery)	46°
S5	S4 AND S1	0°

° Duplicates are removed from the search and from the result count.

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	08/31/2021	03/10/2022							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
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	40	✓	✓							
	41	✓	✓							
	42	✓	✓							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

CLAIM		DATE								
Final	Original	08/31/2021	03/10/2022							
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	71		✓							

[19] **Intellectual Property Office of the Philippines**
Bureau of Patents

[11] Patent No.: 1/2013/500793

[45] Issued: 31 January 2017

[21]	Application No:	1/2013/500793
	National Phase Entry Date	23 April 2013
[22]	International Filing Date:	25 November 2011
[43]	International Publication Date:	31 May 2012
[86]	International Application No.:	PCT/AU2011/001532
[87]	International Publication No.:	WO2012/068635 A1
[60]	Division of Application No.:	
[54]	Title:	USB OUTLET CHARGER
[71]	Applicant(s):	CLIPSAL AUSTRALIA PTY LTD [New South Wales, AU]
[72]	Inventor(s):	DE MAN, Gerrit [New South Wales, Australia]
[30]	Foreign Application Priority Data:	2010905218 25.11.2010 AU
[51]	Int. Class[8]:	H 01R 13/648, 31/06, H 02J 7/00, H 05K 5/04
[58]	Field of search:	H 01R 13/648, 31/06, H 02J 7/00, H 05K 5/04

[56] Reference(s) Considered/Cited:

Document description
CN 2012 13213 (Y) - 25 March 2009 - WENZHI WU

[57] **ABSTRACT**

Disclosed is a Universal Serial Bus (USB) charging module for installation with a surface mounted power outlet. The charging module allows convenient and flexible installation in certain new and already installed power outlets to provide a convenient charging facility of devices with USB connection. Also disclosed is a housing for the charging module, a charging circuit and a method of installation.

Industry / Technical Field					
No. of Claim(s)	32	claim/s	Drawing(s)	17	sheet/s
Multiple Dep. Claim(s)	11	claim/s	Specification and Claim(s)	31	page(s)
Specie/s Claim(s)	0	claim/s	Sequence Listings	0	page(s)
Total No. of Claim(s)	43	claim/s			

Examiner: Leodelino C. Paden

Attorney/Agent: A.Q. ANCHETA AND PARTNERS

hbo

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USB OUTLET CHARGER

FIELD OF THE INVENTION

The present invention relates to an electrical power outlet in a building such as a hotel, office or home. In a particular form, the invention relates to a power outlet providing an interface for charging Universal Serial Bus (USB) compatible devices.

PRIORITY

The present application claims priority from Australian Provisional Patent Application No. 2010905218 entitled "USB Outlet Charger" filed on 25 November 2010.

The entire contents of this document are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Many electronic devices such as mobile phones, mp3 players and digital cameras are charged through USB ports in either a computer or a USB Alternating Current (AC) adaptor which may be plugged into a wall socket or power outlet. Charging devices through a USB port on a computer requires the computer to be switched on and also prevents other peripheral devices such as mice and memory devices from accessing the port while in use. By using a USB AC adaptor the electronic device may be charged at a wall socket or power outlet. One portion of the adaptor has AC prongs which engage into AC receptacles of the wall socket while another portion of the adaptor has a USB port to interface with a USB connector of an appliance or electronic device to be

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charged. The disadvantage with this arrangement is that the USB AC adaptor is a separate component that must be purchased and carried around and also that the AC prongs will only be suitable for a particular country or region. This leads to another drawback with using USB AC adaptors in foreign countries, namely that additional AC adaptors are necessary to engage with sockets found in different areas around the world.

There are also USB wall outlets wherein the USB charger is integral with the power outlet. Having the USB charger integral with the power outlet can lead to increased complexity during installation and costly repair and replacement of parts.

An object of the present invention is to ameliorate one or more of the above described difficulties or at least provide a useful alternative for charging USB compatible devices.

Other advantages of the present invention will become apparent from the following description, taken in connection with the accompanying drawings, wherein, by way of illustration and example, several aspects and embodiments of the present invention are disclosed.

SUMMARY

In one aspect of the invention, there is proposed a Universal Serial Bus (USB) charging module housing adapted for securement to a surface mountable power outlet, the housing including:

an engaging portion for connecting the housing to a supporting portion of the power outlet;

access means to allow a USB charging circuit to be inserted into the housing; and

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an aperture for allowing external access to a USB port.

In one form, the USB charging module housing further includes at least one aperture for receiving wires carrying mains power.

In one form, the access means to allow the USB charging circuit to be inserted into the housing is provided by an aperture in an external face of the housing.

In one form, the aperture is covered by a removable portion.

In one form, the removable portion includes at least one aperture for receiving wires carrying mains power.

In one form, the supporting portion of the power outlet is an integral portion of a grid or face plate.

In another form, the supporting portion of the power outlet is located in a mounting plate that is adapted to be connected to the rear of a grid or face plate.

In one form, the housing is connected to the supporting portion of the power outlet from the front of the grid or face plate.

In one form, the housing is connected to the supporting portion of the power outlet from the rear of the grid or face plate.

In one form, the engaging portion of the USB charging module housing includes a plurality of clips extending outwardly from one or more exterior faces of the housing, said clips for engagement with one or more surfaces of the supporting portion of the power outlet in a snap fit arrangement.

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In one form, the clips have a tapered front face and a substantially vertical rear face.

In one form, the USB charging module housing has an aperture located on the front face of the housing for allowing external access to a USB port.

In a further aspect of the invention there is proposed a USB charging module adapted for securement to a surface mountable power outlet, the charging module including:

a USB port;

a USB charging circuit that is capable of receiving a mains power input;

a housing, said housing including an engaging portion for connecting the housing to a supporting portion of the power outlet; access means to allow the USB charging circuit to be inserted into the housing and an aperture for allowing external access to the USB port.

In one form, the USB charging module includes a USB charging circuit with a printed circuit board (PCB).

In one form, the USB charging module includes a plurality of wires that are soldered directly to the PCB for connection to mains power either directly or via a switch.

In another form, the USB charging module includes a terminal block mounted on the PCB for connection to wires carrying mains power either directly or via a switch.

In other embodiments, there are provided screwed terminals for wire termination.

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In a further aspect of the invention there is proposed a surface mountable power outlet for allowing a user to charge a USB compatible device, the power outlet including:

a supporting portion;

a USB charging module including a USB port; a USB charging circuit that is capable of receiving a mains power input; a housing, said housing including an engaging portion for connecting the housing to the supporting portion of the power outlet; access means to allow the USB charging circuit to be inserted into the housing and an aperture for allowing external access to the USB port;

a grid or face plate adapted to allow a user to access the USB port;

a connection between the USB charging module and mains power; and

mounting means for mounting the power outlet to a mounting surface.

In one form, the mounting surface is a wall or floor.

In one form, the power outlet further includes a cover plate.

In one form, the mains power is between about 100-240V alternating current (AC).

In a further aspect of the invention there is proposed a method of installing a power outlet for allowing a user to charge a USB compatible device as herein described, comprising the steps of:

connecting the engaging portion of the USB charging module housing to the supporting portion of the power outlet;

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connecting the mains power to the USB charging module; and

mounting the power outlet to the mounting surface.

In a further aspect of the invention there is proposed a method of installing a power outlet for allowing a user to charge a USB compatible device as herein described, comprising the steps of:

connecting the engaging portion of the USB charging module housing to the supporting portion of the power outlet;

connecting the mounting plate to the rear of a grid or face plate.

connecting the mains power to the USB charging module; and

mounting the power outlet to the mounting surface.

In one form, the power outlet is attached or mounted to the mounting surface by fastening the grid or face plate to the surface by screws.

It will be understood that the term "comprise" and any of its derivatives (e.g. comprises, comprising) as used in this specification is to be taken to be inclusive of features to which it refers, and is not meant to exclude the presence of any additional features unless otherwise stated or implied.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that such prior art forms part of the common general knowledge of the technical field.

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DRAWINGS

Various aspects of the present invention will be described in detail with reference to the following drawings in which:

FIGURE 1 is a front perspective view of a USB charging module housing according to a first aspect of the present invention;

FIGURE 2 is a rear perspective view of the USB charging module housing of Figure 1;

FIGURE 3 is a detailed view of part of an engaging portion of the USB charging module housing as shown in Figure 1;

FIGURE 4 is a view of a removable cover that fits into the rear opening of a USB charging module housing;

FIGURE 5 shows an embodiment of a supporting portion of a surface mountable power outlet adapted to engage with a USB charging module housing;

FIGURE 6 is a detailed view of the mating interface of the supporting portion shown in Figure 5;

FIGURE 7 is a perspective view of a USB charging module according to an embodiment of a second aspect of the present invention;

FIGURE 8 is a perspective view of a USB charging module according to another embodiment of the second aspect of the present invention;

FIGURE 9 is a side view of the USB charging module shown in Figure 8;

FIGURE 10 is an end or rear view of the USB charging module shown in Figure 7 (wires not shown);

FIGURE 11 is a view of a USB charging module engaged with a grid or face plate of a surface

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mountable power outlet according to an embodiment of the present invention;

FIGURE 12 is a view of a USB charging module engaged with a grid or face plate of a surface mountable power outlet according to another embodiment of the present invention;

FIGURE 13 is a surface mountable power outlet according to an embodiment of a third aspect of the present invention;

FIGURE 14 shows a surface mountable power outlet according to another embodiment of the third aspect of the present invention;

FIGURE 15 is a circuit schematic depicting an embodiment of the AC mains voltage step down and regulation component of the USB charging circuit;

FIGURE 16 is a circuit schematic of a power conditioning circuit with a DC-DC converter to regulate the current and voltage suitable for the USB charging module;

FIGURE 17 is a top view of a USB charging circuit adapted to fit inside the USB charging module housing of Figure 1;

FIGURE 18 is a perspective view of the USB charging circuit as shown in Figure 17;

FIGURES 19a-19c depict a sequential series of views of a method of installing a USB charging module to a surface mountable power outlet according to a fourth aspect of the present invention; and

FIGURE 20 shows a flow diagram illustrating a general method of installing a USB charging module into a surface mountable power outlet according to a fourth aspect of the present invention.

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FIGURE 21 is a perspective view of an embodiment of a USB charging module suitable for front entry engagement with a power outlet.

FIGURE 22 is a section view through A-A of the engaging portion of the USB charging module housing of Figure 23;

FIGURE 23 is a front view of the USB charging module housing as depicted in Figure 21;

FIGURE 24 is a section view B-B of the supporting portion of the grid or face plate depicted in Figure 25;

FIGURE 25 is a front view of a grid or face plate suitable for engagement with the USB charging module of Figure 21;

FIGURE 26 shows the USB charging module of Figure 21 to be connected from the front of the grid or face plate according to an embodiment of the present invention; and

FIGURE 27 shows the USB charging module of Figure 21 to be connected from the front of the grid or face plate according to another embodiment of the present invention.

In the following description, like reference characters designate like or corresponding parts throughout the several views of the drawings.

DESCRIPTION

Referring now to Figures 1-4, there is shown a USB charging module housing 10 according to a first aspect of the present invention. The housing 10 has an aperture 12 through a front face 11 that is large enough to provide access for a USB connector to plug

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into a USB port or socket 50 enclosed within the housing (see Figure 7). At the rear of the housing 10 (see Figure 2) is an opening or aperture 13 which enables access for inserting a USB charging circuit 60 (see Figure 7) into the housing 10. Although this embodiment shows the rear of the housing as being open to provide an access means for the USB charging circuit 60, it is possible that the opening 13 could be located on a different face and may constitute an entire face or a part thereof. Figure 4 shows a removable cover 20 that engages with the rear of the housing 10 to substantially seal the enclosure from dust and ingress. The removable cover 20 has angled clips 26 and 27 that engage into mating apertures 16 and 15 respectively of the housing 10 in a snap fit arrangement. The lip of the angled clips 27 are inserted directly into apertures 15 and then the cover 20 is closed by applying force proximate the clips 26 until they snap into apertures 16. The clips 26, 27 are flexible and resilient so that they may bend sufficiently to allow fitment into the apertures 15, 16 whereupon they return to their undeformed positions.

In one embodiment, a feature of the housing 10 is the clip interface comprising four clips 14 that are positioned around the four side faces of the housing 10. These clips form an engaging portion that connects the housing 10 to a supporting portion 30 (see Figure 5) of a surface mountable power outlet. The supporting portion 30 may be integral with a grid or face plate of the power outlet or located on a mounting plate that is adapted to be connected to the rear of a grid or face plate. Figure 3 shows a detailed view of a clip 14, in

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particular illustrating a type of clip with a tapered front face 14b and substantially vertical rear face 14a. These clips are designed to engage with the mating interface 34 of the supporting portion 30 which is most clearly illustrated in Figure 6. Figure 6 shows detail of a typical mating interface 34 which will connect to a USB charging module housing 10. As the housing 10 is inserted into the supporting portion 30, the tapered surface 14b of the clip 14 will engage a corresponding tapered surface 35 of the supporting portion 30. As more insertion force is applied, the clip 14 will deflect slightly as it passes the vertical surface 37 of the supporting portion 30. The substantially vertical rear face 14a of the clip 14 will eventually pass the lowest point of the vertical surface 37, upon which it reaches the recessed horizontal surface 36 of the supporting portion 30. The compression force acting on the clip 14 is then released and it deflects back to its undeformed position and the substantially vertical rear face 14a engages in surface to surface contact with the horizontal recessed surface 36 of the supporting portion 30 to thereby retain housing 10 to the supporting portion 30. In the embodiment shown in Figure 5, the supporting portion 30 has only two mating interfaces 34 requiring that only two of the four clips 14 be used to connect the housing 10 to the supporting portion 30. In practice, two or more of the clips 14 may be used to secure the housing, and the supporting portion 30 may also have two or more mating interface 34.

Referring now to Figure 7, there is shown a USB charging module 40 according to an embodiment of a

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second aspect of the present invention. Enclosed inside the housing 10 is a USB port 50 and a USB charging circuit 60. Wires 70, 71 to be connected to mains power are soldered directly onto a printed circuit board (PCB) 62 of the charging circuit 60 (see Figure 16). The wires 70, 71 exit the housing 10 through apertures 22 located through the removable cover 20 (see Figure 10). During installation these wires may be connected to mains power either directly or via a switch. In other embodiments, there may be simply provided screwed terminals for wire termination instead of a terminal block.

Referring now to Figures 8 and 9, there is shown a USB charging module 80 according to another embodiment of the second aspect of the present invention. Enclosed inside the housing 10 is USB port 50 and USB charging circuit 60 with a terminal block 65 to be connected to mains power. During installation, wires carrying mains power either directly or via a switch are connected to the terminal block 65 to power the USB charging circuit 60. The wires enter the housing 10 through apertures 18 located on one side of the housing 10.

In the USB charging module embodiments described above, the power input to the module is mains power (also known as household, supply or grid power) supplied between about 100-240V alternating current (AC). The USB charging circuit 60 regulates the voltage and steps it down to a usable 4.75-5.25V direct current (DC) which is typically required to charge many electronic devices.

Referring now to Figures 11-14, there are shown various embodiments of the USB charging module 40 or 80

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connected to a grid or face plate of a surface mountable power outlet. Figure 11 shows USB charging module 40 engaged with a supporting portion 30 which is integral with a grid or face plate 100. In one example, the supporting portion 30 is integrally machined into the grid or face plate 100 during manufacture. In other embodiments, the supporting portion 30 is provided as a separate piece and is attached to the grid or faceplate during or before installation. The grid or face plate 100 can be constructed from plastic, metal or any other suitable materials. Figure 11 shows a grid or face plate 100 with two apertures 102 (only one visible in this view) capable of receiving switches or other electrical connectors in addition to USB ports. Further, as the USB charging module is modular in design, it can always be easily interchanged for a switch or other desired user interface. The grid or face plate 100 shown in Figure 11 may be adapted in many ways such as providing for AC receptacles as commonly found in most household power outlets. The grid or face plate 100 is fastened to a wall by screws or other suitable fasteners through mounting lugs 101. These may be arranged in any suitable position on the grid or face plate 100 and may vary in quantity.

Figure 12 shows a USB charging module 80 engaged with a supporting portion 30 located in a mounting plate 200 that is adapted to be inserted into the rear of a grid or face plate 110. In this arrangement the supporting portion 30 is integrally machined into mounting plate 200. Such a mounting plate 200 (also known as a base or base plate) in standard power outlets, commonly includes electrical contacts for AC

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receptacles, switch mounting and terminals to connect mains power wiring. The mounting plate 200 is designed to be received by the rear of a grid or face plate 110. As shown in Figure 12, the mounting plate 200 is fastened to the grid or face plate 110 by screws at mounting positions 201. The grid or face plate 110 is mounted onto a wall by screws at mounting locations 111, 112.

Figure 13 more specifically shows a surface mountable power outlet 500 according to a third aspect of the present invention allowing a user to charge USB compatible devices. In this arrangement the USB charging module 40 or 80 is connected to a supporting portion 30 that may either by integral with the grid or face plate or located on a mounting plate adapted to be connected to the rear of the grid or face plate. In this embodiment the power outlet 500 has a pair of switches and AC receptacles in addition to the USB charging module 40 or 80. A power outlet 500 such as this allows a user to plug in normal AC type connectors with power switched on or off and advantageously also provides a user with access to a USB port 50 for charging electronic devices. If the USB charging module 40 or 80 is wired directly to mains without a switch then the charging module 40 or 80 is constantly connected to mains power so that when a user connects their device into the USB port, charging will begin automatically. If the USB charging module 40 or 80 is wired to mains via a switch, then power will not be drawn until the user engages the switch to an "ON" position. As shown in Figure 14 in another embodiment of a wall mounted power outlet 510, there is a USB

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charging module 40 or 80 provided additionally with LED status lights 55 that indicate whether the device connected to the port is charging or not. In both Figures 13 and 14 there is also shown a cover plate 90, 91 that is adapted to fit around the periphery of the power outlet. The cover plate 90, 91 usually snap fits around the grid or face plate and is provided primarily for aesthetics when the power outlet is mounted to a surface such a wall or floor.

It will be appreciated by those skilled in the art that the surface mountable power outlet embodiments illustrated in this text are by no means limiting to how the invention may be performed. The geometric arrangement of switches, AC receptacles, USB ports or other network connection ports may be customised to suit a particular application. The supporting portion 30 also need not necessarily be limited to being an integral portion of a grid or face plate or located on a mounting plate adapted to be inserted into the rear of a grid or face plate. The supporting portion 30 could be mounted or machined into almost any structure, including a box or other structural housing. Further, the engaging portion of the USB charging module housing and supporting portion of the power outlet may be designed with alternative interfaces to the clip arrangement shown which achieves the principle aim of the invention in providing a modular USB housing which is adapted to be installed in a surface mountable power outlet thereby allowing a user to charge USB compatible devices.

Referring now to Figures 15-19, there is shown the USB charging circuit 60 that receives a 240V AC mains

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power input and provides a 5V DC output to the USB port 50, suitable for charging USB compatible electronic devices. The USB charging circuit 60 comprises the following stages. In the first stage, shown in Figure 15, the 240V AC mains input is first stepped down using a transformer 61 to reduce the high AC voltage to a low AC voltage (e.g. 15V, 1.2A). This stepped down AC voltage is then passed through a rectifier circuit 63 (e.g. bridge rectifier) that outputs a full wave varying rectified voltage shown as the output across load R_L. As shown in Figure 16, this varying voltage is then smoothed with a capacitor to produce a relatively smooth DC voltage with a small ripple. A voltage regulator (e.g. 7812 Integrated Circuit (IC)) is then used to output a regulated 12V DC output as will be understood by the person skilled in the art.

In the second stage, an embodiment of which is shown in Figure 16, a DC-DC converter (e.g. Texas Instruments TPS40210 current mode boost controller) is then used to regulate the output suitable for the USB charger. The TPS40210 implements a DC-DC single-ended primary inductance converter (SEPIC) with input and output current regulation, as well as output voltage regulation implemented by closed loop feedback control. The TPS40210 ensures that the output voltage of the USB charger is between about 4.75 and 5.25 V (nominally 5V DC) with an operating current of about 1A and also prevents overcharging. The voltage input in Figure 16 is the regulated 12V from the first stage, which is converted to a regulated 5V DC voltage output by the circuit shown. It should be understood that this is just one example of how a USB charging circuit may be

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implemented and any other suitable circuit arrangement may be used.

Referring specifically to Figures 17 and 18 there is shown an embodiment of the physical circuit layout of the USB charging circuit 60. A double layered PCB 62 is used which provides a compact and efficient way to house all of the components inside the housing 10. On one layer of the PCB 62 there is mounted the USB port 50, an optional terminal block 65 and the circuit components for the AC mains voltage step down and first stage regulation (including transformer, capacitors, 7812 IC voltage regulator and rectifier circuit). On the second layer of the PCB 62 there is provided the power conditioning circuitry for the USB charger output (including the TPS40210 and various other capacitors, inductors, resistors and diodes).

In other embodiments, there is provided 2 or 3 or more PCBs over which the circuit components are arranged, rather than (or as well as) a double layered arrangement.

Referring now to Figures 19a-19c there is shown a sequential series of views of a method of installing the USB charging module 80 to a surface mountable power outlet according to a fourth aspect of the present invention. In this embodiment, the mounting surface is a wall 90. In Figure 19a there is shown the step of connecting the engaging portion of the USB charging module housing 10 to a supporting portion 30 of the power outlet. Figure 19a shows the USB charging module 80 already having been engaged with the supporting portion 30. Figure 19b illustrates the next step of connecting the mains power to the USB charging circuit

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60. The USB charging module 80 and grid or face plate assembly is held in close proximity to a wall opening where the power outlet is to be located. The wiring from the mains (typically active and neutral wires, with earth optional) is physically connected to the USB charging circuit 60. The particular embodiment illustrated in Figures 19a-19c shows a USB charging module 80 with a terminal block 65 for terminating the mains wires. The final step in the installation is to attach or mount the power outlet to the wall 90 as illustrated in Figure 19c. The grid or face plate is held flat against the wall 90 and screws or other suitable fastening means are inserted through mounting apertures in the grid or face plate and fastened securely to the wall 90. In another example, the USB charging module 40 may be connected using wires 70, 71 as previously described.

Figure 20 illustrates a flow diagram of a method of installing the USB charging module 40 or 80 to a surface mountable power outlet. In step 600, the installer begins with the USB charging module. In step 601, the engaging portion of the USB charging module housing 10 is connected to the supporting portion 30 of the power outlet. In step 602, a determination is made as to whether the supporting portion is located in a mounting plate that is not integral with the grid or faceplate. If the supporting portion 30 is integral with the grid or face plate, the mains power is connected to the USB charging circuit 60 and the power outlet is attached or mounted to the mounting surface (which may be a wall or floor or other appropriate surface) in step 604. If the supporting portion 30 is

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located in a mounting plate that is not integral with the grid or face plate, then there is an additional step 603 of connecting the mounting plate to the grid or face plate.

In step 605, the installer then connects the AC mains power to the USB and then in step the power outlet assembly is mounted or attached to the mounting surface such as the wall 90 or a floor. In step 606, the resulting product of the method is a surface mounted USB power or charging outlet.

Once installation is complete, the power outlet provides an interface to charge USB compatible devices. The USB charging module 40,80 receives a mains input power between about 100-240V AC and converts this to a regulated 5V DC output suitable for charging USB compatible electronic devices. The modular housing 10 enables the power outlet to have interchangeable interfaces to suit operational requirements. The USB charging module 40,80 may be removed from the power outlet and replaced with a switch or any other interface without having to replace the entire power outlet.

Referring now to Figures 21-27, there is shown a further embodiment whereby the USB charging module 40,80 is connected to the supporting portion 130 of a grid or face plate 120 of a surface mountable power outlet from the front thereby providing a 'front entry' insertion option. Whereas previously described the USB charging module 40,80 is connected into a supporting portion 30 in the rear of the grid or face plate, it is also desirable to be able to insert the module from the front of the grid or face plate. It will be appreciated

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that this connection may be facilitated in many ways, an example of which is shown in Figures 21-27. Figure 21 generally shows a USB charging module 40,80 which can be connected to mains power as previously described. In one form, the module may have a clip interface comprising clips 18 as shown in more detail in Figures 22-23. Figure 23 is a front view of a USB charging module housing 10 showing the location of two clips 18 suitable for front entry connection of the module. Figure 22 is a sectional view through A-A of Figure 23 providing detail of a possible clip arrangement. This clip arrangement allows the housing 10 to engage with a supporting portion 130 of a grid or face plate 120 as shown in Figure 25. Figure 24 shows as a sectional view through B-B of Figure 25 which generally shows the supporting portion 130 in more detail. The housing 10 of the USB charging module 40,80 is inserted through aperture 132 of the supporting portion 130. The clip arrangement facilitates a snap-fit connection between the clips 18 and the supporting portion 130. As the module is inserted into the grid or face plate, the resilient clips 18 bend slightly as force is applied such that the outer most surface 18b of the clips 18 can pass the inner most surface 133 of the supporting portion 130.Once engaged, surface 19 of the housing 10 mates with recessed surface 131 of the supporting portion 130 and surface 18a of the clips 18 is in contact with surface 134 of the supporting portion 130.

Figures 26-27 show exploded views of the USB charging module 40,80 and grid or face plate front entry installation. Figure 26 shows a grid or face

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plate 120 with two apertures 132 which enables more than one USB charging module 40,80 to be inserted. Figure 27 shows a grid or face plate 140 with a single aperture 132 for receiving a USB charging module 40,80 from the front. In addition, Figure 27 shows a cover plate 145 that is attached or mounted to the grid or face plate after the USB charging module 40,80 has been connected and screws 146 for attaching or mounting the grid or face plate to a surface such as a wall or floor.

Although various illustrative embodiments of the present invention have been described in the foregoing detailed description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the scope of the invention as set forth and defined by the following claims.

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CLAIMS:

1. A Universal Serial Bus (USB) port housed in a housing including an engaging portion, the engaging portion including at least two deflectable clips, each for engaging with a corresponding recessed surface of a corresponding mating interface of a supporting portion disposed at the rear of a power outlet for retaining the USB port to the power outlet, upon insertion of the engaging portion into the supporting portion from the rear of the power outlet.

2. A Universal Serial Bus (USB) port housed in a housing as claimed in claim 1, wherein the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

3. A Universal Serial Bus (USB) port housed in a housing as claimed in claim 2 wherein the at least two deflectable clips each includes a face for engaging with the corresponding recessed surface of the supporting portion for thereby retaining the USB port to the power outlet.

4. A Universal Serial Bus (USB) port housed in a housing as claimed in any one of claims 1 to 3

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wherein the engaging portion includes four deflectable clips for engaging with the supporting portion.

5. A Universal Serial Bus (USB) charging module including:

a housing;

a USB port;

an engaging portion including at least two deflectable clips, each for engaging with a recessed surface of a corresponding mating interface of a supporting portion of a power outlet disposed at the rear of the power outlet for retaining the USB port to the power outlet upon the at least two deflectable clips being inserted into the supporting portion from the rear of the power outlet; and

a USB charging circuit housed in the housing and electrically connected to the USB port at an output and for connection to mains power at an input.

6. A Universal Serial Bus (USB) charging module as claimed in claim 5 wherein the at least two deflectable clips each has a tapered surface for engaging with a corresponding tapered surface of the corresponding mating interface of the supporting portion and for causing deflection of the corresponding deflectable clip upon insertion of the engaging portion into the supporting portion.

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7. A Universal Serial Bus (USB) charging module as claimed in claim 6 wherein the engaging portion includes four deflectable clips for connecting the USB charging module to the supporting portion.

8. A Universal Serial Bus (USB) charging module as claimed in claim 7 wherein the USB charging module is removable from the supporting portion once connected to the supporting portion.

9. A Universal Serial Bus (USB) charging module as claimed in claim 5 wherein the USB charging circuit, in use, converts mains power input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

10. A method of connecting a Universal Serial Bus (USB) housing to a power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the USB housing housing a USB port and including an engaging portion, the method including:

engaging the engaging portion of the USB housing with a supporting portion located at a rear side of the power outlet by inserting the engaging portion into the supporting portion from the rear side of the power outlet, thereby retaining the USB housing to the power outlet.

11. A method of connecting a Universal Serial Bus (USB) housing as claimed in claim 10 wherein the

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step of engaging the engaging portion of the USB housing with the supporting portion includes causing at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion upon inserting the engaging portion into the supporting portion and then causing the at least two clips to each assume an undeflected position upon further inserting the engaging portion into the supporting portion.

12. A method of connecting a Universal Serial Bus (USB) housing as claimed in any one of claims 10 or 11 wherein the step of inserting the engaging portion into the supporting portion also causes the USB port to be located within an aperture in the power outlet to allow access to the USB port by a user via the aperture.

13. A method of connecting a Universal Serial Bus (USB) housing as claimed in claim 10 further including the step of connecting one or more electrical terminals of the USB housing to mainspower.

14. A power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, the power outlet including:

an aperture for receiving a switch; and

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a USB port housed in a housing as claimed in claim 1 , for receiving the USB connector; wherein the USB port is disposed in the aperture and is connected to the power outlet at the supporting portion located at the rear of the power outlet.

15. A power outlet as claimed in claim 14 wherein the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mainspower.

16. A power outlet as claimed in claim 15 further including a second aperture in which is disposed a switch for controlling mains power supplied to the USB charging circuit.

17. A power outlet as claimed in any one of claims 15 or 16 wherein, in use, the USB charging circuit converts mains power received at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

18. A power outlet for allowing a user to charge a device via a Universal Serial Bus (USB) connector of the device and for allowing the user to provide mains power to a further device via an alternating current (AC) connector, the power outlet having a front side accessible bya user, and the power outlet including:

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at least one power socket for connection to mains power and for receiving the AC connector; an aperture for receiving a switch; and a Universal Serial Bus (USB) port housed in a housing as claimed in claim 1, for receiving the USB connector.

19. A power outlet as claimed in claim 18 wherein the USB port is electrically connected to an output of a USB charging circuit, the USB charging circuit also including an input for connection to mainspower.

20. A power outlet as claimed in claim 19 wherein, in use, the USB charging circuit converts mains power at the input of between 100V and 240V alternating current (AC) to between 4.75V and 5.25V direct current (DC) at the output for supply to the USB port.

21. A power outlet as claimed in any one of claims 18 to 20 wherein the engaging portion is provided by four deflectable clips for connecting the USB charging module to the supporting portion of the power outlet.

22. A power outlet as claimed in claim 18 including a second power socket and two switches, at least one switch for controlling mains power supplied to at least one of the power sockets.

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23. A method of installing a Universal Serial Bus (USB) charging module as claimed in claim 5, in a power outlet, the method including:

connecting the USB charging module to the power outlet from a rear of the power outlet by connecting the engaging portion to a supporting portion at the rear of the power outlet so that the USB port is accessible via an aperture in the power outlet;

connecting the input of the USB charging circuit to mains power; and

mounting the power outlet to a mounting surface.

24. A method of installing a Universal Serial Bus (USB) charging module as claimed in claim 23 wherein the step of connecting the USB charging module to the power outlet includes inserting the engaging portion of the USB charging module into the supporting portion of the power outlet causing the at least two clips of the engaging portion to each deflect upon engaging with a corresponding tapered surface of the supporting portion and then causing the at least two clips to each assume an undeflected position upon further inserting the engaging portion into the supporting portion, to thereby retain the engaging portion to the supporting portion.

25. A method of installing a Universal Serial Bus (USB) charging module as claimed in any one of claims 23 to 24 wherein the step of connecting the input of the USB charging circuit to mains power

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includes connecting an active wire and a neutral wire of the USB charging module to mainspower.

26. A method of installing a Universal Serial Bus (USB) charging module as claimed claim 23 wherein the step of connecting the input of the USB charging circuit to mains power occurs after the step of connecting the USB charging module to the power outlet.

27. A method of installing a Universal Serial Bus (USB) charging module as claimed claim 23 wherein the step of mounting the power outlet to a mounting surface includes mounting the power outlet to a wall around an aperture in the wall, and wherein the USB charging module is thereby retained within a cavity behind the wall.

28. An interface between a supporting portion located at a rear of a power outlet and a USB port, the power outlet having a front side accessible by a user when the power outlet is mounted to a surface, and the interface including at least two mating interfaces of the supporting portion, each engaging with a corresponding deflectable clip of an engaging portion disposed about the USB port to thereby retain the USB port to the power outlet, the interface having been formed by inserting the engaging portion into the supporting portion from a rear side of the power outlet.

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29. An interface as claimed in claim 28 wherein the at least two mating interfaces each includes a recessed surface engaging with a face of the corresponding deflectable clip.

30. An interface as claimed in claim 29 wherein the at least two mating interfaces each includes a tapered surface for engaging a tapered surface of the corresponding clip upon insertion of the corresponding clip into the at least two mating interfaces.

31. An interface as claimed in any one of claims 28 to 30 wherein the supporting portion is disposed about an aperture in the power outlet.

32. An interface as claimed in claim 31 wherein the USB port is disposed within the switch aperture and is accessible via the aperture.

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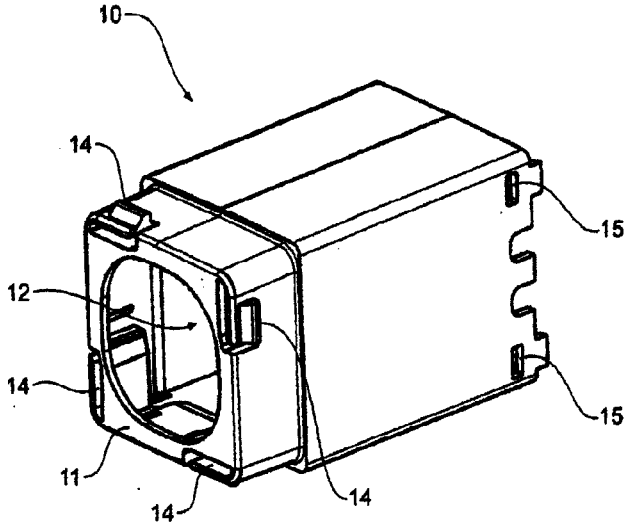


FIG.1

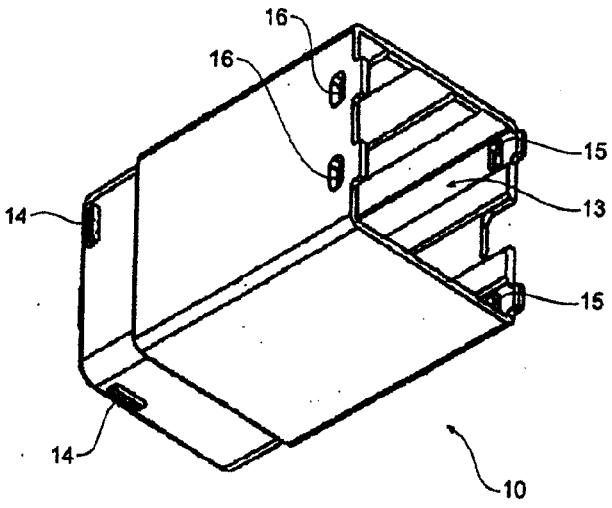


FIG.2

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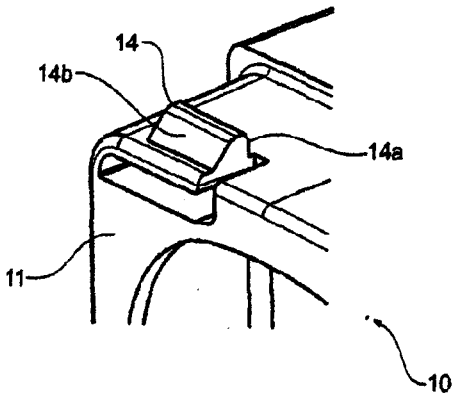


FIG.3

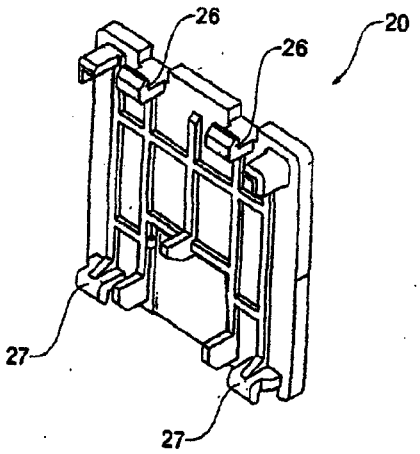


FIG.4

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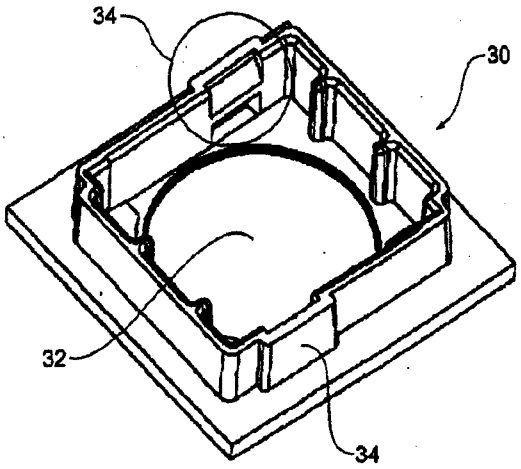


FIG.5

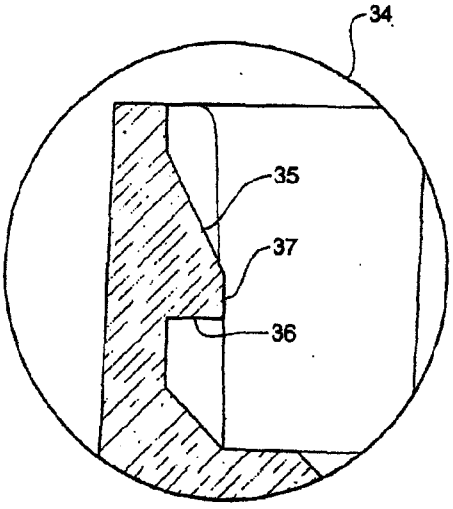


FIG.6

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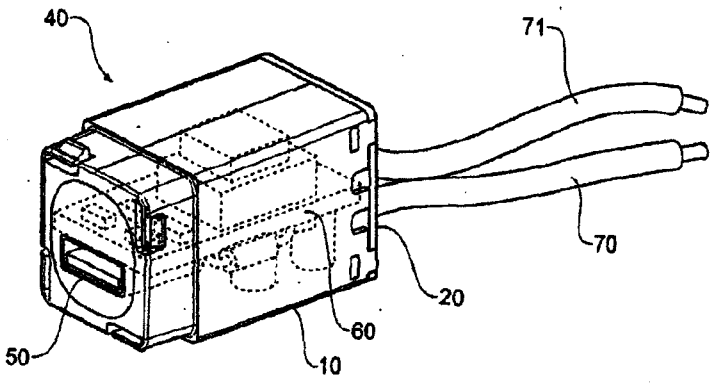


FIG.7

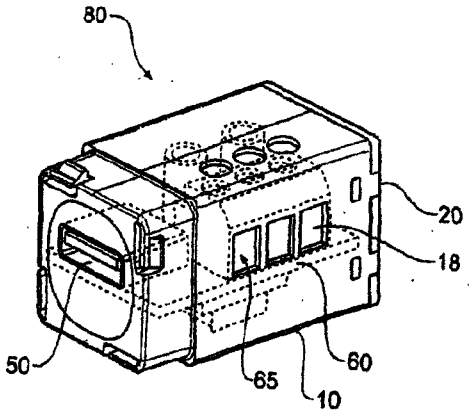


FIG.8

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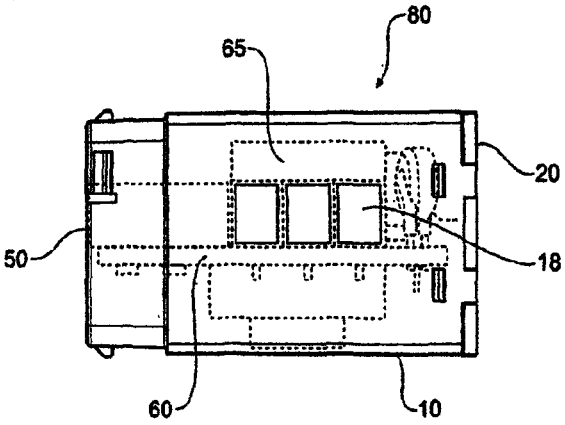


FIG.9

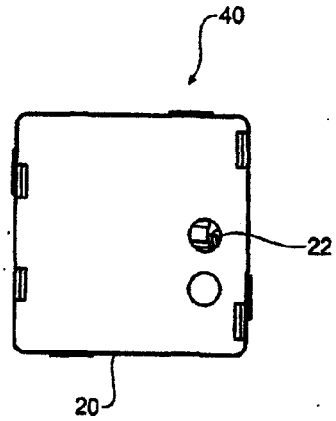


FIG.10

Clipsal Australia Pty. Ltd.

Applicant

By:

MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

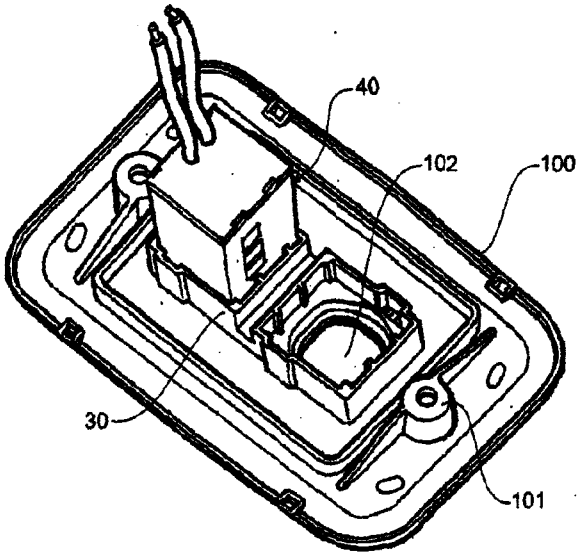


FIG.11

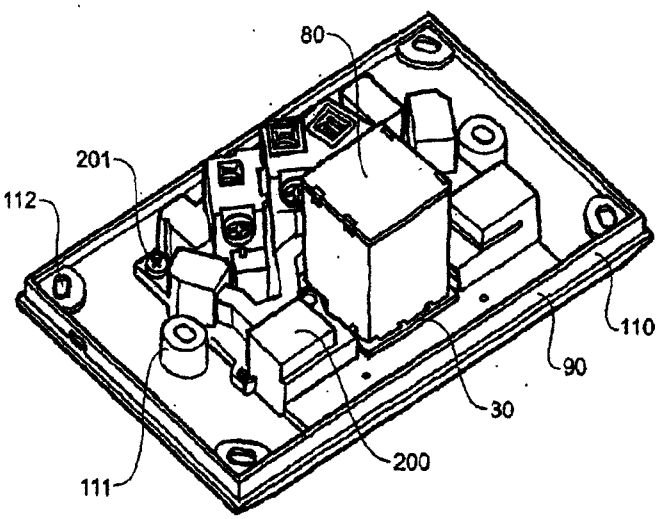


FIG.12

Clipsal Australia Pty. Ltd.

Applicant

By:
MARI-GEN P. MONTOYA
Resident Agent

EXHIBIT 1002
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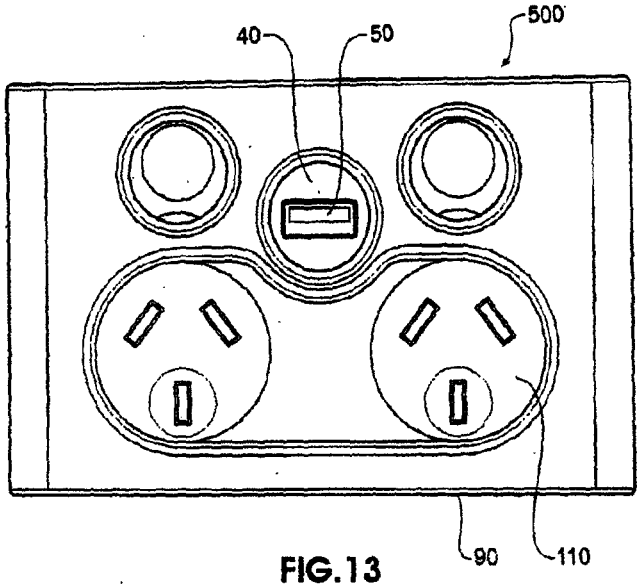


FIG.13

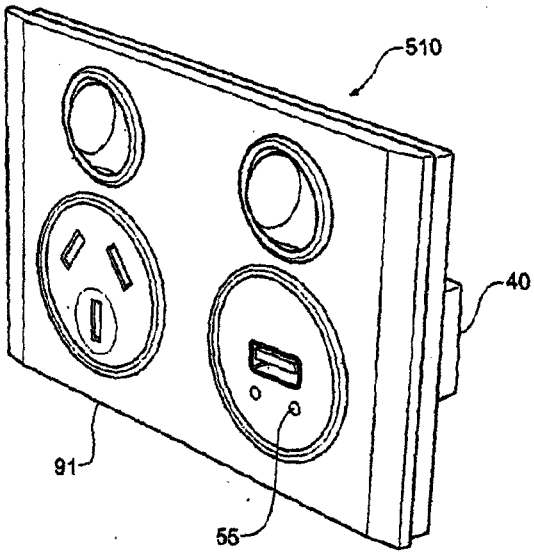


FIG.14

Clipsal Australia Pty. Ltd.

Applicant

By:

MARILEN P. MONTOYA
Resident Agent

EXHIBIT 1002
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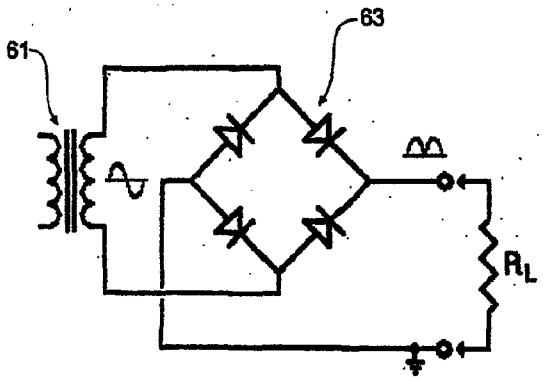


FIG.15

Clipsal Australia Pty. Ltd.

Applicant

By:
MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

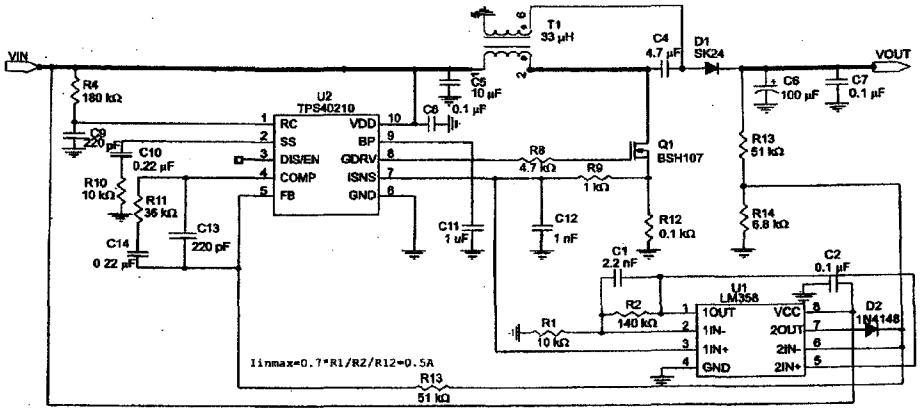


FIG.16

By:
MARI-LEN P. MONTOYA
Resident Agent

Clipsal Australia Pty. Ltd.
Applicant

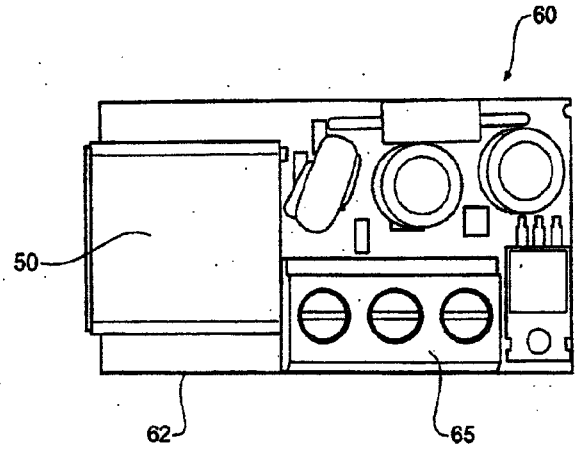


FIG.17

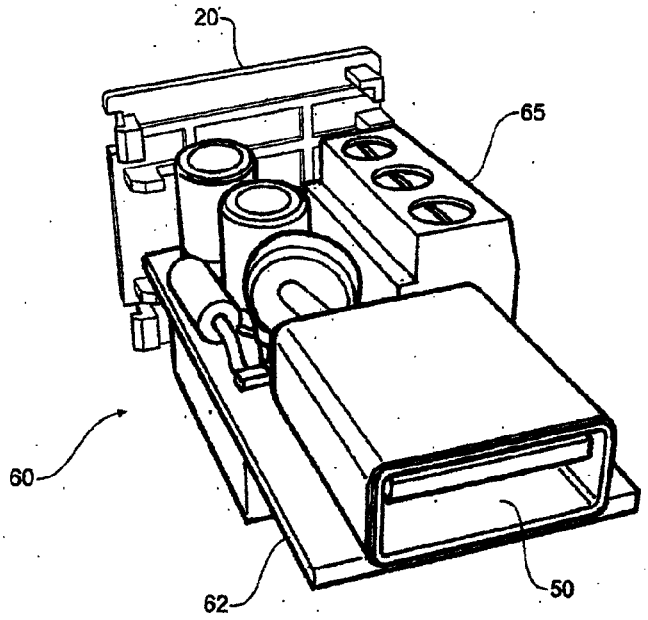


FIG.18

Clipsal Australia Pty. Ltd.

Applicant

By: MARI-LEN P. MONTOYA
Resident Agent

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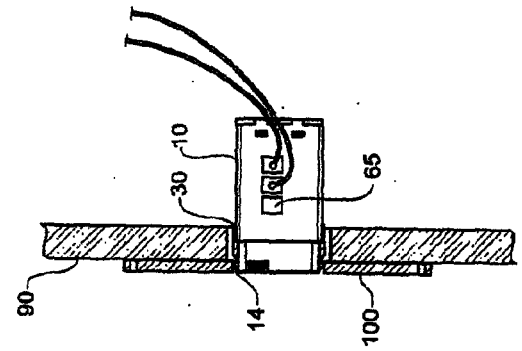


FIG.19c

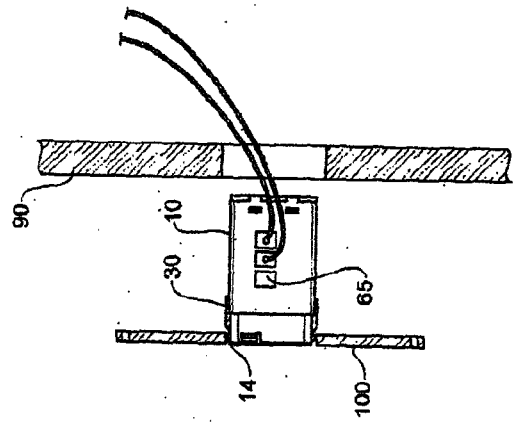


FIG.19b

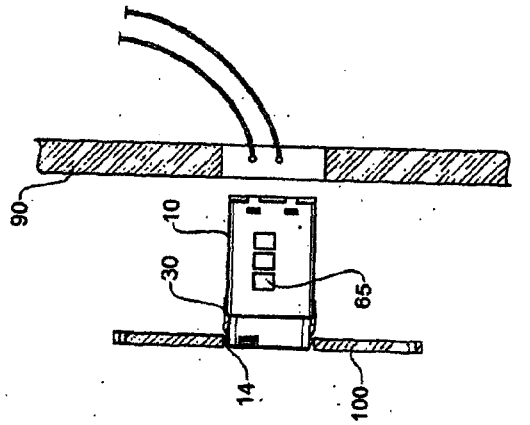


FIG.19a

Clipsal Australia Pty. Ltd.

Applicant

By:
MARI-LEN P. MONTOYA
Resident Agent

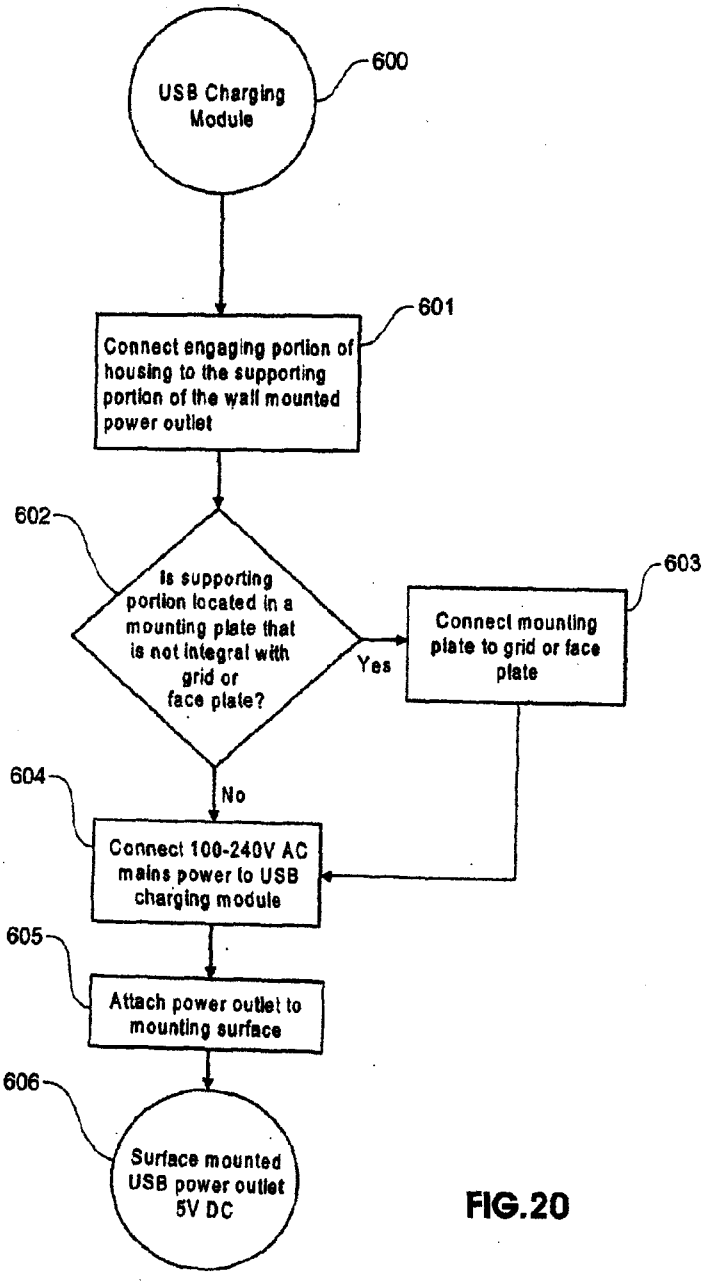


FIG.20

Clipsal Australia Pty. Ltd.

Applicant

By:

MARI-LEN P. MONTOYA
Resident Agent

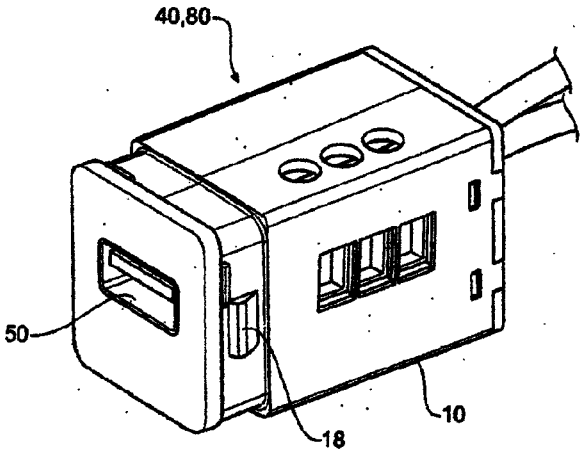


FIG.21

Clipsal Australia Pty. Ltd.

Applicant

By: MARI-LEN P. MONTOYA
Resident Agent

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Petitioner ADC (IPR2024-00671)

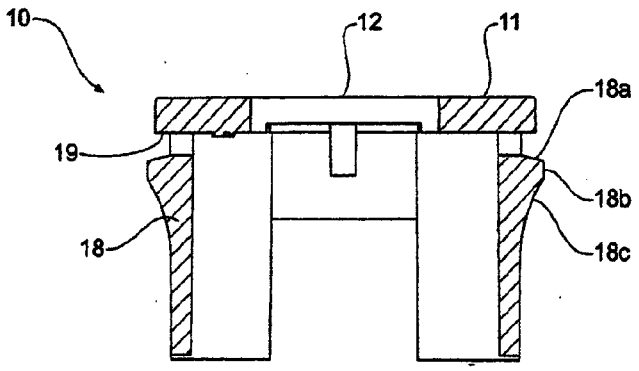


FIG.22

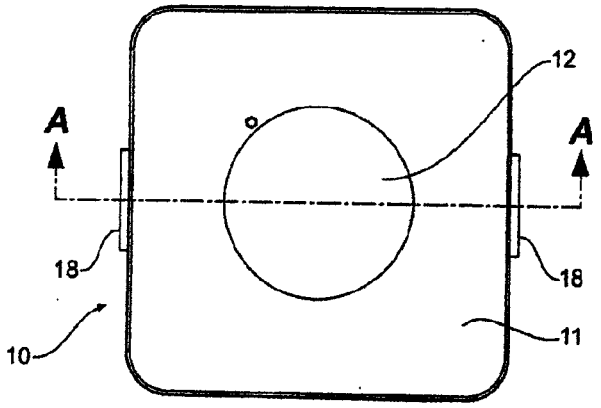


FIG.23

Clipsal Australia Pty. Ltd.

Applicant

By:
MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

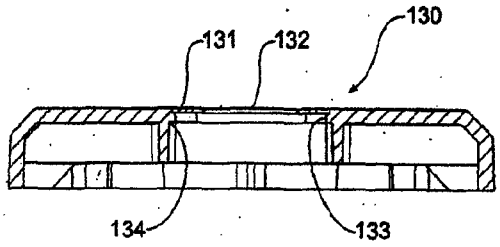


FIG.24

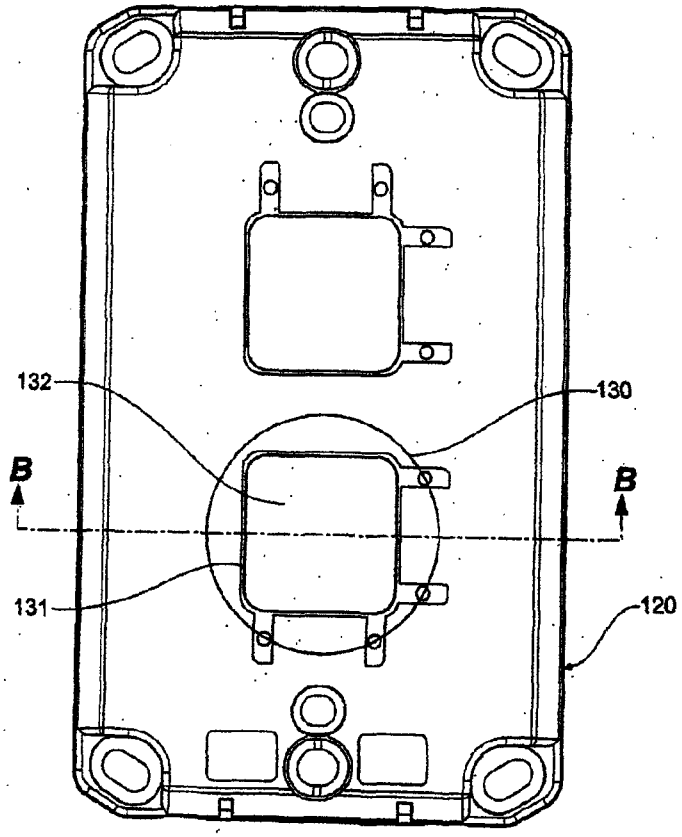


FIG.25

Clipsal Australia Pty. Ltd.

Applicant

By:

MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

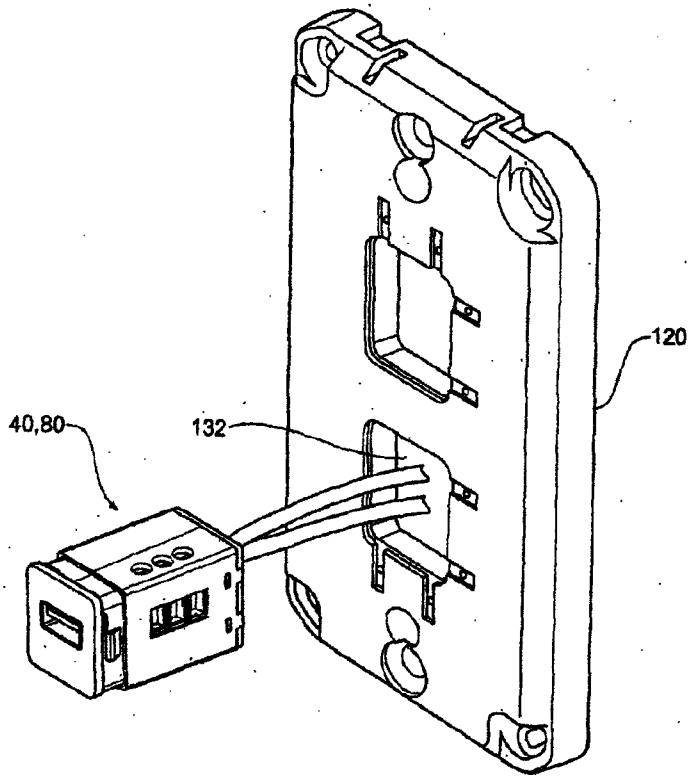


FIG.26

Clipsal Australia Pty. Ltd.

Applicant

By:

MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

'16 JUL 10 P3:33

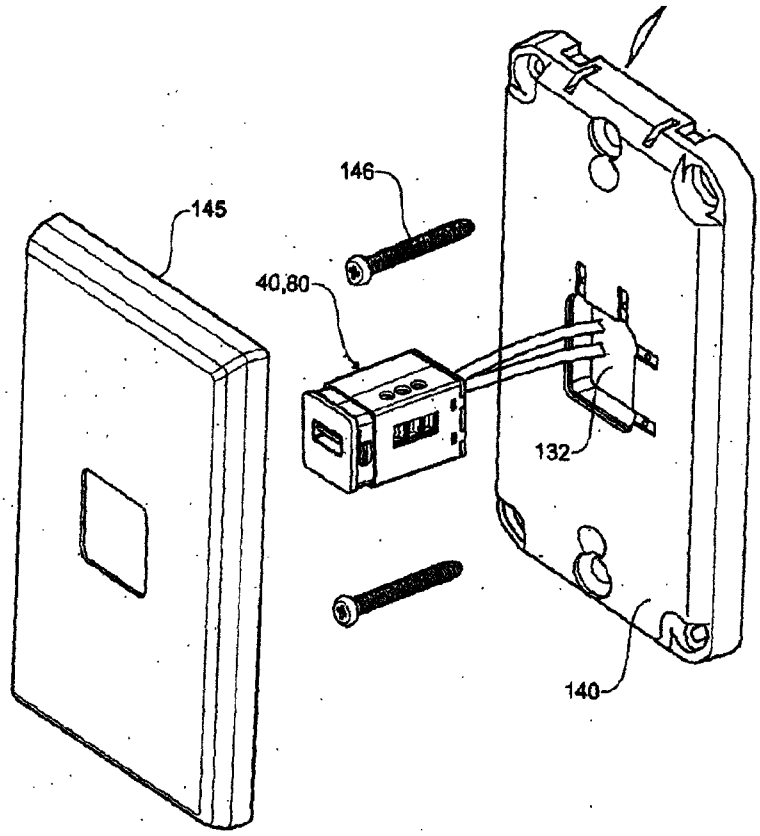


FIG.27

Clipsal Australia Pty. Ltd.

Applicant

By: MARI-LEN P. MONTOYA
Resident Agent

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

CPC - Searched*		
Symbol	Date	Examiner
B60L53/14 H02J7/342 H02J7/0047 H02J7/0034 H02J7/0029 H02J1/122 H02J7/00 H02J7/0048 H02J7/00302 H02J7/00309 H02J7/00306 Y02T90/14 Y02T10/7072 Y02T10/70 H02J2310/46	08/31/2021	MD

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
320	105	08/31/2021	MD

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/M BAYE DIAO/ Primary Examiner, Art Unit 2859	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/820,040	NOOK et al.
	Examiner	Art Unit
	M'BAYE DIAO	2859

Search Notes		
Search Notes	**Date**	**Examiner**
SEARCH(SEARCH Notes Attached)	08/31/2021	MD
Inventor Name and Assignee Search (SEARCH).	08/31/2021	MD
Parent Applications Noted.	08/31/2021	MD
IPR2018-00503 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2020-00944 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2020-01387 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
IPR2021-00309 Reviewed Petition for Inter Partes Review of U.S. Patent No. 9,007,015.	08/31/2021	MD
(307/150 Text Search Only -- see attached Search Printout).	08/31/2021	MD
IP.com PAT and NPL Search Conducted.	08/31/2021	MD
Updated Search Above.	03/10/2022	MD
Dialog ProQuest Search Conducted.	03/10/2022	MD

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/M BAYE DIAO/ Primary Examiner, Art Unit 2859	

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Examiner-Initiated Interview Summary	**Application No.** 16/820,040	**Applicant(s)** NOOK et al.		
	Examiner M'BAYE DIAO	**Art Unit** 2859	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
M'BAYE DIAO	Primary Examiner	Telephonic
William L. Klima Reg. No. 32,422	Attorney of Record	

Date of Interview: 09 March 2022

Issues Discussed:

Proposed Amendment(s)

The amendments to claim 24 render the claims indefinite which necessitated a Final rejection of the application. Agreement was reached by both parties to send the 112 (b) rejection and Examiner furthermore found new art US 2013/0154550 to Balmefrezol et al., (Balmefrezol)

/M BAYE DIAO/ Primary Examiner, Art Unit 2859	03/10/2022

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/820,040	03/16/2020	Jonathan Lewis NOOK	054985-000055-US-02-02	1056

20230 7590 03/15/2022

Vorys, Sater, Seymour and Pease LLP
1909 K St., NW
9th Floor
Washington, DC 20006-1152

EXAMINER	
DIAO, M BAYE	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
03/15/2022	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):

patlaw@vorys.com

PTOL-90A (Rev. 04/07)

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

Office Action Summary	Application No. 16/820,040	Applicant(s) NOOK et al.	
	Examiner M'BAYE DIAO	Art Unit 2859	AIA (FITF) 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 02/07/2022.

☐ 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) _____ 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) 24-71 is/are rejected.

8) ☐ Claim(s) _____ 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 03/16/2020 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 _____.

3) ☑ Interview Summary (PTO-413) Paper No(s)/Mail Date 20220310.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Amendment

2. Acknowledgment is made of amendment filed on 02/07/2022 in which claims 24,26-32, 38,42, and 48 are currently amended while claim 71 has been newly added. By this amendment, claims 24-71 are now pending in the application.

Specification

Claim Objections

3. Claim 24 is objected to because of the following informalities: Claim 24 recites: "… and a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and **a USB charging input** connected to the USB input charge circuit, **the USB charging input** configured for electrically connecting to the USB charger and providing charging input from the USB charger through **the USB charging input** and the USB input charge circuit to the power supply". The underlined limitations are indefinite as it is not clear as what "**the USB charging input"** is referring to as there are two USB charging inputs at **element (56)** and **at element (52)** as shown in **Fig. 1.** It is also unclear as to which element the limitations "**a USB charger**" is referring to. Therefore claim 24 is unclear and does not set the metes and bounds of the claimed invention.

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Petitioner ADC (IPR2024-00671)

4. Claim 26 is objected to due to the minor informalities. In claim 26, the underlined limitations of, "… the USB charging circuit is located internally within the jump starting device" lacks antecedent basis.

5. Claim 24 is further objected to due to minor informalities. In claim 24, lines 12-13, delete, **"the"** as it is being repetitive.

6. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims **24-71** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

9. It is not clear how the limitations of, "… and a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from **a USB charger** to increase charge voltage for charging the power supply; and **a USB charging input** connected to the USB input charge circuit, **the USB charging input** configured for electrically connecting to the USB charger and providing charging input from the USB charger through **the USB charging input** and the USB input charge circuit to the power supply" are achieved or performed. The underlined limitations are indefinite as it is not clear as what "**the USB charging input"** is referring to as there are

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two USB charging inputs at **element (56)** and **at element (52)** as shown in **annotated Fig. 1 below.** It is also unclear as to which element the limitations "a USB charger" is referring to?

10. Claim 26 recites, "...the USB charging circuit is located internally within the jump starting device". There is insufficient antecedent basis for this underlined limitations in the claim.

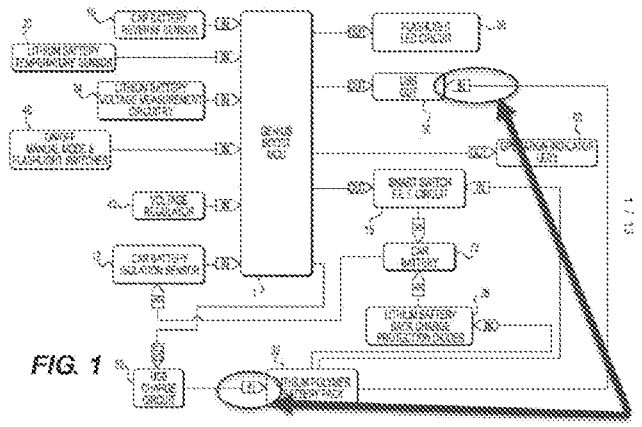


FIG. 1

11. Claims 25-71 depend either directly or indirectly from claim 24 and therefore are also rejected for the same reasons since they inherit the same deficiencies.

12. Claim 26 is

Claim Rejections - 35 USC § 103

8. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

9. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective

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Petitioner ADC (IPR2024-00671)

filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

12. **Claims 24-25,27-28,30-32,36-58,60,63-71 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol et al., (Balmefrezol) US 2013/0154550**.

13. Regarding claim 24, Richardson discloses a jump starting device**(10)(Abstract; ¶[0001])** for boosting or charging a depleted or discharged battery **(battery of vehicle 28)(¶[0006])** having a positive battery terminal **(Red clamp; Fig. 2.C)** and a negative battery terminal **(black clamp)(Note-jumper cable 60 has red (positive) and black (negative) clamps. EX1010 at ¶[0020]); Richardson discloses "a pair of conductive leads for connecting the supplemental**

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power to an engine electrical system), the jump starter device(**10)** comprising: a power supply **(jump starter batteries 22 provide power to the battery of the vehicle(28) to be jump started; see ¶[0006] and Fig. 2C**); a positive battery connector **(labeled Red clamp; Fig. 2.C)** for electrically connecting(**via cables 60; note the cables are electric conductor)** the jump starter device(**10)** to the positive battery terminal of the depleted or discharged battery(**battery of vehicle 28)**; a negative battery connector **(labeled black clamp; Fig. 2.C)** for electrically connecting(**via cables 60; note- the cables are electric conductor)** the jump starter device(**10)** to the negative battery terminal of the depleted or discharged battery(**battery of vehicle 28)**; a power switch **((contact relay 34); see Figs. 1 and 2C)** connected in circuit with the power supply(**jump starter batteries 22)** and the positive and negative battery connectors(**Red and Black clamps; see Figs. 1 and 2C)**, the power switch(**contact relay 34)** configured to switch power on or off from the power supply(**jump starter batteries 22)** to the depleted or discharged battery(**battery of vehicle 28)**, the power switch(**34)** configured(**under the control of the microprocessor 12)** to switch power on when the jump starting device is connected to the depleted or discharged battery(**note-Only after the reverse polarity and battery presence tests have been conducted at steps 214 and 252 does the process proceed to step 268 where microprocessor 12 sends a signal to close contact relay 34. (See also Fig. 3, Fig. 6, ¶[0014] and [0027] to turning on the power switch or circuit(34)(see ¶[0014])(note- Richardson also makes clear that the microcontroller only closes relay 34 if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity. For example, Richardson states that "when the jump starter 10 is initially powered on 200, the microprocessor initializes the hardware . . . . then performs a self-test operation 208 where . . . all sensors 20, 24, 30, 32, 38, 40 . . . are tested". Richardson further**

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discloses the process of measuring the vehicle battery voltage necessarily entails detecting the presence of a vehicle battery connected to the positive and negative output ports of the discharged or depleted battery since reading a sufficiently low voltage would indicate either the absence of a vehicle battery or a battery with a voltage below a required threshold for detection. Only after the reverse polarity and battery presence tests have been conducted at steps 214 and 252 does the process proceed to step 268 where microprocessor 12 sends a signal to close contact relay 34. (See also Fig. 3, Fig. 6, see also ¶[0014] and [0027]).

14. Richardson does not expressly teach the limitations of,

- and a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and a USB charging input connected to the USB input charge circuit, the USB charging input configured for electrically connecting to the USB charger and providing charging input from the USB charger through the USB charging input and the USB input charge circuit to the power supply.

15. However, Balmefrezol discloses factual evidence of, a USB input charge circuit **(298)** connected to the power supply**(200)**, the USB input charge circuit comprising a DC/DC converter**(buck/boost 210/220)(see ¶[0020]-[0021], [0030])**, the USB input charge circuit**(298)** configured for converting power from a USB charger**(AC/DC converter; see ¶[0055],[0068] and Fig. 1)** to increase charge voltage**(Boost operation; see ¶[0045],[0048])** for charging the power supply; and a USB charging input **(construed as USB interface see ¶[0045])** connected to the USB input charge circuit**(298)**, the USB charging input**(USB interface)** configured for electrically connecting to the USB charger and providing charging input from the USB charger

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through the USB charging input and the USB input charge circuit to the power supply**(see ¶[0074]).**

16. Richardson and Balmefrezol are power supply devices analogous art**.** It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teachings of Balmefrezol by incorporating a USB input charge circuit connected to the power supply, the USB input charge circuit comprising a DC/DC converter, the USB input charge circuit configured for converting power from a USB charger to increase charge voltage for charging the power supply; and a USB charging input connected to the USB input charge circuit, the USB charging input configured for electrically connecting to the USB charger and providing charging input from the USB charger through the USB charging input and the USB input charge circuit to the power supply**,** as recited, in order to provide connection to an external source of voltage (preferably, about 5 volts DC), to charge the battery and to generate the so-called On The Go (OTG) voltage required by the peripheral connected to the USB interface. Furthermore, having a USB input charge circuit connected to the power supply, the USB input charge circuit configured for converting power from a USB charger to charge voltage for charging the power supply, will also enable an external electronic or peripheral devices, such as the 3V SIM interface, the 3V MMC interface or any audio amplifier, to be connected to the USB charging input connector and powered up, as per the teachings of Balmefrezol **([0009]).**

17. Accordingly claim 24 would have been obvious.

18. Regarding claim 25, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further discloses, wherein

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the USB charging input**(construed as USB interface see ¶[0045])** comprises a USB charging port**(USB interface)(¶[0068])**.

19. Regarding claim 26, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, the USB input charg~~ing~~ circuit is located internally within the jump starting device**(10)(Richardson; ¶[0014])**.

20. Regarding claim 27, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further discloses, wherein the USB charging input comprises a USB connector**(USB interface; see ¶[0045])**

21. Regarding claim 28, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further discloses, wherein the USB charging circuit comprises one or more DC-DC converter **(DC-DC converter circuits (210) and (220); ¶[0043],[0068]).**

22. Regarding claim 30, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further teaches, wherein the USB input charging circuit**(construed as USB interface see ¶[0045])** is configured to convert power from any USB charger **(such as a 3.5V input into 5 volt DC signal on the output of the second DC-DC converter circuit 220 which is provided to the battery 200; see ¶[0074],[0082])** to charge voltage and current for charging the power supply**(200)**.

23. Regarding claim 31, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 28. Balmefrezol further teaches, wherein the DC-DC converter**(210,220)** is configured to be turned on and off via a circuit**(control logic 250 ¶[0086])** by an output from a microcontroller**(250)**.

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24. Regarding claim 32, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 31. Balmefrezol further discloses, wherein the power source(**200**) is a rechargeable battery(**see ¶[0074]**), and wherein microcontroller software(**as embedded into microcontroller 250**) can turn charge off if the rechargeable battery voltage is measured to be too high by an A/D input(**see ¶[0086]**).

25. Regarding claim 36, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further discloses, further comprising a USB output(**at ball 291**) configured to provide charging power from the power supply(**200**) to a USB-chargeable device(**via USB output 291, such as a 3V SIM or a 3V MMC interface; see ¶[0045],[0064]**).

26. Regarding claim 37, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 36. Balmefrezol further discloses, wherein the USB output comprises a USB output port(**output USB interface inherently has an output port; see ¶[0074]).**

27. Regarding claim 38, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 36. Balmefrezol further discloses, wherein the USB output comprises a USB output connector(**output of USB interface;¶[0074 and Fig. 1]).**

28. Regarding claim 39, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 36. Balmefrezol further discloses, wherein the USB output comprises a USB output port(**output of USB interface;¶[0074] and Fig. 1**])connected to the power supply(**200; see Figs. 1-2**) by a USB output circuit(**see USB interface connector ¶[0074]**).

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29. Regarding claim 40, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Balmefrezol further discloses, wherein the USB output is configured to provide a portable charger for charging smartphones, tablets, music players, and other rechargeable electronic devices(**¶[0009]-[0010],[0012], and [0023]**)

30. Regarding claim 41, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 39. Balmefrezol further discloses, further comprising a microcontroller(**250**)(**Fig. 2**) and a control circuit(**250**), the control circuit from the microcontroller allows the USB output circuit to be turned on and off by software control to prevent the power supply getting too low in capacity(**see ¶[0072],[0074],[0078],[0082], and [0086],[0090], and [0094]**).

31. Regarding claim 42, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 39. Balmefrezol further discloses, wherein the USB output is brought to an outside of the jump charge device(**combination of 6 and 10 operates as a jump charge device; see ¶[0042]**) with a USB connector(**see ¶[0009],[0074]**)

32. Regarding claim 43, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 42. Balmefrezol further discloses, wherein the USB connector includes a voltage divider configured to enable charge to certain smartphones that require it(**see ¶[0042], [0065], and [0067]).**

33. Regarding claim 44, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the power supply(**22**) is a rechargeable battery disposed within the jump starter device(**10**)(**Richardson; ¶[0014]**).

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34. Regarding claim 45, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the power switch**(34)** comprises a power switch control system or circuit**(12)** configured to control the power switch and turn power on or off from the power supply**(22)** to the depleted or discharged battery**(battery of vehicle 28)** when connected to the positive and negative battery connectors**(Red and Black clamps)((see¶[0012],[0014])(Note- Richardson discloses that the power switch is turned on to cause the internal power supply to be connected to the output port in response to signals from the sensors indicating (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. Richardson also discloses or teaches that the power switch is not turned on when signals from the sensors indicate either the absence of a vehicle battery at the output port or improper polarity connection of positive and negative terminals of the vehicle battery with the positive and negative polarity outputs. Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs).**

35. Regarding claim 46, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 45. Richardson further discloses, wherein the power switch control system or circuit**(12)** comprises one or more sensors**(30,24)** configured to

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detect whether the positive and negative battery connectors are properly connected to the depleted or discharged battery prior to switching on the power switch(**Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. 77. Richardson discloses that the reverse voltage sensor 24 detects whether jumper cables that have been manually connected to the vehicle battery have been properly connected or if there is a reverse connection. Richardson discloses or teaches that the power switch for charging the vehicle battery cannot be turned on unless there is a proper connection of the cables. For example, referring to FIG. 3 (a portion of which is reproduced below), Richardson states: If the system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214. If the voltage measured is significantly less than the voltage of the jump starter capacitors 21 and batteries 22, then a reverse polarity connection of the jumper cables to the vehicle is determined and an error flag is set and the event saved in nonvolatile memory 216. A "Reverse Polarity" error message is displayed 218 on the LCD 46, and the reverse voltage LED 48 is illuminated 216. Any further jump starter action by the operator is ignored until the reverse polarity. Furthermore, Richardson further discloses (see ¶[0015]) that the microcontroller receives signals from the vehicle voltage**

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sensor 30 and the reverse voltage sensor 24 and that it generates a control signal 58(activated output signal, as per claim 11) which controls the contact relay 34 to connect the jump starter batteries 22 to the vehicle to be started 28. Richardson also makes clear that the microcontroller only closes relay 34(activate switch or turn on switch) if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity

36. Regarding claim 47, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch control system or circuit**(12)** is configured to detect presence**(via vehicle voltage sensor 30 and reverse polarity sensor 24 which indicate the presence of a vehicle battery connected with proper polarity)** of the depleted or discharged battery**(battery of vehicle 28)** when connected between the positive and negative battery connectors**(Red and Black clamps) (see also Fig. 3, Fig. 6, ¶[0014] and [0027])**.

37. Regarding claim 48, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch system or circuit is configured to detect polarity**(via reverse polarity detection sensor 24 ; see also Fig. 3, Fig. 6, ¶[0014] and [0027])** of the depleted or discharged battery**(battery of vehicle 28)** when connected between the positive and negative battery connectors**(Black and Red clamps).**

38. Regarding claim 49, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 46. Richardson further discloses, wherein the power switch control system or circuit is configured to detect presence **(via voltage sensor 30)**of the depleted or discharged battery**(vehicle of battery 28)** when connected between the positive

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and negative battery connectors(**Red and Black clamps**), and configured to detect polarity(**via reverse polarity detection 24**) of the depleted or discharged battery when connected between the positive and negative battery connectors, wherein the power switch control system or circuit(**12**) switches on (**by closing relay 34**) the power supply(**22**) to connect the power supply to the depleted or discharged battery only when the depleted or discharged battery is present when connected between the positive and negative battery connectors and the depleted or discharged battery is connected with correct polarity between the positive and negative battery terminals(**note-((see¶[0012],[0014])(Note- Richardson discloses that the power switch is turned on to cause the internal power supply to be connected to the output port in response to signals from the sensors indicating (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. Richardson also discloses or teaches that the power switch is not turned on when signals from the sensors indicate either the absence of a vehicle battery at the output port or improper polarity connection of positive and negative terminals of the vehicle battery with the positive and negative polarity outputs. Richardson discloses in FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. 77. Richardson discloses that the reverse voltage sensor 24 detects whether jumper cables that have been manually connected to the vehicle battery**

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have been properly connected or if there is a reverse connection. Richardson discloses or teaches that the power switch for charging the vehicle battery cannot be turned on unless there is a proper connection of the cables. For example, referring to FIG. 3 (a portion of which is reproduced below), Richardson states: If the system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214. If the voltage measured is significantly less than the voltage of the jump starter capacitors 21 and batteries 22, then a reverse polarity connection of the jumper cables to the vehicle is determined and an error flag is set and the event saved in nonvolatile memory 216. A "Reverse Polarity" error message is displayed 218 on the LCD 46, and the reverse voltage LED 48 is illuminated 216. Any further jump starter action by the operator is ignored until the reverse polarity condition is corrected 220, at which point processing returns to the start of the main processing loop 210." Richardson, ¶([0014],[0020]). Thus, the "Reverse Polarity" error message on the LCD 46 and illuminated LED 48 warn a user when a vehicle battery is connected with reverse polarity, prompting the user to correct the connection). Additionally, Richardson discloses (see ¶[0015]) that the microcontroller receives signals from the vehicle voltage sensor 30 and the reverse voltage sensor 24 and that it generates a control signal 58(activated output signal) which controls the contact relay 34 to connect the jump starter batteries 22 to the vehicle to be started 28. Richardson also makes clear that the microcontroller only closes relay 34(activate switch or turn on switch) if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity).

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39. Regarding claim 50, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 45. Richardson further discloses, wherein the power switch control system or circuit comprises a microcontroller(**microcontroller 12**) configured for providing an output(**contact relay control output 58**) controlling the power switch(**34**)(**see Fig. 1**)(**see Exhibit 1010, ¶[0014]**).

40. Regarding claim 51, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller(**12**) receives input from one or more sensors(**battery presence sensor 30; reverse polarity sensor 24; 20,32,temperature sensor 38, and 40**) configured to detect presence of the depleted or discharged battery when connected between the positive and negative battery connectors, and to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors(**Richardson ¶[0010]-[0015] and [0027]**).

41. Regarding claim 52, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 51. Richardson further discloses, wherein the one or more sensors(**battery presence sensor 30; reverse polarity sensor 24; 20,32,temperature sensor 38, and 40**) includes one sensor(**30**) configured to detect presence of the depleted or discharged battery(**battery of vehicle 28**) when connected between the positive and negative battery connectors(**Red and Black clamps**), and another sensor(**24**) configured to detect polarity of the depleted or discharged battery when connected between the positive and negative battery connectors (**Richardson ¶[0010]-[0015],[0020] and [0027]-[0028]**).

42. Regarding claim 53, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 52. Richardson further discloses, wherein the one or more sensors(**24,30,38,40**) is one or more sensing circuits(**see circuits in Fig. 2B).**

43. Regarding claim 54, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller**(12)** switches the power switch**(contact relay 34)** on to provide power from the power supply**(22)** to the depleted or discharged battery**(battery of vehicle 28)** only when the depleted or discharged battery is determined by the microcontroller to be present and connected with the correct polarity**(Richardson ¶[0010]-[0015] and [0027])**.

44. Regarding claim 55, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, wherein the microcontroller**(12)** is a programmable microcontroller configured to allow updates in functionality and system parameters**(Richardson ;¶[0011])**.

45. Regarding claim 56, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 55. Richardson further discloses, wherein the programmable microcontroller**(12)** comprises a memory**(see Richardson; ¶[0011])**.

46. Regarding claim 57, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the positive battery connector comprises a positive battery cable**(cable 60 has Red(positive battery cable) and Black(negative battery cable); see Fig. 2C)**, and the negative battery connector comprises a negative battery cable.

47. Regarding claim 58, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 57. Richardson further discloses, wherein the positive battery cable comprises a positive battery clamp**(Red clamp of 60; see Fig. 2C))** and the negative battery cable comprises a negative battery clamp**(Black clamp of 60; see Fig. 2C))**.

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48. Regarding claim 60, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 51. Richardson further discloses, wherein the one sensor**(30)** is configured for detecting presence of the depleted or discharged battery**(battery of vehicle 28)** when connected between the positive and negative battery connections**(Red and Black clamps)**, and the other sensor is a reverse polarity sensor**(24) (see ¶[0011],[0014]-[0015]).**

49. Regarding claim 63, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson discloses, further comprising an output port**(see annotated Fig. 2C below)** providing positive and negative polarity outputs**(as respectively corresponding to Red and Black clamps of cable 60; see Fig. 2C below)** to the positive and negative battery connectors.

50. Regarding claim 64, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses further comprising a temperature sensor**(38)(see ¶[0013] and Fig. 1)** configured to detect temperature of the power supply**(22)** and to provide a temperature signal to the microcontroller**(12)**.

51. Regarding claim 65, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 50. Richardson further discloses, a voltage measurement circuit**(20)** configured to measure output voltage of the power supply**(22)** and to provide a voltage measurement signal to the microcontroller**(12) (12)(see ¶[0012] and Fig. 1)**.

52. Regarding claim 66, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson discloses, further comprising a voltage regulator configured to convert output voltage of the power supply to a voltage level appropriate to provide operating power to internal components of the device**(10)(note-(Fig. 2A; regulator LM7805 is a 5V regulator although not labeled)**.

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53. Regarding claim 67, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 60. Richardson discloses, further comprising a manual override switch**(push button switch 44)** configured to activate a manual override mode to enable a user to connect jump start power to the positive and negative battery connectors when the one sensor**(30)** configured for detecting presence of the depleted or discharged battery**(battery of vehicle 28)** is unable to detect presence of the depleted or discharged battery**(see ¶[0013]-[0015],[0026]**).

54. Regarding claim 68, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 67. Richardson discloses, wherein the microcontroller**(12)** is configured to detect actuation of the manual override switch**(44)** for at least a predetermined period of time before activation of the manual override mode**(see ¶[0039]**).

55. Regarding claim 71, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. Richardson further discloses, wherein the power switch is configured to switch power on only when the jump starting device is properly**(see ¶[0012],[0014]**) connected to the depleted or discharged battery.**(Note- Richardson discloses that the power switch is turned on to cause the internal power supply to be connected to the output port in response to signals from the sensors indicating (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. Richardson also discloses or teaches that the power switch is not turned on when signals from the sensors indicate either the absence of a vehicle battery at the output port or improper polarity connection of positive and negative terminals of the vehicle battery with the positive and negative polarity outputs. Richardson discloses in**

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FIGS. 3-8 "flow charts of the processing steps of the portable power source of the present invention." Ex. 1006, ¶0010. This sequence of processing steps involves several checks performed by the microcontroller before turning on the power switch to jump start the vehicle. As discussed below, these checks include detecting (1) the presence of a vehicle battery at said output port and (2) proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs. 77. Richardson discloses that the reverse voltage sensor 24 detects whether jumper cables that have been manually connected to the vehicle battery have been properly connected or if there is a reverse connection. Richardson discloses or teaches that the power switch for charging the vehicle battery cannot be turned on unless there is a proper connection of the cables. For example, referring to FIG. 3 (a portion of which is reproduced below), Richardson states: If the system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214. If the voltage measured is significantly less than the voltage of the jump starter capacitors 21 and batteries 22, then a reverse polarity connection of the jumper cables to the vehicle is determined and an error flag is set and the event saved in nonvolatile memory 216. A "Reverse Polarity" error message is displayed 218 on the LCD 46, and the reverse voltage LED 48 is illuminated 216. Any further jump starter action by the operator is ignored until the reverse polarity condition is corrected 220, at which point processing returns to the start of the main processing loop 210." Richardson, ¶([0014],[0020]). Thus, the "Reverse Polarity" error message on the LCD 46 and illuminated LED 48 warn a user when a vehicle battery is connected with reverse polarity,

prompting the user to correct the connection). Additionally, Richardson discloses (see ¶[0015]) that the microcontroller receives signals from the vehicle voltage sensor 30 and the reverse voltage sensor 24 and that it generates a control signal 58(activated output signal, as per claim 11) which controls the contact relay 34 to connect the jump starter batteries 22 to the vehicle to be started 28. Richardson also makes clear that the microcontroller only closes relay 34(activate switch or turn on switch) if the reverse polarity sensor 24 and vehicle voltage sensor 30 indicate the presence of a vehicle battery connected with proper polarity).

56. .

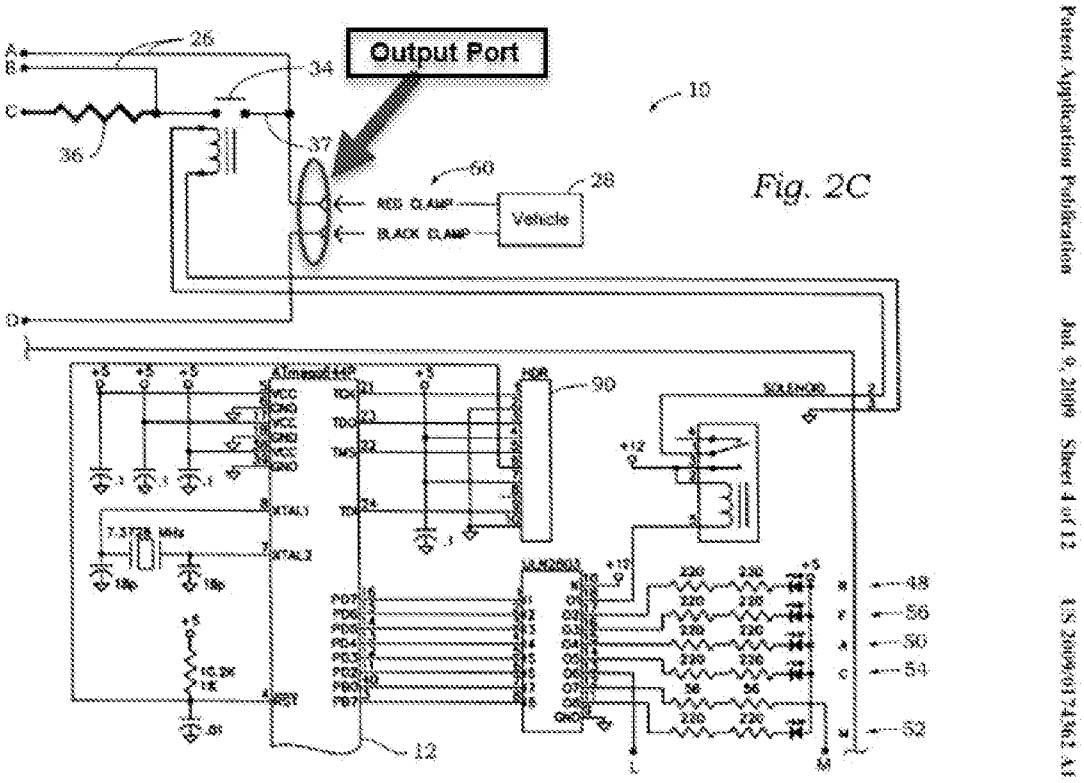


Fig. 2C

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57. **Claim 35 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol et al., (Balmefrezol) US 2013/0154550 and in further view of Tinaphong US 2011/0175461**

58. Regarding claim 35, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 25. Balmefrezol further discloses, wherein the USB port is a USB connector(**¶[0045]).**

59. However, Tinaphong discloses factual evidence of, wherein the USB port is a micro-USB connector **(note-Figs. 2 and 9 show a mini USB connector 24; see ¶[0073]-[0074] as evidenced by secondary evidences and knowledge of one of ordinary skill in the art as taught by Tinaphong US 2011/0175461**).

60. Therefore it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify Richardson in view of Balmefrezol by having have configured the connector to be a micro-USB connector, since market demand, rather than scientific literature, can drive design trends and may show obviousness and that that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims and furthermore any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed. It would have further been an obvious matter of design choice and the need presented before the effective filing date of the claimed invention to have chosen the USB connector of Richardson as modified by Balmefrezol to micro-USB connector since a patent claim can be proved obvious by showing that the claimed combination of elements was "obvious to try," particularly when there is a design need or market pressure to solve a

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problem and there are a finite number of identified, predictable solutions such that a POSITA would have had good reason to pursue the known options within his or her technical grasp.

61. **Claims 69-70 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol (cited above) and Brown USPAT 8,076,900 and in further view of Waldron US 2011/0068734.**

62. Regarding claim 69, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. However the combination of Richardson and Balmefrezol fails to expressly teach the limitations of, "wherein the positive and negative battery connectors are defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof".

63. Brown discloses and shows in **Figs. 1-2**, factual evidence of, wherein the positive**(94)** and negative battery connectors**(96)** are defined by a jumper cable device**(90)** including a plug**(92)** configured to plug into an output port**(84)** of the device**(handheld battery charger booster device (10))**, a pair of cables**(booster cable 90)** integrated with the plug**(92)(see Figs. 1-2)** at one respective end thereof and being configured to be connected to positive and negative battery terminals**((94) and (96) respectively)** of the depleted or discharged battery at another respective end thereof**(at the size of the alligators clips)(see col. 4, lines 22-41).**

64. Richardson and Brown are battery charger analogous art. It would have been obvious to one having ordinary skill in the art to incorporate the teachings of Brown into the device of Richardson as modified by Balmefrezol, wherein the positive and negative battery connectors are

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defined by a jumper cable device including a plug configured to plug into an output port of the device, a pair of cables integrated with the plug at one respective end thereof and being configured to be connected to positive and negative battery terminals of the depleted or discharged battery at another respective end thereof, as recited, so as to tethered the cable to one end of the plug. The advantage for doing so is to improve portability and decrease the chance of having the cables entangled with each other and to fit to the compartment of the carrying case.

65. The combination of Richardson, Balmefrezol and Brown does not expressly teach, the limitations of:

66. a pair of cables having cable ends integrated with the plug at one respective end thereof.

67. Waldron is an analogous art and pertains to the same field of endeavor, namely battery jumping devices. Waldron discloses factual evidence of a pair of cables **(44)** having cable ends integrated with the plug **(46)** at one respective end thereof **([0023]; Fig. 1).**

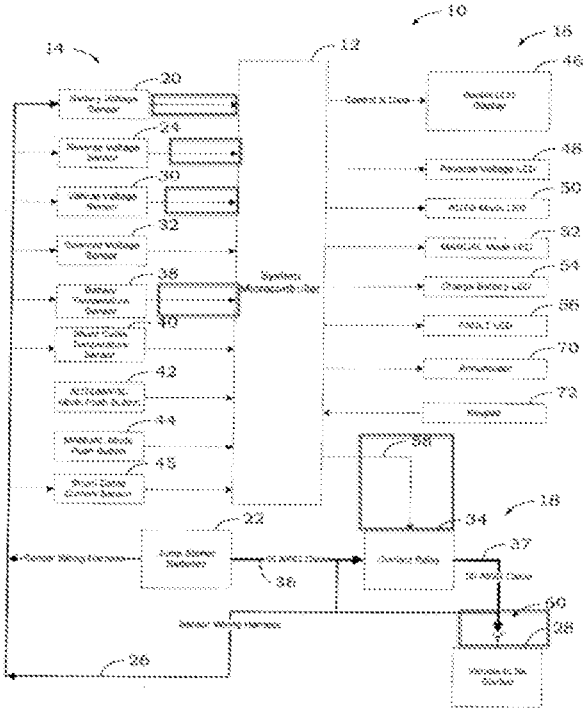
68. Therefore it would have been obvious to one having ordinary skill in the art at the time of the effective filing date of the claimed invention to have had the pair of cables ends of the jumper cable device of Richardson as modified by Balmefrezol and Brown integrated with the plug at one respective thereof so as to tethered the cable to one end of the plug. The advantage for doing so is to improve portability and decrease the chance of having the cables entangled with each other and to fit to the compartment of the carrying case, in which some items are form fitting compartments and are thus configured to the shape of the item to be carried, as per the teachings of Waldron **([0012]).**

69. Regarding claim 70, Richardson as modified by Balmefrezol and Brown discloses all the claimed invention as set forth and discussed above in claim 69. Brown further discloses, wherein

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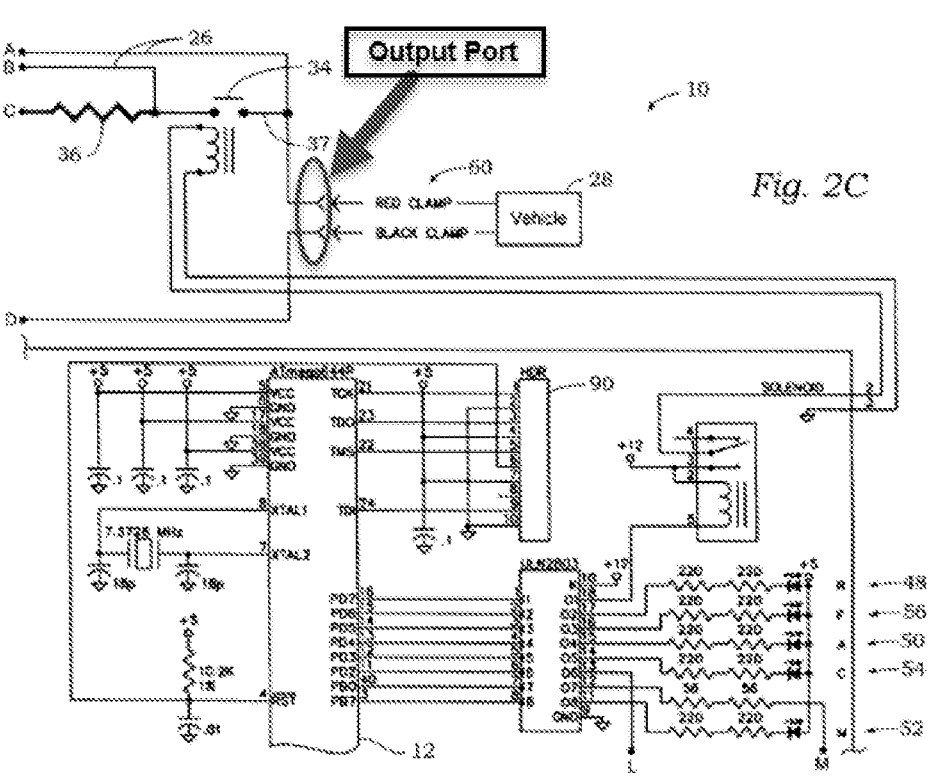
the output port**(84)** and the plug**(92)** are dimensioned so that the plug will fit into the output port only in one specific orientation**(see Figs. 1-2)**.

70. Accordingly, claims 69-70 would have been obvious.



Richardson's *Fig. 1* reproduced above

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71. **Claim 29 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol and in further view of Xinfang USPAT 9,506,446 (Exhibit 1008 IPR2020-01387).**

72. Regarding claim 29, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 28. However, the combination of Richardson and Balmefrezol does not expressly teach, "wherein the DC-DC converter is configured to convert 5V potential provided from a USB charger to 12.4VDC".

73. However, Xinfang discloses factual evidence of, wherein the DC-DC converter is configured for up-converting the input voltage received by the USB connector**(38,40) (included in battery circuit board 44)(note- The battery circuit board 44 may be provided with voltage** boost**ing circuitry to step up the output voltage from the battery cell 42 to the**

ignition output port 46 to provide an output voltage higher than about 13.6V; see col. 5, lines 29-40 and Fig. 2).

74. Xinfang further discloses, wherein the input voltage is 5V**(inherent for a standard USB connector)** that is up-converted to 13.6 VDC for charging the power supply. Richardson in view Balmefrezol and Xinfang differs from the claimed invention in that the input voltage is up-converted 13.6V to instead of 12.4V. It would have been an obvious matter of design choice to configure the output of the voltage boosting circuit of Xinfang to up-convert the 5V input of the USB connector to 12.4V as recited since such modification is an obvious matter of design choice to meet load power requirements. Furthermore, when a device or technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or in a different one, so that if a person of ordinary skill can implement a predictable variation, the variation is likely obvious.

75. Accordingly claim 29 would have been obvious.

76. **Claim 33 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol et al., (Balmefrezol)US 2013/0154550 and in further view of Nakamoto et al., (Nakamoto) USPAT 9,601,800**

77. Regarding claim 33, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim32. Balmefrezol further discloses, wherein the rechargeable battery**(18)** is a lithium battery**(see ¶[0039]-[0041]**,

78. However, the combination of Richardson and Balmefrezol does not expressly teach:

- and further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells of the lithium battery.

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79. Nakamoto discloses factual evidence of, further comprising a lithium battery charge controller**(5)** configured to provide charge balance**(via balance circuit 6)** to internal lithium battery cells**(100A)(see Fig. 9)** of the lithium battery**(100)(see col. 10, line 49 to col. 11, line 14).**

80. Therefore it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teachings of Nakamoto by having the lithium battery of Richardson as modified by Balmefrezol further comprising a lithium battery charge controller configured to provide charge balance to internal lithium battery cells, as recited, so as to reduce variations in battery voltage between the electric cells.

81. Accordingly claim 33 would have been obvious.

82. **Claims 59,61 are rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view of Balmefrezol et al., (Balmefrezol)US 2013/0154550 and in further view of Krieger US 2004/0130298(Exhibit 1009 on IPR2020-00944).**

83. Regarding claim 59, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24. However, the combination of Richardson and Balmefrezol does not expressly teach, wherein said power switch comprises a plurality of FETs in parallel.

84. Krieger discloses factual evidence of, wherein said power switch comprises a plurality of FETs in parallel**(12a,12b,12c,12d)**.

85. Richardson and Krieger are battery jump starter apparatus analogous art.

86. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to have substituted the relay of Richardson as modified by

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Richardson by a plurality of FETs in parallel as disclosed by Krieger for the advantages of their fast switching speed, their low loss and their low on-resistance type that FETs present over relay switches.

87. Accordingly claim 58 would have been obvious.

88. Regarding claim 59, Richardson in view of Balmefrezol and Krieger discloses all the claimed invention as set forth and discussed above in claim 58. Krieger further discloses, wherein the FET switch **(12)** comprises a plurality of FETs in parallel**(12a,12b,12c,12d).**

89. Regarding claim 61, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 60. However the combination of Richardson and Balmefrezol fails to expressly disclose, wherein the one sensor configured for detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors.

90. Krieger teaches factual evidence of, wherein the presence circuit**(16)**comprises a first optically coupled isolator phototransistor**(22)** and the polarity circuit**(also performed by 16)** comprises a second optically coupled isolator phototransistor**(22)([0033])(note- the opto-isolator (16) only turns on when it is properly biased "as a result of a correct polarity connection being made between the boosting battery (2) and the depleted battery (11). By detecting the correct connection of the depleted battery (11), Krieger also necessarily and implicitly detects that the depleted battery (11) is present; See [0033]-[0034],[0038],[0048]).**

91. Richardson and Krieger are battery jump starter apparatus analogous art.

92. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate the teaching of Krieger into the jump starter apparatus of Richardson as modified by Balmefrezol, wherein the one sensor configured for

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detecting presence of the depleted or discharged battery and the reverse polarity sensor comprise optically coupled isolator phototransistors, as recited, so as to prevent the battery assembly from providing a discharge output to the external load, as recited, for the advantages of providing a safe delivery of power to the depleted battery of the vehicle that need to be jump started while preventing a potentially dangerous situation that could result when an improper polarity connection is made between the boosting battery and the depleted battery, as per the teachings of Krieger **(¶[0034]).** It would have further been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention was made to include in the jump starter apparatus of Richardson, wherein the presence circuit that comprises a first optically coupled isolator phototransistor and the polarity circuit comprises a second optically coupled isolator phototransistor since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

93. **Claims 62 is rejected under 35 U.S.C. 103 as being unpatentable over Richardson et al., (Richardson) US 2009/0174362 (Exhibit 1010 IPR2020-01387) in view in view of Balmefrezol et al., (Balmefrezol)US 2013/0154550 and in further view of Kim USPAT 5,867,007.**

94. Regarding claim 62, Richardson in view of Balmefrezol discloses all the claimed invention as set forth and discussed above in claim 24, but fails to expressly teach the limitations of, further comprising a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery.

95. Kim teaches**(col. 3, lines 46-55)** and shows in **Fig. 1,** factual evidence of, further comprising a plurality of power diodes**(31)(which comprises diodes D1 and D2)** coupled

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between the positive and negative battery connectors**((10) and (20)** and the power supply**(32)** to prevent back-charging of the power supply from an electrical system**(33)** connected to the depleted or discharged battery.

96. Richardson, Balmefrezol, and Kim are battery powered devices analogous art.

97. Therefore it would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to incorporate in the device of Richardson as modified by Balmefrezol, a plurality of power diodes coupled between the positive and negative battery connectors and the power supply to prevent back-charging of the power supply from an electrical system connected to the depleted or discharged battery, as recited, so as to provide a safety measure and protection to the battery by preventing a reverse current flow back to the power supply which might damage both the batteries and the connected load.

Response to Arguments

98. Applicant's arguments with respect to claim(s) 24-71 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument.

Citation of Prior Art

99. For a list of related prior art references not mentioned above but disclose related apparatus or method, see Form PTO-892.

Conclusion

100. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

101. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M'BAYE DIAO whose telephone number is (571)272-6127. The examiner can normally be reached M-F; 9:00AM-6:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DREW A DUNN can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about

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filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M'BAYE DIAO
Primary Examiner
Art Unit 2859

/M BAYE DIAO/
Primary Examiner, Art Unit 2859
March 9, 2022

EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

PTOL-413A (07-16)
Approved for use through 05/31/2024. 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.

Applicant Initiated Interview Request Form

Application No.: 16/820,040 First Named Applicant: Jonathan Lewis Nook
Examiner: DIAO, M BAYE Art Unit: 2859 Status of Application: pending

Tentative Participants:
(1) William L. Klima, Reg. No. 32,422 (2) Rick Stanfield (inventor w. applicant NOCO)
(3) Nitish Agrawal (tech w. applicant NOCO) (4)

Proposed Date of Interview: 6-9-22 **Proposed Time:** 2:30 (○AM ◉PM)

Type of Interview Requested:
(1) ☑ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☑ NO
If yes, provide brief description:

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) 35 USC 103	24-25, . .	Richardson et al. . . .	☐	☐	☐
(2) 35 USC 103	35	Richardson et al. . .	☐	☐	☐
(3) 35 USC 103	69-70	Richardson et al. . .	☐	☐	☐
(4) 35 USC 103		All remaining reject.	☐	☐	☐

☐ Continuation Sheet Attached ☐ Proposed Amendment or Arguments Attached
Brief Description of Arguments to be Presented: Discussion of prior art, in particular Balmefrezol et al. (US 2013/0154550).

An interview was conducted on the above-identified application on

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/William L. Klima/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

William L. Klima
Typed/Printed Name of Applicant or Representative

202-467-8832
Applicant's/Applicant's Representative's Telephone Number

32,422
Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. 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 and 1.14. This collection is estimated to take 24 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.
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Petitioner ADC (IPR2024-00671)

PTOL-413A (07-16)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Instruction Sheet for:
APPLICANT INITIATED INTERVIEW REQUEST FORM

(Not to be Submitted to the USPTO)

1. If this form is signed by a registered practitioner not of record, the authority to submit the Applicant Initiated Interview Request Form is pursuant to limited authority to act in a representative capacity under 37 CFR 1.34 and further proof of authority to act in a representative capacity may be required. *See* 37 CFR 1.34.

   The Office will accept the signed form as an indication that the registered practitioner not of record is authorized to conduct an interview on behalf of the principal in pursuant to 37 CFR 1.34.

   For more information, see the "Conducting an Interview with a Registered Practitioner Acting in a Representative Capacity" notice which is available on the USPTO Web site at: http://www.uspto.gov/patents/law/notices/2010.jsp.

2. This is not a power of attorney to any named practitioner. Accordingly, any registered practitioner not of record named on the form does not have authority to sign a request to change the correspondence address, a request for express abandonment, a disclaimer, a power of attorney, or other document requiring the signature of the applicant, assignee of the entire interest or an attorney of record. If appropriate, a separate power of attorney to the named practitioner should be executed and filed in the US Patent and Trademark Office.

3. Any interview concerning an unpublished application under 35 U.S.C. § 122(b) with a registered practitioner not of record who obtains authorization through use of the PTOL-413A will be conducted based on the information and files supplied by the practitioner in view of the confidentiality requirements of 35 U.S.C. § 122(a).

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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.

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UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/820,040	**06/07/2022 03:04:29 PM ET**	**054985-000055-US-02-02**

Title of Invention

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1056	FILED BY	Lisa Elliott
PATENT CENTER #	60705793	FILING DATE	03/16/2020
CUSTOMER #	20230	FIRST NAMED INVENTOR	Jonathan Lewis NOOK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	William Klima

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022-06-07 - PTOL413A - 16820040 - 054985-000055-US-02-02.pdf	3	First Action Interview - Schedule Interview request	334 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022-06-07 - PTOL413A - 16820040 - 054985-000055-US-02-02.pdf	D366D1E859F17769E8F16B9F439584B91C76D337241D7A2571E86C9201619B79220D6376D9A21963A83AF74ADE22E4AEB0B5A058F141F6ECC9705EAEAF19D12D

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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.

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Petitioner ADC (IPR2024-00671)

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PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/820,040	**06/09/2022 09:43:05 AM ET**	**054985-000055-US-02-02**

Title of Invention

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1056	FILED BY	Lisa Elliott
PATENT CENTER #	60709383	FILING DATE	03/16/2020
CUSTOMER #	20230	FIRST NAMED INVENTOR	Jonathan Lewis NOOK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	William Klima

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022_06_09_agenda_final_.pdf	1	Miscellaneous Incoming Letter	53 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022_06_09_agenda_final_.pdf	B11BAF854F2242C33042D40EDBE7F37D3BE99CEEC413769C430F2B36FE3EC8E83D5679CADB1664E7CAA493B1EB298694ED889D0BA6387E0A811A58D413CD8B82

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EXHIBIT 1002
Petitioner ADC (IPR2024-00671)

AGENDA
Telephonic Interview – Thursday, June 9, 2022 at 2:30 PM
16/820,040
Final Office Action, 3-15-2022
Examiner M'Baye DIAO
William L. Klima, Reg. No. 32,222
6-9-22

1) Balmefrezol et al. (US 2013/0154550) discloses charging an internal battery of a cell phone having a low voltage (i.e. 2.3 V up to 4.5 V), instead of charging a jump starter having a relatively high voltage (12V or higher).

   See paragraphs [0004], [0016], and [0103].

2) Balmefrezol et al. does not disclose boosting (UP conversion) the voltage from the USB interface (VBUS/OTG 295 - FIG. 2) to the internal battery 200 of the cell phone. Instead, Balmefrezol discloses decreasing the voltage (DOWN conversion) from the USB interface to the internal battery 200 of the cell phone.

3) The USB interface (e.g. input port) has a voltage of around 5V and must be bucked (i.e. DOWN conversion) to charge the internal battery of the cell phone at around 3.5V.

   See paragraph [0103].

4) Balmefrezol et al. discloses two distinctive charging circuits through a USB interface and an AC/DC interface.

   See paragraph [0016], [0042], and [0107], and claims 19 and 22.

5) The two converters 210 and 220 (FIG. 2) are buck/boost converters that operate differently in opposite current flow directions, and are configured to buck (i.e. DOWN conversion) in a first direction from the USB interface to the internal battery 200 of the cell phone, and to boost (i.e. UP conversion) in an opposite direction from the internal battery 200 of the cell phone back to the USB interface to supply power to peripherals (i.e. On The Go (OTG) requirement).

   See paragraphs [0043] to [0047] and paragraphs [0109] to [0116].

6) FIG. 3 shows the logic of control circuit 250 (FIG. 2). In the third and fourth entry (box) from the to, the "USB Charger [is] on" the "SMPS USB [is] in buck mode to charge battery.

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Petitioner ADC (IPR2024-00671)

AGENDA
Telephonic Interview – Thursday, June 9, 2022 at 2:30 PM
16/820,040
Final Office Action, 3-15-2022
Examiner M'Baye DIAO
William L. Klima, Reg. No. 32,222
6-9-22

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/820,040	**06/09/2022 09:41:18 AM ET**	**054985-000055-US-02-02**

Title of Invention

PORTABLE VEHICLE BATTERY JUMP START APPARATUS WITH SAFETY PROTECTION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1056	FILED BY	Lisa Elliott
PATENT CENTER #	60709372	FILING DATE	03/16/2020
CUSTOMER #	20230	FIRST NAMED INVENTOR	Jonathan Lewis NOOK
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	William Klima

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022_06_09_agenda_final_.pdf	1	Miscellaneous Incoming Letter	53 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022_06_09_agenda_final_.pdf	B11BAF854F2242C33042D40EDBE7F37D3BE99CEEC413769C430F2B36FE3EC8E83D5679CADB1664E7CAA493B1EB298694ED889D0BA6387E0A811A58D413CD8B82

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for 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.

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Espacenet

CN203211234U Emergency starting device of automobile

Applicants: HUIZHOU HUAYITONG TECHNOLOGY CO LTD

Inventors: YU CHUNLAN

Classifications:
IPC ***B60R16/033;***

Priorities: CN201320217854U 2013-04-26

Application: CN203211234U·2013-04-26

Publication: CN203211234U·2013-09-25

Published as: CN203211234U

Emergency starting device of automobile

Abstract

The utility model relates to a starting device of an automobile, in particular to an emergency starting device of an automobile. The emergency starting device comprises an internal battery, a charge input interface, a display module, a control module, a relay, an input key and output terminals. A main contact of the relay is connected with the internal battery and the output terminals respectively; the control module comprises a microprocessor and an external battery reverse connection detection circuit, and the microprocessor controls on and off of the relay via a relay switching circuit so as to control the internal battery to output currents to the output terminals; the external battery reverse connection detection circuit is used for providing correct or erroneous external battery connection signals. The emergency starting device has the advantages that the internal battery is connected with an external battery by the relay, and the relay is in an off state under conventional conditions or after the automobile is successfully started, so that sparks are prevented when the emergency starting device is connected to the automobile or is disconnected from the automobile; the relay is prevented from being actuated under the control of the microprocessor when the output terminals and the external battery are in wrong polarity connection, so that high currents caused by the wrong polarity connection can be prevented.

(19) The State Intellectual Property Office (SIPO) of the People's Republic of China

(12) Utility Model Patent

(10) Patent publication No.: CN 203211234 U

(45) Patent Date: September 25, 2013

(21) Appl. No.: 201320217854. 6

(22) Filed on: April 26, 2013

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(72) Inventor(s): YU, Chuanlan

(51) Int. Cl.
B60R 16/033 (2006. 01)

(ESM) An invention patent application was filed on the same day for this invention

Claims: 1 page, Description 3 pages, Drawings 6 pages

(54) Title of Utility Model

Emergency starting device of automobile

(57) Abstract of Disclosures

The utility model relates to a starting device of an automobile, in particular to an emergency starting device of an automobile. The emergency starting device comprises an internal battery, a charge input interface, a display module, a control module, a relay, an input button and output terminals, where a main contact of the relay is connected with the internal battery and the output terminals respectively, the control module comprises a microprocessor, the microprocessor controls on and off of the relay via a relay switching circuit so as to control the internal battery to output currents to the output terminals, and further comprises an external battery reverse connection detection circuit for providing correct or erroneous external battery

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connection signals. In the emergency starting device of the present invention, the internal battery and an external battery are connected in via the relay, and the relay is in an off state under normal conditions or after the automobile is successfully started, so that sparks are prevented when the emergency starting device is being connected to the automobile or is being disconnected from the automobile; in addition, the relay is prevented from being actuated under the control of the microprocessor when the output terminals and the external battery are connected in a wrong way, so that large currents caused by the wrong connection can be prevented.

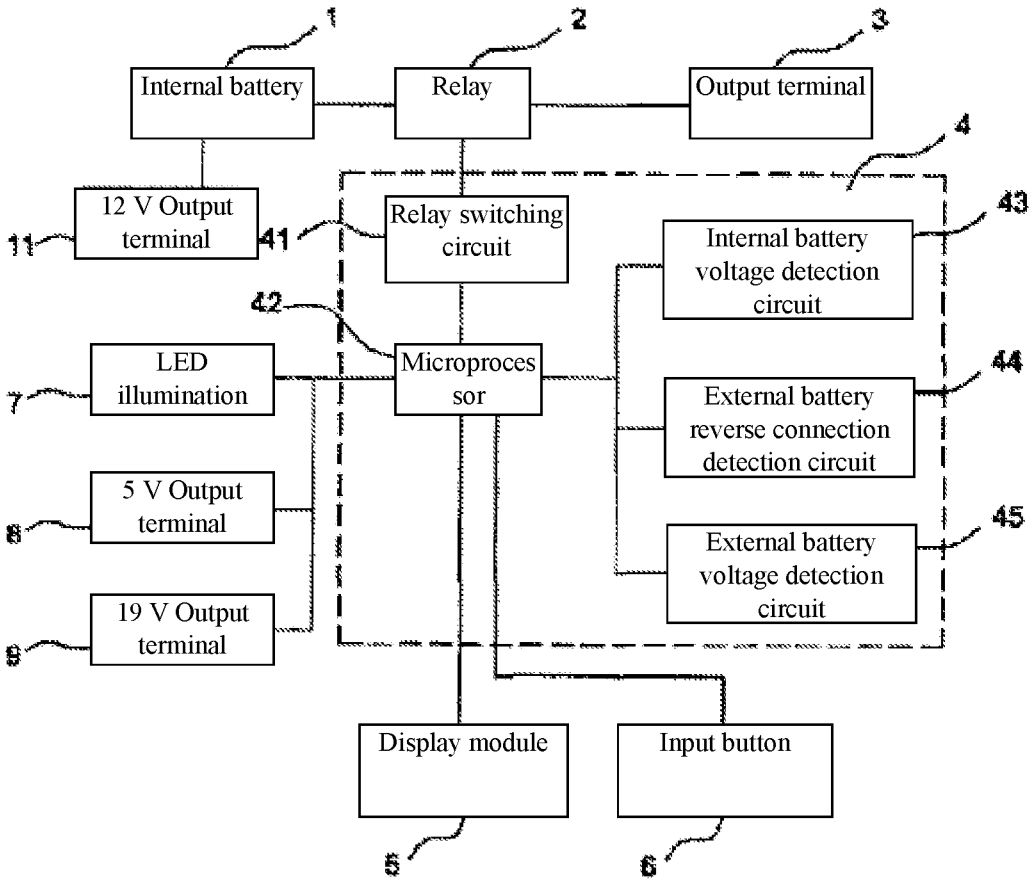


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Emergency starting device of automobile

Technical Field

[0001] The utility model relates to a starting device of an automobile, in particular to an emergency starting device of an automobile.

Background Art

[0002] Automobiles are an indispensable means of transportation in society and production. Current gasoline fuel vehicles are all equipped with a battery inside the car. The car engine charges the battery through a generator during operation. When the car engine stops running, the battery can supply electric power to the car or can start the car engine. The battery installed inside the car is generally a lead-acid battery. A lead-acid battery typically has a lower battery capacity after a certain number of charge and discharge cycles. After a long period of use, the battery may be dead. In such a case, the car may not start due to over-discharge of the battery or battery failure. A common method to solve such issue is to replace the car battery with an external battery to start the car. The common emergency power source for a car is a lead-acid battery to replace the original car battery. However, this may have a few drawbacks. The lead-acid battery itself is bulky in a relative large size, and has no polarity detection function. When the polarity of the emergency start power source connected is opposite to that of the original car battery, a large current may be generated to cause battery damage or even an explosion. In addition, as for the external lead-acid battery used as an emergency power supply for a car, it does not have a specific structural design to prevent spark generation. As a result, when it is connected, sparks may be generated at the time of connecting or disconnection. Hence, this type of battery has safety risks.

Summary of Utility Model

[0003] The present utility model provides an automobile emergency starting power source to solve the deficiencies mentioned above. The automobile emergency starting power source provided in the present utility model will not form a connected circuit when the electrodes

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of this automobile emergency starting power source is connected in an incorrect way. At the same time, when the automobile emergency starting power source of the present utility model is being connected with or disconnected from the automobile, the spark generation can be effectively prevented, and the safety is improved.

[0004] The present utility model is achieved as follows, an automobile emergency starting device comprises an internal battery, a charge input interface, a display module, a control module, a relay, an input button and output terminals, where a main contact of the relay is connected with the internal battery and the output terminals respectively, the control module comprises a microprocessor, the microprocessor controls on and off of the relay via a relay switching circuit so as to control the internal battery to output currents to the output terminals, the control module further comprises an external battery reverse connection detection circuit for providing correct or erroneous external battery connection signals. The automobile emergency starting device according to the present utility model further includes a 12V output terminal, and the 12V output terminal is connected to the internal battery.

[0005] In order to allow the display module to display the internal battery voltage, the present utility model has the following feature: the control module further includes an internal battery voltage detection circuit, and the internal battery voltage detection circuit is connected to the microprocessor via signals.

[0006] In order to allow the display module to display the external battery voltage, the control module further includes an external battery voltage detection circuit, and the external battery voltage detecting circuit is connected to the microprocessor via signals.

[0007] The automobile emergency starting device of the present utility model further comprises an LED illumination device and an LED illumination drive circuit.

[0008] For convenient use, the automobile emergency starting device of the present utility model further comprises a 5 V voltage output circuit and a 19 V voltage output circuit; the

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5 V output circuit is connected to a 5 V output terminal, and the 19V output circuit is connected to a 19 V output terminal.

[0009] The automobile emergency starting device of the present utility model adopts a built-in battery scheme, and at the same time the internal battery and the external battery are connected through a relay. Under a normal condition, the relay is in an off state, while when the device is connected with an external car battery, the device is able to detect the external battery voltage, and the detected voltage is then displayed on an LCD. At this time, the JUMP button in the input buttons is pressed to control the on and off of the relay, so that the emergency start device will not generate sparks when it is being connected. After the car is successfully jump-started, the device will shut down the relay within 2 seconds, so as to disconnect the external battery from the internal battery, accordingly the emergency starting device of the present utility model will not generate sparks when it is being disconnected, and will not has the issue that the car generator reversely charge the preset device. In addition, an external battery reverse connection detection circuit is also provided in the device. Therefore, when the polarity of the connection between an output terminal of the emergency starting device of the present utility model and the external battery is wrong, the microprocessor controls the relay to be in an off state, which can effectively prevent the large current generation caused by such wrong connection.

Brief Description of Drawings

[0010] Figure 1 is a schematic view showing the structure of the system of the present utility model.

[0011] Figure 2 is a schematic diagram of the circuit of the control module of the present utility model.

[0012] Figure 3 is a schematic diagram of the circuit of the LED illumination device of the present utility model.

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[0013] Figure 4 is a schematic diagram of the circuit of the 5 V output of the present utility model.

[0014] Figure 5 is a schematic diagram of the circuit of the 19 V output of the present utility model.

[0015] Figure 6 is a front view of the present utility model.

[0016] Figure 7 is a bottom view of the present utility model.

[0017] Figure 8 is a right view of the present utility model.

[0018] Figure 9 is a left view of the present utility model.

[0019] In the drawings: 1- internal battery, 2- relay, 3- output terminal, 4- control module, 5- display module, 6- input button, 7- LED illumination device, 8- 5 V output terminal, 9- 19 V output terminal, 10- charge input, 11- 12 V output terminal

Description of Embodiments

[0020] The present utility model will be further described in detail below with reference to the accompanying drawings and specific embodiments. However, the present invention is not limited to the following embodiments, and any changes or alternatives made on the basis of the principles of the embodiments of the present utility model fall within the scope of the present utility model.

[0021] In reference to Figures 1 to 9, an automobile emergency starting device comprises an internal battery 1, a charge input 10 interface , a display module 5, a control module 4, a relay 2, an input button 6 and output terminals 2, where a main contact of the relay 2 is connected with the internal battery 1 and the output terminals 3 respectively, the control module 4 comprises a microprocessor 42, the microprocessor 42 controls on and off of the relay 2 via a relay switching circuit 41 so as to control the internal battery 1 to output currents to the output terminals 3, the

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control module 4 further comprises an external battery reverse connection detection circuit 44 for providing correct or erroneous external battery connection signals.

[0022] In order to allow the display module 5 to display the internal battery 1 voltage, the present utility model has the following feature: the control module 4 further includes an internal battery voltage detection circuit 43, and the internal battery voltage detection circuit 43 is connected to the microprocessor 42 via signals.

[0023] In order to allow the display module 5 to display the external battery voltage, the control module 4 further includes an external battery voltage detection circuit 45, and the external battery voltage detecting circuit 45 is connected to the microprocessor 42 via signals.

[0024] The automobile emergency starting device of the present utility model further comprises an LED illumination device 7 and an LED illumination drive circuit.

[0025] For convenient use, the automobile emergency starting device of the present utility model further comprises a 5 V voltage output circuit and a 19 V voltage output circuit; the 5 V output circuit is connected to a 5 V output terminal 8, and the 19V output circuit is connected to a 19 V output terminal 9. The automobile emergency starting device of the present utility model also includes a 12V output terminal 11, and the 12V output terminal 11 is connected to the internal battery 1.

[0026] When a car cannot be started due to a failure of the built-in battery of the car, the output terminal 3 of the emergency starting device of the present utility model will be connected with an external battery, that is built-in battery of the car to be jump-started. Under normal conditions, the relay of the device is in the off state. While in the case where the output terminal 3 of the device is connected to the external battery and the polarity connection is incorrect, the external battery reverse connection detection circuit 44 sends a signal to the microprocessor 42, so that the microprocessor 42 controls the relay 2 to retain in the off state. This makes it possible to avoid a large current generation caused by such an incorrect connection. On the other hand, when the connection polarity between the output terminal 3 and the external battery are correct,

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the external battery voltage detecting circuit 45 will operates, the microprocessor 42 detects the external battery voltage, and displays the voltage on the LCD. If the external battery voltage is within the normal range, the JUMP button of the input button 6 can be pressed to make the relay 2 in the on state, so that the internal battery 1 outputs current to the car to be started through the output terminal 3. After the car is started for 2 seconds, the microprocessor 42 controls the relay 2 to switch to the off state, and then the output terminal 3 cables can be removed from the car. Since there would be no current in the output terminal 3 after the relay 2 is turned off, no spark is generated when the output cable is removed. After the car has been started and the output terminal 3 is removed, the jump-staring process of the emergency start device of the present utility model is complete.

[0027] The internal battery 1 voltage is displayed on the display module 5 by means of internal battery voltage detection circuit 43 providing a signal to the microprocessor 42 to facilitate monitoring of the battery usage status. The signal is sent to the microprocessor 42 through the external battery voltage detecting circuit 45, and the external battery voltage can be displayed on the display module 5 to facilitate learn the condition of the external battery.

[0028] In order to allow the internal battery 1 to be charged, a charge input 10 interface is further provided on the device. In addition, the device is also provided with an LED illumination device 7 for providing lighting in the case where the light intensity is insufficient. The device is also equipped with a 5 V output terminal 8, a 19 V output terminal 9 and a 12V output terminal 11. Under normal conditions, the present utility model can be used as a general power source for other devices.

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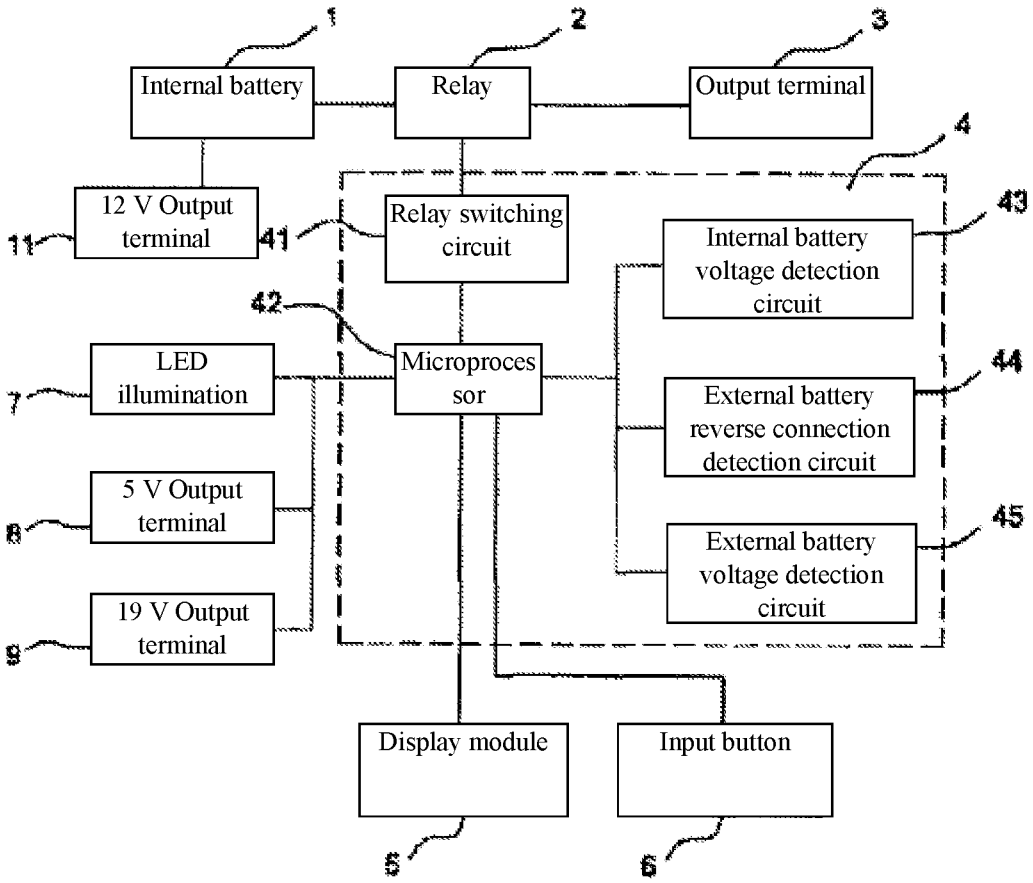


Figure 1

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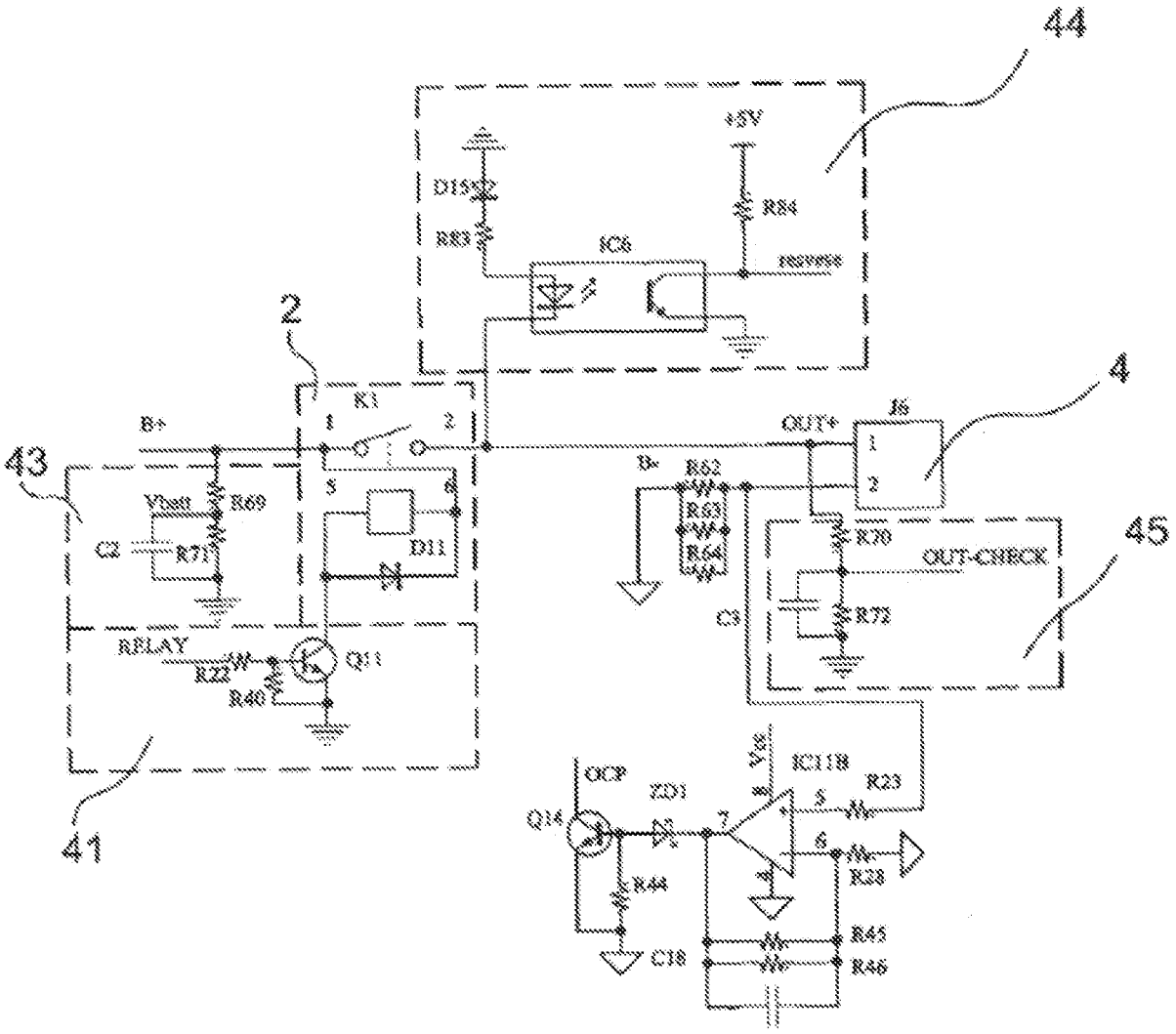


Figure 2

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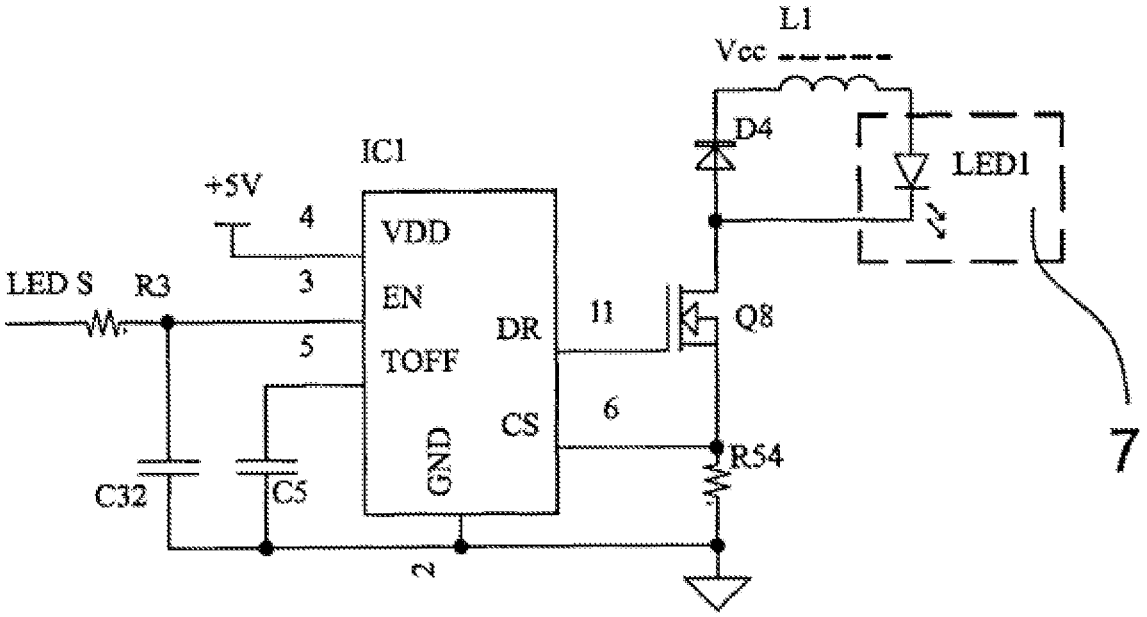


Figure 3

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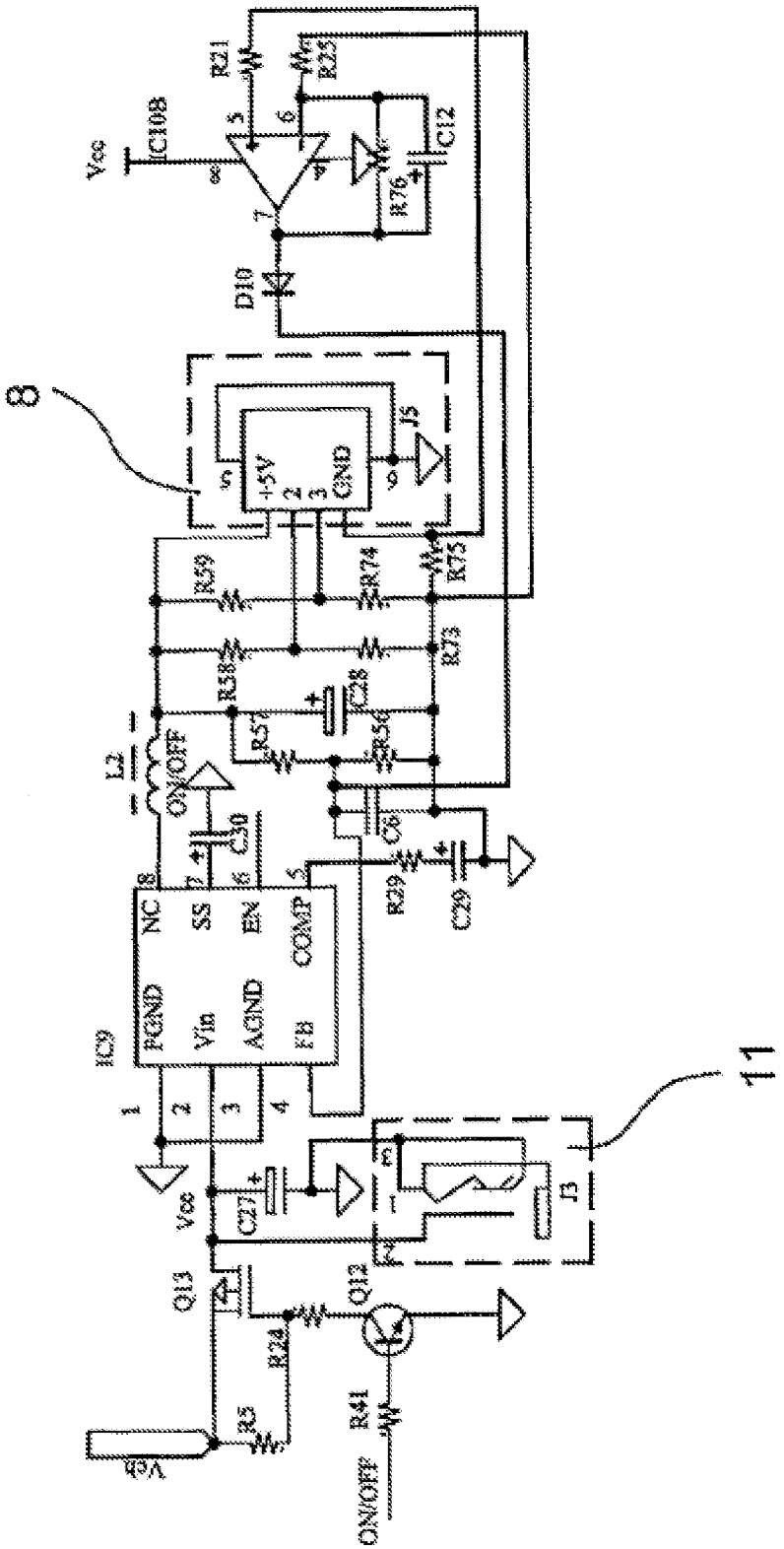


Figure 4

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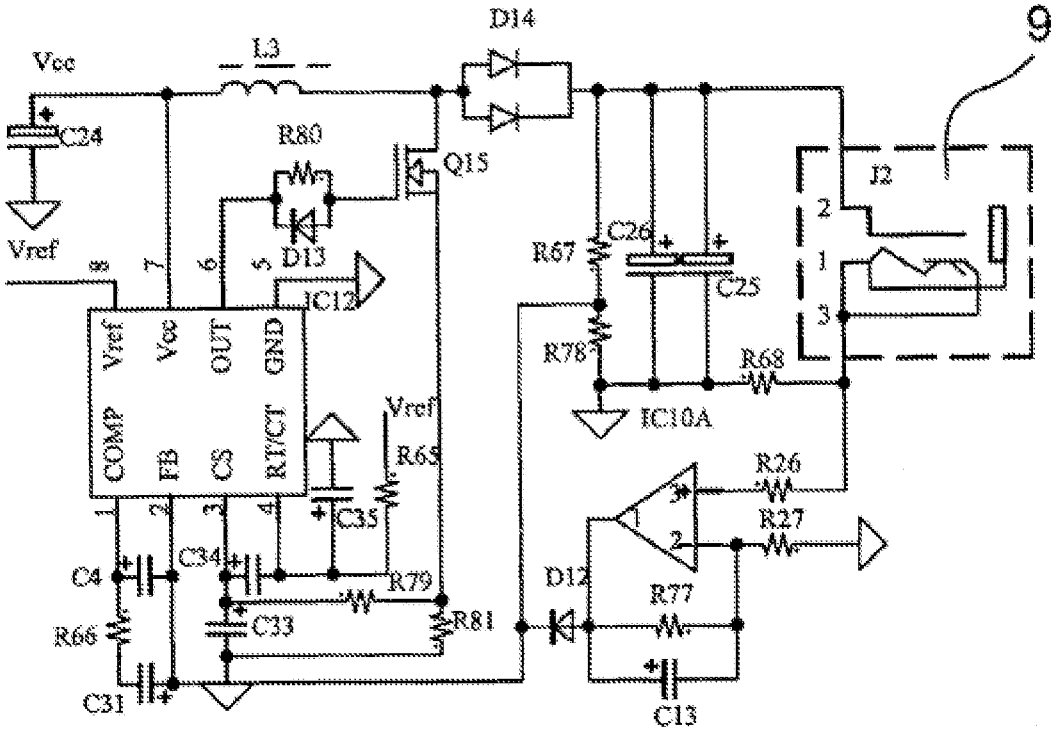


Figure 5

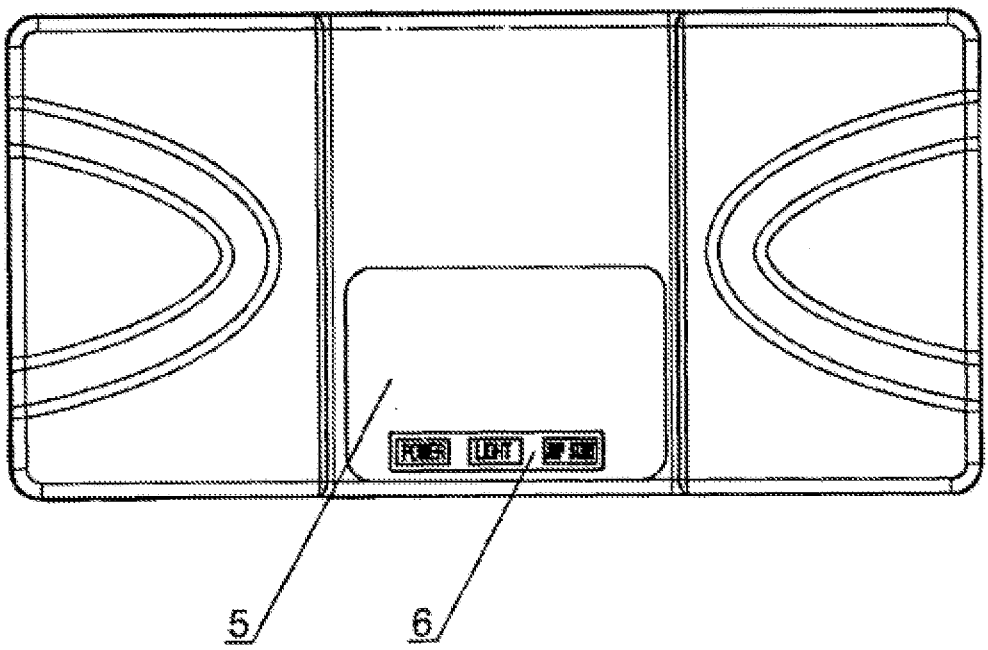


Figure 6

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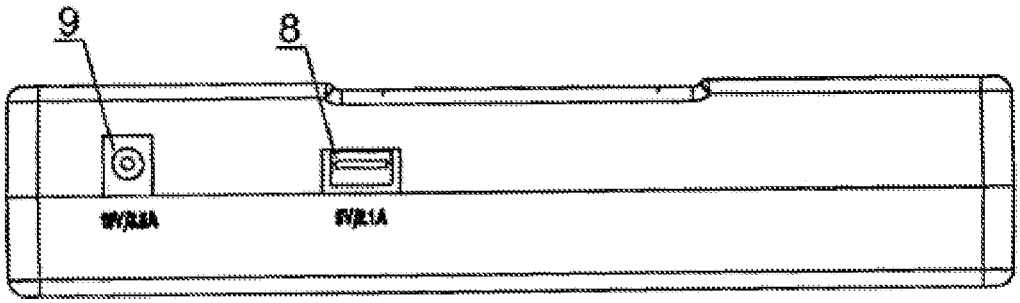


Figure 7

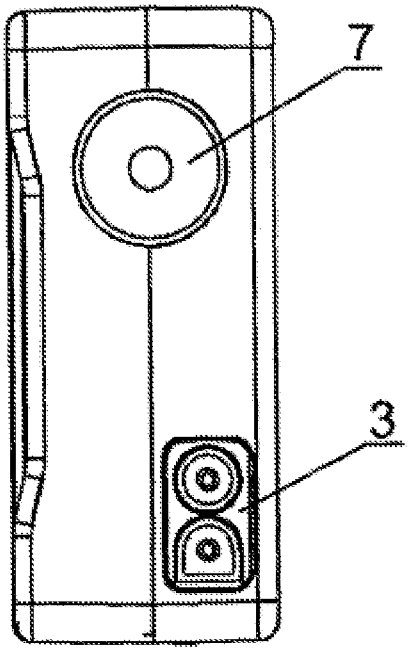


Figure 8

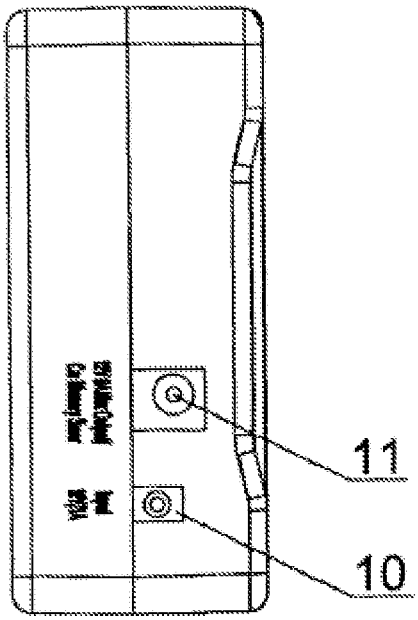


Figure 9

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DESCRIPTION CN203211234U

10 Emergency starting device for automobile

[0001]

14 Technical field

[0002]

18 The utility model relates to an automobile starting device, in particular to an automobile emergency starting device.

[0003]

23 Background technique

[0004]

27 Automobile is an indispensable means of transportation in social production.

28 Current fuel vehicles are equipped with batteries inside the car. The battery is charged by a generator during the operation of the car engine. When the car engine stops running, the battery can provide electricity for use by the car or start the engine.

31 The storage battery installed inside the car is generally a lead-acid battery.

32 After a certain number of charge and discharge cycles of lead-acid batteries, the battery capacity will become lower and lower. After long-term use, the battery may be directly scrapped. When the car is in use, the car may not be able to start due to battery over-discharge or battery failure. The common method is to replace the car battery with a separate battery to start the car. The common emergency starting power source for this kind of car is a lead-acid battery instead of the original car battery. When in use, because the lead-acid battery itself is relatively heavy and bulky, and has no polarity detection function, when the polarity of the connected

emergency starting power source is opposite to the polarity of the original car battery, a large current may be generated to make the battery It may even explode in severe cases. At the same time, such a single lead-acid battery is used as an emergency power supply for the car to start, and there is no spark-proof design when it is connected. It can generate sparks instantly when the emergency power supply is connected or disconnected. There are unsafe factors.

[0005]

46 Utility model content

[0006]

50 The utility model aims at the above-mentioned shortcomings and provides an emergency starting power supply for automobiles.

52 The utility model of the automobile emergency starting power supply will not be energized when the emergency starting power supply is connected to the power supply in the automobile circuit and the polarity of the power supply is reversed.

55 At the same time, the automobile emergency starting power supply of the utility model can effectively prevent electric sparks from being generated when it is connected to or disconnected from the automobile, and the safety is improved.

[0007]

61 The utility model is realized in this way. An automobile emergency starting device includes an internal battery, a charging input interface, a display module, a control module, a relay, an input button and an output terminal, wherein the main contact of the relay is connected to the internal battery and output terminal respectively. Terminal connection; the control module contains a microprocessor, the microprocessor controls the opening and closing of the relay through the relay switch circuit to control the internal battery to output current to the output terminal; the control module also includes an external battery for providing the correct or wrong signal of the external battery wiring Reverse connection detection circuit.

68 The automobile emergency starting device of the present invention also includes a 12V output terminal, and the 12V output terminal is connected to the internal battery.

[0008]

73 In order to enable the display module to display the internal battery voltage, it is characterized in that the control module further includes an internal battery voltage detection circuit, and the internal battery voltage detection circuit is signally connected to the microprocessor.

[0009]

79 In order to enable the display module to display the external battery voltage, the control module also includes

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an external battery voltage detection circuit, and the external battery voltage detection circuit is signally connected to the microprocessor.

[0010]

85 The automobile emergency starting device of the utility model also includes an LED lighting device and an LED lighting drive circuit.

[0011]

90 For convenient use, the automobile emergency starting device of the present invention also includes a 5V voltage output circuit and a 19V voltage output circuit; the 5V output circuit is connected to the 5V output terminal, and the 19V output circuit is connected to the 19V output terminal.

[0012]

96 The car emergency starting device of the utility model adopts a built-in battery solution, and the internal battery and the external battery are connected through a relay. Normally, the relay is in the off state. When the device is connected to the external car battery, the device will detect When the external battery voltage is reached, the voltage will be displayed on the LCD at the same time. At this time, pressing the JUMP button in the input button can control the on and off of the relay, so that the car's emergency starting device does not produce sparks when it is connected.

102 After using this device to start the car successfully, the device will switch off the electrical appliances within 2 seconds, disconnect the external battery from the internal battery, so that the car' s emergency starting device will not produce sparks when it is removed. There will be no reverse charging of the device by the car generator.

106 At the same time, the device is equipped with an external battery reverse connection detection circuit. When the output terminal of the automobile emergency starting device of the present utility model is connected to the external battery in the wrong polarity, the microprocessor controls the relay to not pull in, which can effectively prevent the polarity. Large current caused by wrong connection.

[0013]

113 Description of the drawings

[0014]

117 Figure 1 is a schematic diagram of the system structure of the utility model.

[0015]

121 Figure 2 is the circuit schematic diagram of the control module of the present invention.

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[0016]

125 Figure 3 is a schematic diagram of the circuit of the LED lighting device of the present invention.

[0017]

129 Figure 4 is a schematic diagram of the 5V output circuit of the utility model.

[0018]

133 Figure 5 is a schematic diagram of the 19V output circuit of the utility model.

[0019]

137 Figure 6 is a schematic front view of the utility model.

[0020]

141 Figure 7 is a schematic bottom view of the utility model.

[0021]

145 Figure 8 is a schematic diagram of the right side view of the utility model.

[0022]

149 Figure 9 is a schematic left view of the utility model.

[0023]

153 In the picture: 1-internal battery, 2-relay, 3-output terminal, 4-control module, 5-display module, 6-input button, 7-LED lighting device, 8-5V output terminal, 9-19V output terminal , 10-charging input, 11-12V output terminal.

[0024]

159 Detailed ways

[0025]

163 The following describes the present utility model in further detail with reference to the drawings and specific

embodiments, but the present utility model is not limited to the following embodiments. Any changes or alternatives made on the principle of this embodiment fall into the requirements of the present utility model. Within the scope of protection.

[0026]

170 With reference to Figures 1 to 9, an automobile emergency starting device includes an internal battery 1, a charging input 10 interface, a display module 5, a control module 4, a relay 2, an input button 6 and an output terminal 3, wherein the relay 2 is the main The contact contacts are respectively connected to the internal battery 1 and the output terminal 3; the control module 4 includes a microprocessor 42, which controls the opening and closing of the relay 2 through the relay switch circuit 41 to control the internal battery 1 to the output terminal 3. Output current; the control module 4 also includes an external battery reverse connection detection circuit 44 that is used to provide an external battery connection signal.

[0027]

180 In order to enable the display module 5 to display the voltage of the internal battery 1, it is characterized in that the control module 4 further includes an internal battery voltage detection circuit 43, and the internal battery voltage detection circuit 43 is in signal connection with the microprocessor 42.

[0028]

186 In order to enable the display module 5 to display the external battery voltage, the control module 4 further includes an external battery voltage detection circuit 45, and the external battery voltage detection circuit 45 is signally connected to the microprocessor 42.

[0029]

192 The automobile emergency starting device of the present invention also includes an LED lighting device 7 and an LED lighting drive circuit.

[0030]

197 For ease of use, the automobile emergency starting device of the present invention also includes a 5V voltage output circuit and a 19V voltage output circuit; the 5V output circuit is connected to the 5V output terminal 8 and the 19V output circuit is connected to the 19V output terminal 9.

200 The automobile emergency starting device of the present invention further includes a 12V output terminal 11, and the 12V output terminal 11 is connected to the internal battery 1.

[0031]

205 When the car cannot be started due to the car's own battery, the output terminal 3 of the car emergency

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starting device of the present invention is connected to the external battery, that is, the car's own battery to be started.

208 Normally, the relay is in the off state. If the output terminal 3 is connected to the external battery with wrong polarity, the external battery reverse connection detection circuit 44 provides a signal to the microprocessor 42 so that the microprocessor 42 can control the relay 2 not to suck. It can avoid the large current caused by wrong polarity connection.

212 If the output terminal 3 and the external battery have the correct polarity and the external battery voltage detection circuit 45 works, the microprocessor 42 will detect the external battery voltage and display this voltage on the LCD. If the external battery voltage is within the normal range, then You can press the JUMP button in the input button 6 to turn on the relay 2 so that the internal battery 1 outputs current to the vehicle to be started through the output terminal 3.

217 When the car is started for 2 seconds, the microprocessor 42 will control the relay 2 to disconnect, so as to remove the output terminal 3 wiring.

219 Since there is no current in output terminal 3 after relay 2 is off, no spark will be generated when it is removed.

220 When the car has been started and the output terminal 3 is disconnected, the work of the car emergency starting device of the present invention is completed.

[0032]

225 The internal battery voltage detection circuit 43 provides signals to the microprocessor 42 to display the voltage of the internal battery 1 on the display module 5 to facilitate monitoring of the battery usage status.

227 The signal provided by the external battery voltage detection circuit 45 to the microprocessor 42 can display the external battery voltage on the display module 5 to facilitate the understanding of the external battery condition.

[0033]

233 In order to allow the internal battery 1 to be charged, a charging input 10 interface is provided on the device.

234 At the same time, the device is also provided with an LED lighting device 7 to facilitate lighting when the light intensity is insufficient.

236 The device is also equipped with 5V output terminal 8 and 19V output terminal 9 and 12V output terminal 11, which can be used as a general power supply for other electrical equipment.

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CLAIMS CN203211234U

1.

13 An emergency starting device for an automobile, comprising an internal battery (1), a charging input (10) interface, a display module (5), a control module (4), a relay (2), an input button (6) and an output terminal (3), It is characterized in that the main contacts of the relay (2) are respectively connected with the internal battery (1) and the output terminal (3); the control module (4) contains a microprocessor (42), and the microprocessor (42) passes The relay switch circuit (41) controls the opening and closing of the relay (2) to control the internal battery (1) to output current to the output terminal (3); the control module (4) also includes the external battery reverse connection for providing the correct or false signal of the external battery wiring Detection circuit (44).

2.

24 The automobile emergency starting device according to claim 1, characterized in that the control module (4) further comprises an internal battery voltage detection circuit (43), the internal battery voltage detection circuit (43) and the microprocessor (42)) Signal connection.

3.

30 The automobile emergency starting device according to claim 1, characterized in that the control module (4) further comprises an external battery voltage detection circuit (45), the external battery voltage detection circuit (45) and the microprocessor (42)) Signal connection.

4.

36 The automobile emergency starting device according to claim 1, characterized in that the device also includes an LED lighting device (7) and an LED lighting drive circuit.

5.

41 The automobile emergency starting device according to any one of claims 1 to 4, characterized in that the device further includes a 5V voltage output circuit and a 19V voltage output circuit; the 5V output circuit is connected to the 5V output terminal (8), and the 19V output The circuit is connected to the 19V output terminal (9).

6.

48 The automobile emergency starting device according to any one of claims 1 to 4, characterized in that the device further comprises a 12V output terminal (11), and the 12V output terminal is connected to an internal battery (1).

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(19)中华人民共和国国家知识产权局

(12)实用新型专利

(10)授权公告号 CN 203211234 U
(45)授权公告日 2013.09.25

(21)申请号 201320217854.6

(22)申请日 2013.04.26

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(51)Int.Cl.
B60R 16/033(2006.01)

(ESM)同样的发明创造已同日申请发明专利

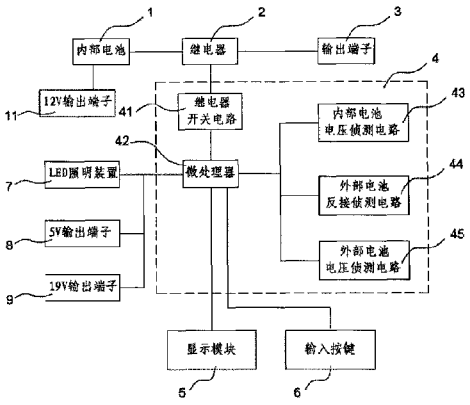
权利要求书1页 说明书3页 附图6页

(54)实用新型名称

一种汽车应急启动装置

(57)摘要

本实用新型涉及一种汽车启动装置，具体涉及一种汽车应急启动装置。本实用新型包括内部电池，充电输入接口，显示模块，控制模块，继电器，输入按键和输出端子，其中所述继电器主触点分别与内部电池和输出端子连接；控制模块中包含微处理器，所述微处理器通过继电器开关电路控制继电器开合用以控制内部电池向输出端子输出电流；还包括用于提供外部电池接线正误信号的外部电池反接侦测电路。本装置内部电池与外部电池通过继电器接入，在通常情况和汽车启动成功后继电器处于关断状态，使本装置在接入与取下时不产生火花。同时输出端子与外部电池相连接的极性接错时，微处理器控制继电器不吸合，可防止极性接错而产生的大电流。



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1. 一种汽车应急启动装置，包括内部电池 (1)，充电输入 (10) 接口，显示模块 (5)，控制模块 (4)，继电器 (2)，输入按键 (6) 和输出端子 (3)，其特征是所述继电器 (2) 主触点分别与内部电池 (1) 和输出端子 (3) 连接；控制模块 (4) 中包含微处理器 (42)，所述微处理器 (42) 通过继电器开关电路 (41) 控制继电器 (2) 开合用以控制内部电池 (1) 向输出端子 (3) 输出电流；控制模块 (4) 中还包括用于提供外部电池接线正误信号的外部电池反接侦测电路 (44)。

2. 根据权利要求 1 所述的汽车应急启动装置，其特征是控制模块 (4) 中还包括内部电池电压侦测电路 (43)，所述内部电池电压侦测电路 (43) 与微处理器 (42) 信号连接。

3. 根据权利要求 1 所述的汽车应急启动装置，其特征是控制模块 (4) 中还包括外部电池电压侦测电路 (45)，所述外部电池电压侦测电路 (45) 与微处理器 (42) 信号连接。

4. 根据权利要求 1 所述的汽车应急启动装置，其特征是所述装置内还包括 LED 照明装置 (7) 和 LED 照明驱动电路。

5. 根据权利要求 1 到 4 任一所述的汽车应急启动装置，其特征是所述装置内还包括 5V 电压输出电路和 19V 电压输出电路；5V 输出电路与 5V 输出端子 (8) 相连接，19V 输出电路与 19V 输出端子 (9) 相连接。

6. 根据权利要求 1 到 4 任一所述的汽车应急启动装置，其特征是所述装置内还包括 12V 输出端子 (11)，所述 12V 输出端了与内部电池 (1) 连接。

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一种汽车应急启动装置

技术领域

[0001] 本实用新型一种汽车启动装置，具体涉及一种汽车应急启动装置。

背景技术

[0002] 汽车是社会生产中不可缺少的一种交通运输工具。目前的燃油汽车都在汽车内部设置蓄电池，汽车发动机在运转过程中通过发电机对蓄电池进行充电，当汽车发动机停止运转时，可以由蓄电池提供电力供应汽车使用或使发动机启动。汽车内部所设置的蓄电池一般为铅酸电池。铅酸电池在经过一定次数的充放电循环后会电池容量越变越低。经过长期使用还可能使电池直接报废。当汽车在使用过程中，可能会由于电池过放电或电池失效而使汽车无法启动。常见的方法是用一个单独的蓄电池替换汽车蓄电池，使汽车启动，常见的这种汽车应急启动电源是铅酸电池代替原汽车蓄电池。在使用的时候，由于铅酸电池自身比较笨重，体积庞大，同时也没有极性检测功能，当接入的应急启动电源极性和原汽车蓄电池极性相反时可能会产生很大的电流使蓄电池损坏，严重时甚至会发生爆炸。同时这样的单独铅酸电池作为汽车启动应急电源，在接入的时候也没有防火花设计，可以在接入或断开应急电源瞬间产生火花，存在不安全因素。

实用新型内容

[0003] 本实用新型针对上述不足之处而提供的一种汽车应急启动电源。本实用新型的汽车应急启动电源，当应急启动电源接入汽车电路中电源极性接反时不与通电。同时本实用新型的汽车应急启动电源接入或断开与汽车连接时可有效防止电火花产生，提高了安全性。

[0004] 本实用新型是这样实现的，一种汽车应急启动装置，包括内部电池，充电输入接口，显示模块，控制模块，继电器，输入按键和输出端子，其中所述继电器主触点分别与内部电池和输出端子连接；控制模块中包含微处理器，所述微处理器通过继电器开关电路控制继电器开合用以控制内部电池向输出端子输出电流；控制模块中还包括用于提供外部电池接线正误信号的外部电池反接侦测电路。本实用新型的汽车应急启动装置内还包括 12V 输出端子，所述 12V 输出端子与内部电池连接。

[0005] 为使显示模块可以显示内部电池电压，其特征是控制模块中还包括内部电池电压侦测电路，所述内部电池电压侦测电路与微处理器信号连接。

[0006] 为使显示模块可以显示外部电池电压，控制模块中还包括外部电池电压侦测电路，所述外部电池电压侦测电路与微处理器信号连接。

[0007] 本实用新型的汽车应急启动装置，还包括 LED 照明装置和 LED 照明驱动电路。

[0008] 为方便使用，本实用新型的汽车应急启动装置内还包括 5V 电压输出电路和 19V 电压输出电路；5V 输出电路与 5V 输出端子相连接，19V 输出电路与 19V 输出端子相连接。

[0009] 本实用新型的汽车应急启动装置，采用内置电池方案，同时内部电池与外部电池通过继电器接入，通常情况下继电器处于关断状态，当本装置与外部汽车电池相连接时，本

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装置将侦测到外部电池电压，同时会将此电压显示在 LCD 上，此时，按动输入按键中的 JUMP 按键可以控制继电器的通断，使本汽车应急启动装置在接入时不产生火花。应用本装置成功启动汽车后，本装置将在 2 秒钟之内关断续电器，使外部电池与内部电池断开连接，使本汽车应急启动装置在移开时也不会产生火花，同时也不会产生汽车发电机给本装置反向充电之情形。同时本装置内部设置有外部电池反接侦测电路，当本实用新型的汽车应急启动装置输出端子与外部电池相连接的极性接错时，微处理器控制继电器不吸合，可有效防止极性接错而产生的大电流。

附图说明

[0010] 图 1 为本实用新型系统结构示意图。

[0011] 图 2 为本实用新型控制模块电路原理图。

[0012] 图 3 为本实用新型 LED 照明装置电路原理图。

[0013] 图 4 为本实用新型 5V 输出电路原理图。

[0014] 图 5 为本实用新型 19V 输出电路原理图。

[0015] 图 6 为本实用新型的主视示意图。

[0016] 图 7 为本实用新型的仰视示意图。

[0017] 图 8 为本实用新型的右视示意图。

[0018] 图 9 为本实用新型的左视示意图。

[0019] 附图中 :1- 内部电池，2- 继电器，3- 输出端子，4- 控制模块，5- 显示模块，6- 输入按键，7-LED 照明装置，8-5V 输出端子，9-19V 输出端子，10- 充电输入，11-12V 输出端子。

具体实施方式

[0020] 下面结合附图和具体实施例对本实用新型作进一步详细说明，但本实用新型并不限于下述实施方式，任何在本实施例原理上所做的改变或替代方案，均落入本实用新型要求保护的范围之中。

[0021] 结合附图 1 到图 9，一种汽车应急启动装置，包括内部电池 1，充电输入 10 接口，显示模块 5，控制模块 4，继电器 2，输入按键 6 和输出端子 3，其中所述继电器 2 主触点触头分别与内部电池 1 和输出端子 3 连接 ；控制模块 4 中包含微处理器 42，所述微处理器 42 通过继电器开关电路 41 控制继电器 2 开合用以控制内部电池 1 向输出端子 3 输出电流 ；控制模块 4 中还包括用于提供外部电池接线正误信号的外部电池反接侦测电路 44。

[0022] 为使显示模块 5 可以显示内部电池 1 电压，其特征是控制模块 4 中还包括内部电池电压侦测电路 43，所述内部电池电压侦测电路 43 与微处理器 42 信号连接。

[0023] 为使显示模块 5 可以显示外部电池电压，控制模块 4 中还包括外部电池电压侦测电路 45，所述外部电池电压侦测电路 45 与微处理器 42 信号连接。

[0024] 本实用新型的汽车应急启动装置，还包括 LED 照明装置 7 和 LED 照明驱动电路。

[0025] 为方便使用，本实用新型的汽车应急启动装置内还包括 5V 电压输出电路和 19V 电压输出电路 ；5V 输出电路与 5V 输出端子 8 相连接，19V 输出电路与 19V 输出端子 9 相连接。本实用新型的汽车应急启动装置内还包括 12V 输出端子 11，所述 12V 输出端子 11 与内部电池 1 连接。

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[0026] 当汽车由于汽车自带电池原因不能启动时，把本实用新型的汽车应急启动装置输出端子 3 与外部电池即待启动汽车自带电池相连接。通常情况下继电器处于关断状态，如果输出端子 3 与外部电池连接时极性有误，通过外部电池反接侦测电路 44 提供信号到微处理器 42，使微处理器 42 控制继电器 2 不能吸合从而可以避免因极性接错而产生的大电流。如果输出端子 3 与外部电池极性正确，外部电池电压侦测电路 45 工作，微处理器 42 会检测出外部电池电压，同时会将此电压显示在 LCD 上，如果外部电池电压在正常范围，则可以按动输入按键 6 中的 JUMP 按键使继电器 2 吸合，以便内部电池 1 通过输出端子 3 向待启动汽车输出电流。当汽车启动 2 秒后，微处理器 42 会控制继电器 2 断开，以便取下输出端子 3 接线。由于继电器 2 断开后输出端子 3 中没有电流，所以在取下时不会产生火花。当汽车已启动且取下输出端子 3 接线后，本实用新型的汽车应急启动装置工作完成。

[0027] 通过内部电池电压侦测电路 43 提供给微处理器 42 信号，可以在显示模块 5 上显示出内部电池 1 电压，以方便对电池使用状态进行监控。通过外部电池电压侦测电路 45 提供给微处理器 42 信号，可以在显示模块 5 上显示出外部电池电压，以方便了解外部电池情况。

[0028] 为了让内部电池 1 可以充电，在本装置上设置有充电输入 10 接口。同时本装置上还设置有 LED 照明装置 7，以方便光线强度不够时用作照明。本装置上还设置了 5V 输出端子 8 和 19V 输出端子 9 以及 12V 输出端子 11，在平时可以当一般电源供其它用电设备使用。

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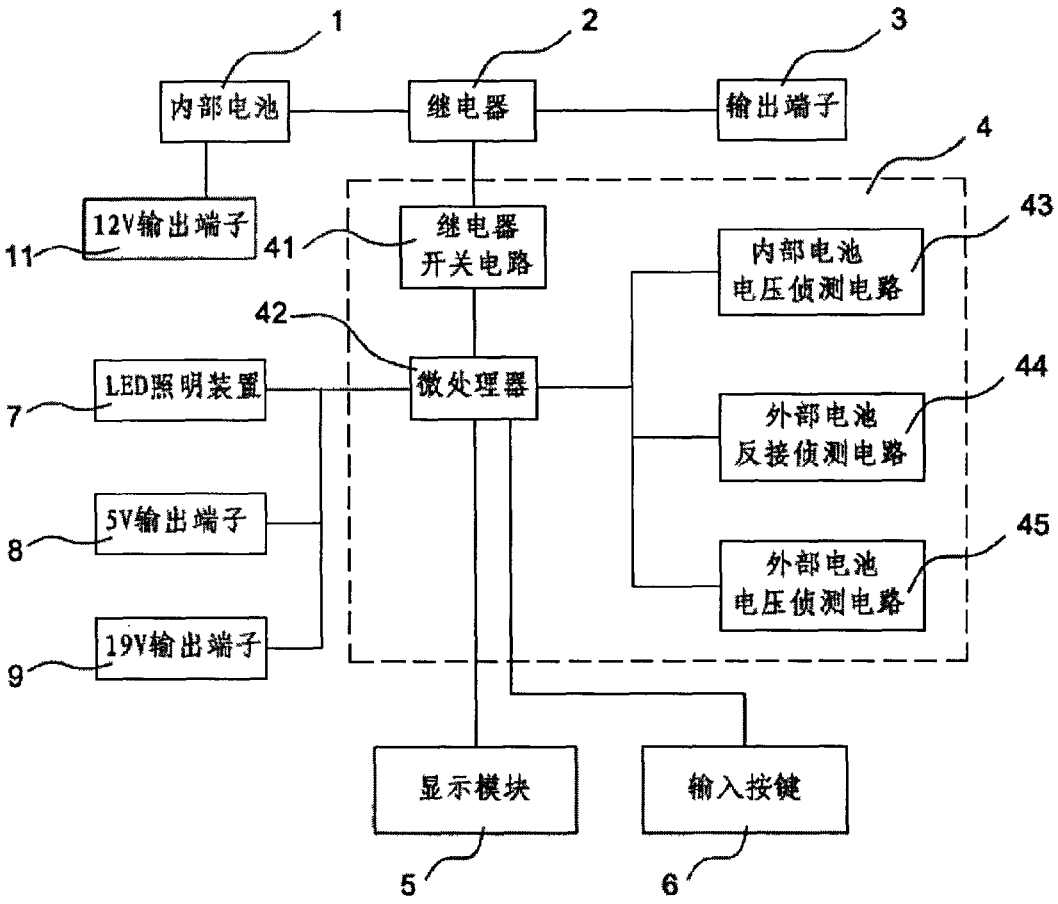


图 1

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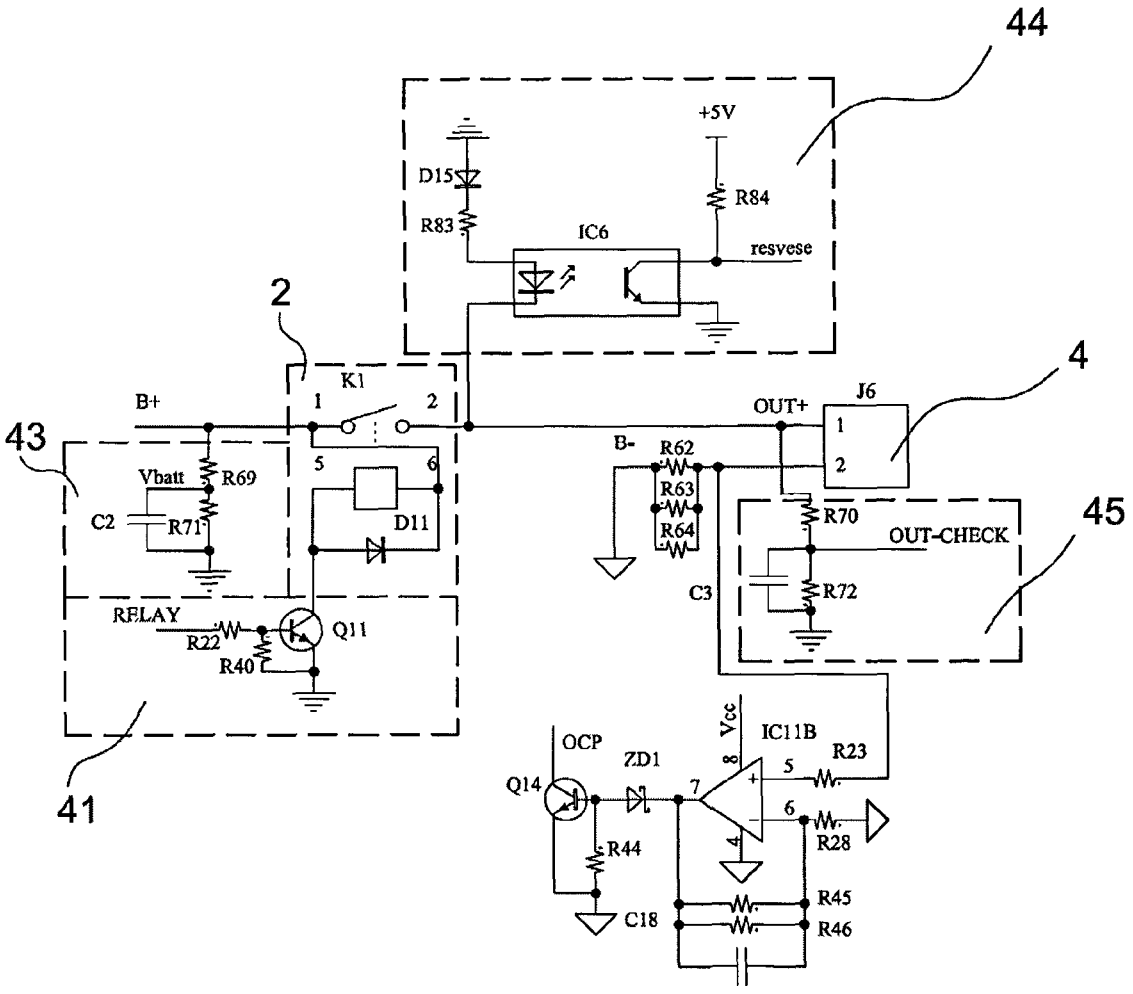


图 2

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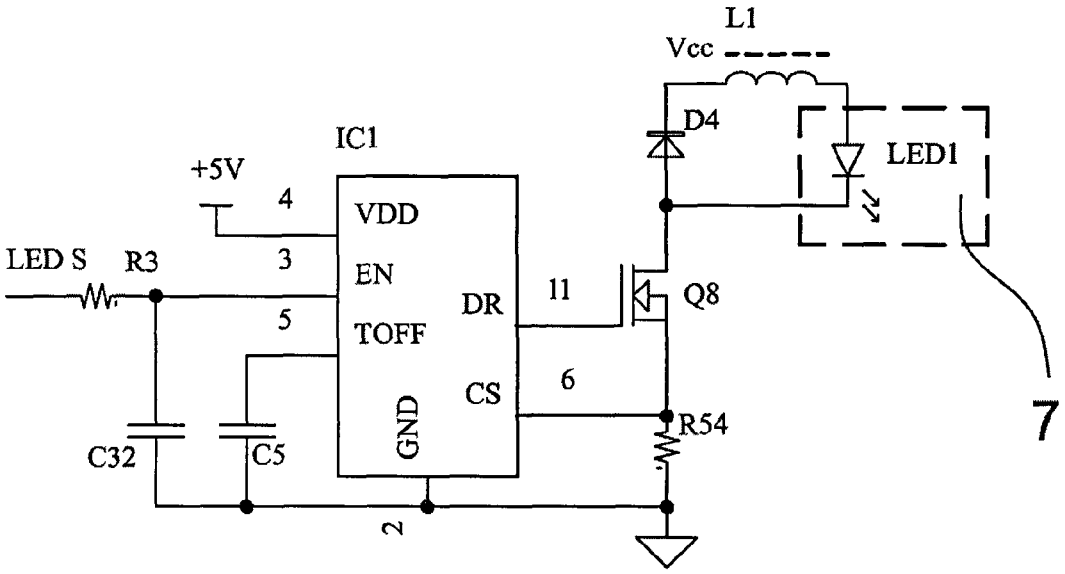


图 3

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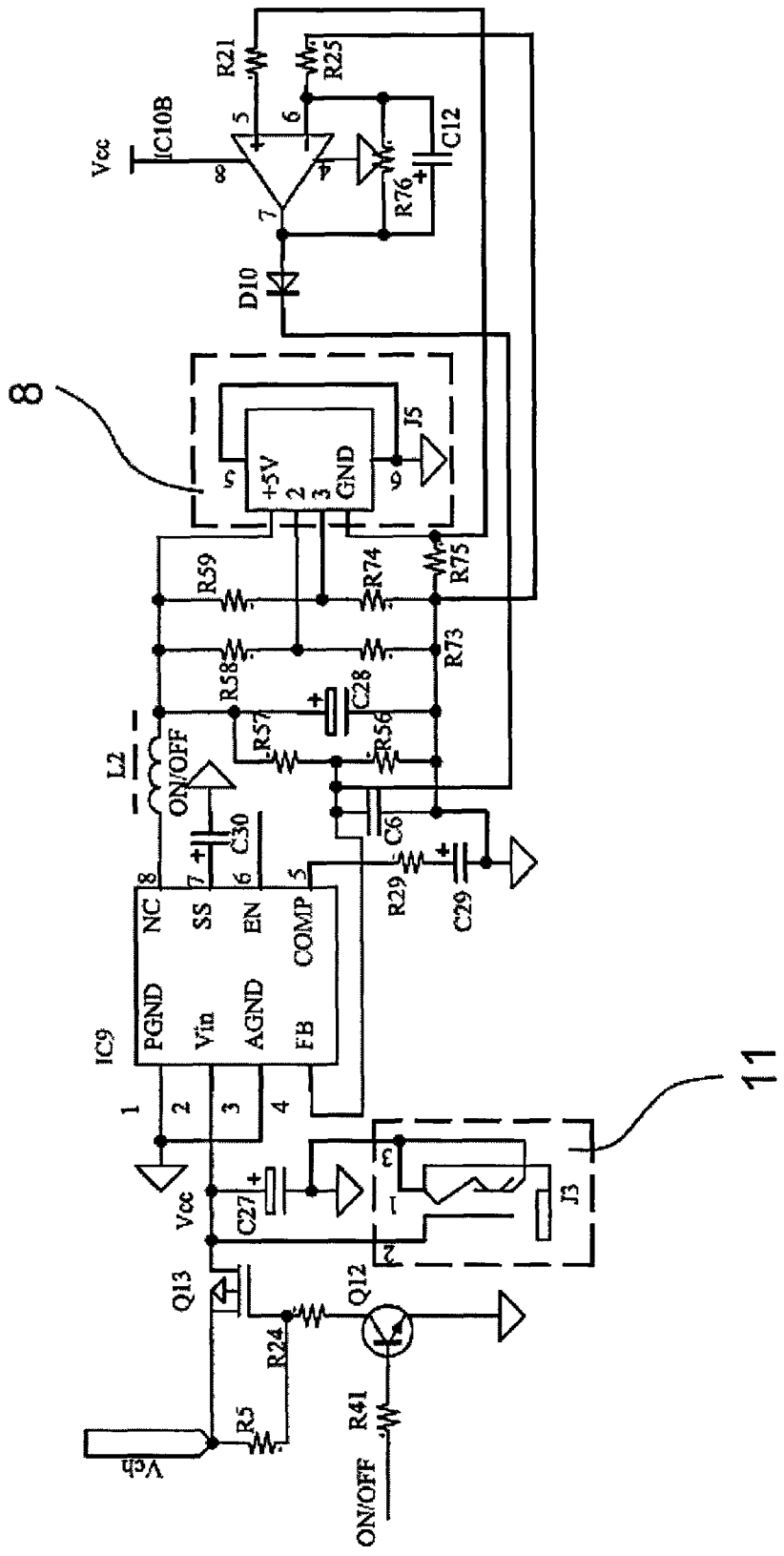


图 4

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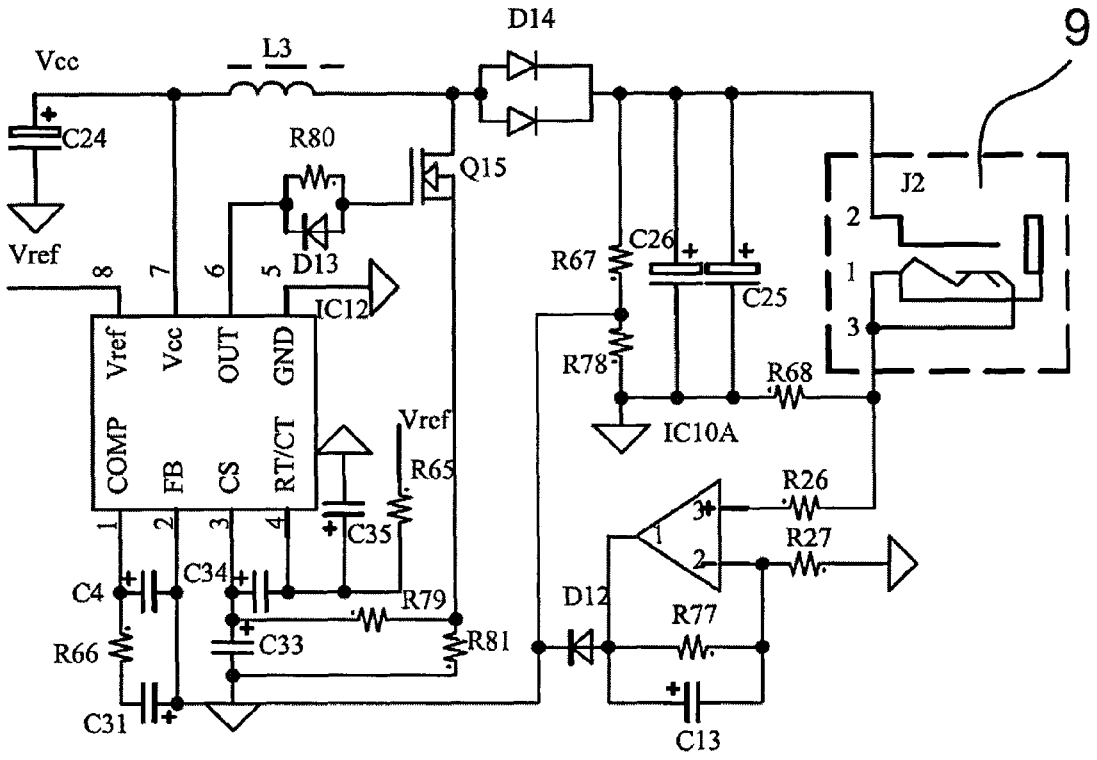


图 5

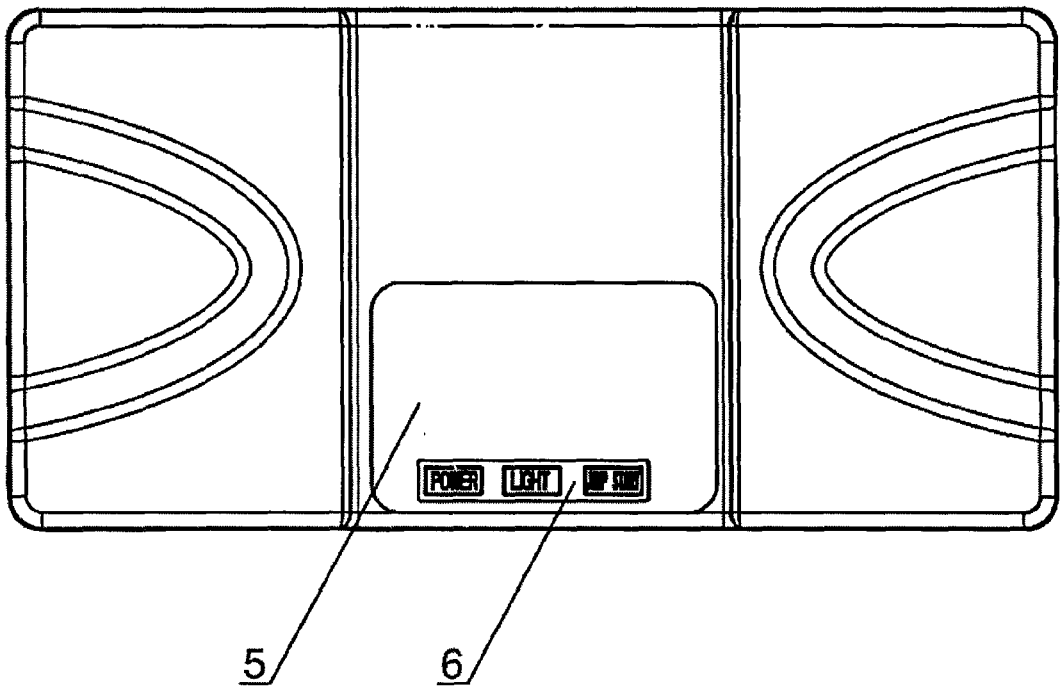


图 6

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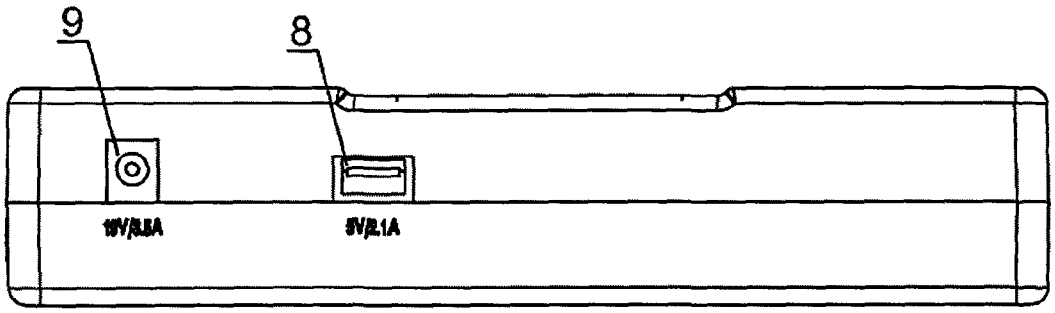


图 7

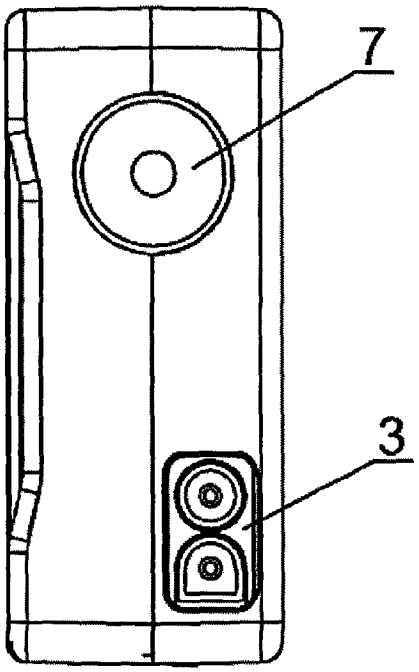


图 8

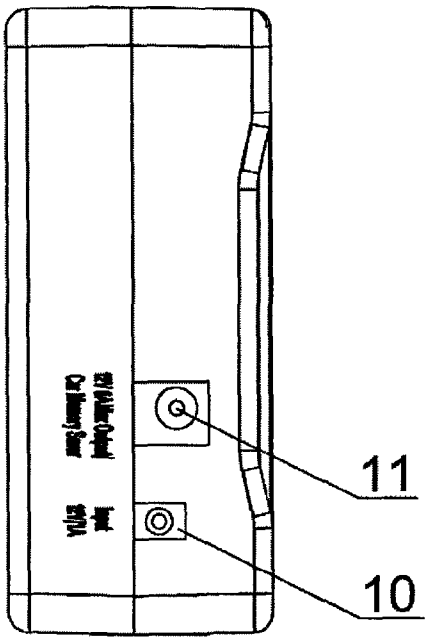


图 9

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Espacenet

JP2015115979A VEHICULAR AUXILIARY POWER FEEDER

Applicants: ASIA BRIGHT IND HONG KONG CO LTD,SFJ CORP

Inventors: TODA AKIRA

Classifications:
IPC ***B60R16/03; H02H7/18; H02J7/00;***

Priorities: JP2013254061A 2013-12-09

Application: JP2015115979A·2013-12-09

Publication: JP2015115979A·2015-06-22

Published as: JP2015115979A

VEHICULAR AUXILIARY POWER FEEDER

Abstract

PROBLEM TO BE SOLVED: To shorten reaction time of disconnecting a current of a protective circuit in a vehicular auxiliary power feeder.SOLUTION: In a control circuit part 4, when a first detection part 1b detects that a vehicular auxiliary power feeder 100 has approached the abnormal state, the gate voltage of a first MOSFET 1a is controlled to disconnect a current path between an input terminal 20 and a lithium ion storage battery 2 using the first MOSFET 1a, and when a second detection part 3b detects that the vehicular auxiliary power feeder 100 has approached the abnormal state, the gate voltage of a second MOSFET 3a is controlled to disconnect the current path between the lithium ion storage battery 2 and an output terminal 31 using the second MOSFET 3a.

(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2015-115979
(P2015-115979A)
(43)公開日　平成27年6月22日(2015.6.22)

(51) Int.Cl.			F I			テーマコード（参考）
H02J	7/00	(2006.01)	H02J	7/00	S	5G053
H02H	7/18	(2006.01)	H02H	7/18		5G503
B60R	16/03	(2006.01)	B60R	16/02	670V	

審査請求 未請求　請求項の数 3　OL　（全 14 頁）

(21)出願番号　特願2013-254061 (P2013-254061)
(22)出願日　平成25年12月9日 (2013.12.9)

(71)出願人　505468956
ＳＦＪ株式会社
千葉県浦安市千鳥１２－１

最終頁に続く

(54)【発明の名称】車両用補助給電装置

(57)【要約】
【課題】車両用補助給電装置の保護回路の電流切断の反応時間を短縮する。
【解決手段】制御回路部４は、第１の検出部１ｂにより、車両用補助給電装置１００が異常状態に近づいたと検出された場合、第１のＭＯＳＦＥＴ１ａのゲート電圧を制御して、第１のＭＯＳＦＥＴ１ａにより、入力端子２０とリチウムイオン蓄電池２との間の電流経路を遮断し、第２の検出部３ｂにより、車両用補助給電装置１００が異常状態に近づいたと検出された場合、第２のＭＯＳＦＥＴ３ａのゲート電圧を制御して、第２のＭＯＳＦＥＴ３ａにより、リチウムイオン蓄電池２と出力端子３１との間の電流経路を遮断する。
【選択図】図３

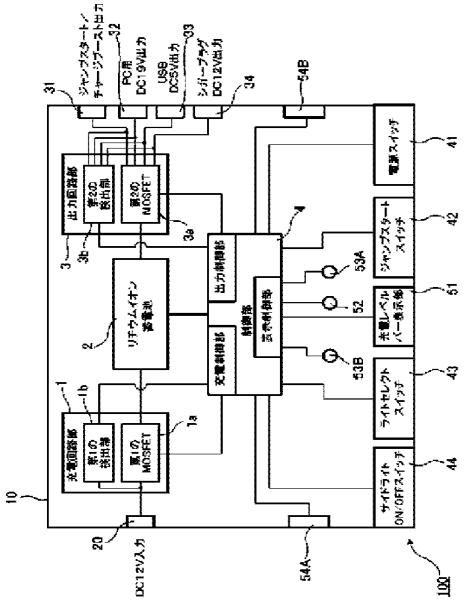


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