

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN MEDiatek TONG TECHNOLOGY CO., LTD.,
Petitioner,

v.

THE NOCO COMPANY
Patent Owner.

IPR2020-01387
Patent 9,007,015 B1

Before JAMESON LEE, DAVID C. McKONE, and
JASON M. REPKO, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

II. INTRODUCTION

A. *Background and Summary*

Shenzhen Mediatek Tong Technology Co., Ltd. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–3, 5, 8–17, 19–21, and 23 (“challenged claims”) of U.S. Patent No. 9,007,015 B1 (Ex. 1001, “the ’015 Patent”). The Noco Company (“Patent Owner”) filed a Preliminary Response (Paper 5, “Prelim. Resp.”). Petitioner filed a Reply. Paper 7. Patent Owner filed a Sur-Reply. Paper 8.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Further, a decision to institute may not institute on fewer than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). After considering the evidence and arguments presented by the parties, we determine that Petitioner has not shown a reasonable likelihood of prevailing on at least 1 of the challenged claims.

Accordingly, the Petition is denied, and no *inter partes* review is instituted.

B. *Real Parties-in-Interest*

Each party identifies itself as the only real party-in-interest. Pet. 57; Paper 3, 1.

C. *Related Matters*

The parties identify multiple district court litigation involving the ’015 patent, in United States District Courts for the Northern District of Ohio, the Southern District of Ohio, the Northern District of California, the Central District of California, and the Middle District of Florida. Pet. 57; Paper 3, 1–2. Petitioner

is a named defendant in *The NOCO Company v. Shenzhen Mediatek Tong Technology Co. Ltd. et al.*, Case No. 1:19-cv-01855 (N.D. Ohio). Pet. 57. Patent Owner also identifies IPR2018-00503 and IPR2020-00944 as a proceedings involving petitions for *inter partes* review of claims in the '015 patent. Paper 3, 2–3. Petitioner was not the petitioner in either of those proceedings. The Board declined institution in IPR2018-00503 on July 11, 2018. IPR2018-00503, Paper 9. The Board instituted *inter partes* review on claims 1–23 of the '015 patent in IPR2020-00944 on November 12, 2020. IPR2020-00944, Paper 20.

D. The '015 Patent

The '015 patent is titled “Portable Vehicle Battery Jump Start Apparatus with Safety Protection.” Ex. 1001, code (54). It discloses an apparatus for jump starting a vehicle engine, which apparatus includes an internal power supply, an output port having positive and negative polarity outputs, a “vehicle battery isolation sensor” to detect presence of a vehicle battery connected between the positive and negative polarity outputs, a “reverse polarity sensor” to detect the polarity of the vehicle battery connected between the positive and negative outputs, a power FET switch connected between the internal power supply and the output port, and a microcontroller which receives input signals from the vehicle battery isolation sensor and the reverse polarity sensor and provides an output signal to the power FET switch. *Id.* at 3:16–30. The '015 patent describes that the power FET switch is turned on by the microcontroller to connect the internal power supply to the output port in response to signals from the two sensors indicating the presence of a vehicle battery at the output port and proper polarity connection of positive and negative terminals of the vehicle battery with the positive and negative polarity outputs. *Id.* at 3:31–36.

Figure 1 of the '015 patent is a functional block diagram of the disclosed apparatus and is reproduced below.

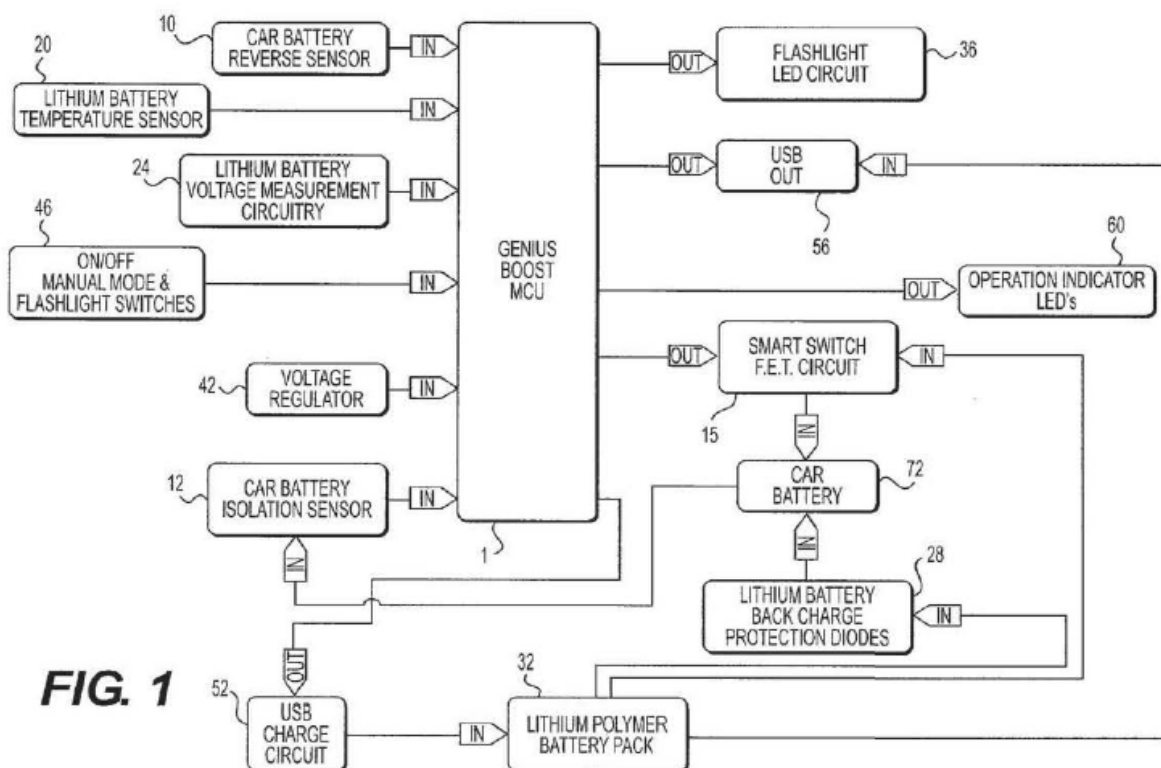


Figure 1 is a functional block diagram of a handheld vehicle battery boost apparatus according to the '015 patent. *Id.* at 3:50–52.

The apparatus includes, *inter alia*, lithium polymer battery pack 32, car battery isolation sensor 12, car battery reverse [polarity] sensor 10, smart switch FET circuit 15, and programmable microcontroller unit (MCU) 1. *Id.*, cols. 3–4. Reverse polarity sensor 10 “monitors the polarity of the vehicle battery 72 when the handheld battery booster device is connected to the vehicle’s electric system.” *Id.* at 4:20–22. Car battery isolation sensor 12 “detects whether or not a vehicle battery 72 is connected to the booster device.” *Id.* at 4:26–28. 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).” *Id.* at 4:32–38.

Figure 2A-4 of the '015 patent, reproduced below, discloses preferred embodiments of the vehicle isolation sensor 12 and the reverse polarity sensor 10.

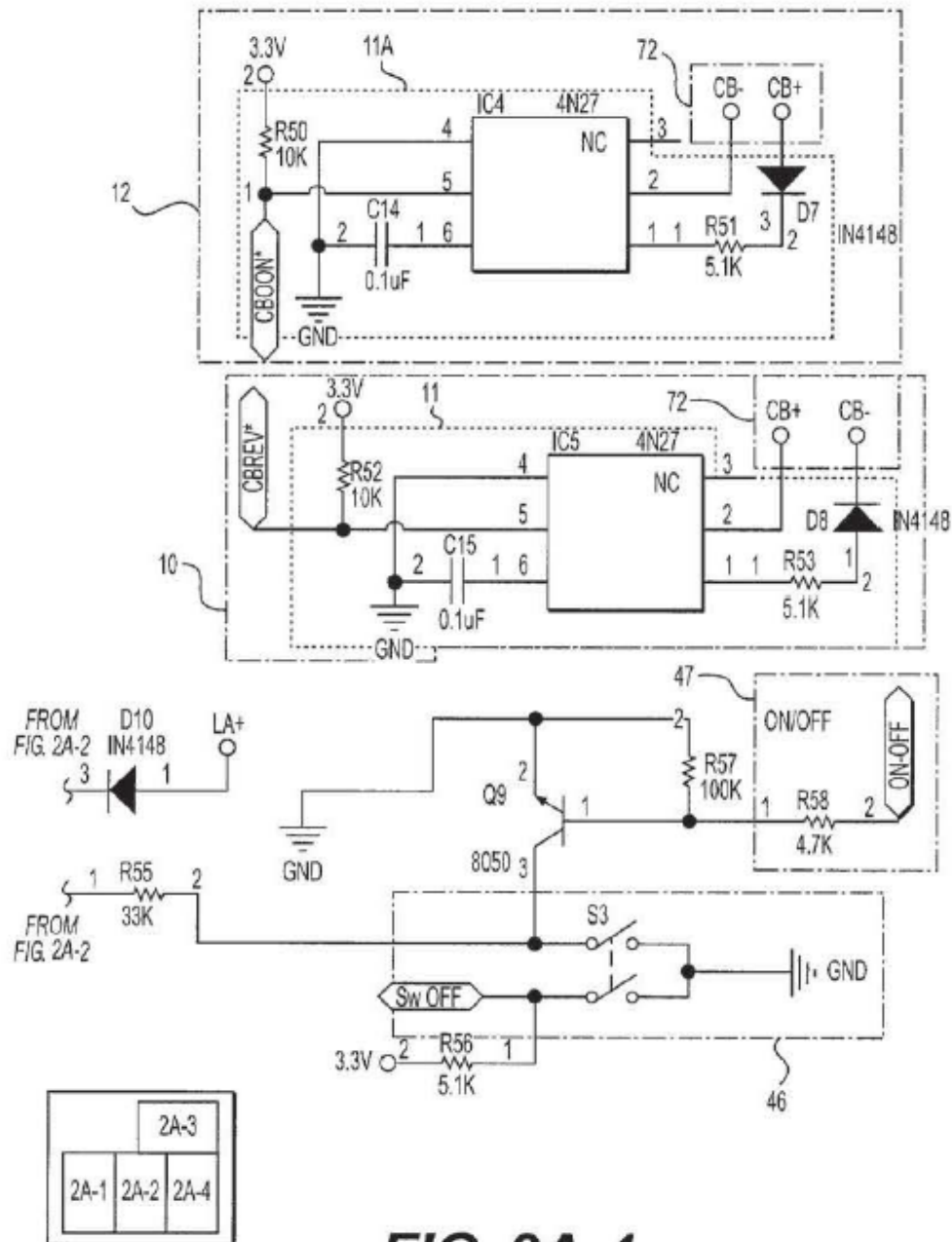


FIG. 2A-4

Id., Fig. 2A-4. Figure 2A-4, above, is a schematic circuit diagram depicting elements of an exemplary embodiment of a handheld vehicle battery boost apparatus. *E.g.*, *id.* at 3:53–55. Element 12 of Fig. 2A-4 is a preferred embodiment of the vehicle isolation sensor and comprises optocoupler LED 11A that, “if the battery 72 is connected to the terminals of the booster device with the correct polarity,” will conduct current, “and is therefore turned on, . . . indicating the presence of a battery across the jumper output terminals of the handheld booster device.” *Id.* at 5:26–36. Element 10 of Fig. 2A-4 is a preferred embodiment of the reverse polarity sensor and comprises optocoupler LED 11 that, “if the battery 72 is connected to the terminals of the booster device with the correct polarity,” will not conduct current, “and is therefore turned off.” *Id.* at 5:17–24.

The '015 patent explains:

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[ing] sparking/short circuiting of the lithium battery pack.

Id. at 5:37–54.

Claim 1, reproduced below with bracketed letters added consistent with the labeling used in Petition, is the sole independent claim and is illustrative of the challenged claims (paragraph break added at limitation [g]).

1. [P] Apparatus for jump starting a vehicle engine, comprising:
 - [A] an internal power supply;
 - [B] an output port having positive and negative polarity outputs;
 - [C] 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;
 - [D] 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;
 - [E] a power switch connected between said internal power supply and said output port; and
 - [F] 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,
 - [G] 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.

Id. at 8:4–37.

E. Evidence

Petitioner relies on the following evidence:¹

References		Date	Exhibit
Richardson	US Pub. App. 2009/0174362 A1	Published July 9, 2009; filed Dec, 9, 2008	Ex. 1010
USB	Battery Charging Specification, Rev. 1.2, USB Implementers Forum, Inc.	Dec. 7, 2010	Ex. 1009
Zhang	Chinese Utility Model App. 20122023580.X	Published Jan. 23, 2013	Ex. 1005 ²
Xinfang	US Patent No. 9,506,446 B2	Issued Nov. 29, 2016; filed Oct. 31, 2013	Ex. 1008

Petitioner also relies on the Declarations of David C. Hartup, Ph.D. (Ex. 1003).

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

¹ The '015 patent issued from Application 14/325,938, filed July 8, 2014, which is a continuation of Application PCT/US2014/045434, filed July 3, 2014. Ex. 1001 at codes (21, 22, 63).

² English translation of Zhang is Ex. 1006. Hereinafter, citations to Zhang are to Ex. 1006.

Claim(s) Challenged	35 U.S.C. §³	Basis
1, 5, 8, 9, 17, 19, 20	102	Zhang
1, 5, 8, 9, 17, 19, 20	103	Zhang
2, 3, 10, 12–16, 21, 23	103	Zhang, Xinfang
11	103	Zhang, USB
1, 8, 9, 17, 19	102	Richardson
2, 3, 10, 12–15, 21, 23	103	Richardson, Xinfang

III. ANALYSIS

A. *Level of Ordinary Skill*

Petitioner asserts that in the relevant time frame, a person of ordinary skill in the art (“POSITA”), would have had “a minimum of a bachelor’s degree in electrical engineering, or its equivalent, and two years of experience in studying or designing battery charging systems.” Pet. 6. Patent Owner agrees with Petitioner’s proposed level of ordinary skill in the art. Prelim. Resp. 8.

Petitioner’s articulation of the level of ordinary skill in the art is supported by the Declaration of Dr. Hartup. Ex. 1003 ¶ 46. It also appears consistent with what is reflected by the content of the applied prior art references. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (the applied prior art may reflect an appropriate level of skill). Further, it is not objected to by Patent Owner.

We adopt Petitioner’s articulation of the level of ordinary skill in the art, but delete the qualifier “a minimum of,” to keep that level from being vague and extending to a range that corresponds to the skill level of an expert. Thus, we regard the level of ordinary skill as being at the level of a person with “a bachelor’s

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284, 287–88 (2011), revised 35 U.S.C. §§ 102 and 103 effective March 16, 2013. Because the challenged patent has an effective filing date after March 16, 2013 (Ex. 1001, Codes (22), (63)), the effective date of the applicable AIA provisions, we refer to the post-AIA versions of §§ 102 and 103.

degree in electrical engineering, or its equivalent, and two years of experience in studying or designing battery charging systems.”

B. Claim Construction

For petitions filed on or after November 13, 2018, we use the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2019). The Petition here was filed on July 29, 2020. Paper 2. We apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) (“the *Phillips* standard”).

Claim terms are generally given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution history, other claims, and even extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

The specification may reveal a special definition given to a claim term by the patentee, or the specification or prosecution history may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Id.* at 1316. If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). The disavowal, if any, can be effectuated by language in the specification or the

prosecution history. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016).

Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner has not proposed a specific construction for any term, and is satisfied with their ordinary and customary meanings under the *Phillips* standard. Pet. 7. For the term “output port,” however, Petitioner states: “Petitioner has recognized the apparent construction given that term by Patent Owner in related litigation, and analyzed the term under both that more expansive interpretation, and its ordinary and customary meaning.” *Id.* at 7 n.1. Patent Owner also has not proposed a construction for any term, including the term “output port,” and asserts that no express construction for any term is necessary. Prelim. Resp. 7–8.

For purposes of this decision, there is no dispute between the parties that would require claim construction to resolve.

C. *The Law on Anticipation and Obviousness*

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). The applied reference “need not satisfy an *ipsissimis verbis* test.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); accord *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990).

Identity of terminology between the prior art reference and the claim is not required.

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results (“the *Graham* factors”). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

*D. Alleged Anticipation of
Claims 1, 8, 9, 17, and 19 by Richardson*

1. Overview of Richardson

Richardson relates to a portable power source to provide supplemental power to start internal combustion and turbine engines. Ex. 1010 ¶ 1. As background, Richardson describes that internal combustion and turbine engines require a power source to start, and that commonly this power source is in the form of a battery. *Id.* ¶ 2. Richardson further describes that if the battery lacks sufficient power to start the engine, a supplemental power source is necessary to jump start the engine, and that, typically, “jumper cables are used to connect the battery of one vehicle to the dead battery of another vehicle needing to be jumped.” *Id.* ¶ 3. Richardson discloses an apparatus and method for temporarily delivering supplemental power to the electrical system of a vehicle. *Id.* ¶ 5. A preferred

embodiment is a portable supplemental power source, also called a “jump starter,” illustrated in Figure 1, which is reproduced below:

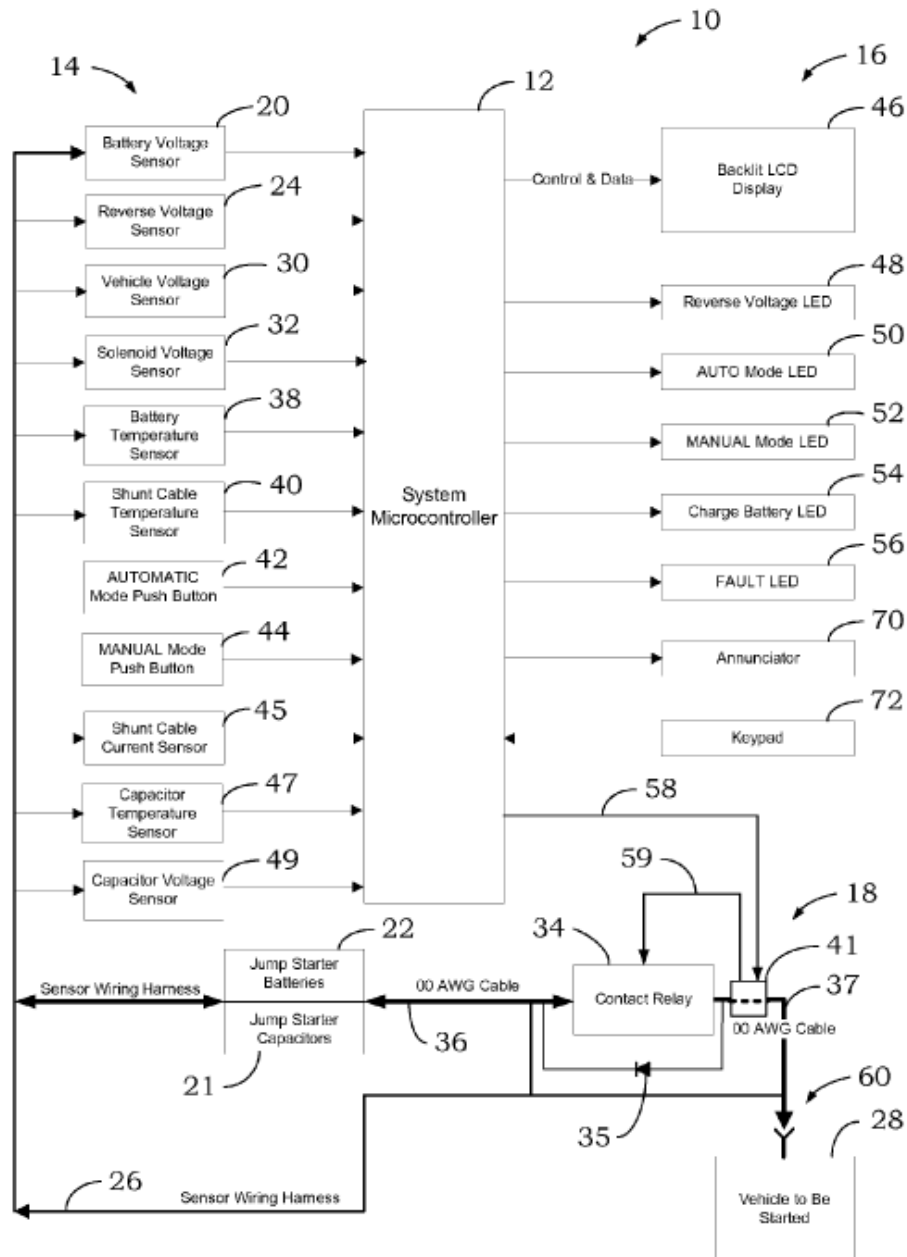


Fig. 1

Figure 1 is a functional block diagram of Richardson’s portable jump starter.

Id. ¶ 7.

Jump starter 10 includes programmable microprocessor 12, which receives input 14 and produces informational outputs 16 and control outputs 18. *Id.* ¶ 11. Control outputs 18 includes contact relay control output 58, which operates contact relay 34 through temperature sensor 41. *Id.* ¶ 14. Shunt cable 36 connects capacitors 21 and batteries 22 to control relay 34. *Id.* ¶ 12. “When the jump starter operation has been successfully initiated, the contact relay 34 is closed and the jump starter capacitors 21 and batteries 22 are connected to the starter system or batteries of the vehicle to be started.” *Id.* ¶ 14.

Battery voltage sensor monitors the voltage level of one or more batteries 22; reverse voltage sensor 24 monitors the polarity of the jumper cables on line 26; vehicle voltage sensor 30 monitors the voltage on line 37, which reflects the voltage of the vehicle. *Id.* ¶ 12. Battery temperature 38 monitors the temperature of the jump starter’s batteries 22 to detect overheating due to excess current draw from the batteries during jump starting, and shunt cable temperature sensor 40 monitors the temperature of shunt cable 36 to detect overheating of the cable. *Id.* ¶ 13. Automatic mode push button 42 is provided to set the jump starter in automatic mode of operation, and manual mode push button 44 is provided to set the jump starter in manual mode of operation. *Id.*

LCD display 46 displays user instructions, error messages, and real-time sensor data during operation. *Id.* ¶ 14.

2. *Claim 1*

For reasons discussed below, Petitioner has not adequately addressed this limitation of claim 1:

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.

Ex. 1001, 8:26–37. Petitioner’s accounting for it is vague and incomplete, as well as speculative.

The limitation refers to the action of the claimed microcontroller, which receives input signals from the vehicle isolation sensor and the reverse polarity sensor and provides an output signal to the power switch. Ex. 1001, 8:23–25. According to this limitation, if a signal indicates absence of a vehicle battery, or if a signal indicates improper polarity connection to the vehicle battery, the power switch cannot be turned on. Facially, in its broadest possible reading, the requirement might allow the switch to be governed by one condition, not necessarily both. Neither party has read the language that way. Petitioner has applied the language as meaning both conditions govern operation of the power switch. Pet. 1, 4, 15–16. Patent Owner’s argument is consistent with that reading. Prelim. Resp. 15–18, 21–25. We have no reason to disagree with that understanding of the claim language, in light of the Specification of the ’015 patent.⁴ See e.g., Ex. 1001, 4:32–38 (“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

⁴ The most expansive reading permitted by the literal language and not precluded by an express disclaimer is the broadest possible interpretation not satisfying even the broadest reasonable interpretation standard. See *In re Smith Int’l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir. 2017).

10).”). Thus, the power switch can be turned on *only* in response to a signal indicating presence of a vehicle battery *and* a signal indicating proper polarity connection to that vehicle battery. Petitioner has not made a sufficient showing that that is true in Richardson.

Referring to Richardson’s Figures 3–8, Petitioner asserts: “several checks are performed prior to the microcontroller sending a signal to close the power switch and thus jump start the vehicle.” Pet. 46. That statement is over broad and Petitioner does not cite to any testimony of Dr. Hartup to support it. The inaccuracy and over-breadth is evident from the flow chart shown in Figure 4, reproduced below:

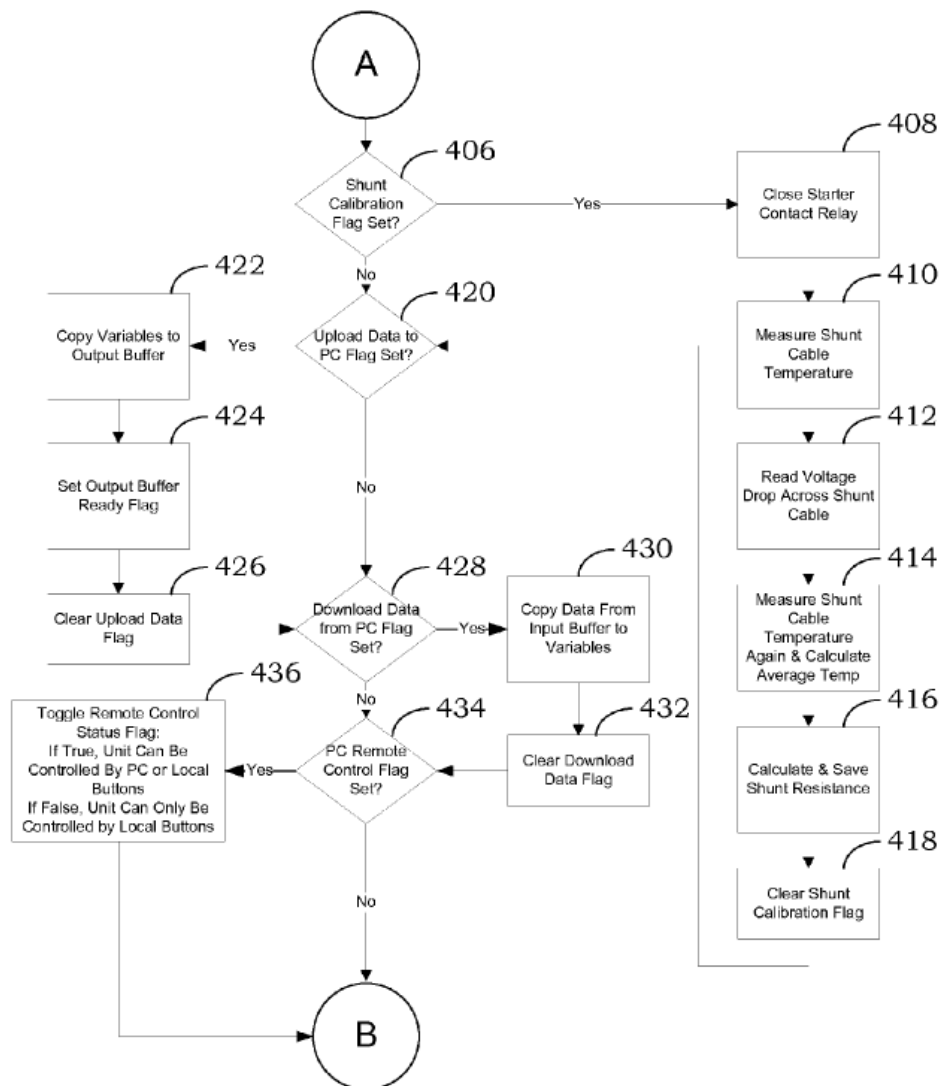


Fig. 4

Figure 4 is a partial flow chart of the processing steps of Richardson's device. Ex. 1010 ¶ 9. As shown in Figure 4, the only check that is made prior to closing the power switch at step 408 is checking at step 406 whether the shunt calibration flag is set. All other checks follow closing of the power switch at step 408, including those in the steps within B and C, as shown in Figures 3 and 5 below:

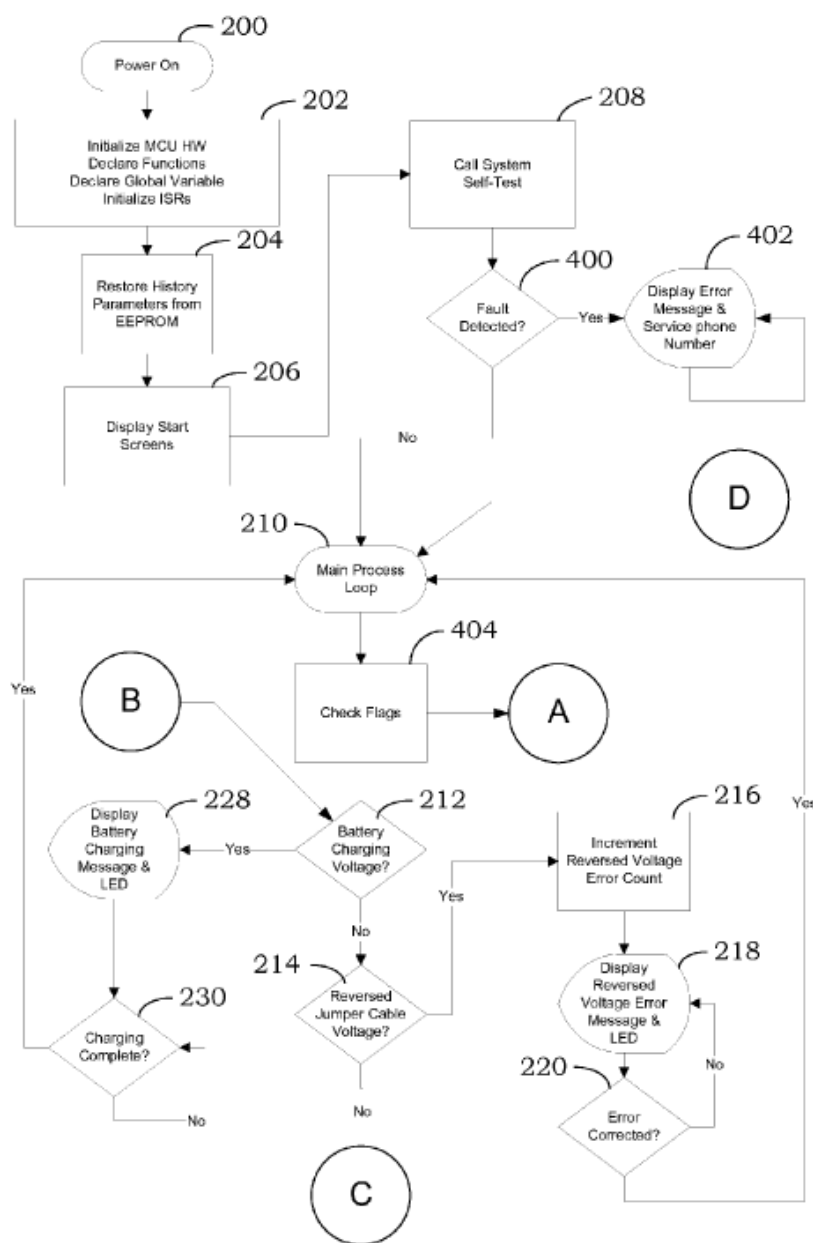


Fig. 3

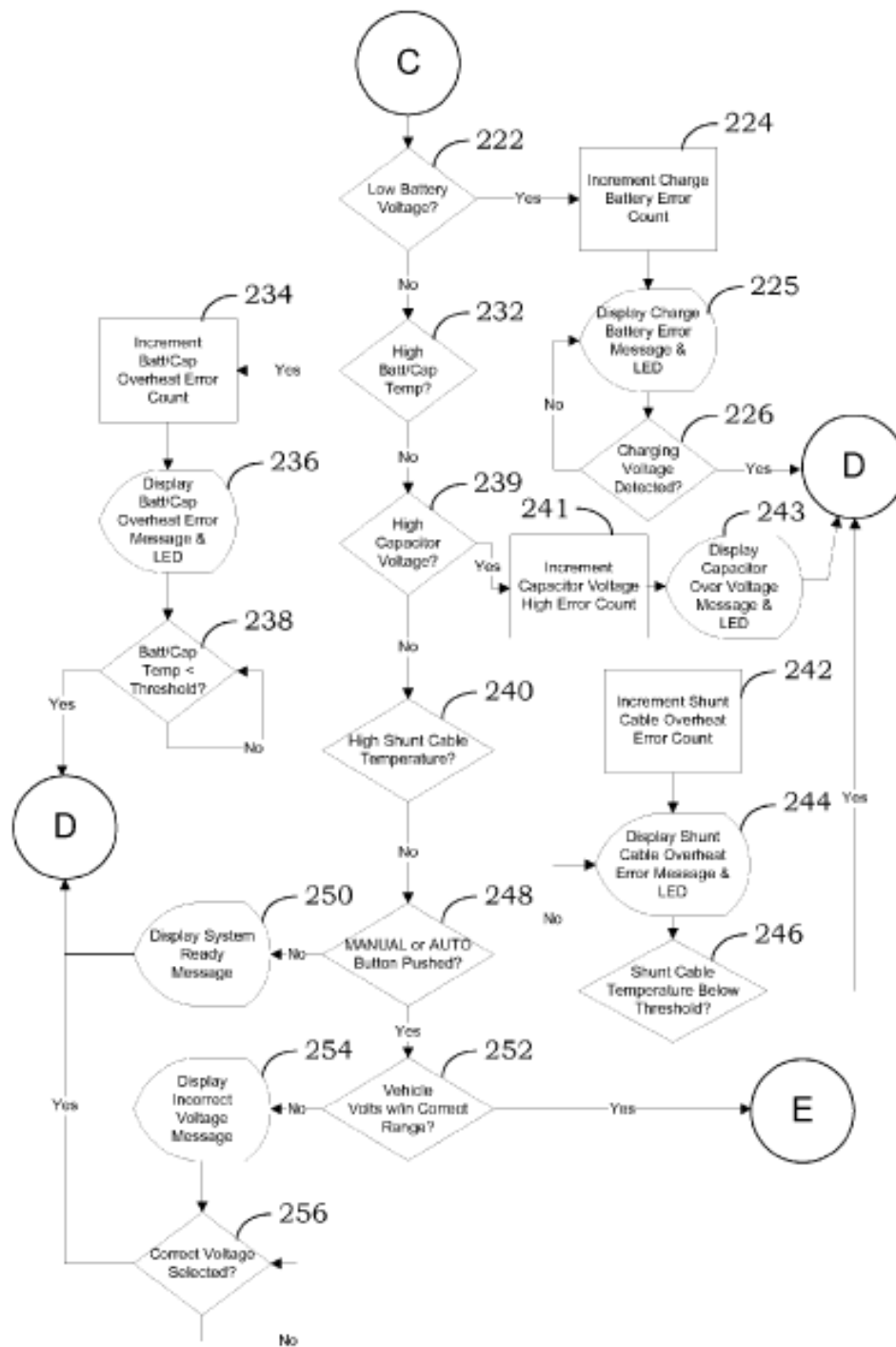


Fig. 5

Figures 3 and 5 are partial flow charts of the processing steps of Richardson's device. Ex. 1010 ¶ 9.

In particular, Petitioner refers to the checking performed at step 212 in Figure 3, i.e., checking if there is a “battery charging voltage.” Pet. 47. Indeed, Petitioner quotes the following text from Paragraph 20 of Richardson:

If the system does not detect a battery charging voltage 212 . . . the voltage is measured by the reverse voltage sensor 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 system batteries 22, then a reverse polarity connection . . . is determined”

Richardson ¶ 20 (quoted at Pet. 47). Paragraph 20 of Richardson continues to state, from where the above-quoted text leaves off:

and an error flag is set and the event saved in non-volatile 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 start 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.

Id. As discussed above, and as shown by Figures 3 and 4, step 408 in Figure 4 (closing the starter contact relay (a power switch)) precedes step 212 in Figure 3 (checking if there is a battery charging voltage and if not, whether there is reverse polarity connection).

Although it is possible to reach step 212 without going through step 408, such as when the shunt calibration flag is determined in step 406 as not having been set, that path as shown in Figures 3 and 4 makes no mention of any action on the starter contact relay or the status of the starter contact relay. Petitioner assumes that in that path the starter contact relay is open and not closed. Pet. 46–47. That assumption is not supported by the cited disclosure of Richardson. Petitioner does not explain the circumstances in which the shunt calibration flag is set or not set. It is speculative based on the Petition to assume that whenever the shunt calibration flag is not set, the starter contact relay is open. For instance, step 408 might have

already been visited once before, the shunt calibration flag reset, and the main process loop revisited. Petitioner has not provided adequate explanation for the assumption to be made.

Furthermore, the cited text from Paragraph 20 of Richardson itself indicates that when checking for presence of a “battery charging voltage,” the starter contact relay already is closed. That is because, at that moment, the system is expecting the vehicle battery to be charging and that, if it is not, the system wants to check if the battery has been incorrectly connected in reverse polarity. *See* Richardson ¶ 20 (pertinent text quoted above). The vehicle battery cannot be charging unless the starter contact relay already is closed to connect the charging source to the vehicle battery.

Thus, disclosure of Richardson, as explained by Petitioner, does not support Petitioner’s assertion (Pet. 46) that “[Richardson’s] microcontroller only closes relay 34 if the reverse polarity sensor 24 and voltage sensor 30 indicates the presence of a vehicle battery connected with proper polarity. (EX1003 at ¶ 119).” The cited disclosure of Richardson, as discussed above, relates to the condition of detecting that there is no vehicle “charging” voltage after the jumper cables have been manually connected to a vehicle battery and the system is expecting the vehicle battery to be charging. Also as discussed above, if there is not a charging voltage, then something is wrong and the system checks to see if the battery is incorrectly connected with reverse polarity. This manner of operation indicates the opposite of what is required by the claim, because the starter relay contact already is closed when a check is made on whether the vehicle battery is connected in reverse polarity.

Additionally, regarding sensing the presence of a vehicle battery and not closing the power switch unless a vehicle battery is present, Petitioner asserts:

Richardson also discloses that at step 252 a vehicle battery presence test is conducted. (EX1010 at Fig. 5; EX1003 at ¶ 119). For example, vehicle voltage sensor 30 “monitors the voltage on line 37 (voltage of the vehicle)” for detecting the voltage of the vehicle to be started. (EX1010 at ¶ 0012; EX1003 at ¶ 119). “If one of the push buttons 42 and 44 has been selected, the system will compare the operator-configured starter voltage against the voltage of the vehicle to be started 28 . . . If the difference between the voltage selected and the voltage measured is not within a predetermined range and tolerance 252 . . . further operation is prohibited until the correct voltage is selected 256 at which point processing returns to the main processing loop 210.” (EX1010 at ¶ 0026). 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, because 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. (EX1003 at ¶ 119). 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 microcontroller 12 sends a signal to close contact relay 34. (See EX1010 at Fig. 3, Fig. 6; see also EX1010 at ¶¶ 0014 and 0027; EX1003 at ¶ 119).

Pet. 47–48.

Petitioner’s argument is unpersuasive for two reasons. First, the referenced procedure does not compare the detected voltage to zero or to whatever is consistent with the absence of a vehicle battery and makes no determination that a vehicle battery is absent. The determination made is whether the difference between the detected voltage and the battery type as set by the operator is within a predetermined range. If it is not, then a conclusion is drawn that the operator has selected the wrong setting and such an alert message is displayed to the operator. Ex. 1010 ¶ 26 (“a ‘Wrong Selector Volts’ message is displayed 254 on the LCD 46”). The message is not that no vehicle battery is connected. There is no

awareness of whether a vehicle battery is connected. In the absence of a connected battery, the difference with respect to a selected setting would lead to a conclusion that the operator has made the wrong selection of battery type, not that a battery has not been connected. Thus, based on Petitioner's accounting, there is no sensor signal in Richardson indicating the absence of a vehicle battery at the output port. The evidence does not sufficiently support battery presence detection as asserted by Petitioner, only a detection of mismatched voltage levels which is much broader than absence of a vehicle battery. Richardson describes that its jump starter device can be configured for "12, 18, 24, 30, or 36 volts" operation. Ex. 1010 ¶ 26.

Second, even assuming that Petitioner is correct that the procedure for checking proper configuration setting for battery type determines the presence or absence of a battery, Petitioner has not sufficiently shown that that process occurs before closing of the power switch as is required by claim 1. The procedure at issue, Box 252, occurs in the operational flow chart shown in Figure 5, where the starting point is labeled Point "C," reproduced below:

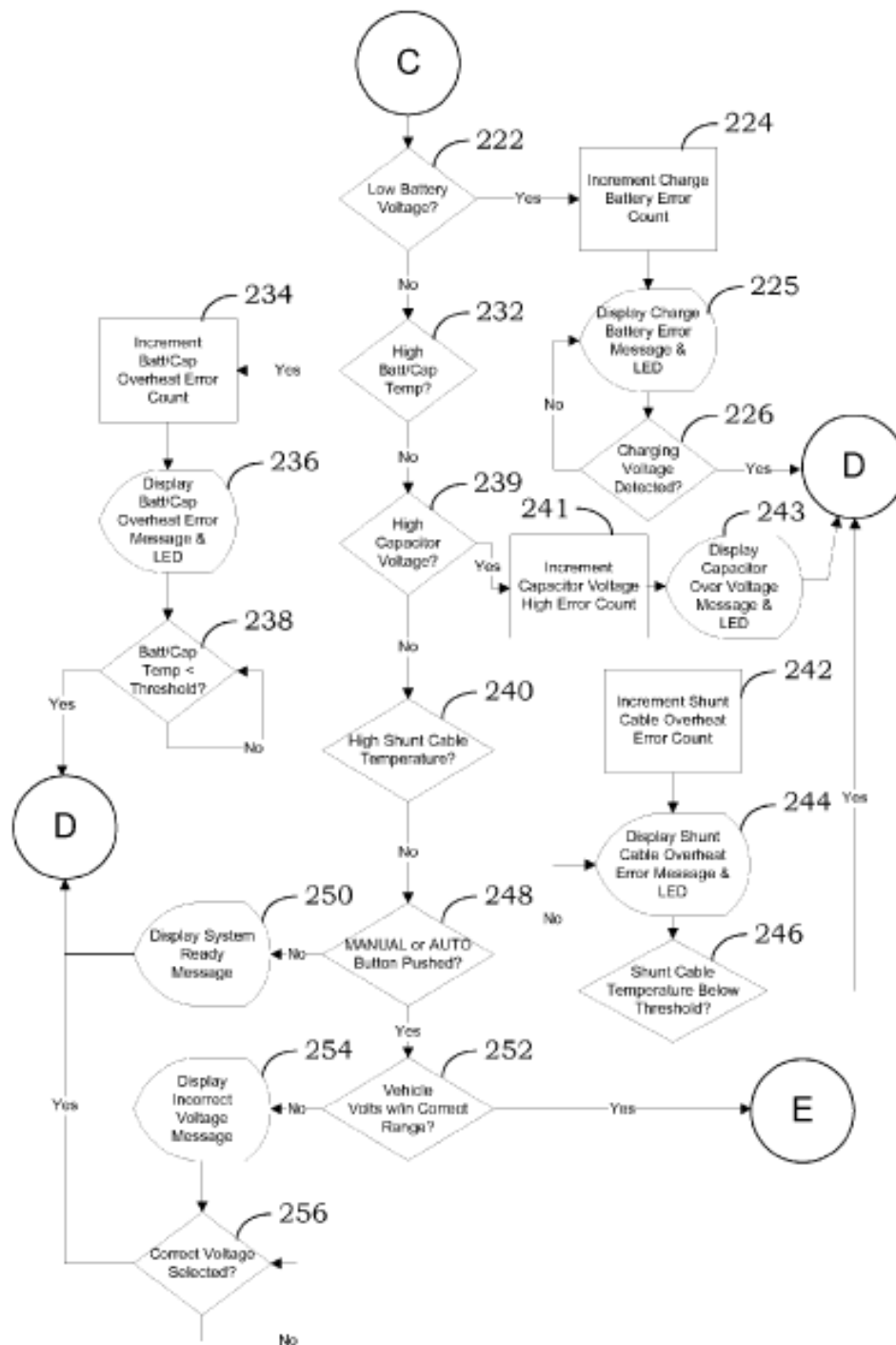


Fig. 5

Figure 5 is a flow chart within which is shown the steps for determining whether the operator has selected the correct battery type configuration. Ex. 1010 ¶ 26.

Box 248 is where it is determined whether the operator has pressed buttons 42 or

44. *Id.* ¶ 25. Box 252 is where it is determined whether the difference between the voltage selected and the detected voltage is not within a predetermined range. *Id.* ¶ 26. All of the actions taken in Figure 5, however, are subsequent to closing of the starter contact relay or power switch 34, not prior.

As shown in Figure 3, the process proceeds from Box 404 to actions represented by “A.” As shown in Figure 4, when actions in “A” are completed, the process advances to Point “B.” As shown in Figure 3, Point “B” leads to Box 212 and then Box 214 in Figure 3. Finally, as shown in Figure 3, the process advances from Box 214 to actions represented by “C.” Figure 5 illustrates the actions taken in “C.” As discussed above, the power switch is turned on within “A,” specifically Box 408 in “A.” Yet, all of “A” precedes entry of the process into “C” where the battery type selection is checked at Box 252 as discussed above. This flow of events is contrary to Petitioner’s contention that the power switch is turned on after the checking that is performed at Box 252.

For the foregoing reasons, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that claim 1 is anticipated by Richardson.

3. *Claims 8, 9, 17, and 19*

Claims 8, 9, 17, and 19 each depend, directly or indirectly from claim 1 and thus incorporate all of the limitations of claim 1. 35 U.S.C. § 112(d). The deficiencies discussed above for claim 1 equally applies to claims 8, 9, 17, and 19. Thus, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that any of claims 8, 9, 17, and 19 is anticipated by Richardson.

E. *Alleged Obviousness of Claims 2, 3, 10, 12–15, 21, and 23 over Richardson and Xinfang*

Claims 2, 3, 10, 12–15, 21, and 23 each depend, directly or indirectly, from claim 1, and thus incorporate all of the limitations of claim 1. 35 U.S.C. § 112(d).

Xinfang, as applied by Petitioner, does not make up for the deficiency of Richardson as discussed above in the context of claim 1, but relates to limitations additionally set forth in the dependent claims. Thus, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that any of claims 2, 3, 10, 12–15, 21, and 23 would have been obvious over Richardson and Xinfang.

*F. Alleged Anticipation of
Claims 1, 5, 8, 9, 17, 19, and 20 by Zhang*

1. Overview of Zhang

Zhang describes a smart jump starter device with a voice prompt function. Ex. 1006, code (57). Zhang states as background that under different operating environments, “it is difficult to correctly operate 12 V/24 V change over to the jump starter 100% of the time by manual operation alone.” *Id.* ¶ 2. Zhang describes the advantages of its disclosed device as follows:

[T]his jump starter can carry out safety protection regarding gear position selection, correct connection, incorrect connection, undervoltage or overvoltage, etc. At the same time, the corresponding voice prompt and photoelectric indicators are added to the safety prompts regarding selection of changing gear position, low battery voltage warning, output overcurrent protection, clip output short circuit protection, manual force start and other areas.

Id. ¶ 7. Zhang does not mention vehicle battery presence or absence detection.

Figure 1 of Zhang illustrates Zhang's device and is reproduced below:

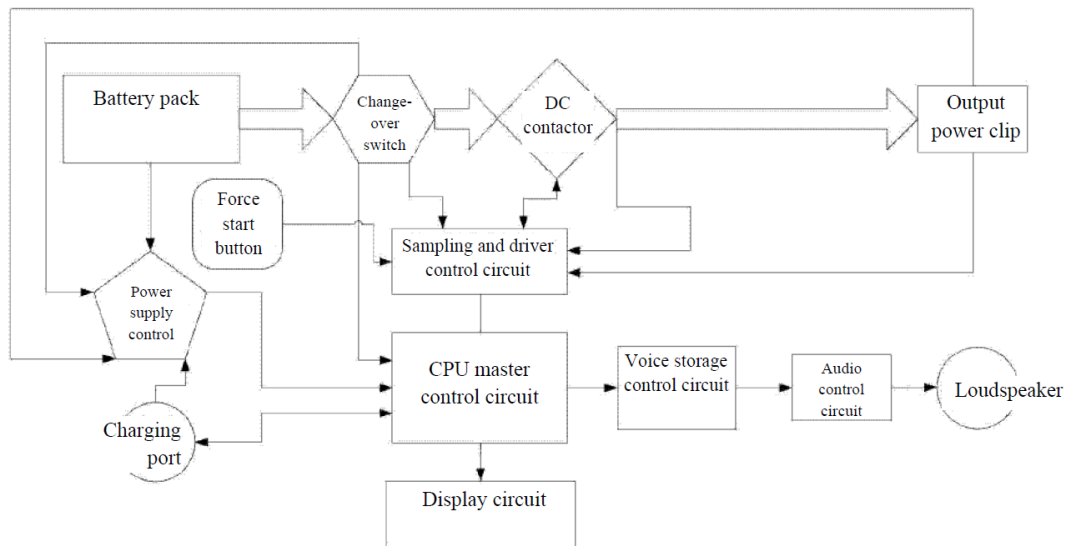


Figure 1

Figure 1 is a circuit diagram of Zhang's jump starter. *Id.* ¶ 8. The jump starter includes a battery pack connected to a change-over switch and the change-over switch is connected to an output power clip through a DC contactor. *Id.* ¶ 14. The jump starter further includes a CPU master control circuit, a sampling and driver control circuit, and a power supply control circuit. *Id.* ¶¶ 14, 15. Through the change-over switch, the battery pack can act as a 12 V DC battery source or a 24V DC battery source, and the change-over switch has a 12 V gear setting and a 24 V gear setting. *Id.* ¶ 16. The jump starter uses the DC contactor as an automatic electronic switch. *Id.* ¶ 17. The jump starter samples voltages from key points in the system, e.g., the terminals of the battery pack, the small teeth of the output power clip, the output end of the change-over switch, and the input and output terminals of the DC contactor. *Id.* ¶ 18. The output terminal of the change-over switch is connected to the input terminal of the DC contactor. *Id.* ¶ 43.

One of the protection functions provided by Zhang's jump starter is "[s]hutdown protection and prompt when the output power clip is connected erroneously in reverse polarity." *Id.* ¶ 25. In that regard, Zhang describes the shutdown protection as follows:

3.2 12 V gear reverse polarity connection protection and prompt: set the change-over switch at the 12 V gear. The corresponding gear position detection and content of the prompt are as above. At the same time, the voltage at the two terminals of the external 12 V (or 24 V) battery is sampled using the small teeth of the power clip. The internal conductor wire of the power clip is connected to the 'J1' port of the control board, and after the reverse connection signal is converted by D9, IC6 and R5, the external reverse connection signal "Reverse-Ctrl" is transmitted to the P12 port of the microcontroller. The microcontroller determines that the jump starter has been changed over to the 12 V gear, and at the same time, *detects that the external battery is connected in reverse polarity. At this time, the DC contactor will maintain its disconnected state*, and continuously transmit a pulse signal to the voice chip to retrieve the reverse connection voice prompt, to report the reverse connection message to the user in a timely manner; other indicators: the 12 V gear position indicator light is lit; the reverse connection alarm indicator light LED7 is lit; the Nixie tube automatically flashes a reverse connection error code "Er1".

Id. ¶ 51 (emphasis added).

Another function Zhang provides is protection against voltage mismatch between internal and external batteries, e.g., not properly setting the internal battery charging source to 12V or 24V. *Id.* ¶ 26. Zhang describes as follows:

3.1 Correct 12 V gear connection, conduction and prompt: set the change-over switch at the 12 V gear. When the microcontroller detects that the voltage at "OUT+" and "BAT1+" is within the range of the 12 V gear, the jump starter automatically reports the 12 V gear position voice prompt. At the same time, the voltage at the two terminals of the 12 V battery is sampled in two ways, where one way is connected to the input terminal of the DC contactor, so that the microcontroller can

detect the effective voltage value within the range of the 12 V gear at the “BAT+/External” point. The other way is sampled using the small teeth of the power clip. The internal conductor wire of the power clip wire is connected to the “J1” port of the control board, and after the correct connection signal is converted by R5, D8, and IC5, the external correct connection signal “RIGHT-Ctrl” is transmitted to the P13 port of the microcontroller. The microcontroller determines that the jump starter has been changed over to the 12 V gear, and at the same time the power clip is connected correctly and reliably. At this time, the microcontroller once again outputs a high level to the control circuit of the DC contactor for it to carry out pull-in and conduction. It also transmits a pulse signal to the voice chip to retrieve the correct connection and conduction voice prompt, to report the correct connection message to the user in a timely manner; other indicators: the 12 V gear position indicator light is lit; the corresponding correct connection LED indicator light is lit; the Nixie tube automatically displays the integrated voltage value after the internal and external batteries are connected in parallel.

Id. ¶ 50.

Zhang also provides protection for when the output power clip is overloaded or when there is a short circuit of the output power clip. *Id.* ¶¶ 27–28.

2. Claim 1

Claim 1 recites an “[a]pparatus for jump starting a vehicle engine.” Ex. 1001, 8:4. Petitioner points out that Zhang discloses “a jump starter.” Pet. 10 (citing Ex. 1006 ¶¶ 5, 6, 14, 15). Patent Owner does not argue that this preamble recitation is not met. We are sufficiently persuaded that it is.

Claim 1 recites that the apparatus comprises “an internal power supply.” Ex. 1001, 8:6. Petitioner identifies Zhang’s battery pack as the claimed internal power supply. Pet. 10. Patent Owner does not argue that this limitation is not met. We are sufficiently persuaded that it is.

Claim 1 recites that the apparatus comprises “an output port having positive and negative polarity outputs.” Ex. 1001, 8:7–8. Petitioner identifies Zhang’s

output power clip as having both “anode and cathode power clips,” thus meeting the requirement of an output port. Pet. 10 (citing Ex. 1006 ¶¶ 19, 58, 60). Patent Owner does not argue that this limitation is not met. We are sufficiently persuaded that it is.

Claim 1 recites “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.” Ex. 1001, 8:8–11. Petitioner cites to Paragraph 50 of Zhang, reproduced above, as describing circuitry which detects the external vehicle battery voltage and whether that detected voltage is within an expected range suitable for the internal power supply set to 12 V. Pet. 11 (also citing Ex. 1003 ¶ 54). Patent Owner does not argue that this limitation is not met. We are sufficiently persuaded that it is. A circuit that determines if the external battery has a voltage suitable for the internal 12 V power supply of the jump starter is reasonably deemed such a sensor.

Claim 1 recites “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.” Ex. 1001, 8:13–20. Petitioner cites to Paragraph 50 of Zhang, reproduced above, as describing circuitry which detects the external vehicle battery voltage and whether that detected voltage is within an expected range suitable for the internal power supply set to 12 V. Pet. 11 (also citing Ex. 1003 ¶ 54). Patent Owner does not argue that this limitation is not met. We are sufficiently persuaded that it is.

Claim 1 recites “a power switch connected between said internal power supply and said output port.” Ex. 1001, 8:21–22. Petitioner identifies Zhang’s DC contactor as the power switch connected between the battery pack as the internal power supply and the power clip as the output port. Pet. 13. Zhang expressly states that “[t]his jump starter utilizes a high-power DC contactor as an automatic control electronic switch and it controls the on and off states through a circuit.” Ex. 1006 ¶ 17. Patent Owner does not argue that this limitation is not met. We are sufficiently persuaded that it is.

Claim 1 recites “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.” Ex. 1001, 8:23–26. Petitioner identifies in Zhang a microcontroller which receives an input signal “Right-Ctrl” indicative of battery presence and an input signal “Reverse-Ctrl” indicative of reverse polarity connection, and which sends an output signal to control the DC contactor. Pet. 14–15 (citing Ex. 1006 ¶¶ 50–52). Figure 3 of Zhang illustrates a circuit diagram of the CPU master control circuit. Ex. 1006 ¶ 10. The circuit diagram includes what is designated as IC2-MC96F32Q, which is referred to in Zhang as a microcontroller. *Id.* ¶ 19. Patent Owner does not argue that the microcontroller limitation is not met. We are sufficiently persuaded that it is.

However, for reasons discussed below, Petitioner has not adequately addressed this limitation of claim 1 regarding the microcontroller:

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.

Ex. 1001, at 8:26–37.

As discussed above in Section II.D.2., for satisfying this limitation, two conditions are prerequisites to turning on the power switch, a signal indicating presence of a vehicle battery *and* a signal indicating proper polarity connection to the vehicle battery. The power switch can be turned on *only* in response to a signal indicating presence of a vehicle battery *and* a signal indicating proper polarity connection to that vehicle battery. For the latter condition, Petitioner cites to Paragraph 51 of Zhang, which describes that if the microcontroller detects that the external battery is connected in reverse polarity, the DC contactor will be maintained in its disconnected state. Pet. 15 (citing Ex. 1006 ¶ 51). The cited disclosure supports Petitioner’s assertion about the second condition. Patent Owner does not argue that the second condition is not met. We are sufficiently persuaded that it is. The problem lies with the first condition, as we discuss below.

For the first condition Petitioner cites to Paragraph 50 of Zhang, reproduced above. Petitioner asserts that “Zhang discloses that its microcontroller detects if there is a safe connection to the vehicle battery, and maintains the DC contactor (e.g., the switch) in the disconnected position unless it determines the battery is safely connected.” Pet. 15 (citing Ex. 1006 ¶ 50; Ex. 1003 ¶59). That assertion is not supported by the cited evidence.

Zhang states the following, with regard to detecting the presence of a 12 V vehicle battery:

At the same time, the voltage at the two terminals of the 12 V battery is sampled in two ways, where one way is connected to the input terminal of the DC contactor, so that the microcontroller can detect the effective voltage value within the range of the 12 V gear at the “BAT+/External” point. The other way is sampled using the small teeth of the power clip.

Ex. 1006 ¶ 50. The input terminal of the DC contactor is defined by Zhang as that on the side of the change-over switch. *Id.* ¶ 43. The vehicle battery on the output terminal side of the DC contactor. *Id.* In that configuration, as noted by Patent Owner, the voltage of the vehicle battery cannot be measured at the input terminal of the DC contactor unless the DC contactor already is closed. Prelim. Resp. 16. As Patent Owner persuasively states: “Otherwise, an open DC contactor would prevent measurement of the car battery on the input side of the DC contactor.” *Id.*

We recognize that Paragraph 50 of Zhang describes two ways to measure the voltage “at the two terminals” of the vehicle battery, and the other way is by the small teeth of the output power clip. Ex. 1006 ¶ 50. But Zhang describes the two ways as occurring “at the same time,” and not as alternative implementations. Thus, measurements at both points are taken to obtain the voltage at the two terminals of the vehicle battery. Dr. Hartup does not address or explain how a measurement can be taken at the input terminal of the DC contactor that would be indicative of the voltage of the external vehicle battery connected to the output terminal of the DC contactor, if the DC contactor is not already closed. Ex. 1003 ¶ 59. The Petition does not address Zhang’s disclosure of measuring the voltage of the vehicle battery on the input side of the DC contactor at the same time a measurement is taken by the small teeth of the output power clip.

Determining whether a vehicle battery is present after the DC contactor is closed, as Zhang’s disclosure evidently indicates, does not meet the conditions required by the claim for closing the power switch, i.e., closing the power switch only if a vehicle battery is detected as present and the polarity of the connection is determined as correct. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that claim 1 is anticipated by Zhang.

3. Claims 5, 8, 9, 17, 19, and 20

Claims 5, 8, 9, 17, 19, and 20 each depend, directly or indirectly, from claim 1, and thus incorporates all of the limitations of claim 1. 35 U.S.C. § 112(d). The deficiencies of the Petition with respect to claim 1, as discussed above, equally applies to claims 5, 8, 9, 17, 19, and 20. Petitioner has not shown a reasonable likelihood that it would prevail in establishing that any of claims 5, 8, 9, 17, 19, and 20 is anticipated by Zhang.

*G. Alleged Obviousness of
Claims 1, 5, 8, 9, 17, and 20 over Zhang*

Petitioner's presentation of obviousness of these claims is no different from its presentation of anticipation of these claims over Zhang. Pet. 7–20. We see no identification by Petitioner of any difference between the claimed invention of any claim and the disclosure of Zhang, which would be covered by a theory of obviousness of the invention as a whole. In particular, the deficiencies identified above in the anticipation analysis is not cured by any theory of obviousness advanced by Petitioner. Thus, the obviousness ground of unpatentability is no better than the alleged anticipation of the same claims by Zhang. Petitioner has not shown a reasonable likelihood that it would prevail in establishing that any of claims 1, 5, 8, 9, 17, and 20 would have been obvious over Zhang.

*H. Alleged Obviousness of Claims 2, 3,
10, 12–16, 21, and 23 over Zhang and Xinfang*

Claims 2, 3, 10, 12–16, 21, and 23 each depend, directly or indirectly, from claim 1, and thus incorporates all of the limitations of claim 1. 35 U.S.C. § 112(d). Xinfang, as applied by Petitioner, does not make up for the deficiency of Zhang as discussed above in the context of claim 1, but relates to limitations additionally set forth in these dependent claims (Pet. 23–29). Thus, Petitioner has not shown a

reasonable likelihood that it would prevail in establishing that any of claims 2, 3, 10, 12–16, 21, and 23 would have been obvious over Zhang and Xinfang.

*I. Alleged Obviousness of
Claim 11 over Zhang and USB*

Claim 11 depends from claim 1 and thus incorporate all of the limitations of claim 1. 35 U.S.C. § 112(d). USB, as applied by Petitioner, does not make up for the deficiency of Zhang as discussed above in the context of claim 1, but relates to limitations additionally set forth in claim 11 (Pet. 29–30). Thus, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that claim 11 would have been obvious over Zhang and USB.

J. Discretionary Denial under 35 U.S.C. § 314(a)

Patent Owner asserts that we should exercise delegated discretion under 35 U.S.C. § 314(a) not to institute review, based on the factors set forth in *General Plastic Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 9 (PTAB Sept. 6, 2017) (precedential as to Section II.B.4.i). Prelim. Resp. 27–33. We do not reach the question of discretionary denial under 35 U.S.C. § 314(a) because, as determined above, Petitioner has not shown a reasonable likelihood that it would prevail in establishing unpatentability of any claim.

IV. CONCLUSION

Petitioner has *not* shown a reasonable likelihood that it would prevail in establishing unpatentability of at least 1 challenged claim of the '015 patent.

V. ORDER

It is

ORDERED that no *inter partes* review is instituted and the Petition is *denied*.

IPR2020-01387
Patent 9,007,015 B1

Counsel for Petitioner:

Justin B. Kimble
Jerry Tice
Bragalone Conroy PC
JKimble-IPR@bcpc-law.com
jtice@bctc-law.com

Counsel for Patent Owner:

William H. Oldach III
Rex W. Miller, II
William L. Klima
Vorys, Sater, Seymour and Pease, LLP
wholdach@vorys.com
rwmiller@vorys.com