

***Deltran USA LLC, Petitioner v.
The Noco Company, Patent Owner***
IPR2024-01219



United States Patent No. 11,667,203

Patent Owner's Demonstrative Exhibits

U.S. Patent Nos. 11,667,203

(12) **United States Patent**
Nook et al.

(10) **Patent No.:** US 11,667,203 B2
(45) **Date of Patent:** *Jun. 6, 2023

(54) **PORTABLE VEHICLE BATTERY JUMP
START APPARATUS WITH SAFETY
PROTECTION**

(58) **Field of Classification Search**
CPC B60L 53/14; H02J 7/342; H02J 7/0047;
H02J 7/0034; H02J 7/0029; H02J 1/122;
(Continued)

(71) Applicant: **THE NOCO COMPANY**, Glenwillow,
OH (US)

(56) **References Cited**

(72) Inventors: **Jonathan Lewis Nook**, Gates Mills,
OH (US); **William Knight Nook**,
Shaker Heights, OH (US); **James
Richard Stanfield**, Glendale, AZ (US);
Derek Michael Underhill, Tempe, AZ
(US)

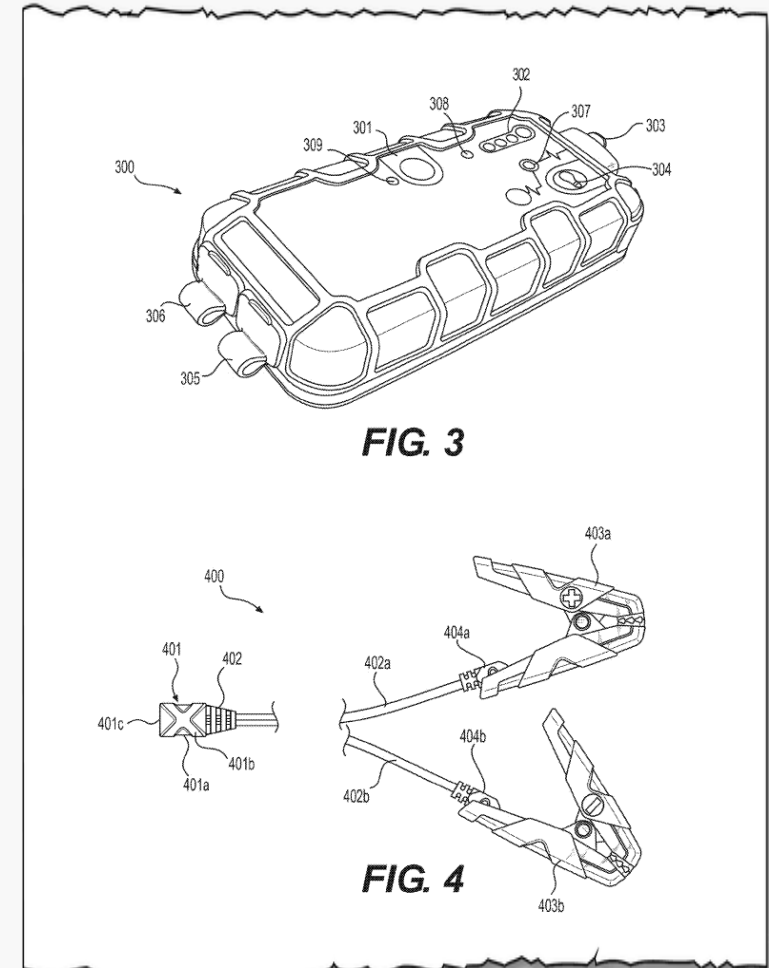
U.S. PATENT DOCUMENTS

3,085,187 A 4/1963 Godshalk
3,105,183 A 9/1963 Hysler et al.
(Continued)

FOREIGN PATENT DOCUMENTS

(73) Assignee: **The NOCO Company**, Glenwillow,
OH (US)

AU 6997198 A 7/1998
AU 2015258229 A1 1/2016
(Continued)



Instituted Grounds

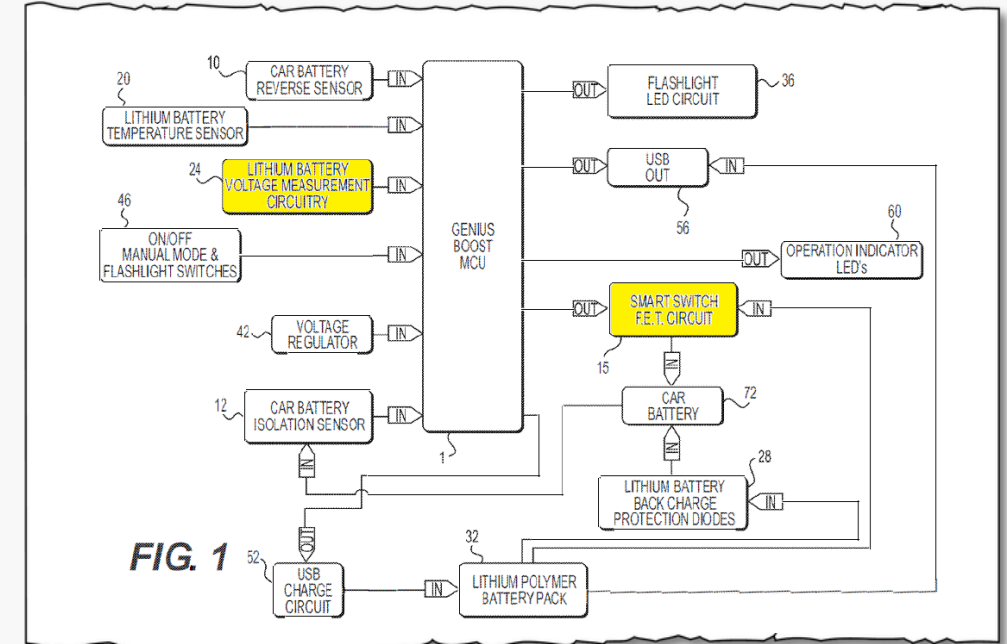
- I. **GROUND 1**: Claims 1, 3-5, and 9 over Richardson in view of Zhao
- II. **GROUND 2**: Claims 2, 10, and 11 over Richardson and Zhao in view of AAPA or Epower-20/Epower-21
- III. **GROUND 3**: Claims 6-8 over Richardson and Zhao in view of Krieger
- IV. **GROUND 4**: Claims 1, 3-5, and 9 over Yu in view of Paparrizos
- V. **GROUND 5**: claims 2, 10, and 11 over Yu and Paparrizos in view of AAPA or Epower-20/Epower-21
- VI. **GROUND 6**: Claims 6-8 over Yu and Paparrizos in view of Krieger

U.S. Patent Nos. 11,667,203

Independent Claim 1

(Vehicle Battery Isolation Sensor Limitations)

1. A jump starter apparatus for jump starting a vehicle battery, comprising:
 - a power supply that includes one or more rechargeable batteries;
 - a USB port configured to receive power from an external power source for charging the one or more batteries;
 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.



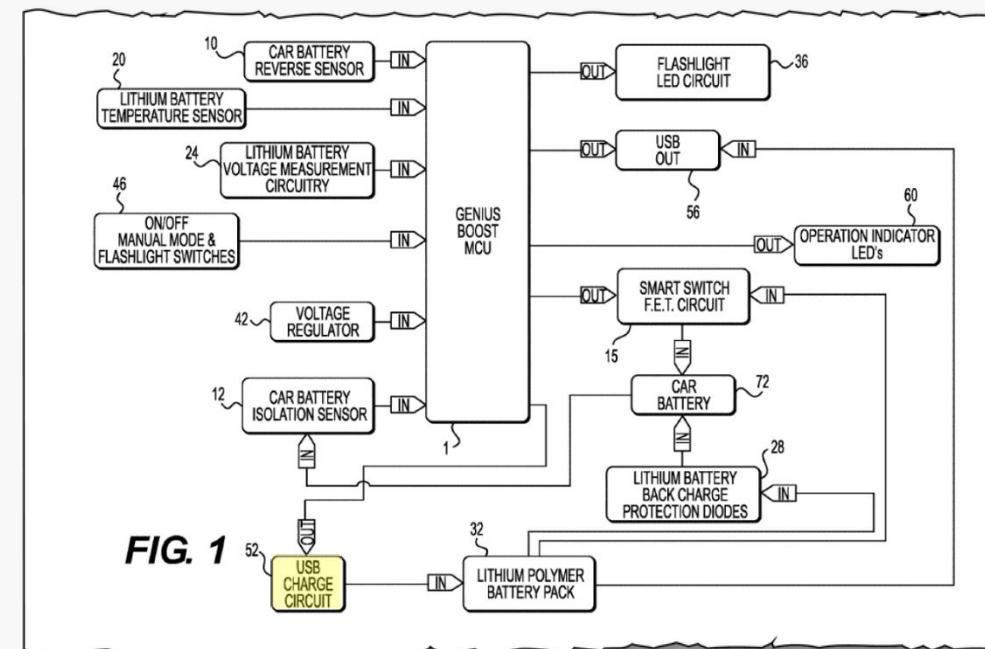
Ex. 1001 ('203 Patent), 8:32-60 & Fig. 1

U.S. Patent Nos. 11,667,203

Independent Claim 1

(USB Charging Limitations)

1. A jump starter apparatus for jump starting a vehicle battery, comprising:
 - a power supply that includes one or more rechargeable batteries;
 - a USB port configured to receive power from an external power source for charging the one or more batteries;
 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.



Ex. 1001 ('203 Patent), 8:32-60 & Fig. 1

PATENTABILITY

Collateral Estoppel Does Not Apply to Richardson Analysis

Richardson Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

Richardson is Inoperable Under Petitioner's Interpretation

Richardson Fails to Teach Claim 5 Limitations

Yu Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

A POSITA Would Not Have Modified Richardson to Add USB Charging

The Petition Fails to Establish How to Combine Richardson and Zhao

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 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,
 - wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.

Petitioner's Argument

The Board previously found that Richardson discloses controlling the power switch based on signals from the vehicle battery isolation sensor and the reverse polarity sensor as claimed. EX1034, 51-67; EX1035, 2; EX1003, ¶110. Patent Owner is precluded from arguing otherwise under principles of collateral estoppel. §IX, *supra*.

Ex. 1001 ('203 Patent), 8:32-60;
Petition, pp. 41-48

Collateral Estoppel Does Not Apply to Richardson Analysis

Collateral Estoppel Only Applies When

- “(1) the identical issue was previously adjudicated;
- (2) the issue was actually litigated;
- (3) the previous determination was necessary to the decision; and
- (4) the party being precluded from relitigating the issue was fully represented in the prior action.”

Kroy IP Holdings, LLC v. Groupon, Inc., 127 F.4th 1376, 1380 (Fed. Cir. 2025)

PO Response, pp. 32-43

Collateral Estoppel Does Not Apply to Richardson Analysis

- Petitioner's Limitation-by-Limitation Usage of Collateral Estoppel is Improper
- Collateral Estoppel Does Not Apply Because the Issues Are *Not* Identical
- Collateral Estoppel Does Not Apply to Inoperability of Richardson
- Collateral Estoppel Does Not Apply Because Richardson Was *Not* Essential to the Final Written Decision on the '015 Patent
- No Dispute that Collateral Estoppel Does Not Apply to Claim 5

Petitioner's Limitation-by-Limitation Usage of Collateral Estoppel is Improper

“It is not correct to weigh the changes in the reissue claim against the original claim. It is the reissue claim alone that is to be analyzed in accordance with the Graham guidelines, and *the differences to be considered are the differences between the reissue claim as a whole and the prior art.*”

Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1136 (Fed. Cir. 1985)

“The claimed invention and an invention in the prior art must both be analyzed as a whole for the same reason; an invention is more than the sum of its individual elements.”

GE v. Raytheon Techs. Corp., 983 F.3d 1334, 1352 (Fed. Cir. 2020)

“Different art makes different grounds, which makes for different issues. Collateral estoppel is not appropriate where the issues are different.”

TicketNetwork, Inc. v. CEATS, Inc. IPR2018-00245, Paper 50 (PTAB 2019)

Collateral Estoppel Does Not Apply Because the Issues Are Not Identical

1. A jump starter ~~[[A]]~~ apparatus for jump starting a vehicle engine battery, comprising:
 - ~~a~~ ~~[[n]]~~ internal power supply that includes one or more rechargeable batteries;
 - ~~—~~ an output port having positive and negative polarity outputs;
 - a USB port configured to receive power from an external power source for charging the one or more batteries;
 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - ~~a vehicle battery isolation sensor connected in circuit with said positive and negative polarity outputs, configured to detect presence of~~ ~~[[a]]~~ the vehicle battery connected between said positive and negative polarity outputs to the jump starter apparatus;
 - ~~a reverse polarity sensor, separate from the vehicle battery isolation sensor connected in circuit with said positive and negative polarity outputs, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery 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; and~~
 - a power switch configured to electrically connect the power supply to the vehicle battery, connected between said internal power supply and said output port; and
 - wherein the power switch is controlled based on a microcontroller configured to receive input signals from said the vehicle isolation sensor and ~~[[said]]~~ the reverse polarity sensor, and to provide an output signal to said power switch, such that said the power switch is turned on to cause said internal power supply to be connected to said output port the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection, 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.

PO Response, pp. 36-37

Collateral Estoppel Does Not Apply to Inoperability of Richardson

Collateral Estoppel Only Applies When

- “(1) the identical issue was previously adjudicated;
- (2) **the issue was actually litigated;**
- (3) the previous determination was necessary to the decision; and
- (4) the party being precluded from relitigating the issue was fully represented in the prior action.”

Kroy IP Holdings, LLC v. Groupon, Inc., 127 F.4th 1376, 1380 (Fed. Cir. 2025)

“From the court’s opinion, it appears... that the §101 issue was never ‘actually litigated,’ because the court did not evaluate that question.”

PO Response, pp. 42-43

Voter Verified, Inc. v. Election Sys. & Software LLC, 887 F.3d 1376, 1384 (Fed. Cir. 2018)

Richardson Was Not Essential to the FWD on the '015 Patent

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

Claim(s) Challenged	35 U.S.C. §²	Basis
1, 7–9, 15, 17–21	102	Richardson
2, 3, 12–14, 23	103	Richardson, Lei
4, 5	103	Richardson, Krieger
6	103	Richardson, Wanzong
16	103	Richardson, Baxter
10–13	103	Richardson and either Epower-20 or Epower-21
22	103	Richardson, Richardet
1, 17, 21	102	Klang
4, 5	103	Klang, Krieger
22	103	Klang, Richardet
23	103	Klang, Lei

Ex. 1034 ('015 IPR FWD), p. 9

For the foregoing reasons, Petitioner has proved by a preponderance of the evidence that claim 1 is anticipated by Klang.

Ex. 1034 ('015 IPR FWD), p. 37

For the foregoing reasons, Petitioner has proved by a preponderance of the evidence that claim 1 is anticipated by Richardson.

Ex. 1034 ('015 IPR FWD), p. 67

PO Response, pp. 39-42

Richardson Was Not Essential to the FWD on the '015 Patent

“If a judgment of a court of first instance is based on determinations of two issues, either of which standing independently would be sufficient to support the result, the judgement is not conclusive with respect to either issue standing alone.”

Restatement (Second) of Judgments §27 cmt. i.

“[a]ny one of these findings would have been sufficient to support the judgement of noninfringement of Claim 1, making them alternative, not cumulative, findings... we are therefore constrained by our precedent to hold that Masco is *not precluded* from relitigating the issues”

Masco Corp. v. United States, 303 F.3d 1316, 1331 (Fed. Circ. 2002)

See also, *Comair Rotron, Inc. v. Nippon Densan Corp.*, 49 F.3d 1535, 1538-39 (Fed. Circ. 1995) (holding that a finding was not essential to a judgement for collateral estoppel purposes where that judgement was supportable on other grounds)

PATENTABILITY

Collateral Estoppel Does Not Apply to Richardson Analysis

Richardson Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

Richardson is Inoperable Under Petitioner's Interpretation

Richardson Fails to Teach Claim 5 Limitations

Yu Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

A POSITA Would Not Have Modified Richardson to Add USB Charging

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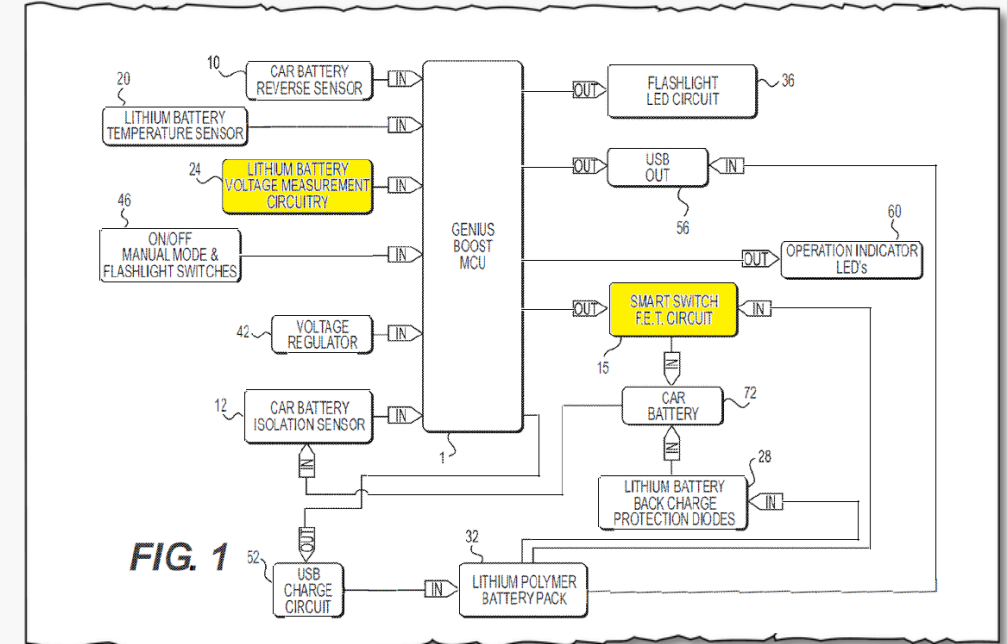
The Petition Fails to Establish How to Combine Yu and Paparrizos

U.S. Patent Nos. 11,667,203

Independent Claim 1

(Vehicle Battery Isolation Sensor Limitations)

1. A jump starter apparatus for jump starting a vehicle battery, comprising:
 - a power supply that includes one or more rechargeable batteries;
 - a USB port configured to receive power from an external power source for charging the one or more batteries;
 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.



Ex. 1001 ('203 Patent), 8:32-60 & Fig. 1

Richardson Fails to Teach Battery Isolation Sensor Claim Limitations

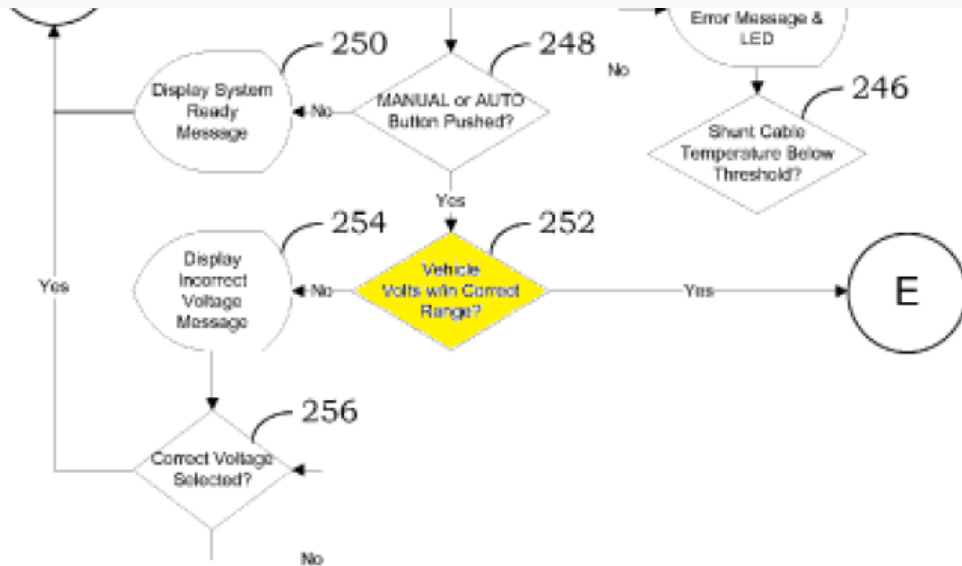
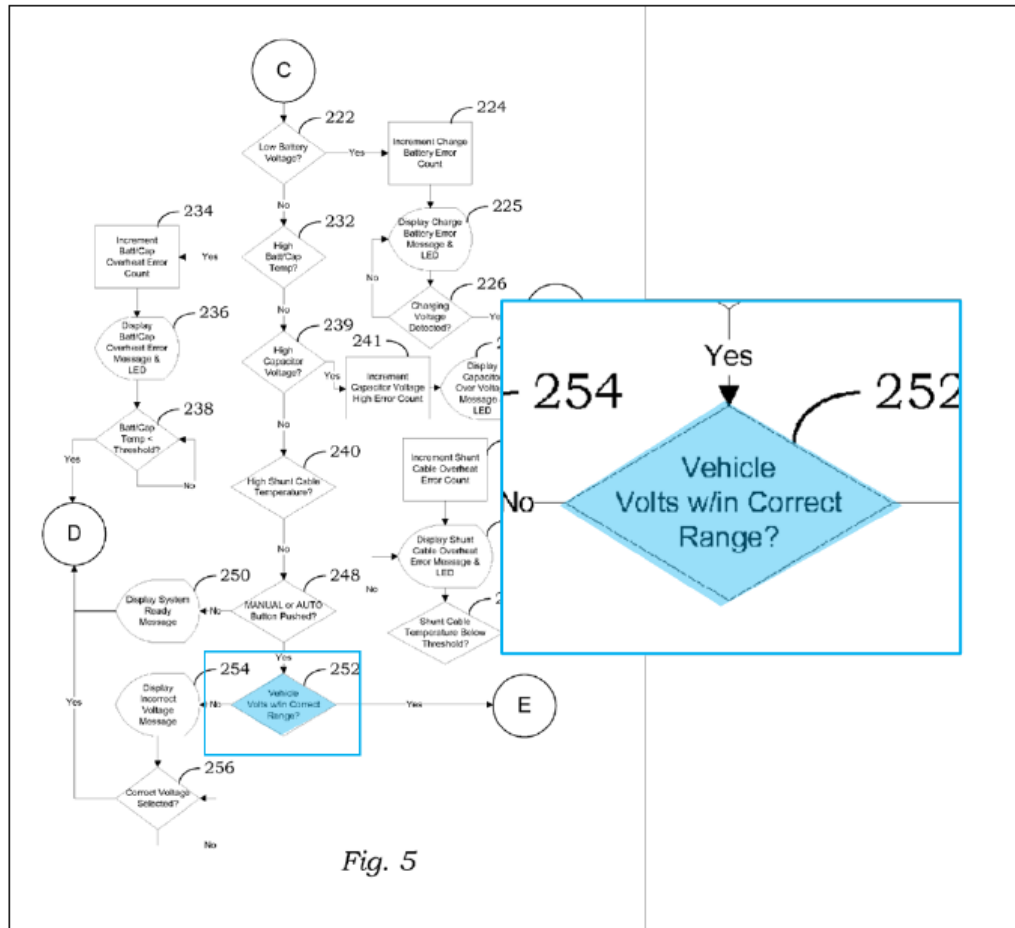


Fig. 5

[0034] If one of the push buttons 42 or 44 has been selected, the system will compare the operator-configured starter voltage against the voltage of the vehicle to be started 28. The jump starter 10 may be configured for 12, 18, 24, 30, 36, 42 or 48 volts, for example, using a selector jumper 55. For example, if the batteries 23 are both 12-volt batteries, the system may be configured for 12- or 24-volt operation. For example, if jumper 27 is placed across terminals 31, the 24-volt configuration may be selected. If jumper 29 is placed across terminals 31, the 12-volt configuration may be selected. If the batteries 23 are 12-volt batteries and a battery 25 is a 6-volt battery, 18- or 30-volt configurations may be provided. For example, if jumper 27 is placed across terminals 31, the 30-volt configuration may be selected. If jumper 29 is placed across terminals 31, the 18-volt configuration may be selected. It should be understood that two or more batteries of the same or different voltage levels may be used to meet the voltage requirements of the vehicle to be started. If the difference between the voltage selected and the voltage measured is not within a predetermined range and tolerance 252, a "Wrong Selector Volts" message is displayed 254 on the LCD 46 and further operation is prohibited until the

Ex. 1005 (Richardson), Fig. 5, para. [0034]

Richardson Fails to Teach Battery Isolation Sensor Claim Limitations



Petitioner's Original Argument

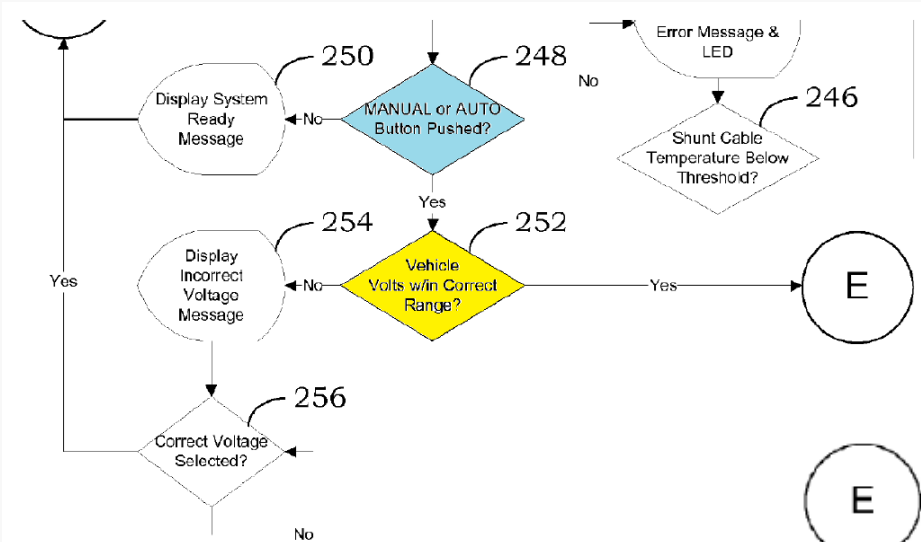
EX1003, §102. As a POSITA would have understood, Richardson's device makes a determination of battery presence at [step 252](#) of the processing loop in connection with the operation of vehicle voltage sensor 30. EX1005, FIG.5.; EX1003, ¶103.

Petition, p. 43

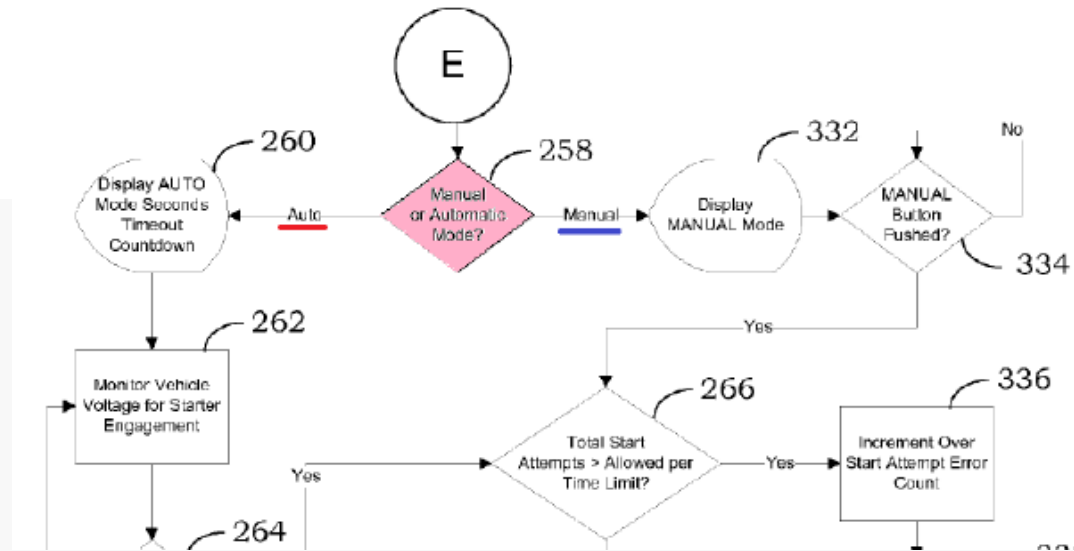
Ex. 1005 (Richardson), Fig. 5

DEMONSTRATIVE
EXHIBIT - NOT EVIDENCE

Richardson Fails to Teach Battery Isolation Sensor Claim Limitations



"If in manual mode, the jump starter 10 may be used when the battery voltage of the vehicle is below 10 volts, or if the vehicle's battery is not connected."



Ex. 1005 (Richardson), Figs. 5 & 6, para. [0049]

Richardson Fails to Teach Battery Isolation Sensor Claim Limitations

Petitioner's New Argument

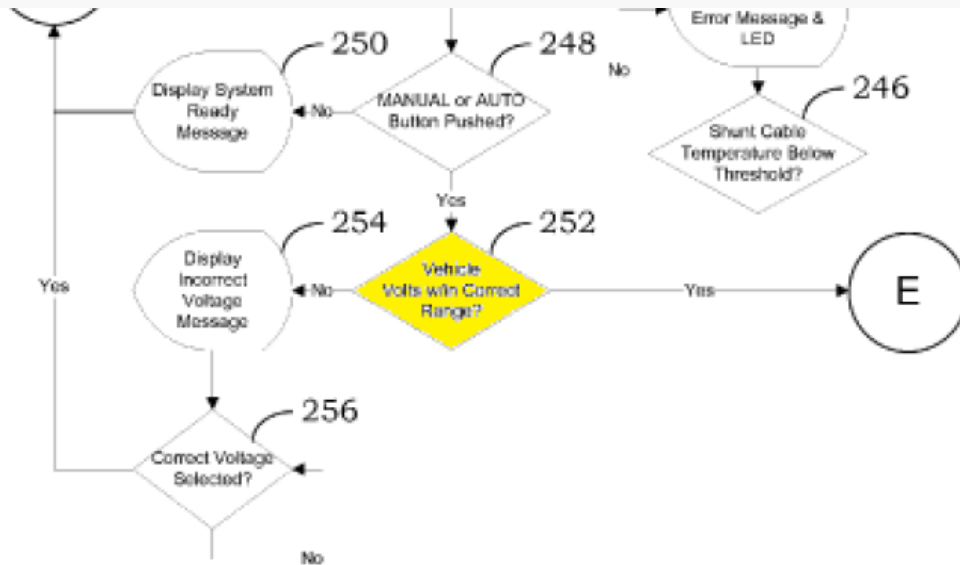


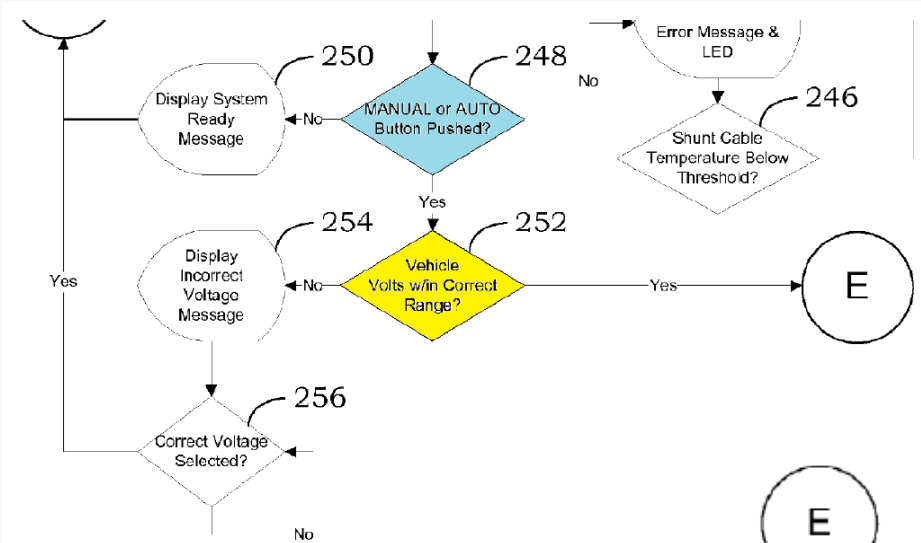
Fig. 5

Ex. 1005 (Richardson), Fig. 5

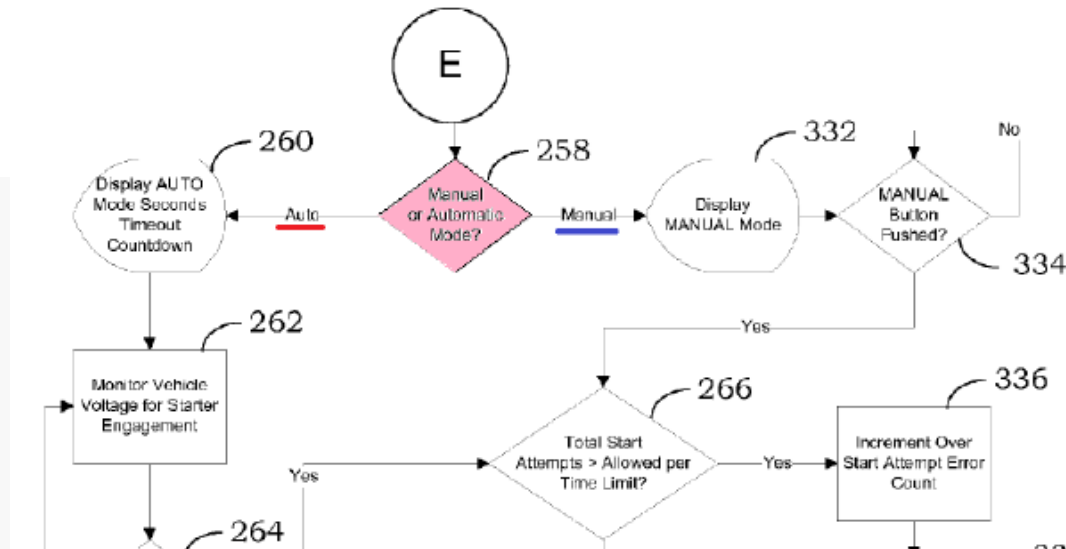
Accordingly, a POSITA would understand that when operating in auto-mode, Richardson's step 252 only returns a "yes" if an appropriate battery is present—as opposed to manual mode may be used if a battery is not present or if a battery voltage is under 10 volts (*e.g.*, a dead battery)). EX1005, ¶47 (stating that manual mode may be used for an under 10V battery and without a battery). Regardless of how manual mode operates, Richardson's disclosed auto-mode operates according to NOCO's alleged timing requirement for limitation 1[G]—step 252 detects an appropriate battery *before* the switch is closed. EX1057, ¶¶7-9.

Pet.'s Reply, p. 4

Richardson Fails to Teach Battery Isolation Sensor Claim Limitations



"Next, the system checks the status of the automatic 42 and manual 44 push buttons. If neither button has been pushed **248**, a "Ready" message is displayed 250... If one of the push buttons 42 or 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 selected voltage is within the correct range 252, **then** the system determines which button was selected **258**."

Ex. 1005 (Richardson), Figs. 5 & 6, paras. [0033]-[0035]

PATENTABILITY

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Richardson Fails to Teach Claim 5 Limitations

Yu Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

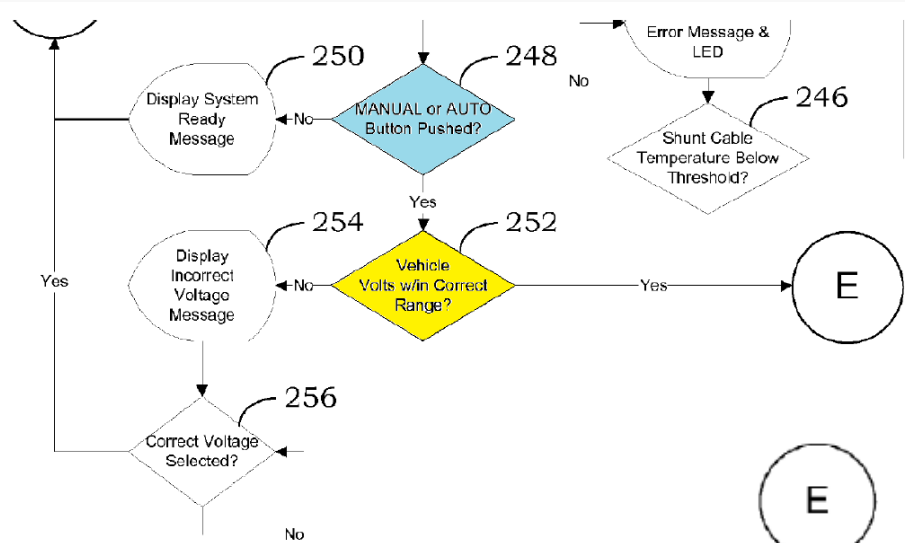
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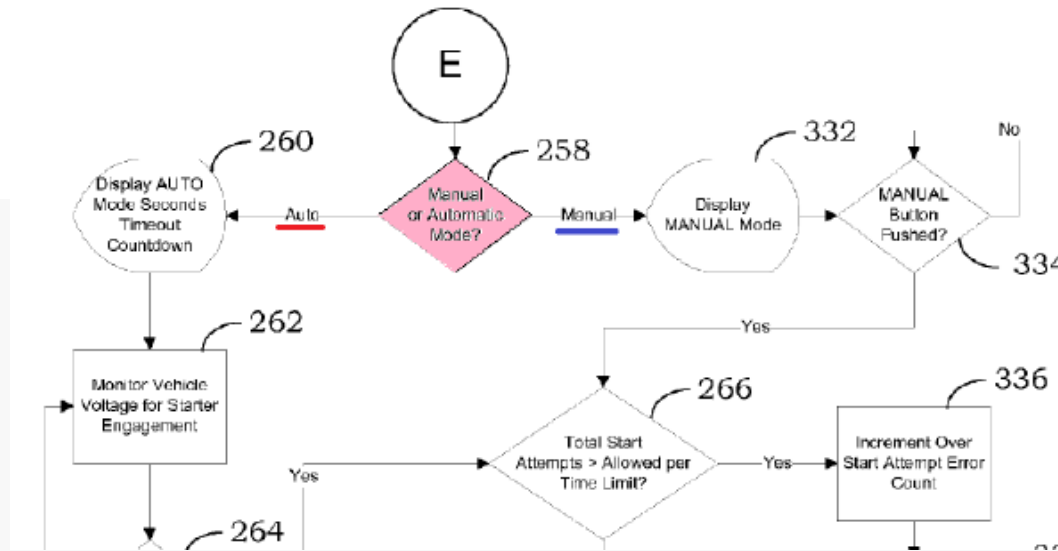
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The Petition Fails to Establish How to Combine Yu and Paparrizos

Richardson is Inoperable Under Petitioner's Interpretation



"If the difference between the voltage selected and the voltage measured is not within a predetermined range and tolerance 252... further operation is prohibited..."



"If in manual mode, the jump starter 10 may be used when the battery voltage of the vehicle is below 10 volts, or if the vehicle's battery is not connected."

Richardson is Inoperable Under Petitioner's Interpretation

“Enablement of prior art requires that the reference teach a skilled artisan – at the time of filing – to make or carry out what is disclosed in relation to the claimed invention without undue experimentation”

In re Morsa, 803 F.3d 1374, 1377 (Fed. Cir. 2015)

“if an obviousness case is based on a non-self-enabled reference, and no other prior art reference or evidence would have enabled a skilled artisan to make the claimed invention, then the invention cannot be said to have been obvious”

Raytheon Techs. Corp. v. GE, 993 F.3d 1374, 1377 (Fed. Cir. 2021)

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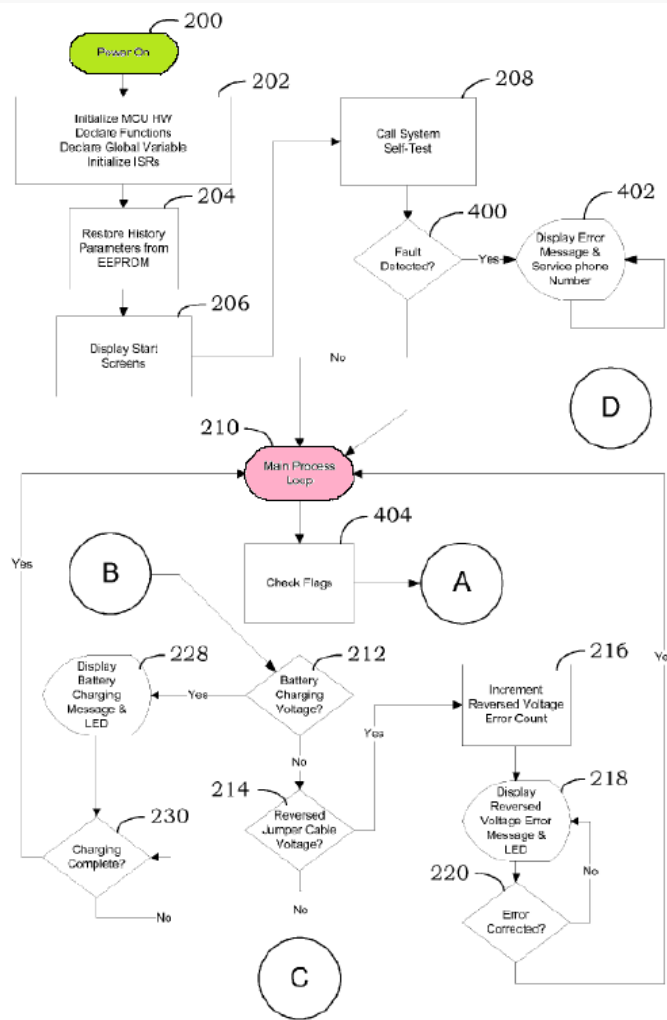


Fig. 3

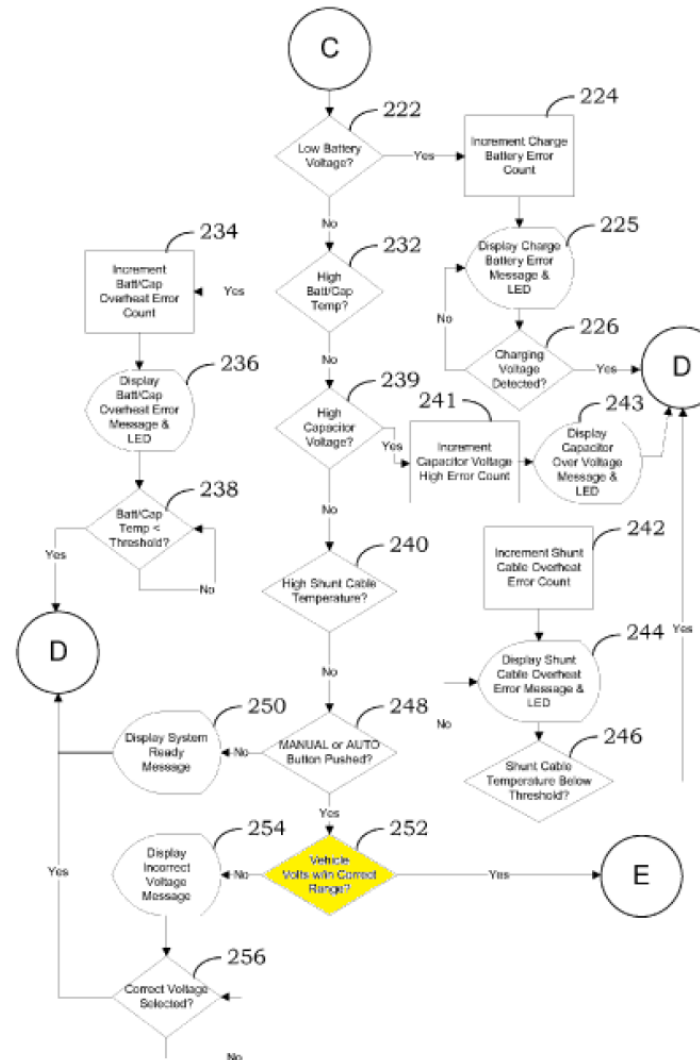


Fig. 5

5. The jump starter apparatus of claim 4, wherein the controller is configured to automatically cause the vehicle battery isolation sensor to **detect presence** of the vehicle battery and the reverse polarity sensor to detect polarity of the vehicle battery **when** the vehicle battery is electrically connected to the jump starter apparatus and **the jump starter apparatus becomes operational**.

Ex. 1005 (Richardson), Figs. 3 & 5;

Ex. 1001 ('203 Patent), 9:8-14

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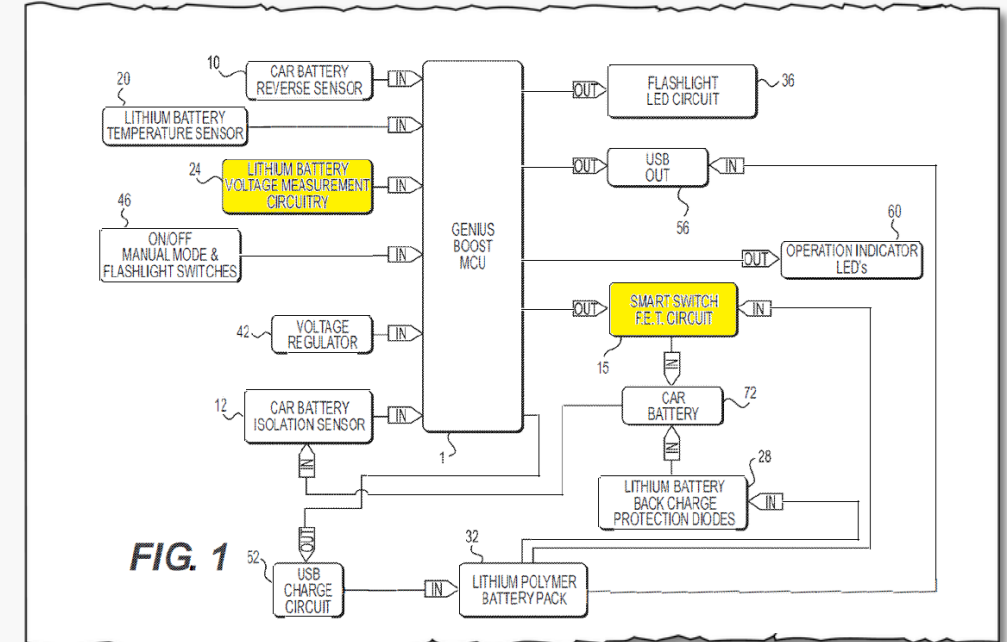
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 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.



Ex. 1001 ('203 Patent), 8:32-60 & Fig. 1

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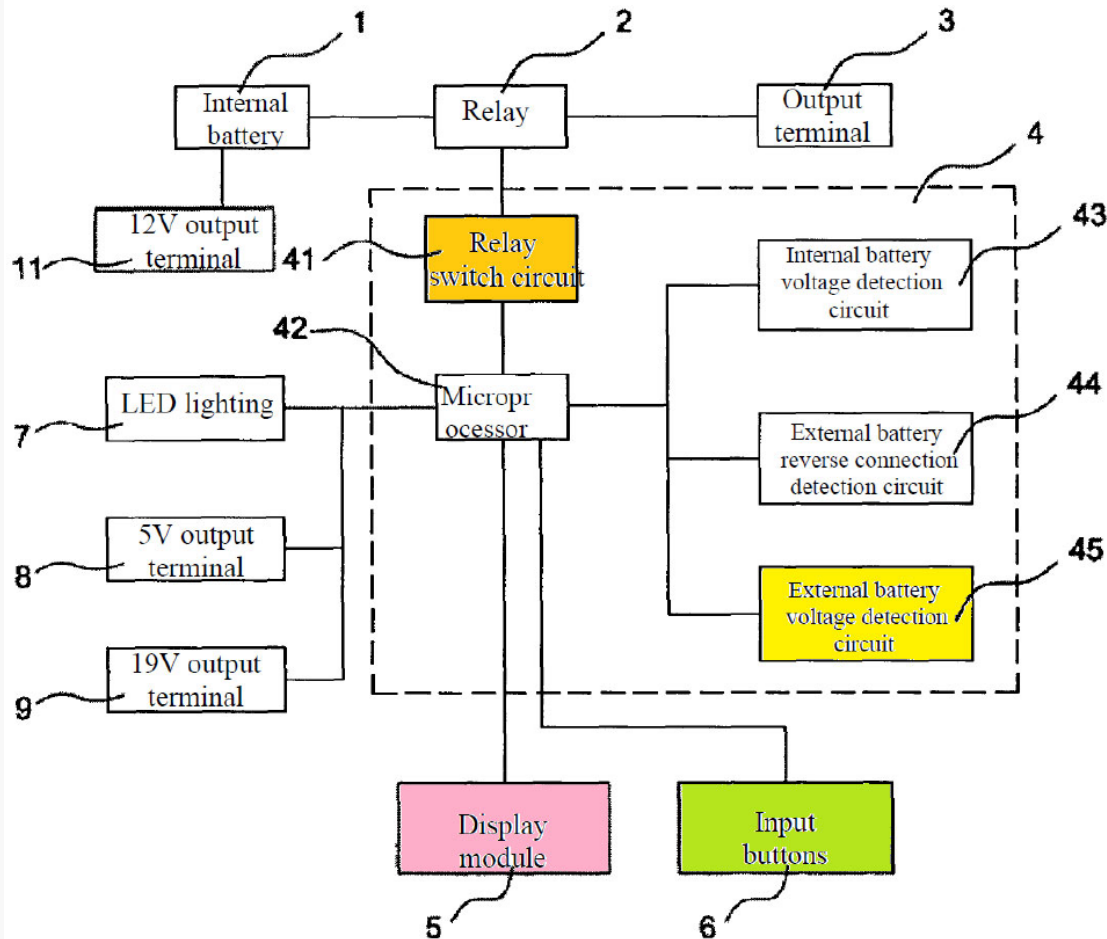


Fig. 1

"The microprocessor 42 will detect the external battery voltage and simultaneously display this voltage on the LCD. If the external battery voltage is within the normal range, then the JUMP button of the input buttons 6 can be pressed to close the relay 2, and the internal battery will output current to the vehicle to be started through the output terminal 3."

"A signal is provided to the microprocessor 42 through the external battery voltage detection circuit 45, so the external battery voltage can be displayed on the display module 5 to facilitate understanding of the external battery condition."

Ex. 1008 (Yu), Fig. 1, paras. [0026], [0027]; see also paras. [0006], [0009]; PO Response, pp. 46-51

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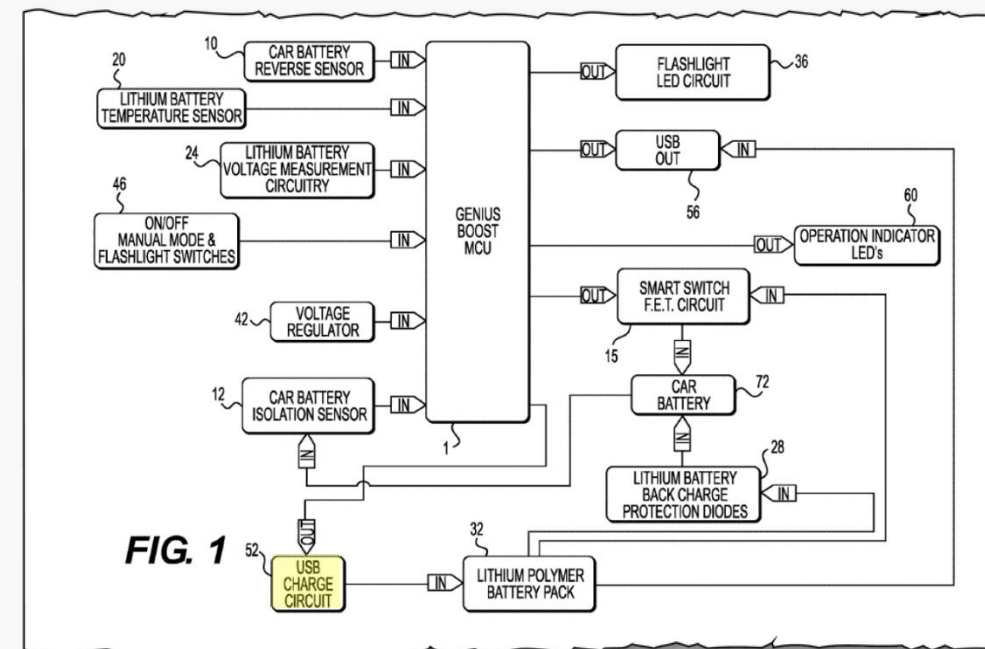
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U.S. Patent Nos. 11,667,203

Independent Claim 1

(USB Charging Limitations)

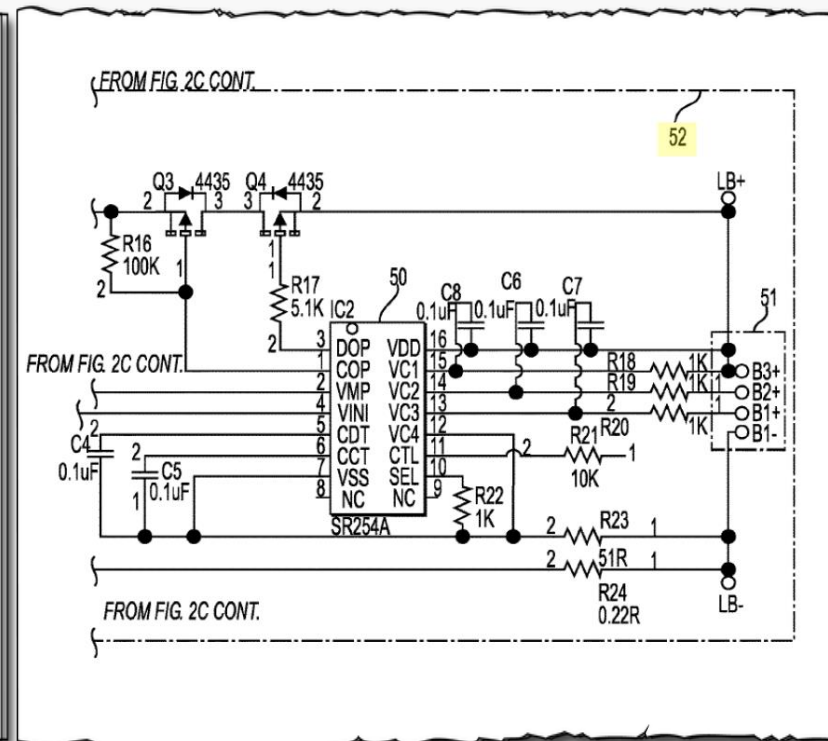
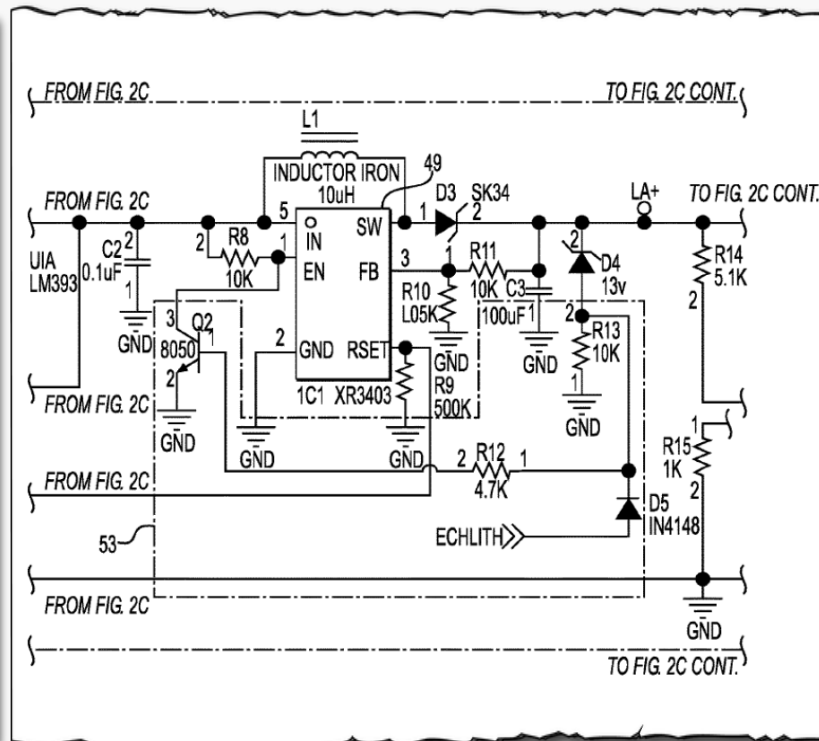
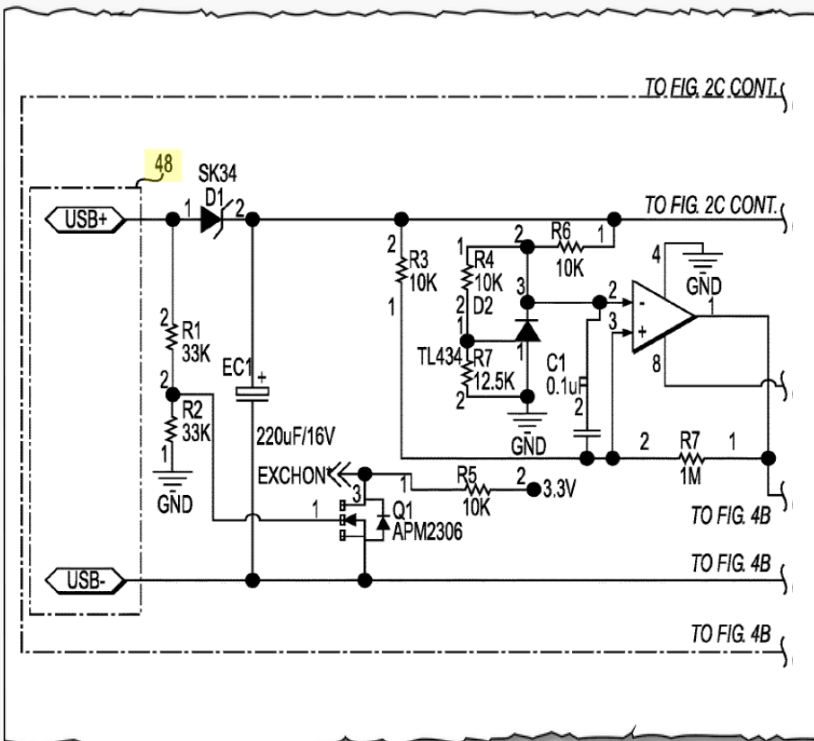
1. A jump starter apparatus for jump starting a vehicle battery, comprising:
 - a power supply that includes one or more rechargeable batteries;
 - a USB port configured to receive power from an external power source for charging the one or more batteries;
 - a DC-DC converter coupled between the USB port and the one or more rechargeable batteries and configured to increase a voltage received from the external power source for charging the one or more rechargeable batteries;
 - a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
 - a reverse polarity sensor, separate from the vehicle battery isolation sensor, configured to detect a proper polarity connection between the jump starter apparatus and the vehicle battery; and
 - a power switch configured to electrically connect the power supply to the vehicle battery,wherein the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that the power supply is connected to the vehicle battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.



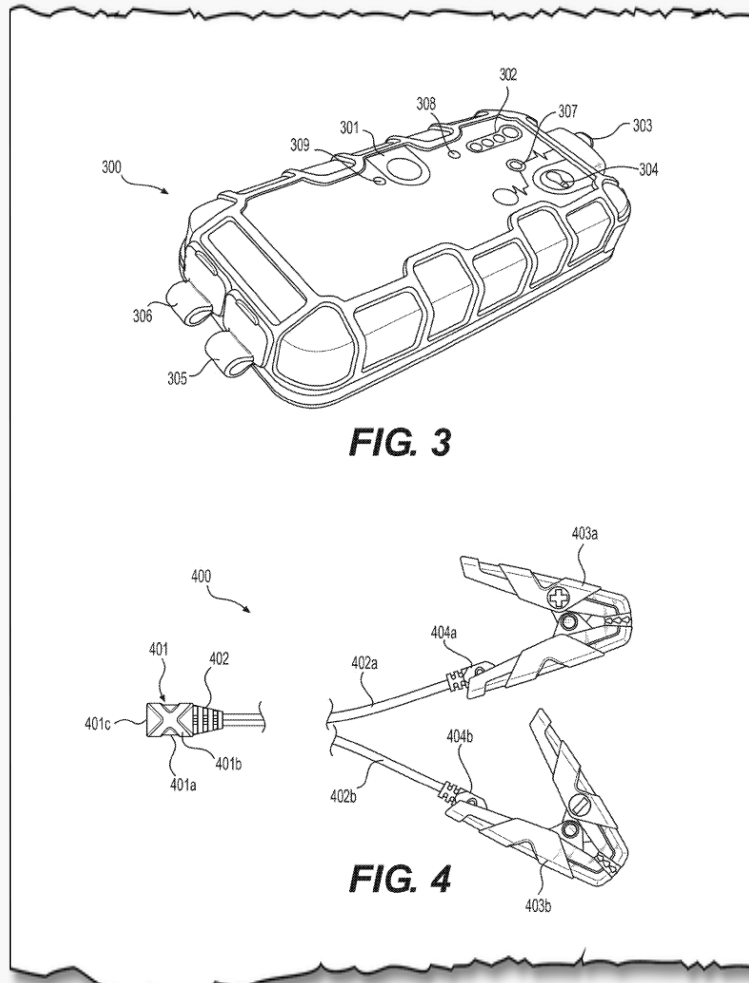
Ex. 1001 ('203 Patent), 8:32-60 & Fig. 1

The '203 Patent Provides Complete Diagrams of the USB Input/Charge Circuits

“The USB charge circuit **52** allows the internal lithium battery pack **32** to be charged using a standard USB charger.”



The Petition Misrepresents How a POSITA Would Have Viewed Jump Starters and USB at the Time of Filing



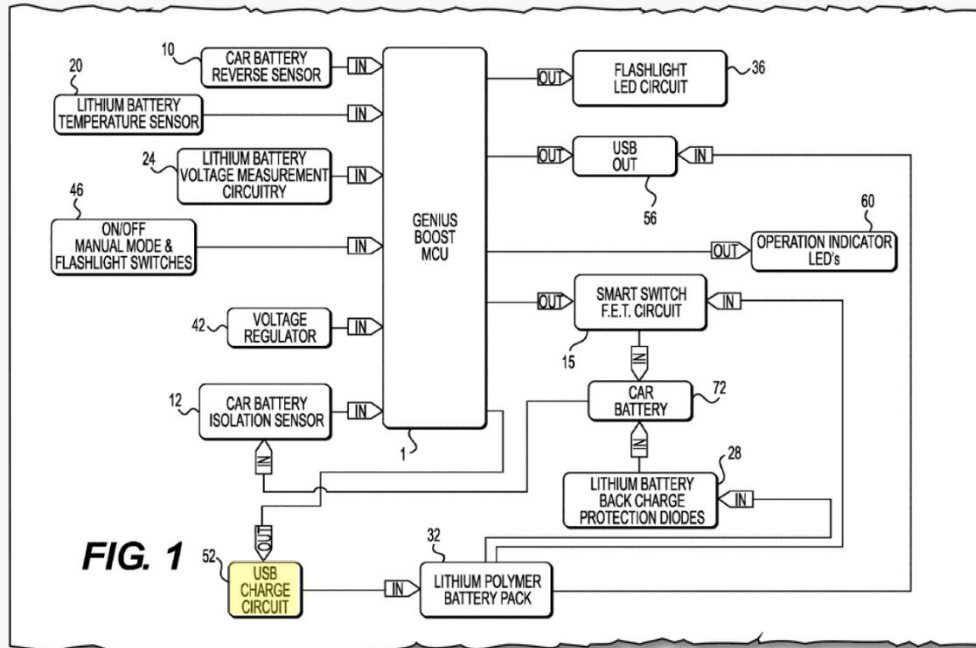
“[a]t the heart o the handheld battery booster is a lithium polymer battery pack 32, which stores sufficient energy to jump start a vehicle engine serves by a conventional 12 volt lead-acid or valve regulated lead-acid battery.” [’203 Patent, 4:23-27]

“USB charge circuit 52 converts power from any USB charger power source, charge voltage and current for charging the lithium battery pack 32.” [’203 Patent, 5:32-34]

“One of the key performance metrics for a jump starter device is the maximum current it can supply for the duration needed to jump start an engine (approximately 20-50 ms).” [Ex. 2003, para. 71] “These aforementioned factors necessitate that the battery cells (and thus the battery pack) of a jump starter have a substantially larger nominal capacity than would otherwise be needed in most other electronic applications, which generally require substantially lower peak current.” [*Id.*, para. 74].

“[u]nlike digital multimeters, pocket calculators, cellphones, or other small consumer electronic devices that Petitioner uses in its prior art examples, the high-power functionality of jump starters requires such devices to have large-capacity battery packs. **Because of this, vehicle jump starters are more equivalent to those of electric lawnmowers, snowblowers, and other high-power cordless tools.**” [Ex. 2003, para. 85]

The Petition Misrepresents How a POSITA Would Have Viewed Jump Starters and USB at the Time of Filing



“Because of the high capacity batteries required in a jump starter, it is my opinion that a PHOSITA would not have considered 2014-era USB to be a viable charging solution.” [Ex. 2003 (Fayed Decl.), para. 84]

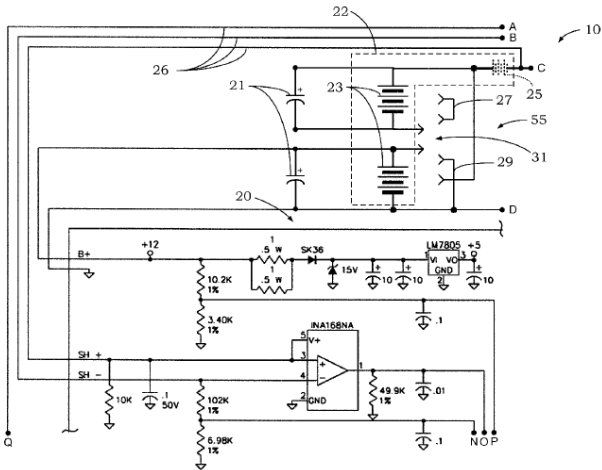
Ex. 1001 ('203 Patent), Fig. 1

The Petition Fails To Demonstrate That A PHOSITA Would Have Applied USB Charging Techniques To A Jump Starter At The Time Of The Priority Date

- USB was not a known technique for charging any large-capacity battery due, in part, to the extended charging times that were associated with USB in 2014.
- There was no perceived problem with using barrel chargers, nor was USB charging considered a known solution for charging any large-capacity batteries.
- Given the size of typical vehicle engines, jump starters are required to provide a massive peak current in order to properly function, typically between 1000 and 4000 amperes, which thereby requires portable jump starter devices to have large-capacity internal battery cells.
- Because of the high capacity batteries required in a jump starter, a PHOSITA would not have considered 2014-era USB, which was known to have a limited, specified power output, to be a viable charging solution.
- The Petition focuses only on charging voltage differences, and fails to recognize the differences between charging a consumer electronic device and a high-power, high-capacity battery for a jump starter.

Richardson Discloses a Heavy-Duty Commercial Jump Starter

(19)	United States	
(12)	Patent Application Publication	(10) Pub. No.: US 2013/0154543 A1
	Richardson et al.	(43) Pub. Date: Jun. 20, 2013
(54)	METHOD AND APPARATUS FOR PROVIDING SUPPLEMENTAL POWER TO AN ENGINE	(60) Provisional application No. 61/018,715, filed on Jan. 3, 2008.
(71)	Applicants: Francis D. Richardson, Eudora, KS (US); Richard L. Henderson, Leawood, KS (US); John A. Fox, Eudora, KS (US); Russell W. Sherwood, Olathe, KS (US)	Publication Classification
		(51) Int. Cl. <i>H02J 7/00</i> (2006.01)
		(52) U.S. Cl. CPC <i>H02J 7/007</i> (2013.01) USPC <i>320/104; 320/136; 320/134; 320/109</i>
(75)	Inventors: Francis D. Richardson, Eudora, KS (US); Richard L. Henderson, Leawood, KS (US); John A. Fox, Eudora, KS (US); Russell W. Sherwood, Olathe, KS (US)	(57) ABSTRACT
(21)	Appl. No.: 13/768,534	A method and apparatus provides supplemental power to an engine. The method and apparatus includes a pair of conductive leads for connecting the supplemental power to an engine electrical system, one or more batteries connected in parallel with one or more capacitors, a relay connected to the conductive leads, a shunt cable connecting the batteries and capacitors to the relay and a processor for controlling the relay to selectively apply electrical power to the engine electrical system. The method and apparatus includes safety features to reduce the risk of injury to the operator and damage to the apparatus and/or engine electrical system.
(22)	Filed: Feb. 15, 2013	
	Related U.S. Application Data	
(63)	Continuation-in-part of application No. 12/243,562, filed on May 6, 2009, which is a continuation-in-part of application No. 12/330,875, filed on Dec. 9, 2008, now abandoned.	



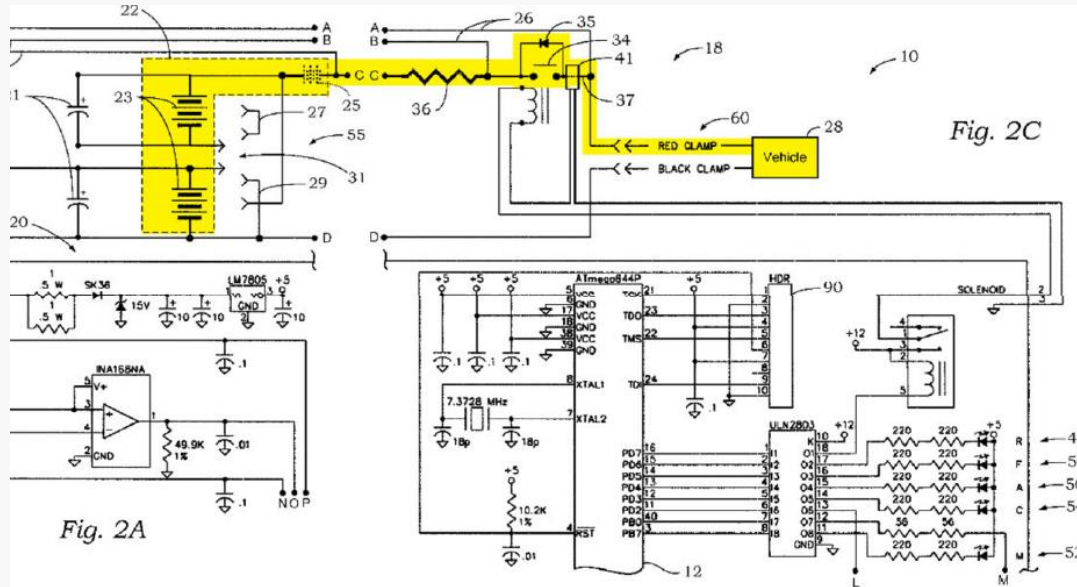
[0034] ...The jump starter 10 may be configured for 12, 18, 24, 30, 36, 42 or 48 volts, for example, using a selector jumper 55 ...If the batteries 23 are 12-volt batteries and a battery 25 is a 6-volt battery, 18- or 30-volt configurations may be provided.

Ex. 1005 (Richardson), paras. [0005], [0034];
PO Response, pp. 59-61

93. Richardson contemplates a battery pack with a capacity that is at least four times larger than that of a standard 12 volt vehicle charger... In fact, the commercial embodiment of Richardson is roughly the size of a suitcase and had wheels so that a user could roll it from vehicle to vehicle.

Ex. 2003 (Fayed Decl.) , para. 101

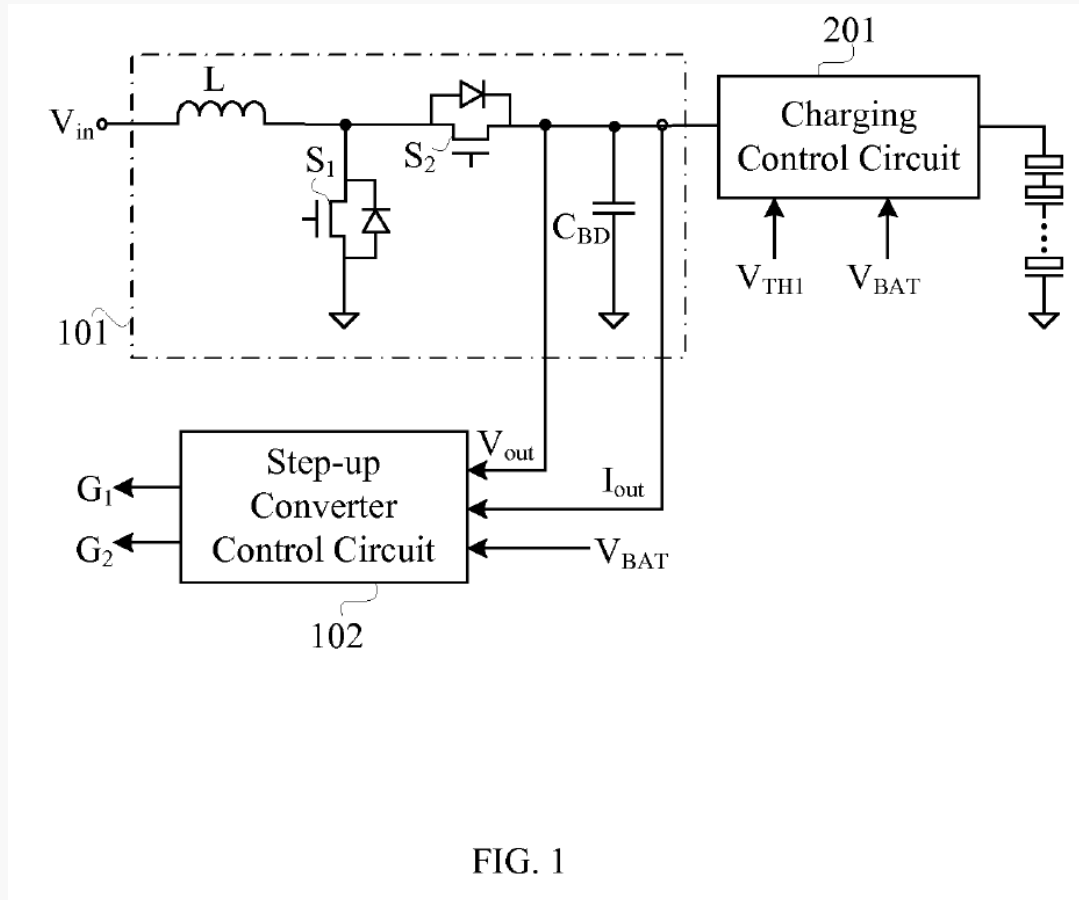
Richardson is Designed for Rapid Recharging



[0055] Referring to FIGS. 1 and 2, a diode 35 may be connected across the contact 34 to charge the capacitors 21 and jump starter batteries 22 from the vehicle charging system 28. The charging system of the vehicle may be used to charge the capacitors 21 and jump starter batteries 22... This allows the capacitors 21 and jump starter batteries 22 to be fully recharged in about 1 to 5 minutes and can therefore start many vehicles in a row without becoming discharged.... This is very useful when starting fleets of vehicles with dead batteries.

Ex. 1005 (Richardson), Fig. 2C, para.
[0055]; PO Response, pp. 59-61

Zhao is a Step-Up Charger for Low Power Devices.



When battery voltage V_{BAT} is greater than threshold voltage V_{TH1} , comparator 303 can output a high level signal to fully turn on power transistor Q_1 . In this case, the output signal of power stage circuit 101 can directly charge the battery device. When battery voltage V_{BAT} is greater than threshold voltage V_{TH1} but less than final voltage V_{CV} (e.g., final voltage V_{CV} can be about 8.4V if two lithium batteries are connected in series), step-up converter control circuit 102 can maintain output current I_{out} at a predetermined operating current...

FIG. 1

A POSITA Would Have Been Particularly Dissuaded From Even Attempting To Add USB Charging To The Unique Jump Starters Of Richardson

- The Petition fails to consider the actual system of Richardson, which has a very large capacity battery that relies on rapid recharging from a vehicle's electrical system
- A POSITA would not have considered the low-voltage, low-power charger of Zhao for jump starting vehicle batteries up to 48V
- A POSITA would not have considered Zhao's system suitable for rapid recharging a high-capacity battery ("in about 1 to 5 minutes")

PATENTABILITY

Collateral Estoppel Does Not Apply to Richardson Analysis

Richardson Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

Richardson is Inoperable Under Petitioner's Interpretation

Richardson Fails to Teach Claim 5 Limitations

Yu Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

A POSITA Would Not Have Modified Richardson to Add USB Charging

The Petition Fails to Establish How to Combine Richardson and Zhao

A POSITA Would Not Have Modified Yu to Add USB Charging

The Petition Fails to Establish How to Combine Yu and Paparrizos

The Petition Fails to Establish How to Combine Richardson and Zhao

A POSITA would have been motivated to combine Zhao's charging system—which uses a DC-DC converter to boost a 5V USB input—with Richardson's jump starter in order to provide multiple ways of charging Richardson's battery, including through the use of a 5V USB input.

Petition, p. 39

The Petition Fails to Establish How to Combine Richardson and Zhao

~~A POSITA would have been motivated to combine Zhao's charging system—which uses a DC-DC converter to boost a 5V USB input—with Richardson's jump starter in order to provide multiple ways of charging Richardson's battery, including through the use of a 5V USB input.~~

Richardson

[0034] ...The jump starter 10 may be configured for 12, 18, 24, 30, 36, 42 or 48 volts, for example, using a selector jumper 55. For example, if the batteries 23 are both 12-volt batteries, the system may be configured for 12- or 24-volt operation.

Ex. 1005 (Richardson), para. [0034]

Zhao

When battery voltage V_{BAT} is greater than threshold voltage V_{TH1} , comparator 303 can output a high level signal to fully turn on power transistor Q_1 . In this case, the output signal of power stage circuit 101 can directly charge the battery device. When battery voltage V_{BAT} is greater than threshold voltage V_{TH1} but less than final voltage V_{CV} (e.g., final voltage V_{CV} can be about 8.4V if two lithium batteries are connected in series)...

Ex. 1006 (Zhao), 4:34-41

The Petition Fails to Establish How to Combine Richardson and Zhao

- Richardson is a heavy-duty jump starter (12V-48V) that is unsuitable for USB charging
- Richardson emphasizes the importance of rapid recharging which could not have been achieved with USB charging
- Richardson discloses no charging circuitry other than charging from the vehicle battery
- The Petition fails to demonstrate *how* to incorporate Zhao's low-power charging system into Richardson's high-power jump starter
- The Petition fails to demonstrate that Zhao's step-up converter is compatible with Richardson's high-power jump starter

PATENTABILITY

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A POSITA Would Not Have Modified Richardson to Add USB Charging

The Petition Fails to Establish How to Combine Richardson and Zhao

A POSITA Would Not Have Modified Yu to Add USB Charging

The Petition Fails to Establish How to Combine Yu and Paparrizos

Paparrizos is a Step-Up Charger for Low Power Devices

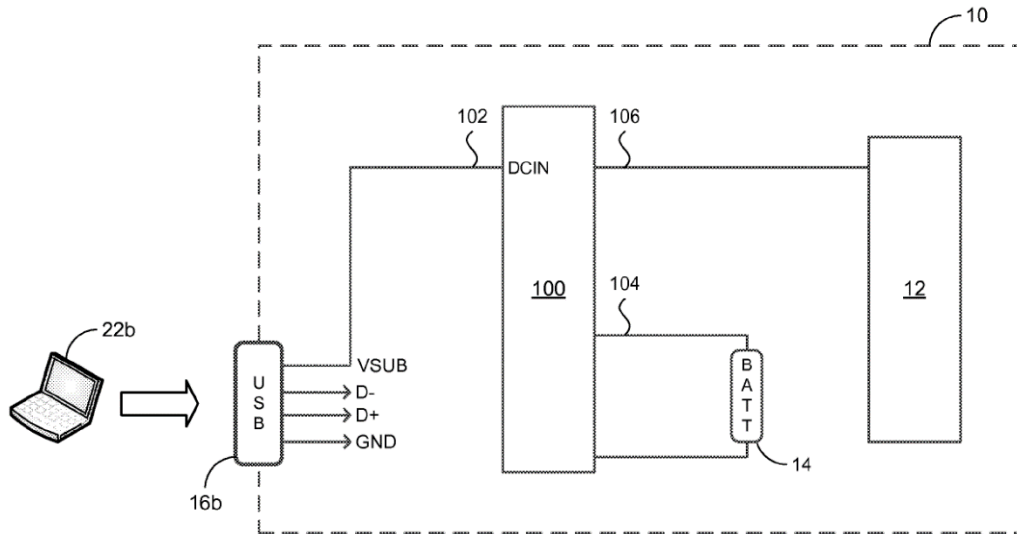


Fig. 1B

FIG. 1 shows a high level block diagram of an electronic device 10 that incorporates a battery charging circuit 100 in accordance with the present disclosure. For example, the electronic device 10 may be a smartphone, personal data assistant, portable computer, computing tablet, digital imaging devices, audio devices, and so on.

Yu Already Contemplated USB Charging and Boost Conversion

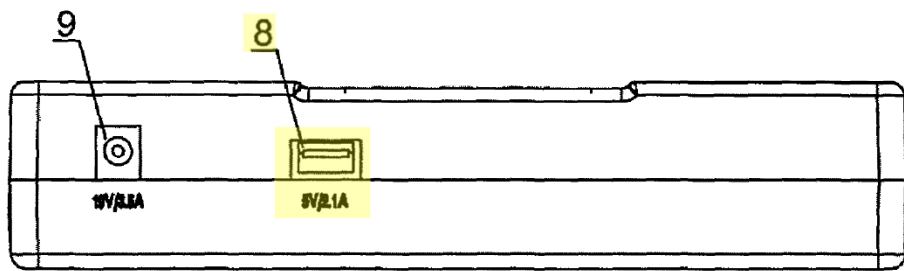


Fig. 7

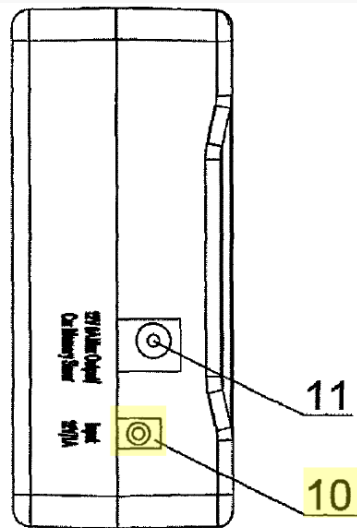


Fig.9

Ex. 1008 (Yu), Figs. 1, 7, 9;
Ex. 2003 (Fayed Decl.),
para. 127-128

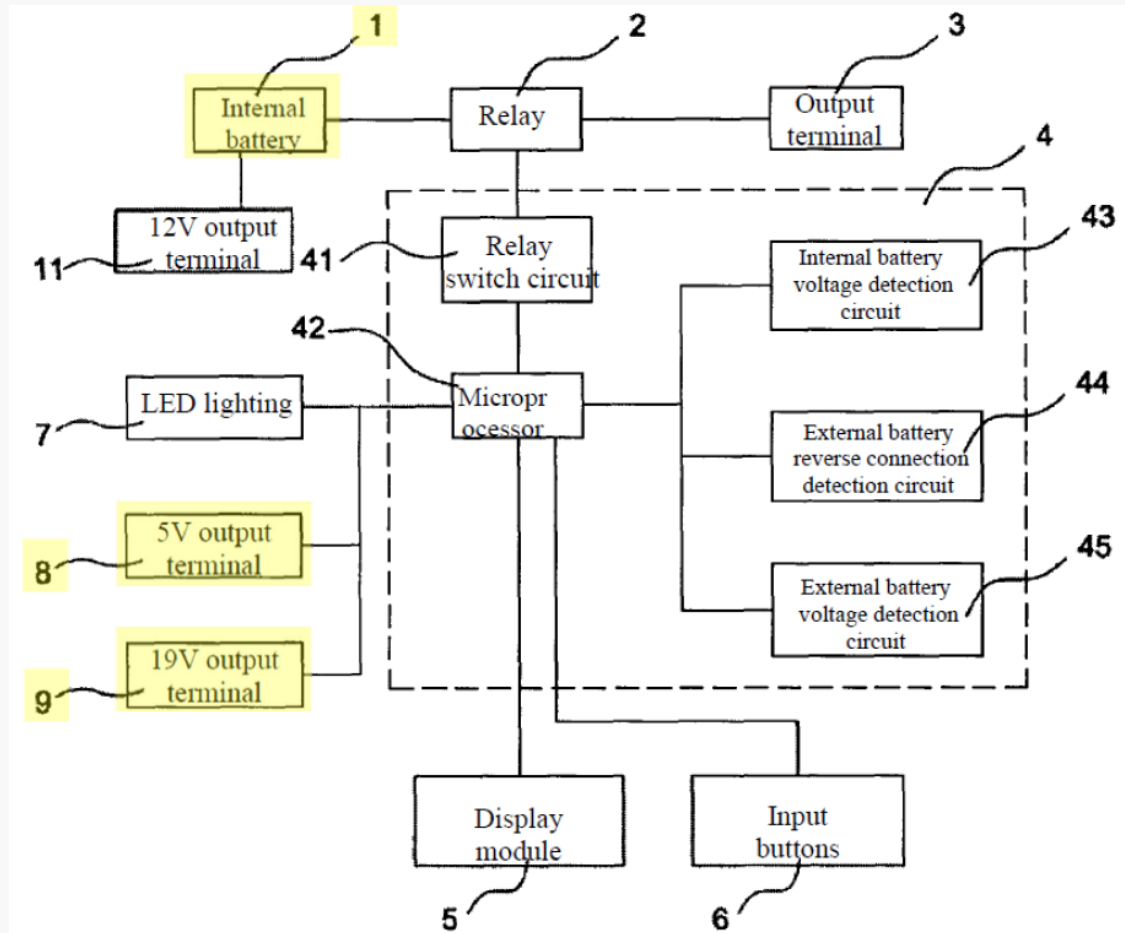


Fig. 1

PATENTABILITY

Collateral Estoppel Does Not Apply to Richardson Analysis

Richardson Fails to Teach Vehicle Battery Isolation Sensor Claim Limitations

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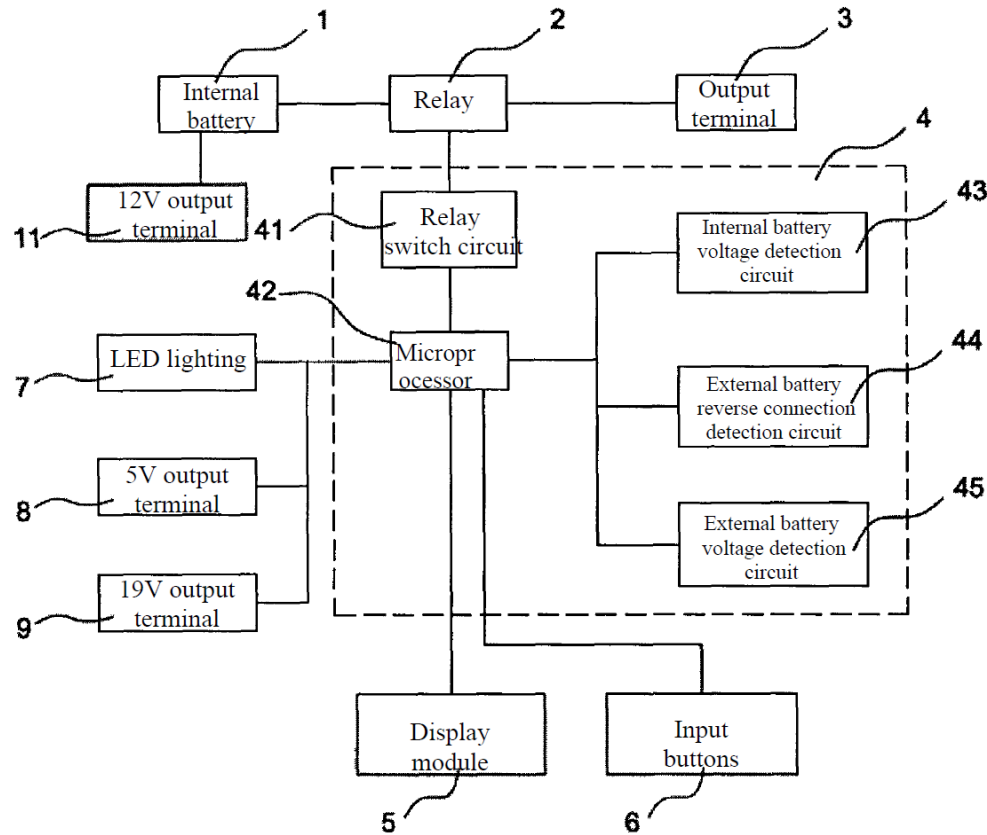


Fig. 1

Ex. 1008 (Yu), Fig. 1

DEMONSTRATIVE
EXHIBIT - NOT EVIDENCE

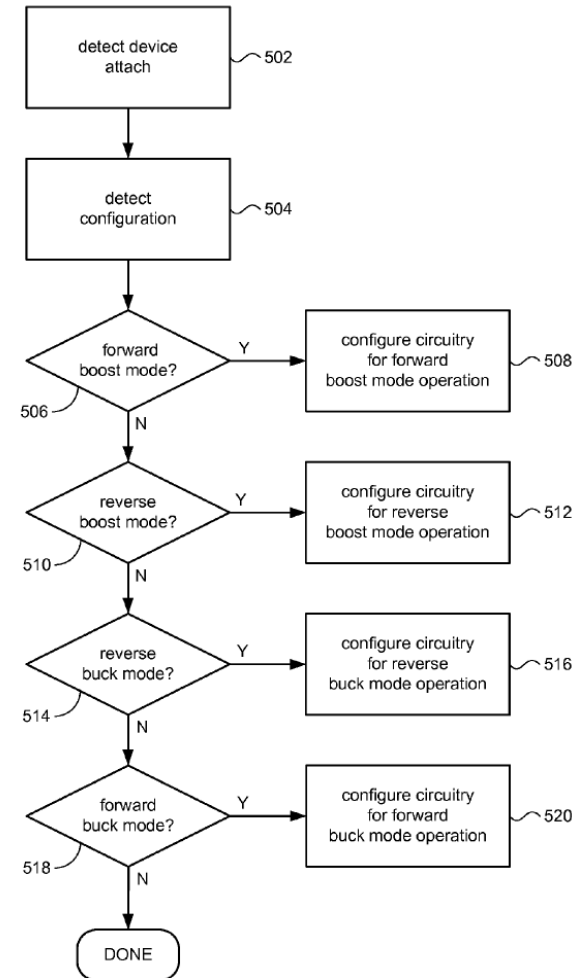


Fig. 5

Ex. 1009 (Paparrizos),
Fig. 5

PO Response, pp. 59-61;
Ex. 2003 (Fayed Decl.),
para. 132-135;
PO Preliminary Response,
pp. 49-51

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Petitioner's Reply Calculations Are Improper

- Petitioner tries to demonstrate that “a 72-hour charging time is a [sic] reasonable/practical/typical/useful for a portable jump starter” by pointing to the PSX3 device. Rep., pp. 18-19.
- Petitioner then uses the PSX3 “reasonable” charging time and compares it to calculated values that allegedly represent charging times of the V39 device.
- But Dr. MacCarley’s alleged charging times conflict with Petitioner’s own evidence:
 - Dr. MacCarley claims that a charging power of 10W would take only 3.9 hours to charge. Ex. 1057, pp. 40-41.
 - But the V39 device is described as taking “10 hours” to fully charge from “8 Watts” of charging power. Ex. 1061, p. 1.

GROUND 2 AND 5 ARE IMPROPERLY BASED ON NON-PRIOR ART EVIDENCE

Petitioner requests cancellation of claims 1-11 on the following grounds:

Ground	Claims	Obviousness Combination under §103
G1	1, 3-5, 9	Richardson in view of Zhao
G2	2, 10, 11	G1 combination in further view of AAPA or Epower-20/Epower-21
G3	6-8	G1 combination in further view of Krieger
G4	1, 3-5, 9	Yu in view of Paparrizos
G5	2, 10, 11	G4 combination in further view of AAPA or Epower-20/Epower-21
G6	6-8	G4 combination in further view of Krieger

“the basis of an IPR ground ‘can only include prior art consisting of patents or printed publications, and because AAPA is not a prior art patent or printed publication (per *Qualcomm I*), it follows that the plain meaning of [35 U.S.C.] § 311(b) does not permit the basis to include AAPA.”

Qualcomm Inc. v. Apple Inc., 134 F.4th 1355, 1364-65 (Fed. Cir. 2025)

“We see no support for the position that an IPR petitioner should not be held to its express inclusion of AAPA in the basis of a ground.”

Qualcomm, 134 F.4th at 1368