

IPR2024-01219
EX1057 - Declaration of C. Arthur MacCarley
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DELTRAN USA LLC
Petitioner

v.

THE NOCO COMPANY
Patent Owner

Case IPR2024-01219
Patent No. 11,667,203

DECLARATION OF C. ARTHUR MACCARLEY, Ph.D., P.E.
IN SUPPORT OF PETITIONER'S REPLY
TO PATENT OWNER'S RESPONSE

UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42

TABLE OF CONTENTS

UPDATED EXHIBIT INDEX	iii
LISTING OF CHALLENGED CLAIMS	vii
I. NOCO MISCHARACTERIZES THE FACTS, THE PETITION, AND THE PRIOR ART	1
A. Richardson Teaches Limitation 1[G]	1
1. Even under NOCO’s construction, Richardson’s step 252 teaches Limitation1[G].	2
2. NOCO’s argument that Richardson is inoperable is irrelevant to the grounds of the petition and is factually incorrect.	6
B. Yu Teaches Limitation 1[G]	17
C. NOCO’s Motivation to Combine Arguments are disingenuous and factually incorrect.....	22
1. NOCO does not argue that USB would not work given sufficient time.....	23
2. NOCO has ignored prior art evidence showing that USB charged jump starters were known prior to the ’203 patent.	24
3. NOCO is incorrect that “USB [is] a nonviable option for portable jump starters.”	32
4. USB Charging would have been appropriate for both Richardson and Yu and a POSITA would have been motivated to add USB charging to both Richardson and Yu. ...	46
D. Richardson Teaches Claim 5	53
1. NOCO’s interpretation of claim 5 is based on ignoring key portions of the claim.	53

EX1057 - Declaration of C. Arthur MacCarley

2.	Under a correct understanding of the claim, Richardson teaches claim 5.....	58
----	---	----

II.	ARGUMENTS RAISED BY DR. FAYED AND NOT PRESENTED IN NOCO’S PATENT OWNER RESPONSE	58
-----	---	----

UPDATED EXHIBIT INDEX

Ex #	Exhibit Description
1001	U.S. Patent No. 11,667,203 (“the ’203 patent”)
1002	Prosecution History of the ’203 patent
1003	Expert Declaration of C. Arthur MacCarley
1004	<i>Curriculum Vitae</i> for C. Arthur MacCarley
1005	U.S. Patent Publication No. 2013/0154543 A1 to Richardson et al. (“Richardson”)
1006	U.S. Patent No. 9,391,467 B2 to Zhao et al. (“Zhao”)
1007	Chinese Utility Model Patent No. CN 203211234 U to Yu (“Yu”)
1008	Certified English Translation of Yu
1009	U.S. Patent No. 9,219,372 B2 to Paparrizos et al. (“Paparrizos”)
1010	U.S. Patent Publication No. 2004/0130298 A1 to Krieger et al. (“Krieger”)
1011	U.S. Patent Publication No. 2013/0241488 A1 to Dao (“Dao”)
1012	Carku Product Brochure for the Epower-20 jump starter product (“Epower-20”)
1013	Carku Product Brochure for the Epower-21 jump starter product (“Epower-21”)
1014	IPR2020-00944 Exhibit 1022 – Declaration of Xingliang (Leon) Lei
1015	IPR2020-00944 Exhibit 2024 – Transcript of Deposition of Xingliang (Leon) Lei
1016	U.S. Patent Publication No. 2013/0285596 A1 to Zhou et al. (“Zhou”)
1017	U.S. Patent No. 9,035,599 B2 to Amemiya et al. (“Amemiya”)
1018	Chinese Utility Model Patent No. CN 202512152 U

Ex #	Exhibit Description
1019	Certified English Translation of CN 202512152 U
1020	Chinese Utility Model Patent Publication No. CN 201226449Y
1021	Certified English Translation of CN 201226449Y
1022	Chinese Utility Model Patent No. CN 203788026 U
1023	Certified English Translation of CN 203788026 U
1024	Declaration of Jeffrey L. Ravencraft of USB Implementers Forum, Inc., dated October 28, 2023 (“Ravencraft Decl.”)_
1025	Battery Charging Specification, Revision 1.0, Mar. 8, 2007 from the Universal Serial Bus Implementers Forum (“USB-IF”), Ex. D to Ravencraft Decl.
1026	Transcript of Deposition of Bryan A. Legates, dated September 25, 2023 (“Legates Dep. Tr.”)
1027	Bryan Legates, “Current-Limited DC/DC Converter Simplifies USB Power Supplies,” LINEAR TECHNOLOGY MAGAZINE, (Feb. 1, 2001),
1028	Complaint filed against Defendants in the Middle District of Florida (ECF No. 1), filed on November 13, 2023
1029	XR3403 Datasheet by XySemi Inc., Rev. 0.5
1030	Defs. Deltran USA and Deltran Operations USA Stipulation Regarding Invalidity Contentions
1031	Brents, Barry, “Automotive Electronics Drive The Need For Circuit Protection,” Electronic Design (May 7, 2014), accessed via https://www.electronicdesign.com/technologies/power/article/21799679/automotive-electronics-drive-the-need-for-circuit-protection
1032	Healey, James R., “Newest VW lacks USB, only iPhones welcome,” USA Today (July 8, 2014), accessed via https://www.usatoday.com/story/money/cars/2014/07/08/vw-gti-2015-usb-iphone/12378577/
1033	U.S. Patent No. 9,007,015 to Nook et al. (“the ’015 Patent”)
1034	Final Written Decision in IPR2020-00944 (Paper 73) as to the ’015 Patent, dated November 3, 2021

Ex #	Exhibit Description
1035	Judgment Affirmed, Fed. Cir. R. 36 (ECF No. 52) in Nos. 2022-1646, 2022-1741, Fed. Cir. appealed from IPR2020-00944, dated February 12, 2024
1036	U.S. Patent No. 5,793,185 to Prelec et al. (“Prelec”)
1037	[INTENTIONALLY BLANK]
1038	[INTENTIONALLY BLANK]
1039	Excerpt of Prosecution History of the ’023 patent, Amendment and Response to Non-Final Office Action dated October 25, 2021
1040	U.S. Patent No. 9,954,391 to Lei (“Lei”)
1041	U.S. Patent No. 2007/0108940 to Sainomoto et al. (“Sainomoto”)
1042	Fronter Economics, The Development of the USB Standard, An Interoperability Case Study (available at https://www.frontier-economics.com/media/uful43pg/case-study-the-development-of-the-usb-standard-final.pdf), last visited July 11, 2024.
1043	Wikipedia.co, USB, (available at https://en.wikipedia.org/wiki/USB), last visited on July 11, 2024.
1044	www.diskmfr.com , USB versions differences and development history (available at https://www.diskmfr.com/usb-versions-differences-and-development-history/), last visited July 11, 2024.
1045	Wikipedia.com, Boost Converter (available at https://en.wikipedia.org/wiki/Boost_converter), last accessed July 11, 2024.
1046	U.S. Patent No. 4,451,743 to Suzuki et al.
1047	IPR2024-00577, Patent Owner Preliminary Response, June 4, 2024
1048	IPR2024-00671, Patent Owner Preliminary Response, June 13, 2024
1049	“Chevrolet, GMC Pack USB Ports Into 2014 Pickups,” cars.com (2013) (available at https://www.cars.com/articles/chevrolet-gmc-pack-usb-ports-into-2014-pickups-1420663052892/) (last accessed July 14, 2024)
1050	Len Sherman, “The Basics of USB Battery Charging: A Survival Guide,” Maxim Integrated (December 9, 2010)
1051	Comparison of invalidated ’015 patent claims to ’203 patent claims

IPR2024-01219
EX1057 - Declaration of C. Arthur MacCarley

Ex #	Exhibit Description
1052	Wayback Machine Capture of www.bestbuy.com from June 3, 2012
1053	Declaration of Yingchun Wan, dated May 11, 2020
1054	IPR2024-0000671, Decision Granting Institution of <i>Inter Partes Review</i> , August 29, 2024
1055	IPR2024-00577, Decision Granting Institution of <i>Inter Partes Review</i> , August 29, 2024
1056	Def. Deltona Transformer Corp.'s Stipulation Regarding Invalidity Contentions
1057	Reply Expert Declaration of C. Arthur MacCarley
1058	Transcript of Deposition of Dr. Fayed
1059	Public Trial Transcript pages 794-1069, ITC-337-TA-1359
1060	Final Initial Determination, ITC-337-TA-1359
1061	Voltaic V39 archived website (2013)
1062	Powerstation PSX3 Jump Starter Manual 2013
1063	YouTube Video regarding PSX Jump Starter
1064	Archived website – Richardson Infinity Series Jump Starter
1065	Dell Alienware 18 Specifications (2013)
1066	Transcript of Deposition of Dr. Fayed in IPR2024-00671
1067	Voltaic V39 archived website showing USB cable
1068	IPR2024-00671, Paper 24, Final Written Decision, '243 patent (August 26, 2025)
1069	IPR2024-00577, Paper 25, Final Written Decision, '023 patent (August 26, 2025)

LISTING OF CHALLENGED CLAIMS

U.S. Patent No. 11,667,203 (Claims 1-11)

Claim	Claim Language
1[PRE]	A jump starter apparatus for jump starting a vehicle battery, comprising:
1[A]	a power supply that includes one or more rechargeable batteries;
1[B]	a USB port configured to receive power from an external power source for charging the one or more batteries;
1[C]	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;
1[D]	a vehicle battery isolation sensor configured to detect presence of the vehicle battery connected to the jump starter apparatus;
1[E]	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
1[F]	a power switch configured to electrically connect the power supply to the vehicle battery,
1[G]	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.
2	The jump starter apparatus of claim 1, wherein the jump starter apparatus is a hand-held device.
3[A]	The jump starter apparatus of claim 1, further comprising: a positive battery terminal connector for electrically connecting the jump starter apparatus to a positive terminal of the vehicle battery; and

Claim	Claim Language
3[B]	a negative battery terminal connector for electrically connecting the jump starter apparatus to a negative terminal of the vehicle battery.
4	The jump starter apparatus of claim 1, further comprising: a controller that receives the signals from the vehicle battery isolation sensor and the reverse polarity sensor and controls the power switch.
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.
6	The jump starter apparatus of claim 1, wherein the power switch is a FET switch.
7	The jump starter apparatus of claim 1, wherein the reverse polarity sensor comprises an optically coupled isolator phototransistor coupled to a vehicle battery terminal connector via a diode.
8	The jump starter apparatus of claim 1, wherein the vehicle battery isolation sensor comprises an optically coupled isolator phototransistor coupled to a vehicle battery terminal connector via a diode.
9	The jump starter apparatus of claim 1, further comprising: a battery charge controller configure [sic] to control charging of the one or more rechargeable batteries from the USB port.
10	The jump starter apparatus of claim 9, wherein the jump starter apparatus is further configured to provide power for charging an external device.

Claim	Claim Language
11	The jump starter apparatus of claim 10, further comprising: a USB output port for providing power from the rechargeable power supply for charging the external device.

1. I, C. Arthur MacCarley, hereby declare that the following is true and correct. I previously provided a declaration filed as Exhibit 1003 in support of the Petition for Inter Partes Review of U.S. Patent No. 11,667,203 (“Petition”). My testimony from my first Declaration remains the same. I am competent to make this Declaration based upon my personal knowledge and technical expertise for the reasons set forth in my first Declaration. If called to testify, I could and would testify honestly, under oath, to the matters set forth herein. The opinions I express in this Declaration are from the perspective of a person of ordinary skill in the art (“POSITA”) at the time of the ’203 patent’s July 3, 2014 priority date, unless stated otherwise.

2. For purposes of preparing this Declaration, I have considered all materials filed in this proceeding to date and the additional materials cited herein.

I. NOCO MISCHARACTERIZES THE FACTS, THE PETITION, AND THE PRIOR ART

A. Richardson Teaches Limitation 1[G]

3. Richardson teaches limitation 1[G] both under the plain and ordinary meaning and under NOCO’s strained construction. Richardson’s system when used in “auto” mode unambiguously teaches the limitation. *See* Pet., 48-49.

4. Limitation 1[G] requires that:

... the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor such that

EX1057 - Declaration of C. Arthur MacCarley

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. EX1001, claim 1.

Dr. Fayed and NOCO do not dispute that Richardson performs reverse polarity detection. *See* POR, 45-46. For example, Dr. Fayed testified that “...before [Richardson] turns on the contact relay to start the jump-starting process, [Richardson] will be determining whether the connection is in the right polarity or not.” EX1058, 21:8-11. Instead, NOCO argues that step 252 of Richardson fails to teach detecting the presence of a battery according to the order-of-steps (allegedly) required by limitation 1[g]. However, NOCO has mischaracterized the petition’s mapping of Richardson to limitation 1[G] and, in addition, is factually incorrect regarding Richardson’s disclosure.

1. Even under NOCO’s construction, Richardson’s step 252 teaches Limitation1[G].

5. NOCO argues that because Richardson’s manual mode allows the jump starter to be used with a dead battery or if no battery is present, step 252 cannot (according to NOCO) detect the presence of a battery. POR, 31. NOCO is incorrect both regarding how the petition maps Richardson to the claims and how Richardson’s jump starter functions.

6. Richardson’s step 252 prevents the contact relay (*i.e.*, the power switch)

from closing unless an appropriate vehicle battery is present. *See* Pet., 41–43. As the petition explains, Richardson makes a determination of battery presence at step 252 of the processing loop in connection with the operation of vehicle voltage sensor 30. Pet., 41–43. Richardson’s , step 252 determines “[i]f the difference between the voltage selected and the [vehicle battery] voltage measured is not within a predetermined range and tolerance 252....” EX1005, ¶34. Richardson explains that if the measured difference in voltage is outside of the predetermined range, then further operation, including closing of the contact relay, is prohibited. *Id.*, ¶34. Dr. Fayed agrees with this understanding of Richardson. For example, Dr. Fayed testified during his deposition that: “Q. If the difference between the connected battery, the vehicle battery, and the configuration that the user selected is outside of that predetermined range in tolerance, then Richardson says further operation is prohibited, correct? A. That's what it explains, yes.” EX1058, 41:9–15. Dr. Fayed also testified that:

Q. -- if Step 252 does not return a "yes," then we will never get to block E, correct?

A. Correct. If Step 252 does not yield a "yes," it will not go into E.

Q. And if we don't go to E, we'll never get to Step 268 which is shown in Figure 6, correct?

A: That is correct, yes.

Q. And Step 268 is where the contact relay is closed, correct?

A. Correct.

EX1058, 44:18-45:4. A POSTA would understand that if, at step 252, Richardson detects the presence of an appropriate battery (i.e., one where the difference in voltage is *within* the predetermined range), then Richardson will close the contact relay (power switch) (so long as other safety checks are also passed).

7. When in “auto” mode, Richardson’s device closes the contact relay only when an appropriate battery is present (i.e., step 252 is satisfied), just as required by limitation 1[G]. After describing that step 252 looks for a battery within a predetermined range, Richardson spends the next dozen paragraphs describing how auto-mode operates, starting with step 260. EX1005, ¶35 (“If the Auto button 42 was pushed, a ninety-second count down timer is started and displayed 260 on the LCD 46...”), ¶¶36-46 (describing the process steps of auto mode). Then, in paragraph 49, Richardson teaches that manual mode may be used when “the battery voltage of the vehicle is below 10 volts, or if the vehicle battery is not connected,” including when the “vehicle’s battery is extremely low or completely dead.” *Id.*, ¶49. That is, unlike auto-mode, Richardson teaches that when in manual mode the system *will* proceed past step 252 if no battery is present or if a dead battery is connected. In addition, at no point does Richardson teach or suggest that auto-mode can be used with a battery that has a voltage less than 10 volts or when no battery is present. *See generally* EX1005. Thus, a POSITA would understand that Richardson teaches that manual mode may be used in two additional scenarios that auto mode cannot: (1)

when no battery is connected and (2) the battery has less than 10-volt charge (which includes zero or near zero, dead batteries). A POSITA would further understand Richardson teaches that when in auto-mode, step 252 only returns a “yes” if an appropriate battery is present (as opposed to manual mode which allows the jump starter to be used if a battery is not present or if a battery voltage is under 10 volts (*e.g.*, a dead, zero-volt battery)).

8. A POSITA would therefore understand that when Richardson’s system is used in auto-mode (*i.e.*, auto-mode is selected at step 248) to jump start a vehicle, at step 252 Richardson’s system detects that an appropriate, non-dead vehicle battery is present ***before*** closing the contact relay at step 268. This is exactly the function and timing that NOCO alleges is required by limitation 1[G].

9. Dr. Fayed appears to disagree with this understanding of paragraph 49 of Richardson. Dr. Fayed testified that the first sentence of paragraph 49 “doesn’t actually say” that auto mode “cannot do these things....it just tells you that manual mode could be used for that.” EX1058, 51:10-52:4. Dr. Fayed’s interpretation appears to require Richardson to explicitly state every possibility of what auto-mode can or cannot do. In other words, Dr. Fayed asserts that Richardson does not explicitly state that auto-mode ***cannot*** be used for a battery under 10 volts or with no battery at all. But Richardson also does not state that auto-mode ***can*** be used for the same. *See generally* EX1005. Thus, Dr. Fayed appears to be arbitrarily choosing

between two unstated options. As discussed in the paragraphs above, however, a POSITA would understand—based at least on the organization of Richardson’s disclosure and the fact that he specifically calls out two scenarios for manual mode (a battery under 10 volts and no battery present)—that Richardson’s auto-mode cannot also be used for those same two scenarios where manual mode can be used.

10. Accordingly, Limitation 1[G] is clearly taught by Richardson’s “auto” mode and the petition and my opinions rely on this mapping of Richardson.

2. NOCO’s argument that Richardson is inoperable is irrelevant to the grounds of the petition and is factually incorrect.

11. NOCO argues that if step 252 can detect and return a “no” when a dead battery or no battery is present (according to Richardson’s manual mode), then “Richardson could never proceed down its manual operation pathway.” POR, 31, *see also, id.*, 30. NOCO concludes that “if Petitioner’s [(alleged)] interpretation is accepted, then Richardson is a non-self-enabled reference that is fundamentally inoperative.” POR, 31. NOCO’s arguments are misdirected and fail for several reasons.

12. ***First***, NOCO misrepresents the Petition and my testimony as interpreting Richardson such that “Step 252 of Richardson would prevent jump starting and display an incorrect voltage message when no vehicle battery is present.” POR, 30. However, neither myself nor the Petition adopt this interpretation; instead, as explained above, Richardson’s auto-mode teaches the

claimed features.

13. NOCO quotes the Petition as stating: “Richardson’s device makes a determination of battery presence at step 252,” but then immediately substitutes NOCO’s own characterization of what “Petitioner’s position appears to be...,” proffering a different argument that the Petition never makes. POR, 24-25. NOCO then asserts that the petition’s alleged interpretation of step 252 “was confirmed” during my deposition and proceeds to mischaracterize my deposition testimony. POR, 25. This section of NOCO’s argument is reproduced and annotated below:

Petitioner’s claim that “Richardson’s device makes a determination of battery presence at step 252” misunderstands what is actually occurring in this step. Petitioner’s position appears to be that Step 252 inherently teaches an isolation sensor that indicates when the vehicle battery is connected since a disconnected battery will not have a measured voltage within the correct range and will not be able to proceed past Step 252. *See Pet.*, pp. 41-43. This understanding was confirmed during the examination of Petitioner’s expert. *See Ex. 2005, 27:7-29:15* (Q: “according to your interpretation, without a vehicle battery connected, Richardson’s process can never get to Step 258 in Figure 6, correct?” A: “Yes.”).

POR, 24-25. As seen above, NOCO cites “27:7-29:15” of my deposition transcript and claims that I was confirming the “interpretation” that NOCO proffers in the underlined sentence above. This is not true, and I will correct the record regarding

my deposition testimony.

14. During the relevant portion of my deposition, NOCO's attorney posed questions regarding my declaration. Specifically, in the relevant portion, he began by asking about paragraph 103 of my original declaration. EX2005, 24:2-8 (asking about paragraph 103). In this paragraph, I explain one of my opinions regarding Richardson's system:

103. As a POSITA would have understood, Richardson's device makes a determination of the presence of a non-dead battery at **step 252** of the processing loop in connection with the operation of vehicle voltage sensor 30. EX1005, Fig. 5.

EX1003, ¶103. My subsequent answers were directed toward my opinion in this paragraph. When asked, for example, what would happen at step 252 if no battery was connected, my response (*i.e.*, that the system would not proceed past 252) was explaining how Richardson works in auto mode. *See, e.g.*, EX2005, 25:19-26:9 (explaining that that in auto mode, Richardson would not proceed past step 252 if no battery or a dead battery are connected); 26:25-27:20 (same); 28:8-15 (same). During this line of questioning, and in particular during the portion that NOCO cites, the NOCO attorney did not make clear that he was asking about manual mode. In fact, when I later tried to clarify that at step 248, the system is already in either manual or auto mode, the attorney appeared to believe that information was irrelevant. EX2005, 38:8-22.

15. Therefore, when NOCO states that I “confirmed” the interpretation that “Step 252 inherently teaches an isolation sensor that indicates when the vehicle battery is connected since a disconnected battery will not have a measured voltage within the correct range and will not be able to proceed past Step 252” (POR, 24-25), they are leaving off the fact that the “interpretation” is *my interpretation of Richardson’s auto-mode*. Whether due to the confusing questions or my misunderstanding of what NOCO’s attorney was asking, as clarified here, it is my opinion that when Richardson is in auto-mode it will not proceed past step 252 if no battery or a dead battery are present. In other words, when in auto-mode, step 252 only proceeds if an appropriate, non-dead battery is detected. In manual mode, however, the system *will* proceed past step 252 if no battery is present or if a dead battery is connected. Ultimately, Richardson’s auto-mode teaches the claimed features of limitation 1[G].

16. Indeed, NOCO’s response and Dr. Fayed appear to acknowledge that the portions of Richardson’s disclosure that I cited in my declaration when addressing limitations 1[D] and 1[G] are discussing Richardson’s auto-mode. *See* EX1003, ¶¶101, 111 (citing EX1005, ¶¶7, 27, 34, 41). NOCO’s response quotes paragraph 35 of Richardson:

Specifically, Richardson explains how the next step in the process after Step 252 is to determine whether the manual or automatic operation buttons were pressed by the user (*see* Ex. 1005, Fig. 5, Step 248):

If the selected voltage is within the correct range 252, then the system

- 25 -

determines which button [manual or automatic mode] was selected 258.

Ex. 1005, ¶ [0035]: *see* Ex. 2005, 29:16-30:8. Richardson then describes the

POR, 25-26; EX2005, ¶151(same). NOCO's response next states that "Richardson then describes the automatic process before continuing to discuss the manual process" and provides a quote of paragraph 47 of Richardson:

determines which button [manual or automatic mode] was selected 258.

Ex. 1005, ¶ [0035]: *see* Ex. 2005, 29:16-30:8. Richardson then describes the automatic process before continuing to discuss the manual process:

If manual mode is selected 258, "Manual" is displayed 332 on the LCD 46, the system will prompt the operator to press the manual button 44 again. If the manual button 44 is pressed a second time 334, then the system checks the number of start attempts 266 If the total start attempts have not exceeded the limit 266, the processing continues at block 268 as described above.

Ex. 1005, ¶ [0047]. As discussed above, Step 268 is where energy transfer from Richardson's jump starter battery to the vehicle begins. Thus, Richardson discloses activating its jump starter while operating in a manual mode. *See* Ex. 2005, 31:3-32:13. This entire process workflow, which occurs after Step 252, is depicted in Figure 6 of Richardson:

POR, 26, EX2003, ¶151 (same). NOCO's remark that "Richardson then describes

the automatic process” is referring to twelve paragraphs of Richardson from, at least, paragraph 35 through paragraph 46, yet NOCO and Dr. Fayed essentially ignore these paragraphs.

17. **Second**, Richardson’s manual mode is described as an optional feature. Richardson states that “[i]f 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.” EX1005, ¶49. Indeed, Dr. Fayed testified that manual mode is an optional feature of Richardson’s system. EX1058, 51:16–52:4 (“[Richardson] says that you *may* be able to use the device if you are in manual mode.... *So that's an option* or a feature that exists in it.” (emphasis added)). Thus, Richardson teaches at least one embodiment where auto-mode is included but manual mode is not. In that embodiment, where no manual mode exists, the included auto-mode would still teach the claimed features. *See, e.g.*, Pet., Ground 1; EX1003, ¶¶74-120.

18. **Third**, even if NOCO is correct in their assertion that the Petition interprets Richardson such that “Step 252 inherently teaches an isolation sensor that indicates when the vehicle battery is connected since a disconnected battery will not have a measured voltage within the correct range and will not be able to proceed past Step 252” (POR, 24-25; EX2003, ¶149), NOCO is *factually incorrect* that Richardson would be inoperative. A POSITA would understand that at step 252 Richardson could simply use two different “predetermined ranges”—one for manual

EX1057 - Declaration of C. Arthur MacCarley

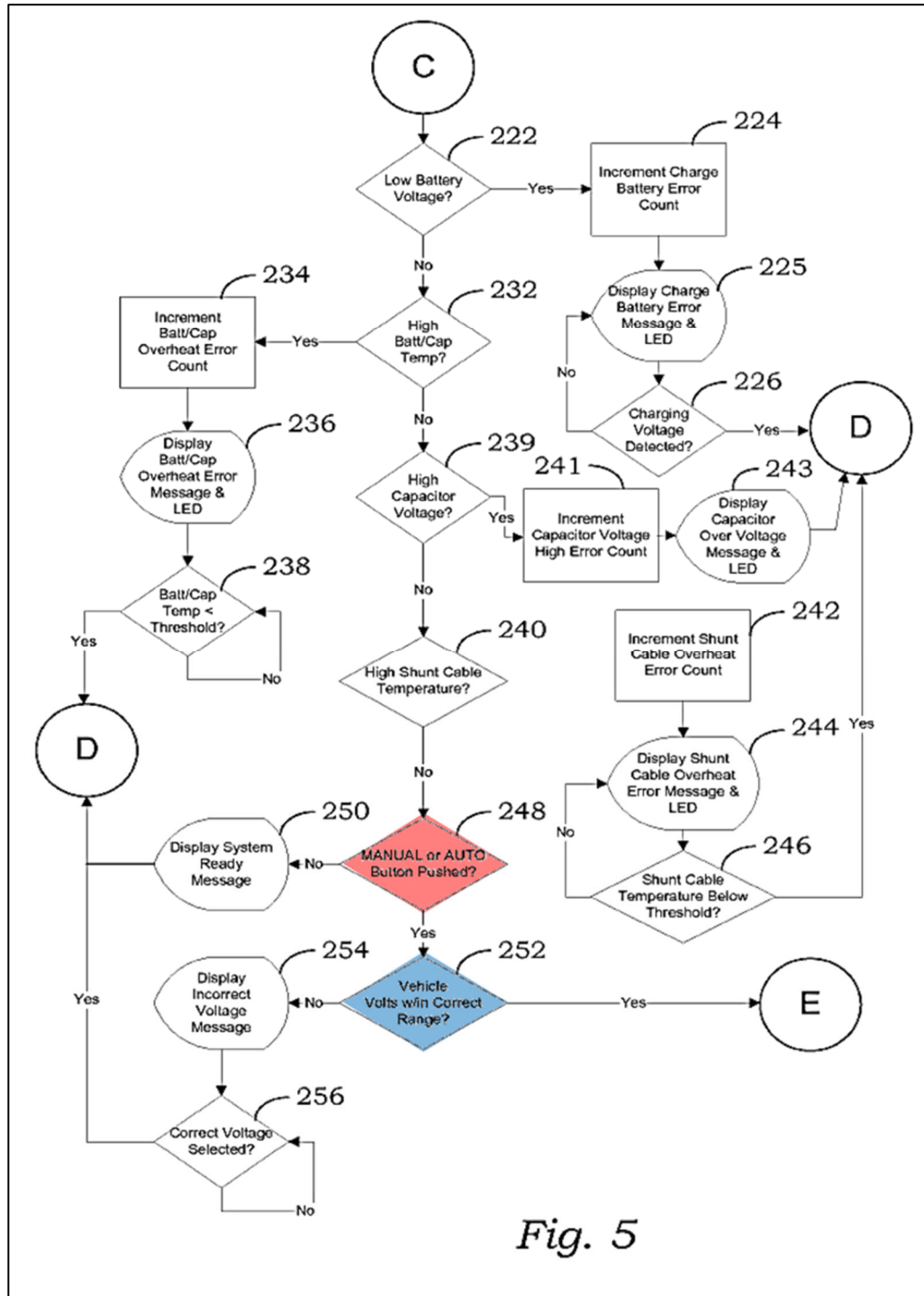
mode and one for auto-mode. For example, the range for auto-mode would provide a “yes” if the vehicle battery is appropriate for the selected jump starter voltage (*e.g.*, 12V selected, so an approximately 12V vehicle battery is present). Meanwhile, the range for manual mode provides a “yes” if (1) an appropriate vehicle battery for the selected voltage is present, (2) if a less than 10V (*e.g.*, a dead, zero-volt battery) is present, or (3) if no battery is present. The table below illustrates this possible mode of operation of Richardson:

Vehicle Battery State	Result of Step 252	
	Manual Mode	Auto-Mode
Vehicle Battery Appropriate for Selected Jump Starter Voltage	Yes	Yes
Dead Vehicle Battery	Yes	No
No Vehicle Battery Connected	Yes	No

19. Richardson’s predetermined ranges could be set up in numerous different ways to achieve the above. Richardson’s system looks for whether a *difference* between the vehicle battery voltage and the selected voltage is within a range. EX1005, ¶34. To determine whether a vehicle battery has an appropriate voltage for the selection, the range could be non-zero to 2 volts. As an example, if 12 volts is selected and a vehicle battery with a voltage of 11 volts is connected, the *difference* (1V) would be within this range. For a vehicle battery that is “extremely low or completely dead,” (EX1005, ¶49) the system could look for a voltage reading

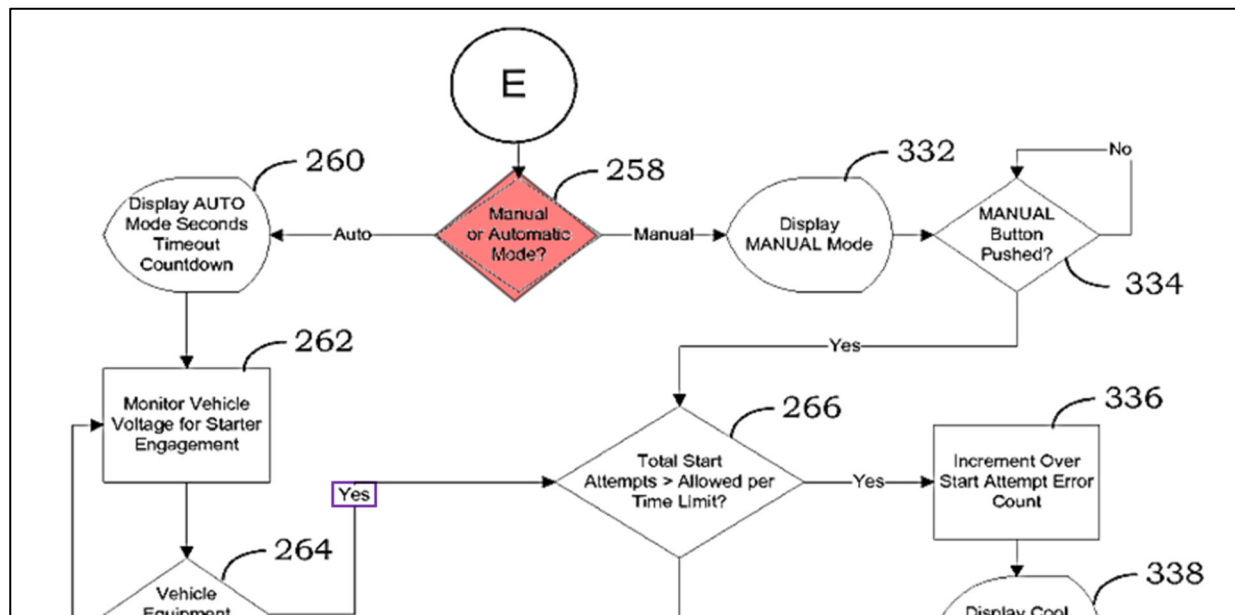
of zero or near-zero. Lastly, for a disconnected battery, the system could look for a non-reading of voltage, since the circuit (*i.e.*, the red and black clamps) will be an open circuit. Again, these are just possible ways for the system to operate. For auto-mode, the predetermined range would only include the first range. For manual mode, the predetermined range could include the three sets: *e.g.*, acceptable range = {nonzero to 2V; zero or near-zero vehicle battery voltage; no reading from vehicle battery}.

20. It makes sense that Richardson could operate with two different predetermined ranges for auto-mode and manual mode. Indeed, **step 248**—which immediately precedes **step 252**—requires the user to put the jump starter in one of the two modes by pressing “auto” or “manual” *before* **step 252** can occur. EX1005, Fig. 5 (reproduced, annotated below).



In other words, the jump starter is already in one of the two modes (*i.e.*, auto or manual) by the time [step 252](#) occurs. After [step 252](#), Richardson's step 258 simply checks which state (*e.g.*, manual mode or auto-mode) the system is in, to route the

system for the appropriate next step. As seen in Fig. 6, Richardson’s flowchart bifurcates at **step 258** depending on whether the device is in manual mode (*i.e.*, to the right) or auto-mode (*i.e.*, to the left). EX1005, Fig. 6 (reproduced-in-part, annotated below).



Step 258 does not require any input from the user (*e.g.*, pressing the auto or manual buttons); instead, “the system determines which button *was selected*.” EX1005, ¶35. By contrast, when describing step 248, Richardson expressly notes that user must press one of the buttons: “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 on the LCD....” *Id.*, ¶33. Similarly, when describing step 334 (shown in the above image as “MANUAL Button Pushed?”), Richardson states: “*If the manual button 44 is pressed a second time 334*, then the system checks the

number of start attempts 266.” *Id.*, ¶47. Accordingly, a POSITA would understand that Richardson’s system enters manual mode or auto-mode at step 248 where a user is required to press either the manual or auto button.

21. Lastly, it is worth noting that Dr. Fayed testified that he has seen the physical product that he believes is the commercial embodiment of Richardson. As Dr. Fayed states, “In connection with my prior involvement with an ITC proceeding involving the related ’023 Patent and the Richardson prior art reference, ***I have personally viewed the commercial embodiment of Richardson***, which is quite large. 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.”. EX2003, ¶101; EX1058, 49:19-50:22. The fact that Dr. Fayed was able to confirm that the Infinity Series jump starter reflects the description contained in Richardson’s disclosure is further proof that Richardson provides sufficient disclosure such that a POSITA would understand how Richardson’s described device would be constructed as an actual product.

22. Accordingly, NOCO is factually incorrect that Richardson would be “inoperable” or not enabled. Instead, a POSITA would readily understand that there are many ways for Richardson’s system to operate with both auto-mode and manual mode as part of the system.

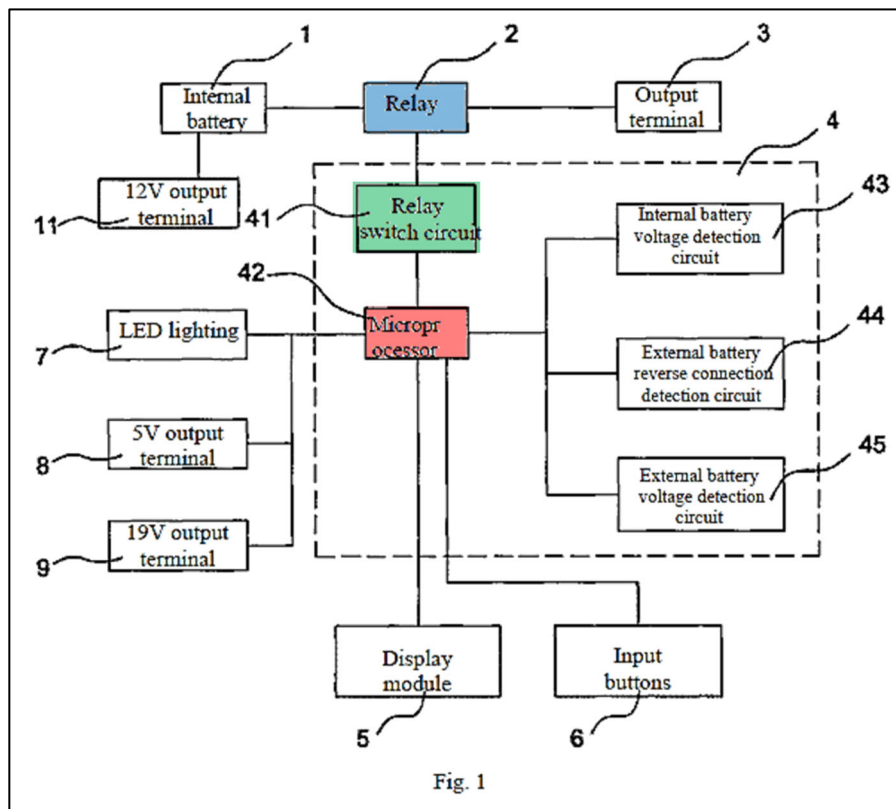
B. Yu Teaches Limitation 1[G]

23. NOCO argues that Yu does not teach limitation 1[G] because Yu does not use “the vehicle battery isolation sensor to control the power switch at any point in time.” POR, 46. To reach this conclusion NOCO misunderstands Yu’s disclosure as teaching that *the user* “evaluate[s] a measured voltage on a display and make[s] manual safety decisions.” POR, 47. In essence, NOCO argues that the user controls the power switch (relay). This argument is unsupported by Yu, misrepresents the requirements of claim 1, and is contrary to the testimony of Dr. Fayed.

24. It is undisputed that the relay (power switch) of Yu is only controlled by the microprocessor. Yu explicitly states that “*the microprocessor controls the opening and closing of the relay* through the relay switch circuit....” EX1008, ¶4. Indeed, Dr. Fayed testified that Yu is configured so that only the microprocessor can control the relay. Specifically, Dr. Fayed acknowledged: “Q. Aside from the relay switch circuit, is there anything else connected to the relay that can control the relay? A. No, there isn't....” (EX1058, 56:16-21) and also acknowledged that “Q. And there's one line going from the microprocessor to the relay switch circuit, correct? A. **Yeah, that is correct.**” (*Id.*, 57:11-14). Dr. Fayed also confirmed that it is *the microprocessor* that closes the relay after the user presses the JUMP button. EX1058, 58:5-11 (“Q. And then the microprocessor will close the relay, correct? A. The microprocessor will close the relay in response to the user pressing the JUMP

[button]...”).

25. Figure 1 (reproduced, annotated below) of Yu shows that the only input (*i.e.*, connection) to the relay 2 is from the relay switch circuit 41 which in turn receives its input from the microprocessor 42. EX1008, Fig. 1. A POSITA would understand that the relay switch circuit 41 is a hardware relay driver that boosts the MCU’s output current in order to close or open the relay.



Despite the clear disclosure and admissions that Yu’s microprocessor controls the relay, NOCO still argues that Yu requirement that a user must press the “JUMP” button somehow means that the user is making the decision of whether it is safe to close the power switch. POR, 46-47. This argument relies on a distorted reading of

Yu's disclosure.

26. Yu essentially teaches that three conditions must be met for the microprocessor to close the relay and initiate jump starting: (1) **the connection must be correct polarity**; (2) **the connected vehicle battery voltage must be within a "normal range,"** and (3) **the JUMP button must be pressed.** EX1008, ¶26.

Specifically, Yu explains that:

If the output terminal 3 is connected to an external battery with incorrect polarity, a signal is provided to the microprocessor 42 through the external battery reverse connection detection circuit 44, so that the **relay 2 controlled by the microprocessor 42** will not close, preventing the wrong polarity from causing a large flow of current. **If the output terminal 3 is connected to the external battery with correct polarity,** the external battery voltage detection circuit 45 will operate. **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.

Id., ¶26 (emphasis added). Taking this paragraph in parts, **the first condition** asks whether "**the output terminal 3 is connected to the external battery with correct polarity.**" The **second condition** is whether "**the external battery voltage is within the normal range.**" The **third condition** is whether "**the JUMP button of the input buttons 6 can be pressed.**" Further, when considering that Yu describes in paragraph 4 that "the microprocessor controls the opening and closing of the relay," it is clear

that the portion in **blue** above could also be written as “then the JUMP button of the input buttons can be pressed [so that the microprocessor will] close the relay 2.”

27. Further, as seen in paragraph 26 quoted above, if any of the conditions (1), (2), or (3) are not met, the microprocessor will **not** close the relay. For example, regarding the **first condition**, Yu teaches that “[i]f the output terminal 3 is connected to an external battery with incorrect polarity...the *relay 2 controlled by the microprocessor 42* **will not close**, preventing the wrong polarity from causing a large flow of current.” EX1008, ¶26. Critically, regarding the **second condition**, if the vehicle battery voltage is **not** within the normal range, pressing the JUMP button will do nothing—the microprocessor will **not** close the relay. A POSITA would understand that this makes sense since a user may not accurately evaluate the voltage of the vehicle battery and may not even be aware of what the “normal range” is supposed to be. Indeed, Yu does not suggest or describe that his system informs the user what the “normal range” is. In fact, Yu never even mentions a “user” at any point in its disclosure. *See generally* EX1008. Accordingly, contrary to NOCO’s assertions, Yu **does not** rely on a user to decide whether the voltage is within the “normal range.” A POSITA would understand that if any one of the three conditions is not met, the relay will not close, regardless of user input.

28. Conditions (1)—proper polarity—and (2)—battery present—above meet the two conditions required in limitation 1[G]. The inclusion of a **third**

condition—(3) the JUMP button is pressed—does not place Yu’s system outside of the scope of the claim. Indeed, claim 1 recites, “[a] jumps starter apparatus... *comprising*...” EX1001, claim 1. It is my understanding that word “comprising” is an open-ended term which does not exclude additional features from being included in a claimed invention. Moreover, Yu’s system achieves the same safety feature recited in the claim regardless of the third condition. That is, Yu’s microprocessor will not close the relay unless both (1) proper polarity is detected and (2) the presence of a vehicle battery is detected, even if the Jump button has been pressed. Accordingly, Yu plainly and unambiguously teaches limitation 1[G].

29. NOCO admits that the external battery reverse connection detection circuit 44 “does control the relay 2 via the microprocessor 42,” but argues the voltage detection circuit 45 does not. POR, 47. Under NOCO’s interpretation, the user must determine whether the vehicle battery voltage is within a normal range or even present. POR, 49. But, as discussed above, these arguments ignore the context of Yu and are unsupported.

30. Lastly, NOCO attempts to address the Petition’s (alleged) “fallback” position. POR, 49-51 (“As a fallback position, Petitioner tries to argue” (quoting Pet., 68-69). In its response, NOCO provides a partial quote, but leaves off a critical portion of the Petition: “*To the extent Patent Owner argues Yu does not disclose a battery presence sensor*, it would have been obvious to a POSITA to detect the

presence of vehicle battery based upon the OUT-CHECK signal received from external battery detection circuit 45.” Pet. 68 (emphasis added to language omitted by NOCO); POR, 49 (quoting the non-emphasized language only). Indeed, this quoted language from the Petition was directed to limitation 1[D], not limitation 1[G] which is the focus of NOCO’s argument.

31. Moreover, NOCO *does not* argue that Yu does not disclose a battery presence sensor. Instead, NOCO admits that Yu includes a vehicle battery detection sensor but only quibbles whether the microprocessor controls the relay based on the vehicle battery detection sensor. *See* POR, 46 (arguing that “Yu fails to teach... *using the vehicle battery isolation sensor* to control the power switch....”), 49 (arguing that “Yu has no vehicle battery detection sensor *that is used to control a relay switch....*”) “ In other words, the Petition’s alleged “fallback” position is not at issue because NOCO does not argue that Yu fails to disclose a battery presence sensor.

C. NOCO’s Motivation to Combine Arguments are disingenuous and factually incorrect.

32. NOCO argues that “a PHOSITA would not have been motivated to modify any portable vehicle jump starter, much less the specific jump starters of Richardson and Yu to be charged via USB in 2014.” POR, 52. Specifically, NOCO argues three points to reach this conclusion: (1) “USB was not a known technique for charging any large-capacity battery” (POR, 53); (2) a POSITA “considered USB

to be a nonviable option for portable jump starters” (POR, 57); and (3) USB charging would be “unsuitable” for Richardson and Yu (POR, 61).

33. However, based on Richardson’s lack of discussion of the concepts of battery capacity and charge time, a POSITA would understand that these concepts are not, in Richardson’s view, critical requirements of Richardson’s system. Further, as explained below, NOCO appears to make an untrue statement regarding argument (1), and NOCO is simply incorrect regarding the arguments (2) and (3).

1. NOCO does not argue that USB would not work given sufficient time.

34. While NOCO argues that USB would take “too long” to charge Richardson or Yu’s jump starters, NOCO ***does not*** argue that USB would fail to charge either device given a sufficient amount of time. *See generally* POR. Dr. Fayed asserts that charge time is an important consideration for a POSITA, but neither he nor NOCO offer any evidence to support their contention that a POSITA would recognize charging times as a problem when considering adding USB charging to a jump starter. *See generally* EX2003. Instead, as explained below, a POSITA would not consider charging times to be an issue and, in fact, would recognize that even if charging times were considered, the charge times using USB would not be an issue. *See ¶¶48-58, infra* (incorporated here).

2. *NOCO has ignored prior art evidence showing that USB charged jump starters were known prior to the '203 patent.*

35. As I explained in my previous declaration, a POSITA would not have considered charging times of the larger capacity batteries of jump starters to be an obstacle when considering whether to add or include USB charging to a portable jump starter. EX1003, ¶¶ 36-41, 66, 70, 77-79, 86, 90-98, 139-141, 148-150.

36. Regardless, I respond to NOCO's argument in full below. In its response, NOCO and its expert both assert that "USB was not a known technique for charging any large-capacity battery" and/or that "USB was [not] considered a known solution for charging any large-capacity batteries." POR, 53; EX2003, ¶88. However, it appears that both Dr. Fayed and NOCO were aware of prior art jump starters that were charged by USB.

37. NOCO and its expert were aware of Epower-10, a portable jump starter that is charged by USB. Exhibit 1053 to the petition and to my first declaration is a declaration from Yingchun Wan, an employee of Shenzhen Carku Technology Co., Ltd. ("Carku"). EX1053, 2. Based on the first page of this exhibit, it is my understanding that this declaration was submitted by Carku in the IPR proceeding of the '015 patent. *Id.*, 1. The declaration is signed by Mr. Wan and dated May 11, 2020. *Id.*, 10. Considering that this was submitted in the IPR for the '015 patent and was signed in 2020, I suspect that NOCO would have known about this declaration and its contents at least since the '015 IPR petition was filed on May 14,

EX1057 - Declaration of C. Arthur MacCarley

2020. Attached at page 56 is Exhibit H to Mr. Wan's declaration. EX1053, 56. Exhibit H first shows an email from Mr. Wan to a third party at "Eye System." *Id.*, 57-58. Mr. Wan's email states that he enclosed an "e-catalogue" as an attachment to his email. *Id.*, 57. The email itself is dated April 23, 2014, which is several months before the '203 patent's July 3, 2014, priority date. *Id.* (reproduced, annotated below).

From: wanny <sales10@car-ku.com>
Sent: Wednesday, April 23, 2014 11:24 PM
To: Giuseppe Orfanò
Subject: E-catalogue from Carku
Attachments: Carku catalogue.ppt

Dear Giuseppe,
 Enclosed pls check our E-catalogue for you. Pls review all of the models, Carku jump starters are with best quality, the designs are followed by other factories. We hope to get more inquiry from you.
 Any question about the product, pls send me reply.
 Best wishes

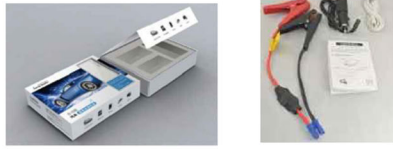
38. One of the products listed in this distributed product catalogue was Carku's Epower-10 portable jump starter. EX1053, 63 (reproduced below).



Model : EPOWER-10
The slimmest jump starter

TECHNICAL SPECIFICATION :	
Input :	14V1A; Micro USB5V/2A
Output :	5V/2A; 12V Jump start LED light (light, burst flashing, SOS)
Start Current :	150A
Peak Current :	300A
Size :	139*75*15mm
Weight :	200g, Battery capacity: 6000mAh
Operating Temp. :	-20°C ~ 60°C / -4°F ~ 140°F
Lifetime :	> 1000 cycles

ACCESSORIES :	
Home charger*1	Jumper Cable*1
Car charger*1	3 mobile connectors*1



Packing: Color Box + EVA tray

EX1057 - Declaration of C. Arthur MacCarley

The above product listing includes several technical specifications for the Epower-10 jump starter. It advertises that the Epower-10 is “The slimmest jump starter.” *Id.* It also states an output of “5V/2A” which would be a USB output, as well as “12V Jump Start” which refers to the jump starter cables and ability to jump start a vehicle, and an LED flashlight. *Id.* The product includes a 150 amp start current and 300 amp peak current which are used to jump start a vehicle. EX1053, 63. The document also lists a “Battery Capacity” of 6,000 mAh. *Id.* **Importantly**, as Dr. Fayed agreed during his deposition, this document lists an “Input” that includes “micro USB5V/2A” which is a micro-USB charging input. EX1053, 63; EX1058, 34:19-35:19 (“Q. The first line is "Input: 14 volts 1 amp; Micro USB 5 volts/2 amps"; is that right? A. Correct.”)

39. During his deposition in this IPR, Dr. Fayed also acknowledged that he had seen the above product document during the ITC litigation. EX1058, 34:19-35:4 (“Q. ...Have you seen [page 63 of Exhibit 1053] before? A. It does look familiar. I believe I've seen it perhaps in the context of the ITC.”). I have reviewed Dr. Fayed’s testimony in the public version of the ITC trial transcript (EX1059). Indeed, it appears that during the ITC trial, Dr. Fayed was specifically questioned regarding his analysis of Epower-10 and was shown a physical sample of the product. For example, Dr. Fayed was asked the following:

Q. So you had an opportunity to look at physical samples of the E-Power 10; right?

Do you understand they were made available for inspection, sir?

A. As I have mentioned, and testified before, I have not done functional testing of any of these devices.

Q. So I have an E-Power 10 right here, RPX-7. You never looked at it; right?

A. I have not looked at that physical sample, no.

Q. You haven't looked inside of this device to understand if your concern about this was misplaced; right?

A. I have not looked at that device physically, no.

Q. I have RPX-7. You see that I have opened it up to show you the inside of RPX-7, right, sir?

A. Correct.

Q. The blue output, that's -- the blue connector here, that's the EC-5 connector to provide jump start power; right?

A. It appears to be a connector that provides power to something.

Q. Okay.

The blue and red wires go to the battery; right?

A. Correct.

Q. Sorry. The black and red wires go from this blue connector to the battery; right?

A. Without taking -- let me re-correct my answer here.

Without taking this out, I can't really see where those wires are connected, so I cannot tell.

Q. How about now, sir?

A. They appear to be connected to... I'm not 100 percent sure. I mean, they appear to be connected to the battery. At least from that pinch point, they appear to be connected, but I don't know for sure.

EX1059, 995:4-996:12. It is my understanding that on July 5, 2024, in the Final

Initial Determination the ITC specifically found that:

Upon review of the submissions and evidence of record, the undersigned finds that Respondents have established, by clear and convincing evidence, that ***E-Power 10 is prior art under 35 U.S.C. § 102(a)(1), as it was on sale prior to the July 3, 2014 effective filing date of the '023 patent.***

EX1060, 290 (emphasis added). As noted in my first declaration, the '023 patent shares the same specification with the '203 patent and also shares the same priority date of July 3, 2014. EX1003, ¶46. I understand, therefore, that, at least based on the ITC's finding, Epower-10 is also prior art to the '203 patent.

40. Thus, based on the above, NOCO and Dr. Fayed were both apparently aware of the E-power 10 device, that it is a jump starter with USB charging input, and that E-power 10 was found to be prior art to the '203 patent. Further, based at least on Dr. Fayed's theory that "[H]igh capacity batteries [are] required in a jump starter," (EX2003, ¶¶84, 90) it follows that at least Dr. Fayed and NOCO would consider the 6,000 mAh battery included in Epower-10 to be a large capacity battery since it is used in a jump starter device (*i.e.*, Epower-10). Accordingly, NOCO's and Dr. Fayed's statements that "USB was not a known technique for charging large-capacity batteries" (POR, 53; EX2003, ¶88) is in error at least because Epower-10 is a jump starter with a large-capacity battery that is charged via USB.

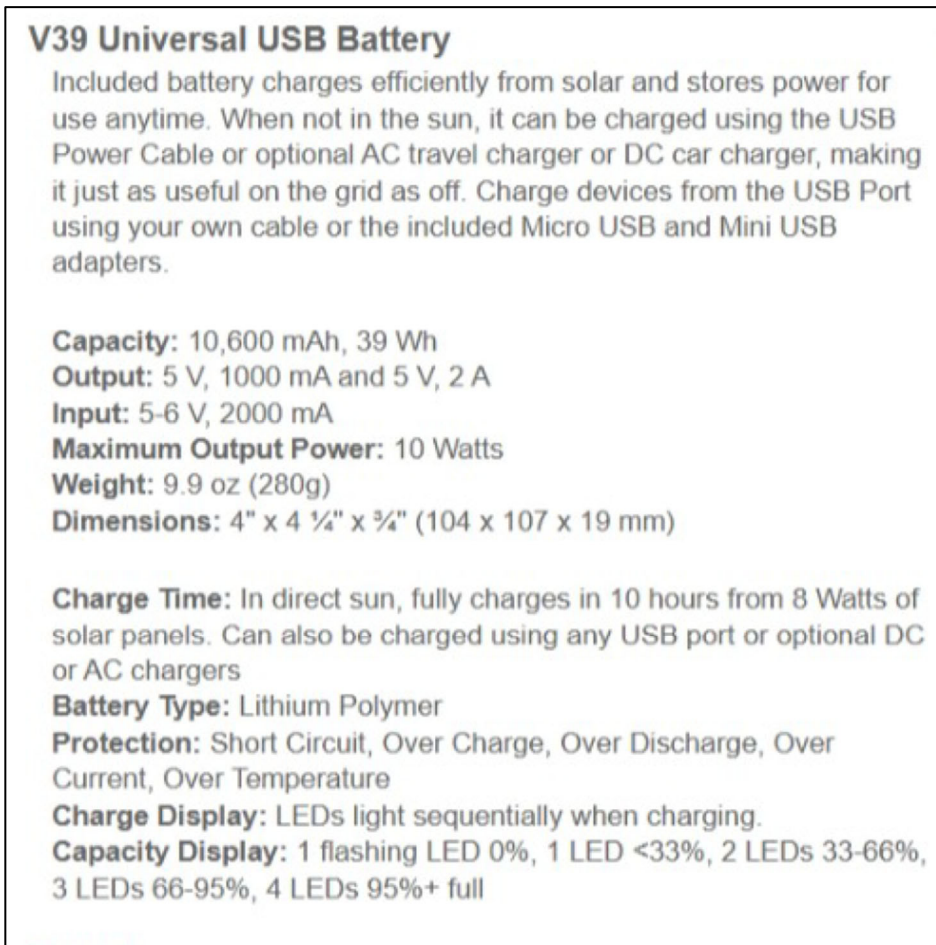
41. In addition, it was known to charge large capacity batteries with USB.

For example, Exhibit 1061 is a print of an archived web page dated October 28, 2013, which shows a product page for the Voltaic V39 USB Battery bank. EX1061, 1 (reproduced-in-part below).



The webpage advertises various features of the V39 USB Battery including “two USB output ports; a hi-power port for fast tablet charging and a low-power port for smartphones. *Id.* Charges from solar or a USB port.” *Id.* As seen in the reproduced image below, the device includes a “lithium polymer” battery, protection against “short circuit, over charge, over discharge, over current, [and] over temperature.” *Id.* The advertised charge time is 10 hours in direct sun from 8-watt solar panels and the V39 “[c]an also be charged using any USB port or optional DC or AC chargers.” *Id.* Thus, the V39 includes up to four different charging options: solar, USB, DC,

and AC charger.

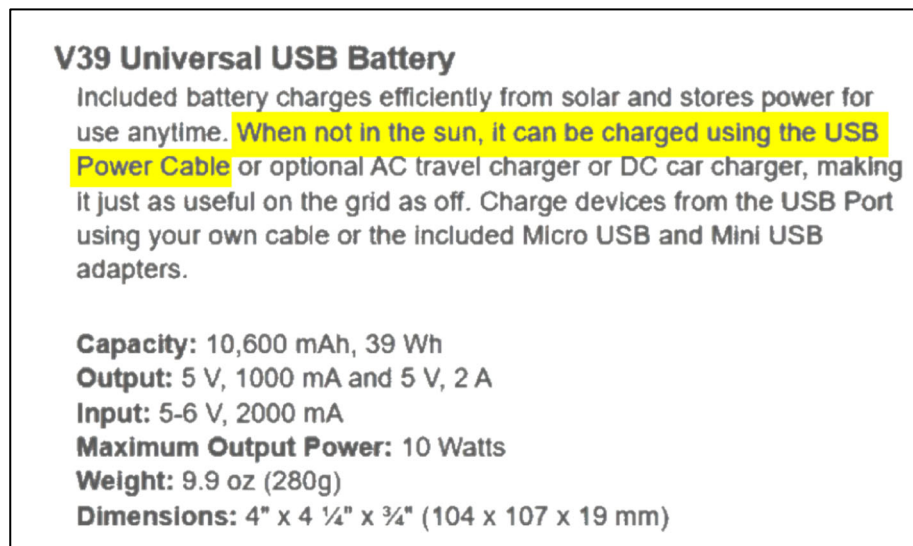


EX1061, 1. Indeed, as seen above, the website states that the “[i]ncluded battery charges efficiently from solar and stores power for use anytime. When not in the sun, it can be charged using the USB Power Cable or optional AC travel charger or DC car charger, making it just as useful on the grid as off.” *Id.*

42. As seen in the screenshots above, the website states that the V39 includes a “10,600 mAh / 39 Watt hour” battery. EX1061, 1. Given that the ’203 patent describes an 8,000 mAh battery, which Dr. Fayed and NOCO describe as a “large size [] battery pack,” there is no question that the **larger** 10,600 mAh battery

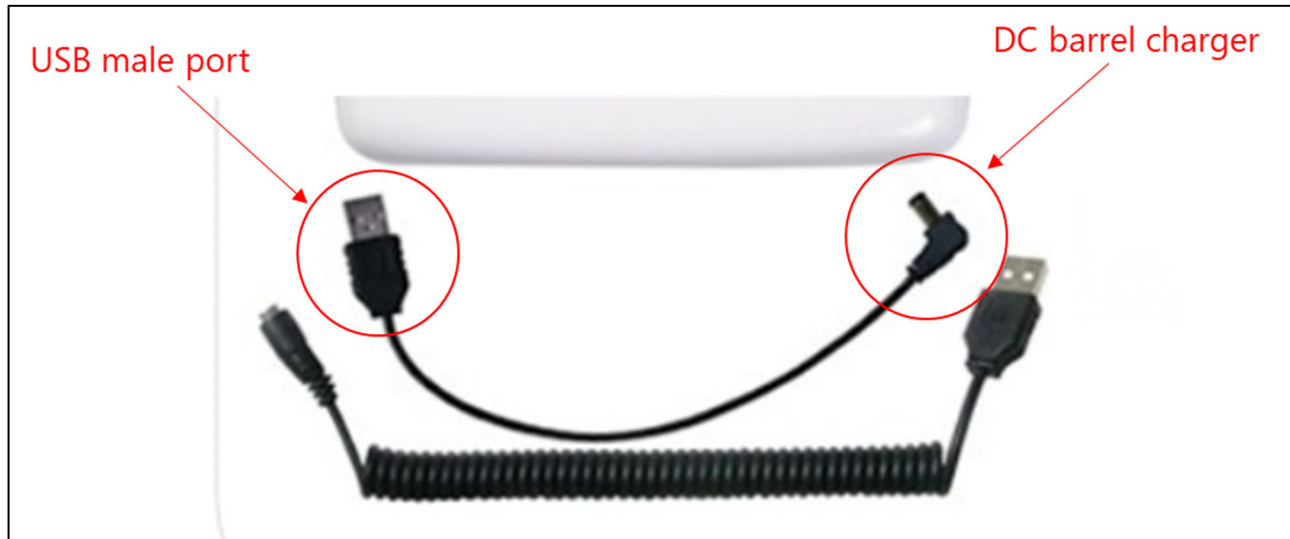
EX1057 - Declaration of C. Arthur MacCarley

of the V39 also qualifies as a large size battery. POR, 6 (“The ’203 Patent even illustrates the large size of the battery pack by providing an example configuration: “three 3.7V, 2666 mAh lithium polymer batteries in a 3S1P configuration.” (citing EX1001, 4:29-30)); EX2003, ¶27 (same). As mentioned above, the V39 product page states that the device can be charged “using the USB Power Cable” and lists a 5-6V, 2000 mA power input. EX1061, 1 (reproduced-in-part, annotated below).



Further, one image of the V39 depicts the USB cable used to charge the device. As seen in Exhibit 1067 (which is the same website as EX1061, but with a different image selected), the USB cable has a USB male connector on one end which would be plugged into the USB port of a power supply (e.g., a plug-in USB adapter) and the other end includes a barrel connector. EX1067, 1 (reproduced-in-part, annotated below). Notably, this cable does not require any complex designs because the same wires that transfer power from a USB port can simply be connected to a DC barrel

EX1057 - Declaration of C. Arthur MacCarley
charger connector without any significant changes. The relevant photo from Exhibit
1067 is reproduced and annotated below, showing the included USB power adaptor
cables.



43. In light of either Epower-10 or the Voltaic V39, NOCO’s assertion that “USB was not a known technique for charging any large-capacity battery” (POR, 53; EX2003, ¶88) is false. Epower-10 is a prior art jump starter that was charged using USB. Voltaic’s V39 included a large-capacity battery that is also charged via USB. A POSITA would have known about both Epower-10 and the Voltaic V39 and, therefore, would have considered USB to be a known technique for charging “large capacity” batteries (*i.e.*, V39, Epower-10) as well as for charging portable jump starters (*i.e.*, Epower-10).

3. *NOCO is incorrect that “USB [is] a nonviable option for portable jump starters.”*

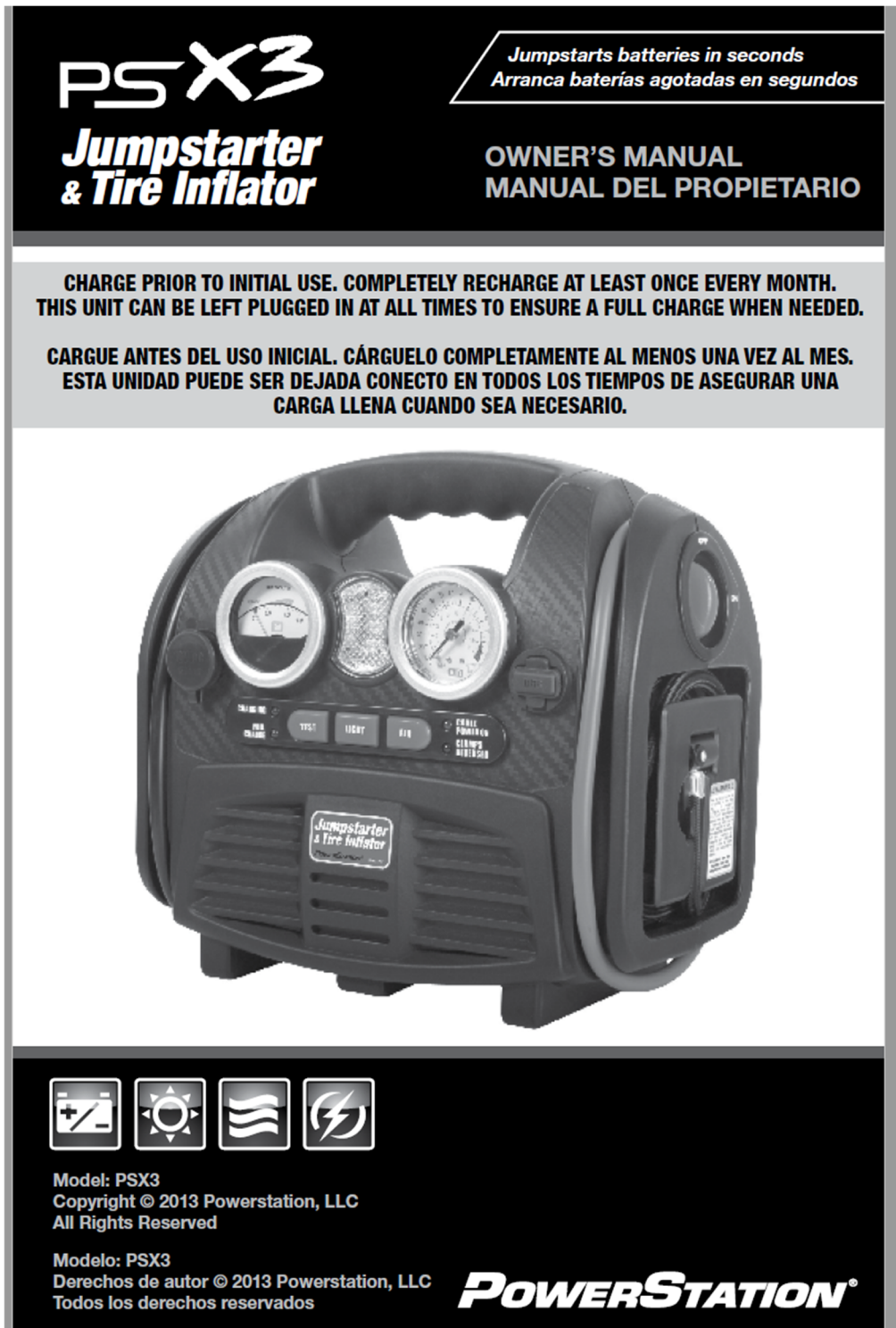
44. NOCO argues that “the PHOSITA at the time considered USB to be a

nonviable option for portable jump starters, rather than simply a less-desirable alternative.” POR, 57; EX2003, ¶89. This argument appears to be based only on Dr. Fayed’s assertion that jump starters require large capacity batteries and high-power charging sources to maintain a *reasonable/practical/useful/typical* charging time. For example, Dr. Fayed asserts that “the nominal capacity of each battery cell in a jump starter’s battery pack is much larger than other low-peak-current applications (e.g., a handheld multimeter). This large nominal capacity requires a high-power charging energy source *in order to maintain a reasonable/practical charging time.*” EX2003, ¶77 (emphasis added). He also states that if the number of cells in a battery increases “[t]his again, requires an even larger charging energy source *to maintain a useful charging time*, since the battery cell capacity will be larger.” *Id.*, ¶78. Again, Dr. Fayed testifies that “in order *to maintain a typical charging time*, a PHOSITA would have recognized that jump starters needed to rely on a high-power charging energy source.” *Id.*, ¶84. In other words, Dr. Fayed’s argument is premised on the theory that “reasonable/practical/useful/typical” charging times are an important consideration to a POSITA. However, at no point does Dr. Fayed or NOCO ever explain what the bounds of a “reasonable/practical/useful/typical” charging time are. *See generally* EX2003. Instead, Dr. Fayed and NOCO simply assert that using USB to charge a jump starter would necessarily result in unacceptable charging times. POR, 57-59. As explained

below, the evidence shows that charging times for jump starters using USB would be consistent with or faster than consumer expectations at the time.

45. A POSITA would have known that charging even a large capacity jump starter battery using a USB charging input would not have resulted in an unreasonable charging time in jump starter applications. Regardless, the USB charging times resulting from adding USB charging to a jump starter like Richardson or Yu would have been very well within a “reasonable” charging time for a jump starter battery. Although USB may be a slower charging method than, for example, a 12V DC barrel charger, even USB would not create an “unreasonable” charging time for a jump starter.

46. A POSITA would have been aware that in late 2013 through early 2014 portable, battery powered jump starters took *days* to fully charge. For example, Exhibit 1062 is a product manual for the Powerstation PSX3 jump starter which was at least publicly known and/or on sale as of December 13, 2013. *See* EX1062, 1 (including a 2013 Copyright date); EX1063, 1-2 (showing an upload date of Dec. 13, 2023). As seen in the reproduced image below, the PSX3 is a combination jump starter and tire inflator marketed by PowerStation, LLC.



As seen above, the manual includes a 2013 copyright date. EX1062, 1. In addition, EX1063 is a collection of screenshots from a YouTube video titled “Costco PSX3

EX1057 - Declaration of C. Arthur MacCarley

air compressor/jumper cable” that was uploaded to YouTube on December 13, 2013.

EX1063, 1-2 (available at https://youtu.be/ai5Ok6iCh_8, last accessed August 21, 2025). As can be seen in two images below, the PSX3 product shown in the video is the same as the one described in the EX1062 manual.



EX1063, 2



EX1062, 1

Further, the narrator of the video states that he purchased the device “from Costco” as indicated in the title. Accordingly, the PSX3 was at least on sale and publicly known as of December 13, 2013, when the video was uploaded to YouTube.

47. The product manual states that its “initial charge could take up to 72 hours.” EX1062, 10 (reproduced-in-part below).

Charging the PSX3 before initial use

We recommend charging the PSX3 on a regular basis. The initial charge could take up to 72 hours.

Note: *The PSX3 charger is fully automatic and maintains the battery charge as long as the PSX3 remains plugged into a wall socket with 120V power. Leaving your PSX3 plugged in will not damage the battery and ensures a fully charged battery at all times.*

Note: *If the battery is fully discharged, up to 72 hours may be needed to completely recharge. If you store your PSX3 for extended periods of time without use, completely recharge at least once every month. The PSX3 is equipped with a sensor that prevents overcharging.*

The fact that the PSX3 includes a lead acid battery (as opposed to a lithium-ion battery) is insignificant. Regardless of the battery chemistry, the PSX3 demonstrates that jump starters with initial charge times (*i.e.*, full charge times) of up to 72 hours were known, and the accompanying YouTube video (EX1063) is evidence that consumers were not dissuaded from buying the device due to the 72-hour charge time.

48. Thus, the PSX3 is a prior art jump starter that was available for sale just 7 months prior to the '203 patent's July 2014 priority date and which shows that at least a 72-hour charging time would have been reasonable, typical, and/or useful. In other words, when discussing what a "reasonable" charging time for a jump starter would have been as of July 3, 2014, a POSITA would have known that charging times less than or equal to 72 hours would have been considered reasonable by consumers.

49. As a comparative example, the Voltaic V39, discussed above, would

have taken under 4 hours to fully charge using its included 5V, 2A USB charger.

Below I provide calculations based on the Voltaic V39's large battery capacity of 10,600 mAh with varying nominal voltages and input charging power.

50. I have reviewed Dr. Fayed's Declaration (EX2003) in full, including the section titled "Fundamentals of Battery Charging." EX2003, ¶¶66-70. Dr. Fayed provides equations to compute the total charging time (measured in hours) to fully charge a battery. While Dr. Fayed has not quantified or calculated any charging times in his declaration, I have performed calculations using Dr. Fayed's equations to determine charging times for the battery included in the V39 product discussed above.

51. The equation Dr. Fayed provides to charge a multi-cell battery pack is expressed mathematically as:

$$T_{chg} = \frac{V_{cell-nom} \times C_{cell-nom}}{\eta_{src} \times V_{src} \times I_{src}} \times N$$

EX2003, ¶70, Eq. 11. In the above expression, T_{chg} is the total charge time (measured in hours); $V_{cell-nom}$ is the battery cell's nominal voltage (measured in volts), $C_{cell-nom}$ is defined by Dr. Fayed as the battery cell's nominal capacity (measured in amp-hours); V_{src} and I_{src} are the voltage (measured in volts) and current (measured in amps), respectively, of the charging energy source; η_{src} is the power conversion efficiency; and N is the number of cells in the battery pack.

EX2003, ¶¶66-70.

52. As discussed above, the V39 website lists a battery size of “10,600 mAh, 39 whr.” Thus, the website lists battery size both in terms of milliamp-hours and watthours. As Dr. Fayed explains, watthours is a measure of the total energy which can be expressed as: $E_{src} = V_{cell-nom} \times C_{cell-nom}$. EX2003, ¶¶67, Eq. 1. 10,600 mAh is the total nominal capacity of the V39’s battery, $C_{cell-nom}$. Plugging these values into the above equation, we can determine that the V39’s nominal voltage, $V_{cell-nom}$, is equal to $\frac{39 \text{ whr}}{10.6 \text{ Ahr}}$ or 3.67 volts; or, for ease or reference, approximately 3.7 volts, which is a typical voltage for a lithium-ion battery. For example, the most common type of cylindrical lithium-ion battery is a Lithium Nickel Manganese Cobalt Oxide (LNMC: LiNiMnCoO_2), which has a nominal voltage range of 3.6-3.7 volts. Therefore, for the sake of these calculations, I treat the battery cell voltage $V_{cell-nom}$ of the V39 battery as 3.7V. Additionally, as mentioned above, the V39 battery cell’s nominal capacity $C_{cell-nom}$ is 10,600 mAh or 10.6 Ahr.

53. As mentioned above, the V39 product page states that the device can be charged “using the USB Power Cable” and lists a 5-6V, 2000 mA power input. EX1061, 1. Taking a conservative approach, my calculations assume the low end of this range, *i.e.*, 5V. Using 6V would have increased the charging power and proportionally decreased the charging times listed in the table below. The voltage

of the USB charging source V_{src} is thus set at 5V and the current of the USB charging source is I_{src} is set at 2000 mA or 2A.

54. For the first calculation, I will assume 100% efficiency (*i.e.*, $\eta_{src} = 1$). However, my calculations below will take efficiency into account when addressing a hypothetically worst case (*i.e.*, lowest) charging power. It is worth noting that a POSITA would further understand that it is not necessary to account for series and/or parallel wiring configurations when calculating battery capacity (energy). As Dr. Fayed agrees, the total energy storage capacity of the battery pack is the product of the power of a single cell and the number of cells, regardless of serial and/or parallel wiring configurations. EX2003, ¶69. Thus, when considering that Voltaic states the V39's total battery capacity, but does not note how many cells exist, one can treat the cells as having the same voltage which together combine to create the battery pack. Accordingly, when calculating the total charge time using the equation provided by Dr. Fayed, a POSITA would understand when **total** capacity is used, the number of cells, N , is set to 1.

55. Inputting these values into Equation 11 provided by Dr. Fayed, yields:

$$T_{chrg} = \frac{(3.7V) \times (10.6Ah)}{(1) \times (5V) \times (2A)} \times (1) = \frac{(39Wh)}{(1) \times (5V) \times (2A)} \times (1) = 3.9h$$

The results of the above calculation show that the V39 battery would take just 3.9 hours to fully charge using its stated USB input charge option. These values and the

resulting charge time are represented in the **first row** of the table:

Nominal Capacity and Voltage	Capacity (Wh)	Charging Power	Time to Full Charge
10,600 mAh, 3.7V	39 Wh	5V, 2A (10W)	3.9 hours

In the second row of the table, I have calculated a second scenario which relies on a charging input that is consistent with the *slowest* USB charging power available in 2014. Specifically, the lowest USB power (as of the '203 patent's priority date) is provided at 5V, 0.5A, or 2.5 W. I provide this calculation to demonstrate the total charging time even when using the slowest USB charging rate. This is reflected in the **second row** of the table where the V39 battery capacity is held constant, but the charging power is now "5V, 0.5A (2.5W)." As seen in the table, even with this low charging power, it would still take only 15.6 hours to fully charge the V39's large capacity battery.

Nominal Capacity and Voltage	Capacity (Wh)	Charging Power	Time to Full Charge
10,600 mAh, 3.7V	39 Wh	5V, 2A (10W)	3.9 hours
10,600 mAh, 3.7V	39 Wh	5V, 0.5A (2.5W)	15.6 hours

For the **third row** of the table, I have taken efficiency into account. As Dr. Fayed notes in his declaration, "in many cases the charging source voltage may be different than battery pack's nominal voltage, and thus, it is standard practice that a power

EX1057 - Declaration of C. Arthur MacCarley

converter (e.g., buck, boost, or buck-boost) is introduced between the energy source and the battery pack.” EX2003, ¶70. As of 2014, power converters are typically quite efficient. For example, the XR3403 step up DC/DC converter, shown in Fig. 2C of the '203 patent and which was known in the art prior to the '203 patent, states an efficiency of up to 96% for its DC/DC converter. EX1029, 1; EX1001, Fig. 2C; *see also*, EX1003, ¶52. Despite the up to 96% efficiency specified for XR3403, in his declaration, Dr. Fayed provides an example with a lower efficiency of only 80%. EX2003, ¶70 (“If, for example, η_{src} is 0.8....”). As seen in the **third row** below, even using Dr. Fayed’s 80% example, it still only takes 19.5 hours to fully charge the V39’s battery. ***This is less than 1/3 the time it takes to fully charge the PSX3 jump starter.***

Nominal Capacity and Voltage	Capacity (Wh)	Charging Power	Time to Full Charge
10,600 mAh, 3.7V	39 Wh	5V, 2A (10W)	3.9 hours
10,600 mAh, 3.7V	39 Wh	5V, 0.5A (2.5W)	15.6 hours
10,600 mAh, 3.7V	39 Wh	5V, 0.5A @ 80% eff. (2W)	19.5 hours

For the bottom three rows of the table, I calculate the charging time for a hypothetical battery that has the V39’s stated capacity of 10,600 mAh, but with a much larger nominal voltage of 12V. This hypothetical battery would, without question, have enough voltage to jump start a vehicle that uses a 12V battery. Using these values,

this hypothetical battery would have an absurdly large total energy, E_{src} , of 127.2 watt-hours. It is worth noting that this hypothetical 127.2 watt-hour capacity is ***over four times larger*** than the 29.6 WH battery described by the '203 patent. EX1001, 4:27-31. In other words, I have calculated this extremely large hypothetical battery to definitively show that, even in an extreme case, the total charging time would not exceed the known 72 hour charging time of the prior art PSX3 jump starter.

56. The bottom three rows follow the same variation in charging power as the first three rows, but as explained above, the battery capacity is increased to the extreme 127.2 Wh case. These calculations are reflected in the bottom three rows of the table.

Nominal Capacity and Voltage	Capacity (Wh)	Charging Power	Time to Full Charge
10,600 mAh, 3.7V	39 Wh	5V, 2A (10W)	3.9 hours
10,600 mAh, 3.7V	39 Wh	5V, 0.5A (2.5W)	15.6 hours
10,600 mAh, 3.7V	39 Wh	5V, 0.5A @ 80% eff. (2W)	19.5 hours
10,600 mAh, 12V	127.2 Wh	5V, 2A (10W)	12.72 hours
10,600 mAh, 12V	127.2 Wh	5V, 0.5A (2.5W)	50.88 hours
10,600 mAh, 12V	127.2 Wh	5V, 0.5A @ 80% eff. (2W)	63.6 hours

As illustrated by the table above, which uses the equations provided by Dr. Fayed, even with a large 127.2 Wh battery, the slowest USB charging power available in

2014, and Dr. Fayed’s example of 80% efficiency, ***charging times would still not exceed the reasonable 72 hour charging time*** listed for the PSX3 jump starter. For completeness, I present the table below again, without any colored fonts and slightly reformatted.

Nominal Capacity and Voltage	Capacity	Charging Power	Time to Full Charge
10,600 mAh, 3.7V	39 Wh	5V, 2A (10W)	3.9 hours
		5V, 0.5A (2.5W)	15.6 hours
		5V, 0.5A @ 80% eff. (2W)	19.5 hours
10,600 mAh, 12V	127.2 Wh	5V, 2A (10W)	12.72 hours
		5V, 0.5A (2.5W)	50.88 hours
		5V, 0.5A @ 80% eff. (2W)	63.6 hours

As discussed, the table above demonstrates that even with a battery that is ***over four times larger*** than the patent’s described “large” battery, the time to a full charge using extremely slow charging inputs (*e.g.*, the last row of the table) would ***still not exceed*** what a POSITA would have known to be a typical charge time of 72 hours for a portable jump starter. Accordingly, NOCO’s assertion that USB would be a “nonviable” option because it would result in an “unreasonable/unpractical/atypical/non-useful” charging time is unsupported by the commercial technology available before the priority date of the ’203 patent.

57. It is worth noting that the charge times I calculated above are for charging a completely depleted battery to full charge. It goes without saying that if the device battery did not require a full charge (*i.e.*, the battery was only partially

depleted), the time to full charge would be shorter than what is shown in the table above. Devices are almost never fully discharged at the time that a charging cycle is initiated. A portable jump starter, for example, is capable of multiple uses on a single charge. In addition, many users rely on a portable jump starter as an emergency tool and, therefore, prefer to keep the jump starter fully charged at all times. In those cases, a user may charge a portable jump starter after just one or two jump start attempts. In those cases, depending on the size of the jump starter battery, the battery will not be fully discharged prior to a user recharging it. Accordingly, the time required to fully charge the battery would be proportionally less than the calculated charge times I provide above.

58. Lastly, Dr. Fayed has acknowledged, in other forums, that USB charging is at least useful as a secondary means of charging. Indeed, Dr. Fayed admitted both in his deposition in this IPR and during the ITC trial that: “A person of skill in the art, therefore, would likely conclude that adding a USB charging facility is only useful maybe as an optional/secondary method of charging (perhaps overnight) when the device is not being used, and that the device must have a primary method that can charge the device at a reasonable rate.” EX1059, 991:5-19; EX1058, 72:13-73:7. Accordingly, NOCO’s and Dr. Fayed’s current assertion that USB is a “nonviable” charging option for a jump starter directly contradicts Dr. Fayed’s earlier opinions.

4. *USB Charging would have been appropriate for both Richardson and Yu and a POSITA would have been motivated to add USB charging to both Richardson and Yu.*

59. NOCO argues that a POSITA “would not have modified the particular systems of Richardson” to include USB charging because Richardson “has a very large capacity battery that relies on rapid recharging from a vehicle’s electrical system” and “would not have modified” Yu to add USB because Yu “already implements a USB port but still chose not to rely on it for charging.” POR, 59; EX2003, ¶95. However, NOCO and Dr. Fayed are incorrect regarding Richardson’s jump starter and misunderstand Yu’s teachings.

60. ***First***, Richardson’s disclosed system does not rely solely on rapid recharging from a vehicle’s electrical system, nor does Richardson require a large capacity battery. Instead, Richardson’s disclosure does not mention battery capacity at all and only discusses charging times in a single sentence in the last paragraph prior to Richardson’s claims. EX1005, ¶55 (“This allows the capacitors 21 and jump starter batteries 22 to be fully recharged in about 1 to 5 minutes...”). Considering the absence of any discussion of battery capacity and only a passing mention of charging times, a POSITA would have understood that neither are critical to Richardson’s disclosure. Indeed, the ’203 patent offers no discussion of charging times or the import of particular sized batteries. *See generally*, EX1001.

61. While Richardson mentions that the jump starter batteries can be

EX1057 - Declaration of C. Arthur MacCarley

configured from 12 to 48 volts, Richardson never provides an example configuration that exceeds 30 volts. Richardson teaches “[t]he jump starter 10 may be configured for 12, 18, 24, 30, 36, 42 or 48 volts, for example, using a selector jumper 55.” EX1005, ¶34. Richardson then provides examples of various battery configurations, none of which produce more than 30V: “if the batteries 23 are both 12-volt batteries, the system may be configured for 12- or 24-volt operation;” or “[i]f the batteries 23 are 12-volt batteries and a battery 25 is a 6-volt battery, 18- or 30-volt configurations may be provided.” *Id.* After providing these lower voltage examples, Richardson teaches that any number of batteries of various voltage levels may be utilized in its system: “[i]t 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.” *Id.*, ¶34.

62. Similarly, Richardson’s only other discussion of various voltages relates to monitoring the vehicle system after a completed jump start, merely noting that “[n]ormal vehicle charging voltages fall within certain ranges for 12, 18, 24, 30, 36, 42 and 48 volts systems.” EX1005, ¶54. In addition, none of Richardson’s independent claims are limited to a specific voltage.

63. Accordingly, NOCO’s arguments regarding battery capacity improperly rely only on Richardson’s highest possible embodiment (*i.e.*, 48V) and ignore all of Richardson’s other embodiments, including those described in more

detail with much lower voltages.

64. Further, Richardson teaches that a battery charger (*e.g.*, an AC charger) is one way to charge its jump starter batteries. Paragraph 28 of Richardson states:

If the jumper cables 60 are not reverse connected 214, then the state of charge of the capacitors 21 and batteries 22 is determined 222. If the voltage level of the system batteries 22 measured by the voltage sensor 30 is equal to a state of charge of eighty percent or more below a fully charged voltage level 222, an error flag is set and the event recorded in memory 224. The charge battery LED 54 is illuminated and the LCD 46 displays a “Charge Battery” message 225. The system stays in this condition, which prohibits any further jump starter action by the operator until a charging voltage is detected 226, ***which is great enough to indicate that a battery charger (not shown) has been connected to the batteries 22.***

EX1005, ¶28 (emphasis added). A POSITA would understand that Richardson’s reference to “a battery charger (not shown)” is referring to an external, plug-in type battery charger. Indeed, Richardson’s states that “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.” *Id.*, ¶55. Thus, Richardson ***shows***, in figures 1 and 2, how to charge the jump starter batteries using a vehicle. Accordingly, where Richardson says “a battery charger (***not shown***),” a POSITA would understand Richardson to be referring to something ***other than*** charging from a running vehicle. Moreover, Exhibit 1064 is an archived copy of a website showing the commercial embodiment of Richardson’s jump starter: the “Infinity Series” jump starter. EX1064, 1. As shown in the reproduced images

below, the webpage confirms that Richardson's device allows "[r]echarg[ing] from 120 volts AC mains with external charger." *Id.* (reproduced-in-part, annotated below).

The screenshot displays the Richardson website with a red and black theme. At the top, a banner features the Richardson logo and the text: "Start your vehicle big or small instantly every time with the safest jumpstarter available." Below the banner, there is a search bar labeled "search term...".

On the left sidebar, there is a section titled "Rent a Jumpstarter" with the text: "Interested in just renting for now? [Click Here](#) to view more information about renting the best and safest jumpstarters made." Below this is the "Jumpstarter Series" section, which includes images of the "EX" and "REvolution" series. At the bottom of the sidebar is the "Latest News" section with three items:

- Most Powerful Jump Starters
- Introducing the new Infinity ultra capacitor jumpstarter
- Jump starters Computer Controlled jump starter

The main content area is titled "Infinity Jumpstarters" and features the text: "Rugged, damage resistant, and tough HPX® resin STORM® utility case". Below this is an image of a green jumpstarter case. To the right of the image, under the heading "Computer controlled technology", is a list of features:

- Full safety protection from shorts, and reverse connections
- Monitoring of all operational and temperature parameters
- Auto self test on opening with display annunciation
- Status condition LED annunciation with liquid crystal display, LCD
- Starting current display after successful start
- Charging system diagnostics after successful start

Specifications

- 24 volt and 12 volt models
- 2400 CCA at 24 volts, 4600 CCA at 12 volts, 55KW output power
- Dual 22 amp hour 12 volt sealed AGM batteries
- 2/0 gauge extra heavy highly flexible welding cable
- 350 amps continuous rated output connector
- NATO Slave connector or high current Parrot clamps
- termination
- Starting up to 1000HP diesel piston engine with 24 volts
- Recharge from working equipment in just a few minutes
- Recharge from 120 volts AC mains with external charger
- 45 day standby without recharge to 70% charge
- Wheel kit and handle accessory for hard surface rolling
- Rain tight closed case for inclement weather operation
- Richardson Commercial Price List (2013) NEW

EX1064, 1. While I have not personally examined the physical Infinity Series jump starter device, Dr. Fayed stated that he has seen this device during the ITC proceeding: “[i]n connection with my prior involvement with an ITC proceeding involving the related ’023 Patent and the Richardson prior art reference, ***I have personally viewed the commercial embodiment of Richardson....***” EX2003, ¶101. When asked during his deposition in this case, Dr. Fayed could not recall whether the commercial embodiment was called the “Infinity Series” but confirmed that the device was “suitcase sized:”

Q. You've seen the commercial embodiment of Richardson, correct?

A. *I've seen the commercial on what?*

Q. Embodiment of Richardson?

A. *That is correct. During – I have seen it during the ITC trial. I think there was -- it was like a big suitcase or something that I've seen, yes. Suitcase size I mean.*

Q. And that commercial embodiment was the Richardson Infinity series, correct?

A. It was Richardson. I don't know if it was the 80 series. Like I don't remember the exact series number, but it was definitely Richardson.

EX1058, 49:19-50:12. Further, during the ITC trial, Dr. Fayed testified that it is his belief, based on his understanding of Richardson's disclosure, that the Infinity Series pictured above is the commercial embodiment of Richardson:

Q. Can we please pull up CDX-12C at page 20.

So in your testimony a few moments ago, you said, "I was informed that the Richardson Infinity Series jump starter that's pictured here was some sort of commercial realization disclosed in the Richardson patent."

Do you recall that?

A. Yes.

Q. Who told you that?

A. The attorneys.

Q. Okay.

You can take this down.

Did you form your understanding of the disclosure of the Richardson patent based on the pictures and other information that you received about the Richardson jump starter?

A. Did I -- repeat the question again. I'm sorry.

Q. Did you inform some of your impressions or opinions about the scope of the disclosure of the Richardson patent reference by what is disclosed in the pictures or other information that you received about the Richardson jump starter product?

A. I have formed my opinions about Richardson by studying that patent disclosure itself. These pictures and what I was told was a commercial embodiment of

this patent was a confirmation of my understanding of what I read in the patent itself.

EX1059, 988:19-989:19 (emphasis added). Therefore, it is my understanding that Exhibit 1064 shows the same Infinity Series jump starter that Dr. Fayed refers to in his testimony.

65. Thus, NOCO is incorrect that Richardson does not include or contemplate charging via some other method other than a running vehicle. Instead, as seen in Richardson's disclosure (*i.e.*, EX1005, ¶28) and as corroborated by the AC external charger included in Richardson's commercial embodiment, Richardson expressly contemplates use of an external battery charger to charge the jump starter's internal batteries.

66. ***Second***, NOCO argues that the fact that Yu's authors knew about USB ***output*** ports means that they also knew about USB ***charging input ports*** and the choice to not include USB charging means that a POSITA "would not have made the [Petition's] proposed combination." POR, 61. This argument makes no sense. First, it is irrelevant that Yu's device does not include a USB charging input port. There is nothing to suggest that Yu's authors made any conscious choice to not include a USB charging input. Second, as the petition explains, a POSITA would have been motivated to add USB charging as an additional means to charge the jump starter at least due to the convenience and ubiquitous availability of USB ports. Pet., 60; EX1003, ¶140. Lastly, NOCO has not argued in its POR that Yu and Paparrizos

cannot be safely combined. Regardless, Yu and Paparrizos describe—in more detail than the '203 patent—how to incorporate a USB input and DC/DC converter to supply charging power to a battery. *See* EX1003, ¶¶69, 93, 137-142, 147-157. To the extent any safety issues arise when combining the teachings of Yu and Paparrizos, a POSITA would have known how to counteract any safety risks associated with having multiple charging input circuits using conventional technology. *See id.*

D. Richardson Teaches Claim 5

1. NOCO's interpretation of claim 5 is based on ignoring key portions of the claim.

67. NOCO advances an erroneous interpretation of claim 5 of the '203 patent based on selectively omitting key claim language and misconstruing both the claim's requirements and the teachings of the prior art. Specifically, NOCO argues that Richardson fails to teach claim 5 (as construed by NOCO). *POR*, 43. The plain language of claim 5, the record, and the technical disclosures of Richardson confirm that Richardson teaches the limitations of claim 5. NOCO's arguments are based on a misreading of the claim and an artificial narrowing that is unsupported by the specification or a POSITA's understanding of the claim.

68. Claim 5 recites:

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

EX1057 - Declaration of C. Arthur MacCarley

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.

EX1001, claim 5 (emphasis added). NOCO argues that claim 5 requires the controller to cause the sensors to perform detection “when the device is powered on,” regardless of whether the jump starter is electrically connected to a vehicle battery. POR, 44 (“claim 5...requires [battery presence detection] when the ‘jump starter apparatus becomes operational.’”), 44 (“the ’203 Patent makes clear that the jump starter apparatus becomes operational...when the device is powered on.”).

69. I do not agree with NOCO’s interpretation of claim 5 which requires ignoring the first condition recited after “when”: that “the vehicle battery is electrically connected to the jump starter.” A POSITA would understand that, based on the plain language of the claim, claim 5 requires that the controller “automatically causes” the two sensors to detect when the following two conditions are satisfied, that: (1) “the vehicle battery is electrically connected to the jump starter apparatus” **and** (2) “the jump starter apparatus becomes operational.” A POSITA would understand that if only one condition is satisfied, then the claim is not met.

70. Importantly, a POSITA would understand that the claim requires the controller to “automatically cause...***the reverse polarity sensor to detect polarity of the vehicle battery*** when” both conditions are satisfied. It is important to note that the reverse polarity sensor cannot do any “detecting” ***unless the vehicle battery is***

electrically connected to the jump starter apparatus. As is consistent with the '203 patent, the reverse polarity sensor makes its determination that the polarity is correct *before* the switch is closed and the jump starter *power supply* becomes connected to the vehicle battery. *See* EX1001, 5:67-6:13; POR, 18 (citing same). In other words, when claim 5 recites that “the vehicle battery is electrically connected to the jump starter *apparatus*” it is describing the point in time when the red and black clamps are attached, but before the power switch is closed to allow power to flow from the jump starter battery to the vehicle battery. Dr. Fayed agrees that this is the case: “Q. If the red and black clamps are not connected to anything, can the reverse polarity sensor make a determination of polarity? *A. If the battery is not connected, then there is no polarity to determine.* It's an open circuit.” EX1058, 21:12-18. The full questions and answers on this topic are presented below:

Q. Sure. We can take it in parts.

So you're using the patented jump starter. You connect the red and black clamps to the vehicle battery.

A. Correct.

Q. At that time -- sorry. So at that time the jump starter is connected to the vehicle electrical system, correct?

MR. SAUER: Objection. Form.

THE WITNESS: The jump starter, when you refer to the jump starter, if you mean the clamp cables will be connected, yes, they will be connected at that time, yes.

BY MR. CHANDRA: Q. And before the contact relay is closed, the jump starter battery is not connected to the vehicle battery, correct?

A. That is correct. The clamp could be connected to the vehicle battery. That doesn't mean that the contact relay is necessarily turned on, and, therefore, the lithium battery inside the device will not be connected to the vehicle system yet.

Q. And at that time, before the contact relay is closed, so it's currently open, the contact relay is open, the reverse polarity sensor makes the determination of polarity, correct?

MR. SAUER: Objection. Form.

THE WITNESS: And the clamps are connected. You're specifically asking if it does that while the clamps are connected.

BY MR. CHANDRA:

Q. Correct.

A. That would be -- that would be -- I can't comment on the exact time when it will do that, but at some point it will be making that determination because that determination will determine whether it should or should not turn on the contact relay. So at some point before it turns on the contact relay to start the jump starting process, it will be determining whether the connection is in the right polarity or not.

Q. If the red and black clamps are not connected to anything, can the reverse polarity sensor make a determination of polarity?

A. If the battery is not connected, then there is no polarity to determine. It's an open circuit.

Q. So you have to connect the jump starter to something, to either the vehicle battery or the vehicle electrical system, in order for the reverse polarity sensor to make a determination?

A. That is correct.

Id., 19:12-22:2. Thus, the '203 patent's specification, as well as Dr. Fayed's

testimony, confirms that the first condition—that the vehicle battery is electrically connected to the jump starter apparatus—is a requirement that a POSITA would not ignore when understanding the scope of claim 5. NOCO’s arguments which ignore this condition are, therefore, fundamentally flawed because NOCO’s construction selectively relies on certain parts of the claim while wholly ignoring other parts. A POSITA would not read claim 5 in such a selective way.

71. Lastly, NOCO’s argument that “claim 5 adds a further temporal restriction to claim 1 *that functions as a more stringent safety feature*” (POR, 44) appears to misunderstand that claim 5’s required condition that “the vehicle battery *is electrically connected* to the jump starter apparatus” (EX1001, claim 5) is *different* from closing the power switch to connect the jump starter *battery*—as opposed to the jump starter *apparatus*—to the vehicle battery. Indeed, claim 1 describes closing the power switch “such that the [jump starter] *power supply* is connected to the vehicle battery.” EX1001, claim 1. By contrast, claim 5’s requirement that “the vehicle battery is electrically connected to the jump starter *apparatus*” is directed to the time *before* the power switch is closed. *See* EX1058, 20:4-12 (“Q. And before the contact relay is closed, the jump starter battery is not connected to the vehicle battery, correct? *A. That is correct. The clamps could be connected to the vehicle battery. That doesn't mean that the contact relay is necessarily turned on, and, therefore, the lithium battery inside the device will not*

be connected to the vehicle system yet.”)

2. Under a correct understanding of the claim, Richardson teaches claim 5.

72. Under the correct understanding of claim 5 explained above, Richardson teaches the required limitations.

73. Richardson teaches that at step 214 “[o]nce jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214.” EX1005, ¶27; Pet., 49–53; EX1003, ¶¶113–117. Thus, Richardson’s reverse polarity detection occurs when (1) the vehicle battery is electrically connected to the jump starter apparatus (*i.e.*, the jumper cables are connected) and (2) the jump starter apparatus is operational (*i.e.*, the jump starter is turned on). Further, as discussed above, at step 252 Richardson detects the presence of a vehicle battery. See ¶¶5-10, *supra*. Step 252 occurs *after* step 214, thus the jumper cables are still connected to the vehicle battery and the jump starter is powered on. Accordingly, Richardson teaches the timing of detection required by the claim.

II. ARGUMENTS RAISED BY DR. FAYED AND NOT PRESENTED IN NOCO’S PATENT OWNER RESPONSE

74. Dr. Fayed appears to raise arguments in his declaration that are not also raised by NOCO in their patent owner response. My understanding is that NOCO’s

choice to not raise these arguments means that the arguments are waived. However, for the sake of completeness, I address some of the arguments raised by Dr. Fayed but not adopted by NOCO in this section.

75. Dr. Fayed asserts that the prior art does not contemplate charging large or high-voltage batteries via USB. EX2003, ¶¶119, 124. This is incorrect. Zhao expressly contemplates more than three cells in series. Indeed, Dr. Fayed testified in his deposition in IPR2024-00671 that Zhao's figure 1 expressly contemplates a "minimum" of three battery cells and that each cell is anywhere from 3.6 to 4.2 volts:

Q. Okay. So in [figure 1], [Zhao is] contemplating that there's a pack of at least three cells here?

A. ***Well, a minimum of three of these units would be symbols, that is correct. The only thing I will point out is that a lot of times, when people use the symbol for the battery, it doesn't necessarily mean that that means it's a single cell. It could also by itself mean multiple cells. So the only thing I can say for sure, by just looking at the figure, that there are three units of batteries that this patent is contemplating. Whether each unit is a single cell or not, it may or may not be.***

Q: And so if these are three cells here connected in series, we talked before about Zhao contemplating 4.2 volts per cell, so the total pack here would be at least 12.6 volts; is that right?

A. ***If the fully charged voltage of each cell is 4.2 and there are three of them, then that will be the number that you referred to, 12-point-something. If they are lithium-ion batteries and they are fully charged, then yes, that would be the voltage level.***

Q. And so ***there's this three dots here or ellipses in***

the pack which suggests that we could add even more cells, connect them in series if we wanted to?

A: That's what that normally indicates in schematics, correct.

Q. Okay. So our pack voltage could actually go -- could go up above 12.6 volts here if we wanted it to?

A. Yeah. If somebody is gonna use that circuit and choose to add more cells, they could do that, yes. Or that figure leaves the room for doing that, yes.

EX1066, 46:20-48:9. Accordingly, Dr. Fayed apparently agrees that Zhao expressly contemplates having a battery pack that includes more than three cells and, if a POSITA wanted, the battery pack could have a nominal voltage of higher than 12 volts.

76. Paparrizos also contemplates a higher voltage battery pack. For example, Paparrizos expressly states that “[t]he battery voltage of such batteries typically range from 6 to 8.4 volts but can provide lower or higher voltages.” EX1009, 2:38-40; EX1058, 67:15-20 (“Q. So Paparrizos, the last sentence says, ‘The battery voltage of such batteries typically range from 6 to 8.4 volts but can provide lower or higher voltages,’ right? A: That is correct.”). Thus, as Dr. Fayed agrees, Paparrizos expressly contemplates higher battery voltages than 8.4 volts. EX1058, 67:21-68:2 (“Q. So Paparrizos contemplates having a battery in his device that's larger than 8.4 volts, correct? A. That is correct, yes.”).

77. Further, Paparrizos teaches, and Dr. Fayed agrees, that Paparrizos’ device may be a laptop computer. EX1009, 2:59-60 (“For example, the electronic

device **22b** may be a laptop computer.”); 1058., 67:3-10 (“Q. So Paparrizos says that the electronic device may be a portable computer, correct? A. Correct. Q. A portable computer is a laptop, correct? A. A laptop would qualify for that, yes.”). A POSITA would have known that in 2014, Laptop computers had batteries with voltages at least as high as **14.8 volts**. For example, the 2013 product specification for the Dell Alienware 18 laptop lists a battery capacity of 86 (WHr) and a voltage of 14.8 VDC (volts DC). EX1065, 1, 5 (reproduced-in-part, annotated below).

Battery	
Type	8-cell “smart” lithium ion (86 WHr)
Dimensions:	
Height	170.20 mm (6.70 inches)
Width	76.35 mm (3.00 inches)
Depth	19.70 mm (0.77 inch)
Weight	0.465 kg (1.02 lbs)
Voltage	14.80 VDC
Operating time	Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions.
Life span (approximate)	300 discharge/charge cycles
Temperature range:	
Operating	0 °C to 35 °C (32 °F to 95 °F)
Storage	–40 °C to 65 °C (–40 °F to 149 °F)
Coin-cell battery	CR-2032

Accordingly, a POSITA would have understood that the laptop described by Paparrizos could have a battery with a capacity as large as 86 Wh and a voltage of 14.8 volts.

78. Lastly, it is worth noting that Dr. Fayed’s characterization of the type of electronics that Paparrizos describes is misleading. Dr. Fayed provides two quotes from Paparrizos in paragraph 124 of his declaration:

124. But as discussed above, a PHOSITA would not understand the small battery systems contemplated by Paparrizos and the vehicle jump starter described by Yu to be similar devices. Paparrizos discloses a battery charging circuit that can operate in a boost mode to step up a DC input charging voltage. *See* Ex. 1009, 1:30-39. But just like Zhao, Paparrizos does not teach or suggest applying its techniques beyond small electronics devices known to have low-capacity batteries. *See* Ex. 1009, 2:26-29. Paparrizos' techniques relate to charging of "[c]omputer tablets and other mobile devices, such as mobile phones, digital SLR cameras, video recorders, audio devices" (*id.*, 2:26-29), with battery packs that "typically range from 3.0V to 8.4V," not to charging jump starters or comparable devices. *Id.*, 1:13-15. In fact, Paparrizos expressly notes that "the USB specification imposes current limits for various devices that can be connected to the battery charging circuit," which further confirms that its charging circuit is not intended for charging large-capacity battery systems. *Id.*, 4:48-58. When considering charging techniques, a PHOSITA would understand that these small electronics devices are not similar to a vehicle jump starter.

EX2003, ¶124 (annotated). However, Dr. Fayed acknowledged that the two citations he provides in this paragraph are incorrect. EX1058, 71:7-72:10. Instead, Dr. Fayed agreed that these citations should have been only to Paparrizos background section where Paparrizos is not describing its system, but is instead describing the prior art. EX1009, 1:9-17; EX1058, 71:7-72:10. In other words, Dr. Fayed does not cite to Paparrizos' disclosure in column 2, where it expressly teaches that "[t]he battery voltage of such batteries typically range from 6 to 8.4 volts but can provide lower or higher voltages." EX1009, 2:38-40.

79. I understand that this declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also understand that I may be subject to cross-examination concerning this declaration, and I will appear for cross-examination, if required of me, during the time allotted for cross-examination.

80. I hereby declare that all of the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on this 2nd day of September 2025.

A handwritten signature in black ink, appearing to read "C. Arthur MacCarley", is written over a horizontal line.

C. Arthur MacCarley, Ph.D., P.E.