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[1]

U.S. Patent No. 11,667,203

PATENT OWNER'S NOTICE OF APPEAL

[1] ADC Solutions Auto LLC was joined as a petitioner to this proceeding based on a petition and a motion for joinder in IPR2025-00885.

Pursuant to 37 C.F.R. § 90.2(a), The NOCO Company ("NOCO" or "Patent Owner") hereby appeals to the United States Court of Appeals for the Federal Circuit from the Patent Trial and Appeal Board's Final Written Decision in IPR2024-01219 entered on March 13, 2026 (Paper No. 27), and from all underlying orders, decisions, rulings and opinions regarding the *inter partes* review of U.S. Patent No. 11,667,203 B2 ("the '203 Patent") that are adverse to NOCO. This Notice of Appeal is timely under 37 C.F.R. § 90.3(a)(1), having been filed within 63 days of the Final Written Decision.

In accordance with 37 C.F.R § 90.2(a)(3)(ii), Patent Owner further indicates that the issues on appeal include, but are not limited to: (1) the Board's decision that claims 1, 3-5, and 9 were obvious over U.S. Patent App. Pub. No. 2013/0154543 A1 ("Richardson") in view of U.S. Patent No. 9,391,467 B1 ("Zhao"); (2) the Board's decision that claims 2, 10, and 11 were obvious over Richardson in view of Zhao and Epower-20/Epower-21; (3) the Board's decision that claims 6–8 were obvious over Richardson in view of Zhao and U.S. Patent App. Pub. No. 2004/0130298 A1 ("Krieger"); (4) the Board's legal errors in undertaking its obviousness analyses; (5) the Board's motivation to combine analyses; (6) the Board's findings that conflict with the evidence of record or are otherwise unsupported by substantial evidence; (7) the Board's failure to consider evidence of record (including testimonial and documentary) fully and properly; and (8) any finding or determination supporting or

related to the above issues, as well as all other issues decided adversely to Patent Owner in any orders, decisions, rulings, and opinions.

This Notice of Appeal, along with a copy of the Final Written Decision, is being filed electronically with the United States Court of Appeals for the Federal Circuit along with the required docketing fees.

Respectfully submitted,

Date: May 14, 2026

/s/ Joseph M. Sauer
Joseph M. Sauer, Reg. No. 47,919
JONES DAY
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-7506
jmsauer@jonesday.com

Counsel for Patent Owner

CERTIFICATE OF FILING

The undersigned certifies that, along with electronic filing through the Patent Trial and Appeal Case Tracking System (P-TACTS), a true and correct copy of the above-captioned **PATENT OWNER'S NOTICE OF APPEAL** is being filed by email with the Director on May 14, 2026, at the email address efileSO@uspto.gov, in accordance with 37 C.F.R. § 90.2(a)(1)(i).

The undersigned also hereby certifies that a true and correct copy of the above-captioned **PATENT OWNER'S NOTICE OF APPEAL** and the filing fee is being filed via CM/ECF with the Clerk's Office of the United States Court of Appeals for the Federal Circuit on May 14, 2026.

Date: May 14, 2026

/s/ Joseph M. Sauer
Joseph M. Sauer, Reg. No. 47,919
JONES DAY
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-7506
jmsauer@jonesday.com

Counsel for Patent Owner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned hereby certifies the foregoing document, **PATENT OWNER'S NOTICE OF APPEAL**, was served via electronic mail on the date below, upon the following:

Ryan N. Miller
Fox Rothschild LLP
rmiller@foxrothschild.com

Anthony J. Noonan
Fox Rothschild LLP
anoonan@foxrothschild.com

Chetan Chandra
Fox Rothschild LLP
cchandra@foxrothschild.com

Nicholas Almerini
Fox Rothschild LLP
nalmerini@foxrothschild.com

Jonathan R. Lagarenne
Fox Rothschild LLP
jlagarenne@foxrothschild.com

Paul L. Smelcer
Husch Blackwell LLP
paul.smelcer@huschblackwell.com

Daisy Manning
Husch Blackwell LLP
PTAB-DManning@huschblackwell.com

Date: May 14, 2026

/s/ Joseph M. Sauer
Joseph M. Sauer, Reg. No. 47,919
JONES DAY
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-7506
jmsauer@jonesday.com

Counsel for Patent Owner

Trials@uspto.gov
571-272-7822

Paper 27
Date: March 13, 2026

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DELTRAN USA LLC,
Petitioner,

v.

THE NOCO COMPANY,
Patent Owner.

IPR2024 01219[1]
Patent 11,667,203 B2

Before JAMESON LEE, AVELYN M. ROSS, and
JASON M. REPKO, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

[1] ADC Solutions Auto LLC was joined as a petitioner to this proceeding based on a petition and a motion for joinder in IPR2025-00885

I. INTRODUCTION

Deltran USA LLC ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1–11 (Pet. 4) of U.S. Patent No. 11,667,203 B2 (Ex. 1001, "the '203 patent"). The NOCO Company ("Patent Owner") filed a Preliminary Response to the Petition. Paper 7 ("Prelim. Resp."). We instituted *inter partes* review. Paper 8 ("DI" or "Decision on Institution").

Thereafter, Patent Owner filed a Response (Paper 11, "PO Resp."), Petitioner filed a Reply (Paper 14, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 17, "Sur-reply"). The Final Hearing was held on October 12, 2025, and a transcript of the Final Hearing is in the record. Paper 26 ("Tr.").

For the reasons set forth below, upon considering the Petition, Patent Owner's Response, Petitioner's Reply, Patent Owner's Sur-reply, and evidence of record, we determine that Petitioner has established by a preponderance of the evidence that claims 1–11 of the '203 patent are unpatentable.

A. Real Parties-in-Interest

Petitioner identifies "Deltran USA LLC," "Deltran Operations, Inc.," and "Deltona Transformer Corporation" and as the real parties-in-interest. Pet. 80.

Patent Owner identifies "The Noco Company" as the real party-in-interest. Paper 4 (Mandatory Notice), 1.

B. Related Proceedings

The parties both identify *The Noco Company v. Deltona Transformer Corporation, et al.,* Case No. 6:23-cv-02194 (M.D. Fla.) ("the parallel

litigation") as involving the '203 Patent. Pet. 80; Paper 4, 1–2. Petitioner notes that "[r]elated patents also asserted in the above captioned litigation include U.S. Patent No. 11,447,023 (the '023 patent) and U.S. Patent No. 11,584,243 (the '243 Patent)." Pet. 80.

The parties also indicate that the '023 patent is currently the subject of IPR2024-00577, and the '243 patent is currently the subject of IPR2024-00671. Pet. 81; Paper 4, 2.

C. The '203 patent (Ex. 1001)

The '203 patent, titled "Portable Vehicle Battery Jump Start Apparatus With Safety Protection," issued on June 6, 2023. *Id.* codes (45), (54). The "invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery." *Id.* at 1:7–9.

The '203 patent discloses a "handheld battery booster according to one aspect of the invention." *Id.* at 4:22–23. "At the heart of the handheld battery booster is a lithium polymer battery pack 32, which stores sufficient energy to jump start a vehicle engine served by a conventional 12 volt lead-acid or valve regulated lead-acid battery." *Id.* 4:23–27. Figure 3 reproduced below, depicts an exemplary handheld battery booster device. *Id.* at 7:57–58.

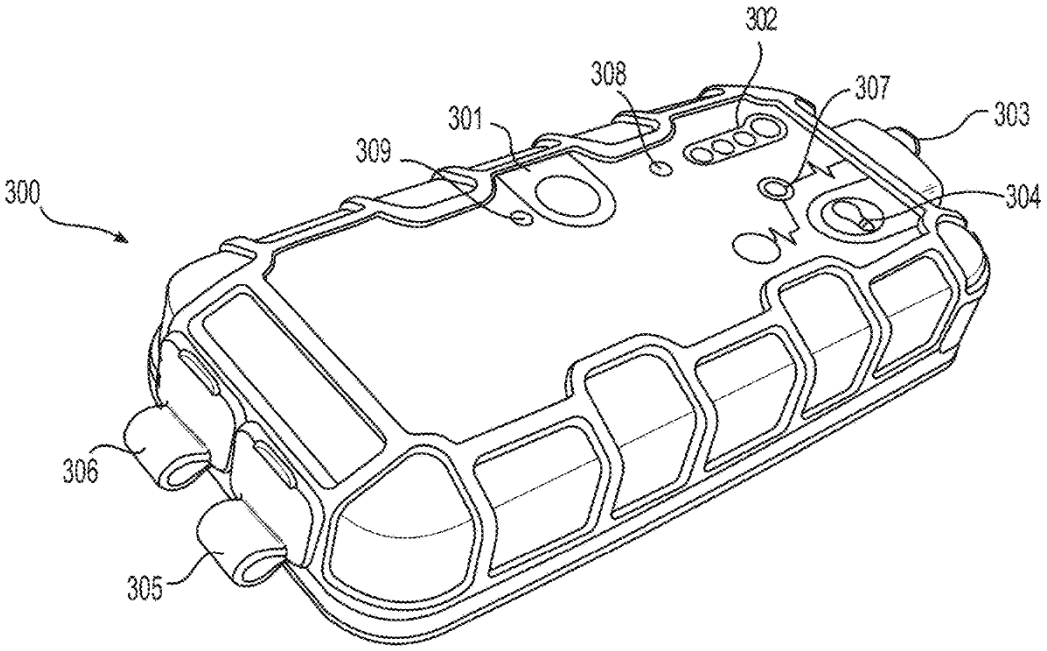


FIG. 3

Figure 3 "is a perspective view of a handheld jump starter booster device in accordance with one example embodiment of the invention." *Id.* at 4:12–14. Figure 3 illustrates the following: power on switch 301; LED "fuel gauge" indicators 302; 12 volt output port 303 connectable to cable device 400; flashlight control switch 304 for activating flashlight LEDs; USB input port 305 for charging the internal lithium battery; USB output port 306 for providing charge from the lithium battery to other portable devices such smartphones; "boost on" indicator 307 showing that power is being provided to 12 volt output port 303; "reverse" indicator 308 showing that the vehicle battery is improperly connected with respect to polarity; "power on" indicator 309 showing that device 300 is powered up for operation. *Id.* at 7:57–8:4.

Figure 4, reproduced below, depicts jumper cables useful for the handheld jump starter shown in Figure 3. *Id.* at 8:5–6.

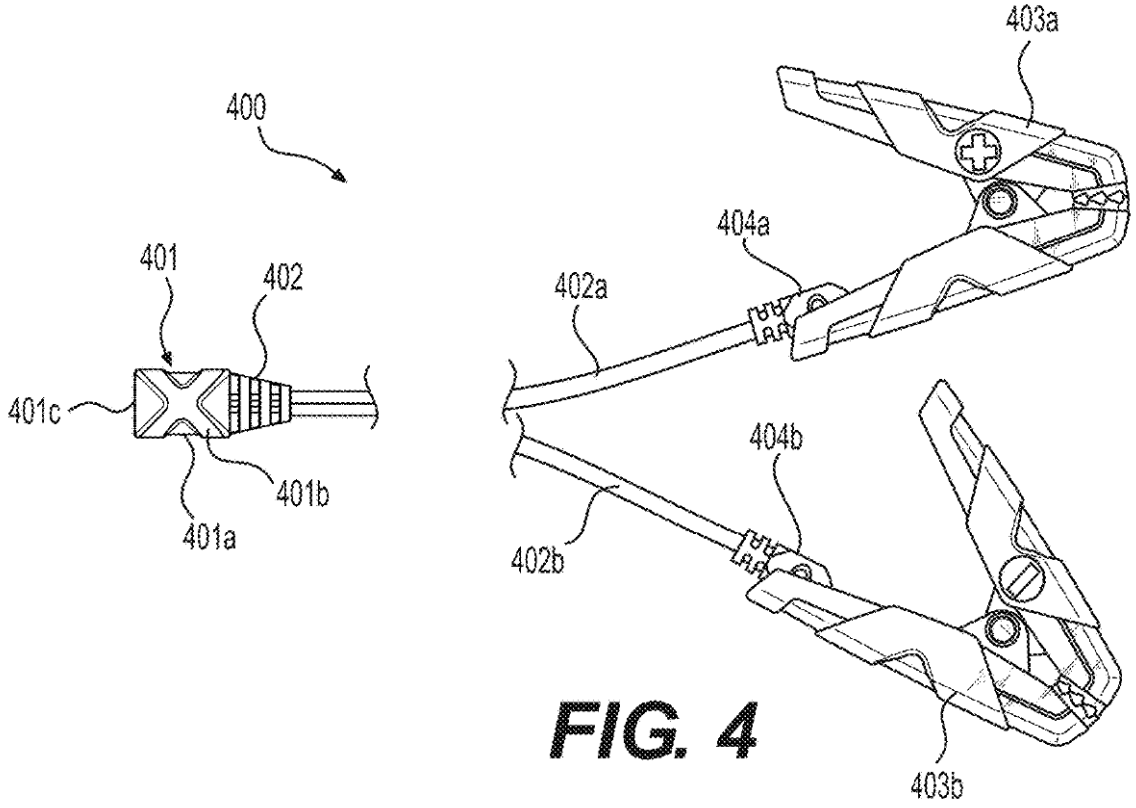


FIG. 4

Figure 4 "is a plan view of a jumper cable." *Id.* at 4:15–17. Figure 4 illustrates the following: plug 401 configured to plug into 12 volt output port 303 of handheld device 300; a pair of cables 402a, 402b integrated with plug 401 and respectively connected to positive and negative polarity battery terminal clamps 403a, 403b via ring terminals 404a, 404b. *Id.* at 8:5–11. Handheld booster device 300 is connected to a vehicle battery by connecting plug 401 into output port 303 and connecting battery clamps 403a, 403b to respective terminals of the battery. *Id.* at 8:11–18.

Figure 1, reproduced below, illustrates an exemplary embodiment.

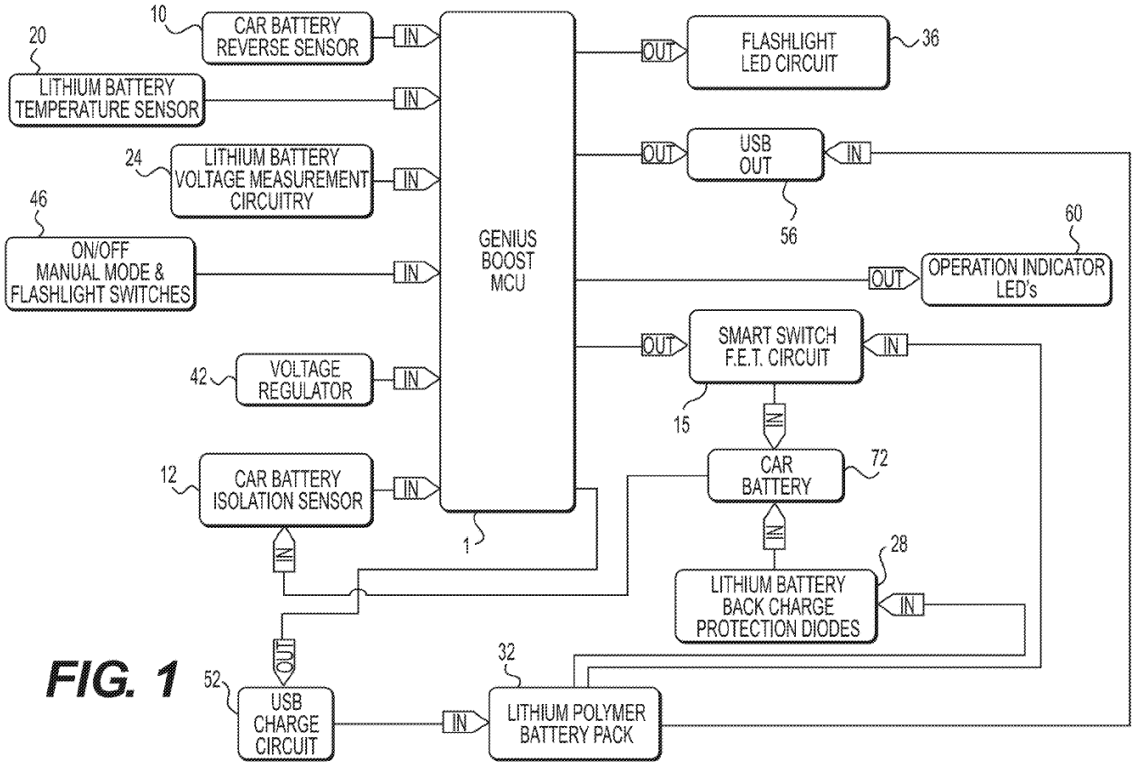


FIG. 1

Figure 1 "is a functional block diagram of a handheld battery booster according to one aspect of the invention." *Id.* at 4:22–23. Programmable microcontroller unit (MCU) 1 receives various inputs and produces informational as well as control outputs. *Id.* at 4:35–37. Car battery reverse sensor 10 detects, and informs MCU 1, whether the negative and positive terminals of booster device 300 are respectively and thus correctly connected to negative and positive terminals of the vehicle battery 72. *Id.* at 4:45–51.

USB charge circuit 52 converts power from "any USB charger power source, to charge voltage and current for charging the lithium battery pack 32." *Id.* at 5:32–34. In a specific example of Figure 2C, the USB charge circuit 52 converts power of "a standard USB charger" to the charging power. *Id.* at 7:40–41. The input of the charge circuit 52 is a "standard micro-USB connector 48 allowing standard cables to be used." *Id.*

at 7:42–43. "The 5V potential provided from standard USB chargers is up-converted to the 12.4 VDC voltage required for charging the internal lithium battery pack using a DC-DC converter 49." *Id.* at 7:43–46.

D. Illustrative Claim

Petitioner challenges claims 1–11 of the '203 patent. Independent claim 1 is representative of the challenged claims and is reproduced below with Petitioner's annotations:[2]

> 1. 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

[2] For convenience, we adopt Petitioner's annotated claim format.

> battery when both (i) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter apparatus, and (ii) the reverse polarity sensor currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.

Ex. 1001, 8:32–60.

E. The Asserted Unpatentability Challenges

Petitioner asserts that claims 1–11 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §[3]	Reference(s)/Basis
1, 3–5, 9	103	Richardson,[4] Zhao[5]
2, 10, 11	103	Richardson, Zhao, AAPA or Epower-20,[6] Epower-21[7]
6–8	103	Richardson, Zhao, Krieger[8]
1, 3–5, 9	103	Yu,[9] Paparrizos[10]

[3] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the '203 patent issued was filed after this date, the AIA version of § 103 applies.
[4] US 2013/0154543 A1, published June 20, 2013 (Ex. 1005, "Richardson").
[5] US 9,391,467 B2, issued July 12, 2016 (Ex. 1006, "Zhao").
[6] Product Brochure for Model E-Power-20B, Shenzhen Carku Technology Co., Ltd., Allegedly Distributed April 15–May 5, 2014, at "2014 Canton Fair" (Ex. 1012, "Epower-20").
[7] Product Brochure for Model E-Power-21, Shenzhen Carku Technology Co., Ltd., Allegedly Distributed April 15–May 5, 2014, at "2014 Canton Fair" (Ex. 1013, "Epower-21").
[8] US 2004/0130298 A1, published July 8, 2004 (Ex. 1010, "Krieger").
[9] CN 203211234U, September 25, 2013 (Ex. 1008 (certified English translation), "Yu").
[10] US 9,219,372 B2, issued December 22, 2015 (Ex. 1009, "Paparrizos").

Claim(s) Challenged	35 U.S.C. §[3]	Reference(s)/Basis
2, 10, 11	103	Yu, Paparrizos, AAPA or Epower-20, Epower-21
6–8	103	Yu, Paparrizos, Krieger

Pet. 4. Petitioner also relies on testimony of C. Arthur MacCarley. Ex. 1003; Ex. 1057. Patent Owner relies on the testimony of Ayman Fayed. Ex. 2001; Ex. 2003.

II. ANALYSIS

A. Principles of Law

In an *inter partes* review, "the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997). A claim is unpatentable as obvious, under 35 U.S.C. § 103, if the differences between the claimed invention and the prior art are such that the claimed invention, as a whole, would have been obvious to a person having ordinary

skill in the art, before the effective filing date of the claimed invention. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.[11] *Graham*, 383 U.S. at 17–18. Consideration of the *Graham* factors "helps inform the ultimate obviousness determination." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc), *cert. denied*, 138 S. Ct. 420 (2017). "Obviousness does not require absolute predictability of success[;] . . . all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted). But, a petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art ("POSITA" or "PHOSITA") before the effective filing date of the claimed invention. *Graham*, 383 U.S. at 17.

[11] Neither Petitioner nor Patent Owner raises issues of objective indicia of nonobviousness.

Petitioner contends that a person of ordinary skill in the art, "[a]s of the claimed priority date of July 3, 2014, . . . would have been a person with a bachelor's degree in electrical engineering or its equivalent and two years of experience in the field of electrical engineering including some experience in design of battery charging systems." Pet. 21 (citing Ex. 1003 ¶¶ 19–30). Patent Owner "does not propose a different level of skill in the art[.]" PO Resp. 16.

In light of the record before us, we adopt Petitioner's proposal regarding the level of ordinary skill in the art, because it is supported by the testimony of C. Arthur MacCarley and not disputed by Patent Owner.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b). Under *Phillips*, we give claim terms "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

"Petitioner submits there are no formal claim constructions necessary in this proceeding[.]" Pet. 22. Patent Owner also "does not propose any terms need to be construed." PO Resp. 15.

As neither party proposes an express construction for our consideration and because we determine that claim construction is not

necessary, we do not expressly construe any claim terms. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy"); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Collateral Estoppel

"Collateral estoppel applies when '(1) the identical issue was previously adjudicated; (2) the issue was actually litigated; (3) the previous determination was necessary to the decision; and (4) the party being precluded from relitigating the issue was fully represented in the prior action.'" *Kroy IP Holdings, LLC v. Groupon, Inc.*, 127 F.4th 1376, 1380 (Fed. Cir. 2025) (quoting *Jean Alexander Cosmetics, Inc. v. L'Oreal USA, Inc.*, 458 F.3d 244, 249 (3d Cir. 2006)).

Petitioner alleges there is no dispute that the claim limitations 1[PRE], 1(A), 1(D)–1(G) are found in Richardson. Pet. 35, 37, 41, 43, 46, 48. According to Petitioner, each of the collateral estoppel elements is also met because the relevant issues were fully litigated by the Patent Owner in IPR2020-00944, involving the '023 patent ("the -00944 IPR"). Pet. 29. In particular, Petitioner asserts that each of the relevant claim limitations were "found to be invalid over Richardson" and that the Board determined that Epower-20 and Epower-21 qualify as a prior art printed publication. Pet. 29–30. Petitioner asserts that "[t]o the extent any of the [claim] limitations include different or additional language, those differences are not

substantial differences that would create a 'new issue of validity' for the Board to resolve." Pet. 30.

In our Decision on Institution, we determined that Patent Owner's arguments did not implicate collateral estoppel because Patent Owner did not dispute the issues Petitioner raised as subject to estoppel. DI 20–22. But, we "encouraged [the parties] to further develop this issue over the course of trial including . . . questions such as whether estoppel should be applied on a limitation by limitation basis, claim by claim basis, or otherwise." DI 21–22.

Here, Patent Owner argues that collateral estoppel does not apply. PO Resp. 32–43. First, Patent Owner argues that collateral estoppel is typically "invoked with respect to the factual finding of unpatentability of an entire claim" and that Petitioner's "limitation-by-limitation usage of collateral estoppel is improper, and violates the requirements that factfinders analyze the obviousness of an 'invention as a whole.'" PO Resp. 33. Patent Owner also contends that claim 1 in this *inter partes* review "presents non-identical issues of patentability" because the claim language is different (PO Resp. 33–34, 36–38), the challenge here is based on obviousness, not anticipation (*id.* at 35), and the Petition here relies on different prior art (*id.* at 36). Second, Patent Owner argues that "the findings that Petitioner now relies on were, in fact, not necessary to the Final Written Decision for the '015 Patent, because that decision rested on multiple independent grounds of unpatentability" and "had the Board made different findings with respect to Richardson in the '015-FWD . . . the '015 Patent would have still been held unpatentable under the alternative prior art grounds involved in the proceeding." PO Resp. 39. And third, Patent Owner asserts that collateral

estoppel cannot apply to issues that were not adjudicated, which include Patent Owner's allegations here "that the prior art is inoperative." PO Resp. 42–43.

Petitioner asserts that "the Petition separately maps Richards teachings to the claims ***and*** notes [the] Board's relevant prior findings" and "maintains that collateral estoppel applies." Pet. Reply 27. Petitioner also states that "[r]egardless of whether collateral estoppel applies, the Petition presents the same facts that underpin the Board's findings and, therefore, the Board should reach the same conclusion." Pet. Reply 27.

Notably, Petitioner, in its briefing, does not address Patent Owner's arguments relating to whether the prior findings are "necessary to the determination" or whether estoppel applies to arguments relating to Richardson being inoperative. *See* Pet. Reply 27. Nor does Petitioner respond to our inquiry about whether collateral estoppel maybe applied on a limitation by limitation basis. *See* Pet. Reply 27. At the hearing, however, Petitioner confirmed that resolution of the issue is not necessary to our final determination.

> JUDGE ROSS: Do we even need to decide the collateral estoppel issue? I mean, it seems to me that if your petition clearly made out your case for the combination of Richardson and Zhao, then we don't even need to reach that.
>
> MR. CHANDRA: That's exactly right, Your Honor. That is our position, as well. We believe collateral estoppel applies, but you don't need to decide that issue in order to find these claims unpatentable. As I mentioned before, these are the same references. We have fairly sought out all of the portions of Richardson, we cited to specific portions. Not just relying on collateral estoppel, but the teachings of the reference itself. So, while this is an issue, we believe that collateral estoppel should

> apply. It does not have to apply in order to find the challenged claims unpatentable.

Tr. 19:9–20. We are persuaded, as discussed in Section II.G., that Petitioner has shown where Richardson in combination with Zhao meets each limitation of the claims of the '203 patent. Accordingly, we need not address whether Petitioner has demonstrated sufficiently that collateral estoppel applies here.

E. Waiver

Petitioner argues that Patent Owner "has waived arguments not raised in its [Patent Owner] Response." Pet. Reply 27. Specifically, Petitioner contends that "[b]y raising an argument in its Preliminary Response, but not its [Patent Owner] Response, a patent owner waives said argument," and further that "[i]t is improper for [Patent Owner] to circumvent word limits and incorporate arguments not raised in its [Patent Owner] Response." Pet. Reply 28 (noting that nearly 30 pages of the Patent Owner Preliminary Response is cited in the Patent Owner Response).

Patent Owner asserts that it "has not abandoned the motivation to combine arguments presented in the Preliminary Response; rather, the Patent Owner Response included 10 whole pages of arguments (*see* POR pp. 52–61) related to the motivation to combine issue." Sur-reply 25–26. Patent Owner contends that its Patent Owner Response includes "the same points included in the Preliminary Response" and further identifies "inherent problems associated with the proposed combinations." Sur-reply 26. Therefore, Patent Owner states no waiver exists. Sur-reply 26.

Our Practice Guide states, that "[o]nce a trial is instituted, the Board may decline to consider arguments set forth in a preliminary response unless they are raised in the patent owner response." Consolidated Trial Practice

Guide ("Practice Guide"), 52 (Nov. 2019) (citing *In re Nuvasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (explaining that a patent owner waives an issue presented in its preliminary response if it fails to renew the issue in its response after trial is instituted)).[12] In addition, in our Scheduling Order, we stated that "Patent Owner is cautioned that any arguments not raised in the response may be deemed waived." Paper 9 at 10; *see also* Practice Guide, 94 (same). Patent Owner confirmed at the Oral Hearing its understanding that arguments raised in its Preliminary Response and not reasserted in its Patent Owner Response were not appropriate for consideration during trial. Tr. 4:10–6:17.

Petitioner does not identify any particular argument raised in the Patent Owner Preliminary Response that is not present in the Patent Owner Response. But, in this Final Written Decision, we do not consider arguments made in the Patent Owner Preliminary Response and instead assess only those fairly presented in the Patent Owner Response.

F. Challenges that Recite Applicant Admitted Prior Art (Grounds 2 and 5)

Patent Owner asserts that "Grounds 2 and 5 of the Petition are . . . improper for relying on non-311(b) evidence as part of the basis for these Grounds. . . . [Specifically,] Petitioner has impermissibly presented applicant admitted prior art (AAPA) as part of the basis of these Grounds." PO Resp. 62. As a result, Patent Owner contends that "the Board should not consider Grounds 2 and 5 [and that] Claims 2, 10, and 11 cannot be held unpatentable." PO Resp. 63–64.

[12] *Available at* https://www.uspto.gov/TrialPracticeGuideConsolidated.

Petitioner argues that "[n]otwithstanding the Petition's 'AAPA' label, the cited admission is a U.S. patent that is prior art under § 102 . . . and is a permissible ground under the AIA." Pet. Reply 26. Petitioner also argues that "Grounds 2 and 5 state 'AAPA **and/or** Epower-20/Epower-21' and explain how claims 2, 10, and 11 are obvious in further view of Epower-20/Epower-21." Pet. Reply 26.

Patent Owner seemingly seeks to exclude the entirety of Petitioner's Grounds 2 and 5. PO Resp. 63–64 (stating that "the Board should not consider Grounds 2 and 5 [and that c]laims 2, 10, and 11 cannot beheld unpatentable, because Petitioner has not presented ***any*** proper grounds challenging the patentability of these claims."). We are not persuaded that Petitioner Grounds 2 and 5 should be wholesale rejected as improperly relying on applicant admitted prior art.

Claim 2 requires that the "jump starter apparatus is a hand-held device" and claims 10 and 11 further recite the jump starter apparatus is "configured to provide power for charging an external device" and "a USB charging port for providing power . . . for charging the external device," respectively. Ex. 1001, 8:61–61, 10:10–16. With respect to claim 2, it is clear that Petitioner's allegations relating to use of AAPA are presented as an alternative to Epower-20/Epower-21. Pet. 4 (Ground 2: "G1 combination in further view of AAPA *or* Epower-20/Epower-21," and Ground 5: "G4 combination in further view of AAPA *or* Epower-20/Epower-21" (emphasis added)), 54 ("[a]lternatively, claim 2 is also obvious in view of Richardson and Zhao in further view of or Epower-20 and/or Epower-21"), 76. In addition, Petitioner does not appear to rely on AAPA to supply any teaching relevant to claims 10 and 11, and instead rests its allegations on disclosures

found in Epower-20 and Epower-21 (Ground 2) and Yu (Ground 5). Pet. 55–57, 76–77. Therefore, we understand Petitioner's allegations for Grounds 2 and 5 to rest on either AAPA or Epower-20/Epower-21—not both. As a result, Petitioner's alternative challenge relying on Epower-20/Epower-21 is *not* based on AAPA and complies with 35 U.S.C. § 311(b). *Qualcomm Inc. v. Apple Inc.*, 134 F.4th 1355, 1364–1366 (Fed. Cir. 2025).

With respect to Petitioner's allegations that rest on AAPA, we determine Petitioner has failed to show that claims 2, 10, and 11 are unpatentable. Our rules require that a petition for *inter partes* review must base the asserted challenges on "prior art consisting of patents or printed publications." 35 U.S.C. § 311(b); 37 C.F.R. § 42.104(b)(2) and (4). And, a petitioner who relies on applicant admitted prior art as the basis, or part of the basis, of a ground, runs afoul of § 311. *Qualcomm*, 134 F.4th at 1365; *see also* USPTO Memorandum, Enforcement and Non-Waiver of 37 C.F.R. § 42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews (Jul. 21, 2025), *available at* www.uspto.gov/sites/default/files/documents/aapa_memo_final__signed.pdf.

We acknowledge but reject Petitioner's position that its combinations discussing AAPA do not "rely" on AAPA but rather rely on U.S. Patent No. 5,793,185 ("the '185 patent"), described in the '203 patent as prior art. Pet. Reply 26. A petition for *inter partes* review must identify, "in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim." 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104 (b)(4). Here, Petitioner's contention that the Grounds 2 and 5 actually rely on the '185 patent when discussing AAPA is inconsistent with the Petition.

In particular, the Petition does not cite to or direct our attention to any specific details from the '185 patent to support its challenges. *See generally* Pet. 54–57, 76–77.

Accordingly, Petitioner has failed to show, by a preponderance of the evidence, that claims 2, 10, and 11 would have been unpatentable over the combination of Richardson, Zhao, and AAPA as well as over the combination of Yu, Paparrizos, and AAPA. Petitioner's alternative allegations based on Epower-20/Epower-21 are considered below.

G. Challenges Based on Richardson and Zhao

Petitioner alleges that claims 1, 3–5, and 9 of the '203 patent are rendered obvious by Richardson and Zhao. Pet. 4, 31–54. Petitioner further alleges that claims 2, 10, and 11 would have been obvious over Richardson, Zhao, and Empower-20/Empower-21. *Id.* at 4, 54–57. In addition, Petitioner contends that claims 6–8 of the '203 patent would have been obvious over the combination of Richardson and Zhao in further view of Krieger. *Id.* at 4, 57–59.

1. Overview of the Prior Art

a) Richardson (Ex. 1005)

Richardson is titled "Method and Apparatus for Providing Supplemental Power to an Engine. Ex. 1005, code (54). Richardson "relates to a portable power source for a motor vehicle and, more particularly, to a method and apparatus to provide supplemental power to start internal combustion and turbine engines." *Id.* ¶ 2. Richardson explains that if "the batteries [of a motor vehicle] are cross-connected or the clamps inadvertently contact each other when one end of the jumper cables is

connected to a battery, sparking can occur resulting in . . . a potential for the batteries exploding and fire[.]" *Id.* ¶ 5.

Richardson states that

> [t]he present invention monitors the voltage of the battery of the vehicle to be jump started and the current delivered by the jump starter . . . to determine if a proper connection has been established and to provide fault monitoring. For safety purposes, only if the proper polarity is detected can the system operate. . . . The system includes one or more internal batteries and capacitors to provide the power to the battery of the vehicle to be jump started. Once the vehicle is started, the vehicle's electrical system may recharge the batteries and capacitors before the unit automatically electrically disconnects from the vehicle's battery.

Id. ¶ 7.

An example jump starter 10 (illustrated by a schematic of Figure 1 and by circuit diagrams of Figures 2A–D) includes microprocessor 12, sensors, LED indicators, capacitors 21 and batteries 22 that collectively supply charging power for charging a vehicle battery, two in-series shunt cables 36, 37 that carry the charging power to the vehicle battery, and contact relay 34 that selectively gates the charging power to the vehicle battery (relaying between the shunt cables 36, 37). *Id.* ¶¶ 12, 14, 16, Fig. 1. When jump starter 10 is powered on, microprocessor 12 initializes the hardware, reads all system parameters and variables, and initializes an interrupt service routine. *Id.* ¶ 22. As part of the routine, a voltage is measured to determine whether cables 36, 37 have been reverse connected to the vehicle. *Id.* ¶ 27. If so, then microprocessor 12 prevents jump starting until the reverse polarity condition is corrected. *Id.* Similarly, another voltage is measured to determine whether jump starter batteries 22 are not

sufficiently charged. *Id.* ¶ 28. Microprocessor 12 prevents jump starting until jump starter batteries 22 are sufficiently charged. *Id.* ¶¶ 28–29.

When the jump starter has been successfully initiated, contact relay 34 is closed and jump starter capacitors 21 and batteries 22 connect to the vehicle battery. *Id.* ¶ 21. Contact relay 34 is opened if the start cycle has successfully completed, a start fault occurs, or the operator interrupts the start cycle. *Id.*

Jump starter 10 may be selectively configured for 12, 18, 24, 30, 36, 42, or 48 volts. *Id.* ¶ 34. For example, if batteries 23 are both 12-volt batteries, the system may be configured for 12-volt or 24-volt operation. *Id.*

b) Zhao (Ex. 1006)

Zhao is titled "Step-up Battery Charging Management System and Control Method Thereof." Ex. 1006, code (54). Zhao states that

> Battery charging systems typically utilize . . . an input supplied by a power supply adapter[] and an output coupled to a single-cell battery[] or multi-cell batteries. A universal serial bus (USB) power supply system usually has a rating power supply voltage of 5V. A single-cell lithium battery can employ . . . step-down topology to charge the single-cell battery. Step-up topology can be used in battery management systems with series connected multi-cell lithium batteries. However, in some circumstances, such as high input current or short-circuit at the output, if relatively large current is used directly for charging, the electronic device and/or its battery can be damaged.

Id. at 1:19–30. Figure 1, reproduced below, is an exemplary charger.

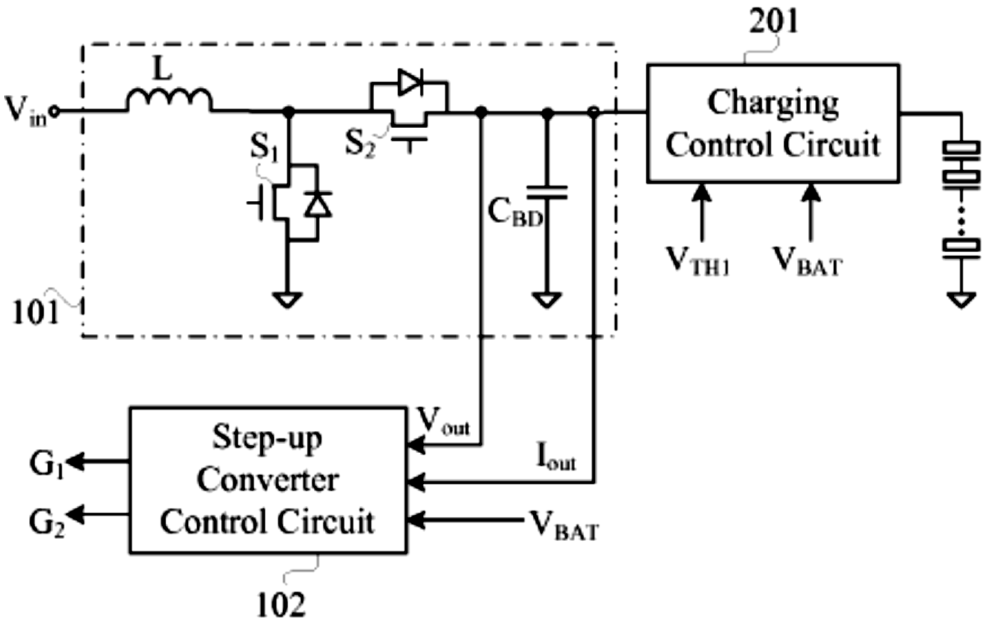


Figure 1 "is a schematic block diagram of a first example step-up battery charger in accordance with embodiments of the present invention." *Id.* at 1:59–61. Step-up battery charger 100 principally includes step-up converter control circuit 102, charging control circuit 201, and power stage circuit 101. *Id.* at 2:63–3:39. Step-up converter portion 101, 102 of charger 100 receives and boosts a DC input voltage V_{in} to generate and output a boosted output signal to charging control circuit 201 for charging of in-series lithium batteries. *Id.* at 3:1–7. DC input voltage V_{in} is provided by a "universal serial bus (USB) charger[] or any other suitable low voltage power supply system." *Id.* at 3:8–11.

2. Analysis of Claim 1

Petitioner argues that the combination of Richardson and Zhao renders claim 1 obvious. Pet. 31–49. Petitioner contends that the Board previously determined each of claim limitations 1[PRE], 1[A], and 1[D]–1[G] were taught by Richardson and are subject to collateral estoppel.

Pet. 35, 37, 41, 43, 46, 48. Petitioner further alleges that even if collateral estoppel does not attach, Richardson teaches each of these limitations.

In particular, Petitioner alleges that "Richardson describes '[j]ump starter 10' which includes 'microprocessor 12' to control the system, thereby allowing the jump starter to boost or charge a vehicle battery by connecting the internal batteries of the jump starter to the positive and negative terminals of a vehicle battery," and meeting limitation 1[PRE]. *Id.* at 35 (citing Ex. 1005 ¶¶ 4, 7, 14, 16, 21, 35, Fig. 1, Fig. 2C, Figs. 3–8; Ex. 1003 ¶¶ 80–81). Petitioner contends that "Richardson teaches its jump-starting apparatus has 'one or more batteries,'" as described in limitation 1[A]. *Id.* at 35–37 (citing Ex. 1005 ¶¶ 7, 16, 21, 35, 55, Abstr., Figs. 1, 2A; Ex. 1003 ¶¶ 83–85). In addition, Petitioner asserts that "Richardson's system uses vehicle voltage sensor 30 to monitor voltage received from the vehicle system on line 37 to determine the plugged or unplugged status of the jumper cables, indicating whether a vehicle battery is present (*i.e.*, connected to the jump starter) or absent (*i.e.*, disconnected)," and a reverse voltage sensor to determine if the cables have been properly connected thereby disclosing the vehicle battery isolation sensor and reverse polarity sensor of limitations 1[D] and 1[E], respectively. *Id.* at 41–46 (citing Ex. 1005 ¶¶ 7, 16, 20, 27, 34, 41, Figs. 1, 3–6; Ex. 1003 ¶¶ 101–106, 116). According to Petitioner, Richardson includes a power switch, or contact relay, to turn on power and the power supply is controlled by receiving separate signals from the isolation sensor and reverse polarity sensors, as described by limitations 1[F] and 1[G], respectively. *Id.* at 46–49 (citing Ex. ¶¶ 21, 35–36, 54, Figs. 1, 3, 6; Ex. 1003 ¶¶ 107–111).

Petitioner further alleges that limitations 1[B] and 1[C] are met by the combination of Richardson and Zhao. *Id.* at 37–41. For example, Petitioner asserts that "Richardson does not describe the type of input connector utilized for charging the jump starter batteries," but "Zhao teaches using a USB input to receive power from an external power source" and that a person of ordinary skill in the art would understand that "a USB charging circuit would necessarily include a USB port." *Id.* at 37–38 (citing Pet. §§ XI.A.1, XI.A.2.b; Ex. 1003 ¶ 86). In addition, Zhao describes a step-up DC-DC converter to boost the input signal to a higher output voltage. *Id.* at 38–39 (citing Ex. 1005 ¶¶ 20, 28–29; Ex. 1006, 1:22–27, 1:34–55, 2:51–3:11, 4:39–41, Abstr.; Ex. 1003 ¶¶ 87–89). Petitioner contends that a person of ordinary skill in the art would have had reason to combine Zhao's USB port and DC-DC boost converter because both references share the same architecture and describe systems for charging battery-powered devices using multicell series-connected battery pack. *Id.* at 31 (citing Ex. 1005 ¶ 34; Ex. 1006, 2:63–3:11; Ex. 1003 ¶ 75). Petitioner further argues that including "USB charging via a DC-DC boost converter" in Richardson would effectively charge the batteries of the jump starter using ubiquitous, widely-available technology. *Id.* (citing Ex. 1003 ¶ 74); *see id.* at 39 (citing Ex. 1003 ¶¶ 89–90; Ex.1006, 3:6–11, 4:39–41). Specifically Petitioner explains that implementing its proposed modification amounts to including a known technique—i.e., charging a battery rated above 5V with a 5B USB input—to achieve a predictable result of charging 12V batteries of Richardson. *Id.* at 32 (citing Ex. 1003 ¶ 77). The combination results in a reliable and easy way for users to charge the batteries of a jump starter. *Id.* Petitioner acknowledges that charging may be slower but would be suitable

and would provide an alternative charging means. *Id.* at 33 (citing Ex. 1003 ¶¶ 78–79); *see also id.* at 39 (stating that "the jump starter batteries can be charged via a traditional high-voltage input . . . . [and] when an AC power-outlet is unavailable—the user can rely on a USB [technology] power outlet"). Petitioner explains that USB technology has been widely-adopted and very popular, is supported by billions of consumer devices, provides convenience to the user, and has become standard equipment on vehicles. *Id.* at 39–40 (citing Ex. 1003 ¶¶ 90–91; Ex. 1025, 6; Ex. 1024 ¶¶ 1–4, 8; Ex. 1049, 1; Ex. 1031; Ex. 1032; 1016 ¶ 2; Ex. 1009, 1:18–23). Petitioner also asserts that USB charging of jump starter batteries would have been known by a person of ordinary skill in the art at the time of invention, as reflected in Chinese Patent No. CN203788026, filed on April 18, 2024. *Id.* at 41 (citing Ex. 1022; Ex. 1023 ¶¶ 3–9, 13, 16–17, Fig. 1, claim 1; Ex. 1003 ¶¶ 92–98). Petitioner asserts a person of ordinary skill in the art would have had a reasonable expectation of success in the combination of Richardson an Zhao because (1) a person of ordinary skill in the art "would have been familiar with the relevant USB standards . . . when designing a portable battery-powered device," (2) "Zhao describes the details of the USB charging circuit in sufficient detail . . . to implement the circuit in Richardson's system," and (3) "the '203 patent inventors believed that others in the industry would be readily able to produce a jump-starter that includes USB charging." *Id.* at 33–34 (citing Ex. 1003 ¶¶ 78–79; Ex. 1053, 159).

Patent Owner does not challenge many of Petitioner's allegations regarding the teachings of Richardson and Zhao. *See generally* Prelim. Resp. Instead, Patent Owner argues that (1) Richardson fails to teach that the "the power switch is controlled based on signals from the vehicle battery

isolation sensor and the reverse polarity sensor," as claimed, i.e., limitation 1[G], and (2) Petitioner fails to establish a reason to combine Richardson and Zhao with a reasonable expectation of success in the combination (*see* Section II.I, below). PO Resp. 16–31, 52–61.

On this full trial record, the arguments and evidence put forth by Petitioner and unchallenged by Patent Owner are supported by the record. We address Patent Owner's disputes below.

Patent Owner asserts that

> claim 1 requires that the power switch is controlled such that the power supply only becomes connected to the vehicle battery when both of two conditions are met, one of which being that the vehicle battery isolation sensor indicates a connected vehicle battery. In other words, claim 1 requires actively monitoring the vehicle battery connection ***before*** the power supply is connected (*i.e.*, before the beginning of jumpstarting of the vehicle).

PO Resp. 17 (citing Ex. 1001, 8:43–60; Ex. 2003 ¶¶ 137–138). In contrast, Patent Owner alleges the Petition

> conflates teachings from two separate features of Richardson: (i) Step 302, which involves monitoring whether the jumper cables have become disconnected ***after*** the jumpstarting energy transfer has already begun; and (ii) Step 252, which involves monitoring vehicle voltage prior to jumpstarting, but does not relate to controlling the power switch based on an indication of the connection with the vehicle battery.

PO Resp. 19. According to Patent Owner, Step 302 "exclusively occurs ***after*** the jumpstarting energy transfer has already begun" and "relate[s] to Richardson's ability to measure voltage during actual jumpstarting and open[s] a relay circuit if the jump starter cables are determined to become disconnected." PO Resp. 19–20 (citing Ex. 1005 ¶¶ 7, 41, Fig. 7).

And, with respect to Step 252, Patent Owner argues that, though "Step 252 does occur prior to the beginning of the energy transfer Step 268, it does not involve controlling the power supply connection based on an indication of whether vehicle battery is present." PO Resp. 22. In fact, Patent Owner alleges that "regardless of whether a vehicle battery is properly connected to Richardson's jump starter, the jumpstarting process of Richardson will proceed past Step 252." PO Resp. 22. According to Patent Owner, "Richardson discloses that Step 252 involves checking the voltage difference between the measured vehicle voltage and the selected voltage in order to determine if the jump starter has the correct battery voltage configuration." PO Resp. 23 (citing Ex. 1005 ¶ 34). Instead of determining whether a battery is present, as Petitioner alleges, Patent Owner asserts that Richardson's "manual mode," occurring after Step 252, "may be used when the vehicle battery is depleted below 10 volts or even when 'the vehicle's battery is not connected.'" PO Resp. 27. Therefore, Patent Owner alleges, "[b]ecause Step 252 must allow Richardson's system to go into manual mode in the case where the battery is at a low voltage or disconnected, the voltage check in Step 252 cannot be monitoring for a voltage range that does not include a zero or low-voltage reading." PO Resp. 29–30.

Patent Owner's arguments do not persuade us that Petitioner has failed to show that Richardson meets the requirements of limitation 1[G], i.e., a power switch that is controlled based on signals from a vehicle battery isolation sensor and the reverse polarity sensor,

> such that the power supply is connected to the vehicle battery when both (1) the vehicle battery isolation sensor currently indicates that the vehicle battery is connected to the jump starter

> apparatus, and (2) the reverse polarity sensor[13] currently indicates that the jump starter and the vehicle battery are connected with the proper polarity connection.

Ex. 1001, 8:52–60. Specifically, Patent Owner's arguments rest on Richardson's "manual mode" of operation and fails to address Richardson's "auto mode," that Petitioner relies upon. *See* PO Resp. 22–30; Pet. 41–49. As Petitioner asserts, when Richardson's system is in "auto mode," the limitations of 1[G] are met. Pet. Reply 2, 4.

Richardson's "auto mode" detects an appropriate voltage before the contact relay, or power switch, is closed. Specifically, Richardson explains that it includes "[a] vehicle voltage sensor 30 [which] monitors the voltage on line 37 (voltage of the vehicle)." Ex. 1005 ¶ 16.

> If one of the push buttons 42 [Automatic Mode Push Button] or 44 [Manual Mode Push Button] has been selected, the system will compare the operator-configured starter voltage against the voltage of the vehicle to be started 28.
>
> * * *
>
> If the difference between the voltage selected and the voltage measured is not within a predetermined range and tolerance 252, a "Wrong Selector Volts" message is displayed 254 on the LCD 46 and further operation is prohibited until the correct voltage is selected 256 at which point processing returns to the main processing loop 210.

[13] Patent Owner does not argue that Richardson fails to teach the claimed "reverse polarity sensor" or that the power supply is only connected once the reverse polarity sensor indicates a proper polarity connection. *See* PO Resp. 16 (stating that Richardson does not disclose "a vehicle battery isolation sensor . . . [that] control[] the power switch based on the detected connection"), 17 ("claim 1 requires actively monitoring the vehicle battery connection ***before*** the power supply is connected"); *see generally id.* 16–30.

Ex. 1005 ¶ 34. Richardson thus indicates that if an appropriate voltage is not detected, "further operation is prohibited" (Ex. 1005 ¶ 34) meaning the system will not proceed to Step 268, where the contact relay closes (i.e., the power switch turns on) and the start cycle begins (*id.* ¶ 35). Dr. Fayed, Patent Owner's declarant, agrees.

> 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.**

Ex. 1058, 44:15–45:4. Therefore, contrary to Patent Owner's assertion, Step 252 does indicate the presence of a battery and that detection occurs *prior to* the contact relay closing and power being supplied to the jump starter apparatus. And, without a positive indication (or signal) from Step 252, operation will not proceed forward to Step 268 where the contact relay closes and power is supplied.

We acknowledge Patent Owner's argument that in "manual mode" "Richardson permits low voltage (*e.g.*, a battery at a low voltage or even disconnected) to proceed past Step 252 and, therefore, battery presence detection is not occurring at this step" (Sur-reply 2). Regardless of whether "manual mode" permits operation beyond Step 252, in "auto mode," it does not. Thus, Richardson's "auto mode" complies with limitation 1[G], that is,

step 252 detects the presence of a vehicle battery having an appropriate voltage prior to closing the contact switch that delivers the power supply.

We are also not persuaded by Patent Owner's position that Step 252 of Richardson operates in the same manner whether the user has selected "auto mode" or "manual mode." Sur-reply 3–7. Richardson prompts a user to select "auto mode" or "manual mode" *prior to* Step 252 and unless the voltage detected in Step 252 is within a predetermined range, "*further operation is prohibited*." Ex. 1005 ¶ 34. Otherwise, these express teachings of Richardson would have little meaning. Dr. MacCarley's testimony that a person of ordinary skill in the art would have understood Richardson operates differently based on mode selection is consistent with Richardson's teachings. Ex. 1057 ¶ 7. Specifically, Dr. MacCarley states that

> 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)).

Ex. 1057 ¶ 7. In sum, under Patent Owner's reading Step 252 would have no effect, but that contradicts Richardson's express teachings. *See generally* PO Resp.; Sur-reply.

We are also not convinced that Patent Owner has shown that Richardson is not enabled. Enablement requires a showing that the person of ordinary skill in the art would not have been able to practice the claimed invention without undue experimentation. *Amgen Inc. v. Sanofi, Aventisub LLC*, 987 F.3d 1080, 1084 (Fed. Cir. 2021). Prior art disclosures are presumed enabling. *Impax Labs. Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008). The burden of proving a prior art reference is not enabled is with patentee, and it is error to shift that burden to the patent challenger. *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355–1356 (Fed. Cir. 2003); *Apple Inc. v. Corephotonics*, 861 Fed. App'x 443, 450 (Fed. Cir. 2021) (stating that regardless of forum, i.e., during patent examination, district court litigation, or AIA trial proceedings, "prior art patents and publications enjoy a presumption of enablement, and the patentee/applicant has the burden to prove nonenablement for such prior art").

Patent Owner's argument that Richardson is not enabled rests on Patent Owner's strained understanding of Petitioner's position. Patent Owner argues that

> if Petitioner's interpretation of Richardson is accepted, then Richardson's device could never proceed past Step 252 in the event of a low voltage or no voltage reading . . . [and] then Richardson could never proceed down its manual operation pathway (Steps 332, 334) to reach the point that its power supply is connected at Step 268.

PO Resp. 31. Therefore, Patent Owner asserts that "Richardson is a non-self-enabled reference that is fundamentally inoperative." PO Resp. 31. However, we understand Petitioner to assert that Richardson can function under two alternative operation modes, i.e., "manual mode" and "auto

mode," that the user selects by pressing either button 42 or 44 before reaching Step252. Ex. 1005 ¶ 34. Petitioner, in detailing its challenge, cites portions of Richardson that relate to the "auto mode" and not Richardson's "manual mode." Pet. 41–43, 48–49. Petitioner does not suggest that Richardson's "manual mode" would not function because Richardson's process would not proceed past Step 252 when no vehicle battery is present; indeed, Petitioner does not discuss or rely on Richardson's "manual mode." *See* Pet. 41–43, 48–49 (citing paragraphs relating "auto mode"). Patent Owner focuses on what it presumes Petitioner's position to be—not Petitioner's actual contentions—and, as a result, fails to show that Richardson is not enabled.

Accordingly, we determine Petitioner has demonstrated by a preponderance of the evidence that each of the limitations recited in claim 1 are taught or suggested by the combination of Richardson and Zhao.

3. Analysis of Claim 5

Claim 5 depends from independent claim 1 and additionally requires that

> the controller is configured to automatically cause the vehicle battery isolation sensor to detect presence of the vehicle battery and the reverse polarity sensor to detect polarity of the vehicle battery when the vehicle battery is electrically connected to the jump starter apparatus and the jump starter apparatus becomes operational.

Ex. 1001, 9:8–14. Petitioner alleges that Richardson describes this limitation because Richardson's microcontroller 12 automatically causes vehicle voltage sensor 30 to detect presence of the vehicle battery and reverse voltage sensor 24 to detect polarity of the vehicle battery when

connected to the jump starter and the jump starter becomes operational. Pet. 52 (citing Ex. 1005, Fig. 1).

Patent Owner contends that "the language of the '203 Patent makes clear that the jump starter apparatus becomes operational at the first point in time: when the device is powered on" and "given that claim 1 already requires presence detection prior to connecting the power supply, claim 5 would not make sense as a further narrowing limitation of claim 1 if 'operational' meant when the device started to transfer energy to a connected vehicle." PO Resp. 44 (citing Ex. 1001, 8:3–4; Ex. 2003 ¶ 163). Patent Owner explains that "claim 5 adds a further temporal restriction to claim 1 that functions as a more-stringent safety feature." PO Resp. 44 (citing Ex. 2003 ¶ 164). Specifically, Patent Owner states that "claim 1 requires that the vehicle battery isolation sensor perform its safety check sometime prior to the power supply being connected to the vehicle battery" and "claim 5 goes even further and requires this safety check when the 'jump starter apparatus becomes operational.'" PO Resp. 44. However, "Richardson does not disclose vehicle battery presence detection at any time prior to connecting the power supply" and the Petitioner does not "address the temporal restriction of claim 5." PO Resp. 44–45.

On this full trial record, we disagree with Patent Owner. As Petitioner states, Richardson detects the presence of a vehicle and the proper polarity once an electrical connection to the vehicle is established. Pet. 52–53 (citing Ex. 1005 ¶¶ 16, 27; Ex. 1003 ¶ 116). For example, Richardson explains that once the jumper cables are connected to the vehicle battery, i.e., an electrical connection is established, Richardson monitors the vehicle voltage and monitors the polarity of the connection. Ex. 1005 ¶¶ 16, 27. This

connection by jumper cables 60 occurs before the power supply to the vehicle is connected. Richardson states that:

> If the system does not detect a battery charging voltage 212, once jumper cables 60 have been manually connected to the vehicle to be started 28, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214.
>
> * * *
>
> Any further jump starter action by the operator is ignored until the reverse polarity condition is corrected 220, at which point processing returns to the start of the main processing loop 210.

Ex. 1005 ¶ 27. Thus, the temporal limitation of claim 5 is satisfied because Steps 212 and 214 occur prior to Step 252 (detecting vehicle voltage for comparison to the predetermined range) and 268 (contact relay closure, i.e., power supply connection).

Petitioner further explains that "Richardson teaches that reverse polarity detection and battery presence detection both occur 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)." Pet. Reply 26. According to Petitioner, the first detection when the jumper cables are connected to the battery, corresponds to claim 5 and the second detection, which occurs prior to the contact relay closing and power being supplied, satisfies claim 1. Pet. Reply 25. Patent Owner's argument that "claim 5 merely requires presence detection when the 'jump starter ***becomes*** operational,' not when it ***is*** operational (*i.e.*, turned on)" and therefore, "[i]f Petitioner's understanding were correct, and claim 5 only required that the device be 'on' when presence detection occurs, then this dependent claim would provide no

further narrowing of the temporal requirement in claim 1" (Sur-reply 16), misunderstands Petitioner's position. As Dr. MacCarley testifies, the device may become operational at two points in time—when "there is the activation of the electronics, *and* then there's also when it is -- when it has satisfied all of the safety checks and current is actually flowing from the jump starter into the subject vehicle battery. Those were -- would be different events." Ex. 2005, 12:16–14:12 (emphasis added). Thus, claim 5 is fulfilled when the jump starter is connected to the vehicle battery by jumper cables and the electronics are activated (i.e., becomes operational) both of which occur prior to the power supply being connected at Step 268 in response to signals from the vehicle isolation sensor that occur at Step 252.

Therefore, we determine Petitioner has demonstrated by a preponderance of the evidence that each of the limitations recited in claim 5 are taught or suggested by the combination of Richardson and Zhao

4. A. Remaining Claims 2–4 and 6–11

Petitioner also alleges that the subject matter of dependent claims 3, 4, and 9 is rendered obvious by the combination of Richardson and Zhao. Pet. 49–54. Petitioner further asserts that claims 2, 10, and 11 would have been obvious over the combination of Richardson, Zhao, in further view of Epower-20/Epower-21 and that that claims 6–8 would have been obvious over the combination of Richardson, Zhao, and Krieger. Pet. 4, 54–59. Patent Owner does not separately address remaining claims 2–4 and 6–11 beyond what is argued for independent claim 1. *See generally* PO Resp. Therefore, based on our consideration of the arguments and evidence of record, we determine that Petitioner has demonstrated by a preponderance of

the evidence that each of the limitations recited in claims 2–4 and 6–11 are suggested by the above-identified prior art.

5. Reasons to Combine

On this full trial record, we are persuaded that Petitioner has shown a sufficient reason to modify the teachings of Richardson to include the USB charging circuitry of Zhao. Petitioner explains that a person of ordinary skill in the art would have understood "inclusion of a standardized power input port such as [a] USB would provide a reliable and ubiquitous power input for users to easily charge the batteries." Pet. 32. And, because "by 2011 USB technology had been widely adopted in over ***7 billion*** consumer devices," a person of ordinary skill in the art would have understood that including "USB charging in Richardson's jump starter would drastically increase the availability of power sources (i.e., USB outlets) that could be used to charge the jump starter's batteries." Pet. 39–40 (citing Ex. 1003 ¶ 90); *see also* Ex. 1025 (describing the "convenience" of USB charging); Ex. 1049 (describing USB as "common place" in new cars and trucks); Ex. 1031; Ex. 1032; Ex. 1009, 1:18–23 (explaining that USB devices have "become very popular"). Petitioner recognizes that "USB charging may be slower" but asserts that the addition of a USB to Richardson provides advantages other than ubiquity and ease of use. Specifically, Petitioner contends that "when a non-depleted vehicle battery is not available, a user could charge the jump starter batteries using a USB input (e.g., leaving it charging overnight)." Pet. 32. Thus, the addition of a USB input circuit provides an alternative where traditional charging methods are lost, damaged, or otherwise unavailable. Therefore, the benefits of adding a USB power input—increase in flexibility and convenience, and catering to

consumer demand for USB technology—"would have been readily apparent to a POSITA since it was already common practice on many, if not most, portable electronics." Ex. 1003 ¶ 77; *see also id.* ¶¶ 90–98. Accordingly, Petitioner has provided sufficient reasoning with rational underpinnings to explain why a person of ordinary skill in the art would have modified the teachings of the applied references. *See KSR*, 550 U.S. at 418.

Patent Owner argues that a person of ordinary skill in the art would not have had reason to combine the teachings of Richardson and Zhao to include a USB charger. PO Resp. 52. In particular, Patent Owner asserts that because (1) traditional barrel chargers were known to be suitable (PO Resp. 52–56), (2) USB charging would have been deemed a nonviable option (*id.* at 57–59), and (3) Richardson's system would have presented unique problems (*id.* at 59–61), a person of ordinary skill in the art would not have modified Richardson in the manner proposed by Petitioner.

a) Whether the existence of known suitable techniques would have dissuaded a person of ordinary skill in the art from modifying the teachings of Richardson

Patent Owner argues that "it is not surprising that Petitioner was not able to identify any prior art that teaches or suggests charging a jump starter device, or even a device having comparable battery capacity, via USB," because existing barrel chargers "provided charging power that was suitable for these large-capacity batteries." PO Resp. 52. Patent Owner asserts that USB charging was known to have "severe drawbacks" and "was not a known technique for charging any large-capacity battery due, in part, to the extended charging times that were associated with USB in 2014." PO Resp. 53. Patent Owner contends that "here, there was no perceived

problem with using barrel chargers, nor was USB charging considered a known solution for charging any large-capacity batteries." PO Resp. 54.

We understand Patent Owner's argument that other solutions, perhaps even better solutions, such as a barrel charger were known to exist. But, "[o]ur caselaw is clear. It's not necessary to show that a combination is 'the best option, only that it be a suitable option.'" *See Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021). Furthermore, Patent Owner's argument that "there was no perceived problem with using barrel chargers" and therefore, no need to weigh the benefits against apparent disadvantages, overlooks much of Petitioner's reasons to combine. The convenience, flexibility, and universal availability of USB are an advantage over barrel chargers. And, in a situation where alternate charging means are unavailable, the person of ordinary skill in the art must balance the trade-offs and consider charging slowly, or not at all. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (explaining that "a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine"); *see also Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (explaining that while a motivating benefit may come at the expense of another benefit, the trade-off does not necessarily nullify the motivation to combine).

b) Whether a person of ordinary skill in the art would have considered modifying Richardson to include a USB charger unviable

Patent Owner contends that even if considered as a solution, a person of ordinary skill in the art "would not have considered USB to be a charging solution for large capacity batteries," given that vehicle engines require jump

starters "to provide a massive peak current in order to properly function, typically between 1000 and 4000 amperes, which thereby requires portable jump starter devices to have large-capacity internal battery cells." PO Resp. 57. Patent Owner argues that a person of ordinary skill in the art "would not have considered 2014-era USB, which was known to have a limited, specified power output, to be a viable charging solution," and "the inefficiencies associated with boost converting a low voltage would have only furthered the distance between the limited charging power of USB and barrel chargers." PO Resp. 57. Patent Owner asserts that "the Petition never addresses the fact that jump starter battery packs are required to have larger-capacity battery packs than common consumer electronic devices," and focuses only on "voltage differences." PO Resp. 58. In doing so, Patent Owner contends that "Petitioner has fallen prey to hindsight bias." PO Resp. 58. According to Patent Owner, "[t]he relevant inquiry . . . is whether a PHOSITA would have chosen to charge the large, high-capacity battery pack of a jump starter using the limited power output capabilities of USB at the time." PO Resp. 59.

On this record, we are not persuaded by Patent Owner's arguments that Petitioner ignores the capacity of the battery pack being charged in Richardson. Though Richardson expresses some desire to start a fleet of vehicles (Ex. 1005 ¶ 55), voltages up to 48 volts (*id.* ¶¶ 34, 54), and rapid recharging (*id.* ¶ 54), Richardson's teachings are not so limited. Indeed, Richardson broadly describes a battery charger for charging a vehicle battery and voltages ranging from 12 to 48 volts. *Id.* ¶¶ 2, 6, 34, 54. Furthermore, Richardson does not discuss any specific capacity requirements. *See generally id.* We acknowledge Dr. Fayed's testimony that because of the

high battery capacity of Richardson, a person of ordinary skill in the art would not have used a USB port to charge a Richardson's system and that use of USB charging would result in inefficiencies. Ex. 2003 ¶¶ 71, 80; PO Resp. 57. But, Patent Owner does not direct our attention to any record evidence of the specific limits of charging by USB at the relevant time, or an understanding of what capacity is required by Richardson. In addition, the '203 patent is likewise silent as to any requisite charging capacities and, as Petitioner aptly notes (Pet. Reply 21), Patent Owner "cannot demand a greater level of detail from the prior art than is taught by the '023 patent." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1570 (Fed. Cir. 1997). Further, Petitioner directs our attention to Epower-10 and Wang each of which suggest that the ordinarily skilled artisan at the time of invention would have considered the use of a USB input charger for a vehicle jump starter system to be a viable solution. Ex. 1023; Ex. 1053, 63.

c) Whether a person of ordinary skill in the art would have been dissuaded from making the modification proposed by Petitioner because of the teachings of Richardson

Patent Owner contends that a person of ordinary skill in the art "would not have modified the particular systems of Richardson and Yu—one of which has a very large capacity battery that relies on rapid recharging from a vehicle's electrical system and the other already implements a USB port but still chose not to rely on it for charging." PO Resp. 59. With respect to Richardson, Patent Owner urges that

> in Richardson's depicted system, 'the batteries 23 are 12-volt batteries and a battery 25 is a 6-volt battery,' such that the output may be either 12, 18, 24, or 30 volts. Ex. 1005, ¶ [0034]. The fact that Richardson's system includes three batteries, two of

> which are 12-volt batteries that are individually capable of jumpstarting a standard vehicle, in no way demonstrates that Richardson's system would not present a unique charging challenge that would have further deterred a PHOSITA from relying on USB charging.

PO Resp. 59–60 (citing Ex. 2003 ¶ 103). Patent Owner also explains that "[w]hile it is true that Richardson does not expressly discuss specific capacity requirements, by the nature of being a portable jump starter, Richardson's batteries are required to have a minimum capacity such that they can be used to jump start 'fleets of vehicles with dead batteries.'" PO Resp. 60 (citing Ex. 1005 ¶ 55; Ex. 2003 ¶ 104). Therefore, Patent Owner reasons that charge voltages and battery capacity are important considerations because "the prior art references certainly are" tied to particular battery capacities and both Richardson and Yu "provide a battery output above 12-volts and at a high current, because that is what is required to jump-start any standard automobile." PO Resp. 60–61.

On this record, we are unpersuaded by Patent Owner's arguments relating to a large capacity battery requirement and rapid recharging. Though Richardson discusses rapid recharging in a single, near-final paragraph of Richardson that introduces the concept of rapid charging of the jump starter batteries to charge a fleet of vehicles, Richardson's characterization is permissive or optional. Ex. 1005 ¶ 55. For example, Richardson states

> The charging system of the vehicle ***may be used to charge*** the capacitors 21 and jump starter batteries 22. . . . This allows the capacitors 21 and jump starter batteries 22 to be fully recharged in about 1 to 5 minutes and ***can therefore start many vehicles*** in a row without becoming discharged.

Id. ¶ 55 (emphasis added). We do not view this singular occurrence as supplanting the breadth of Richardson's complete disclosure.

Furthermore, Petitioner's combination does not remove any existing capability of Richardson; Richardson remains capable of rapid recharging using its original circuitry under Petitioner's combination. Indeed, Petitioner's proposed combination *adds* USB functionality to the Richardson system. For example, Petitioner explains that

> the inclusion of a standardized power input port such as USB would provide a reliable and ubiquitous power input for users to easily charge the batteries. Although USB charging may be slower than charging via the vehicle's battery taught by Richardson, *the addition of a USB charging* to Richardson's system would allow the jump starter batteries to be charged in [different] ways.

Pet. 32 (emphasis added). Petitioner further explains that the USB would have been advantageous "when a non-depleted vehicle battery is not available [i.e., Richardson's disclosed charging technique], a user could charge the jump starter batteries using a USB input (e.g., leaving it charging overnight)." Pet. 32–33. Thus Petitioner does not propose a substituting USB charging for Richardson's existing charging method, but instead proposes an additional, alternate charging method, as a backup. Pet. 32–33.

6. Conclusion as to Obviousness

Upon review of the full trial record, and arguments and evidence therein, we determine that Petitioner has demonstrated by a preponderance of the evidence that each of the limitations recited in claims 1–11 would have been suggested by the combination of Richardson and Zhao, with the additional teachings of Epower-20/Epower-21 and Krieger. We further determine that the ordinarily skilled artisan would have had reason to make

the combination proposed by Petitioner and would have had a reasonable expectation of success in the combination.

H. Challenges Based on Yu and Paparrizos

Petitioner alleges that claims 1, 3–5, and 9 of the '203 patent are rendered obvious by Yu and Paparrizos. Pet. 4, 59–76. Petitioner further alleges that claims 2, 10, and 11 would have been obvious over Yu, Paparrizos, and Empower-20/Empower-21. *Id.* at 4, 76–77. In addition, Petitioner contends that claims 6–8 of the '203 patent would have been obvious over the combination of Yu and Paparrizos in further view of Krieger. *Id.* at 4, 77–78.

1. Overview of the Prior Art

Petitioner alleges that claims 1, 3–5, and 9 of the '203 patent are rendered obvious by Yu and Paparrizos. Pet. 4, 59–76. Petitioner further alleges that claims 2, 10, and 11 would have been obvious over Yu, Paparrizos, and Empower-20/Empower-21. *Id.* at 4, 76–77. In addition, Petitioner contends that claims 6–8 of the '203 patent would have been obvious over the combination of Yu and Paparrizos in further view of Krieger. *Id.* at 4, 77–78.

a) Yu (Ex. 1008)

Yu is titled "Automotive Emergency Starting Device." Ex. 1008, code (54). Yu "relates to an automotive starting device [and], specifically, an emergency automotive starting device" (*id.*, Abstr.), i.e., jump starter. Yu states

> A common emergency automotive starting power supply is a lead-acid battery that replaces the original car battery. . . [T]he lead-acid battery itself is relatively heavy and large, . . . lacks a

> polarity detection function, [and, if] the polarity of the connected emergency starting power supply is opposite to that of the original automobile battery, . . . damage to the battery may occur[] and even an explosion in severe cases. Additionally, . . . [s]parks can be generated instantly when the emergency power supply is connected or disconnected.

Id. ¶ 2. Yu explains that

> The emergency automotive starting power supply in the present invention will not power on when the emergency starting power supply is connected to the automobile circuit with reversed polarity. In addition, the emergency automotive starting power supply in the present invention can effectively prevent the generation of electric sparks when connecting or disconnecting from the vehicle, improving safety.

Id. ¶ 3.

An example of the jump starter (illustrated by a schematic of Figure 1 and circuit diagrams of Figures 2–5) is described as follows:

> [The jump starter principally] consist[s] of an internal battery 1, a charging input 10 interface, a display module 5, a control module 4, a relay 2, input buttons 6 and an output terminal 3[.] . . . [T]he main contacts of the relay 2 are connected to the internal battery 1 and the output terminal 3[. T]he control module 4 includes a microprocessor 42, which controls the opening and closing of the relay 2 through the relay switch circuit 41 to control current output from the internal battery 1 to the output terminal 3[. T]he control module 4 also includes an external battery reverse connection detection circuit 44 that provides a signal [indicating] correct or incorrect [connection of the internal battery 1 to the external battery, i.e., vehicle battery].

Id. ¶ 21. The jump starter also includes voltage detection circuits 43, 45 respectively for the internal battery 1 and the external battery. *Id.* ¶¶ 22–23. The jump starter has an additional input and outputs as follows: a charging input 10 (only perspective view shown; no internal schematics presented) for

charging of the internal battery 1 (*id.* ¶ 28, Fig. 8); and 5V, 19V, and 12V output terminals 8, 9, 11 for supplying power to "other electrical equipment" (*id.* ¶¶ 25, 28).

During a jump start operation, output terminal 3 is connected to the vehicle battery. *Id.* ¶ 26. Depending on whether output terminal 3 is connected to the vehicle battery with incorrect polarity or correct polarity, microprocessor 42 accordingly controls connection of internal battery 1 to the vehicle battery by keeping open relay 2 (incorrect polarity) or closing relay 2 (correct polarity). *Id.* Once output terminal 3 is correctly connected to the vehicle battery (correct polarity), microprocessor 42 closes relay 2, the vehicle is started, and microprocessor 42 then opens relay 2. *Id.*

b) Paparrizos (Ex. 1009)

Paparrizos is titled "Buck Boost Charging for Batteries." Ex. 1009, code (54). Paparrizos describes "a battery charging circuit having several operating modes includ[ing] boost and buck mode, and forward and reverse mode." *Id.*, Abstr. Paparrizos explains that "[c]onsumers are used to . . . battery charging from a USB power source. However, since a large majority of USB devices are defined at 5V, it may not be possible to charge high voltage (>5V) [Li-ion cell stacks] using a typical[] USB power source." *Id.* at 1:9–26. The battery charger of Paparrizos, therefore,

> include[s] first and second terminals . . . [whereby] power received at the first terminal (e.g., via a power source) may be delivered to a device at the second terminal (e.g., electronics or a battery), and vice-versa. The battery charging circuit may operate in buck mode (power stepped down) or boost (power stepped up) mode, and in the forward mode (power from first terminal delivered to second terminal) or reverse mode (power from the second terminal delivered to the first terminal).

Id. at 1:30–39. Paparrizos explains that "the electronic device 22*b* may be a USB device that outputs only 5V[] but must charge an 8.4V battery" and whereby "the battery 14 may supply 8.4V to electronic device 22*b* which is rated to operate at . . . 5V per the USB specification." *Id.* at 3:58–4:14. Voltages higher than 8.4V are contemplated by Paparrizos. *Id.* at 2:32–40 ("The battery voltage of such batteries typically range from 6–8.4V but can provide lower or higher voltages.").

2. Analysis of Claim 1

Petitioner argues that the combination of Yu and Paparrizos renders claim 1 obvious. Pet. 59. Petitioner contends that limitations 1(preamble) and 1(A) are taught by Yu's disclosure of a jump-starting device and an "internal battery," i.e., a power supply. *Id*. at 61 (citing Ex. 1008, Abstr., claim 1, ¶¶ 1, 3–4, 9, 21, 26, Figs. 1, 8; Ex. 1003 ¶¶ 143–144). Petitioner contends that limitation 1(D) is taught by Yu's control system consisting of a microprocessor connected to sensors which include "an external battery voltage detection circuit." Pet. 66 (citing Ex. 1008, claim 3, ¶¶ 6, 9, 23, 26–27, Figs. 1, 2). Petitioner contends limitation 1(E) is taught by Yu's external battery reverse connection detection circuit which is a reverse polarity sensor. *Id*. at 69 (citing Ex. 1008, Abstr., claim 1, claim 3, ¶¶ 3–4, 6, 21, 23, 26–27, Figs. 1–2; Ex. 1003 ¶¶ 161–162). Petitioner also contends that Yu describes relay 2 that is opened and closed by a relay switch circuit to control current output from the internal battery to the output terminal. Pet. 71–72 (citing Ex. 1008, Abstr., claim 1, ¶¶ 4, 9, 1, Figs. 1, 2; Ex. 1003 ¶ 163).

With respect to the USB connector, i.e., limitation 1(B), Petitioner asserts that "Yu discloses a charging input interface, which can be a 12V/1A

barrel-style receptacle" and that a person of ordinary skill in the art would have been motivated to include the widely-adopted USB input feature of Paparrizos as an alternative charging option. *Id*. at 63 (citing Ex. 1008, Abstr., Fig. 9; Ex. 1009, Abstr., 7:66–67, 8:7–9; Ex. 1003 ¶¶ 147–149). Petitioner also argues that Paparrizos describes "USB charging features includ[ing] a battery charging circuit which can operate in a 'boost (power stepped up mode)' and a 'forward mode'" to enhance USB input/output to charge an internal battery. *Id*. at 65 (citing Ex. 1009, 1:34–38). Petitioner explains that a person of ordinary skill in the art would have understood that the "buck boost circuit [] operates 'as a boost converter'" when in forward mode and is therefore equivalent with a DC-DC converter because "it converts a DC 5V USB input to a higher voltage DC output to charge a rechargeable battery." *Id*. (citing Ex. 1009, 4:36–39, 3:11–23; Ex. 1003 ¶¶ 153–154).

Petitioner explains that a person of ordinary skill in the art would have modified Yu with Paparrizos as an alternative so that Yu's device could be "charged with a 12V power input (if available) and the 5V USB input when an outlet providing 12V is not available." Pet. 63. Petitioner contends that Paparrizos "teaches charging high voltage batteries using a 5V USB input" and that "Paparrizos recognizes the convenien[t] benefits of utilizing the 'very popular [USB specification]' to allow consumers 'to charge their USB devices from universal USB power sources.'" *Id*. (citing Ex. 1009, 7:66–67, 8:7–9; Ex. 1003 ¶¶ 147–148). Petitioner contends the USB charging circuit "activate[s] the DC-DC boost circuit when the input voltage is detected to be lower than the charged voltage charging level (i.e., the fully-charged voltage level of the battery)" acknowledging that "different input voltages can be

used." *Id*. at 63–64 (citing Ex. 1009, 8:10–28). Therefore, Petitioner explains that a person of ordinary skill in the art would have understood the benefits of allowing for multiple different input voltages and would have been "motivated to include the additional USB input" based on knowledge in the art of USB charging of high-voltage batteries, such as jump-starters. Pet. 63–64 (citing Ex. 1003 ¶ 149).

As Patent Owner did above with the combination of Richardson and Zhao, Patent Owner does not challenge most of Petitioner's allegations regarding the teachings of Yu and Paparrizos. *See generally* PO Resp. Instead, Patent Owner argues that Petitioner (1) Yu fails to teach that the "the power switch is controlled based on signals from the vehicle battery isolation sensor and the reverse polarity sensor," as claimed, i.e., limitation 1[G], and (2) Petitioner fails to establish a reason to combine Yu and Paparrizos with a reasonable expectation of success in the combination (*see* Section II.I, below). PO Resp. 46–51, 52–61.

On this full trial record, the arguments and evidence put forth by Petitioner and unchallenged by Patent Owner are supported by the record. We address Patent Owner's disputes below.

Patent Owner contends that Yu "fails to teach the vehicle battery isolation sensor limitations" because "it simply does not teach or suggest using the vehicle battery isolation sensor to control the power switch at any point in time." PO Resp. 46. According to Patent Owner, "Yu instead relies on a user to evaluate a measured voltage on a display and make manual safety decisions." PO Resp. 47 (citing Ex. 2003 ¶ 168). Patent Owner asserts that contrary to Petitioner's assertions, "Yu's 'external battery voltage detection circuit 45' only provides a voltage signal to be displayed on Yu's display

module" and does not "suggest using the signal received from the voltage detection circuit 45 to control the relay 2." PO Resp. 47–49 (citing Pet. 66–72; Ex. 1008 ¶¶ 3, 6, 9, 26, 27; Ex. 2003 ¶¶ 168–171).

On this complete trial record, we agree with Patent Owner that Petitioner has not carried its burden to demonstrate that Yu teaches using its battery isolation sensor to control the power switch. Petitioner relies on paragraph 26 of Yu to support its contentions. Pet. 73 (citing Ex. 1008 ¶ 26; Ex. 1003 ¶ 166). Paragraph 26 states, in relevant part,

> 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.

Ex. 1008 ¶ 26 (emphasis added). The plain language of Yu indicates that by pressing the Jump button, the relay is closed; if the Jump button is not pushed, the relay remains open.

Petitioner contends that Patent Owner's declarant, Dr. Fayed, "confirmed that ***the microprocessor*** is what closes the relay after the JUMP button is pressed." Pet. Reply 9 (citing Ex. 1058, 58:5–11). But, Dr. Fayed's testimony is not that clear. When questioned about whether the microprocessor will close the relay, Dr. Fayed testified that "[t]he microprocessor will close the relay in response to the user pressing the JUMP. So the user is doing the control. The microprocessor is just the executioner of that task." Ex. 1058, 58:5–11; *see also id.* at 54:17–55:8 (stating that whether the microprocessor controls the relay is a general question that can't be answered with a yes or no); 56:19–21 (noting that the questioner's and Dr.

Fayed's definition of "control" is not aligned). We acknowledge Petitioner's argument that Yu, elsewhere, states that "the microprocessor controls the opening and closing of the relay" (Ex. 1008 ¶ 4), and read together with paragraph 26 suggests that the microprocessor controls the operation of the relay. Pet. Reply 11. But, the language of paragraph 26 is clear; when the battery is in correct polarity, the Jump button "can be pressed to close the relay." Ex. 1008 ¶ 26. In contrast, Yu also states when incorrect polarity exists "a signal is provided to the microprocessor 42 . . . so that the relay 2 controlled by the microprocessor 42 will not close." Ex. 1008 ¶ 26; *see also* Ex. 1058, 53:12–54:4 (Dr. Fayed testifying that the microprocessor maintains an open circuit in the event of wrong polarity). Furthermore, and as Patent Owner asserts, paragraph 26 "can also be understood to mean that a user will evaluate the displayed voltage and then, once the user has determined that the voltage is within the normal range, the user can press the JUMP button." Sur-reply 13. Patent Owner's contention is consistent with other portions of Yu which states that "[a] signal is provided to the microprocessor 42 through the external battery voltage detection circuit 45, so the external battery voltage can be displayed on the display module 5 *to facilitate understanding of the external battery condition*." Ex. 1008 ¶ 27 (emphasis added). Petitioner does not direct our attention to any portion of Yu that describes the microprocessor assessing whether the voltage is in correct polarity or within normal voltage range and then proceeding to close the relay without involvement of the user.

Without more, we cannot say that Petitioner has carried its burden to show that the disputed limitation is taught by Yu. Accordingly, we determine Petitioner has not demonstrated by a preponderance of the evidence that the combination of Yu and Paparrizos would have rendered claim 1 obvious.

3. Remaining Claims 2–11

Petitioner asserts that claims 3–5, and 9 would have been obvious over the combination of Yu and Paparrizos. Pet. 72–76. Petitioner also asserts that that claims 2, 10, and 11 would have been obvious over the combination of Yu and Paparrizos with Epower-20/Epower-21. Pet. 76–77. Petitioner also asserts that claims 6–8 would have been obvious over the combination of Yu and Paparrizos with Krieger. Pet. 77–78. Patent Owner does not separately address remaining claims 2–11 beyond what is argued for independent claim 1. *See generally* PO Resp.

Therefore, for the same reasons given in connection with claim 1, discussed above, we determine that Petitioner has not met its burden to demonstrating that the above-identified prior art teaches or suggests the limitations of claims 2–11. Accordingly, we determine that Petitioner has not demonstrated by a preponderance of the evidence that the combination of Yu and Paparrizos would have rendered claims 2–11 obvious.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that the subject matter of claims 1–11 is unpatentable.[14]

[14] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding after this decision issues, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

In summary:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 3–5, 9	103	Richardson, Zhao	1, 3–5, 9	
2, 10, 11	103	Richardson, Zhao, Epower-20, Epower-21	2, 10, 11	
2, 10, 11	103	Richardson, Zhao, AAPA		2, 10, 11
6–8	103	Richardson, Zhao, Krieger	6–8	
1, 3–5, 9	103	Yu, Paparrizos		1, 3–5, 9
2, 10, 11	103	Yu, Paparrizos, Epower-20, Epower-21		2, 10, 11
2, 10, 11	103	Yu, Paparrizos, AAPA		2, 10, 11
6–8	103	Yu, Paparrizos, Krieger		6–8
Overall Outcome			1–11	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–11 of U.S. Patent No. 11,667,203 B2 are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

PETITIONER:

Ryan Miller
Nicholas Almerini
Jonathan Lagarenne
Anthony Noonan
Chetan Chandra
FOX ROTHSCHILD LLP
rmiller@foxrothschild.com
nalmerini@foxrothschild.com
jlagarenne@foxrothschild.com
anoonan@foxrothschild.com
cchandra@foxrothschild.com

PETITIONER (Joined):

Daisy Manning
Paul Smelcer
HUSCH BLACKWELL
ptab-dmanning@huschblackwell.com
paul.smelcer@huschblackwell.com

PATENT OWNER:

Joseph Sauer
David Cochran
Matthew Johnson
John Graves
JONES DAY
jmsauer@jonesday.com
dcochran@jonesday.com
mwjohnson@jonesday.com
jgraves@jonesday.com