

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN XINZEXING E-COMMERCE CO., LTD.,

Petitioner,

v.

SHENZHEN CARKU TECHNOLOGY CO., LTD.,
Patent Owner.

IPR2024-00222
Patent 9,643,506 B2

Before RICHARD M. LEBOVITZ, GARTH D. BAER, and
JULIA HEANEY, *Administrative Patent Judges*.

BAER, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. BACKGROUND

Shenzhen Xinzexing E-commerce Co., Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”), requesting an *inter partes* review of claims 1–3, 6–23, and 25–33 of U.S. Patent No. 9,643,506 B2 (Ex. 1001, “the ’506 patent”). Pursuant to 35 U.S.C. § 314, we instituted *inter partes* review as to all of the challenged claims and all grounds raised in the Petition. Paper 9. Following institution, Patent Owner filed a Response. Paper 12 (“PO Resp.”). Petitioner filed a Reply to Patent Owner’s Response (Paper 15, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 17, “PO Sur-reply”). On May 7, 2025, we held an oral hearing. A transcript of the hearing is included in the record. Paper 26.

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision issued pursuant to 35 U.S.C. § 318(a). For the reasons we discuss below, we determine that Petitioner has proven by a preponderance of the evidence that the challenged claims are unpatentable.

B. RELATED PROCEEDINGS

The ’506 patent is at issue in *Shenzhen CARKU Technology Co., Ltd. v. Shenzhen Xinzexing E-commerce Co., Ltd.*, 1-22-cv-03403 (N.D. Ill.). Pet. 91, Paper 5, 1.

C. THE ’506 PATENT

The ’506 patent describes a “portable backup charger.” Ex. 1001, code (57). Figure 1 of the ’506 patent is reproduced below.

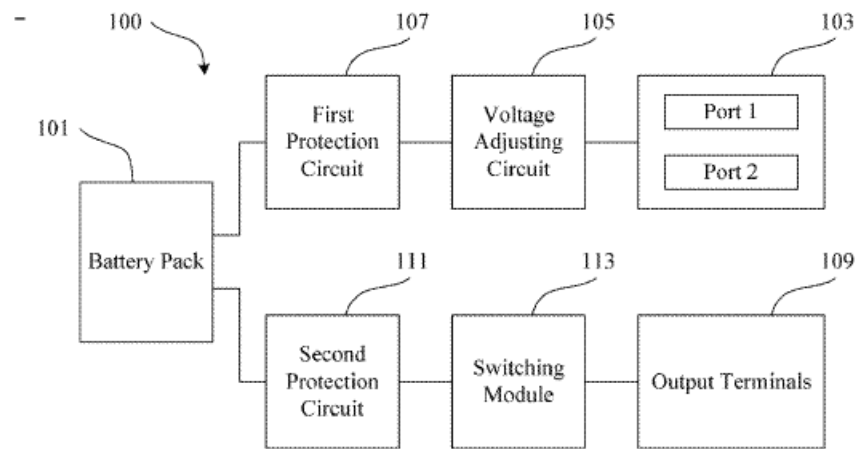


Figure 1

Figure 1 “is a block diagram of a portable backup charger.” Ex. 1001, 3:8.

D. CHALLENGED CLAIMS

Of challenged claims 1–3, 6–23, and 25–33, claims 1 and 21 are independent. Claim 1 is representative and reproduced below:

1. A portable backup charger, comprising:
 - a battery pack having at least one battery cell;
 - at least one output port coupled to the battery pack, wherein the battery pack is configured to output a first current through one or more output ports of the at least one output port in a first operating mode;
 - a pair of output terminals coupled to the battery pack and having a current path to the battery pack different from that of the at least one output port to the battery pack, wherein the battery pack is configured to output a second current capable of starting a vehicle engine through the pair of output terminals in a second operating mode, wherein the second current is higher than the first current;
 - a first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode; and
 - a second protection circuit coupled to the battery pack and configured to prevent overcurrent condition of the second

current when the battery pack is working in the second operating mode.

Ex. 1001, 8:22–42.

E. ASSERTED GROUNDS OF UNPATENTABILITY

Petitioner asserts the following grounds of unpatentability. Pet. 4–5.

Claims Challenged	35 U.S.C. §	References/Basis
1, 9, 11–14, 16–19, 21, 26–28, 30–33	102	Chen ¹
1, 2, 6–9, 11–14, 16–22, 25–28, 30–33	103	Chen, White ²
10	103	Chen, Richardson ³
15, 29	103	Chen, Gozdz ⁴
1, 3, 6–14, 16, 17, 20, 21, 23, 25–28, 30, 31	103	Inskeep, ⁵ Johnson ⁶
19, 33	103	Inskeep, Johnson, Durando ⁷
1, 2, 6, 8–16, 19–22, 26–30, 33	103	Nook ⁸
1, 2, 6–16, 19–22, 25–30, 33	103	Nook, White
3, 23	103	Nook, Miller ⁹
10	103	Nook, Richardson
17, 18, 31, 32	103	Nook, Shoji ¹⁰

II. PRELIMINARY MATTERS

A. LEVEL OF ORDINARY SKILL IN THE ART

Patent Owner contends a person of ordinary skill in the art “would have at least a Bachelor’s Degree in Electrical Engineering and at least two years of experience in the field of electrical engineering and specifically power supply management such as battery charging system design.” PO Resp. 31. Petitioner presents a similar formulation. Pet. 10. Although we do

not discern any meaningful distinction between the parties' formulations, we adopt Patent Owner's description of a person of ordinary skill as it is consistent with the prior art and challenged patent's specification. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill).

B. CLAIM CONSTRUCTION

1. First and Second Operating Modes

Claim 1 requires that the claimed battery pack “is configured to output a first current through one or more output ports of the at least one output port in a first operating mode,” and “is configured to output a second current capable of starting a vehicle engine through the pair of output terminals in a second operating mode.” Ex. 1001, 8:25–34. Claim 21 has similar first and second operating-mode limitations. *Id.* at 9:40–46. Patent Owner proposes that “[t]he proper construction for ‘first operating mode’ is ‘an operating mode of the portable backup charger wherein the battery pack is configured to output a first current through one or more output ports of the at least one output port, and outputting a second current capable of starting a vehicle engine through the pair of output terminals is inhibited.’” PO Resp. 25. Similarly, Patent Owner argues “[t]he proper construction for ‘second operating mode’ is ‘an operating mode of the portable backup charger wherein the battery pack is configured to output a second current capable of starting a vehicle engine through the pair of output terminals, and outputting a first current through one or more output ports of the at least one output port is inhibited.’” *Id.* at 27. Patent Owner asserts that claim differentiation supports its construction because dependent claim 3 recites “a third operating mode for outputting the first current and the second current simultaneously,” and “if the battery pack could output the first current and the second current

simultaneously in the first operating mode, then there would be no difference between the claimed first operating mode and the claimed third operating mode.” *Id.* at 26.

We disagree with Patent Owner’s constructions because, as Petitioner explains, they wrongly import current-inhibiting limitations beyond the plain language in the claim. Pet. Reply 1. Nothing in the at-issue language addresses inhibiting current. In addition, the claimed first and third operating modes are still distinct without importing additional limitations because outputting just the first current is sufficient for the first operating mode, but not for the third. In other words, whereas the third operating mode requires simultaneity, the first and second merely permit it. Thus, claim differentiation does not support Patent Owner’s construction. Last, although Patent Owner asserts that its construction “is consistent with the specification,” nothing in the cited passages describes inhibiting current. Prelim. Resp. 26 (citing Ex. 1001, 4:30–33, 5:30–33, 5:58–62). Instead, the specification characterizes the modes solely by what the portable charger “can output,” not what is inhibited. Ex. 1001, 4:30–33, 5:30–33, 5:58–62. Thus, we decline to read the first and second operating modes to require the current-inhibiting features that Patent Owner asserts.

2. Different Current Paths

Claim 1 recites a “pair of output terminals coupled to the battery pack and having a current path to the battery pack different from that of the at least one output port to the battery pack.” Ex. 1001, 8:27–30. Patent Owner asserts we should construe this term to exclude any overlap between the two current paths. PO Resp. 28 (“If the paths were partially or completely the same, the paths would not be different paths to the battery pack as the claim requires.”). According to Patent Owner, the specification supports its

construction because it describes “[t]he pair of output terminals 109 provides a *current path different and separate* from the current path from the battery pack 101 to the output ports 103.” *Id.* at 29 (quoting Ex. 1001, 5:46–48).

We disagree with Patent Owner’s construction because it once again improperly imports a limitation requiring *separateness* that goes beyond claim term’s plain language, which requires only two *different* paths. As Petitioner notes, instead of supporting Patent Owner’s construction, the specification’s inclusion of both “different *and separate* from” shows that Patent Owner is conflating two phrases that the specification treats as distinct. Pet. Reply 6. In addition, we agree with Petitioner that although two of the ’506 patent’s figures depict separate current paths, that does not support Patent Owner’s construction because those figures “are each a ‘schematic block diagram’” that do not necessarily reflect actual physical current paths. Pet. Reply 7. Thus, we decline to read the claimed “different” current paths to preclude any overlap, as Patent Owner asserts.

III. ANALYSIS

A. PETITIONER’S CHEN-BASED GROUNDS

Petitioner contends that claims 1, 2, 6–22, and 25–33 are unpatentable over Chen either alone or in combination with White, Richardson, or Gozdz. Pet. 10–46. For the reasons explained below, we find Petitioner has shown by a preponderance of evidence that these claims are unpatentable over the asserted references.

1. Description of Chen (Ex. 1006)

Chen teaches “a mobile power supply.” Ex. 1006 ¶ 1. Chen’s Figure 1 is reproduced below.

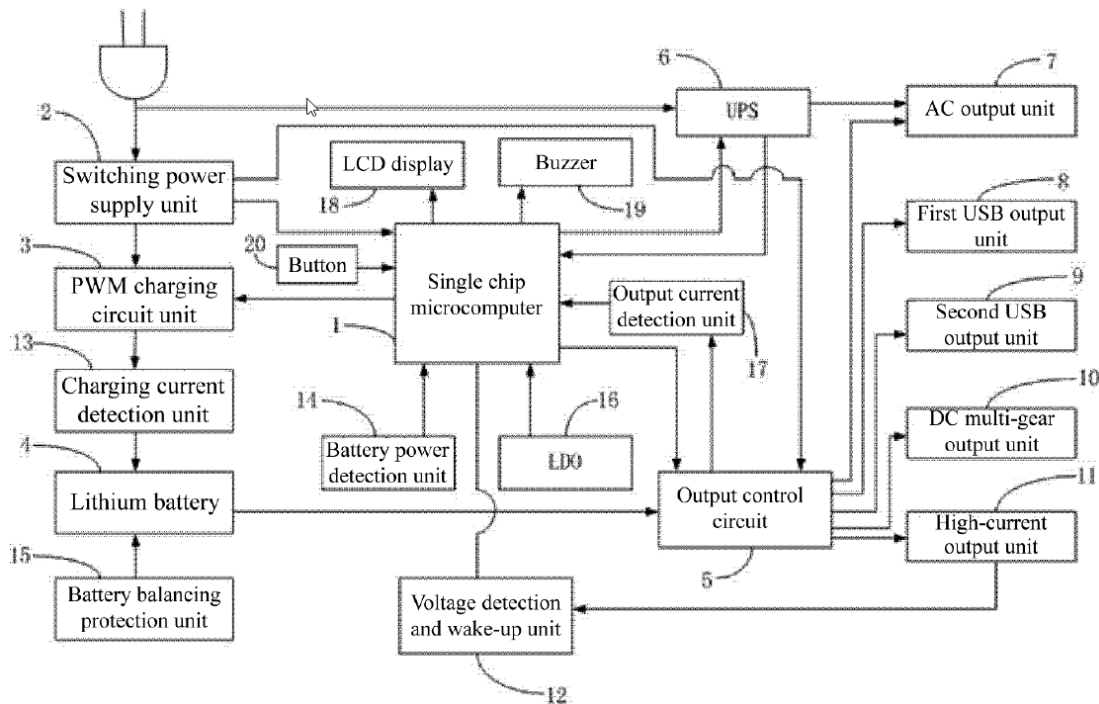


FIG. 1

Figure 1 “is a block diagram” of a mobile power supply. *Id.* ¶¶ 15, 22.

2. Anticipation of Independent Claim 1 Based on Chen

Petitioner contends Chen anticipates independent claim 1. Pet. 13–23. Specifically, Petitioner asserts Chen’s lithium battery teaches the claimed battery pack, Chen’s USB outputs 8 and 9, and multi-gear output 10 teach claim 1’s first-current output port, and Chen’s high-current, car-battery output unit 11 teaches claim 1’s pair of output terminals capable of starting a vehicle. *Id.* at 13–20. Further, Petitioner maps Chen’s electronics U3B and D12 that “form ‘an output power limit control’” to the claimed first protection circuit (*id.* at 20 (quoting Ex. 1006 ¶ 26)) and Chen’s relay K1 that “is automatically turned off to prevent long-term high-current output” to the claimed second protection circuit configured to prevent overcurrent (*id.* at 21 (quoting Ex. 1006 ¶ 26)). Patent Owner contests several aspects of Petitioner’s Chen-based challenge. We address those issues below.

a. Different Current Paths

Claim 1 recites a “pair of output terminals coupled to the battery pack and having a current path to the battery pack different from that of the at least one output port to the battery pack.” Ex. 1001, 8:27–30. Petitioner explains that Chen’s Figures 1, 4, and 7 show the claimed different current paths from Chen’s lithium battery 4 to its high-current output unit 11, as compared to its USB units 8 and 9. Pet. 19.

Patent Owner argues the two current paths are not different because Chen’s Figure 1 shows they overlap between the lithium battery and the output control circuit and “only diverge when making the connection to the output control circuit.” PO Resp. 32. We disagree. First, Patent Owner’s argument is based on a claim construction for “different” current paths that we do not adopt for the reasons above. In addition, we agree with Petitioner that Chen shows the claimed different current paths even under Patent Owner’s construction. Pet. Reply 8–12. Specifically, as Petitioner explains, a skilled artisan would recognize that Chen’s physical circuits are depicted in Figures 4–7, rather than in Chen’s Figure 1, which is merely a “block diagram of the principle of present invention.” *Id.* at 9; Ex. 1006 ¶ 15. Unlike Figure 1, Chen’s Figures 5, 6, and 7 show current paths between the battery and USB outputs, and between the battery and DC multi-gear output, that do not overlap with the high current path shown in Chen’s Figure 4. Pet. 9–12. Based on Petitioner’s analysis and for the reasons above, we agree with Petitioner that Chen teaches the claimed “pair of output terminals coupled to the battery pack and having a current path to the battery pack different from that of the at least one output port to the battery pack.”

b. First Protection Circuit

Claim 1 requires “a first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode.” Ex. 1001, 8:36–38. Petitioner asserts Chen’s electronics U3B and D12 that “form ‘an output power limit control’” as well as Chen’s “current-sense circuitry connected to op-amp U3A” each provide the claimed first protection circuit. Pet. 20 (quoting Ex. 1006 ¶ 26); Ex. 1003 ¶ 59; *see* Pet. Reply 13–16.

Patent Owner raises two arguments in contesting this limitation. First, Patent Owner asserts Chen’s electronics U3B and D12 do not protect the battery pack *in the first operating mode* because they protect only while current is output to multi-gear output 10 and Petitioner “does not analyze whether the multi-gear output 10 has a current less than the first current as required by limitation [1.3].” PO Resp. 35. Second, Patent Owner asserts Petitioner “does not identify a first protection circuit for the USB outputs 8, 9 as required by limitation [1.4].” *Id.* at 36. We disagree with both arguments.

As to the first, Petitioner cites ample evidence showing why Chen’s jumpstart current is higher than the current to Chen’s DC multi-gear output, including that the jumpstart current is labeled as the “high-current,” and is 200A. Pet 19–20; Pet. Reply 13. Petitioner’s expert presents unrebutted testimony supporting Petitioner’s position. Ex. 1003 ¶ 57, Ex. 1100 ¶ 31. Ex. 1003 ¶ 57; Ex. 1100 ¶ 30–31. In addition, as Petitioner explains, “[t]o the extent Patent Owner contends that Chen’s ‘DC multi-gear output’ . . . would actually output a current of 200A, [Patent Owner] is taking the absurd position that it would output an astounding 3,800 Watts.” Pet. Reply 15; *see* Ex. 1100 ¶ 31 (explaining why a 200A current to Chen’s DC multi-gear output would be “unsafe” and “inconsistent” with Chen’s other disclosures).

Patent Owner does not dispute Petitioner's arguments in this regard. *See* PO Resp. 34–35; PO Sur-reply 16–18. We agree with Petitioner that Chen's multi-gear output 10 has an output current less than Chen's jumpstart current, and thus agree with Petitioner that Chen's U3B and D12 electronics teach a “first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode,” as claim 1 requires.

As to Patent Owner's second argument, we disagree because it ignores that Petitioner identified op-amp U3A as the claimed first protection circuit. Pet. Reply 14–15, *see* Ex. 1003 ¶ 59; Pet. 20 (citing Ex. 1003, ¶¶ 58–60). Patent Owner does not dispute that Chen's op-amp U3A provides overcurrent protection for USB outputs 8 and 9. Instead, Patent Owner argues only that Petitioner did not rely on op-amp U3A as the claimed first protection circuit. *See* PO Resp. 34–36; PO Sur-reply 17–18. We disagree because Petitioner did so by raising the issue in the Petition and in Dr. Woods's Expert Report, and by clarifying its position in its Reply. Pet. 20 (citing Ex. 1003 ¶¶ 58–60); Ex. 1003 ¶ 59; Pet. Reply 14–15. We agree with Petitioner that Chen's op-amp U3A teaches a “first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode,” as claim 1 requires.

c. Second Protection Circuit

Claim 1 requires “a second protection circuit coupled to the battery pack and configured to prevent overcurrent condition of the second current when the battery pack is working in the second operating mode.” Ex. 1001, 8:39–43. Petitioner explains that Chen has this second protection circuit because it teaches that “[w]hen the battery voltage returns to normal, the

relay K1 is automatically turned off to prevent long-term high-current output from damaging the lithium battery.” Pet. 21 (quoting Ex. 1006 ¶ 26).

Patent Owner asserts that Chen is deficient because Chen’s protection circuit measures voltages, rather than current. PO Resp. 38–39. We disagree with Patent Owner’s argument because, as Petitioner explains, “nothing in the claim language requires a structure that actually detects/measures a current value.” Pet. Reply 15. Instead, the claim requires only “prevent[ing] overcurrent,” which Chen does because its relay K1 is “able ‘to automatically turn off’ the output current and thereby ‘prevent long-term high-current output from damaging the lithium battery.’” PO Resp. 16 (quoting Ex. 1006 ¶ 26). Thus, we agree with Petitioner that Chen teaches the claimed second protection circuit that prevents overcurrent.

d. Remaining Limitations of Claim 1 and Claim 21

Petitioner provides a detailed analysis demonstrating that Chen teaches the remaining limitations of claim 1. *See* Pet. 10–21. Petitioner’s anticipation analysis for independent claim 21 mirrors its claim 1 analysis as the two claims are substantively nearly the same.¹¹ *See id.* at 27–28. Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s anticipation analysis of claims 1 and 21 based on Chen. We have reviewed Petitioner’s arguments and evidence and, based on that analysis, we find Petitioner has shown by a preponderance of the evidence that Chen anticipates claims 1 and 21.

¹¹ Independent claim 21 is broader than independent claim 1 because, as Petitioner notes, claim 21 does not include a “different from” limitation for the two current paths. Pet. Reply 8.

3. Anticipation of Dependent Claims 9, 11–14, 16–19, 26–28, and 30–33 Based on Chen

Petitioner asserts Chen also teaches the additional features in dependent claims 9, 11–14, 16–19, 26–28, and 30–33 including an on/off switch for the high-current path (claims 9 and 26), a voltage-adjusting circuit (claim 11), low and high current ranges (claims 12, 13, and 27), an operating mode controller (claims 14, and 28), a USB port (claims 16 and 30), 12V and 19V output ports (claims 17, 18, and 32), and a lithium battery (claims 19 and 33). Pet. 22–29. Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s anticipation showing based on Chen. We have reviewed Petitioner’s arguments and evidence and, based on that analysis, we find Petitioner has shown by a preponderance of the evidence that Chen anticipates claims 9, 11–14, 16–19, 26–28, and 30–33.

4. Obviousness of Claims 1, 2, 6–9, 11–14, 16–22, 25–28, and 30–33 Based on Chen and White

Petitioner contends claims 1, 2, 6–9, 11–14, 16–22, 25–28, and 30–33 would have been obvious over Chen and White. Pet. 29–44. Petitioner proposes adding White’s keyed connector plug 24 and fuse 66 “‘to ensure proper polarity’ in the connection between the power supply battery and the car battery” and “‘to prevent damage’ to either of the batteries.” *Id.* at 30 (quoting Ex. 1007). Petitioner maps White’s fuse as an alternative for claim 1’s “second protection circuit.” *Id.* at 35–36. Petitioner further relies on White for teaching several dependent claim features such as overcurrent, overcharge, and overdischarge protection (claim 2), connecting clamps (claim 6), a reverse connection-proof plug (claim 8), and output terminals detachably coupled to the battery pack (claim 20). *Id.* at 36–44.

Patent Owner asserts one skilled in the art would not have added White's fuse to Chen because doing so was "unnecessary" given Chen's built-in relay K1 that already provides protection. PO Resp. 42–43. We disagree because, as Petitioner notes, "the Petition cited ample evidence that both layers of over current prevention provide improved safety and protection to the battery." Pet. Reply 17 (citing Pet. 31–33); *see also, e.g.*, Pet. 31 (describing "advantageously reduc[ing] the likelihood of damage"), *id.* at 32 (describing "the additional benefit of a safety fuse along a jumper cable to promptly cut off current in the event of a short circuit" and "more simplified maintenance and repair"). Given Petitioner's un rebutted rationale, Petitioner has articulated sufficient reasoning with rational underpinning to support the legal conclusion that adding White's fuse and polarity-protection connector to Chen's power-supply system would have been obvious to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner's obviousness showing based on Chen and White. We have reviewed Petitioner's arguments and evidence and, based on that analysis, we find Petitioner has shown by a preponderance of the evidence that claims 1, 2, 6–9, 11–14, 16–22, 25–28, and 30–33 would have been obvious over Chen and White.

5. Obviousness of Claim 10 Based on Chen and Richardson

Petitioner asserts Richardson teaches the additional feature in dependent claim 10—"prohibit[ing] the outputting of the second current after a predetermined time." Pet. 44 (citing Ex. 1014 ¶ 37, Fig. 7). According to Petitioner, a skilled artisan would have included Richardson's time-based current cutoff when starting a vehicle engine "to provide an added safety layer that advantageously avoids over-exhaustion of the internal lithium

battery capacity due to jumpstarting current delivery during an extended time period.” *Id.* at 45 (citing Ex. 1003, ¶¶ 137–139).

Patent Owner first argues that Petitioner “provides no explanation how relay 34, temperature sensor 41 and jump cables 60 in cited upper portion of FIG. 2C in Richardson to connect with circuit elements in FIGS. 1, 2 and 4 of Chen.” PO Resp. 49. We disagree with Patent Owner’s argument because “[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . but rather whether ‘a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.’” *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (internal citations omitted). Patent Owner also reiterates its argument that “there is no current sensor” in either Richardson or Chen. PO Resp. 49. We disagree with this argument because, as explained above, nothing in the relevant claim language requires measuring current.

Based on Petitioner’s analysis outlined above, Petitioner has shown by a preponderance of the evidence that claim 10 would have been obvious over Chen and Richardson.

6. Obviousness of Claims 15 and 29 Based on Chen and Gozdz

Petitioner asserts Gozdz teaches the additional feature in dependent claims 15 and 29—“wherein the discharge rate of the battery pack is in a range of 20c to 70c.” Pet. 45–46 (citing Ex. 1014 ¶ 37, Fig. 7). According to Petitioner, a skilled artisan would have employed Gozdz’s 20c discharge rate in Chen to “advantageously provide a battery that is capable of repeated, safe, and stable charge and discharge at exceptionally high rates while also being inexpensive to make and having high energy and power capacity.” *Id.* at 46

(quotation marks omitted). Other than arguments addressed above, Patent Owner does not additionally challenge Petitioner’s obviousness showing based on Chen and Gozdz. Based on Petitioner’s analysis outlined above, Petitioner has shown by a preponderance of the evidence that claims 15 and 29 would have been obvious over Chen and Gozdz.

B. PETITIONER’S INSKEEP-BASED GROUNDS

1. Description of Inskeep (Ex. 1008)

Inskeep discloses a “portable battery jump starter” that also includes a 12-volt DC power port and a USB power port. Ex. 1008 ¶ 8.

2. Obviousness Analysis

Petitioner contends that claims 1, 3, 6–14, 16, 17, 20, 21, 23, 25–28, 30, and 31 would have been obvious over Inskeep and Johnson, and that claims 19 and 33 would have been obvious over Inskeep, Johnson, and Durando. Pet. 46–68. Petitioner relies primarily on Inskeep, asserting that Inskeep’s rechargeable internal battery teaches claim 1’s battery pack, Inskeep’s USB power port and a DC power port teach claim 1’s first-current output port, and Inskeep’s jumper cable connections teach claim 1’s pair of output terminals capable of starting a vehicle. *Id.* at 52–54. Further, Petitioner asserts Inskeep’s low voltage protection circuit and fuse F2 teach the claimed first protection circuit. *Id.* at 56–57.

For claim 1’s second protection circuit, Petitioner relies on Johnson’s “circuit breaker/resettable fuse 20.” *Id.* at 57–58. According to Petitioner, a skilled artisan would have included Johnson’s jumper-cable harness with a built-in circuit breaker/resettable fuse in Inskeep’s portable charger device to improve user safety and protect against electric damage to the portable charger device. *Id.* at 51.

Petitioner adds Durando to its Inskip-Johnson combination for teaching the lithium-based battery cell recited in dependent claims 19 and 33. *See* Pet. 67–68. According to Petitioner, a skilled artisan would have included Durando’s “batteries having the type of primary lithium-metal, rechargeable lithium-ion, and/or lithium polymer” in the Inskip-Johnson system “to achieve . . . ‘fast charging, small size, and high performance,’” as well as “‘longer useful [battery] life.” *Id.* at 67–68 (quoting Ex. 1008 ¶ 8, Ex. 1003 ¶ 192).

Patent Owner contests several aspects of Petitioner’s Inskip-based challenge. We address those issues below.

a. First Protection Circuit

Claim 1 requires “a first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode.” Ex. 1001, 8:36–38. Petitioner asserts Inskip’s low voltage protection circuit teaches the claimed first protection circuit because it “cut[s] off current to the USB port when voltage drops below a predetermined setpoint,” thus protecting the battery in the lower (first) current operating mode against a short circuit or other conditions that might cause a voltage drop. Pet. 56. In the alternative, Petitioner argues Inskip’s fuse F2 also teaches the claimed first protection circuit because it “would cutoff current and protect the internal battery in the event of a short circuit/overcurrent condition through the port 112.” *Id.* at 56–57.

Patent Owner asserts Inskip’s fuse F2 does not protect the battery pack in the first operating mode because Petitioner failed to show that the current via Inskip’s DC 12V port is less than Inskip’s 500A output for the jumper cables. PO Resp. 51. We disagree. As Petitioner explains, Inskip’s 12V port would have output a current less than jumper cables’ 500A output

because it is a “conventional cigarette style plug” for powering 12V accessories and would be “astoundingly unsafe” with a 500A output. Pet. 56 (quoting Ex. 1009); Pet. Reply 19 *see* Ex. 1003 ¶ 161, Ex. 1100 ¶¶ 46–47. We agree with Petitioner that Inskip’s 12V port has an output current less than the jumper cables’ output current, and thus agree with Petitioner that Inskip’s fuse F2 teaches a “first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode,” as claim 1 requires.

Next, Patent Owner asserts that Inskip’s low-voltage protection circuit for the USB port is deficient because it “is directed to a circuit for maintaining the USB port output voltage only and does not suggest any feature or function with respect to ‘to protect the battery pack,’” as claim 1 requires. PO Resp. 52. Again, we disagree. As Petitioner explains, low voltage protection “protects the internal battery/circuitry against a short circuit or other conditions that might cause a voltage drop.” Pet. 56; *see* Pet. Reply 21. Petitioner’s expert presents un rebutted testimony supporting Petitioner’s position. Ex. 1003, ¶ 162; Ex. 1100 ¶ 49. Patent Owner does not dispute Petitioner’s arguments in this regard. *See* PO Resp. 52–53; PO Sur-reply 22–23. Thus, we agree with Petitioner that Inskip’s low voltage protection circuit teaches a “first protection circuit coupled to the battery pack and configured to protect the battery pack when the battery pack is working in the first operating mode,” as claim 1 requires.

b. First and Second Operating Modes

Claim 1 requires that the claimed battery pack “is configured to output a first current through one or more output ports of the at least one output port in a first operating mode,” and “is configured to output a second current capable of starting a vehicle engine through the pair of output terminals in a

second operating mode.” Ex. 1001, 8:25–34. Petitioner asserts Inskeep teaches the first operating mode by outputting current to its USB power port and DC power port, and the second by outputting current to its jumper cable connections. Pet. 53–54. Patent Owner asserts Petitioner’s challenge fails because Inskeep does not teach inhibiting the output terminals’ current in its first operating mode, or inhibiting the USB port’s/DC power port’s current in the second operating mode. PO Resp. 54. We disagree.

First, Patent Owner’s argument is based on a claim construction (i.e., that the claimed “operating modes” require inhibiting current) that we do not adopt for the reasons above. In addition, we agree with Petitioner that Inskeep teaches the claimed operating modes even under Patent Owner’s construction. Pet. Reply 22–23. Specifically, as Petitioner explains, Inskeep’s Figure 2 includes “USB icon 20 [that] is depicted when the USB port is available for use” and a similar ““engine icon 18’ [that] is illuminated when ‘the jump starter circuit is activated.’” *Id.* at 22 (quoting Ex. 1008 ¶ 27). Thus, Inskeep discloses more than just “mere[] status indicators” as Patent Owner asserts. PO Sur-reply 24. Instead, Inskeep’s description of instances “*when* the jump starter circuit is activated” and “*when* that USB port is available for use” suggests there are instances when the opposite is true—i.e., the circuits are inhibited. Ex. 1008 ¶ 27 (emphasis added). Thus, we agree with Petitioner that Inskeep teaches the claimed first and second operating modes.

c. Remaining Limitations and Summary

Petitioner provides a detailed analysis demonstrating that its proffered combination of Inskeep, Johnson, and Durando teaches the remaining limitations of claims 1, 3, 6–14, 16–17, 19–21, 23, 25–28, 30, 31, and 33. Pet. 46–68. In addition, with the improved-safety, damage-protection, and

better-performance rationales outlined above, Petitioner articulated sufficient reasoning why it would have been obvious to combine Johnson's resettable fuse and Durando's lithium-based battery in Inskeep's multi-purpose battery jump starter. *See id.* at 51, 67. Other than arguments the addressed above, Patent Owner does not additionally challenge Petitioner's Inskeep-based obviousness showings. We have reviewed Petitioner's arguments and evidence and, based on that analysis, we find Petitioner has shown by a preponderance of the evidence that claims 1, 3, 6–14, 16, 17, 19–21, 23, 25–28, 30, 31, and 33 would have been obvious over Inskeep, Johnson, and Durando.

C. PETITIONER'S NOOK-BASED GROUNDS

Petitioner asserts alternative grounds that also challenge claims 1–3, 6–23, and 25–33 based on Nook as a primary reference. *See* Pet. 68–89. Because we have already determined that Petitioner has demonstrated the unpatentability of these same claims in its Chen and Inskeep grounds, we need not address Petitioner's additional contentions for the same claims based on Nook.

IV. CONCLUSION

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 6–23, and 25–33 of the '506 patent are unpatentable.¹² Our conclusions are summarized in the following table.

¹² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or*

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 9, 11–14, 16–19, 21, 26–28, 30–33	102	Chen	1, 9, 11–14, 16–19, 21, 26–28, 30–33	
1, 2, 6–9, 11–14, 16–22, 25–28, 30–33	103	Chen, White	1, 2, 6–9, 11–14, 16–22, 25–28, 30–33	
10	103	Chen, Richardson	10	
15, 29	103	Chen, Gozdz	15, 29	
1, 3, 6–14, 16, 17, 20, 21, 23, 25–28, 30, 31	103	Inskeep, Johnson	1, 3, 6–14, 16, 17, 20, 21, 23, 25–28, 30, 31	
19, 33	103	Inskeep, Johnson, Durando	19, 33	
Overall Outcome			1–3, 6–23, and 25–33	

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–3, 6–23, and 25–33 of the '506 patent are unpatentable; and

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).

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.

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