

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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THE NOCO COMPANY, INC.,  
Petitioner,

v.

PILOT, INC.,  
Patent Owner.

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IPR2021-01235  
Patent 10,328,806 B2

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Before JEFFREY W. ABRAHAM, JULIA HEANEY, and  
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

HEANEY, *Administrative Patent Judge*.

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

## I. INTRODUCTION

The Noco Company, Inc. (“Petitioner”) filed a petition to institute an *inter partes* review challenging claims 1–19 of U.S. Patent No. 10,328,806 B2 (Ex. 1001 (“the ’806 patent”). Paper 1 (“Petition” or “Pet.”). Pilot Inc. (“Patent Owner”) did not file a Preliminary Response.

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). Upon consideration of the Petition and the evidence of record, we determine the Petitioner has established a reasonable likelihood that it would prevail in showing the unpatentability of at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of all claims and all grounds asserted in the Petition.<sup>1</sup>

### A. Related Proceedings

Petitioner identifies the following litigations involving the ’806 patent: (1) *Pilot, Inc. v. The NOCO Company, Inc.*, No. 2:20-cv-01452 (D. Ariz.); (2) *Pilot, Inc. v. GOOLOO Technology LLC and Shenzhen GOOLOO E-Commerce Co., Ltd.*, No. 2:19-cv-09485 (C.D. Cal.); (3) *Pilot, Inc. v. Aukey Technology Co., Ltd. and Shenzhen Aukey E-Business Co., Ltd.*, 2:19-cv-09486 (C.D. Cal.); (4) *Pilot, Inc. vs. Schumacher Electric Corporation*, No. 3:19-cv-01676-N (N.D. Tex.); and (5) *Pilot, Inc. v. Baccus*

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<sup>1</sup> *Guidance on the Impact of SAS on AIA Trial Proceedings* (Apr. 26, 2018), <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>; see also *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

*Global, LLC*, No. 9:21-cv-81009 (S.D. Fla.). Pet. 1–2. Petitioner states action (1) is stayed and a count asserting infringement of the '806 patent was dismissed without prejudice, actions (2)–(4) were dismissed without prejudice, and action (5) is pending. *Id.*

Patent Owner identifies two additional actions involving the '806 patent: (1) *Pilot, Inc. v. Battery-Biz, Inc.*, No. 2:20-cv-10207 (C.D. Cal.); and (2) *Pilot, Inc. v. The Duracell Company*, 1:20-cv-004054 (N.D. Ill.). Paper 4, 1. Patent Owner states both actions were dismissed without prejudice. *Id.*

*B. The '806 Patent*

The '806 patent, titled “Automobile Charger,” is directed to “a novel automobile charger with a safe power supply charging quickly.” Ex. 1001, codes (45), (54), 1:18–19. The '806 patent explains that prior art automobile charging devices, i.e., devices for jump starting vehicles, suffered from various problems, including an inability to automatically detect whether a load (e.g., an automobile storage battery) is connected, whether an automobile engine or storage battery has a reverse current, and whether the battery state is suitable for heavy power generation. Ex. 1001, 1:24–29. The '806 patent aims to solve these problems, and depicts one solution in Figure 1, reproduced below.

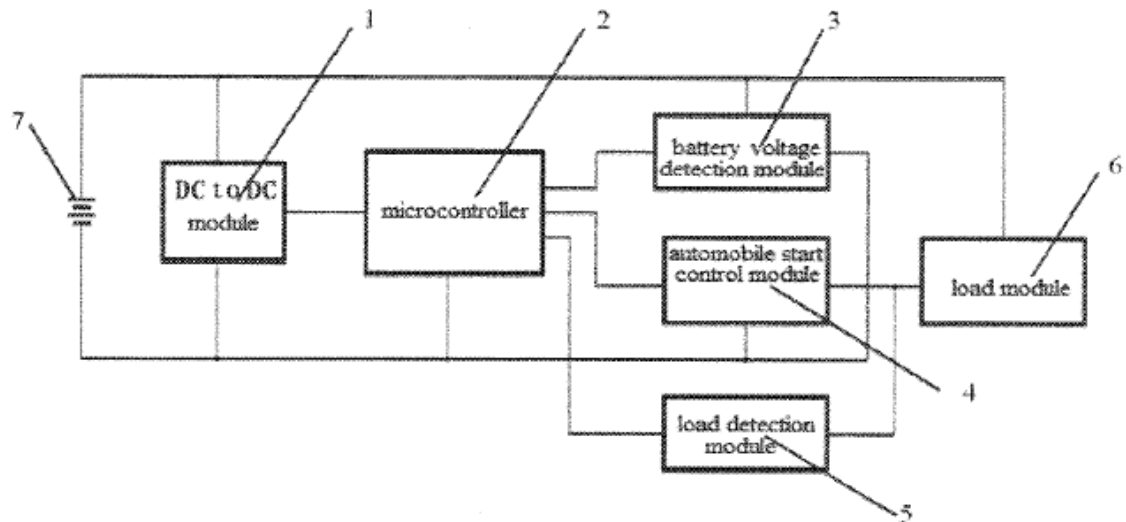


Figure 1 is a block diagram showing an embodiment of the automobile charger, including DC-to-DC module 1, microcontroller 2, voltage detection module 3, automobile start control module 4 (an electronic switch), load detection module 5, load module 6 (comprising the automobile battery and engine), and direct current power supply 7 (the jump starter battery). *Id.* at 2:24, 2:59–62, 3:26–28.

The '806 patent explains that the DC-to-DC module provides “the stable voltage for the microcontroller which collects relevant data” and the microcontroller “determines whether the automobile storage battery is connected with the automobile engine through the load detection module.” Ex. 1001, 4:11–16, 4:20–22. The positive pole of the direct current power supply is connected with one lead of the DC-to-DC module, one end of the battery voltage detection module and one end of the load module; the negative pole of the direct current voltage is connected with the other end of the DC-to-DC module, one end of the microcontroller, one end of the

automobile start control module and the other end of the battery voltage detection module. *Id.* at 3:9–17. When the load is correctly connected, the automobile start control module is automatically activated, and the battery starts to supply power to the load module. *Id.* at 4:16–18. If the load is not connected, or positive and negative polarities are reversed, the automobile start control module is automatically deactivated, and the battery stops supplying power to the load module. *Id.* at 4:20–29.

The '806 patent further explains that the automobile start control module conducts the power supply for the load module through the microcontroller (Ex.1001, 2:1–4), which collects relevant data to conduct the corresponding control (*id.* at 1:66–67). In a standby mode, the microcontroller closes all outputs when the voltage of the direct current power supply is lower than that of the state being able to supply power and then recovers when it is higher than that of the state being able to supply power. *Id.* at 2:17–22.

The '806 patent states that its automobile charger provides benefits over prior art devices, including, *inter alia*, (1) controlling the supply power for the load, which “can offer more protection for the product, or reduce the product size and material cost,” (2) providing low voltage protection to prevent damage caused by over-discharging the battery, (3) preventing improper operations by the user, such as reversed polarity, which can cause damage to the automobile or direct current power supply, and (4) employing voltage backflow protection for an abnormal load, wherein the automobile start line is closed to protect the battery when an abnormal voltage is detected. Ex. 1001, 2:7–40.

*C. The Challenged Claims*

Petitioner challenges claims 1–19 of the ’806 patent. Pet. 1. Claims 1 and 16 are independent claims. Ex. 1001, claims 1–19 (5:8–6:51).

Claims 2–15 depend from claim 1. *Id.* Claims 17–19 depend from claim 16.

*Id.* Claim 1, reproduced below, recites a “charging device” as follows.

1. A charging device, comprising:

a battery connected to a voltage regulator, the battery supplying a charging current;

a battery voltage detector, connected to a microcontroller, to detect a voltage of an automobile battery when the charging device is connected to an automobile;

a load detector, connected to the microcontroller, to detect when the charging device is connected to the automobile battery;

the microcontroller generating, when the charging device is connected to the automobile battery, an output signal based on a detected voltage of the automotive battery;

switching circuitry including a plurality of MOSFETs to selectively connect a negative terminal of the battery to the automobile battery when the microcontroller generates the output signal; and

a boost device for boosting a gate voltage of the plurality of MOSFETs.

*Id.* at 5:8–25.

*D. Asserted Grounds of Unpatentability*

Petitioner asserts the following grounds of unpatentability (Pet. 14):

| Ground No. | Challenged Claim(s) | 35 U.S.C. <sup>2</sup> | Reference(s)/Basis                       |
|------------|---------------------|------------------------|------------------------------------------|
| 1          | 16–19               | § 102                  | Baxter <sup>3</sup>                      |
| 2          | 1, 2, 4–6, 9–14     | § 103                  | Baxter, Krieger <sup>4</sup>             |
| 3          | 16                  | § 102                  | Richardson <sup>5</sup>                  |
| 4          | 1–7, 9–15, 17–19    | § 103                  | Richardson, Krieger                      |
| 5          | 8                   | § 103                  | Richardson, Krieger, George <sup>6</sup> |

Petitioner relies on the Declaration of Alex Z. Kattamis, Ph.D. (Ex. 1008) (“Kattamis Declaration”).

II. ANALYSIS

*A. Claim Construction*

In an *inter partes* review, 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) (2021). Under *Phillips*, claim terms are afforded “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

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<sup>2</sup> The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’806 Patent issued from an application filed after March 16, 2013, we apply the AIA versions of the statutory bases for unpatentability.

<sup>3</sup> US 2010/0173182 A1 to Baxter et al., published July 8, 2010 (Ex. 1003).

<sup>4</sup> US 7,345,450 B2 to Krieger et al., issued Mar. 8, 2008 (Ex. 1004).

<sup>5</sup> US 2009/0174362 A1 to Richardson et al., published July 9, 2009 (Ex. 1005).

<sup>6</sup> US 6,803,743 B2 to George et al., issued Oct. 12, 2004 (Ex. 1006).

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 argues that in the ’806 patent claims “most of the terms can be given their ordinary meaning, or in any event the ordinary meaning they would have to a person of ordinary skill in the art ... of automobile chargers and jump starters.” *Id.* at 15 (citing Ex. 1008 ¶ 31). Petitioner further argues that the term “recharging level” which appears in dependent claims 7 and 8 should be interpreted to mean “the level of the first battery after it is connected to the load.” *Id.* (citing Ex. 1008 ¶ 33).

We determine that we do not need to explicitly construe any claim term for purposes of this Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy,’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))). Nevertheless, the panel invites the parties to further address the construction of the aforementioned claim language during the trial.

*B. Level of Ordinary Skill in the Art*

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field.” *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing *Orthopedic*

*Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.*

Petitioner argues a person of ordinary skill in the art at the time of the invention “would have had an undergraduate degree in electrical engineering (or equivalent subject) together with two or three years of experience in automotive electrical systems industry.” Pet. 12 (citing Ex. 1008 ¶ 13). Patent Owner does not dispute the level of ordinary skill in the art.

In light of the record before us, and for purposes of this Decision, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art.

### *C. Principles of Law*

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *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) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. Reaching this conclusion, however, requires more than merely showing that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*

*D. Alleged Obviousness Based on Richardson and Krieger  
(Ground 4)*

Petitioner argues that claims 1–7, 9–15, and 17–19 are obvious over Richardson and Krieger. Pet. 43–62.

*1. Richardson (Ex. 1005)*

Richardson is titled “Method and Apparatus for Providing Supplemental Power to an Engine.” Ex. 1005, code (54). Richardson describes “a portable power source for a motor vehicle” that “provide[s] supplemental power to start internal combustion and turbine engines.”

*Id.* ¶ 1. Generally speaking:

[Richardson’s] invention monitors the voltage of the battery of the vehicle to be jump started and the current delivered by the jump starter batteries to determine if a proper connection has been established and to provide fault monitoring. For safety

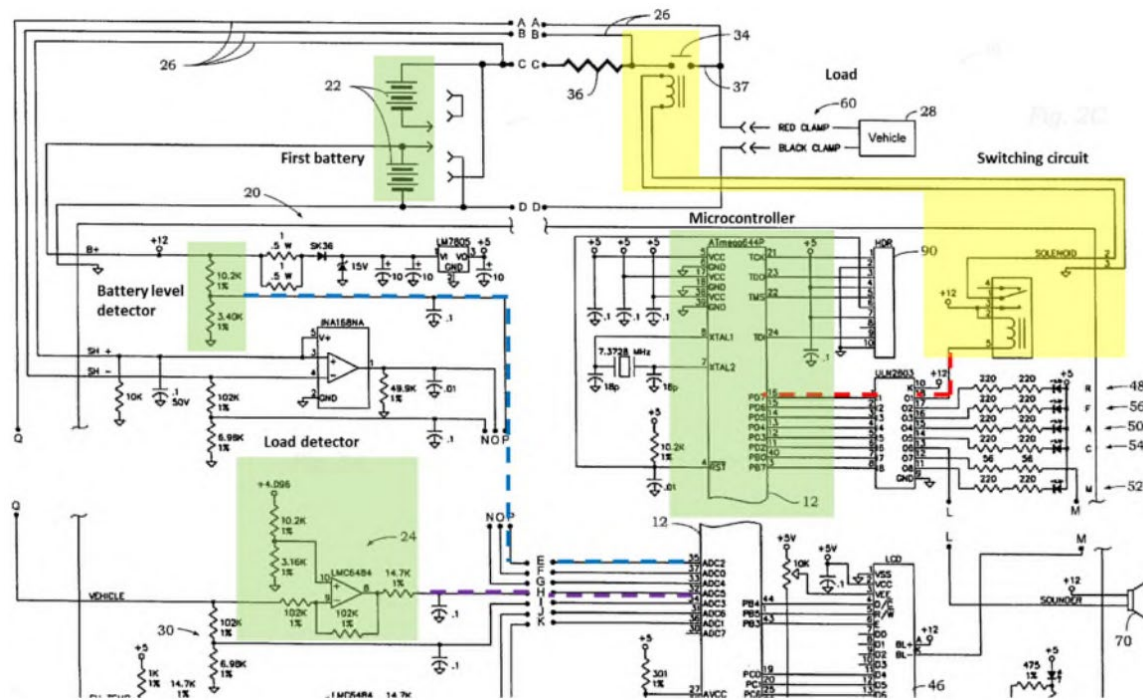
purposes, only if the proper polarity is detected can the system operate. The voltage is monitored to determine open circuit, disconnected conductive clamps, shunt cable fault, and solenoid fault conditions. The current through the shunt cable is monitored to determine if there is a battery explosion risk, and for excessive current conditions presenting an overheating condition, which may result in fire. The system includes an internal battery to provide the power to the battery of the vehicle to be jump started. Once the vehicle is started, the unit automatically electrically disconnects from the vehicle's battery.

*Id.* ¶ 6.

Richardson's Figures 2A–2D are “schematic[s] of the portable power source, control circuit and sensors of the . . . invention.” Ex. 1005 ¶ 8. Dr. Kattamis's Declaration provides a composite of Figures 2A–2D<sup>7</sup> in annotated schematic Figure K–9, reproduced below.

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<sup>7</sup> Richardson's Figures 2A–2D are partial schematics of the same circuit; each Figure is a quadrant of the circuit and labels the circuit terminals to indicate where any given terminal constitutes another terminal of the other three figures. When pieced together, the Figures are located as follows: Figure 2A at upper left; Figure 2B at lower left; Figure 2C at upper right; Figure 2D at lower right.



Ex. 1008 ¶ 166. Figure K-9 shows Richardson's Figures 2A and 2C in their entirety in the upper half of the figure. Figure K-9 shows partial versions of Richardson's Figures 2B and 2D in the lower half of the figure.

Richardson describes that its portable power source includes microprocessor 12, jump-starter batteries 22, battery voltage sensor 20, reverse voltage sensor 24, vehicle voltage sensor 30, and contact relay 34.

Ex. 1005 ¶¶ 11-12. In this configuration:

A battery voltage sensor 20 monitors the voltage level of one or more jump starter batteries 22. A reverse voltage sensor 24 monitors the polarity of the jumper cables on line 26 which are connected to the vehicle's electrical system 28. A vehicle voltage sensor 30 monitors the voltage on line 37 (voltage of the vehicle). When the contacts are open, the solenoid voltage sensor 32 input to microprocessor 12 is used to measure the voltage of the jump starter batteries 22, which may be configured for various jump starter voltages. When the contacts are closed, the voltage difference between the batteries 22 and the contact relay 34 is used to measure the voltage drop across a

temperature-and-resistance calibrated 00 AWG [American Wire Gauge] shunt cable 36 in order to calculate the current being delivered by the jump starter batteries 22 to the vehicle's electrical system 28.

*Id.* ¶ 12. Thus, generally speaking, microprocessor 12 receives inputs and produces informational and control outputs. *Id.* ¶¶ 11, 14, Figs. 2C–2D. The microprocessor closes contact relay 34 to connect jump-starter batteries 22 to the vehicle's electrical system and opens the contact relay to disconnect the jump-starter batteries. *Id.* ¶ 14, Figs. 2C–2D. When closed, the contact relay couples the positive pole of the jump-starter batteries to the positive pole (red clamp) of the vehicle's electrical system. *Id.* at Figs. 2A, 2C.

## 2. *Krieger (Ex. 1004)*

Krieger is titled “Microprocessor Controlled Booster Apparatus with Polarity Protection.” Ex. 1004, code (54). Krieger describes “a booster device used for boosting a depleted battery” that prevents current flow to the depleted battery “unless proper polarity is achieved.” *Id.* at 1:15–18, 2:21–44, 5:11–13, Abstract.

Krieger's Figure 1 is reproduced below.

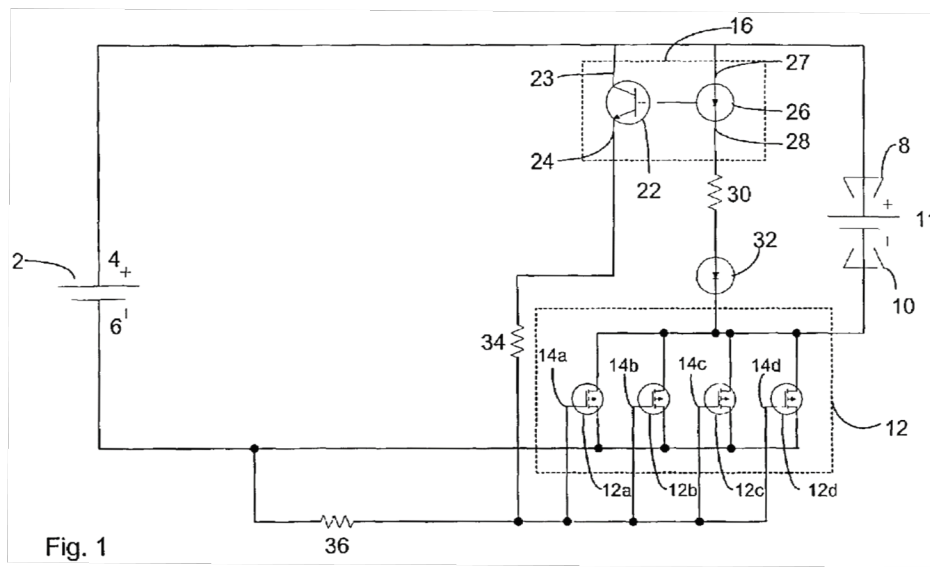


Figure 1 is a circuit schematic of the invention and depicts polarity-sensing circuit 16 and switch 12 connected to boosting battery 2 and depleted battery 11. *Id.* at 4:55–57, 5:11–52. “The switch 12 is activated to complete a boosting circuit between the boosting battery 2 and the depleted battery 11 only when a correct polarity connection between the batteries is attained.” *Id.* at 5:23–26. The polarity-protection circuit preferably includes solid-state components rather than “mechanical or electro-mechanical devices, such as solenoids,” and “[t]he switch 12 is preferabl[y] a solid state device, such as a transistor, diode, field effect transistor (FET), etc.” *Id.* at 2:21–25, 2:60–61, 3:4–5, 5:34–35, 6:30–32. Krieger’s Figure 1 depicts “the switch 12 as a number FETs 12a–12d connected in parallel with each other.” *Id.* at 5:35–37. “The switch 12 is activated by a polarity sensing circuit 16 to allow current flow from the boosting battery 2 to the depleted battery 11.” *Id.* at 5:47–49.

In addition, Krieger discloses an embodiment with “microprocessor 60 . . . programmed to perform essentially all of the control functions needed

for operation of the jump starter” and “used to control the switch 12.” *Id.* at 8:40–9:32. In particular, “[t]he output signals from the microprocessor 60 to control switch 12 are provided to control electrodes 14a–14d of transistors 12a–12d.” *Id.* at 9:11–13.

Krieger describes a “solid state switch arranged in series” with the jumper cable that couples either (1) the boosting battery’s positive pole to the depleted battery or (2) the boosting battery’s negative pole to the depleted battery. *Id.* at 2:64–3:5. Krieger’s Figure 1 provides more details and shows switch 12 arranged in series between the boosting battery’s negative pole and the depleted battery’s negative pole. *Id.* at Fig. 1. In other figures, Krieger also shows switch 12 arranged in series between the boosting battery’s negative pole and the depleted battery’s negative pole. *Id.* at Figs. 3–6.

Like Richardson, Krieger recognizes that improperly connecting jumper cables presents a danger and “one or both of the batteries may be damaged, and in some cases, an explosion, fire and damage to the vehicle or to a person may result.” *Id.* at 1:27–51, 6:33–44.

### *3. Petitioner’s Mapping of Claim 1 to Richardson and Krieger*

The following table summarizes Petitioner’s mapping of claim limitations to the structures of Richardson and Krieger. *See* Pet. 43–50.

| <b>Claim Limitation</b>          | <b>Richardson/Krieger</b> |
|----------------------------------|---------------------------|
| “[a] charging device” (preamble) | Richardson ¶ 41           |

| <b>Claim Limitation</b>                                                                                                                                                                         | <b>Richardson/Krieger</b>                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “a battery connected to a voltage regulator, the battery supplying a charging current”                                                                                                          | Richardson’s jump starter batteries 22 connected to voltage regulator comprising integrated circuit LM7805, resistors, and capacitors                                                                                                                                                                                                                                |
| “a battery voltage detector, connected to a microcontroller, to detect a voltage of an automobile battery when the charging device is connected to an automobile”                               | Richardson’s 10.2K and 3.4K resistors (of the jumper battery voltage sensor 20) and vehicle voltage sensor 30 connected to a microprocessor                                                                                                                                                                                                                          |
| “a load detector, connected to the microcontroller, to detect when the charging device is connected to the automobile battery”                                                                  | Richardson’s reverse voltage detector 24, connected to the microprocessor, detects when the charging device is connected to the vehicle                                                                                                                                                                                                                              |
| “the microcontroller generating, when the charging device is connected to the automobile battery, an output signal based on a detected voltage of the automotive battery”                       | Richardson’s microprocessor 12 includes outputs such as LED 48 that indicate whether jumper cables are correctly connected to the vehicle based on the voltage detected by reverse voltage sensor 24                                                                                                                                                                 |
| “switching circuitry including a plurality of MOSFETs to selectively connect a negative terminal of the battery to the automobile battery when the microcontroller generates the output signal” | Richardson’s contact relay 34 closes when control output 58 of microprocessor 12 indicates the jumper cables are correctly connected to the vehicle; Krieger’s protection circuit comprises switch 12 which is preferably a solid state device such as a MOSFET; replace Richardson’s switching circuitry (e.g., contact relay 34) with MOSFETs as taught by Krieger |

| Claim Limitation                                                        | Richardson/Krieger                                                                                                                                |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| “a boost device for boosting a gate voltage of the polarity of MOSFETs” | Richardson’s ULN2803 which acts as a boost device to increase the voltage used to trigger the switch circuitry, i.e. MOSFETs as taught by Krieger |

#### 4. Analysis of Claim 1

Petitioner contends that the preamble of claim 1 is not limiting, but even if it were treated as a limitation, Richardson teaches a charging device “[i]n the situation where the vehicle’s battery is present but has a voltage of less than 10 volts, the jump starter will start to charge the vehicle’s battery before any starting operation begins.” Pet. 40 (quoting Ex. 1005 ¶ 41); *see also id.* at 44 (reasoning presented for claim 16).

Claim 1 recites “a battery connected to a voltage regulator, the battery supplying a charging current.” Petitioner contends Richardson’s disclosure of jump starter batteries 22 connected to the voltage regulator comprising integrated circuit LM7805, resistors, and capacitors, satisfies this limitation. Pet. 44 (citing Ex. 1008 ¶ 179).

Claim 1 next recites “a battery voltage detector, connected to a microcontroller, to detect a voltage of an automobile battery when the charging device is connected to an automobile.” Petitioner contends Richardson teaches this limitation based on its disclosure of a battery voltage detector formed by the two resistors labeled as “battery level detector” in Figure K–9 (labeled “10.2K” and “3.40K” in Richardson Figure 2A) and these resistors are connected by terminal E to an ATmega644P microprocessor. Pet. 45 (citing Ex. 1008 ¶ 181).

Claim 1 next recites “a load detector, connected to the microcontroller, to detect when the charging device is connected to the automobile battery.” Petitioner contends Richardson teaches this limitation based on its teaching of reverse voltage detector 24 that detects whether the load is correctly connected, and which is connected by terminal H to the ATmega644P microprocessor. Pet. 45–46 (citing Ex. 1008 ¶ 182).

Claim 1 next recites “the microcontroller generating, when the charging device is connected to the automobile battery, an output signal based on a detected voltage of the automotive battery.” Petitioner contends Richardson teaches this limitation by disclosing that microprocessor 12 “includes several outputs 16 to provide information to the user and to control the application of power to the vehicle to be jump started” and one of these outputs is reverse voltage LED 48 “illuminated when the microprocessor 12 determines that a reverse voltage jumper cable voltage is detected by reverse voltage sensor 24.” Pet. 46 (quoting Ex. 1005 ¶ 14; citing Ex. 1008 ¶ 185) (emphasis omitted).

Claim 1 next recites “switching circuitry including a plurality of MOSFETs to selectively connect a negative terminal of the battery to the automobile battery when the microcontroller generates the output signal.” Petitioner contends Richardson teaches this limitation by disclosing “a solenoid and a [contact] relay are connected [by] the pin 01 of chip ULN2803 . . . to [an] output signal . . . generated by the microcontroller [12].” Pet. 47 (citing Ex. 1008 ¶ 188). Petitioner further contends contact relay control output 58 of microprocessor 12 controls contact relay 34 based upon the reverse polarity sensor 24 determining that the jump starter is correctly connected to the vehicle. Pet. 47 (citing Ex. 1005 ¶¶ 14, 20,

Fig. 2C; Ex. 1008 ¶ 188, Fig. K–9). Petitioner acknowledges that Richardson does not disclose the solenoid and contact relay include a plurality of MOSFETs to selectively connect a negative terminal of the battery to the automobile battery when the microcontroller generates the output signal and relies on Krieger as teaching these limitations, as discussed below. Pet. 47–49.

As to the “MOSFETs” limitation, Petitioner contends Krieger discloses a polarity protection circuit for a battery booster device and that the protection circuit includes “a switch 12, which is preferably ‘a solid state device, such as a transistor, diode, field effect transistor (FET), etc.’” Pet. 47 (quoting Ex. 1004, 5:34–35) (emphasis omitted). Petitioner further contends a MOSFET is a specific type of field effect transistor and thus a person of ordinary skill in the art would have understood a MOSFET as a type of device which may comprise Krieger’s switch 12 and FETs 12a–12d of the switch. *Id.* (citing Ex. 1008 ¶ 189). According to Petitioner, it would have been obvious to replace Richardson’s solenoid and contact relay with a solid-state switch of MOSFETs in view of Krieger. *Id.* at 47–48. Petitioner further contends Krieger teaches it is preferable not to include mechanical or electro-mechanical devices, such as solenoids, in the polarity protection circuit. *Id.* (citing Ex. 1004, 2:23–25; Ex. 1008 ¶ 190).

As to the “negative terminal” limitation, Petitioner contends Krieger discloses the switch 12 connects to the negative terminal of the automobile battery, and teaches that “other locations of the switch in the boosting circuit are possible.” Pet. 48 (citing Ex. 1004, 5:27–30, 5:32–33). Petitioner further contends a person of ordinary skill would have understood that the switching may be placed on either the positive or negative side of the

connection between the jump starter batteries and the load and, because there are only two possible general locations to provide the switch, “it would have been obvious to try locating the switch on the negative side.” *Id.* (citing Ex. 1008 ¶ 191). Petitioner also contends a person of ordinary skill would have been further motivated to locate the switch on the negative side because “when performing a jump start . . . there generally will be some arc or spark” and therefore “it is common in the automotive industry . . . to connect the negative terminals last . . . whenever the final connection is made” and “advisable to have this connection be made away from the automobile battery, usually to ground via the engine block.” *Id.* at 49 (citing Ex. 1008 ¶ 192; Ex. 1007).

Claim 1 next recites “a boost device for boosting a gate voltage of the plurality of MOSFETs.” Petitioner contends that Richardson teaches this limitation by disclosing a ULN2803 chip, which a person of ordinary skill in the art would have recognized as a transistor array featuring high voltage outputs for switching inductive loads that would act as a boost device to increase the voltage used to trigger Richardson’s switch circuitry to connect the charging device battery to the load. Pet. 49 (citing Ex. 1008 ¶ 194). Petitioner further contends it would have been obvious to replace Richardson’s switch circuitry with a solid-state switch of MOSFETs, as discussed above, and that Krieger suggests a boost device for the substituted MOSFETs by disclosing a level translator 68 “translates the output voltage of [its] microprocessor 60 to the higher levels that are needed to operate transistors 12a–12d.” *Id.* at 50 (quoting Ex. 1004, 9:21–23; citing Ex. 1008 ¶ 195) (emphasis omitted). Thus, Petitioner contends it would have been obvious to a person of ordinary skill in the art to use either Krieger’s level

translator or Richardson's ULN2803 as a boost device for boosting the gate voltage of the substituted MOSFETs. Pet. 50 (citing Ex. 1008 ¶ 195).

Having reviewed Petitioner's undisputed evidence and argument regarding claim 1, we find that Petitioner has demonstrated sufficiently that Richardson and Krieger teach or suggest all of the limitations of claim 1, and that a person of ordinary skill in the art would have had reason to combine the teachings and would have had a reasonable expectation of success in doing so. Thus, we are persuaded Petitioner has established a reasonable likelihood of prevailing on its obviousness challenge with respect to claim 1.

*5. Claims 2–7, 9–15, and 17–19<sup>8</sup>*

Claims 2–7 and 9–15 depend directly or indirectly from claim 1. Petitioner directs us to portions of Richardson and Krieger that disclose the additional limitations of these claims. Pet. 50–60.

After reviewing the undisputed evidence and arguments Petitioner presents in the Petition, we are persuaded Petitioner has established a reasonable likelihood of prevailing on its obviousness challenge with respect to these dependent claims.

*6. Conclusion*

For all of the foregoing reasons, we determine Petitioner has demonstrated a reasonable likelihood of prevailing with respect to its argument that claims 1–7 and 9–15 are unpatentable as obvious in view of Richardson and Krieger.

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<sup>8</sup> Claims 17–19 depend from independent claim 16, which we do not address in this Decision. As discussed above, we focus on independent claim 1 and the challenged claims that depend therefrom.

### III. CONCLUSION

Based on the arguments in the Petition and the evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing in showing at least claims 1–7 and 9–15 of the ’806 patent are unpatentable. Accordingly, we institute an *inter partes* review on all the challenged claims and on all of the grounds presented in the Petition. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

### IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that an *inter partes* review of all challenged claims of the ’806 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the ’806 patent is hereby instituted commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

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