

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN CHIC ELECTRICS CO., LTD.,
Petitioner,

v.

PILOT, INC.,
Patent Owner.

IPR2021-01232
Patent 10,046,653 B2

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

ABRAHAM, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. *Background and Summary*

Shenzen Chic Electrics Co., Ltd. (“Petitioner”) filed a petition for an *inter partes* review (Paper 2 (“Pet.”)) challenging claims 1 and 3–20 of U.S. Patent No. 10,046,653 B2 (Ex. 1001 (“the ’653 Patent”). Pilot Inc. (“Patent Owner”) did not file a Preliminary Response.

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2021). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons set forth below, we determine the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we institute an *inter partes* review.

B. *Related Matters*

The parties indicate that the ’653 patent is at issue in one currently pending district court litigation: *Pilot Inc. v. The NOCO Company, Inc.*, No. 2:20-cv-01452 (D. Ariz.), as well as IPR2021-00777. Pet. 2; Paper 4, 2. The parties also indicate that the ’653 patent was at issue in other district court litigations that have been dismissed without prejudice. Pet. 2; Paper 4, 2–3.

C. The '653 Patent (Ex. 1001)

The '653 patent, titled “Automobile Charger,” issued August 14, 2018, and is directed to “a novel automobile charger with a safe power supply charging quickly.” Ex. 1001, codes (45), (54), 1:11–13. The '653 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, 1:18–24. The '653 patent aims to solve these problems, and depicts one solution in Figure 1, reproduced below.

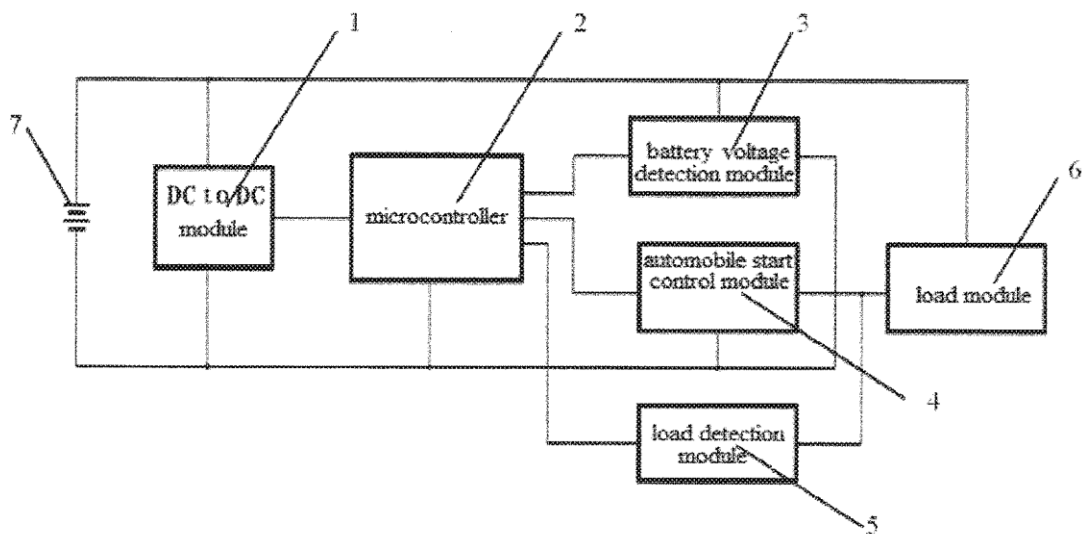


Figure 1 is a block diagram showing one embodiment of an automobile charger that includes DC to DC module 1, microcontroller 2, battery voltage detection module 3, automobile start control module 4, load detection module 5, load module 6, and direct current power supply 7 (the

jump starter battery). Ex. 1001, 2:55–58. Although not shown in Figure 1, the '653 patent states that load module 6 “comprises the automobile storage battery and the automobile engine is located on the end of the load module.” Ex. 1001, 3:23–25.

The '653 patent explains that the DC to DC module provides “the stable voltage for the microcontroller which collects relevant data” and “determines whether the automobile storage battery is connected with the automobile engine through the load detection module.” Ex. 1001, 4:4–16. When the load is correctly connected, the automobile start control module (an electronic switch) is automatically activated, and the battery starts to supply power to the load module. Ex. 1001, 2:18–19, 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. Ex. 1001, 4:19–23.

The '653 patent explains that its automobile charger provides benefits over prior art devices, including, *inter alia*, (1) controlling the supply power for the load, which protects the product and reduces 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, 2:20–36.

D. Illustrative Claims

Of the challenged claims, claims 1, 7, and 17 are independent claims. Claims 1 and 7 are illustrative, and are reproduced below.

1. An automobile charger, comprising:

a first pole of a first battery connected with a first lead of a power converter, a first lead of a battery level detector, and a first lead of a load;

a second pole of the first battery connected with a second lead of the power converter, a first lead of a microcontroller, a first lead of a switching circuit and a second lead of the battery level detector;

a third lead of the power converter connected with a second lead of the microcontroller; and

three additional leads of the microcontroller connected with a third lead of the battery level detector, a second lead of the switching circuit and a first lead of a load detector, respectively,

wherein a second lead of the load detector is connected with a third lead of the switching circuit and a second lead of the load, and

wherein the load includes a second battery and a motor.

Ex. 1001, 5:2–20.

7. A charging device, comprising:

a battery level detector to detect a level of a first battery;

a load detector to detect a type of connection of a load;

a microcontroller to generate an output signal based on the level of the first battery and the type of connection of the load; and

switching circuitry to selectively connect the first battery to the load based on the output signal.

Ex. 1001, 6:28–35. Independent claim 17 is a method claim containing limitations similar to those in claim 7. Ex. 1001, 7:6–13.

E. Asserted Unpatentability Challenges

Petitioner asserts that claims 1 and 3–20 are unpatentable based on the following challenges:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 3, 6	103	Yu, ¹ Klang, ² Koebler ³
4, 7–12, 14–20	103	Yu, Klang, Koebler, Thomason ⁴
5, 13	103	Yu, Klang, Koebler, Richardson ⁵

Petitioner relies on the declaration of James L. Kirtley, Jr., Ph.D. (Ex. 1004).

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have had “a bachelor’s degree in electrical engineering or its equivalent and two years of experience in electrical engineering with some experience in design of battery charging systems.” Pet. 8. Patent Owner does not challenge Petitioner’s definition or offer its own.

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. Based on our review of the ’653 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand and implement the teachings of the ’653 patent and the prior art. *See Okajima v. Bourdeau*, 261

¹ CN 203211234 U, issued Sept. 25, 2013 (Ex. 1005).

² US 6,424,158 B2, issued July 23, 2002 (Ex. 1006).

³ US 2013/0241498 A1, published Sept. 19, 2013 (Ex. 1007).

⁴ US 2005/0110467 A1, published May 26, 2005 (Ex. 1008).

⁵ US 2013/0154543 A1, published June 20, 2013 (Ex. 1009).

F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)). It is also consistent with the level of skill in the art adopted in IPR2021-00777, which also involves the ’653 patent. IPR2021-00777, Paper 7 at 6–7.

B. 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). 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 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 proposes constructions for the terms “battery level detector,” “load detector,” and “switching circuit”/“switching circuitry.” Pet. 9–12. Petitioner contends that “[a]ll other claim terms are to be understood according to their plain and ordinary meaning.” Pet. 9.

We determine that we do not need to expressly construe any terms for purposes of this Decision. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly

those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

C. Claims 7–12 and 14–20 – Alleged Obviousness in View of Yu, Klang, Koebler, and Thomason

Petitioner contends claims 7–12 and 14–20⁶ are unpatentable as obvious in view of Yu, Klang, Koebler, and Thomason. Pet. 50–68.

1. Yu (Ex. 1005)

Yu discloses “an apparatus for the emergency starting of an automobile.” Ex. 1005 ¶ 1. Yu explains that when using an external lead-acid battery to start an automobile, a large current may be generated that can damage the original battery of the automobile or even cause an explosion. Ex. 1005 ¶ 2. According to Yu, its invention “can effectively prevent electric sparks from being generated when it is connected to or disconnected from the automobile, and thus safety can be improved.” Ex. 1005 ¶ 3. Yu provides a schematic diagram of its apparatus in Figure 1, reproduced below.

⁶ Petitioner also asserts that the subject matter of claim 4 would have been obvious in view of Yu, Klang, Koebler, and Thomason. Pet. 50, 52–54. Claim 4 depends from claim 1, which we do not address in this Decision. Instead, we focus on independent claims 7 and 17, and the challenged claims that depend therefrom.

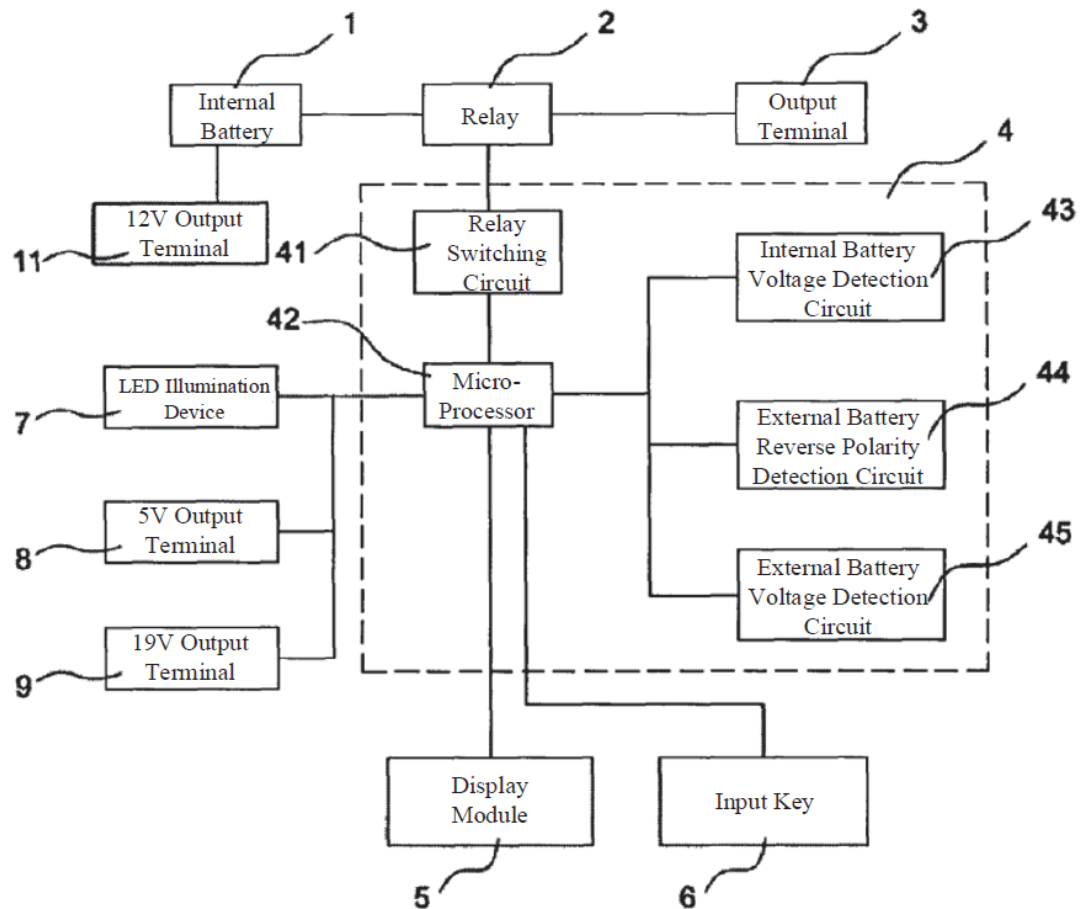


Figure 1 of Yu shows an apparatus for starting an automobile, including internal battery 1, relay 2, output terminal 3, and control module 4. Ex. 1005 ¶ 21. Control module 4 includes relay switching circuit 41, microprocessor 42, internal battery voltage detection circuit 43, external battery reverse polarity detection circuit 44, and external battery voltage detection circuit 45. Ex. 1005 ¶¶ 21–23. Yu explains that microprocessor 42 is configured to control the on/off state of relay 2 via relay switching circuit 41, and that external battery reverse polarity detection circuit 44 is “configured to provide a signal indicating correct or erroneous connection of an external battery.” Ex. 1005 ¶ 21. Yu further explains that internal battery voltage detection circuit 43 and external battery voltage detection circuit 45

provide signals to microprocessor 42 to facilitate monitoring of the condition of the internal and external batteries, respectively. Ex. 1005 ¶ 27.

2. Thomason (Ex. 1008)

Thomason discloses a battery charger “having a polarity detection mechanism, automated current routing circuitry and excessive voltage protection” that is “configured to provide safe, spark free jump starting.” Ex. 1008, code (57). Thomason teaches that its jump-starter includes a first switch that activates the flow of electricity out of the device and a second switch that activates lights on the clamps that connect with the terminals of the battery intended to be recharged. Ex. 1008 ¶ 14. Thomason further teaches that “a variety of other lights and switches are also utilized to designate various functions such as the charge status of the battery being charged as well as the level of the battery in the jump-starting unit.” Ex. 1008 ¶ 14. In one preferred embodiment, Thomason discloses the use of metal-oxide-semiconductor field-effect transistors (MOSFETs) to provide the various switching and signaling functions. Ex. 1008 ¶ 17.

3. Analysis

a. Claim 7

Claim 7 recites a “charging device.” Ex. 1001, 6:28. Petitioner contends Yu discloses an automobile charger based on Yu’s description of its invention as “an apparatus for starting of an automobile, and specifically, . . . an apparatus for emergency starting of an automobile.” Pet. 18 (quoting Ex. 1005 ¶ 1; citing Ex. 1005 ¶¶ 2–4, 21, Fig. 1), 54 (referring to its analysis of this limitation in claim 1).

Claim 7 next recites “a battery level detector to detect a level of a first battery.” Ex. 1001, 6:29. For this limitation, Petitioner directs us to Yu’s

internal battery voltage detection circuit 43, “that is connected to enable signaling to the microprocessor 42 on the voltage of the internal battery 1.” Pet. 41 (addressing this limitation in connection with claim 1), 55 (addressing this limitation in connection with claim 7, referring to its analysis of this limitation in claim 1); *see also* Pet. 20 (asserting internal battery voltage detection circuit 43 corresponds to the claimed battery level detector; citing Ex. 1005 ¶ 22, Fig. 2).

Claim 7 also requires “a load detector to detect a type of connection of a load.” Ex. 1001, 6:30. Petitioner contends that Yu teaches or suggests this limitation based on its disclosure of external battery reverse polarity detection circuit 44, which detects connection polarity, and/or external battery voltage detection circuit 45, which detects the voltage of the external battery and indicates whether the external battery is connected and if the “voltage of the external battery is in a normal range.” Pet. 57 (citing Ex. 1005 ¶¶ 21, 23, 26, 27, Figs. 1–2).

Claim 7 next requires “a microcontroller to generate an output signal based on the level of the first battery and the type of connection of the load.” Ex. 1001, 6:31–33. For this limitation, Petitioner asserts that “Yu explains how microcontroller 42 receives and collects signals from reverse polarity detection circuit 44 and external battery voltage detection circuit 45, and, based on the received and collected signals, [provides] an output control to relay 2.” Pet. 59 (citing Ex. 1005 ¶¶ 21–27, Figs. 1–5). Petitioner also asserts that Thomason discloses measuring the internal battery voltage of a system, and considering the level of the internal battery when determining when to turn its switch on/off, which serves as “a protection mechanism for protecting internal battery by limiting [the] amount of power that is allowed

to flow out of internal battery to prevent it from being fully discharged and to prevent the jump starter from self-destructing when jumper cables are connected together.” Pet. 53 (citing Ex. 1008 ¶ 36). According to Petitioner, a person of ordinary skill in the art would have known from Yu how to use sensor inputs to a microcontroller to control a relay/switch, and would have had reason to “consider the level of the internal battery when determining when to turn on the relay, as taught in Thomason, because that would further protect the internal battery from being connected to a load when it is severely discharged, avoiding damage to the battery.” Pet. 53–54, 59–60.

Finally, claim 7 recites “switching circuitry to selectively connect the first battery to the load based on the output signal.” Ex. 1001, 6:34–35. According to Petitioner, Yu discloses a microcontroller (microprocessor 42) that controls the switching circuitry (relay 2) based on the output from the microprocessor to “selectively connect the internal battery to the external battery to be charged.” Pet. 60.

At this stage of the proceeding, Patent Owner does not dispute that Yu and Thomason disclose the limitations in claim 7, or that a person of ordinary skill in the art would have had reason to combine the teachings of Yu and Thomason and would have known how to do so. After reviewing the evidence and arguments Petitioner presents in the Petition regarding claim 7, we agree that Yu discloses a charging device comprising a battery level detector (internal battery voltage detection circuit 43), load detector (external battery reverse polarity detection circuit 44 and/or external battery voltage detection circuit 45), microcontroller (microprocessor 42), and switching circuitry (relay 2), as claim 7 requires. Ex. 1005 ¶¶ 21–27; Pet.

53–60. Yu also discloses microprocessor 42 receives sensor input signals from internal battery voltage detection circuit 43, external battery reverse polarity detection circuit 44, and external battery voltage detection circuit 45, and can use various signals to control relay 2. Ex. 1005 ¶¶ 26–27. We also agree that Thomason discloses considering the level of the internal battery when determining when to turn its switch on/off and that doing so avoids damaging the battery. Ex. 1008 ¶ 36; Pet. 53–60. Accordingly, Petitioner has demonstrated sufficiently that Yu and Thomason teach or suggest all the limitations of claim 7, 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 7.

b. Claims 8–12 and 14–20

Claims 8–12, and 14–16 depend directly or indirectly from claim 7. Petitioner directs us to portions of Yu and Thomason that disclose the additional limitations in these claims. Pet. 61–66.

Independent claim 17 contains limitations similar to those in claim 7, and Petitioner relies on the same arguments for claim 17 as it does for claim 7. Pet. 66–67. Claim 18 depends from claim 17, and claims 19 and 20 depend from claim 18. For these claims, Petitioner relies on the arguments it presented for claims 8–11. Pet. 67–68.

After reviewing the 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 claims.

4. Conclusion

For all of the foregoing reasons, we determine Petitioner has demonstrated a reasonable likelihood of prevailing with respect its argument that claims 7–12 and 14–20 are unpatentable as obvious in view of Yu, Klang, Koebler, and Thomason.

III. CONCLUSION

Because Petitioner has demonstrated a reasonable likelihood that at least one challenged claim of the '653 patent is unpatentable over the prior art of record, we institute an *inter partes* review. And because we find some grounds sufficient for institution, we institute on all grounds in the petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1353 (2018) (“The agency cannot curate the claims at issue but must decide them all.”); *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute as requiring “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

At this stage of the proceeding, we have not made a final determination with respect to the patentability of any challenged claim or any underlying factual or legal issue.

IV. ORDER

For the reasons given, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1 and 3–20 of the '653 patent is instituted with respect to all grounds of unpatentability asserted in the Petition, commencing on the entry date of this Decision; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of trial.

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