

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN CHIC ELECTRICS CO., LTD.,

Petitioner,

v.

PILOT, INC.,

Patent Owner.

CASE: IPR2023-00810

Patent No. 11,376,971 B2

PAPER 15

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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UPDATED EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 11,376,971 B2 to Wang et al. (“the ’971 Patent” or “the ’971”)
1002	USPTO file history of the ’971 Patent
1003	USPTO file history for U.S. Patent 9,525,297
1004	USPTO file history for U.S. Patent 10,046,653 Patent
1005	USPTO file history for U.S. Patent 10,323,806 Patent
1006	USPTO file history for U.S. Patent 10,875,410 Patent
1007	USPTO file history for pending application 17/131,113
1008	U.S. Patent Application Publication No. 2010/0173182 A1 to Baxter et al. (“Baxter”)
1009	U.S. Patent No. 7,345,450 B2 to Krieger et al. (“Krieger450”)
1010	Chinese Utility New Model Patent No. CN 202696190 U, with certified translation (“Zhang”)
1011	U.S. Patent Application Publication No. 2013/0241498 to Koebler (“Koebler”)
1012	International Publication No. WO2012/080996 A1 to JTM Power Limited (“Tracey”)
1013	U.S. Patent No. 9,506,446 to Xinfang (“Xinfang”)
1014	U.S. Patent Application Publication No. 2013/0154543 to Richardson et al. (“Richardson”)
1015	L. Di Jasio et al, <i>PIC Microcontrollers</i> (2008)
1016	<i>14-Pin, Flash-Based 8-Bit CMOS Microcontrollers</i> , Microchip Technology Inc., PIC16F630/676 Data Sheet, 2010
1017	<i>150mA Low-Noise LDO Regulator</i> , Micrel Inc., MIC5206, May 2006
1018	<i>N-Channel Enhancement Mode MOSFET</i> , Huayi Microelectronics, HY3704P/B, V1.0
1019	<i>HEXFET® Power MOSFET</i> , International Rectifier, IRLS3036-7PPbF, October 2010.
1020	U.S. Patent Application Publication No. 2007/0285049 to Krieger et al. (“Krieger049”)
1021	U.S. Patent No. 5,396,162 to Brilmyer (“Brilmyer”)
1022	U.S. Patent No. 5,820,407 to Morse et al. (“Morse”)
1023	Declaration of David S. Ricketts, PhD. (“Ricketts”)
1024	Claim Listing for ’971 Patent

1025	Datasheet of MC78XX/LM78XX/MC78XXA, 3-Terminal 1A Positive Voltage Regulator, FairChild Semiconductor Corporation, 2001; <i>available at</i> https://pdf.datasheetcatalog.com/datasheet/fairchild/LM7805.pdf
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I. INTRODUCTION

Petitioner in its Petition presented Baxter-based invalidity grounds 1-5 and Krieger450-based invalidity grounds 6-11 against Claims 1-30 of Patent Owner Pilot's U.S. Patent 11,376,971 ("the '971 patent"). Petition, Paper 2 at 1. The Board instituted the *inter partes* review of Claims 1-30 of the '971 patent based on Petitioner's evidence and in light of the Patent Owner Preliminary Response (Paper 6). Institution Decision, Paper 12 at 22. With respect to Baxter-based grounds 1-5, the Board noted that Patent Owner Preliminary Response "does not substantively dispute that Baxter discloses or suggests the limitations in claim 1" and that "Patent Owner does not meaningfully dispute that Baxter discloses or suggests the limitations in claims 2–30," thus institution was appropriate as to all challenged claims on both Baxter-based grounds 1-5 and Krieger450-based grounds 6-11. Institution Decision, Paper 12 at 17-18. The Board's Scheduling Order, set forth a due date of February 1, 2024 for Patent Owner's Response (Paper 13 at 10), and stated that "Patent Owner is cautioned that any arguments not raised in the response may be deemed waived" (Paper 13 at 9).

Pilot's Patent Owner's Response contains approximately 18 lines of text mentioning a few disputes without much analysis or explanation, and without citation to evidence for support. Paper 14, Line 14, Page 4 to Line 11, Page 5. Patent Owner Pilot alleged that (1) the Board construed the term "voltage regulator" in

limitation 1[a] contrary to the plain and ordinary meaning of the term, and (2) the Board used that improper construction to find a voltage regulator in the prior art where none existed. *Id.*

Both of Patent Owner's allegations are simply false.

First, as explained further below, the Board "determine[d] that we do not need to expressly construe any terms for purposes of this Decision" and thus "claim terms [were] afforded 'their ordinary and customary meaning.'" Institution Decision, Paper 12 at 7-8 (citations omitted).

Second, in determining whether the Petitioner identified the claimed a "voltage regulator" in the prior art grounds based on Baxter (Ex. 1008) grounds, the Board noted Petitioner's identification in the prior art of "IC4 and IC1 in Baxter Figure 9 correspond[ing], respectively, to the voltage regulator and microcontroller recited in claim 1" and the voltage regulator's connection to the microcontroller required in the claim. Institution Decision, Paper 12 at 14. IC4 in Baxter is a part labeled with part number MIC5206, which is a well-known voltage regulator, as explained by Petitioner and Petitioner's expert, Dr. David Ricketts. Petition, Paper 2 at 22-25; Ricketts ¶¶224-227. The datasheet for the MIC5206, which describes the part as a "voltage regulator," was also included in in the Petition. Ex. 1017. Despite this, the Patent Owner inexplicably alleged that "no arguments in the Petition or other evidence presented show where such a commonly understood

device resides...” Paper 14 at 4-5.

Third, with respect to the grounds based on the Krieger450 (Ex. 1009) prior art, Krieger450 explicitly calls component 70, which supplies power to microprocessor 60, a “voltage regulator,” and explains the operation of the voltage regulator: “A low voltage power supply is provided to the microprocessor 60 from battery 2 via a voltage regulator 70.” Krieger at 9:15-18; *see also* FIG. 5 (box 70 labelled “Voltage Regulator”). This disclosure is substantively identical to the limitation of claim 1 reciting “the battery capable of supplying power, via the voltage regulator, to at least one microcontroller.” ’971 Patent (Ex. 1001) Col. 5:12-14.

Despite the above and other cited prior art teachings in the Petition, Patent Owner still asserted that “no circuits of . . . Kreiger450 identified by Petitioner in the Petition can reasonably be held to meet the [“voltage regulator”] limitation.” Paper 14 at 5. Patent Owner’s such baseless assertion is not only erroneous but deliberately deceptive, undermining its credibility and the validity of its arguments.

Patent Owner Pilot contended that “a ‘voltage regulator’ is commonly understood by artisans as a circuit designed to automatically maintain a constant voltage in a system.” Paper 14 at 4. Patent Owner also alleged that the Board applied an incorrect claim construction when performing the analysis in the Institution Decision, and should have found that Petitioner did not identify a voltage regulator in the prior art presented in the Grounds of the Petition. *Id.* at 5.

As explained below, the Board did perform this analysis, and the Baxter and Krieger⁴⁵⁰ based prior art grounds in the Petition each do disclose the claimed voltage regulator which Patent Owner inexplicably alleged is missing from the prior art.

As explained below, the claimed “voltage regulator” in Claim Limitation 1[a] of Claim 1 is disclosed and rendered obvious by the cited prior art. In the Patent Owner's Response, Patent Owner merely asserted that with respect to the Baxter-based grounds, “Petitioner skips back and forth between Figures 2 and 9 of Baxter to cobble together the required ‘microcontroller’ that is coupled to a ‘voltage regulator’ of the independent claims.” Paper 14 at 4. But as explained below, this assertion directly contradicts the teachings of Baxter that Figures 2 and 9 describe the same embodiment.

The Patent Owner further alleged that the claimed voltage regulator device “can supply power to both a microcontroller and battery” but the voltage regulator supplying power *to* a battery is not a requirement of any independent claim, which requires that the battery supplies power via the voltage regulator to the microcontroller. '971 Patent Col. 5:12-14, 5:66-6:1, 6:18-21.

Patent Owner has waived all arguments save for this dispute based on its newly presented construction of the claim term “voltage regulator” in Claim Limitation 1[a] of Claim 1. But this dispute raised by Patent Owner is baseless, as

Patent Owner provided no explanation for its dispute and provides no evidence to support it. And even under Patent Owner's own newly presented construction of the claim term "voltage regulator" in Claim 1, the prior art discloses and renders obvious the claimed "voltage regulator."

In short, the Patent Owner's Response is a futile attempt to salvage the invalid claims of the '971 patent from the overwhelming and undisputed prior art evidence presented by Petitioner.

As demonstrated by the Petition and further explained in detail below, Claims 1-30 are invalid and must be canceled.

II. PRIOR ART IN PETITION DISCLOSES "VOLTAGE REGULATOR" OF CLAIM 1 AND RENDERS OBVIOUS CLAIMS 1-30 OF '971 PATENT

Petitioner's evidence and explanations in the Petition demonstrate that, by a preponderance of the evidence, the presented prior art combinations disclose all claim limitations recited in Claims 1-30 and render the claimed subject matter as a whole in each claim obvious and unpatentable. Patent Owner disputed the following portion of Claim Limitation 1[a] (relating to term "voltage regulator") in Claim 1:

*a battery connected to a voltage regulator, the battery capable of supplying power, via the voltage regulator, to at least one microcontroller.*¹

Ex. 1024 (the claims listing showing partitioning of claim limitations).

Patent Owner previously did not raise claim construction issues. *See generally* Patent Owner Preliminary Response, Paper 6. The Board notes that it does not need to expressly construe any terms. Institution Decision, Paper 12 at 8. In the Patent Owner's Response, Patent Owner appeared to propose a construction of "voltage regulator" in Claim Limitation 1[a] as being "a circuit designed to automatically maintain a constant voltage in a system" without providing explanations based on any intrinsic or extrinsic evidence associated with the '971 patent.² Patent Owner Response, Paper 14 at 4-5. A voltage regulator is a well-

¹ Patent Owner does not dispute the prior art discloses or renders obvious the remaining portion of Claim Limitation 1[a]. Patent Owner Response, Paper 14 at 4-5.

² *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998) (holding that any special meaning assigned to a term "must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention"); *see also Helmsderfer v. Bobrick*

known circuit in the electronics as well as a common commercial product for many decades and was well documented in the prior art prior to 2014 as shown by the evidence presented in the Petition and Dr. Ricketts' declaration. A voltage regulator may be used in various applications in different ways, including, for example, being implemented as a circuit connected between the power source and a load to provide a constant voltage to the load despite variations in input voltage or output load,³ or being implemented as a component of the power supply unit that ensures a steady constant voltage supply through all operational conditions and regulates voltage during power fluctuations and variations in loads.⁴

The prior art evidence and analyses in the Petition (Paper 2) and Declaration of Prof. Ricketts (Exhibit 1023) demonstrate that the claimed voltage regulator in Claim Limitation 1[a] is disclosed or otherwise rendered obvious by the prior art on record in this proceeding.

Washroom Equip., Inc., 527 F.3d 1379, 1381 (Fed. Cir. 2008) (“A patentee may act as its own lexicographer and assign to a term a unique definition that is different from its ordinary and customary meaning; however, a patentee must clearly express that intent in the written description.”).

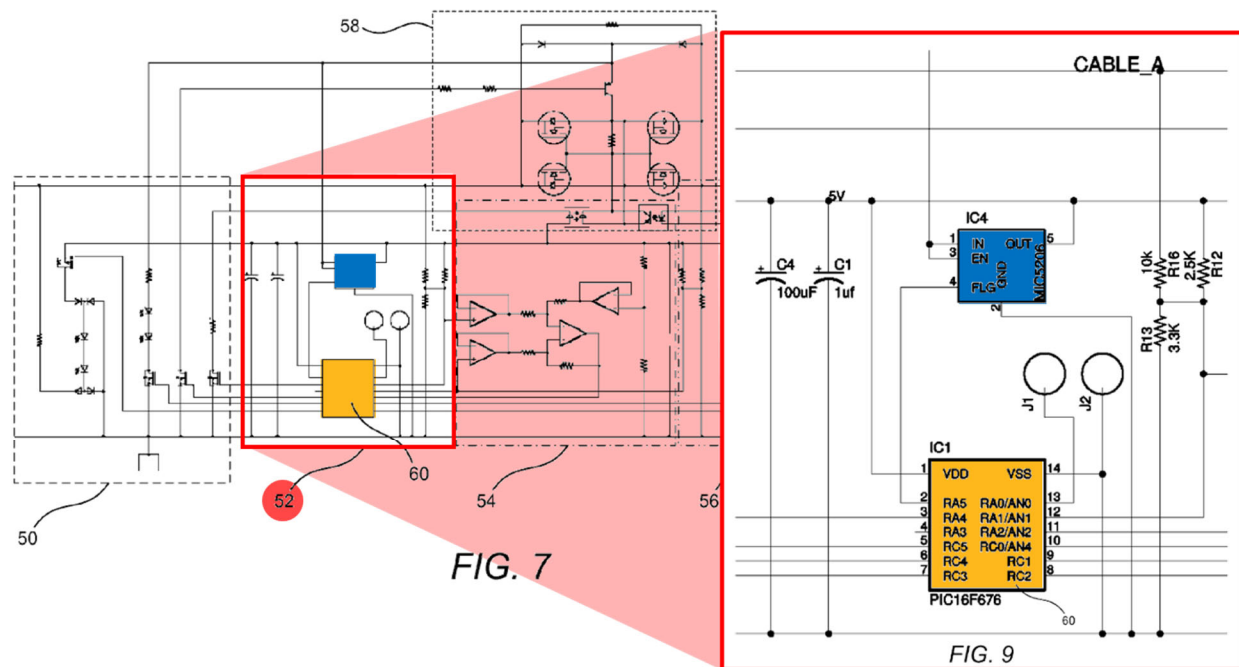
³ https://www.analog.com/en/resources/glossary/voltage_regulator.html

⁴ <https://www.digikey.com/en/maker/tutorials/2020/what-is-a-voltage-regulator>

A. Petitioner's analysis of Figures 2 and 9 of Baxter is correct because these figures illustrate features of the same embodiment in Baxter

Patent Owner appeared to argue that Petition improperly combines different embodiments or designs as shown in Figures 2 and 9 from Baxter. Patent Owner's Response, Paper 14 at 5.

This argument directly contradicts the teachings of Baxter. Specifically, Baxter's Figure 2 provides an overview of the *safety circuit 18*. Baxter at [0044], FIG. 2. Figure 2 outlines the general operation and components of the safety circuit 18. *Id.* Baxter expands on the circuit introduced in Figure 2 by providing "a circuit diagram of one embodiment of the *safety circuit 18*" in Figure 7. *Id.* at [0058] (emphasis added), FIG. 7. This detailed view in FIG. 7 includes areas for further expanded views that are elaborated upon in subsequent Figures 8-12, where Baxter uses its FIG. 9 to focus on **area 52** of FIG. 7 for the embodiment or design in FIG. 2—offering a detailed view of the **voltage regulator (IC4)** and its connection to the **microcontroller (IC1)**. *Id.*, [0058], FIGS. 7, 9 (annotated below).



This linkage in the disclosure of Baxter from FIG. 2 to FIG. 7 to FIG. 9 (and along with Figures 8, 11, and 12) shows that, contrary to Patent Owner’s argument above, all the components provided in Figures 7 to 12 in Baxter, including of the voltage regulator (IC4) and the microcontroller (IC1), are part of the *same embodiment* introduced in FIG. 2. Dr. Ricketts also explained that the features of safety circuit 18 are disclosed in FIG. 2, and in more detail in Figures 7-12. Ricketts ¶216; *see also* ¶220 (“Figs. 7-12 in Baxter show an exemplary safety circuit with more detail than Fig. 2.”).

B. Baxter discloses or renders obvious the “voltage regulator” of Claim 1[a]

As explained by Petition and Dr. Ricketts, Baxter discloses or renders obvious the claimed “voltage regulator.” Petition, Paper 2 at 18-29; Ricketts ¶¶ 216-237. And the Board agreed. Institution Decision, Paper 12 at 17-18.

Specifically, Baxter’s battery (e.g., a battery connected to terminals 20 in FIG. 2 and Positive Cable A/Negative Cable A in FIG. 8) is connected to a voltage regulator (in Detection Circuit & Power Supply 28 in FIG. 2 and IC4 in FIG. 9) that is, in turn, connected to a microcontroller. This battery supplies electrical power, via the voltage regulator, to the microcontroller (e.g., logic or microcontroller 26 in FIG. 2 and IC1 in FIG. 9). Ricketts ¶216.

FIG. 2 in Baxter illustrates how the battery connected at input terminals 20 is also connected to the power supply 28, and the logic or microcontroller 26 is connected to one of the two input terminals 20 (i.e., the connection to the battery ground), and the other terminal of the logic microcontroller 26 is connected to the detection circuit and power supply 28. Baxter at [0044] explains how the logic or microcontroller 26 connects one of the input terminals 20 for a ground connection, and the other power connection is from the power supply 28. Ricketts ¶219.

A POSITA would know that a microcontroller typically needs a 3-5V supply.⁵ Ricketts ¶219. Since an automotive battery is typically 12V or higher, the power supply 28 would need a voltage regulator to convert the input voltage to the lower voltage required by the microcontroller. *Id.*

FIG. 7 in Baxter is annotated below to show the booster box's boundary and internal battery disclosed by Baxter, the voltage regulator, and diode D6 (which has been redrawn for clarity). Ricketts ¶220.

⁵ See, e.g., Ex. 1016, p. 3 (showing "Operating Voltage Range 2.0-5.5V" of PIC16F676 microcontroller used in Baxter's safety circuit). A POSITA would know generally that other microcontrollers operate in this voltage range. As an additional example Krieger450 discloses that "Microprocessors normally run on low Voltages, e.g., 5 volts. A low voltage power supply is provided to the microprocessor 60 from battery 2 via a voltage regulator 70." Krieger450 at 9:15-18. Krieger450 is prior art and illustrates that this knowledge is known to a POSITA as of the priority date.

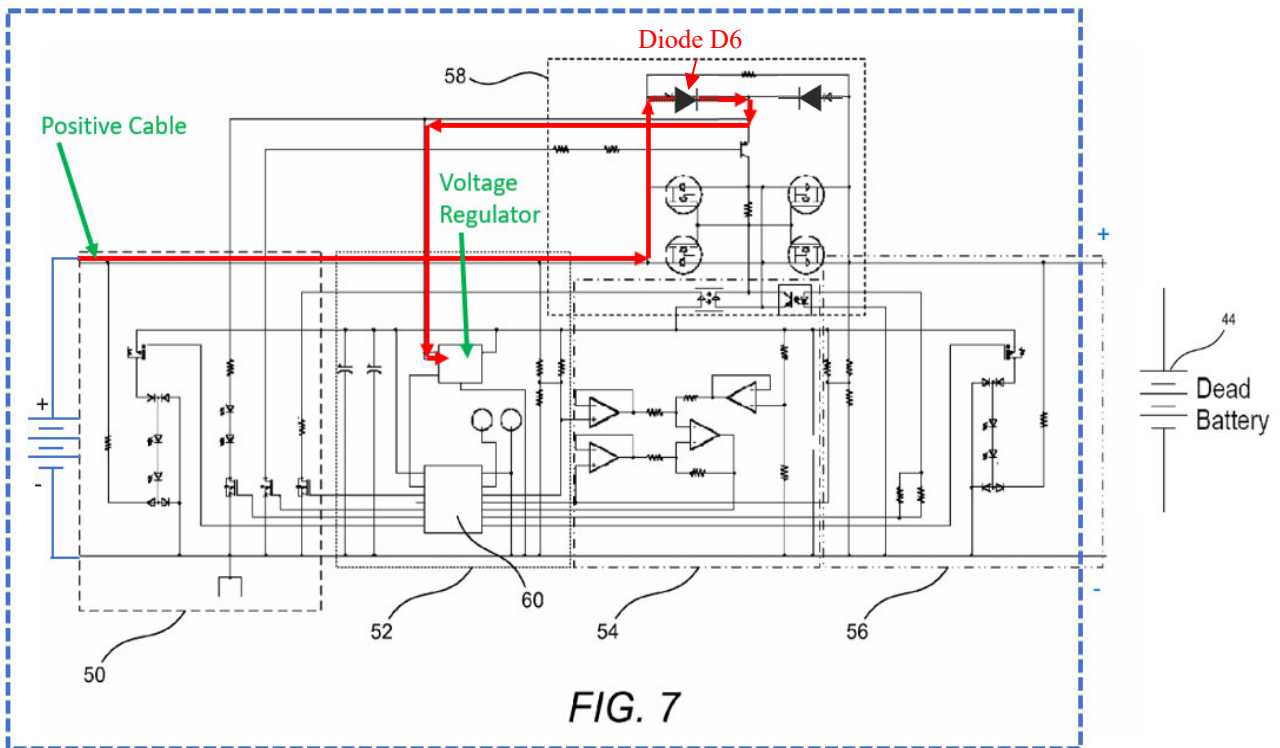


FIG. 9 in Baxter (annotated) shows voltage regulator IC4 which is an integrated circuit with part number MIC5206, which is a well-known linear voltage regulator from Microchip Technology Inc. in Arizona. IC4 supplies a stable accurate DC 5V voltage to microcontroller IC1 which is implemented in FIG. 9 of Baxter by CMOS Flash-based 8-bit microcontroller PIC16F676 from Microchip Technology Inc. Ricketts ¶¶224-27; Ex. 1017, 1, 3.

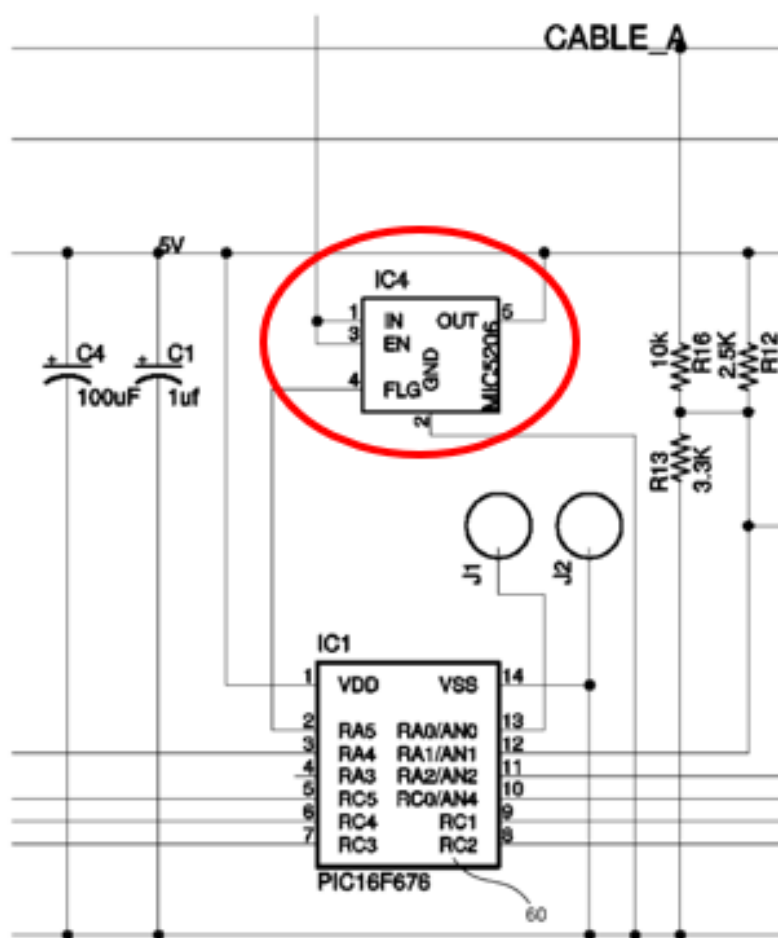


FIG. 9

The voltage regulator output (OUT) connects to the microcontroller IC1 VDD input, as shown in the annotated figure below. Ricketts ¶¶226-27; Ex. 1016, 1, 8 (identifying microcontroller and VDD pin).

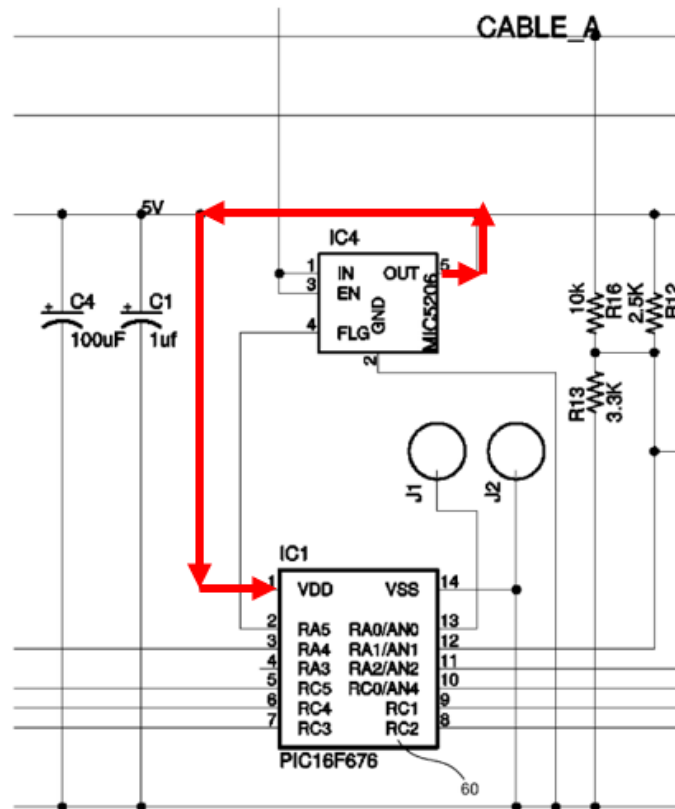


FIG. 9

A portion of the MIC5206 datasheet dated May of 2006 (Ex. 1017) is reproduced below, which explains that “[t]he MIC5206 is an efficient linear **voltage regulator...**” and describes the accuracy of the voltage and current of the voltage regulator product MIC5206 is “better than 1% initial accuracy.” Ex. 1017 at 1 (annotated below).



MIC5206

150mA Low-Noise LDO Regulator

General Description

The MIC5206 is an efficient linear voltage regulator with very low dropout voltage (typically 17mV at light loads and 165mV at 150mA), and very low ground current (600μA at 100mA output), with better than 1% initial accuracy. It has a logic compatible enable/shutdown control input and an internal undervoltage monitor.

Designed especially for hand-held, battery-powered devices, the MIC5206 can be switched by a CMOS or TTL compatible logic signal. When disabled, power consumption drops nearly to zero. Dropout ground current is minimized to prolong battery life.

Features

- Error flag indicates undervoltage fault
- High output voltage accuracy
- Guaranteed 150mA output
- Ultra-low-noise output (8-pin versions)
- Low quiescent current
- Low dropout voltage
- Extremely tight load and line regulation
- Very low temperature coefficient
- Current and thermal limiting
- Reversed-battery protection

Ex. 1017 at 1 (excerpt; annotated).

A POSITA would understand that, in 2006, many years before the Pilot earliest filing in 2014 for the '971 patent, it was well known that the voltage regulator IC4 in Baxter was a voltage regulator that is designed to receive an input voltage and output a constant voltage automatically maintained with the above stated accuracy. Ricketts ¶¶224-26. Indeed, Baxter's IC4 is consistent with what a POSITA would have understood as a voltage regulator. *See, e.g.*, Ex. 1002 (Ricketts Declaration), Appendix B at 3.18 ("An alternative is to use a voltage regulator to convert the varying output voltage of the battery into a constant output voltage consistent with the equipment requirements."); Appendix T (Fundamentals of Power Electronics, Second Edition) at 448 ("In the conventional voltage regulator application, the output voltage $v(t)$ is well regulated by the converter control system, while the input voltage $V_g(t)$ is unknown.")

In view of the foregoing, Baxter discloses or renders obvious the claimed the “voltage regulator” in claim limitation 1[a] in accordance with the plain and ordinary meaning of the term. Petition, Paper 2 at 18-29; Ricketts ¶¶ 216-237.

Even under the Patent Owner's newly presented construction of “voltage regulator” in Claim Limitation 1[a], Baxter discloses or renders obvious such a voltage regulator as “a circuit designed to automatically maintain a constant voltage in a system.”

Specifically, as explained in above, Baxter discloses a voltage regulator IC4 MIC5206 that provides power to a microcontroller IC1, PIC16F676. §II.A. MIC5206's design embodies the principle of automatic operation through its integrated features that adjust the output voltage. In particular, the MIC5206 can maintain a 5 volt Vout voltage output with 1% accuracy. Ex. 1017 at 2, 4. This automatic control facilitates the regulation process in response to system requirements to provide a constant voltage without manual intervention. *Id.* at 3, 8. Additionally, MIC5206 also includes an automatic error signaling mechanism is provided by the error flag output (FLAG), which activates when MIC5206 detects an undervoltage condition, automatically alerting the system to potential voltage irregularities. *Id.* at 3, 5, 8. This feature illustrates MIC5206's capability to autonomously monitor and respond to voltage status.

MIC5206 in Baxter also provides a constant voltage in a system. In particular, MIC5206's very low dropout voltage (17mV at light loads and 165mV at 150mA) coupled with a low ground current, ensures that it can maintain a constant output voltage even under varying load conditions and input voltages. *Id.* at 1, 4-5. Additionally, with better than 1% initial accuracy, the MIC5206 in Baxter can maintain a constant and precise 5 volt output voltage, catering to the requirements of sensitive electronic components and systems. *Id.* at 1, 4. Moreover, MIC5206's feature of ultra-low-noise output ensures that the voltage remains constant and clean, free from fluctuations. *Id.* at 1, 9. By integrating automatic control features with mechanisms designed to ensure stable and precise voltage output, MIC5206 disclosed in Baxter embodies a solution expressly implemented to automatically maintain a constant voltage in a system.

Therefore, Baxter discloses "a circuit designed to automatically maintain a constant voltage in a system."

In view of the foregoing, Baxter discloses or renders obvious the claimed the "voltage regulator" in claim limitation 1[a] of Claim 1. To the extent that Patent Owner asserts its argument about the "voltage regulator" (Patent Owner Response, Paper 14 at 4-5) applies to the other claims that also recite a "voltage regulator," for at least the same reasons above, Baxter also discloses or renders obvious the "voltage regulator" in these claims.

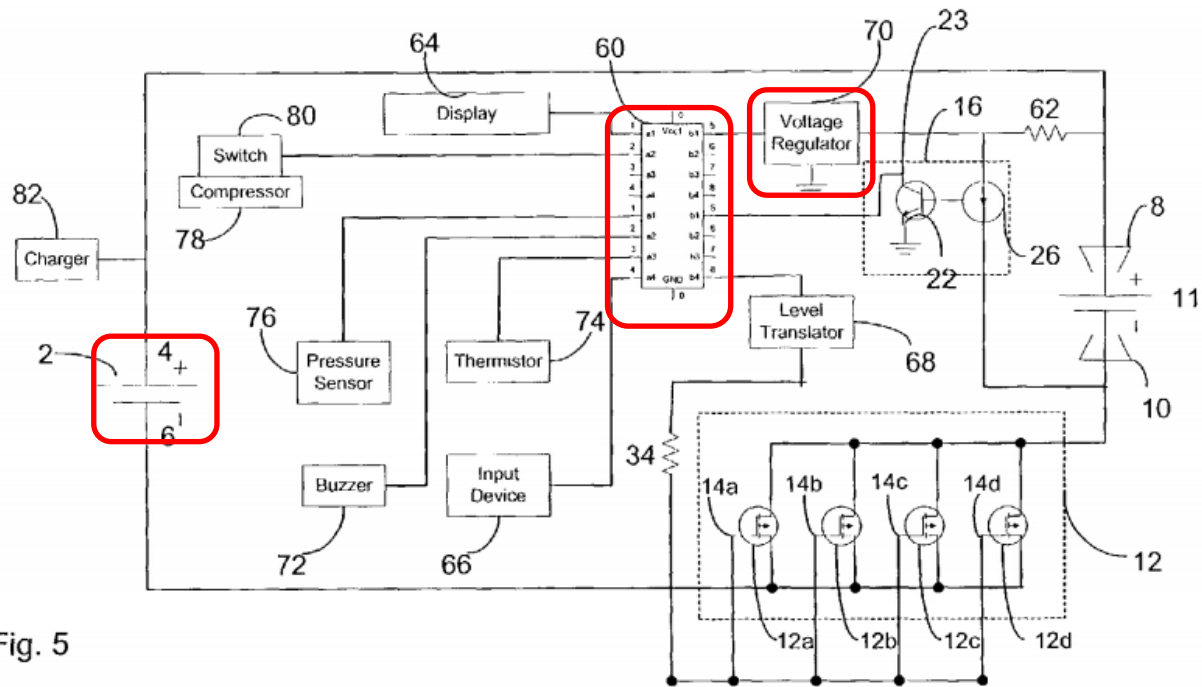
On the record by both Petitioner and Patent Owner in this proceeding, Petitioner's invalidity grounds 1-5 based on Baxter disclose and render obvious the challenged claims in '971 patent.

C. Kreiger450 discloses or renders obvious the “voltage regulator” in Claim Limitation 1[a]

With respect to Petitioner's grounds based on combinations of Krieger450 and other art, in the Patent Owner response, Patent Owner alleges in a conclusory fashion that “if the Board applies a plain and ordinary meaning to the term ‘voltage regulator’ ... the Board will find that no circuits of [] Kreiger450 identified by Petitioner in the Petition can reasonably be held to meet the limitation” Paper 14 at 5. This is simply false.

As explained by Petition and Dr. Ricketts, Kreiger450 renders obvious the claimed “voltage regulator.” Petition, Paper 2 at 62-66; Ricketts ¶¶372-382.

Specifically, Krieger450's jump starter has a boosting battery 2 connected and supplying power to a voltage regulator 70, which supplies power to a microcontroller 60. Krieger450 Fig. 5 (annotated below), 9:15-18; Ricketts ¶¶372-373.



For the avoidance of doubt, Krieger⁴⁵⁰ expressly and definitively calls reference 70 a “voltage regulator” and describes the function of the voltage regulator: “A low voltage power supply is provided to the microprocessor 60 from battery 2 via a voltage regulator 70.” *Id.* 9:15-18, FIG. 5 (box 70 labelled “Voltage Regulator”). The voltage regulator functionality described in Krieger 450 is the same as the typical functionality known to a POSITA. Ricketts ¶219 (“...a voltage regulator [] convert[s] the input battery to the appropriate lower voltage required by the microcontroller”); *see also* Ex. 1002 (Ricketts Declaration), Appendix B at 3.18 (“An alternative is to use a voltage regulator to convert the varying output voltage of the battery into a constant output voltage consistent with the equipment requirements.”); Appendix T (Fundamentals of Power Electronics, Second Edition)

at 448 (“In the conventional voltage regulator application, the output voltage $v(t)$ is well regulated by the converter control system, while the input voltage $V_g(t)$ is unknown.”)

FIG. 5 in Krieger450 does not show a connection to the microprocessor VCC input, a POSITA would understand this connection exists based on the specification text quoted above. *Id.*; Ricketts ¶374. Battery 2 can supply power to microcontroller 60 as recited in limitation 1[a]. Krieger450 at 5:22-26; Ricketts at ¶375.

In view of the foregoing, Krieger450 discloses or renders obvious limitation 1[a] in accordance with the plain and ordinary meaning of the term.

In addition, under the Patent Owner's newly presented construction of “voltage regulator” in Claim Limitation 1[a], Krieger450 discloses or renders obvious such a voltage regulator as “a circuit designed to automatically maintain a constant voltage in a system.”

As explained above, Krieger450, a discloses a boosting battery 2 connected and supplying power to a voltage regulator 70, which supplies a “low voltage power supply” to a microcontroller 60. §II.B; *see also* Krieger450 Fig. 5 (annotated below), 9:15-18, 10:27-28; Ricketts ¶¶372-733.

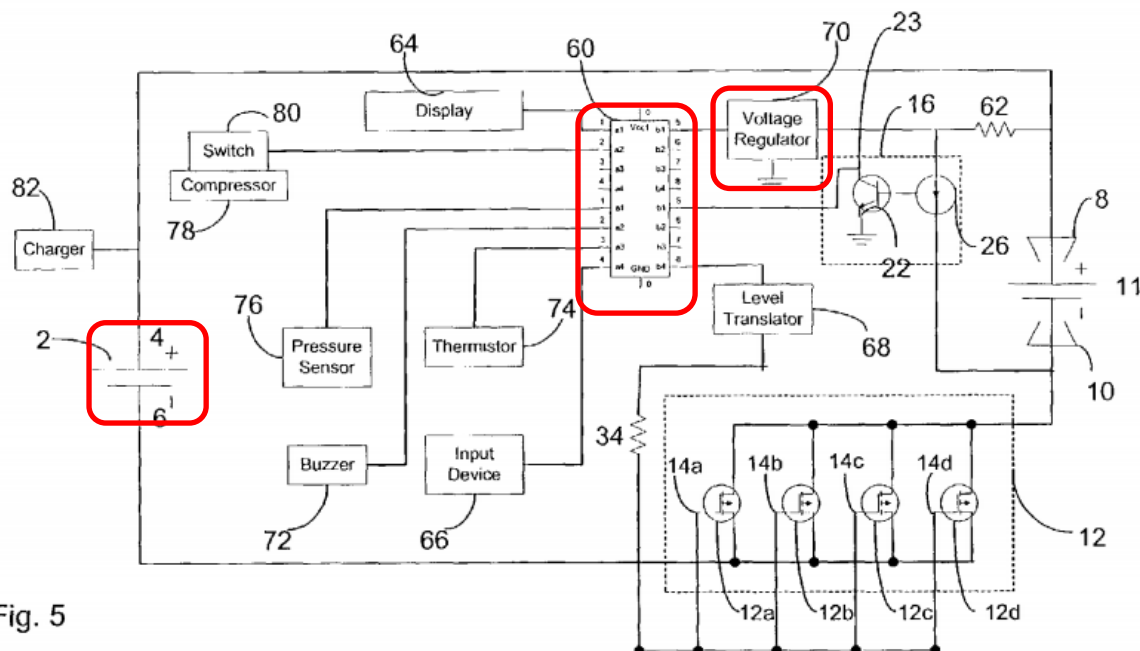


Fig. 5

The teaching in FIG. 5 indicates that Krieger450's voltage regulator automatically receives power from the boosting battery and delivers it to the microprocessor without manual intervention. *Id.* Additionally, as explained in Section in the Petition, Krieger450's microprocessor has the capability to *automatically* monitor the battery voltage and *automatically* respond to certain conditions, such as a low voltage. Petition, Paper 2 at 63-64; Ricketts ¶¶376-380. For the microprocessor to perform these automatic functions reliably, it is necessary that its power supply remains consistent and uninterrupted. Voltage regulator 70, by its very design and purpose, fulfills this requirement by providing a stable and constant voltage output from the boosting battery to the microprocessor. Ricketts ¶216 n.9.

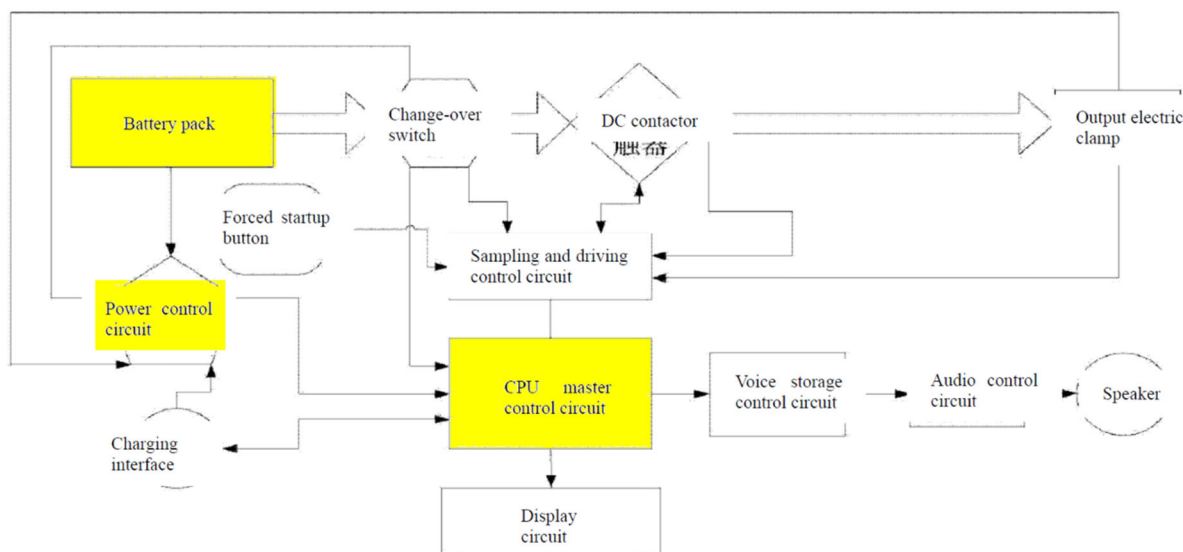
In view of the foregoing, Krieger450 discloses or renders obvious the claimed the “voltage regulator” in claim limitation 1[a] of Claim 1. To the extent that Patent Owner asserts its argument about the “voltage regulator” (Patent Owner Response, Paper 14 at 4-5) applies to the other claims that also recite a “voltage regulator,” for at least the same reasons above, Krieger450 also discloses or renders obvious the “voltage regulator” in these claims.

On the record by both Petitioner and Patent Owner in this proceeding, Petitioner's invalidity grounds 6-11 based on Krieger450 disclose and render obvious the challenged claims in '971 patent.

D. Other prior art evidence by Petitioner further demonstrates that the “voltage regulator” in Claim Limitation 1[a] had been well-known and publicly documented before 2014

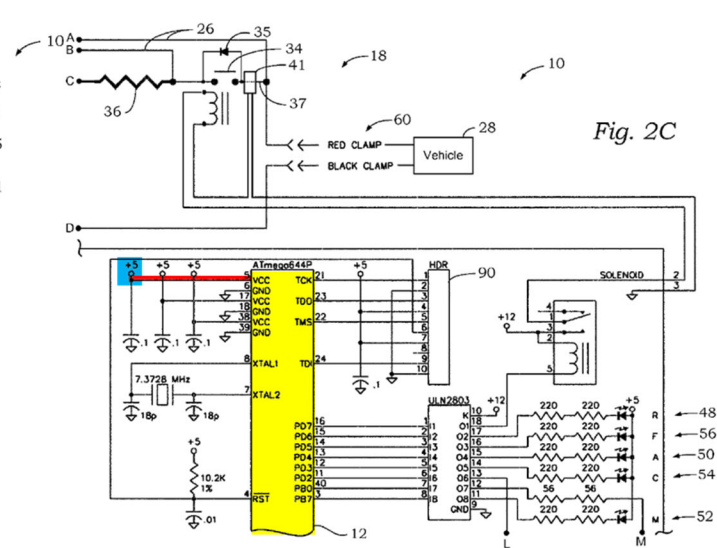
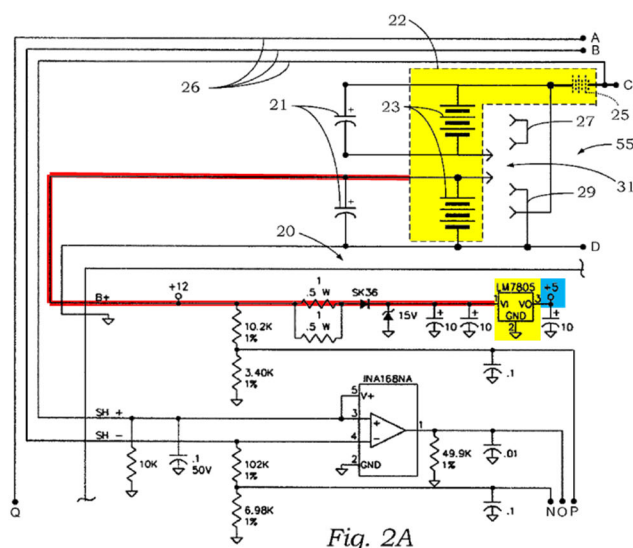
In addition to Baxter and Krieger450, other prior art evidence in the Petition also discloses jumpstarters with a voltage regulator as “a circuit designed to automatically maintain a constant voltage in a system” under Patent Owner's newly presented construction. Such a “voltage regulator” as construed by Patent Owner was nothing new and was disclosed the prior art references on record in this IPR proceeding prior to the earliest 2014 priority date of the '971 patent. Not only does each of Baxter and Krieger450 teaches or suggests the “voltage regulator” recited in limitation 1[a] as discussed above, but so does also other prior art of record.

For example, Zhang (Ex. 1010) included in the Petition discloses a jumpstarter with power control circuit that is connected to a battery pack and also is connected to, and provides power to, a CPU master control circuit (microcontroller). Zhang [0014], Fig. 1 (annotated below). This power control circuit contains “IC1-7805 three terminal integrated voltage regulator,” which functions as a voltage regulator for supplying “5VDC” power to the CPU master control circuit. *Id.* [0019], Fig. 2, [0019].



Richardson (Ex. 1014) included in the Petition also discloses a jumpstarter with voltage regulator LM7805 that converts the power (e.g., at 12V) from batteries 23 into 5V power provided to microcontroller 12. Richardson, Figs. 2A, 2C (annotated below), [0034]; Ex. 1025 (Datasheet titled “MC78XX/LM78XX/MC78XXA 3-Terminal 1A Positive Voltage Regulator,” dated 2001) at 1 (“The MC78XX/LM78XX/MC78XXA series of three terminal

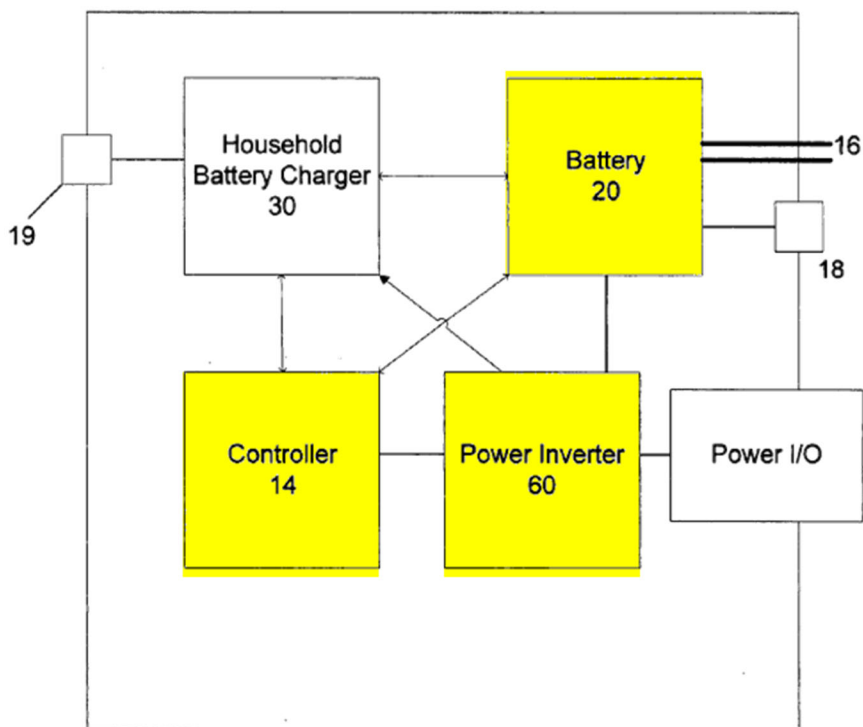
positive regulators are available in the TO-220/D-PAK package and with several *fixed output voltages.*”), 2 (listing electrical characteristics of LM7805, including output voltage of 5.0 V) (emphasis added), 21 (showing “fixed output regulator” application of LM78XX devices, such as LM7805, in Fig. 8).



Richardson’s LM7805 automatically manages the power it receives to provide a steady 5V output. Ex. 1025 at 2. LM7805 regulates the input voltage, which can range from 7V to 20V down to a stable and constant 5V output (4.75 to 5.25V), ensuring that devices or circuits connected to the output receive a consistent voltage supply. *Id.* at 1-2. When connected to a power source and a load (microcontroller), LM7805 automatically provides a constant voltage to the microcontroller without any manual intervention.

Additionally, Krieger049 (Ex. 1020) included in the Petition discloses a “voltage regulator” as “a component of the power inverter 60” that is connected to

battery 20 and controller 14 (microcontroller). Krieger049, [0014], Fig. 3 (annotated below).



These teachings of Zhang, Richardson, and Krieger049, alongside those of Baxter and Krieger450, affirm that the concept and application of voltage regulators, particularly in configurations involving power conversion and stabilization for microcontrollers in jumpstarters, had been well-known and widely implemented prior to the priority date of the '971 patent.

III. PATENT OWNER HAS WAIVED ALL ARGUMENTS EXCEPT ONE DISPUTE WITH THE BOARD ON THE TERM “VOLTAGE REGULATOR” IN LIMITATION 1[A]

Patent Owner has only one dispute—under its apparent construction of term “voltage regulator” in limitation 1[a], Baxter and Kreiger450 do not disclose a

“voltage regulator.” Patent Owner Response, Paper 14 at 4-5. Thus, Patent Owner has waived any arguments not raised in its Response to the Petition.⁶ Scheduling Order, Paper 13 at 9; *see also In re NuVasive*, 842 F.3d 1376, 1380-81 (Fed. Cir. 2016) (holding that if the Patent Owner does not include an argument in its Patent Owner Response that was raised in the Petition, those arguments are waived); *SAP Am., Inc. v. Versata Dev. Grp., Inc.*, CBM2012-00001, Paper 81 at 2-4 (P.T.A.B. Sept. 13, 2013).

⁶ Patent Owner also asserted that “Petitioner fails to make any showing that there is a motivation to combine the primary references to create the inventions of the claims or that a skilled artisan would be able to reliably do so without undue experimentation.” Patent Owner Response at 2. But Patent Owner has not provided any evidence to support such assertion. *Id.* On the contrary, Petition and Dr. Ricketts’ testimony contain ample evidence and explanations as to show that a POSITA would have been motivated to reach the proposed modifications with a reasonable expectation of success. *See, e.g.*, Petition, Paper 2 at 22, 58, 60, 64, 81-82, 84, 86-87, 89, 92; Ricketts ¶¶177, 222-228, 350-351, 361-362, 381, 458, 463, 469, 475, 488.

Additionally, Patent Owner has not substantively disputed that Claims 17-30 are invalid,⁷ and thus effectively waived all arguments regarding these claims. Patent Owner Response, Paper 14 at 4-5. Therefore, Claims 17-30 are invalid, at least because Patent Owner fails to respond to the invalidity grounds relating to Claims 17-30 in Petition.

IV. CONCLUSION

This proceeding is governed by 35 U.S.C. § 316, including its subsection (e) which provides that “the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.” At this stage of this proceeding, Petitioner’s evidence for demonstrating invalidity of Claims 1-30 on

⁷ Patent Owner only proposed a new construction for term “voltage regulator” recited in Claim Limitation 1[a]. Patent Owner Response, Paper 14 at 4-5. Claims 17 and 18 are independent claims. Claims 19-30 depend, directly or indirectly, on claim 18. To the extent that Patent Owner may assert that the same construction should also apply to Claims 17-30, the Patent Owner’s new construction should be rejected. And even if the Patent Owner’s new construction would be entertained, the prior art discloses or renders obvious the “voltage regulator” recited in Claims 17-30 for the same reasons outlined in this Reply for claim 1.

record includes prior art references and supporting evidence, and explanations presented by the Petitioner in the originally filed Petition, and the additional explanations in this Reply.

In contrast, Patent Owner Pilot has presented no evidence to counter Petitioner's invalidity evidence. For example, no testimony or declaration from a technical expert has been provided by Patent Owner to rebut the overwhelming invalidity evidence by Dr. Ricketts and Petitioner.

At this stage of this proceeding, Patent Owner submitted only one document from a related district court litigation under Exhibit 2001 as shown below. Exhibit 2001 by Patent Owner does not address any of substantive issues on the invalidity of Claims 1-30.

TABLE OF EXHIBITS

Exhibit	Description
2001	Order Granting Joint Stipulation to Stay Case Pending Resolution of <i>Inter Partes</i> Review of the '971 Patent, <i>Shenzhen Carku Technology Co., Ltd. v. Pilot, Inc.</i> , Case No. 2:22-cv-08471-HDV-KS, ECF No. 61 (C.D. Cal. Aug. 30, 2023)

Notably, the Patent Owner has not disputed or presented any substantive rebuttal to invalidity challenges presented by the Petitioner, such as Petitioner's prior art references, Petitioner's analyses of the prior art teachings with respect to Claims 1-30, or Petitioner's combinations of the different prior art references. Patent

Owner's entire disputes in the Patent Owner's Response are the 18 lines of text of conclusory and argumentative statements at Pages 4-5, without substantive explanations and analyses, without referring to the specific context in Claim 1, in the specification or the USPTO file history of the '971 patent, and without providing any other extrinsic evidence. Those Patent Owner's statements at Pages 4-5 lack merit and are baseless.

In light of the totality of the abundance of evidence, and specific explanations and analyses with respect to Claims 1-30 provided by Petitioner, and further in view of absence of counter evidence by the Patent Owner, Petitioner respectfully submits that, on the record of this proceeding, the Petitioner has met the required "burden of proving a proposition of unpatentability by a preponderance of the evidence" under 35 U.S.C. § 316(e) with respect to each of Claims 1-30 of the '971 Patent.

Accordingly, the Board should find that Claims 1-30 are invalid and must be canceled.

Dated: April 19, 2024

Respectfully submitted,

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CERTIFICATION OF WORD COUNT UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE totals 4,898 words, excluding the parts exempted by 37 C.F.R. § 42.24(a). This word count was made by using the built-in word count function tool in the Microsoft Word 365 software used to prepare the document.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that true copies of the foregoing PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE and EXHIBIT 1025 were served in their entirety this 19th day of April, 2024 by electronic mail on the Patent Owner via its attorneys of record:

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