

Petition for *Inter Partes* Review of
U.S. Patent No. 8,610,397 B2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NINTENDO CO., LTD., and
NINTENDO OF AMERICA INC.,
Petitioners,

v.

MALIKIE INNOVATIONS LTD.,
Patent Owner.

Case IPR2025-00006
U.S. Patent No. 8,610,397 B2
Issue Date: December 17, 2013

Title: BATTERY CHARGER FOR PORTABLE DEVICES AND RELATED
METHODS

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,610,397 B2**

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List of Exhibits

Exhibit No.	Description of Document
EX1001	U.S. Patent No. 8,610,397 B2 to Michael L. Purdy, et al. (filed Jan. 24, 2012, issued Dec. 17, 2013) (“ 397 ” or “ 397 patent ”)
EX1002	Declaration of Regan Zane, Ph.D. (“ Zane ”)
EX1003	Japanese Patent Application Publication No. JP 2000-323181A to Hisashi Keirinbou (filed on May 13, 1999, published November 24, 2000) (“ Keirinbou ”)
EX1004	Certified Japanese-to-English translation of Keirinbou (EX1003)
EX1005	U.S. Patent No. 5,998,966 to Brian Scott Gaza (filed March 20, 1998, issued December 7, 1999) (“ Gaza ”)
EX1006	U.S. Patent No. 6,437,543 B1 to Van Oler et al. (filed November 20, 2000, issued August 20, 2002) (“ Oler ”)
EX1007	Japanese Patent Application Publication No. JP 2000-134816A to Masatada Tanaka (filed October 27, 1998, published May 12, 2000) (“ Tanaka ”)
EX1008	Certified Japanese-to-English translation of Tanaka (EX1007)
EX1009	U.S. Patent No. 6,459,175 B1 to Patrick H. Potega (filed November 17, 1998, published October 1, 2002) (“ Potega ”)
EX1010	U.S. Patent No. 5,602,455 to Charles S. Stephens, et al. (filed November 4, 1994, published February 11, 1997) (“ Stephens ”)
EX1011	U.S. Patent No. 5,493,199 to Steven E. Koenck, et al. (filed October 6, 1992, published February 20, 1996) (“ Koenck ”)
EX1012	Excerpts from <i>Newton’s Telecom Dictionary</i> (17th ed. 2001)
EX1013	Excerpts from <i>Microsoft Computer Dictionary</i> (5th ed. 2002)
EX1014	Declaration of Tony Givargis, Ph.D. dated September 5, 2025
EX1015	U.S. Patent No. 6,242,893 B1 to Robert P. Freedman (filed June 24, 1999, published June 5, 2001) (“ Freedman ”)

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List of Exhibits

Exhibit No.	Description of Document
EX1016	U.S. Patent No. 6,282,433 B1 to Howard E. Holshouser (filed April 14, 1999, published August 28, 2001) (“ Holshouser ”)
EX1017	U.S. Patent No. 6,574,487 B1 to Steven W. Smith, et al. (filed February 23, 2000 published June 3, 2003) (“ Smith ”)
EX1018	Stipulated Motion Extending Time for Defendants to Respond to Complaint (Doc. 15) in <i>Malikie Innovations Ltd. v. Nintendo Co.</i> , No. 2:24-cv-01490-JLR (W.D. Wash.)
EX1019	LPR 132 Joint Claim Construction and Prehearing Statement (Amended) (Doc. 50) in <i>Malikie Innovations Ltd. v. Nintendo Co.</i> , No. 2:24-cv-01490-JLR (W.D. Wash.)

I. MANDATORY NOTICES UNDER §42.8(A)(1)

A. Real Party-In-Interest (§42.8(b)(1))

Nintendo Co., Ltd. and Nintendo of America Inc. (collectively, “Petitioner”) are the real parties-in-interest to this IPR petition.

B. Related Matters (§42.8(b)(2))

The ’397 patent is the subject of the following pending litigation involving Petitioner: *Malikie Innovations Ltd. v. Nintendo Co.*, Case No. 2:24-cv-01490-JLR (W.D. Wash.). Petitioner was served on October 21, 2024. (EX1018, p.001.)

C. Lead and Back-Up Counsel (§42.8(b)(3))

Petitioner provides the following designation of counsel. A power of attorney is being filed concurrently per 37 C.F.R. § 42.10(b).

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D. Service Information (§42.8(b)(4))

This Petition is being served by Federal Express on PO at the correspondence address of record for the '397 patent, Botos Churchill IP Law LLP – Malik, 430 Mountain Avenue, Suite 401, New Providence, NJ 07974. This Petition is also being

served on litigation counsel identified in the attached Certificate of Service.
Petitioner consents to electronic service at the addresses provided above for lead and back-up counsel.

II. FEE PAYMENT

Petitioner requests review of twenty-two claims, with a \$54,695 payment.

III. REQUIREMENTS UNDER §§ 42.104 AND 42.108 AND CONSIDERATIONS UNDER §§ 314(A) AND 325(D)

A. Standing

Petitioner certifies that the '397 patent is available for IPR and that Petitioner is not barred or otherwise estopped.

B. Identification of Challenge

Ground	Claims	Basis Under § 103
1	1-7, 11-22	Keirinbou (EX1003/EX1004) and Gaza (EX1005)
2	8-10	Ground 1 + Oler (EX1006)
3	1-3, 5-7, 11-13, 15-20, 22	Tanaka (EX1007/EX1008) and Potega (EX1009)
4	4, 8, 14, 21	Ground 3 + Koenck (EX1011)
5	9-10	Ground 3 + Stephens (EX1010)

This Petition is supported by the Declaration of Regan Zane, Ph.D. (**EX1002**) (“Zane”), a qualified technical expert (Zane, ¶¶1-12, Appendix A).

C. §§314(a) and 325(d)

Discretionary denial is not warranted. This is the first and only IPR petition filed by anyone against the '397 patent, and the validity or patentability of the '397 patent has not been adjudicated previously. None of the prior art references relied on in the Grounds were identified during prosecution of the '397 patent. The pending litigation against Petitioner is in a relatively early stage. Petitioner intends to promptly move to stay the litigation pending IPR. Additionally, if IPR is instituted (and the institution is not subsequently vacated, or a Final Written Decision in the IPR is not subsequently vacated or terminated), Petitioner will not pursue in district court any grounds of invalidity against the challenged claims that were, or reasonably could have been, asserted in IPR under §§ 102 or 103 on the basis of prior art patent or printed publications. Petitioner will further address discretionary denial considerations if Patent Owner seeks discretionary denial of the Petition.

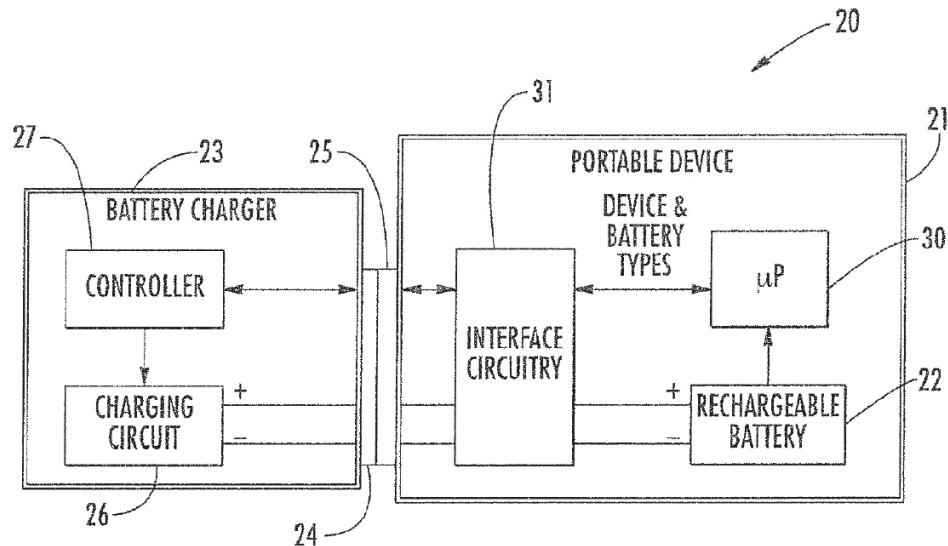
IV. '397 PATENT OVERVIEW

A. POSITA

A POSITA would have a bachelor's degree in electrical engineering or similar degree, with at least two to three years of experience designing, studying, or implementing power electronic systems that include rechargeable batteries and chargers. (Zane, ¶15.) More education and less technical experience, or vice versa, suffices. (*Id.*)

B. Specification Overview

The '397 patent relates to battery chargers for portable devices, such as laptops and cellular phones. ('397, 1:20-22, 1:26-30.) Figure 1 illustrates “a battery charging system in accordance with the present invention”:



('397, Fig. 1, 4:12-13.) As shown, charging system **20** includes portable device **21** with rechargeable battery **22** and battery charger **23**. (*Id.*, 4:36-39.) When portable device **21** is connected to battery charger **23**, the charger causes the device to identify its corresponding portable device type and rechargeable battery type. (*Id.*, 5:29-33.) If the charger recognizes the device type and battery type, the charger selects charging parameters for charging the battery based on different charging parameters associated with the device and battery. (*Id.*, 8:51-9:6.) If the device and battery types are not recognized, the charger provides an error signal to the portable device and may enter a “learning mode” to learn new device/battery parameters. ('397,

8:10-50.) Figure 3 illustrates this process:

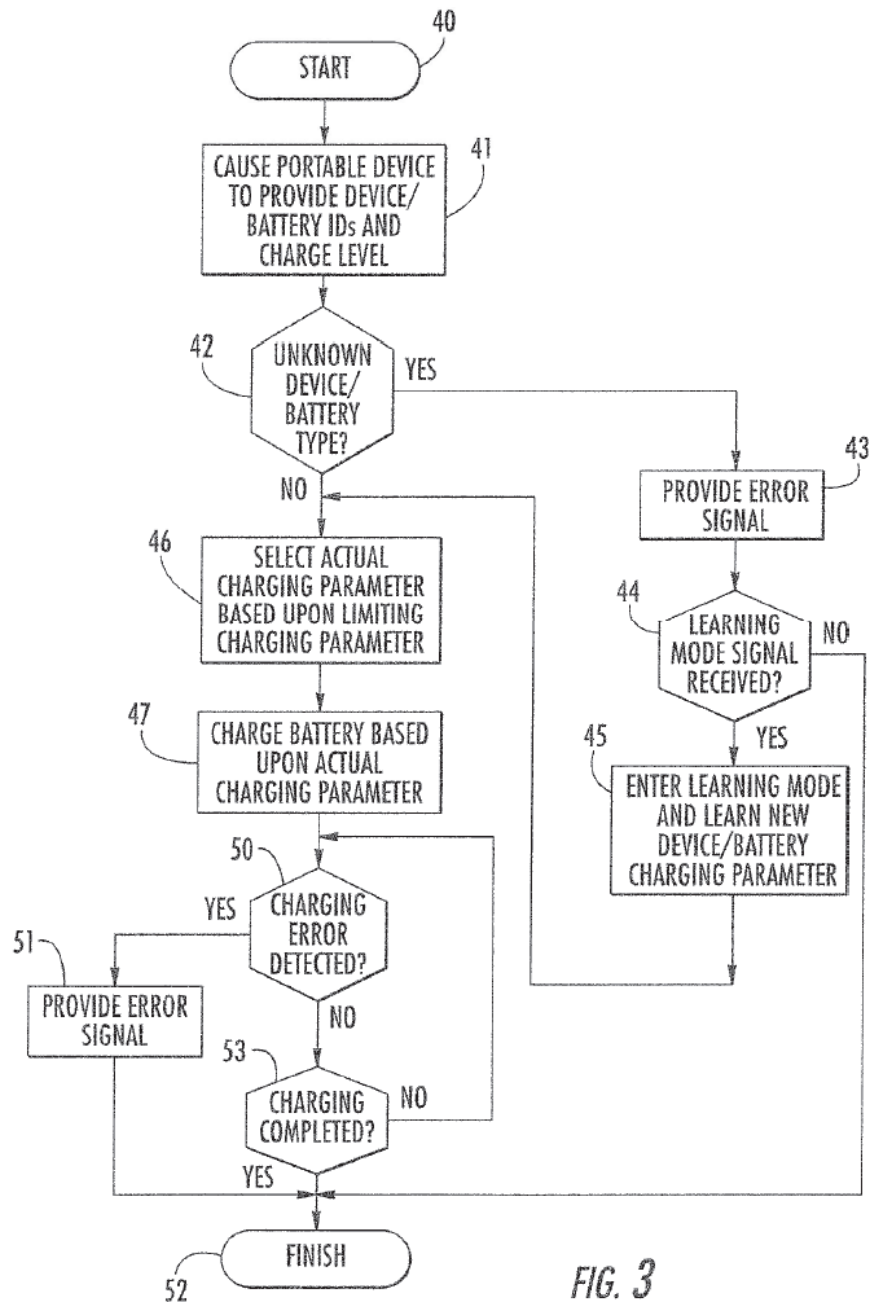


FIG. 3

(*Id.*, Fig. 3, 4:16-17.)

V. CLAIM CONSTRUCTION

No claim construction rulings have issued in the pending litigation. There, the parties dispute the meaning of the term “charging rate,” but Petitioner does not believe any term requires express construction at this time because the claims are obvious under the claim constructions proposed by either party (and under any reasonable construction). (Zane, ¶23.)

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Overview of Grounds

The '397 patent attempts to lay claim to techniques for a battery charger to charge a portable device's battery using device type and battery type information. However, these techniques had already been taught in the prior art years before.

Grounds 1-2 rely primarily on Keirinbou (**EX1003**). Because Keirinbou published in Japanese, this Petition cites to the certified Japanese-to-English translation (**EX1004**). Like the '397 patent, Keirinbou discloses a battery charger for “portable devices that can be used in common with different models of portable devices.” (Keirinbou, Abstract, [0001].) The charger obtains the device's model number to recognize the device's battery type and charge the battery based on that information. (*Id.*, [0006], [0012], Fig. 2.) Ground 1 also cites Gaza (**EX1005**) primarily for its discussion of techniques for allowing a battery charging system to obtain information about the type of batteries being charged. (Gaza, 8:13-52; Zane,

¶¶59-64.) Ground 2 adds Oler (**EX1006**) in connection with dependent claims 8-10, which relate to errors that may occur in connection with the charging process. (Oler, 7:49-8:11; Zane, ¶¶67-69.)

Grounds 3-5 rely primarily on Tanaka (**EX1007**). Because Tanaka published in Japanese, this Petition cites to the certified Japanese-to-English translation (**EX1008**). Tanaka describes an AC adapter that provides power to a connected device based on device specifications provided by the device. (Tanaka, Abstract, [0008]-[0010].) The process involves the charger obtaining maximum charging current and maximum charging voltage data from the device battery's storage unit. (*Id.*, [0017]-[0018], [0058].) Ground 3 also cites Potega (**EX1009**), which similarly describes an "intelligent power supply" that "automatically reconfigures its output voltage, within a broad range, to the powered device's correct power requirements." (Potega, 11:54-59.) Ground 4 adds Koenck (**EX1011**) in connection with claims 4, 8, 14 and 21, while Ground 5 adds Stephens (**EX1010**) in connection with claims 9-10.

All references in Grounds 1-5 are prior art under at least §102(b) (pre-AIA) because they published more than one year before the '397 patent's earliest February 2004 priority date.

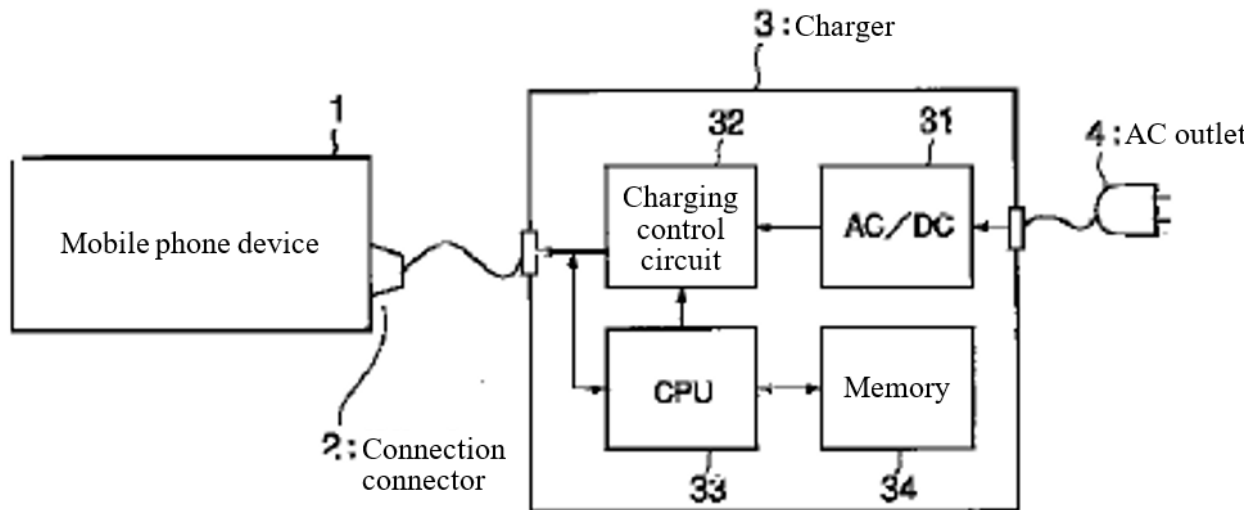
B. Ground 1: Claims 1-7, 11-22 Are Obvious Over Keirinbou and Gaza

1. **Claim 1: “A battery charger for a portable wireless communications device, the portable wireless communications device including a rechargeable battery and a wireless communications transceiver coupled thereto, the portable wireless communications device and rechargeable battery each respectively having a portable device type and a rechargeable battery type associated therewith from among a plurality of different portable device types and different rechargeable battery types having respective charging rates, the battery charger comprising:” (1[p])**

Keirinbou discloses and renders obvious the preamble. (Zane, ¶¶85-96.)

Keirinbou discloses a **“battery charger for a portable wireless communications device, the portable wireless communications device including a rechargeable battery and a wireless communications transceiver coupled thereto.”** (Zane, ¶86.) Keirinbou discloses **“a charger for portable devices, such as mobile phone devices, which use built-in secondary batteries as an operating power source.”**¹ (Keirinbou, [0001].) Figure 1 illustrates the phone (1) and charger (3):

¹ All underlining added to quoted material unless noted.



(Keirinbou, Fig. 1.) Charger 3 includes charging control circuit 32, CPU 33, and memory 34. A POSITA would have understood and found it obvious that the mobile phone would have “**a wireless communications transceiver coupled thereto**” to allow the device to send and receive signals over a wireless network. (Zane, ¶86; EX1012, p.004 (“Transceiver”); EX1017, 2:28-31; EX1016, 3:23-28.) It would also have been understood and obvious for the transceiver in Keirinbou’s phone to be “**coupled**” to the device’s rechargeable battery, as this would have been required for the transceiver to receive operational power. (Zane, ¶87; Keirinbou, [0002].)

Keirinbou discloses “**a plurality of different portable device types and different rechargeable battery types**” as it discloses information about mobile phones and batteries consistent with the examples in the ’397 patent. (Zane, ¶¶88-89; ’397, 1:57-58; 5:39-47.) Keirinbou discloses that “there are various types (models) of mobile phone devices, and the secondary batteries used differ depending

on the model. In other words, the secondary batteries used in mobile phone devices include lithium batteries, nickel-cadmium batteries, nickel-metal hydride batteries, etc., and the capacity thereof varies depending on each mobile phone device.” (Keirinbou, [0002]-[0003].)

Keirinbou further discloses that the “**portable wireless communications device and rechargeable battery each respectively hav[e] a portable device type and a rechargeable battery type associated therewith.**” (Zane, ¶¶90-96.) As explained below, the “**portable device type**” in Keirinbou includes the model or type of portable device; the “**rechargeable battery type**” corresponds to characteristics of the secondary battery including the type of battery and its capacity.

Keirinbou discloses that the battery charger “transmit[s] a command to the portable device” to obtain the “model number of the type from the portable device as a response[.]” (Keirinbou, [0007].) Using this portable device type information, the battery charger also identifies the type of the rechargeable battery. (*Id.*) Keirinbou explains that the charger includes “a memory table that stores the characteristics of a plurality of secondary batteries corresponding to a plurality of types of portable devices,” which is used to control the charging of the secondary battery. (*Id.*)

A POSITA would have understood that the “characteristics” of the rechargeable battery Keirinbou describes define the claimed “**rechargeable battery**

type” because the memory table is used to “recognize[] the type of the secondary battery (any of a lithium battery, nickel-cadmium battery, or nickel-metal hydride battery, etc.) and its capacity (steps S2, S3).” (Keirinbou, [0012]; Zane, ¶¶91-92.) Keirinbou therefore discloses that the portable device and the secondary battery have, respectively, a “**portable device type**” and “**rechargeable battery type**” that are “**from among a plurality of different portable device types and different rechargeable battery types.**”

The claimed “**different rechargeable battery types**” also “hav[e] **respective charging rates.**” As noted above, in pending litigation, Petitioner contends “**charging rate**” means “the current expressed in amperes at which the battery is charged.” PO asserts no construction is necessary. (EX1019.) Keirinbou discloses “**different rechargeable battery types having respective charging rates**” under either position or any other reasonable construction. (Zane, ¶93.) Keirinbou confirms that the “charging control performed by the charging control means in accordance with the characteristics of the secondary battery is further characterized by controlling the charging voltage value, charging current value, and charging time.” (Keirinbou, [0007].) A POSITA would have understood the term “current” (in “charging current value”) refers to the flow of electric charge through a conductor—a property that is measured in amperes. (Zane, ¶93.) Accordingly, Keirinbou’s “charging current value” refers to the current expressed in amperes at

which a battery is charged. (Keirinbou, [0010] (“and charges the battery at a voltage value, current value, and time that match the characteristics of the recognized secondary battery.”), [0011].)

Keirinbou also discloses other information, such as the “charging voltage value” and “charging time” that might also independently satisfy PO’s broader interpretation of “**charging rate**,” as these values define an amount of voltage or current provided over a period of time. (Zane, ¶94.)

Petitioner notes the claim recites “**different rechargeable battery types**” that “**hav[e] respective charging rates**,” which is disclosed by Keirinbou. This is because, Keirinbou discloses recognizing “the built-in secondary battery from the type signal by referring to the memory table, and charges the battery at a voltage value, current value, and time that match the characteristics of the recognized secondary battery[.]” (Keirinbou, [0010].) It therefore would have been obvious that the different secondary battery types in Keirinbou would have had respective charging rates, in accordance with their varying characteristics. (Zane, ¶95.)

The claim language at the end of the preamble recites “**a plurality of different portable device types and different rechargeable battery types having respective charging rates**.” If the phrase “**respective charging rates**” also modifies the claimed “different portable device types,” such a requirement would have been obvious because Keirinbou’s mobile phone receives power from the

charger, which is used to provide current to charge its internal secondary battery. (Keirinbou, [0009], Zane, ¶¶96.) Additionally, the portable device type information the phone provides to the charger is used to determine the charging current value used to charge the device. (*Id.*, [0007], [0009].) It therefore would have been obvious that different mobile phones would have had respective charging rates associated with their device types, in order to support providing charge to the battery through the device. (Zane, ¶¶96.)

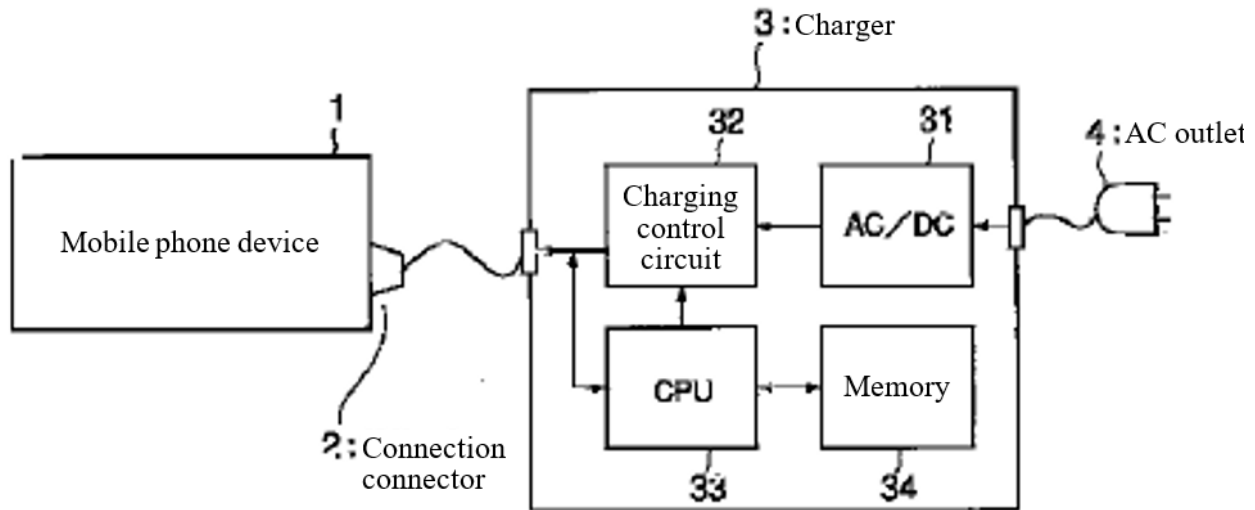
(a) “a charging circuit; and” (1[a])

Claim 1[a] is obvious over Keirinbou. (Zane, ¶¶97-98.) Keirinbou discloses that battery charger 3 includes a “**charging circuit**” in the form of an AC/DC converter 31 (which converts commercial power to direct current) and charging control circuit 32 (which “controls the charging current to charge the secondary battery built into the mobile phone device according to its characteristics”). (Keirinbou, [0009], Fig. 1.)

(b) “a controller coupled to said charging circuit and configured to cause the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type, and to cause said charging circuit to charge the rechargeable battery based on the respective charging rate thereof.” (1[b])

Claim 1[b] is obvious over Keirinbou, alone or in view of Gaza. (Zane, ¶¶99-117.)

Keirinbou discloses “a controller coupled to said charging circuit,” which corresponds to CPU 33:



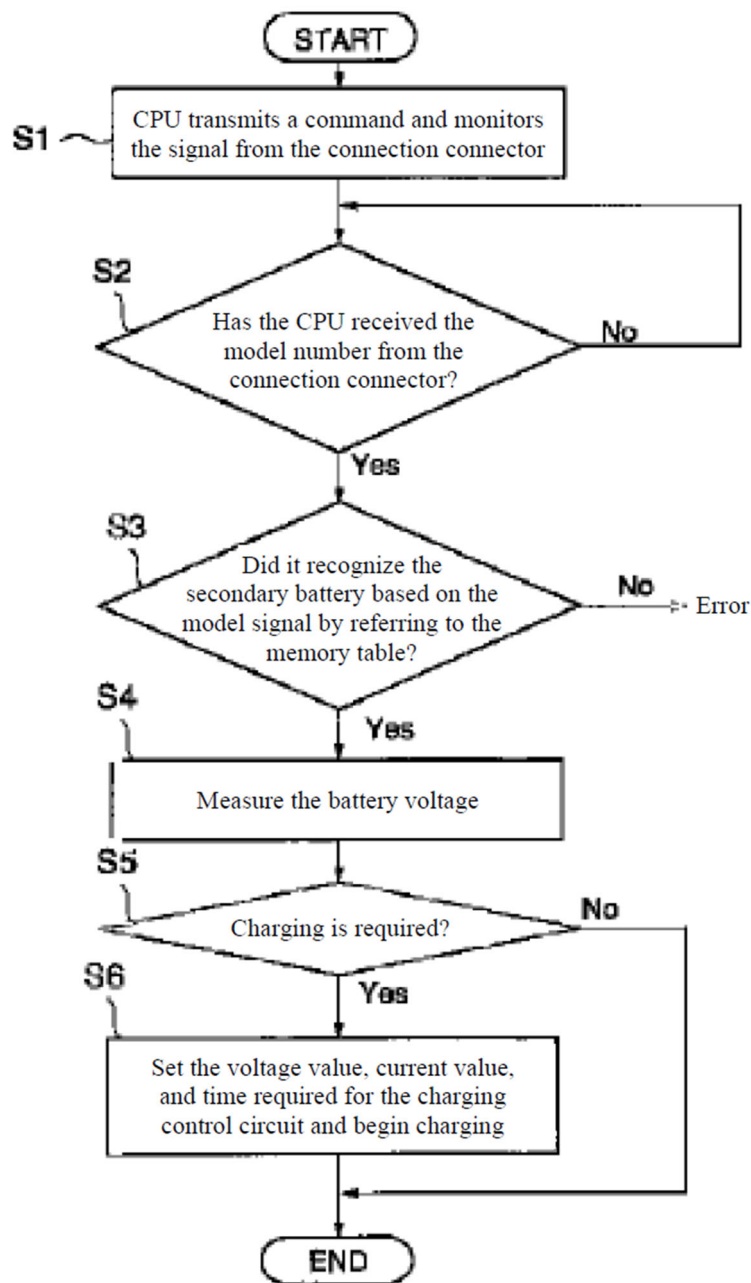
(Keirinbou, Fig. 1; Zane, ¶100.)

CPU 33 “controls the entire charger 3,” and memory 34 “stores a memory table for recognizing the battery built into the mobile phone device from the model number of the mobile phone device.” (Keirinbou, [0009].) CPU 33 (“**controller**”) is “**coupled to said charging circuit**” because it is coupled to charging control circuit 32 and AC/DC 31. (*Id.*, Fig. 1.) A POSITA would have understood the depicted lines in Figure 1 connecting CPU 33 to charging control circuit 32 to indicate that the components are electrically connected. (Zane, ¶101.)

Keirinbou discloses that the controller will “**cause the portable wireless communications device to identify its corresponding portable device type.**” (Zane, ¶102.) CPU 33 transmits a “predetermined command” to the portable device

to cause it to send back its model information. (Keirinbou, [0012]; *see also id.*, [0011]).)

Keirinbou discloses that the controller causes the portable wireless communication device to also identify “**its corresponding rechargeable battery type.**” After CPU 33 receives model information from the portable wireless device, CPU 33 uses that information to identify the type of secondary battery. (Keirinbou, [0012] (CPU 33 “recognizes the type of the built-in secondary battery from this model number...”).) Figure 2 illustrates:



(*Id.*, Fig. 2.) At Step S3, CPU 33 attempts to determine the type of secondary battery based on the model information the portable wireless device provided. (*Id.*, [0010]-[0012].) Keirinbou therefore discloses that CPU 33 (“**controller**”) causes the portable wireless communication device to also identify “**its corresponding**

rechargeable battery type.” (Zane, ¶103.)

Finally, the controller in Keirinbou “**cause[s] said charging circuit to charge the rechargeable battery based on the respective charging rate thereof.**” (Zane, ¶104.) If CPU 33 determines that charging is necessary, it causes the charging control circuit 32 (“**said charging unit**”) to charge the secondary battery based on the optimal charging current value for the battery (“**the respective charging rate thereof**”). (Keirinbou, [0013] (“The CPU 33 measures the current voltage on the battery to determine if charging is necessary. If it is necessary, it sets the optimal voltage value and current value for charging the battery in the charging control circuit 32, sets a necessary and sufficient charging time, and executes the charging until the time elapses (steps S4, S5, S6).”), [0006], [0007].)

The claim requires “**the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type,**” which occurs in Keirinbou when the portable wireless device provides its model number to CPU 33, which is used by CPU 33 to recognize the secondary battery and identify its type. (Keirinbou, [0011]-[0013].) The model information provided by the portable device in Keirinbou satisfies the claim because the model type provided by portable device is directly used by CPU 33 to identify the corresponding secondary battery type. (Zane, ¶105.)

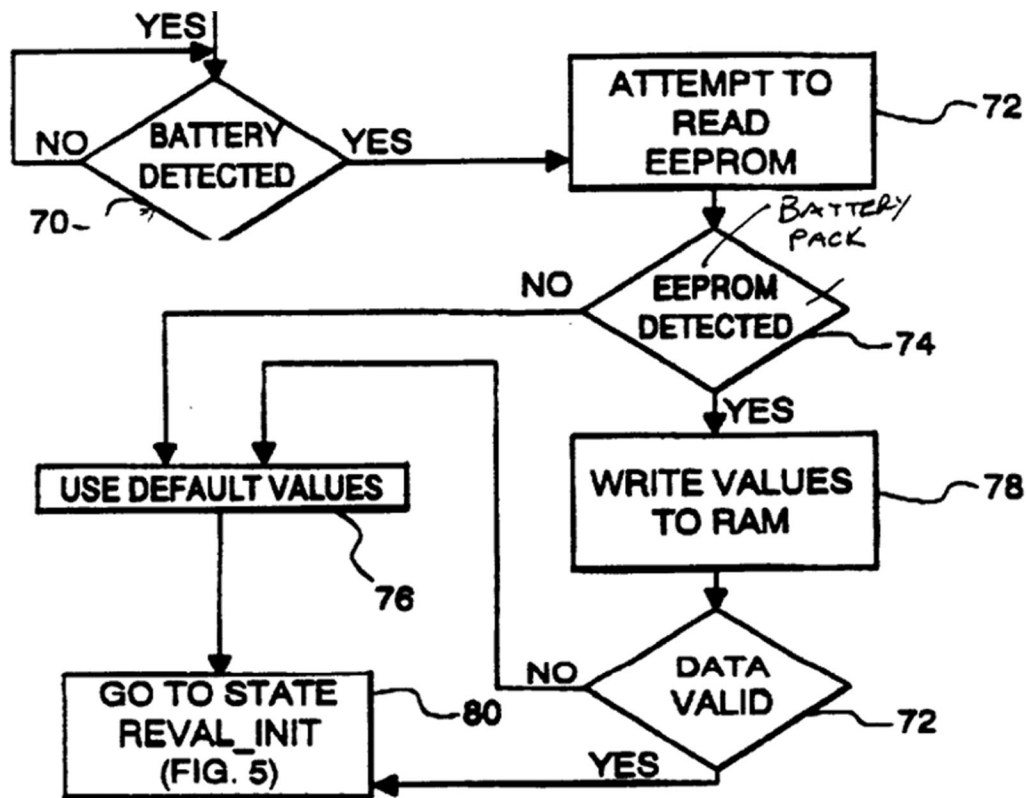
But even if the claim requires that the portable wireless device provide a second or separate piece of information identifying the corresponding rechargeable battery type—that would have been obvious in view of Gaza, which discloses a charging system where battery type information is separately provided by the rechargeable battery itself. (Zane, ¶¶106-111.)

Gaza explains that “[v]arious portable devices and appliances, such as cellular phones, require rechargeable batteries,” which can be of various different types such as nickel cadmium, nickel metal hydride and lithium ion, among others. (Gaza, 1:34-39, 2:44-50.) Gaza describes “smart battery packs,” a well-known term referring to rechargeable battery packs that “normally include a memory storage device which contains information regarding the characteristics of the battery as well as the battery type. Some smart battery packs are known to include a microcontroller which allows communication by way of a bi-directional communication line with the battery charger regarding various battery characteristics.” (*Id.*, 1:51-58.) Gaza further refers to the Smart Battery Specifications, which was a standard published by companies including Intel and Duracell in the 1990s. (*Id.*, 1:58-64.)

Gaza explains that certain types of batteries (such as lithium ion batteries) include “an internal memory storage device, such as an electrically erasable programmable read only memory (EEPROM),” which can “provide various information, including information that the battery is a lithium ion battery.” (Gaza,

3:58-63.) Gaza discloses a technique whereby a battery charger can read the EEPROM of the battery pack, if available, and use that information in charging the rechargeable batteries.

Figure 4 shows a power-up routine for the disclosed battery charger. The relevant bottom half of Figure 4 (below) shows a flowchart of part of the idle-initiate state (IDLE_INIT STATE) (Gaza, 8:13-52), including attempting to read the battery pack EEPROM (Step 72):



(*Id.*, Fig. 4 (excerpt).)

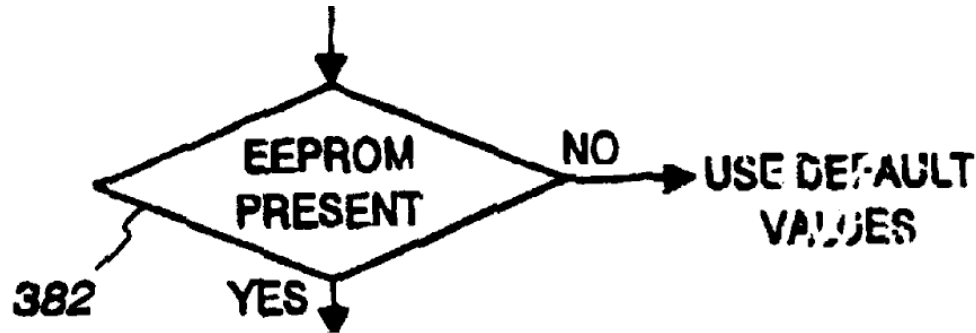
At Step 70, the charger attempts to determine if a battery has been detected. (Gaza, 8:31-34.) If detected, at steps 72 and 74, the system attempts to read the

battery pack EEPROM by initially determining whether the EEPROM is present. (*Id.*, 8:40-43.) If an EEPROM is *not* detected, the system “goes to step 76 and utilizes default values.” (*Id.*, 8:44-45.) If an EEPROM *is* detected, “the constants are written to the on-board RAM on the microcontroller **30** [of the charging system] in step 78.” (*Id.*, 8:45-47.) The process then proceeds to step 79 (labeled as 72 above), in which the data is analyzed “to determine if it is valid, for example, by way of a checksum. If not, the system loops to step 76 and uses default values. If the data is valid, the system goes to the pocket state REVAL_INIT in step 80.” (*Id.*, 8:47-52.) The term “checksum” refers to a well-known set of mathematical techniques (similar in purpose to a “hash”) for checking the integrity of data, which is commonly used to determine whether or not particular data has been corrupted or otherwise altered from the original values.² (Zane, ¶110.)

Figures 12A-12C show a similar process. (Gaza, 14:57-58.) Gaza explains that “the system checks in step 376 [of Figure 12B] whether the system is in the idle state,” and if so, “a reading of the EEPROM of the battery pack is attempted in step 380 [of Figure 12B].” (*Id.*, 16:15-19.) “[I]n step 382, the system checks whether the battery pack EEPROM is present.” (*Id.*, 16:23-24.) As the portion of Figure

² Petitioner focuses on the EEPROM in the battery pack (step 74 of Figure 4). (*See also* Gaza, 9:25-27, 16:20-23.)

12C shown above confirms, if the EEPROM is not found at step 382, the system will use default values:



(Gaza, Fig. 12C (excerpt).) Gaza explains that “the battery pack EEPROM contains various information regarding the battery type and size available to the system over the -COMM and -SIZE terminals... If the battery pack EEPROM is present, the system checks whether the battery is a lithium type battery in step 384.” (*Id.*, 16:20-26.) If the battery is found to be a lithium ion battery, the charger obtains the maximum voltage and charge rate values for the battery. (*Id.*, 16:65-17:5.) Gaza therefore discloses the ability of a device “**to identify... its corresponding rechargeable battery type,**” as claimed, by allowing a wireless mobile device’s battery to provide information about its characteristics, including its type and size. (Zane, ¶111.)

Motivation to Combine: It would have been obvious to combine Keirinbou with Gaza, resulting in Keirinbou’s battery charger further adapted to separately receive battery type information based on Gaza’s teachings. (Zane, ¶112.) Under

the proposed combination, the controller in Keirinbou would be capable of causing the portable wireless device to provide, to the charging circuit, both (1) model information as disclosed in Keirinbou ([0011]), and (2) battery type information under the further combination with Gaza as described above, which would have been provided by the battery installed in the mobile phone device of Keirinbou. Under this combination, the portable device would have “**identif[ied] its corresponding portable device type and its corresponding rechargeable battery type.**” (Zane, ¶112.)

Keirinbou and Gaza are analogous references to the '397 patent, both in the same field of endeavor and reasonably pertinent to problems facing the '397 patent inventors. (Zane, ¶113; '397, 1:20-22.)

A POSITA would have had ample motivations to combine. (Zane, ¶¶114-117.) Keirinbou discloses the ability of the battery charger to recognize the type of secondary battery based on the portable device model number, by using a memory table stored in the charger. (Keirinbou, [0011]-[0013].) It was well-known (and observed in Gaza) that lithium ion rechargeable batteries have different requirements (e.g., requiring both constant current and constant charge) when compared to older battery technologies such as nickel cadmium (NiCd) and nickel metal hydride (NiMH). (Gaza, 3:44-50.) Adding Gaza would have provided a clear benefit by allowing the Keirinbou charger to have the most accurate and up-to-date information

about the type and characteristics of the rechargeable battery installed in the device. This would have enhanced Keirinbou's goal of "provid[ing] a charger for portable devices that can be used with different models of portable devices by equipping the charger with a means for recognizing the secondary battery being used." (Keirinbou, [0005]; Zane, ¶114.)

A POSITA would also have been motivated to send the model information as disclosed in Keirinbou, even if the battery provides its own battery type information based on Gaza. (Zane, ¶115.) Gaza acknowledges scenarios in which the charger must revert to default values because the information obtained from the battery is invalid. (Gaza, 8:42-50, Fig. 4 (Steps 74, 78, 79, and 76), 11:9-12, Fig. 12-C (Step 382).) Sending the model information as disclosed in Keirinbou would have enabled the charger to fall back to a set of baseline default values in the event the information provided by the battery itself was untrustworthy or unavailable.

A POSITA would have had a reasonable expectation of success in making the proposed combination, as it relies on battery charging and detection technologies that were widely used by the late 1990s. (Zane, ¶117.)

2. **Claim 2: “The battery charger of claim 1 wherein different portable device types have at least one different portable device charging parameter; wherein different battery types have at least one different battery charging parameter; and wherein said controller is configured to select at least one actual charging parameter to charge the rechargeable battery based upon a comparison of the at least one different portable device charging parameter and at least one different battery charging parameter.”**

As discussed for claim 1[b], Keirinbou discloses that different portable devices have a portable device type and different rechargeable batteries have a battery type. Keirinbou discloses a battery charger “**wherein different portable device types have at least one different portable device charging parameter,**” as claimed. (Zane, ¶119.) Keirinbou discloses portable device charging parameters that are based on the portable device model number. These device charging parameters include, for example, a voltage value, current value, and a charging time. (See Keirinbou, *e.g.*, [0010].)

It would also have been obvious, based on Keirinbou’s disclosures, that “**different battery types have at least one different battery charging parameter,**” as claimed. (Zane, ¶120.) For example, different types of batteries have different capacities. (Keirinbou, *e.g.*, [0003], [0012].)

Gaza also discloses and renders obvious that “**different battery types have at least one different battery charging parameter.**” (Zane, ¶121.) Gaza discloses that different battery types (such as lithium ion vs. nickel-based batteries) have

different charging requirements. (Gaza, 2:44-50.) Gaza discloses different battery charging parameters and charging methodologies for lithium ion (Figure 13) and nickel-based (Figure 9) rechargeable batteries, in order to account for their differences. (*Id.*, Fig. 5 (Step 102, 104, 106), 9:19-32.) For rapid charging of lithium ion batteries, Gaza discloses obtaining “the maximum voltage for the lithium battery” and “the charge rate N_RAPID_INIT,” which are used to set the current for the charging. (*Id.*, 16:62-17:5, Fig. 13A (Steps 416, 418, 420).) For rapid charging of nickel-based batteries, different parameters and steps are required because nickel-based batteries are more prone to generate unwanted heat during the charging process than lithium ion batteries. (Zane, ¶121.) Gaza discloses obtaining ΔT timer values that are used to determine when to transition the charger from rapid charging to trickle mode charging. (Gaza, *e.g.*, 11:48-52, 12:36-39.) Gaza also discloses obtaining “the maximum allowable voltage VMAX” and “the maximum charging current IMAX” for charging the battery. (*Id.*, 11:61-67.) Gaza discloses many other examples of different battery charging parameters based on battery type.

The proposed combination also discloses and renders obvious that “**said controller is configured to select at least one actual charging parameter to charge the rechargeable battery based upon a comparison of the at least one different portable device charging parameter and at least one different battery charging parameter.**” (Zane, ¶122.) The written description of the ’397 patent

does not detail how the claimed “**comparison**” is carried out, but in one embodiment, the patent explains that this step is carried out by selecting an actual charging parameter based on a “limiting” portable device parameter or battery charging parameter. (’397, 8:51-58.) The term “limiting parameter” in this context generally refers to a value defining a constraint or limit within which the charging process should operate for safe and/or effective charging of the battery. (Zane, ¶122.)

The proposed combination discloses numerous examples of the claimed “**at least one actual charging parameter to charge the rechargeable battery.**” (Zane, ¶123.) Keirinbou discloses that the charging system, after recognizing the secondary battery, “charges the battery at a voltage value, current value, and time that match the characteristics of the recognized secondary battery[.]” (Keirinbou, [0010].) The controller sets the “optimal voltage and current value for charging the battery in the charging control circuit 32” and “sets a necessary and sufficient charging time, and executes the charging until the time elapses (steps S4, S5, S6)”. (*Id.*, [0013].) Any of these parameters (*e.g.* voltage, current, time) qualifies as an “**actual charging parameter,**” and in each case, the selection of each of these parameters is performed because at that time they were determined to be the limiting parameters and were then regulated to ensure optimal charging of the secondary battery.

Gaza further discloses examples of **“at least one charging parameter to charge the rechargeable battery,”** including the maximum voltage and charge rate (for lithium ion batteries), and the ΔT timer values (for nickel-based batteries), as described above. (Zane, ¶124.) These actual charging parameters are also selected **“based upon a comparison of the at least one different portable device charging parameter and at least one different battery charging parameter,”** because under the proposed combination they were selected as limiting parameters to ensure proper charging of the battery. (*Id.*) For example, the ΔT timer values, VMAX, and IMAX values selected for nickel-based batteries as limiting parameters are designed to ensure effective charging for that type of battery. Under the proposed combination, the controller in Keirinbou would have selected these limiting parameters from Gaza for use in charging the secondary battery as they are more optimal than the default values provided based on the model information. (*Id.*)

Under the proposed combination of Keirinbou and Gaza, a further **“comparison”** takes place to determine whether to select an actual charging parameter based on battery information derived from the model information as disclosed in Keirinbou, or from the battery itself under the further combination as disclosed in Gaza. (Zane, ¶125.) As fully explained for claim 1, the charger under the proposed combination would have checked (*e.g.*, using a checksum) the data obtained from the battery to make sure it is valid, and if not, would have used default

values. This provides another example of selecting an actual charging parameter based upon a comparison of the at least one different portable device charging parameter and at least one different battery charging parameter.

3. **Claim 3: “The battery charger of claim 2 wherein said controller is configured to select the at least one actual charging parameter based upon a limiting one of the at least one different portable device charging parameter and the at least one different battery charging parameter.”**

As explained for claim 2, the selection of an actual charging parameter is based on limiting one of the different portable device and battery charging parameter. (Zane, ¶¶122-125, 127.)

4. **Claim 4: “The battery charger of claim 2 wherein said controller is configured to further cause the portable wireless communications device to identify a battery charge level; and wherein said controller is configured to further select the at least one actual charging parameter based upon the battery charge level.”**

Keirinbou’s “**controller**,” which includes CPU 33, identifies the “**charge level**” and then selects a charging parameter (*e.g.*, voltage, current, time) based on that level. (Keirinbou, [0013].) It would have also been obvious to have the voltage measured by the portable device and communicated to the controller. (Zane, ¶129.) The mobile device already has smart circuitry such as a microcontroller to read its memory and communicate with the controller, and the addition of a voltage measurement would be simple and well known in the art, *e.g.*, by the same microcontroller that may be used to communicate with the controller. This would

also provide a more reliable measurement with less noise sensitivity by measuring at the battery within the mobile device. Keirinbou therefore discloses that the portable device “**identif[ies] a battery charge level**” by providing its current battery voltage which is measured by CPU 33. (*Id.*)

CPU 33 then “**further select[s] the at least one actual charging parameter based upon the battery charge level,**” for example, by setting the voltage value, current value, or charging time in response to determining that charging is necessary based on the charge level. (Keirinbou, [0013]; Zane, ¶130.)

5. Claim 5: “The battery charger of claim 2 wherein said controller is configured to enter a learning mode for learning the at least one different portable device or battery charging parameter upon receiving a learning mode signal therefrom.”

Keirinbou and Gaza both disclose and render obvious this claim. (Zane, ¶¶131-135.)

Turning first to Keirinbou, the battery charger enters a “**learning mode**” after it sends a specific command to the portable device to request its model information. (Keirinbou, [0011]-[0012]; Zane, ¶¶102-103, 132.) Keirinbou explains that “[w]hen the AC outlet 4 of the charger 2 is plugged into a commercial power source, the CPU 33 sends out a predetermined command to the connection connector 2 and monitors a signal from the connection connector 2 (step S1).” (*Id.*, [0012].) That signal identifies the model information of the portable device. Keirinbou explains that

“[w]hen the connection connector 2 is connected to the mobile phone device 1, the mobile phone device 1 sends back its model number as described above. Therefore, when the CPU 33 receives this model number, it recognizes the type of the built-in secondary battery from this model number by referring to the memory table 34, and recognizes the type of the secondary battery (any of a lithium battery, nickel-cadmium battery, or nickel-metal hydride battery, etc.) and its capacity (steps S2, S3).” (*Id.*)

The “**learning mode**” in Keirinbou therefore corresponds to the mode in which the controller, after receiving model information from the portable device, enters the mode in which it uses the received model information to determine the portable device and/or battery parameters using the memory table 34. (Zane, ¶133.) And the controller enters this learning mode “**upon receiving a learning mode signal therefrom**,” *i.e.*, upon receiving the signal from CPU 33 indicating the model information of the portable device. (*Id.*; Keirinbou, [0012] (“...CPU 33 sends out a predetermined command to the connection connector 2 and monitors a signal from the connection connector 2 (step S1).”).)

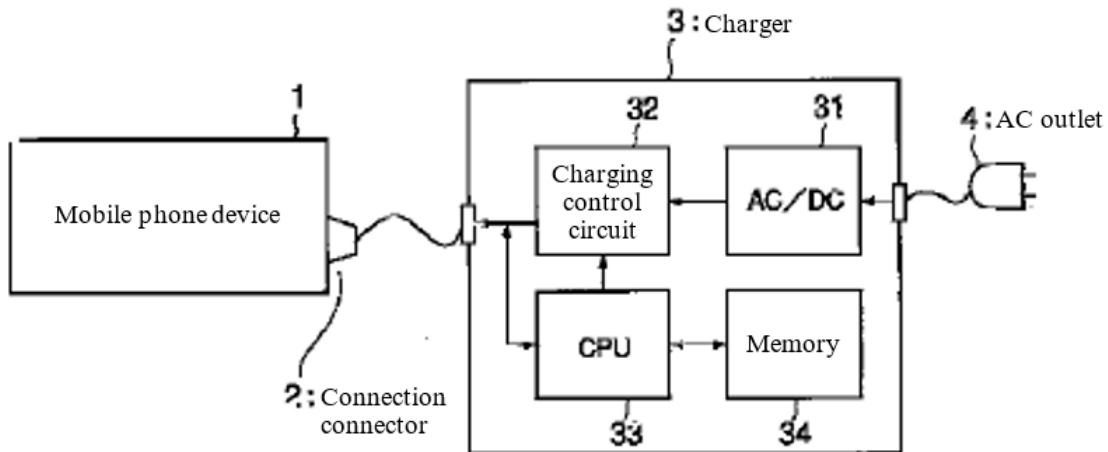
Gaza also separately renders obvious this limitation under the proposed Keirinbou-Gaza combination. Gaza’s charging system attempts to read the battery pack EEPROM by initially determining whether the EEPROM is present. (Gaza, 8:40-43; Zane, ¶¶108-111, 134.) If an EEPROM is *not* detected, the system “goes

to step 76 and utilizes default values.” (Gaza, 8:44-45.) If an EEPROM *is* detected, the constants from the EEPROM “are written to the on-board RAM on the microcontroller **30** [of the charging system] in step 78.” (*Id.*, 8:45-47.) The process then proceeds to step 79 (erroneously labeled as 72 in Figure 4), in which the data is analyzed “to determine if it is valid, for example, by way of a checksum. If not, the system loops to step 76 and uses default values. If the data is valid, the system goes to the pocket state REVAL_INIT in step 80.” (*Id.*, 8:47-52.) These values, as explained previously, include information about the battery such as its type.

The “**learning mode**” under the proposed Keirinbou-Gaza combination therefore includes the mode in which the charger, after determining that a battery EEPROM *is* present, reads the values from the EEPROM and validates that data in order to obtain portable device or battery parameters. (Zane, ¶135.) And the charger under the combination enters this learning mode “**upon receiving a learning mode signal therefrom,**” *i.e.*, upon receiving the signal indicating the presence of an EEPROM on the battery pack. It would have been obvious that the charger’s detection of the battery EEPROM would have included the controller receiving a signal indicating the presence of the EEPROM. (*Id.*; Gaza, 8:42-43.)

6. **Claim 6: “The battery charger of claim 2 further comprising at least one memory coupled to said controller and configured to store the at least one different portable device charging parameter and the at least one different battery charging parameter.”**

Keirinbou discloses the claimed memory—memory 34:



(Keirinbou, Fig. 1; Zane, ¶¶137-138.)

Memory 34 (“**at least one memory**”) is coupled to CPU 33 (“**controller**”). Memory 34 is “an EEPROM (electrically erasable programmable read-only memory)” and “configured so that the memory table can be rewritten or added to by connecting a personal computer to the connection connector 2”. (Keirinbou, [0014].)

Memory 34 is “**configured to store the at least one different portable device charging parameter and the at least one different battery charging parameter,**” because, as explained for claim 2, memory 34 is configured to store

the voltage value, current value, time, and battery capacity. (See Keirinbou, *e.g.*, [0010], [0012], [0003]; Zane, ¶139.)

This limitation is also obvious in view of the combination of Keirinbou and Gaza, the latter further disclosing an EEPROM memory on the battery pack that stores battery charging parameters. (Gaza, 3:57-63; Zane, ¶140.) This EEPROM memory is “**coupled to said controller**” because the controller can obtain information by reading the EEPROM. (Gaza, 8:40-42 (“the system attempts to read the EEPROM 32 in step 72”).) The battery pack EEPROM stores information about the battery type and size. (*Id.*, 16:20-21 (“the battery pack EEPROM contains various information regarding the battery type and size”), 3:60-63.)

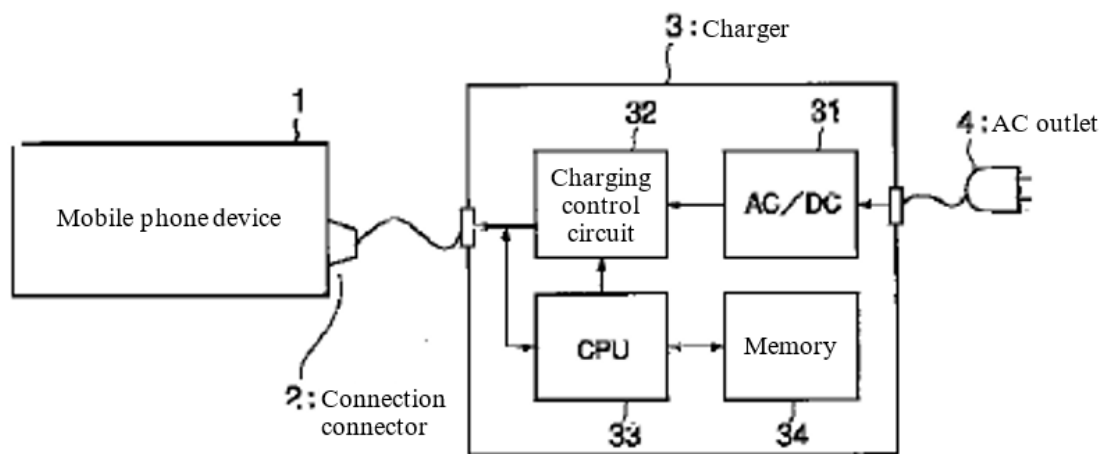
7. Claim 7: “The battery charger of claim 2 wherein the at least one actual charging parameter comprises at least one of a voltage parameter, and a charging time.”

As discussed for claims 1 and 2, Keirinbou discloses the “**at least one actual charging parameter comprises at least one of a voltage parameter, and a charging time.**” (Zane, ¶142.) Keirinbou discloses selecting “charging parameters” for the device and secondary battery based on an analysis of the device model number. (*Id.*, *e.g.*, ¶119.) The charging parameters include a voltage parameter and a charging time. (Keirinbou, [0011] (“...charge the battery with a voltage value, current value, and charge time (any one or two controls are also possible) that match the battery.”); *see also id.*, [0007] (“The charging control performed by the charging

control means in accordance with the characteristics of the secondary battery is further characterized by controlling the charging voltage value, charging current value, and charging time”), [0010] (“The charger for portable devices...charges the battery at a voltage value, current value, and time that match the characteristics of the recognized secondary battery”), [0013] (“The CPU 33 measures the current voltage on the battery to determine if charging is necessary. If it is necessary, it sets the optimal voltage value and current value for charging the battery in the charging control circuit 32, sets a necessary and sufficient charging time, and executes the charging until the time elapses (steps S4, S5, S6)’”).)

8. Claim 11: “A battery charging system comprising:” (11[p])

Keirinbou discloses the preamble. (Zane, ¶145.) As explained for claim 1, Keirinbou discloses a battery charging system that includes a battery charger and mobile device. Figure 1 illustrates:



(Keirinbou, Fig. 1, [0009].)

- (a) **“a portable wireless communications device including a rechargeable battery and a wireless communications transceiver coupled thereto, said portable wireless communications device and rechargeable battery each respectively having a portable device type and a rechargeable battery type associated therewith from among a plurality of different portable device types and different rechargeable battery types having respective charging rates; and” (11[a])**

Claim 11[a] is identical to claim 1[p], and therefore Keirinbou discloses or renders it obvious for the same reasons. (Zane, ¶146.) The components of claim 11[a] would have been part of the battery charging system. (*Id.*)

- (b) **“a battery charger comprising” (11[b])**

Keirinbou discloses **“a battery charger.”** (Zane, ¶147.) Keirinbou describes **“a charger for portable devices, more specifically to a charger for portable devices, such as mobile phone devices, which use built-in secondary batteries as an operating power source.”** (Keirinbou, [0001]; *see also id.*, [0002].)

- (c) **“a charging circuit, and” (11[c])**

Claim 11[c] is identical to claim 1[a], and therefore Keirinbou discloses or renders it obvious for the same reasons. (Zane, ¶148.)

- (d) **“a controller coupled to said charging circuit and configured to cause said portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type, and to cause said charging circuit to charge the rechargeable battery based on the respective charging rate thereof.” (Claim 11[d])**

Claim 11[d] is identical to claim 1[b], and is therefore disclosed or rendered obvious by Keirinbou, alone or with Gaza, for the same reasons. (*Id.*, ¶149.)

9. Claims 12-17

Dependent claims 12-17 are substantially identical to claims 2-7, respectively, except that they depend directly or indirectly from claim 11 instead of claim 1. For the reasons stated above, these claims are obvious over the prior art. (Zane, ¶150.)

- 10. Claim 18: “A battery charging method for a rechargeable battery carried by a portable wireless communications device, the portable wireless communications device and rechargeable battery each respectively having a portable device type and a rechargeable battery type associated therewith from among a plurality of different portable device types and different battery types having respective charging rates, the method comprising:” (18[p])**

Claim 18[p] is substantially identical to claim 1[p] except in method claim form, and is therefore disclosed or obvious for the same reasons. (Zane, ¶152.)

- (a) **“coupling a charging circuit to the portable wireless communications device to cause the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type, and causing the charging circuit to charge the rechargeable battery based on the respective charging rate thereof.” (18[a])**

Claim 18[a] is substantially similar to claims 1[a] and 1[b] except for the distinction that claim 18 is a method claim and further discloses **“coupling a charging circuit to the portable wireless communications device.”** This is a distinction without patentable significance, as Figure 1 of Keirinbou shows the charging control circuit 32 (**“a charging circuit”**) coupled to the mobile phone device 1 (**“the portable wireless communications device”**) through connector 2. (Keirinbou, Fig. 1; Zane, ¶153.) Keirinbou further discloses that if the controller determines that charging is necessary, “it sets the optimal voltage value and current value for charging the battery in the charging control circuit 32, sets a necessary and sufficient charging time, and executes the charging until the time elapses (steps S4, S5, S6).” (Keirinbou, [0013].) It therefore would have been obvious and apparent that Keirinbou’s charging circuit was coupled to the portable communications device, as this would have been necessary in order to allow charging of the secondary battery in the mobile phone. (Zane, ¶153.) For all of the other reasons explained under claim 1, claim 18 is disclosed or rendered obvious by the prior art. (*Id.*)

11. Claims 19-22

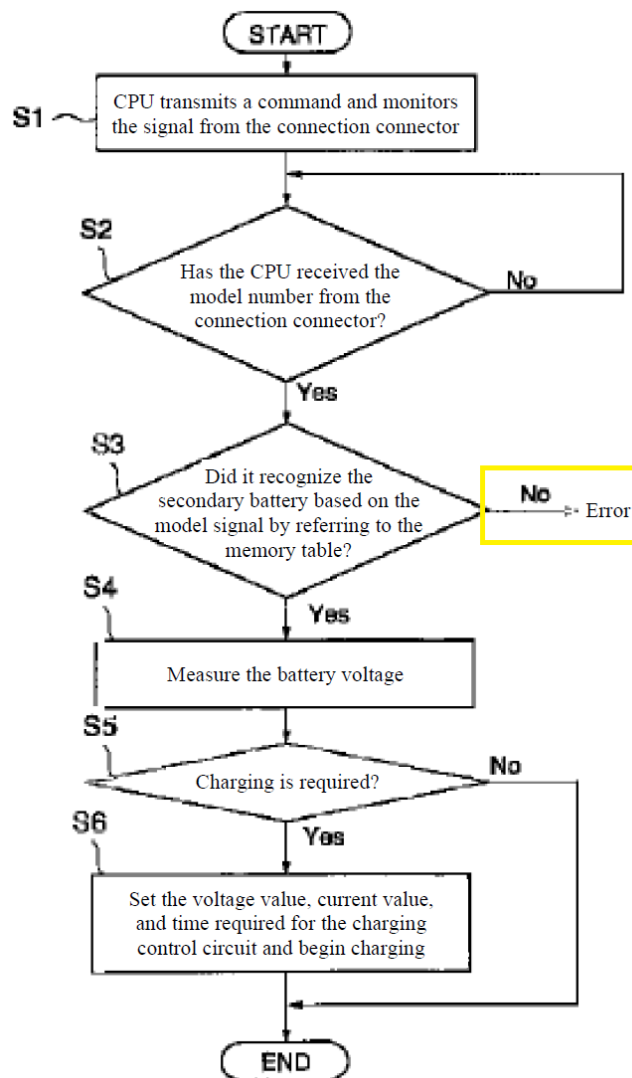
Claims 19-22 are substantially identical to claims 2-4 and 7, respectively, but depend directly or indirectly from independent claim 18 instead of claim 1. For the reasons explained above, these claims are obvious over the prior art. (Zane, ¶154.)

C. Ground 2: Claims 8-10 Are Obvious Over Keirinbou in view of Gaza and Oler

- 1. Claim 8: “The battery charger of claim 1 wherein said controller is configured to further provide an error signal to the portable wireless communications device based upon an unknown portable device type or rechargeable battery type.”**

Claim 8 is obvious based on the Ground 1 prior art (Keirinbou and Gaza), in further view of Oler. (Zane, ¶¶155-164.)

Keirinbou discloses that the controller is configured to provide an error signal in the event of an unknown portable device type or rechargeable battery type. (Zane, ¶156.) Step S3 illustrates:



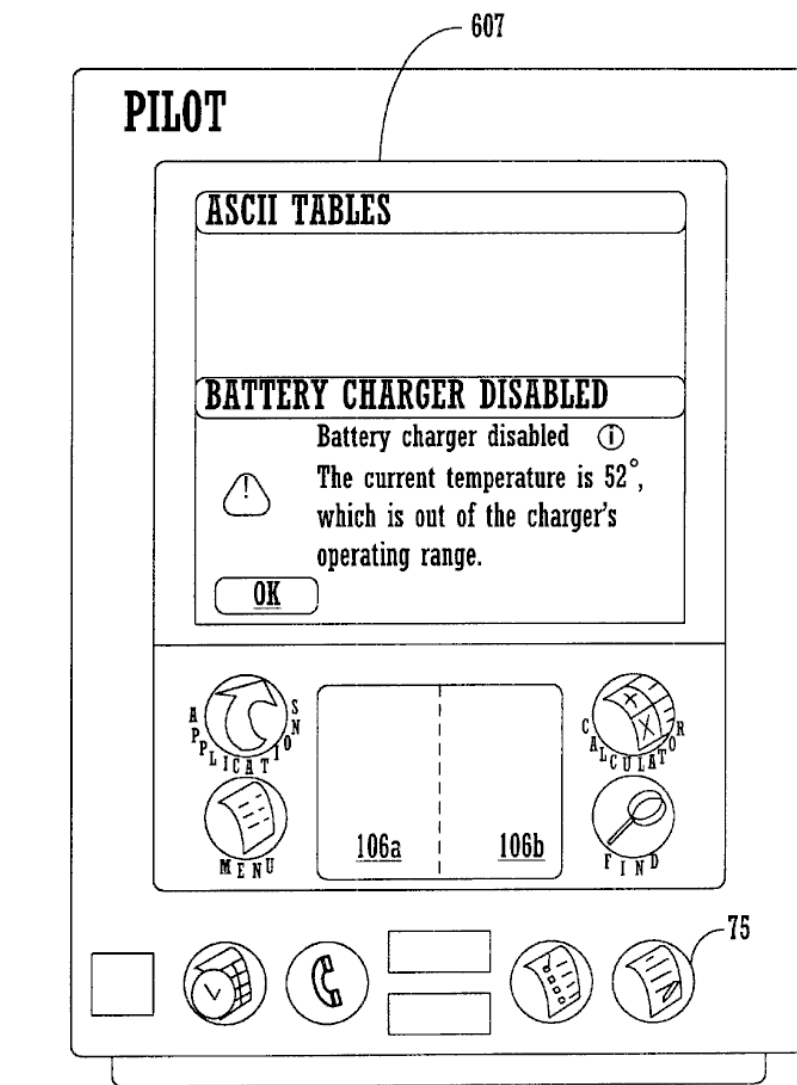
(Keirinbou, Fig. 2.) If the controller (CPU 33) does not recognize the secondary battery based on the model signal provided by the portable wireless device, it signals an error. Keirinbou therefore discloses that “**said controller is configured to further provide an error signal... based upon an unknown portable device type or rechargeable battery type.**” (Zane, ¶156.)

Claim 8 further requires that the error signal be provided “**to the portable wireless communications device.**” It would have been obvious to provide the error

signal in Step S3 to the portable wireless communications device, as explained below, so that the portable wireless device could act upon the error, such as by displaying an appropriate error message. (Zane, ¶¶157-164.)

The requirement that the error signal be provided to the portable wireless communications device would also have been obvious in view of Oler, which describes a technique for extending the battery life of a rechargeable battery “by preventing charging when the battery’s temperature is out of an acceptable range.” (Oler, 1:7-11; Zane, ¶158.) Oler explains that “significant problems occur if a battery is charged outside of a suitable temperature range,” such as reducing the number of charge/discharge cycles and possibly damaging the battery. (Oler, 1:14-23.) Oler purports to address these problems by disclosing a method and system for preventing a battery from charging when its temperature is outside a predetermined range. (*Id.*, *e.g.*, 3:22-27.) Oler explains that the disclosed technique “is well-suited to operating with other electronic devices, for example, cell phones, pagers, web browser, etc.” (*Id.*, 4:8-13, 4:30-32.)

In one embodiment, battery temperature data is collected and checked to see if it falls within an acceptable range. (Oler, Fig. 8 (Steps 805, 808, 810), 7:49-65.) If the temperature falls outside the acceptable range, battery charging is disabled and a message is provided to the display of the device notifying the user of the error. (*Id.*, Fig. 8 (Steps 815, 820), 7:66-8:11.) Figure 6A shows a message:



(*Id.*, Fig. 6A, 6:22-25.) Oler explains that its invention “is well-suited to displaying the warning in a variety of formats, such as a graphical display (e.g. thermometer), alphabetical characters, etc.” (*Id.*, 6:25-28.) Oler therefore discloses providing an error signal to a portable wireless communications device, which in this case, is used by the device to display an appropriate error message to the user. (Zane, ¶159.)

Motivation to Combine: Combining with Oler would have been obvious, resulting in the charging system according to the teachings of Keirinbou and Gaza,

further adapted to provide an error signal to Keirinbou's portable wireless communications device, based upon an unknown portable device type or rechargeable battery type. (Zane, ¶160.) For example, when the controller of Keirinbou determines (Step S3 in Figure 2) that the secondary battery is unrecognized, the error signal would have been provided to the portable wireless communications device under the teachings of Oler. It would have been obvious for the portable device to have presented a warning or error message advising the user that the battery is not being charged because it is unrecognized. (*Id.*)

Oler is an analogous reference to the '397 patent, in the same field of endeavor and reasonably pertinent to various problems facing the '397 patent inventors. (Zane, ¶161; '397, 1:20-22.)

A POSITA would have had a clear motivation to combine to provide the error message of Keirinbou to the device—to allow the portable device to notify the user that the secondary battery was not charging and the reason (*i.e.*, the secondary battery was not recognized), for example by displaying an appropriate error or warning message on the display of the portable device as disclosed in Oler. (Oler, Fig. 6A; Zane, ¶162.) It was well-known that conventional battery chargers (*e.g.*, Gaza) often indicated charging errors by using colored or flashing LEDs. (Gaza, 5:21-24.) LEDs may have signaled to a user that *something* was wrong, but they often left the user guessing as to the precise cause of the problem. By configuring

the controller of Keirinbou to provide the error signal *to the portable wireless communication device*, that device would have been enabled to use its display to present a clear textual message to the user alerting them to the nature of the problem (such as “Battery Unrecognized – Not Charging”). (Zane, ¶¶162-163.) This would have notified the user of the fact that the battery was not charging and the reason why the secondary battery was not being charged.

A POSITA would have understood that the benefit of sending an error signal to the device would have applied to all manner of charging errors. (Zane, ¶163.) For example, a POSITA could have also added an error signal to Keirinbou after step S6 to check for battery temperature and send an additional error signal to the mobile device. Adding an error signal for temperature would further improve the reliability and safety of Keirinbou. (*Id.*)

A POSITA would also have had a reasonable expectation of success. (Zane, ¶164.) As explained for **Ground 1**, the ability for portable wireless communication devices to exchange information with charging devices was well-known. The ability to send an error message to the device would have been a trivial implementation detail. (*Id.*)

2. **Claim 9: “The battery charger of claim 1 wherein said controller is configured to monitor said charging circuit to detect a charging error during charging of the rechargeable battery.”**

Under the proposed combination of Keirinbou and Gaza, in further view of Oler, it would have been obvious to adapt the controller of Keirinbou to “**monitor said charging circuit to detect a charging error during charging of the rechargeable battery.**” (Zane, ¶166.) This limitation is independently disclosed by both Gaza and Oler.

Gaza discloses a technique of monitoring the temperature of nickel-based batteries during rapid charging and, if the temperature exceeds a maximum value, the charger falls back to a trickle charge mode. (Gaza, *e.g.*, 12:38-44 (“[T]he temperature cut-off is determined in step 226 [of Figure 9C]. The system next checks in step 228 to determine if the battery temperature BATT TEMP is greater than the maximum temperature TEMP MAX. If so, the system goes to the trickle charge state NICK_TRICKLE_INIT in step 230.”).) The term “trickle charge” refers to a technique of providing a smaller amount of current to slowly recharge the battery, generating less heat. (Zane, ¶166.) Under the proposed combination of Keirinbou and Gaza, the controller in Keirinbou would have been “**configured to monitor said charging circuit to detect a charging error during charging of the**

rechargeable battery,” *i.e.*, the battery temperature exceeding a maximum value unsuitable for rapid charging of a nickel-based battery. (Zane, ¶166.)

Claim 9 is also separately rendered obvious under the further combination with Oler which discloses a similar feature for monitoring temperature. (Zane, ¶167.) Oler discloses monitoring charging to determine if the battery temperature falls outside a predetermined range, and if so, treats this event as a charging error requiring cessation of further battery charging. (Oler, 7:57-8:5 (“If the temperature is outside of an acceptable range, the process 800 disables the battery charging device 704, in step 815.”).) Under the proposed combination of Keirinbou and Gaza with Oler, it would have been obvious for the controller in Keirinbou to have been **“configured to monitor said charging circuit to detect a charging error during charging of the rechargeable battery,”** *i.e.*, the battery temperature falling outside a predetermined range, to which the controller could have responded by ceasing further battery charging. (Zane, ¶167.)

A POSITA would have been motivated to include both the Gaza and Oler techniques to beneficially safeguard against *more extreme* temperatures that may have made any continued charging dangerous or ineffective, even when using lower energy trickle charging techniques. (Zane, ¶168.) For example, in the event the battery reached a temperature that made even trickle charging inappropriate, under

Oler, all charging could have been stopped until the temperature fell to an acceptable level. (*Id.*)

3. Claim 10: “The battery charger of claim 9 further comprising an indicator connected to said controller and configured to provide an error indication upon detecting the at least one charging error.”

The proposed combination renders this limitation obvious under two separate and independent theories. (Zane, ¶¶170-171.)

First, under the combination of Keirinbou and Gaza, as explained for claim 9, in one example the “**charging error**” in Gaza indicates that the battery temperature exceeds a maximum value. Gaza discloses a plurality of light-emitting diodes (LEDs), of red, yellow, and green colors, to “provide the status of the charging system.” (Gaza, 5:21-25.) “[T]he yellow LEDs are flashed at a 2 Hz rate to indicate that the measured battery temperature, either for the front **24** or rear pocket **26**, is out of the proper temperature operating range.” (*Id.*, 9:48-54.) Gaza therefore renders obvious an “**indicator**” in the form of one or more LEDs that, under the proposed combination, would have been included as part of the Keirinbou charger. A POSITA would have been motivated to provide LED indicators on the charger of Keirinbou to provide a visual indicator of the status of the charging system. Under the proposed combination, it would have been obvious for the battery charger of Keirinbou to comprise LEDs that provide an “**error indication**” that the charging error has

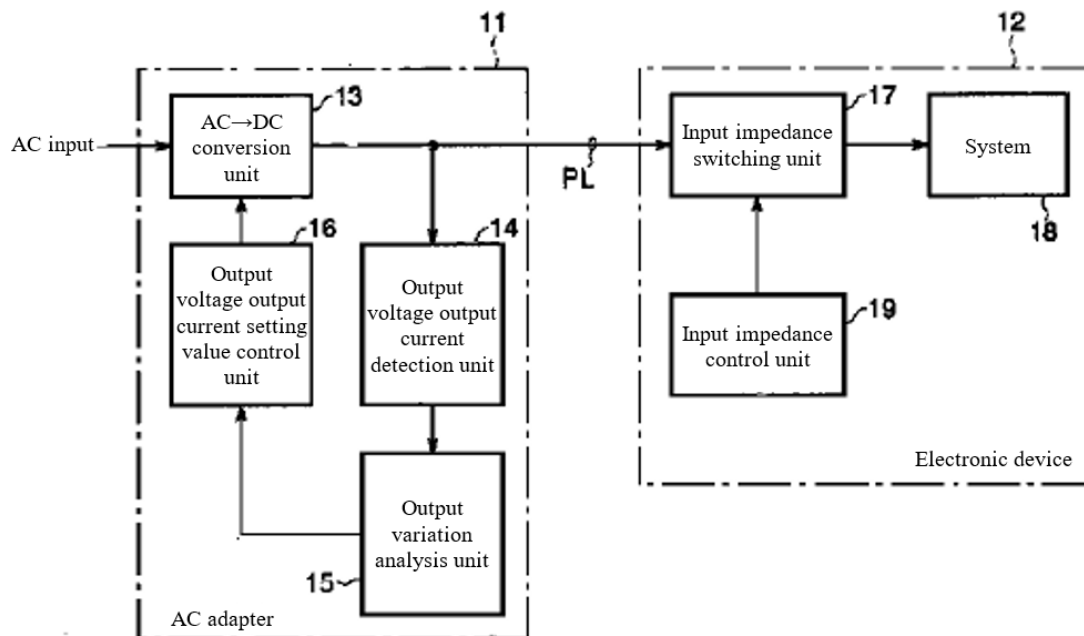
occurred, in this case, that the battery temperature fell outside of the acceptable range. (Zane, ¶170.)

As a second and independent basis, it would have been obvious based on the further combination with Oler to provide an “**error indication**” in the form of a message displayed on the screen of the portable wireless device, as fully explained for claim 8. (Oler, Fig. 6A; Zane, ¶171.) The “**indicator**” takes the form of the display on the portable wireless device, which is “**connected to said controller**” because the controller under the proposed combination would have been capable of transmitting the error signal to the portable wireless device to enable the device to display the error to the user. (Oler, Fig. 6A.)

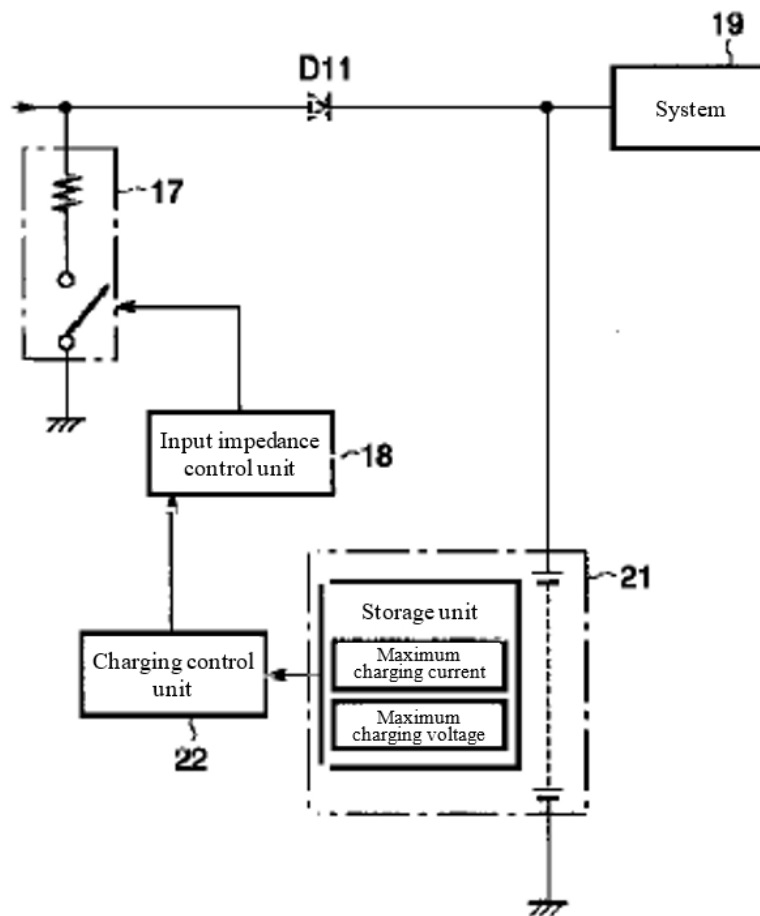
D. Ground 3: Claims 1-3, 5-7, 11-13, 15-20, 22 Are Obvious Over Tanaka and Potega

1. Claim 1 (1[p])

Tanaka discloses “**a battery charger for a portable wireless communications device, the portable wireless communications device including a rechargeable battery and a wireless communications transceiver coupled thereto.**” (Zane, ¶172.) Tanaka discloses an AC adapter power source coupled to “the electronic device main body 12 [] provided with a secondary battery[.]” (Tanaka, [0056].)



(Tanaka, Fig. 1.)



(Tanaka, Fig. 5.) Figure 5 represents the “electronic device main body 12” in Figure 1. (Zane, ¶173.)

A POSITA would have understood that an “electronic device main body” encompasses a wide variety of devices that contain wireless communications transceivers—*e.g.*, “portable personal computer.” (*Id.*; Tanaka, [0002], [0006], [0014].) Portable personal computers at the time (*e.g.*, laptops) included wireless communications transceivers. (Zane, ¶173 (citing EX1013, p.007 (“IEEE 802.11”).) A portable device having a wireless communications transceiver coupled to a rechargeable battery would have been obvious. (*Id.*)

Tanaka further discloses “**the portable wireless communications device and rechargeable battery each respectively having a portable device type and a rechargeable battery type associated therewith from among a plurality of different portable device types and different rechargeable battery types.**”

(Zane, ¶174.) The '397 patent invokes different battery types, such as “Li or Ni-MH[.]” ('397, 1:57-58, 5:39-47.)

It would have been obvious based on Tanaka that different devices would have had different device types and different batteries would have had different battery types. (Zane, ¶175.) For example, Tanaka discloses that conventionally, dedicated AC adapter power supplies were required “for each model and furthermore for each type of built-in secondary battery, and therefore there has existed the problem that a dedicated AC adapter had to be made available for each type of device or each type of secondary battery.” (Tanaka, [0006], [0002].) Tanaka thus discloses “a stable operating power source [] in accordance with the device specifications to multiple types of devices having different power output specifications[.]” (*Id.*, [0011].) Tanaka therefore renders obvious that the portable wireless communications device has a “**portable device type**” associated therewith, “**from among a plurality of different portable device types**,” such as different types and models of portable personal computers. (Zane, ¶175.)

Tanaka also renders obvious that the battery in the portable device has a **“rechargeable battery type associated therewith from among a plurality of ... different rechargeable battery types.”** (Zane, ¶176.) Tanaka discloses “different power input specifications” which would have indicated different types of built-in secondary batteries. (*See also* Tanaka [0043], Fig. 9.)

This limitation would have also been obvious in view of **Potega**. (Zane, ¶¶177-178.) Potega discusses the prevalence of numerous battery types (i.e., battery chemistries) and device types (i.e., phones or laptops and/or their respective models). (Potega, 1:35-39, 19:1-3.) Potega discloses the wide variety of device types. (*Id.*, 1:54-60, 3:24-25; 3:46-48; 13:17-18.) As explained below for claim 1[b], Tanaka and Potega are analogous references to the '397 patent.

Motivation to Combine: A POSITA would have been motivated to combine the teachings of Potega with Tanaka because both references recognize and purport to solve the same problem and discuss the variety of device and battery types in the context of that problem. (Zane, ¶178.) Tanaka recognizes that previously, “dedicated AC adapters having unique standards were required for each model and furthermore for each type of built-in secondary battery.” (Tanaka, [0002].) Potega recognizes that a “dedicated power supply model creates a series of problems.” (Potega, 1:53-54.) Accordingly, this limitation would have been rendered obvious over Tanaka in view of Potega. (Zane, ¶178.)

Tanaka further discloses “**different rechargeable battery types having respective charging rates.**” As discussed, the parties dispute the construction of “charging rate” in the district court litigation. Tanaka discloses this element as understood under either parties’ proposed construction. (Zane, ¶179.) A POSITA would have understood that “different power input specifications” suggests that different device types contain different types of built-in secondary batteries because the input specifications include two current limits—a current limit for preventing an overcurrent and a current limit for charging a secondary battery with a constant current (i.e., the battery charging rate) – and a voltage specification. (Tanaka, [0011], [0043].) Figure 9 depicts four different combinations of device and battery types.

Specification No.	Output voltage [V]	Output current limit value 1 [A]	Output current limit value 2 [A]
Specification 1	15	2.0	1.4
Specification 2	15	2.7	2.0
Specification 3	18	1.7	1.1
Specification 4	18	2.3	1.7

[FIGURE 9]

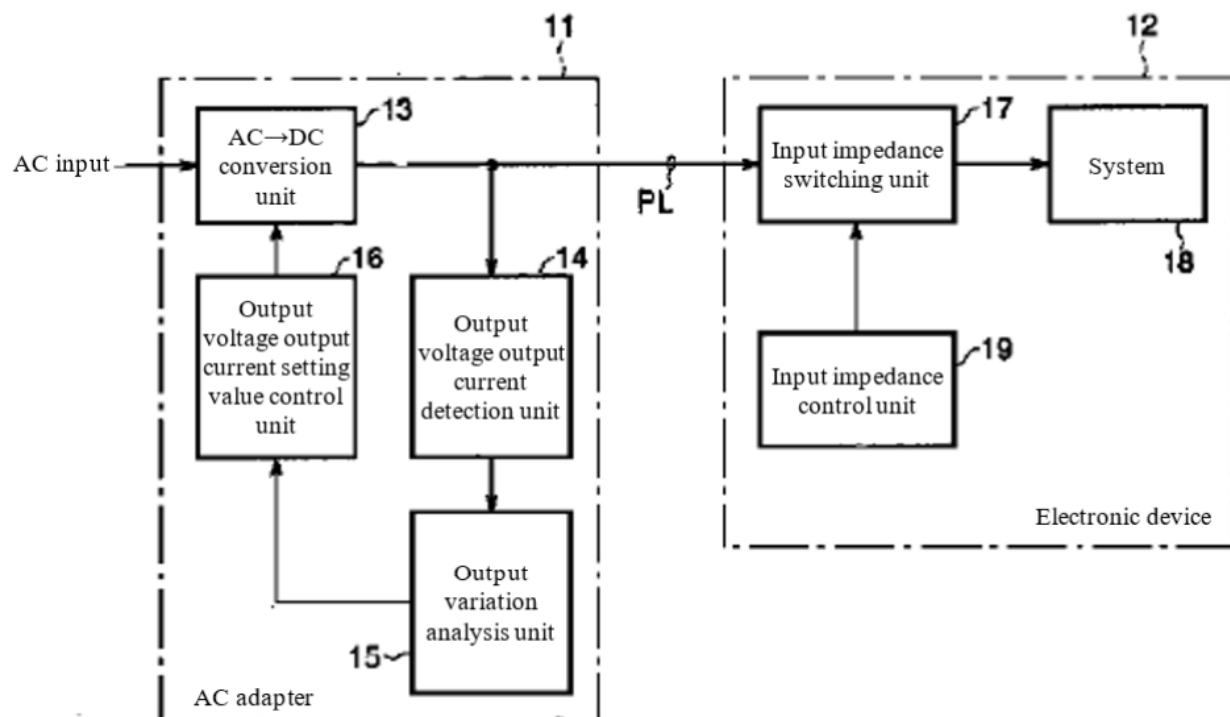
(*Id.*, Fig. 9.) Each specification (i.e., device and battery type) has a corresponding output voltage, output current limit value 1, and output current limit value 2. Thus, Tanaka discloses “**different rechargeable battery types having respective charging rates.**” (Zane, ¶179.)

To the extent the preamble requires different portable device types to have a respective “**charging rate**,” it is disclosed by Tanaka. (Zane, ¶180.) Tanaka discusses that “multiple types of devices hav[e] different power input specifications,” one of which includes current limit value (1) for preventing an overcurrent. (See Tanaka, [0011], [0043].) While Tanaka discloses that current limit value (2) corresponds to the “constant current charging of the secondary battery when the electronic device main body 12 is provided with a secondary battery[,]” it provides no such condition for current limit value (1). (*Id.*, [0043].) Thus, current limit (1) may be used irrespective of the existence of a secondary battery in the device. (Zane, ¶180.) Current limit value (1) must correspond to the device. Accordingly, current limit value (1) for preventing an overcurrent is the “**charging rate**” for a portable device type. (*Id.*)

(a) **Claim 1[a]**

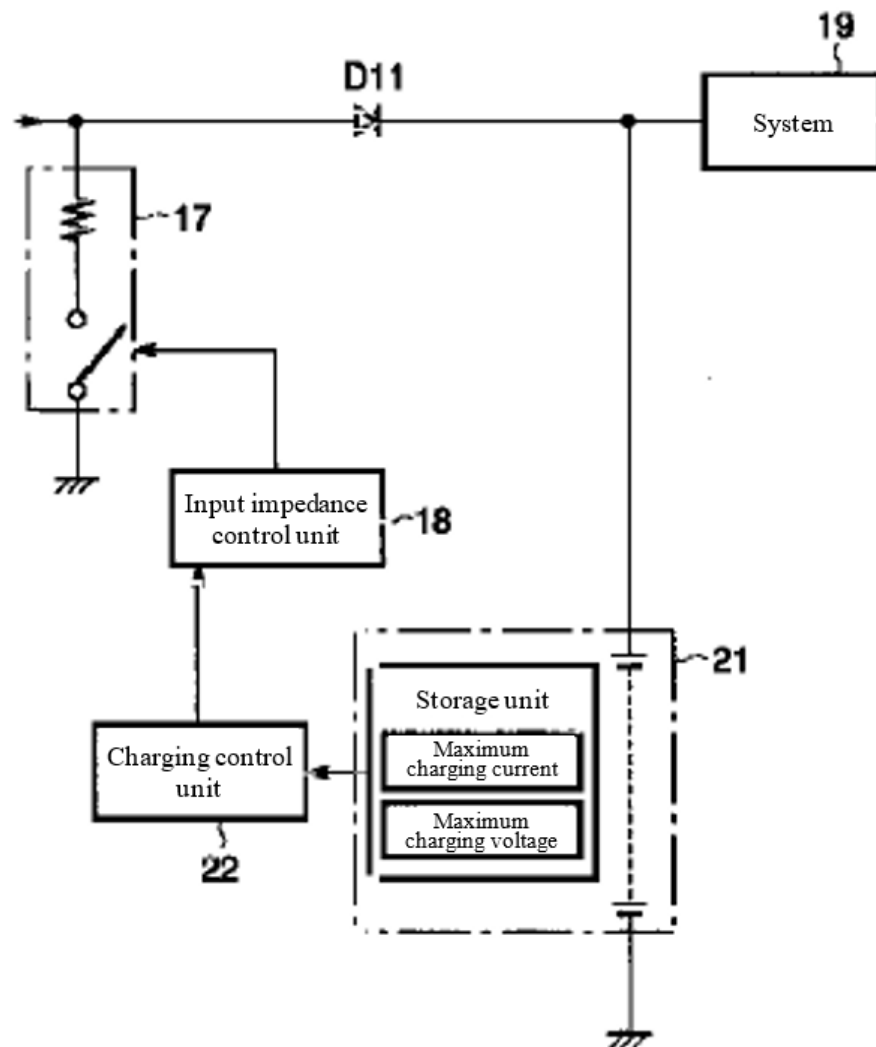
Tanaka discloses “**a charging circuit.**” (Zane, ¶181.) Tanaka discloses an AC adapter containing an “AC→DC conversion unit that converts external

commercial AC power to DC power[.]” (Tanaka, [0017].)



[FIGURE 1]

(*Id.*, Fig. 1.) AC adapter 11 is used to supply DC power to the electronic device main body 12 (*id.*, [0021]) and charge the device’s secondary battery 21, depicted in Figure 5:



(Tanaka, Fig. 5.)

(b) Claim 1[b]

Tanaka's output voltage/output current setting value control unit 16, shown in Figure 1, discloses the claimed **"controller coupled to said charging circuit."**

(Zane, ¶¶182-183.)

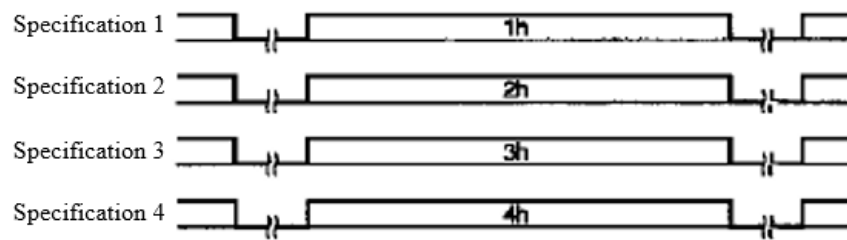
Tanaka explains that output voltage/output current setting value control unit 16 sets the values of the output voltage and output current according to the analysis

and recognition of the specification number by the AC adapter's variation analysis unit 15. (See Tanaka, [0017], Fig. 1.) Figure 1 depicts the AC to DC conversion unit 13 tied to the output voltage/output current setting value control unit 16 with a line connecting the two. Tanaka thus discloses a **“controller coupled to said charging circuit.”** (Zane, ¶183.)

Tanaka discloses a controller **“configured to cause the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type.”** (Zane, ¶184.) The '397 patent refers to placing a logic high signal on differential D+ and D- data lines upon first connecting a device and charger. ('397, 5:56-57, 6:14-22.)

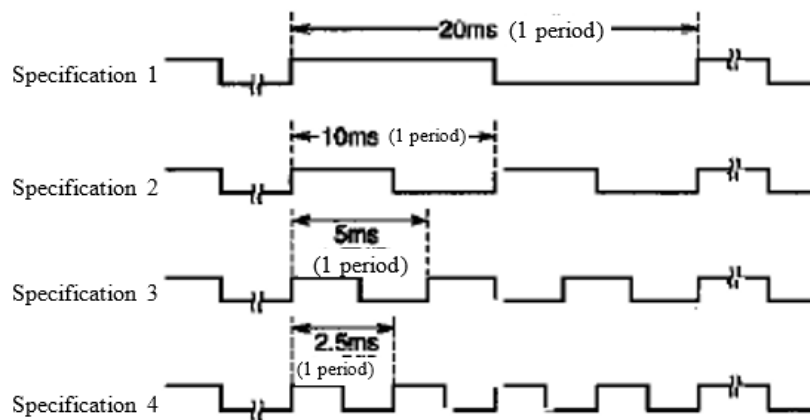
Similarly, Tanaka teaches when an AC adapter is connected to the device, the adapter outputs power in a lower range on the power output line (PL) under a “device specification recognition mode.” (Tanaka, [0020]; Zane, ¶185.) The input impedance of the output power line (PL) is varied through the opening and closing of the input impedance switch on the device and information regarding the specifications of the device and battery are conveyed to the AC adapter. (Tanaka, [0023]; Zane, ¶185.) Figures 10, 11, and 12 depict the transmission of four different specifications (device/battery type) under three types of identification data (digital data / period data / duty data):

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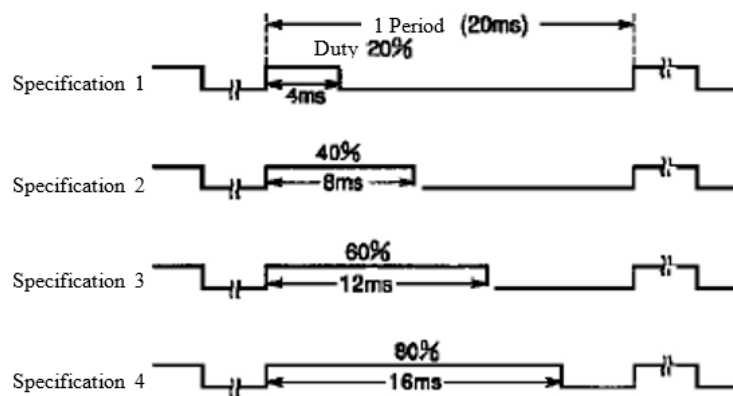
[FIGURE 10]

(Tanaka, Fig. 10.)



[FIGURE 11]

(*Id.*, Fig. 11.)



[FIGURE 12]

(*Id.*, Fig. 12.) Figure 9 summarizes these specifications (device/battery type):

Specification No.	Output voltage [V]	Output current limit value 1 [A]	Output current limit value 2 [A]
Specification 1	15	2.0	1.4
Specification 2	15	2.7	2.0
Specification 3	18	1.7	1.1
Specification 4	18	2.3	1.7

[FIGURE 9]

(*Id.*, Fig. 9.) A POSITA would have understood that this could be applied to any number of device types and battery types under any possible combination of devices and batteries. (Zane, ¶185.) A POSITA would have found it obvious that the output voltage/output current setting value control unit 16 (i.e., the “controller”) would have been responsible for setting the output power in the 5V range as it is the main component that sets the output on the power output line (PL). (*Id.*) Accordingly, Tanaka discloses a controller “**configured to cause the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type.**” (*Id.*) The portable wireless communications device identifies output voltage and current values that correspond to “multiple types of devices having different power input specifications” (Tanaka, [0008], [0011], [0079]), thus providing an identification for both the portable device and rechargeable battery.

To the extent the claim requires the separate transmission of device type and battery type information, it would have been obvious in view of **Potega**. (Zane, ¶186.) Potega recognizes that smart batteries allow a battery device to be able to

provide its “type of battery chemistry” (among other things) to a power supply. (Potega, 58:20-25.) Potega also discloses that a device may have other tools, such as a BIOS, to provide device information such as hardware configuration details. (*See id.*, 66:52-61.) A POSITA would have found it obvious that the hardware configuration in Potega may correspond to the make or model of the device—i.e., a “device type.” (Zane, ¶186.) A POSITA would have found it obvious for a device to provide separate battery and device type identification information. (*Id.*)

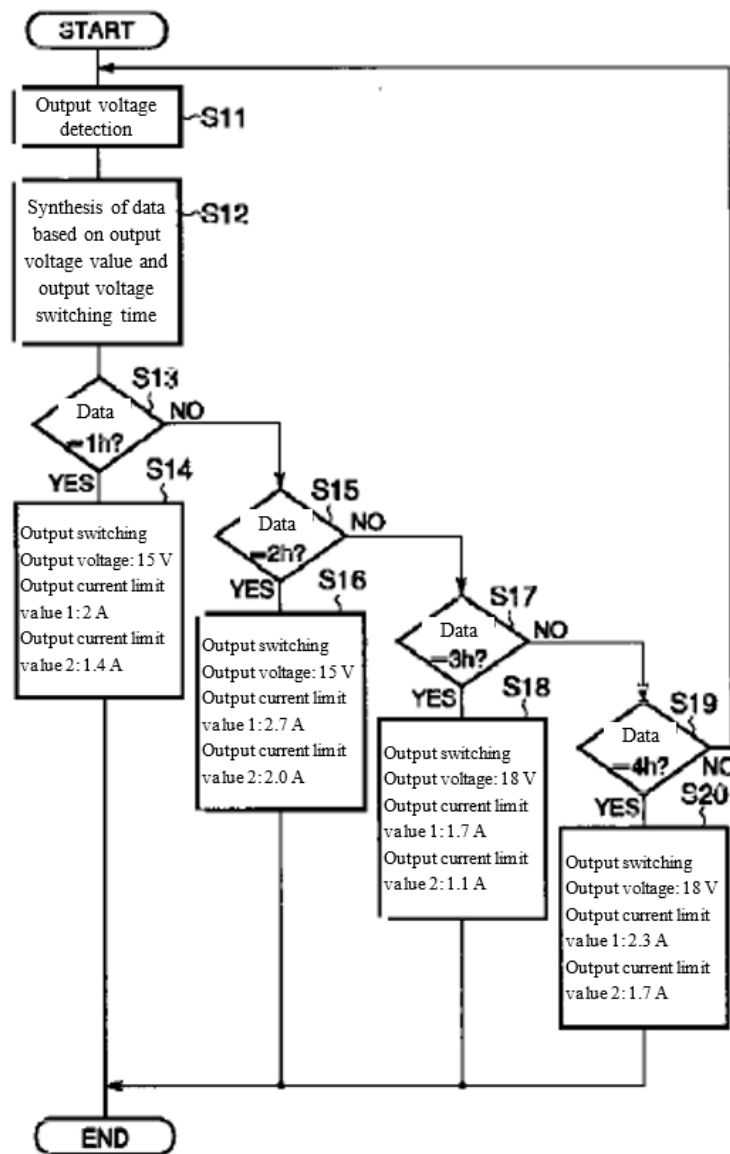
Motivation to Combine: Tanaka and Potega are analogous references to the ’397 patent, in the same field of endeavor and reasonably pertinent to problems facing the ’397 inventors. (Zane, ¶189; ’397, 1:20-22; Tanaka, Abstract, [0006]; Potega, 1:8-13, 11:26-27.)

A POSITA would have been motivated to combine Tanaka with Potega to improve the effectiveness of an “AC adapter capable of realizing an automatic recognition function of device specifications and a matching function of output power source[.]” (Tanaka, [0009]; Zane, ¶187; Potega, 29:47-50; EX1015, 3:60-65.) Independently transmitting and identifying the battery type apart from the device type would have furthered Tanaka’s goal of disclosing an AC adapter capable of providing power to multiple types of devices and batteries in a safe and effective manner. (Zane, ¶187.)

A POSITA would have had a reasonable expectation of success, and implementation of the combination would have been straightforward. (Zane, ¶188; Tanaka, Figs. 5 & 6, [0058].) Accordingly, Tanaka alone or in combination with Potega discloses and renders obvious a controller “**configured to cause the portable wireless communications device to identify its corresponding portable device type and its corresponding rechargeable battery type.**” (Zane, ¶190.)

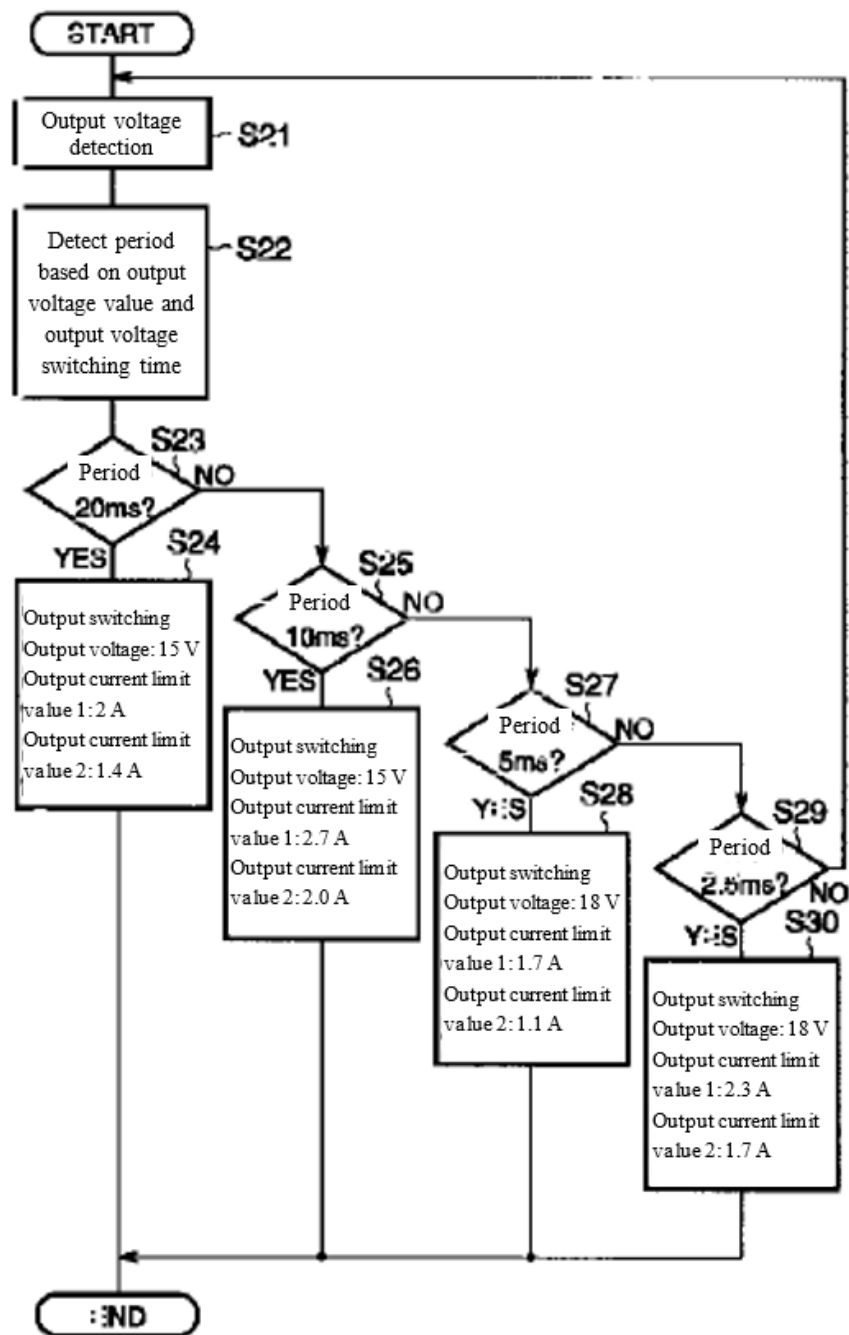
Once the device type and battery type have been identified, the controller “**cause[s] said charging circuit to charge the rechargeable battery based on the respective charging rate thereof.**” The output voltage/output current detection unit 14 detects output impedance variation on the power output line (PL) where the variation analysis unit 15 determines the specification number (the device/battery identification information) which contains the current limit of the device and battery. These current limits correspond to the device and battery “**charging rates**” as understood under both Petitioner’s and Patent Owner’s proposed constructions. (Zane, ¶191.) The output voltage/output current setting value control unit 16 (i.e., the “**controller**”) then sets the values of the output voltage and output current according to the analysis and recognition of the specification number by variation analysis unit 15. The “**controller**” sets the output based on the device charging rates (output current limit 1 – for preventing an overcurrent) and battery charging rates (output current limit 2 – constant current charging of the battery) associated with the

recognized specification (device/battery type). (*Id.*) Figures 6, 7, and 8 (corresponding to Figures 10, 11, and 12 above) illustrate this process:



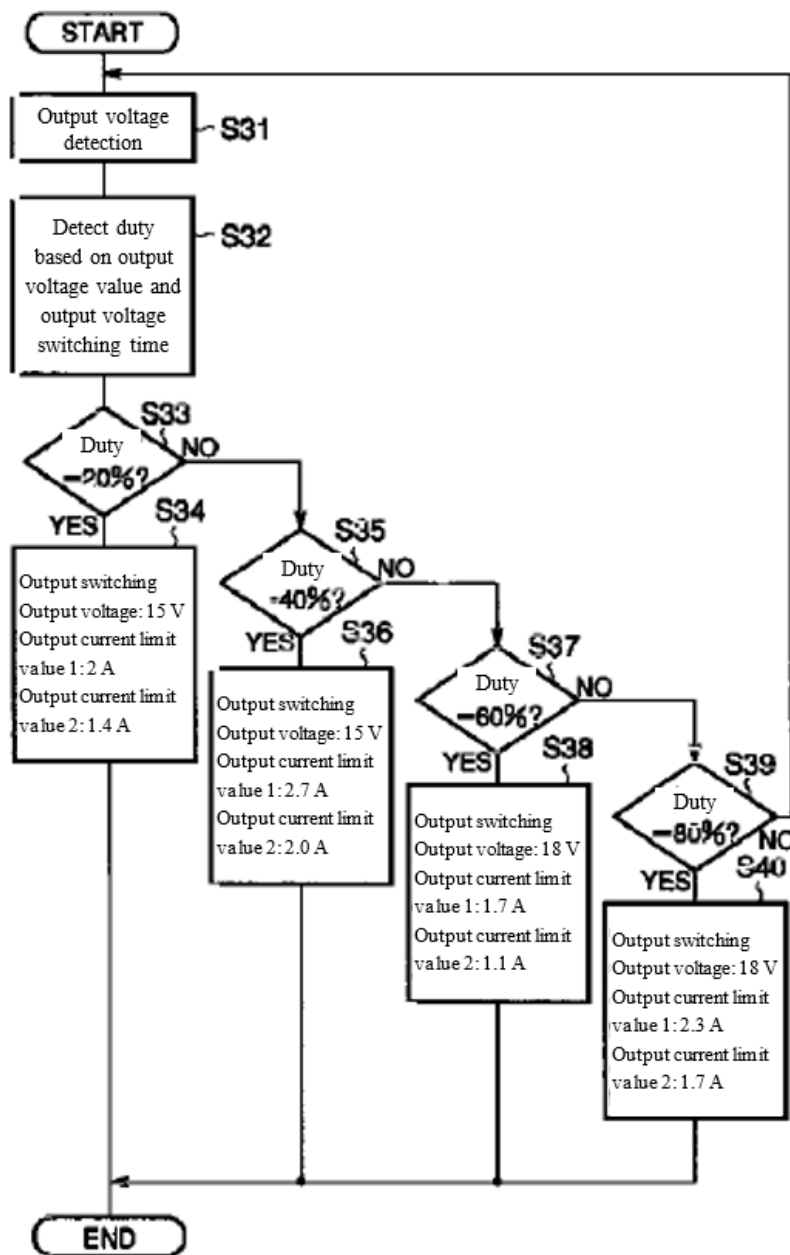
[FIGURE 6]

(Tanaka, Fig. 6.)



[FIGURE 7]

(Tanaka, Fig. 7.)



[FIGURE 8]

(Tanaka, Fig. 8, [0070], [0038], [0042].) Accordingly, Tanaka discloses a controller that causes “said charging circuit to charge the rechargeable battery based on the respective charging rate thereof.” (Zane, ¶192.)

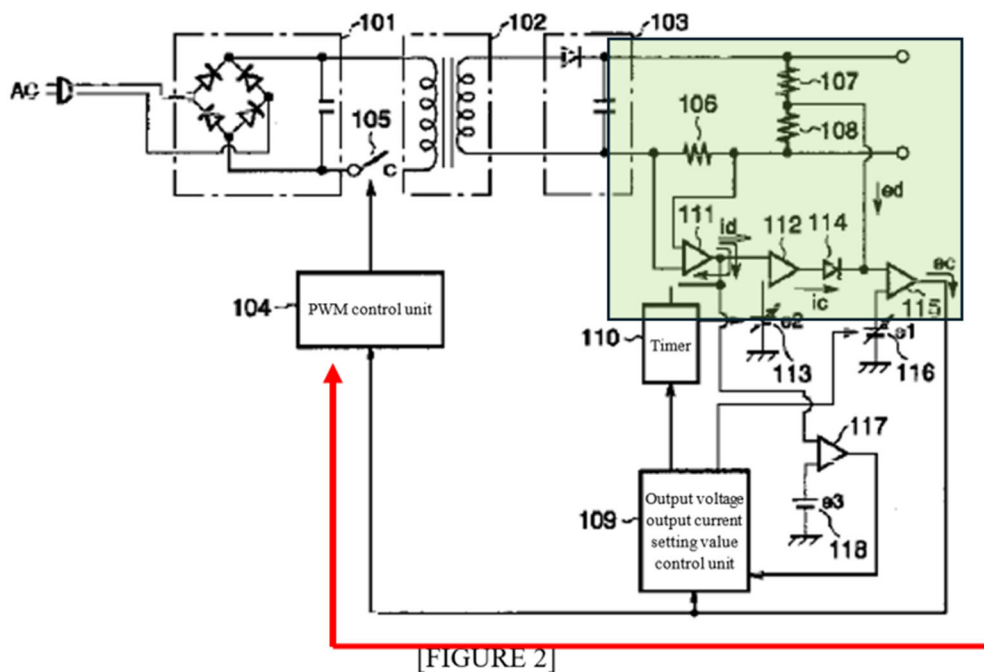
2. Claim 2

Tanaka discloses **“different portable device types have at least one different portable device charging parameter; wherein different battery types have at least one different battery charging parameter.”** (Zane, ¶194.) Tanaka alone or in view of Potega discloses different portable device types and different battery types and each have charging parameters. (*See, e.g.*, Tanaka, Fig. 9, [0058]-[0059] (“maximum charging current and maximum charging voltage data”).) The maximum charging current is comprised of a “current limit value (1) for preventing an overcurrent,” and a “current limit value (2) for constant current charging of the secondary battery” with a constant current. (*Id.*, [0043].) The current limits correspond to the **“device charging parameter”** and the **“battery charging parameter”** respectively. (Zane, ¶194.) Tanaka’s “maximum charging voltage” identifies both a device charging parameter and a battery charging parameter. (Zane, ¶195; ’397, 7:9-20; Tanaka, [0061].)

Tanaka discloses or renders obvious **“and wherein said controller is configured to select at least one actual charging parameter to charge the rechargeable battery based upon a comparison of the at least one different portable device charging parameter and at least one different battery charging parameter.”** (Zane, ¶196.) Tanaka discloses both device and battery charging parameters, for example a maximum charging voltage, an overcurrent limit (as

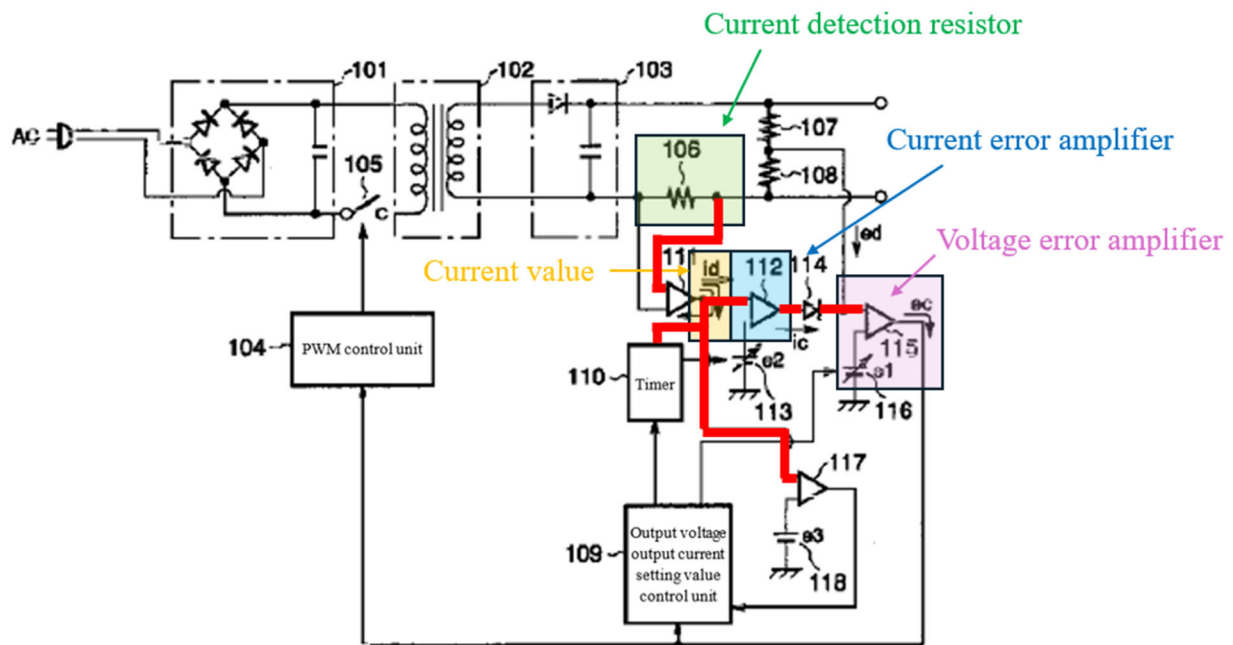
output current limit value 1), and a constant current parameter for charging the battery (as output current limit value 2). These parameters are then communicated to the charger and its controller circuitry.

As the AC adapter begins to output power on the power output line (PL), “the output voltage and output current are detected by voltage dividing resistors 107 and 108, a current detection resistor 106, a voltage error amplifier 115, a current error amplifier 112, etc., included in the output voltage/output current detection unit 14 shown in Figure 1, and the detected values are sent (fed back) to the PWM control unit 104.” (Tanaka, [0030]; Zane ¶197.)



(Tanaka, Fig. 2 (colored annotations added).)

The output current is detected by “amplifying the voltage across the current detection resistor 106 by an amplifier 111, and inputting the current value (i_d) to the current error amplifier 112, comparator 117, and timer 110.” (Tanaka, [0033].) This current value (i_d) is then compared to a reference voltage (e_2) (113) to obtain a current comparison data (i_c) which is fed into a voltage amplifier 115. (*Id.*, [0034].)



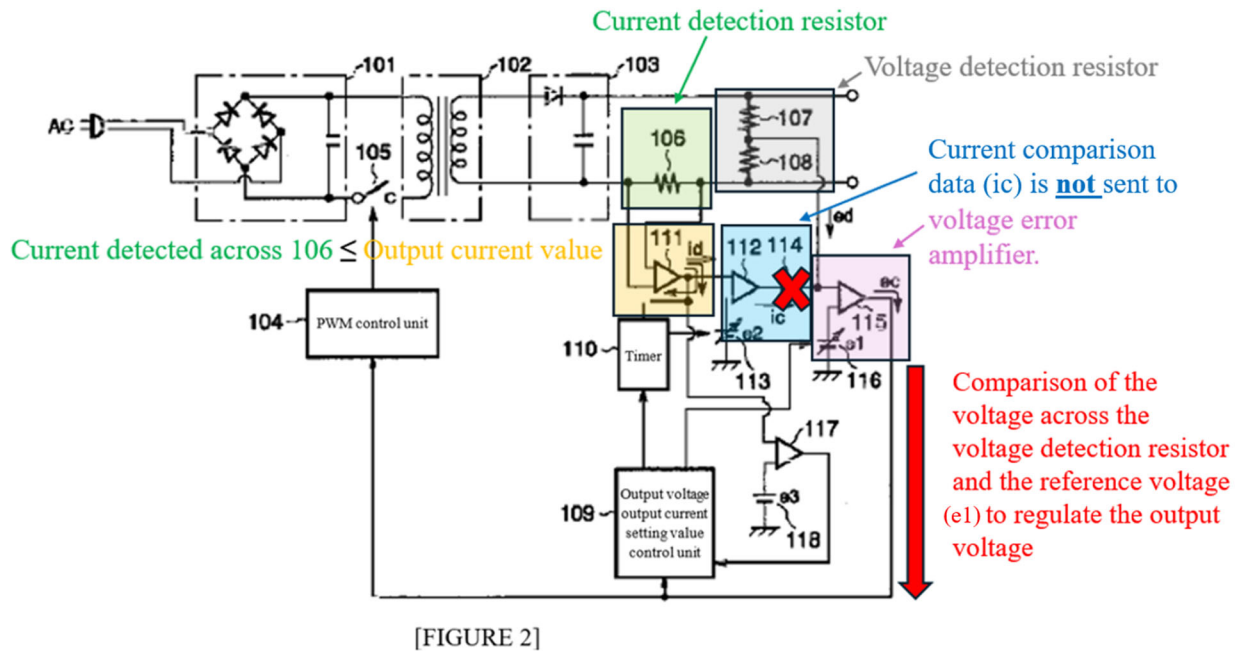
[FIGURE 2]

(*Id.*, Fig. 2 (colored annotations added); Zane, ¶198.)

The output voltage is detected by “inputting voltage data (e_d) obtained by dividing the output voltage by the voltage dividing resistors 107 and 108 into the voltage error amplifier 115.” (Tanaka, [0032]; Zane, ¶199.) “The voltage error amplifier 115 performs the following operations (a) and (b) based on the magnitude

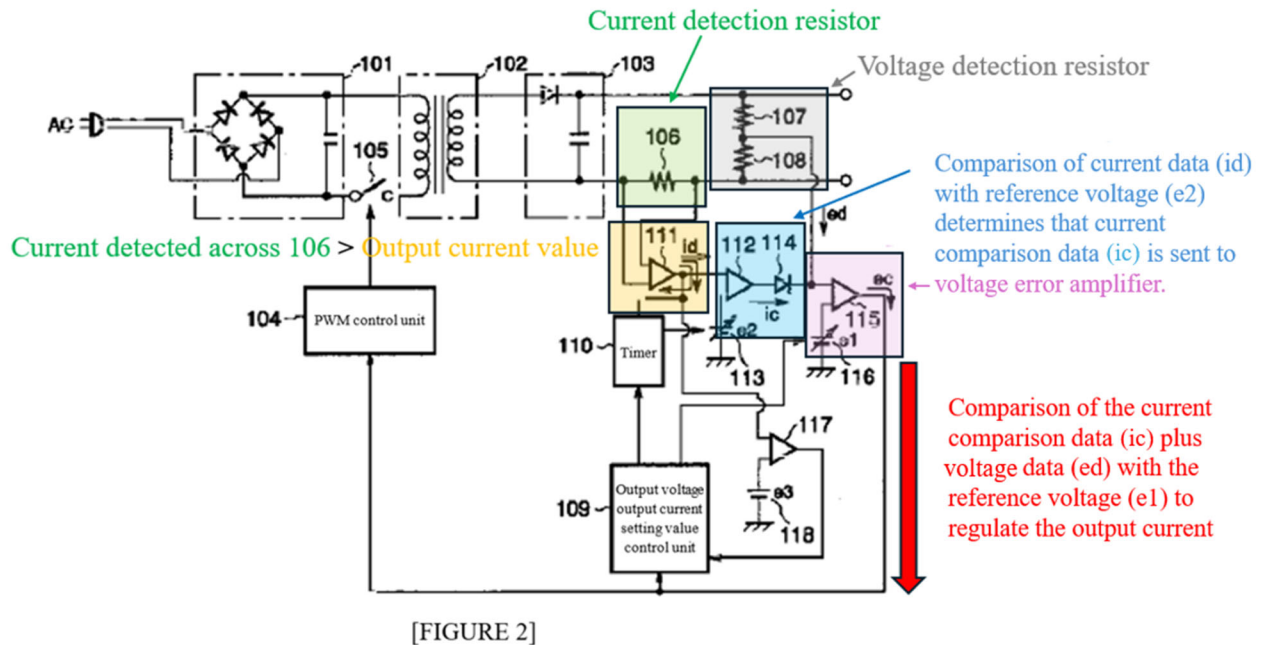
relationship between the current comparison data (ic) and the voltage data (ed).”
(Tanaka, [0035].)

Operation (a): If the output current (output current value (id)) detected across the current detection resistor 106 is less than or equal to the current limit (output current setting value set by the reference voltage (e2)), the current comparison data (ic) is not sent to the voltage error amplifier 115. (Tanaka, [0035].) The voltage amplifier 115 compares the voltage measured at voltage detection resistor 107 and 108 with the reference voltage (e1) set by reference voltage setting unit 116. (Tanaka, [0036].) The voltage comparison data (ec) output from the voltage amplifier 115 is then sent to “the output voltage/output current setting value control unit 109 constituting the output voltage/output current setting value control unit 16 shown in Figure 1 and the PWM control unit 104.” (*Id.* [0037].) Thus, “the output voltage becomes the output voltage setting value.” (Tanaka, [0038]; Zane, ¶200.)



(Tanaka, Fig. 2 (colored annotations added); Zane, ¶200.)

Operation (b): When the “output current value exceeds the output current setting value set by the reference voltage (e2) of the reference voltage setting unit 113, the current comparison data (ic) is output to the voltage error amplifier 115. In this case, the voltage error amplifier 115 compares [voltage data (ed) + current comparison data (ic)] with the reference voltage (e1) of the reference voltage setting unit 116” and outputs that comparison data as (ec). (Tanaka, [0039]-[0040].) The voltage comparison data (ec) is then sent to the output voltage/output current setting value control unit 109 and the PWM control unit 104. (Tanaka, [0041].) Therefore, “when the output current value exceeds the current setting value, current limiting is applied and the output voltage changes.” (Tanaka, [0042].)



(Tanaka, Fig. 2 (colored annotations added); Zane, 201.)

The two amplifiers, 112 and 115, are disclosed to continuously compare the device charging parameters (i.e., “Output Voltage [V]” and current limit value (1)) and battery charging parameters (i.e., current limit value (2)) to the charger output, and the results of the comparisons are used to determine the charger output. (Zane, ¶202.) A POSITA would recognize that an “error amplifier” as used for 112 and 115 is a common component used in control circuits that compares the two signals at its input, subtracts the signal values to determine the difference or error between them, and amplifies the error as needed for the circuit design. (*Id.*) Fig. 2 of Tanaka compares the device and battery charging parameters to the charger output using the error amplifiers and selects one of the parameters as the actual charging parameter by having one amplifier override the other and cause the “output voltage” to

“become the output voltage setting value” or a “current limiting is applied” based on the error amplifier condition.

A POSITA would have additionally found it obvious that the AC adapter must compare current limit value (1) (or the device charging parameter) and current limit value (2) (or the battery charging parameter) and determine which of the two current limit values are greater. (Zane, ¶203.) Figure 9 discloses that “Specification 1” contains a current limit value (1) of 2A and a current limit value (2) of 1.4A:

Specification No.	Output voltage [V]	Output current limit value 1 [A]	Output current limit value 2 [A]
Specification 1	15	2.0	1.4
Specification 2	15	2.7	2.0
Specification 3	18	1.7	1.1
Specification 4	18	2.3	1.7

[FIGURE 9]

(Tanaka, Fig. 9, [0044]-[0045].) Tanaka thus renders obvious a comparison of the two current limits in order to determine which current limit to use in the current error amplifier. (Zane, ¶203.)

3. Claim 3

Tanaka discloses “**select[ing] the at least one actual charging parameter based upon a limiting one of the at least one different portable device charging parameter and the at least one different battery charging parameter.**” (Zane, ¶206.) As discussed for claims 1 and 2, amplifiers 112 and 115 continuously compare the device and battery charging parameters to the output and the

corresponding results are used to determine the output as the actual charging parameter. (Tanaka, [0035-0042].) However, when “the output current value exceeds the current setting value, current limiting is applied and the output voltage changes.” (Tanaka, [0042].) This current limit can be either current limit value (1) for preventing an overcurrent (i.e., the device charging parameter) or current limit value (2) for constant current charging of the secondary battery (i.e., the battery charging parameter). (Tanaka, [0043].)

The AC adapter determines whether the reference voltage (e2) of the reference voltage setting unit 113 should be set to current limit value (1) or needs to be switched to current limit value (2) by periodically comparing the output current with one of the two current limit values. (Tanaka, [0044], [0045].) In particular, the two error amplifiers 112 and 115 determine if current limit value (1) or current limit value (2) is more limiting and the more limiting value will become the “**actual charging parameter**.” (Zane, ¶207.) Tanaka therefore discloses “**said controller**” as claimed. (Zane, ¶208.)

4. Claim 5

Tanaka discloses entering a “**learning mode**” for learning new parameters. (Zane, ¶212.) Tanaka describes entering a “device specification recognition mode” for information exchange at low power/voltage, so that device specifications may be sent to the power supply until AC adapter 11 recognizes and sets the device

specifications and outputs power according to the set device specifications. (Tanaka, [0020], [0058], Fig. 5.) The “device specification recognition mode” is the “**learning mode.**” (Zane, ¶212.)

Tanaka also discloses a “**learning mode signal.**” (Zane, ¶¶210-211.) An AC adapter can signal to the electronic device that it is open to learning new parameters through the output of “a low power and low voltage level...on the power output line (PL).” (Tanaka, [0020].) The “low power and low voltage” transmitted corresponds to the learning mode signal. (Zane, ¶211.) It would have been obvious to a POSITA for the electronic device to send the signal. (*Id.*) It would be advantageous for the device to send the learning mode signal because the device would be in the best position to determine when it is prepared to send its information. (*Id.*)

To the extent a learning mode requires an error signal, it would have been obvious to a POSITA, in view of Potega, to check the validity of the device and/or battery prior to sending a learning mode signal. (Zane, ¶213.) Potega discloses that the device and/or battery connected may be unknown to the battery charger. Potega recognizes that users may purchase and use “knock-offs” or “gray market batteries” that comprise nonstandard chemistries. (Potega, 29:47-52, 1:34-67.) Therefore, it would have been obvious to a POSITA to validate the identity of the connected device and/or battery prior to sending/receiving a learning mode signal. (Zane,

¶213.) By incorporating safety features such as device/battery validation, a manufacturer would provide additional protection. (*Id.*)

Accordingly, Tanaka in view of Potega discloses “**a learning mode for learning the at least one different portable device or battery charging parameter upon receiving a learning mode signal therefrom.**” (Zane, ¶214.)

5. Claim 6

Tanaka discloses claim 6. (Zane, ¶216.) “[W]hen the output voltage/output current setting value control unit 16 receives data indicating the device input specifications,” the output process as indicated in Figures 6, 7, and 8 are executed. (Tanaka [0067], Figs. 6-8, [0068].) A POSITA would have recognized that, for output voltage/output current setting value control unit to determine which output process to execute, it would have been coupled to a memory mapping the stored device input specifications to the correct stored output values. (Zane, ¶216.) The device input specifications represent the claimed device charging parameter and battery charging parameter. Accordingly, it would have been obvious to a POSITA to have included a memory coupled to the controller to store at least one different portable device charging parameter and the at least one different battery charging parameter. (*Id.*)

This limitation would also have been obvious in view of **Potega**. (Zane, ¶217.) Tanaka discloses a memory coupled to a controller. (Tanaka, [0061]

(charging control unit 22 reads from data stored in storage unit of secondary battery 21).) It would have been obvious to couple a memory to the controller in the AC adapter in view of Potega. (Zane, ¶217.) Potega discloses a power supply configured with microprocessor 32, memory 31, and microcontroller 23 coupled together.

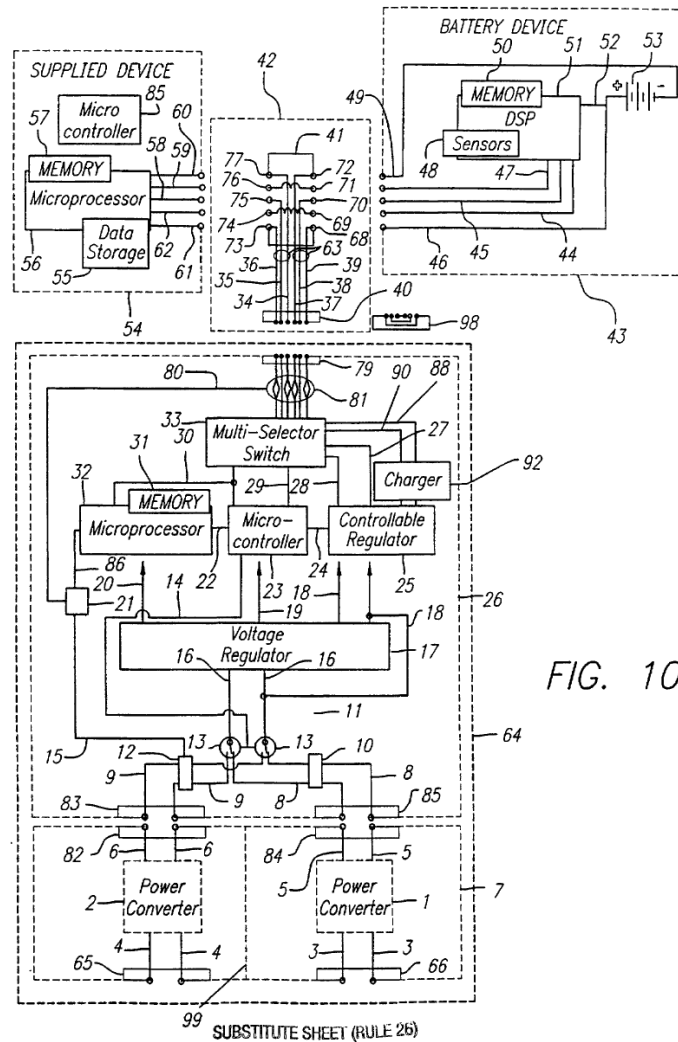


FIG. 10

(Potega, Fig. 10.) A POSITA would have been motivated to incorporate a memory on the AC adapter to increase efficiency and allow the AC adapter to quickly verify certain device and/or battery types. (Zane, ¶217.)

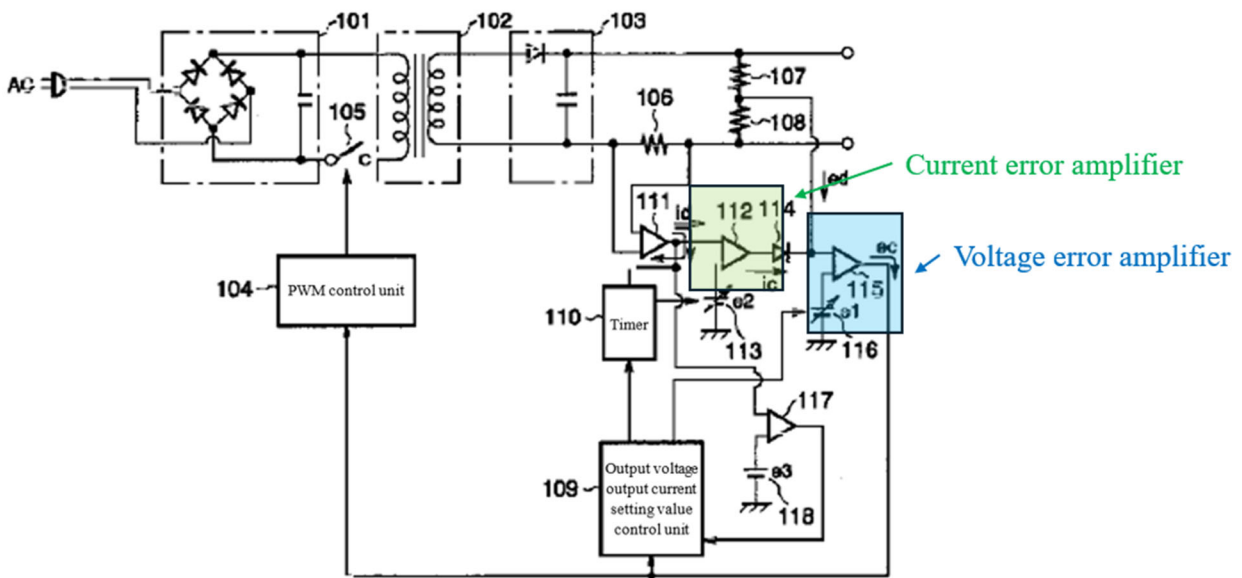
6. Claim 7

Tanaka discloses “**the at least one actual charging parameter comprises at least one of a voltage parameter.**” (Zane, ¶¶219-222.) The output voltage/output current setting value control unit 16 of AC adapter 11 recognizes the power input specifications of the electronic device, sets the output specifications, and outputs power according to the specifications. These specifications include output current limit (1) for preventing an overcurrent, output current limit (2) for charging a secondary battery, and an output voltage:

Specification No.	Output voltage [V]	Output current limit value 1 [A]	Output current limit value 2 [A]
Specification 1	15	2.0	1.4
Specification 2	15	2.7	2.0
Specification 3	18	1.7	1.1
Specification 4	18	2.3	1.7

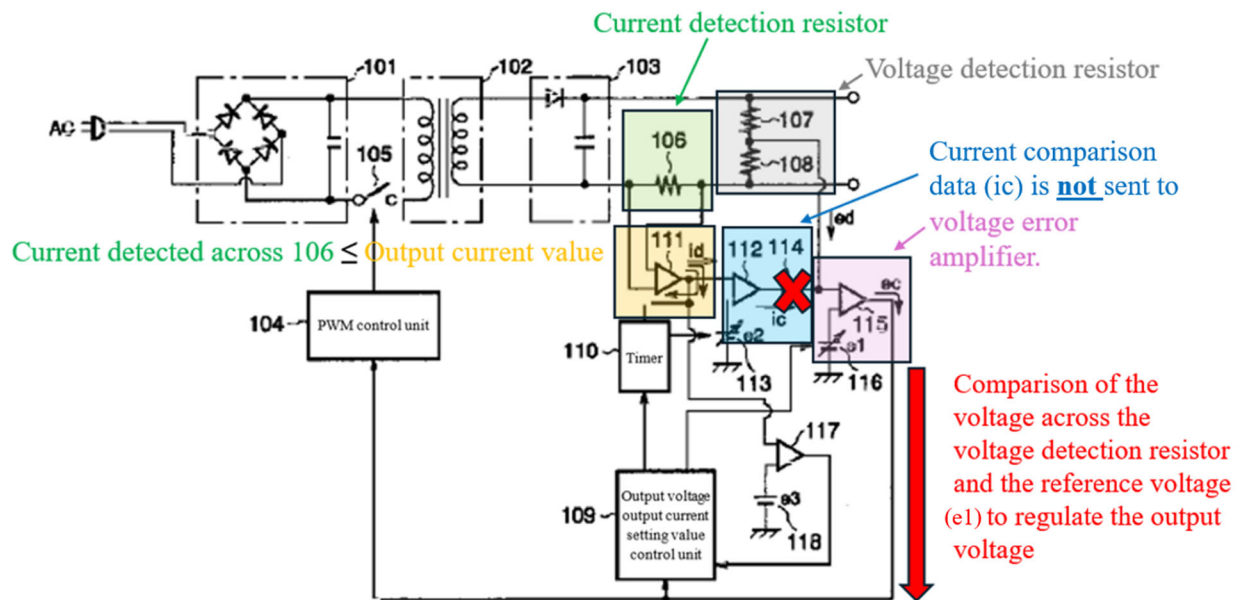
[FIGURE 9]

(Tanaka, Fig. 9.) Once the device specifications are transmitted, the embodiment in Figure 2 of Tanaka uses two amplifiers, 112 and 115, to compare the device and battery charging parameters to the output to determine how the output should be changed:



[FIGURE 2]

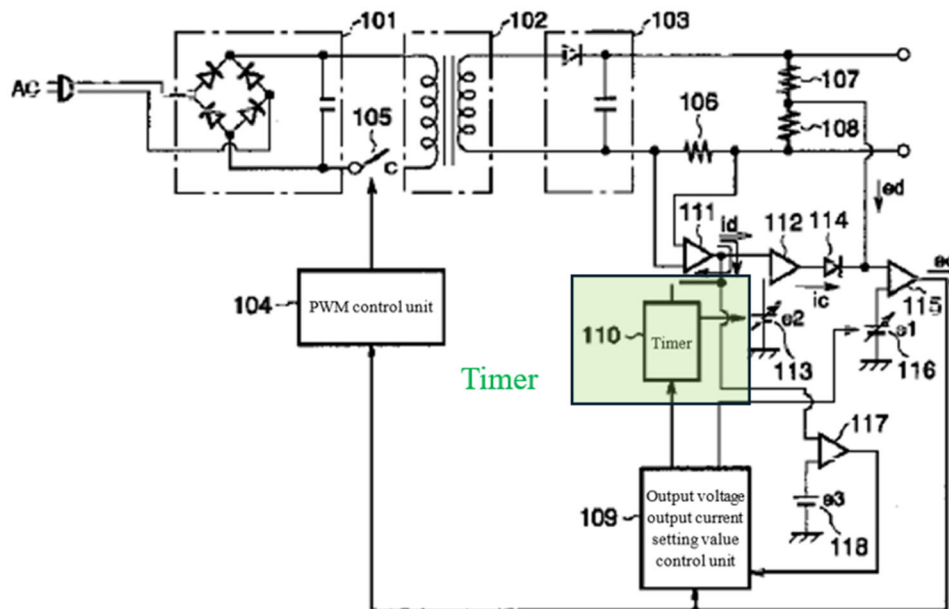
(Tanaka, Fig. 2 (colored annotations added).) The voltage amplifier 115 compares the voltage measured at voltage detection resistor 107 and 108 with the reference voltage (e1) set by reference voltage setting unit 116. (Tanaka, [0036], [0035].) The voltage comparison data (ec) output from the voltage amplifier 115 is then sent to “the output voltage/output current setting value control unit 109 constituting the output voltage/output current setting value control unit 16 shown in Figure 1 and the PWM control unit 104.” (*Id.*, [0037].)



[FIGURE 2]

(Tanaka, Fig. 2 (colored annotations added).) Thus, “the output voltage becomes the output voltage setting value.” (Tanaka, [0038].) Tanaka discloses that the “**actual charging parameter** [i.e., the output voltage] **comprises at least one of a voltage parameter** [i.e., the output voltage setting value].” (Zane, ¶219.)

To the extent this claim also requires a charging time, Tanaka discloses the “**at least one actual charging parameter comprises...a charging time.**” (Zane, ¶220.) Tanaka discloses an AC adapter that utilizes a timer. (Tanaka, [0033] (“timer 110”), [0043] (“Switching between the current limit value (1) and the current limit value (2) is realized by the timer 110....”).)



[FIGURE 2]

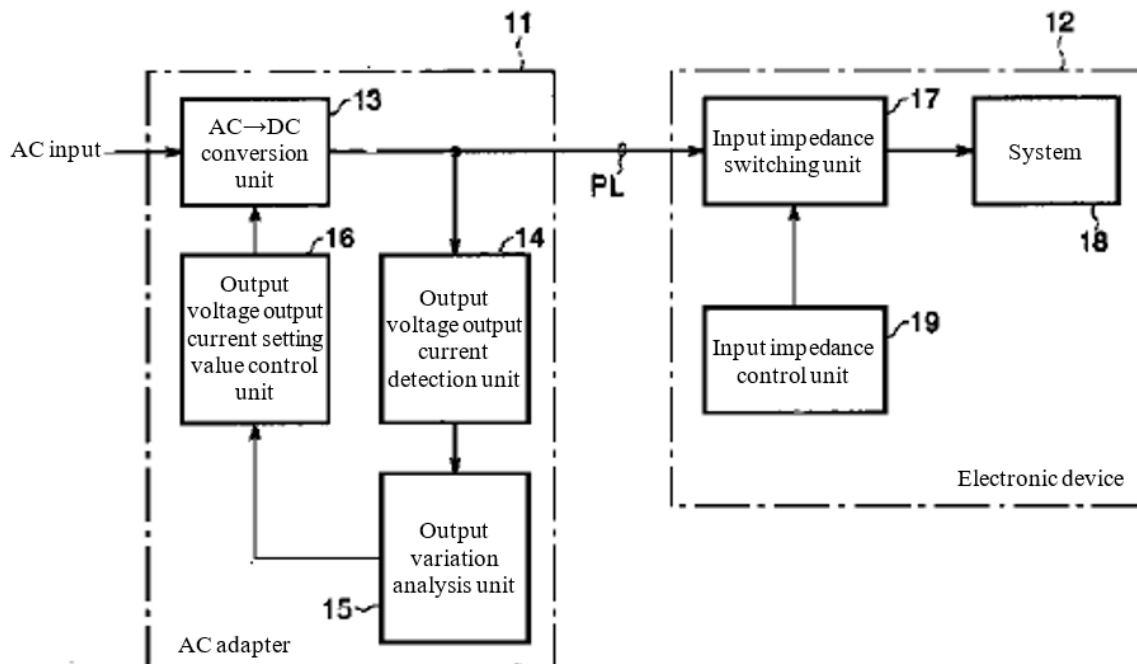
(Tanaka, Fig. 2 (annotation added).) Tanaka explains that the AC adapter utilizes the timer to determine when to adjust the output charging profile and respective charging limit (Tanaka, [0044]-[0045].) The AC adapter will compare the output current to the predetermined time (e.g., 6 seconds) to determine if the output profile needs to be changed. (Zane, ¶220.) Accordingly, Tanaka discloses the “**at least one actual charging parameter comprises...a charging time.**” (*Id.*)

It would have also been obvious to utilize a charging time in the “**actual charging parameter.**” (Zane, ¶221.) Tanaka discloses that battery capacity data, i.e., current battery capacity, maximum charging current, and maximum charging voltage, is stored in the storage unit of the secondary battery. (Tanaka, [0061].) It would have been obvious to communicate these parameters to the battery charger

and for the charger to utilize such data in determining an “actual charging parameter.” (Zane, ¶221.) For example, a charger would recognize the current battery capacity and the maximum charging current, and thus understand when it would reach maximum capacity and accordingly set the charge time, predictably resulting in benefits such as improved efficiency and safety. (*Id.*)

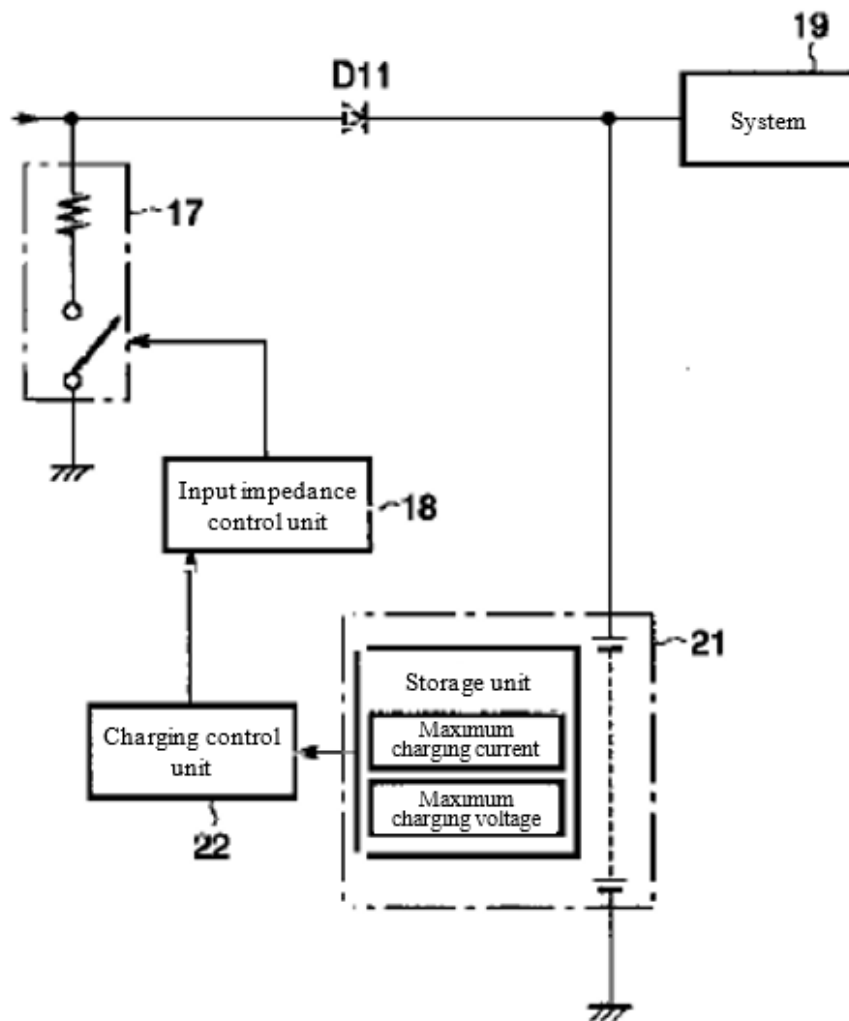
7. Claim 11 (11[p])

Tanaka discloses “a **battery charging system.**” (Zane, ¶224.) Tanaka describes a system that includes an AC adapter power source to charge an electronic device’s secondary battery. (Tanaka, [0012].)



[FIGURE 1]

(Tanaka, Fig. 5, Figs. 1-4.) A POSITA would recognize electronic device 12 would contain a rechargeable battery. (Zane, ¶224.)



[FIGURE 5]

(Tanaka, Fig. 5; Zane, ¶224.)

(a) Claim 11[a]

Claim 11[a] is identical to claim 1[p] above and is disclosed or rendered obvious by Tanaka and Potega for the same reasons. (Zane, ¶226.)

(b) Claim 11[b]

Tanaka discloses “**a battery charger.**” (Zane, ¶227.) Tanaka’s AC adapter is capable of charging the rechargeable battery contained within the electronic device. (See Tanaka, [0062] (“During charging of the above secondary battery 21...”), [0043] (“...for constant current charging of the secondary battery...”); [0058]; [0059]; [0061].)

(c) Claim 11[c], 11[d]

Claim 11[c] and 11[d] are obvious for same reasons as claim 1[a] and 1[b]. (Zane, ¶¶229-230.)

8. Claims 12, 13, and 15-17

Claims 12, 13, and 15-17 are obvious for same reasons as claims 2, 3, 5-7. (Zane, ¶231.)

9. Claim 18 (18[p])

For the reasons explained under claim 1[p], claim 18[p] is disclosed or rendered obvious. (Zane, ¶233.)

(a) Claim 18[a]

Claim 18[a] is substantially similar to claims 1[a] and 1[b] except for the distinction that claim 18[a] is a method claim and further couples the “**charging circuit to the portable wireless communications device.**” For the reasons

explained under claims 1[a] and 1[b], claim 18[a] is disclosed or rendered obvious.

(Zane, ¶234.)

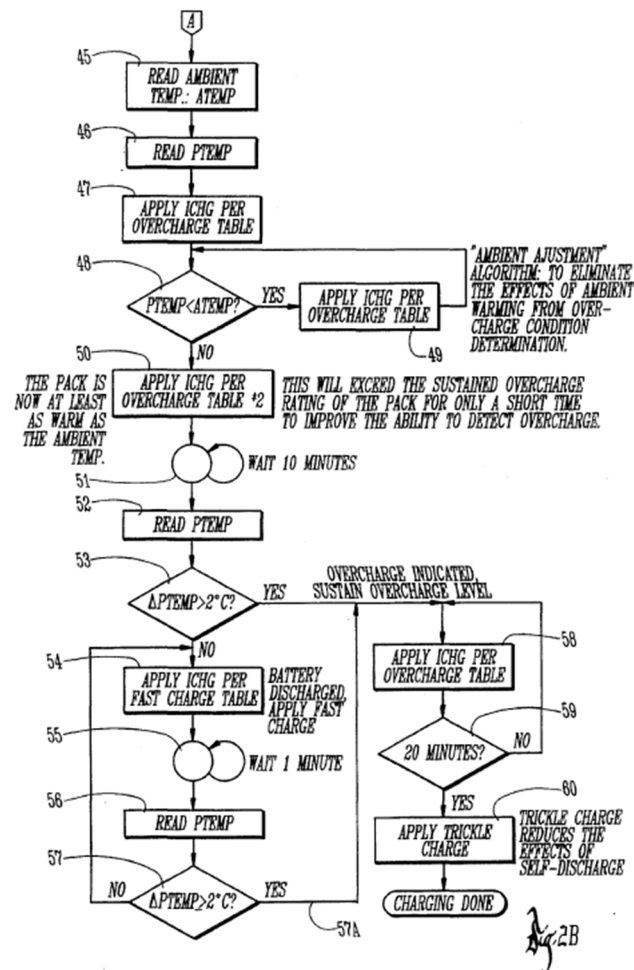
10. Claims 19, 20, and 22

These claims are obvious for the same reasons as claims 2, 3 and 7. (Zane, ¶¶235.)

E. Ground 4: Claims 4, 8, 14, and 21 Are Obvious Over Tanaka in view of Potega and Koenck

1. Claim 4

Tanaka and Potega, in view of Koenck, disclose a controller that “**is configured to further cause the portable wireless communications device to identify a battery charge level.**” (Zane, ¶237.) Koenck’s battery charging system determines the “state of the charge of the battery” by determining the presence of an overcharge condition by applying twice the permissible sustained overcharge rate and monitoring cell temperature. (Koenck, Abstract; 6:30-39.)



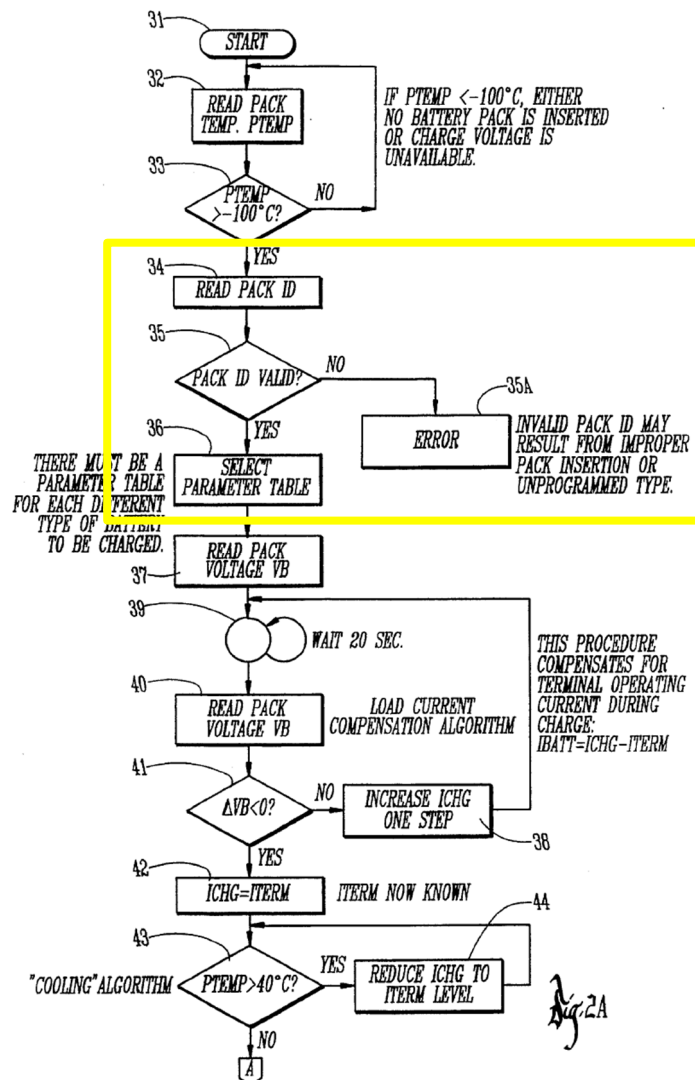
(Koenck, Fig. 2B (Steps 50 to 53).) It further would have been obvious that the controller “cause[s] the portable wireless communications device to identify a battery charge level,” because a portable device would be in a better position to measure internal parameters such as the temperature of the battery. (Zane, ¶238.) Tanaka already discloses that the controller causes the electronic device to measure other related parameters such as battery capacity. (Tanaka, [0061].) Therefore, it would have been obvious for Tanaka’s system to additionally identify the battery charge level to increase battery charging safety as explained by Koenck. (Zane,

¶238.) If the battery is not in an overcharge condition, the controller then “**select[s] the at least one actual charging parameter based upon the battery charge level**” by utilizing a “fast charge parameter table” to apply the appropriate charge value. (Koenck, 6:56-7:2, 8:35-55, 7:5-12.) Tanaka and Potega, in light of Koenck, disclose claim 4. (Zane, ¶239.)

Motivation to Combine: Koenck is an analogous reference to the ’397 patent, in the same field of endeavor and reasonably pertinent to problems facing the ’397 patent inventors. (Zane, ¶240; ’397, 1:20-22; Koenck, Abstract.) A POSITA would have had a clear motivation to combine. Koenck recognizes that it is important to identify the battery charge level for multiple reasons, such as harmful characteristics resulting from overcharging. (Zane, ¶241; Koenck, 2:37-47, 3:16-18.) A POSITA would have had a reasonable expectation of success. (Zane, ¶242.)

2. Claim 8

It would have been obvious to a POSITA that Tanaka and Potega, in view of Koenck, discloses “**an error signal ... based upon an unknown portable device type or rechargeable battery type.**” (Zane, ¶244.) Koenck discloses that a system may “automatically identify battery type.” (Koenck, Abstract, 11:14-17, 5:30-33.) However, “[i]n the case of an invalid reading of battery pack identity, the program may branch to an error sub routine as indicated at 35A.” (Koenck, 5:33-35.)



(Koenck, Fig. 2A (colored annotations added).)

It would have been obvious to a POSITA in view of Potega to provide such an error signal “to the portable wireless communications device.” (Zane, ¶245.) Potega describes “react[ing] to detected battery charging,” including by “alert[ing] the passenger (via a screen message on the laptop, perhaps an audible alarm, etc.)” and providing a “screen-based warning.” (Potega, 29:9-14, 29:23-27.)

Accordingly, Tanaka and Potega, in combination with Koenck, discloses a controller “**configured to further provide an error signal to the portable wireless communications device based upon an unknown portable device type or rechargeable battery type.**” (Zane, ¶¶244-246.)

Motivation to Combine: As explained, Tanaka, Potega, and Koenck are analogous references to the '397 patent. A POSITA would have had a clear motivation to combine Tanaka, Potega, and Koenck. (Zane, ¶248.) Tanaka already recognizes that there may be situations where abnormal charging conditions exist. (Tanaka, [0072].) Both Koenck and Potega recognize that abnormal conditions may arise due to the battery chemistry. (Koenck, 5:38-45; Potega, 29:47-52.) Thus, a POSITA would have been motivated to additionally check for abnormal conditions, such as an unrecognizable battery type, prior to charging in order to increase both the reliability and safety of battery charging. (Zane, ¶248.) A POSITA would have been motivated to send the error signal to the portable device because devices, such as the portable computer in Tanaka, are better equipped to display information to a user. (Zane, ¶249.) A POSITA would have had a reasonable expectation of success, because sending an error message would have been a trivial implementation. (Zane, ¶250.)

3. Claim 14 and 21

These claims are obvious for the same reasons as claim 4. (Zane, ¶¶252, 254.)

F. Ground 5: Claims 9-10 Are Obvious Over Tanaka in view of Potega and Stephens

1. Claim 9

It would have been obvious that Tanaka and Potega, in view of Stephens, discloses a “**controller**” that is “**configured to monitor said charging circuit to detect a charging error during charging of the rechargeable battery.**” (Zane, ¶¶256-257.) Stephens discloses a battery charger controlled by a “controller” with the ability to detect and correctly charge different battery types, and to respond to error conditions detected during charging. (Stephens, 1:65-2:16 (“controller 170”), 4:25-26, 4:34-38 (“whether an error was detected during the charging operation”), Fig. 8 (error subroutine 2000), 6:56-59; 7:4-7; 7:11-14; 7:21-27.)

Motivation to Combine: Stephens is an analogous reference to the ’397 patent, in the same field of endeavor and reasonably pertinent to various problems facing the ’397 patent inventors. (Zane, ¶258; ’397, 1:20-22; Stephens, 3:9-12.) A POSITA would have wanted to combine Stephens with Tanaka and Potega because improving battery charging safety was a common need. (Zane, ¶259; EX1015, 1:12-34; Tanaka, [0076].) Sending an error message to the portable device was a trivial implementation. (Zane, ¶260.)

2. Claim 10

It would have been obvious that Tanaka and Potega, in view of Stephens, disclose an “**error indication upon detecting the at least one charging error.**”

(Zane, ¶262.) Stephens discloses indicating to a user via indicator 120 whether an error was detected during the charging operation. (Stephens, 4:34-42 (“When red LED 121 is lit, an ‘error’ condition is indicated.”), Fig. 8 (block **2060**).) Motivations to combine are addressed above. (Zane, ¶263; Freedman, 1:22-30.)

VII. NO SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS

PO has not identified any alleged objective evidence of non-obviousness, nor is Petitioner aware of any.

VIII. CONCLUSION

Petitioner requests IPR institution.

Dated: October 8, 2025

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this petition complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains 13,973 words, according to the word-processing system used to prepare this petition, excluding the parts of this petition that are exempted by 37 C.F.R. § 42.24(a) (including the table of contents, a table of authorities, mandatory notices, a certificate of service or this certificate word count, appendix of exhibits, and claim listings).

DATED: October 8, 2025

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Petition for *Inter Partes* Review of
U.S. Patent No. 8,610,397 B2

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. Sections 42.6 and 42.105, that a complete copy of the attached **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,610,397 B2**, including all exhibits (**EX1001-1019**) and related documents, are being served via Federal Express on October 8, 2025, the same day as the filing of the above-identified document in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon Patent Owner by serving the correspondence address of record with the USPTO as follows:

Botos Churchill IP Law LLP - Malik
430 Mountain Avenue
Suite 401
New Providence, NJ 07974

And via Federal Express upon the following counsel for Patent Owner in *Malikie Innovations Ltd. v. Nintendo Co.* in the United States District Court, Western District of Washington, Case No. 2:24-cv-01490-JLR as follows:

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Dated: October 8, 2025

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