UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner,

v.

LS CABLE & SYSTEM LTD.
Patent Owner.

Patent No. 8,013,568

Inter Partes Review No. IPR2025-01141

PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

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Exhibit Description	Exhibit #
P. SCHERZ ET AL., PRACTICAL ELECTRONICS FOR INVENTORS (McGraw-Hill 2000)	EX1016
R. CHABAY ET AL., MATTER & INTERACTIONS II: ELECTRIC AND MAGNETIC INTERACTIONS (John Wiley & Sons Inc. 2nd Ed. 2007)	EX1017
A. TANENBAUM, COMPUTER NETWORKS (Prentice Hall PTR 4th Ed. 2007)	EX1018
P. HOROWITZ AND W. HILL, THE ART OF ELECTRONICS (Cambridge Univ. Press 2nd Ed. 1989) ("Horowitz")	EX1019

I. INTRODUCTION

Petitioner Apple Inc. (“Petitioner” or “Apple”) petitions for *inter partes* review of claims 1 and 3-58 of U.S. Patent No. 8,013,568 (“the ’568 Patent”) (EX1001), as amended in *Ex Parte* Reexamination Certificate No. 8,013,568 C1 (EX1002). The challenged claims do not present any patentable improvement over the prior art, as set forth in this Petition and in the supporting Declaration of Dr. Joshua R. Smith. (EX1005).

Accordingly, Petitioner requests that the Board institute *inter partes* review of the ’568 patent and cancel the claims at the conclusion of the instituted proceeding.

II. SUMMARY OF THE ’568 PATENT

A. Background Of The ’568 Patent

The ’568 patent relates to contactless battery charging. Contactless chargers, such as described in the patent, utilize induced electric current to wirelessly charge batteries for devices such as mobile phones. (EX1001, Abstract, 1:9-63.) In some prior art battery chargers, a charger and a battery can be coupled in relatively fixed positions (*e.g.*, held in place by grooves and protrusions). (EX1001, 2:49-3:3.) The ’568 patent purports to improve on prior art chargers by “overcoming the restriction of relative positions” of the battery and charger, for the “convenience of the user,” while preventing overvoltage conditions that can damage the battery. (EX1001, 3:4-39.)

B. Priority Date

The application that became the ’568 patent (Appl. No. 11/997,272) was filed as a national stage application of a PCT application (PCT/KR2006/001713) filed May 8, 2006. (EX1001, (22), (86).) Petitioner assumes, *arguendo* and for the purposes of this proceeding only, that the ’568 patent is entitled to a priority date of July 29, 2005. This is the earliest date of any document to which the ’568 patent claims priority. (EX1001, (30).)

C. Prosecution History Of The ’568 Patent

The prosecution of the ’568 patent was not robust; the originally filed claims were allowed without a single Office Action, and only thirteen references were considered by the Examiner. (EX1003, 28-33; EX1001, (56).)

A supplemental examination proceeding was filed on March 12, 2021, upon which *ex parte* reexamination of the claims was ordered. (EX1004A, 576.) At its conclusion, a reexamination certificate was issued, reflecting that claim 2 is canceled, claims 1, 3, 4, 7-13, 15-19, 21, and 23 are amended; and new claims 25-58 are added. (EX1002, 1:15-22.)

D. Level of Ordinary Skill

Based on the disclosure of the ’568 patent and an assumed priority date of July 29, 2005, a person of ordinary skill in the art (“POSITA”) would have had a Bachelor’s degree and a Master’s degree in Electrical Engineering, Computer

Engineering, Physics, or a related field, as well as one to two years of academic or industry experience in power electronics or battery charging or comparable industry experience. (EX1005, ¶19.)

III. CLAIM CONSTRUCTION

Petitioner does not believe any claim construction is necessary for this Petition.[1] As set forth in this Petition, the challenged claims are invalid under any reasonable interpretation of the claims.

IV. PRECISE REASONS FOR RELIEF REQUESTED

Pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq*. (including § 42.104(b)), Petitioner requests cancellation of claims 1 and 3-58 of the ’568 Patent based on the following references, as supported by the accompanying Declaration of Dr. Joshua R. Smith (EX1005).

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[1] In the event trial is instituted, Petitioner reserves its right to address construction of any terms raised at trial, or in the related district court action. Petitioner believes that the ’568 patent claims are invalid under 35 U.S.C. § 112, including indefiniteness. Because such issues cannot be raised in an IPR, Petitioner reserves the right to raise those issues in the related district court action.

Prior Art Reference	**Abbreviation**
U.S. Patent No. 7,522,878 to Baarman	Baarman-878 (EX1007)
Datasheet for NCP1800, Single-Cell Lithium Ion Battery Charge Controller, Rev. 4 (May 2003)	NCP1800 Datasheet (EX1012)
P. HOROWITZ AND W. HILL, THE ART OF ELECTRONICS (Cambridge Univ. Press 2nd Ed. 1989)	Horowitz (EX1019)
U.S. Patent No. 7,791,319 to Veselic et al.	Veselic (EX1013)
U.S. Patent No. 7,518,267 to Baarman	Baarman-267 (EX1014)

The statutory grounds for the challenge of each claim are set forth below. All statutory citations are pre-AIA based on the earliest possible priority date of July 29, 2005.

Ground	**35 U.S.C. §**	**Claims**	**Prior Art References**
1	103	1, 5, 7, 8, 11, 13-19, 21, 23, 25-49, 52, 54-58	Baarman-878, NCP1800 Datasheet, Horowitz
2	103	3, 4, 6, 9, 10, 12, 20, 22, 24, 50, 51, 53	Baarman-878, NCP1800 Datasheet, Horowitz, Veselic
3	103	1, 3, 7-9, 11, 12, 30-34, 48-50, 52, 53	Baarman-267, Veselic

Below, Petitioner discusses why the challenged claims are unpatentable, including by specifying how and where the prior art satisfies each limitation of each challenged claim, as required by 37 C.F.R. § 42.104(b)(4).[2] Petitioner's showing establishes a reasonable likelihood that it will prevail on each ground of invalidity as to each challenged claim.

V. BAARMAN-878 IN VIEW OF NCP1800 DATASHEET AND HOROWITZ RENDERS OBVIOUS CLAIMS 1 AND 3-58

A. Ground 1: Claims 1, 5, 7, 8, 11, 13-19, 21, 23, 25-49, 52, and 54-58 are Rendered Obvious Based On Baarman-878 and NCP1800 Datasheet in View of Horowitz

1. Summary of Baarman-878

Baarman-878 is a U.S. Patent issued to inventor David W. Baarman. The underlying application (Appl. No. 10/689,148) was filed on October 20, 2003; published as U.S. Patent Appl. Pub. 2004/0130915 on July 8, 2004; and issued as a U.S. Patent on April 21, 2009. Baarman-878 is thus prior art to the '568 patent under at least 35 U.S.C. §§102(a), (b), and (e).

Baarman-878 is analogous art to the claimed invention at least because it is directed to solving the same problem (contactless battery charging) in the same field of endeavor (electronic circuits) as the '568 patent; and provides disclosures analogous to those of the '568 patent. (EX1005, ¶34.)

Baarman-878 discloses "Contactless energy transmission systems (CEETS)"

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[2] Petitioner also shows how each claim preamble is satisfied, but does not concede that any preamble is limiting for any ground in the Petition.

in which a power supply charges and communicates with a remote device, such as a chargeable battery. (EX1007, 1:33-51; EX1005, ¶32.) Such systems can use magnetic induction to wirelessly transfer energy from a primary winding in the power supply to a secondary winding in the battery. (EX1007, 1:33-51; EX1005, ¶32.) The power supply can be adapted in response to signals received wirelessly from the remote device. (EX1007, 2:53-3:21; EX1005, ¶32.) For example, the rail voltage, frequency, and/or duty cycle of the AC signal provided to the primary winding can be adjusted in response to load information received from a controller of the remote device. (EX1007, 2:53-3:21; EX1005, ¶32.)

Baarman-878 incorporates by reference three contemporaneously-filed patent applications: Appl. No. 10/689,499 (EX1008); Appl. No. 10/689,224 (EX1009); and Appl. No. 10/689,375 (EX1010). (EX1007, 1:25-29.) Baarman-878 also incorporates by reference Appl. No. 10/246,155 (EX1011). (EX1007, 3:58-63.)

2. Summary of NCP1800 Datasheet

NCP1800 Datasheet is a May 2003 publication by ON Semiconductor describing the structure and operation of the NCP1800, which is a "constant current, constant voltage (CCCV) lithium ion battery charge controller." (EX1012, 1.) NCP1800 Datasheet is thus prior art to the '568 patent under at least 35 U.S.C. §§ 102(a) and (b).

The NCP1800 "provides the necessary control functions for charging [lithium-ion] batteries precisely and safely." (EX1012, 10.) It "features the constant current and constant voltage method (CCCV) of charging." (*Id.*) The NCP1800 includes overvoltage protection features, and senses an input voltage from a power source (V_{CC}) and an output voltage to a battery (V_{SNS}) to determine whether those voltages fall within acceptable ranges. (*Id.*, 1-4, 7, 8.)

NCP1800 Datasheet is analogous art to the claimed invention at least because it is directed to solving the same problem (battery charging) in the same field of endeavor (electronic circuits) as the '568 patent. (EX1012, 1, 7; EX1005, ¶37.)

3. Summary of Horowitz

Horowitz is an electronics textbook published in 1989, setting forth a "definitive volume teaching the art of the subject." (EX1019, *xix*; EX1005, ¶38.) Horowitz is prior art to the '568 patent under at least 35 U.S.C. §§102(a) and (b).

Relevant to this proceeding, Horowitz includes, in a chapter titled "Foundations," disclosure of diodes and rectifiers for use in power supply circuits. (EX1019, 43-53; EX1005, ¶39.) Horowitz provides numerous examples of rectifiers, as well as specific instructions, including schematics, part number listings, and instrumentation diagrams, for implementing rectifiers into practical systems. (EX1019, 43-53; EX1005, ¶39.)

Horowitz is analogous art to the claimed invention at least because it is a comprehensive and "definitive" textbook in the same field of endeavor (electronic circuits) as the '568 patent; and provides disclosures (*e.g.*, power supply circuits, batteries, and electronic components such as rectifier circuits) analogous to those of the '568 patent, including for the same problem (battery charging) of the '568 patent. (EX1019, *xix*; EX1005, ¶40.)

4. Claim 1

Claim 1 is rendered obvious based on Baarman-878 in view of the NCP1800 Datasheet and Horowitz. (EX1005, ¶41.)

a. [Preamble][3]

Baarman-878 describes "contactless energy transmission systems (CEETS)," which "are composed of power supplies and remote devices." (EX1007, 1:33-51.) The remote device can include a chargeable battery that is charged inductively by the power supply. (EX1007, 1:47-51.)

b. [A]

Baarman-878's battery charging systems use magnetic induction to wirelessly transfer energy from a primary winding (coil) in the power supply to a secondary winding in the battery. (EX1007, 1:33-51; EX1005, ¶43.)

Baarman-878 discloses contactless power supply (CPS) 305 (an external

[3] See the claims appendix for a full recitation of each claim.

contact-less charging device), which becomes inductively coupled to a chargeable remote device 306 when in the presence of the remote device:

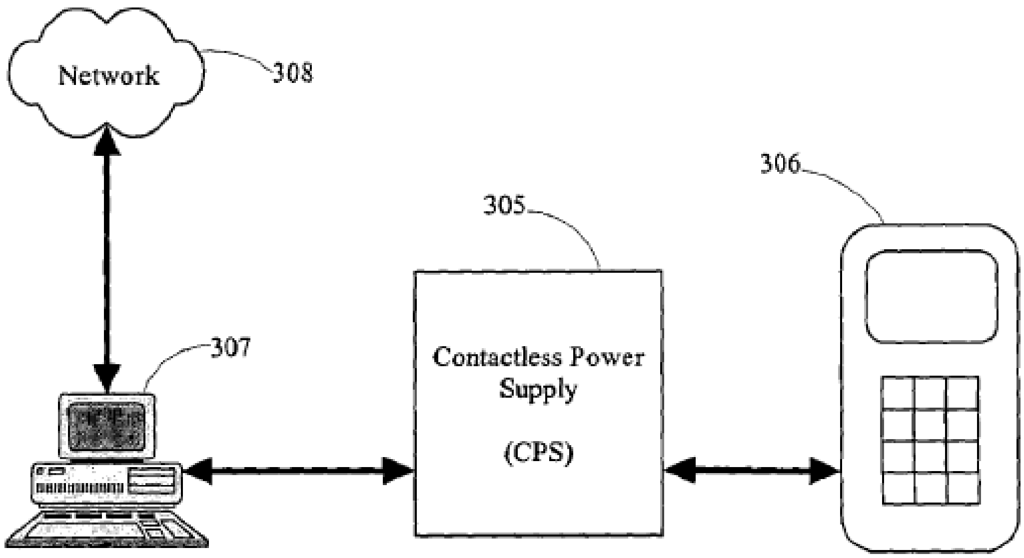


FIG. 6

(EX1007, 7:22-25, Fig. 6; EX1005, ¶44.)

Contactless power supply 305 includes a power source 310, which supplies AC power to primary winding 334 (of tank circuit 314) via inverter 312:

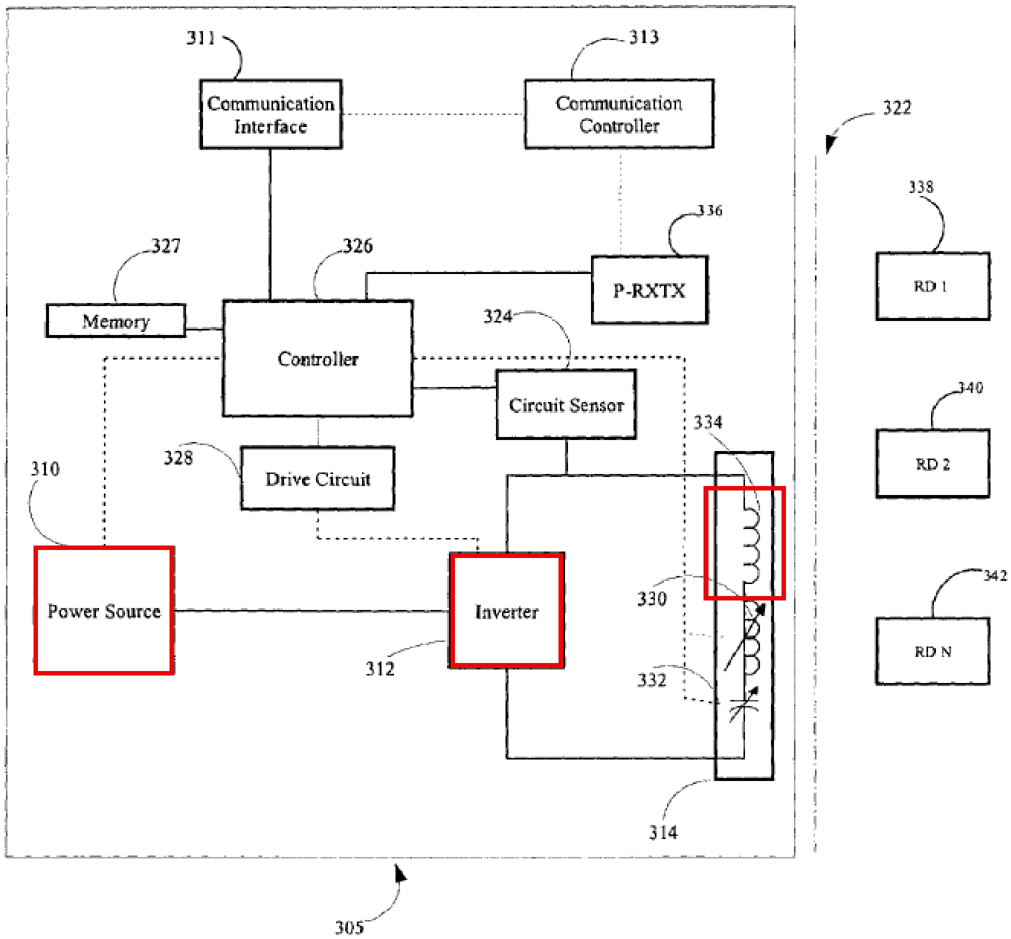


Fig. 7

(EX1007, 7:46-52, 8:41-46, Fig. 7 (annotated); EX1005, ¶45.)

Baarman-878 discloses the tank circuit 314 is "inductively coupled to secondary winding 316" of the remote device 338, via an air gap:

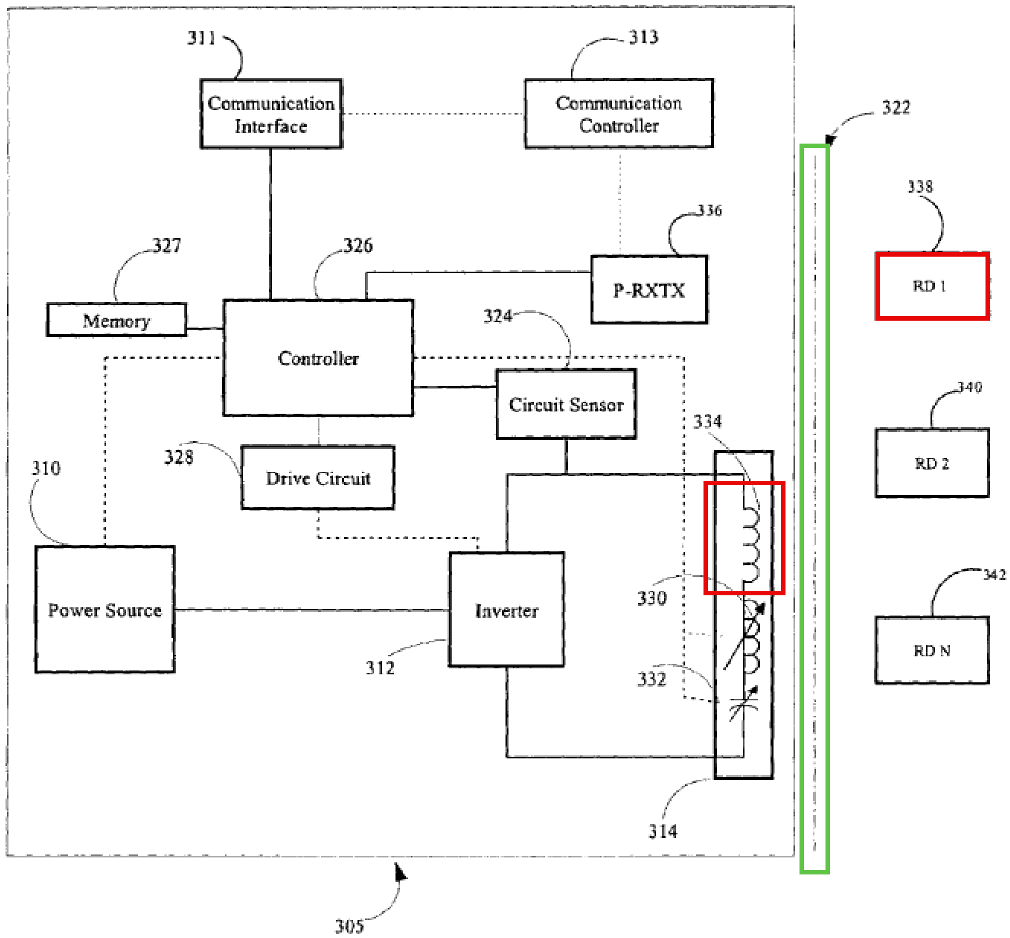


Fig. 7

(EX1007, 7:46-55, Fig. 7 (annotated); EX1005, ¶46.)

The POSITA would understand supplying the AC power to the primary winding, as described in Baarman-878, to generate a magnetic field by the operation of the Biot-Savart Law. (*See* EX1016, 112-13; EX1017, 589-601; EX1005, ¶47.) This is consistent with Baarman-878's disclosure of applying a signal to primary winding 14 "for generating a magnetic field[.]" (EX1007, 3:66-4:12; EX1005, ¶47.) Further, Baarman-878 discloses that "[e]nergy from a primary winding in the power supply is transferred inductively to a secondary winding in the chargeable device." (EX1007, 1:53-55; EX1005, ¶47.) The POSITA would understand from this, and the operation of Faraday's Law, that applying AC current to the primary winding 334 will generate a magnetic field to induce an AC current in secondary winding 316. (*See* EX1016, 112-13; EX1017, 780-89; EX1005, ¶47.)

The POSITA would understand Baarman-878's secondary winding 316 to correspond to variable secondary winding 353 in Fig. 8. (EX1005, ¶47.) Secondary winding 353 induces the AC current, as described above; and provides power to load 350, which may be a rechargeable battery (thus referred to herein as battery 350):

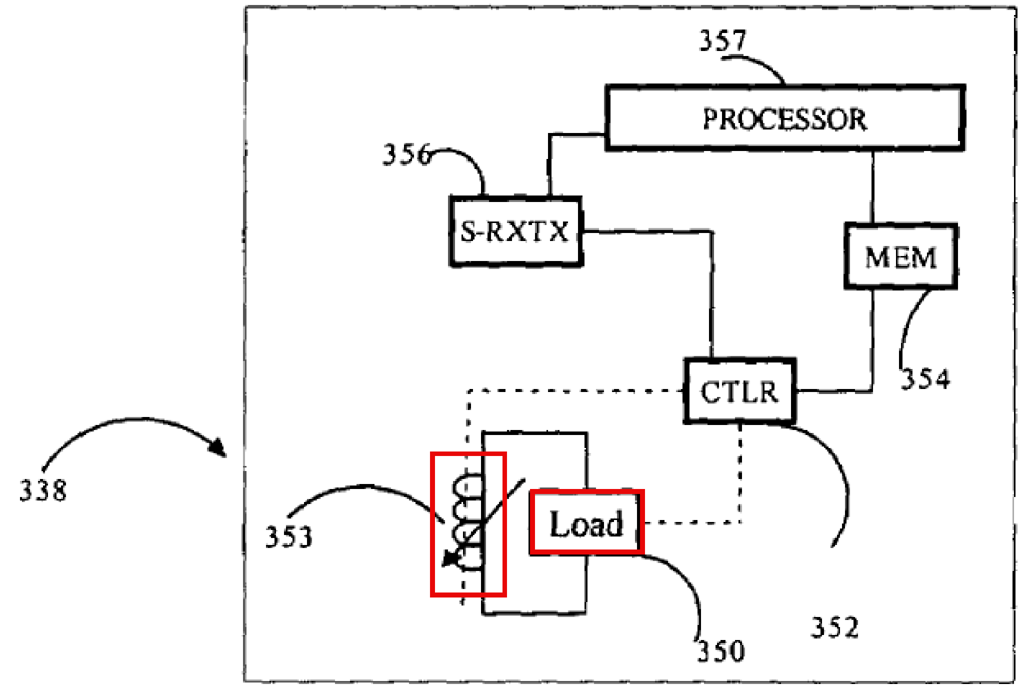


FIG. 8

(EX1007, 9:7-11, Fig. 8 (annotated); EX1005, ¶47.)

The induced AC current meets the claimed "high frequency" AC current. (EX1005, ¶48.) The '568 patent does not define "high frequency," stating only that a high frequency AC current may be "several tens KHz." (EX1001, 6:15-18; EX1005, ¶48.) Baarman-878 discloses, via a patent application incorporated by reference, that the tank circuit (and thus the induced AC current) can operate near 100 KHz, which is on the order of (and higher than) the "high frequency AC current" in the '568 patent. (EX1011, 28; EX1007, 3:58-63; EX1005, ¶48.) Baarman-878 further describes the frequency as variable, and indicates that the secondary winding 353 is coreless and thus can "operate over a wider range of frequencies," which the POSITA would understand to include the claimed high frequency current. (EX1007, 9:12-16; EX1005, ¶48.)

c. [B]

While Baarman-878 describes that its remote device includes a secondary winding 353 that provides induced AC current to a rechargeable battery 350, as described above, Baarman-878 does not detail how the AC current is applied to battery 350 to recharge it. (EX1005, ¶49.) However, the POSITA would understand that an AC signal, such as the AC current induced in the secondary winding 353, is converted to a DC signal (rectified) in order to charge a battery, such as battery 350 in Baarman-878. (*See, e.g.*, EX1013, 1:19-21; EX1005, ¶49.) The POSITA would thus be motivated to look to the prior art for a solution to how to perform this conversion. (EX1005, ¶49.)

Horowitz provides such a solution. (EX1005, ¶50.) Horowitz discloses that "a rectifier changes ac to dc," and provides multiple examples of rectifiers (*e.g.*, bridge rectifiers) that can be used in power supplies such as Baarman-878. (EX1019, 44, 46-47, Fig. 1.74; EX1005, ¶50.) For example, Horowitz discloses that a DC power supply that uses a bridge rectifier to convert an AC input from a secondary coil to a DC output is shown in Figure 1.74:

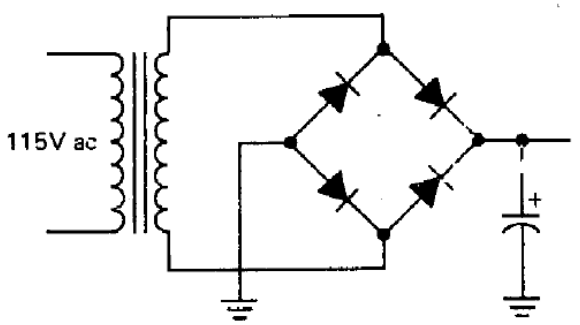


Figure 1.74. Bridge rectifier circuit. The polarity marking and curved electrode indicate a polarized capacitor, which must not be allowed to charge with the opposite polarity.

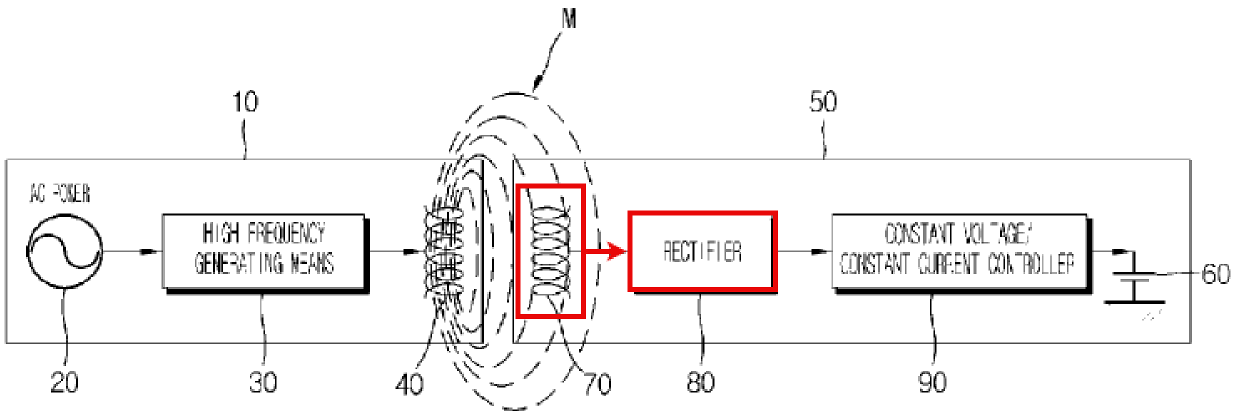
(EX1019, 46-47, Fig. 1.74; EX1005, ¶50.)

Accordingly, the POSITA would have been motivated to combine the rectifier in Horowitz with Baarman-878 to serve the rectifier's intended function: converting the high frequency AC current induced in Baarman-878's secondary winding 353 into a DC current, to apply to battery 350. (EX1005, ¶51.)

The POSITA would have had a reasonable expectation of success in doing so. (EX1005, ¶52.) Rectifiers are established and well-understood circuits that utilize known components, such as diodes, to convert AC signals to DC signals. (*See, e.g.*, EX1016, 131-35; EX1005, ¶52.) For example, Horowitz explains that converting AC to DC is "one of the simplest and most important applications of diodes ([which] are sometimes called rectifiers)." (EX1019, 44-45.) Further, Horowitz's Figure 1.74 illustrates a circuit analogous to Baarman-878: the rectifier is installed in a DC power supply, analogous to Baarman-878's DC power supply that charges battery 350; and the rectifier receives a 115V AC signal from a secondary coil, analogous to Baarman-878's secondary winding 353. (EX1007, 9:7-11, Fig. 8; EX1005, ¶52.) Horowitz further discloses that rectifiers such as shown in Figure 1.74 are easily obtained as prepackaged modules, with a wide array of options to choose from. (EX1019, 46-47; EX1005, ¶52.) The combination of Baarman-878 and Horowitz thus combines prior art elements according to known methods to yield predictable results. (EX1005, ¶52.)

Further, Horowitz's teaching of the rectifier is consistent with the disclosures of the '568 patent. (EX1005, ¶53.) For example, the '568 patent describes a "conventional" contact-less charging method that is "currently widely utilized". (EX1001, 1:57-65, 2:21-32, 2:49-53, Fig. 1; EX1005, ¶53.) According to this known method, a battery charger includes "a rectifier 80 for converting the high frequency AC current induced in the secondary coil 70 into a DC current"—analogous to the Figure 1.74 rectifier of Horowitz and its use in a DC power supply circuit, as shown in Fig. 1 of the '568 patent:

[Fig. 1]



(EX1001, 2:5-12, Fig. 1 (annotated); EX1005, ¶53.)

d. [C]

This element is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶54.) Baarman-878 teaches that remote device 338 includes a remote device controller 352 that controls the battery 350:

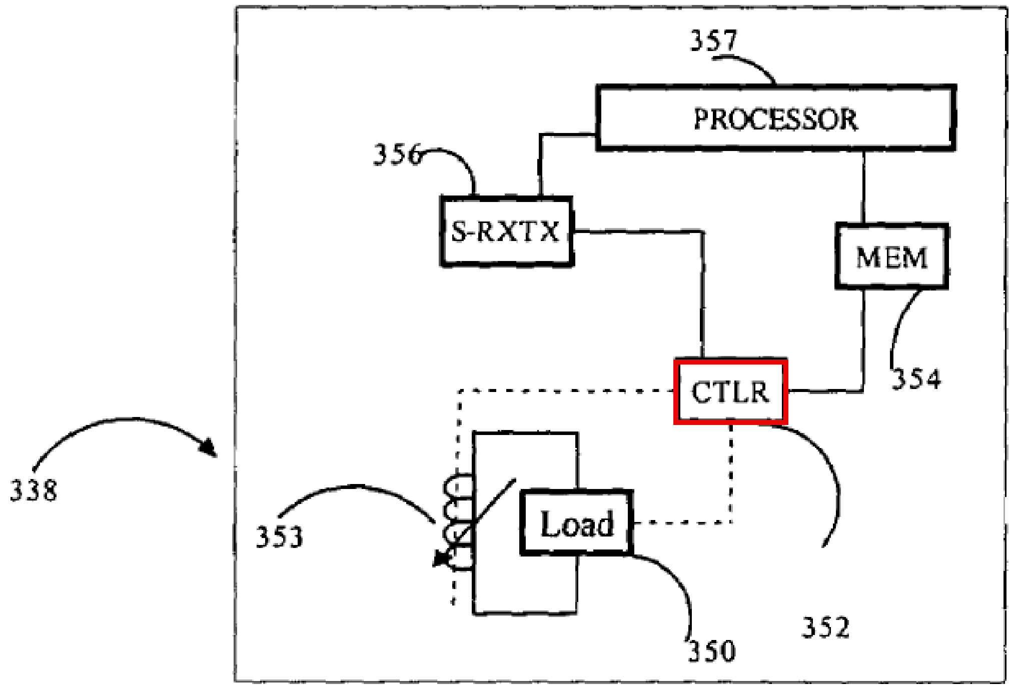


FIG. 8

(EX1007, 9:17-29, Fig. 8 (annotated); EX1005, ¶54.)

The POSITA would have understood that controllers such as controller 352 can be used to manage the charging of the battery, including by regulating voltage and current levels, and by providing functions such as overvoltage protection. (*See, e.g.*, EX1013, 1:22-35; EX1005, ¶55.) Similarly, Baarman-878 discloses that controller 352 can turn the battery on and off, and can control functions of the inductive power supply that charges the battery. (EX1007, 9:17-29; EX1005, ¶55.) Further, in Fig. 8, Baarman-878 shows the controller 352 connected (via dotted lines) to the secondary coil 353 and to the battery 350, indicating that the controller

352 may communicate with those components. (EX1007, Fig. 8; EX1005, ¶55.)

(i) Constant voltage/constant current supplier receiving the DC current from the rectifier

Baarman-878 does not detail specifically how controller 352 controls the charging of battery 350. (EX1005, ¶56.) However, the POSITA would have understood that some rechargeable batteries, including lithium-ion batteries, must be charged according to a constant current/constant voltage process, so that the battery can be charged fully, repeatedly, and safely. (*See* EX1013, 1:36-55; EX1005, ¶56.) Accordingly, in implementing controller 352, the POSITA would have been motivated to look to the teachings of battery charge controllers that supply constant current/constant voltage to the battery. (EX1005, ¶56.)

The POSITA would have looked to the NCP1800 Datasheet, which describes the NCP1800—a "constant current, constant voltage (CCCV) lithium ion battery charge controller" for charging batteries in devices such as cellular phones. (EX1012, 1; EX1005, ¶57.) The NCP1800 Datasheet teaches that, in a "typical application," a CCCV controller receives a DC input signal (V_{IN}), and provides an output signal to charge a battery:

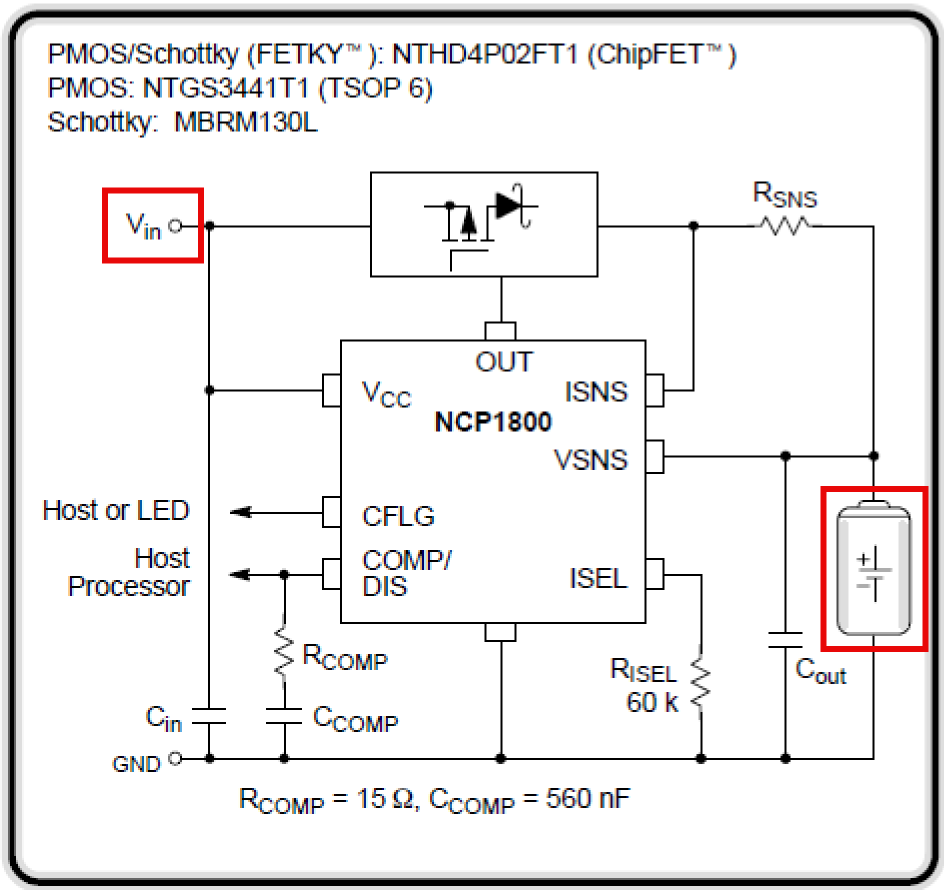


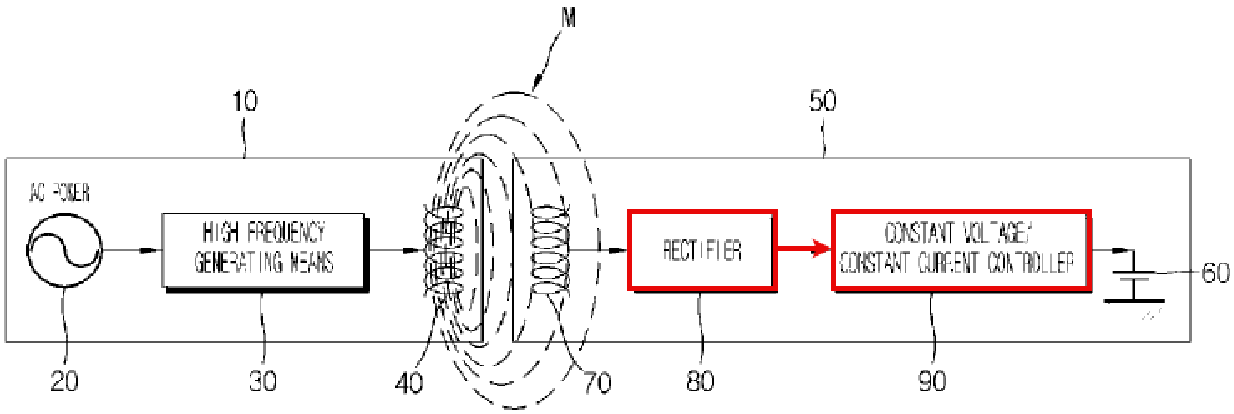
Figure 1. Typical Application

(EX1012, 1, 2, Fig. 1 (annotated); EX1005, ¶57.)

The POSITA would have applied the teachings of the NCP1800 Datasheet to implement controller 352 of Baarman-878. (EX1005, ¶58.) To do so, the POSITA would have applied the output of the rectifier of Horowitz, as described above, to the input of the controller 352. (EX1005, ¶58.) This is because in Baarman-878, an AC current is induced in secondary coil 353; but a CCCV controller (such as disclosed in the NCP1800 Datasheet) accepts a DC signal as input (*e.g.*, V_{IN}). (EX1012, 1, 2, Fig. 1 (annotated); EX1005, ¶58.) The POSITA thus would have appreciated the need to convert the AC signal from Baarman-878's secondary coil 353 to a DC signal for input to the controller; and would have understood Horowitz to teach a rectifier circuit to achieve this goal. (EX1005, ¶58.) The POSITA would have been motivated to make the combination, and would have had a reasonable expectation of success in doing so, for the reasons described above and for [B].

This combination is consistent with the disclosures of the '568 patent. For example, the '568 patent discloses that in a conventional contactless charging method, constant current/constant voltage supply 90 was a "well-known" and "widely used" circuit element for charging a battery. (EX1001, 2:5-20, Fig. 1; EX1005, ¶59.) Fig. 1 illustrates the conventional method, in which constant current/constant voltage supply 90 receives a DC signal from rectifier 80, and provides power to battery cell 60:

[Fig. 1]



(EX1001, 1:64-65, Fig. 1 (annotated); EX1005, ¶59.)

(ii) Supplying a charging power to the battery cell in a constant voltage/constant current mode

The NCP1800 Datasheet further teaches providing a charging power to a battery cell via a constant current/constant voltage charging process. (EX1012, 7-10; EX1005, ¶60.) For example, the NCP1800 Datasheet teaches providing charging power in a "full charge (current regulation)" phase once the battery voltage reaches a first threshold level (V_{PCTH}). (EX1012, 10; EX1005, ¶60.) This is a constant current charging mode in which the charging current is maintained at a constant level (I_{REG}):

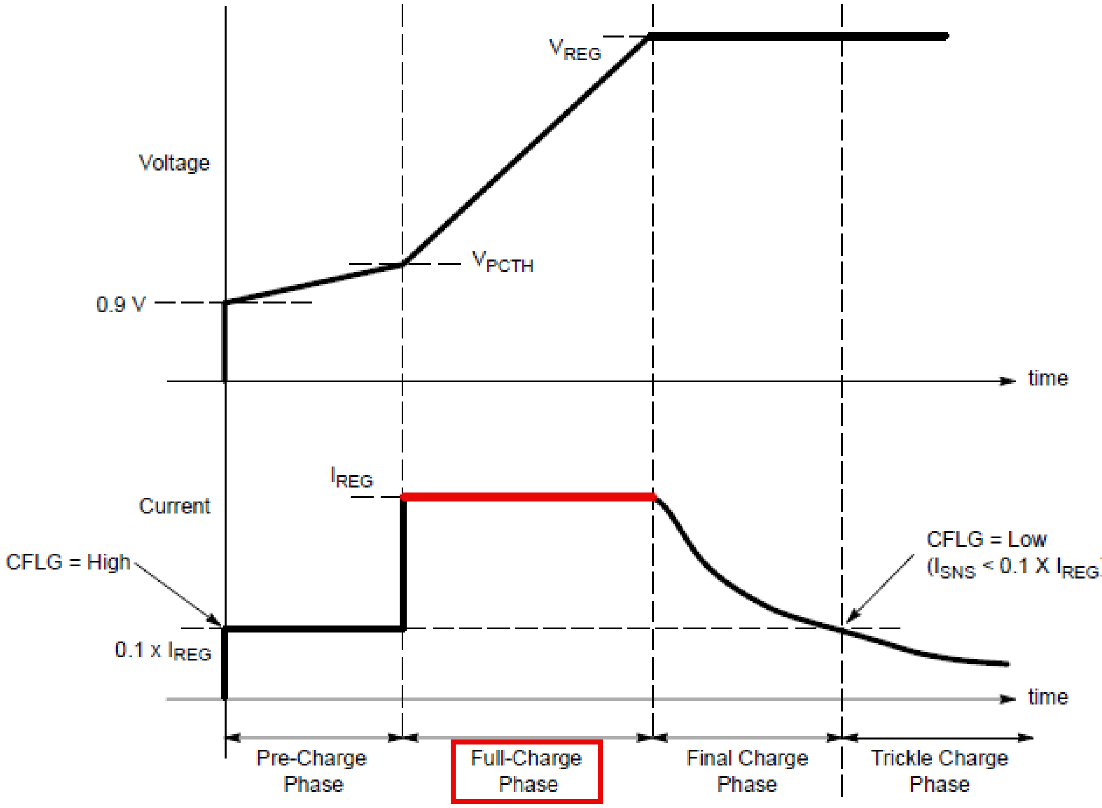


Figure 16. Typical Charging Algorithm

(EX1012, 8-10, Fig. 16 (annotated); EX1005, ¶60.)

Once the battery voltage reaches a second threshold level (V_{REG}), charging power is then provided in a "final charge (voltage regulation)" phase. This is a constant voltage charging mode in which the voltage V_{REG} is maintained, and the charging current decreases based on the state of the battery:

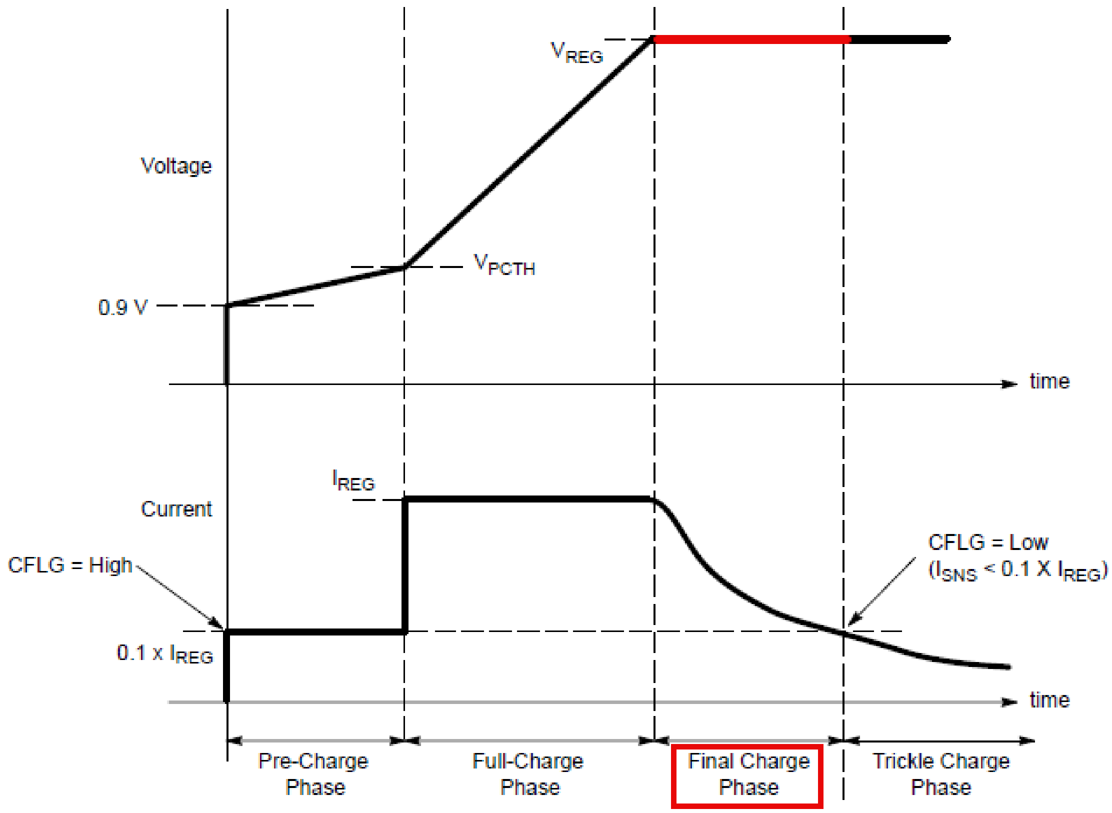


Figure 16. Typical Charging Algorithm

(EX1012, 8-10, Fig. 16 (annotated); EX1005, ¶61.)

The POSITA, motivated as described above, would have applied the teachings of the NCP1800 Datasheet to Baarman-878 and the Horowitz rectifier to meet the claim limitation. (EX1005, ¶62.) Specifically, the POSITA would have implemented Baarman-878's controller 352 according to the NCP1800 Datasheet's teachings of a battery controller (*i.e.*, controller 352) receiving a DC input voltage (*i.e.*, from the rectifier as described above); and providing charging power to a battery (*i.e.*, battery 350) in accordance with a constant current/constant voltage mode. (EX1005, ¶62.)

The POSITA would have enjoyed a reasonable expectation of success in making the combination. (EX1005, ¶63.) First, as the ’568 patent admits, CCCV supplies were “well-known circuit element[s]” that were “widely used” in battery charging devices such as Baarman-878. (EX1001, 2:13-15; EX1005, ¶63; *see also* EX1013, 1:13-61.) Similarly, the ’568 patent admits that in the prior art, it was known to configure a CCCV supply to receive DC current from a rectifier (*e.g.*, rectifier 80), and apply an output signal to a battery cell. (EX1001, 2:13-20, Fig. 1; EX1005, ¶63.) Thus, the application of the NCP1800 Datasheet (which describes an analogous CCCV supply) to Baarman-878 merely involves the application of known techniques. (EX1005, ¶63.) Second, Baarman-878 discloses that its controller 352 can include a “any one of a multitude of commonly available microcontrollers,” such as the Intel 8051 or Motorola 6811; RAM; ROM; and analog and digital outputs. (EX1007, 9:21-29; EX1005, ¶63.) The POSITA would understand that these components of Baarman-878 to be analogous to components disclosed in the NCP1800 Datasheet as implementing a CCCV supply (*e.g.*, “Control” and “Logic” units; analog output voltages). (EX1005, ¶63.) Third, the NCP1800 Datasheet is expressly intended for battery charging circuits, such as Baarman-878; and provides detailed instruction for implementing its teachings, including schematics, electrical characteristics, flowcharts, and guidelines for selecting external components. (EX1012, 1-13; EX1005, ¶63.)

e. [D]

The claimed overvoltage monitoring unit is met by at least by controller 352, implementing a CCCV supply as taught by the NCP1800 Datasheet, in the combination as described above for element [C]. (EX1005, ¶64.)

(i) First and second voltage detectors

The NCP1800 Datasheet teaches first and second voltage detectors that respectively detect first and second voltages at both ends of the CCCV supply. (EX1005, ¶65.) For instance, as shown below, input signal V_{CC} is a first voltage at a first (front) end of the CCCV supply (*e.g.*, a NCP1800 unit), and output signal V_{SNS} is a second voltage at a second (rear) end of the CCCV supply:

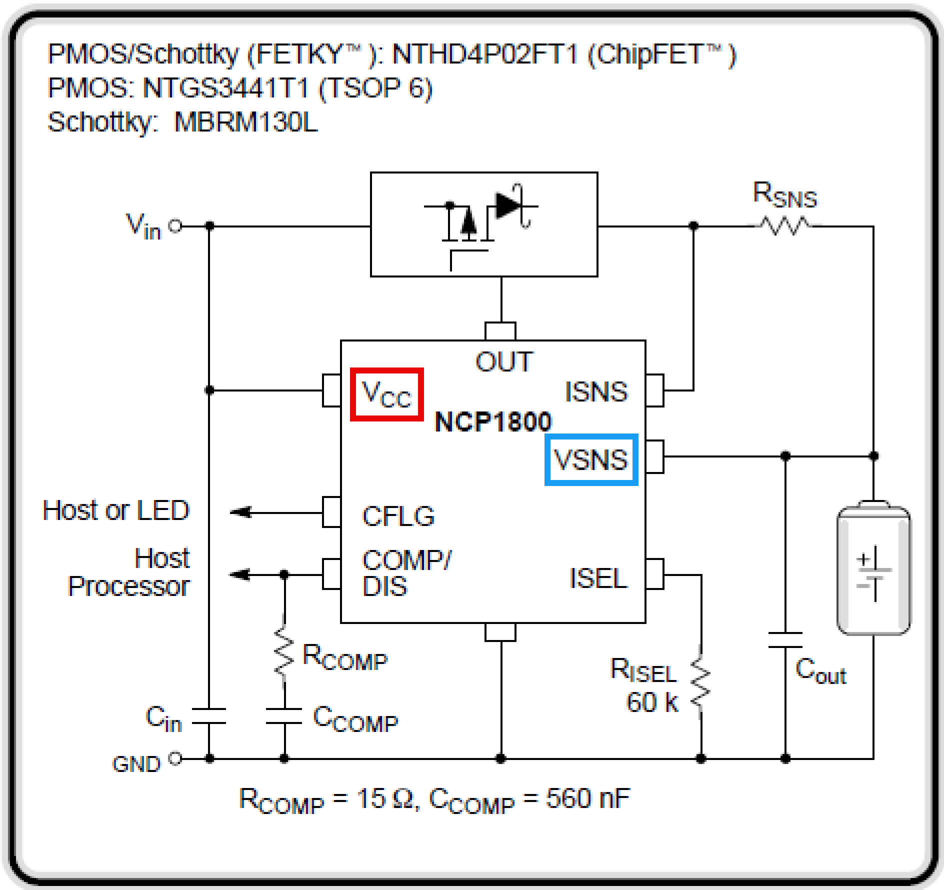


Figure 1. Typical Application

(EX1012, 1, 2, Fig. 1 (annotated); EX1005, ¶65.)

In an internal block diagram, the NCP1800 Datasheet illustrates example first detectors (annotated in red below) that detect the first voltage V_{CC}, and second detectors (blue) that detect the second voltage V_{SNS}:

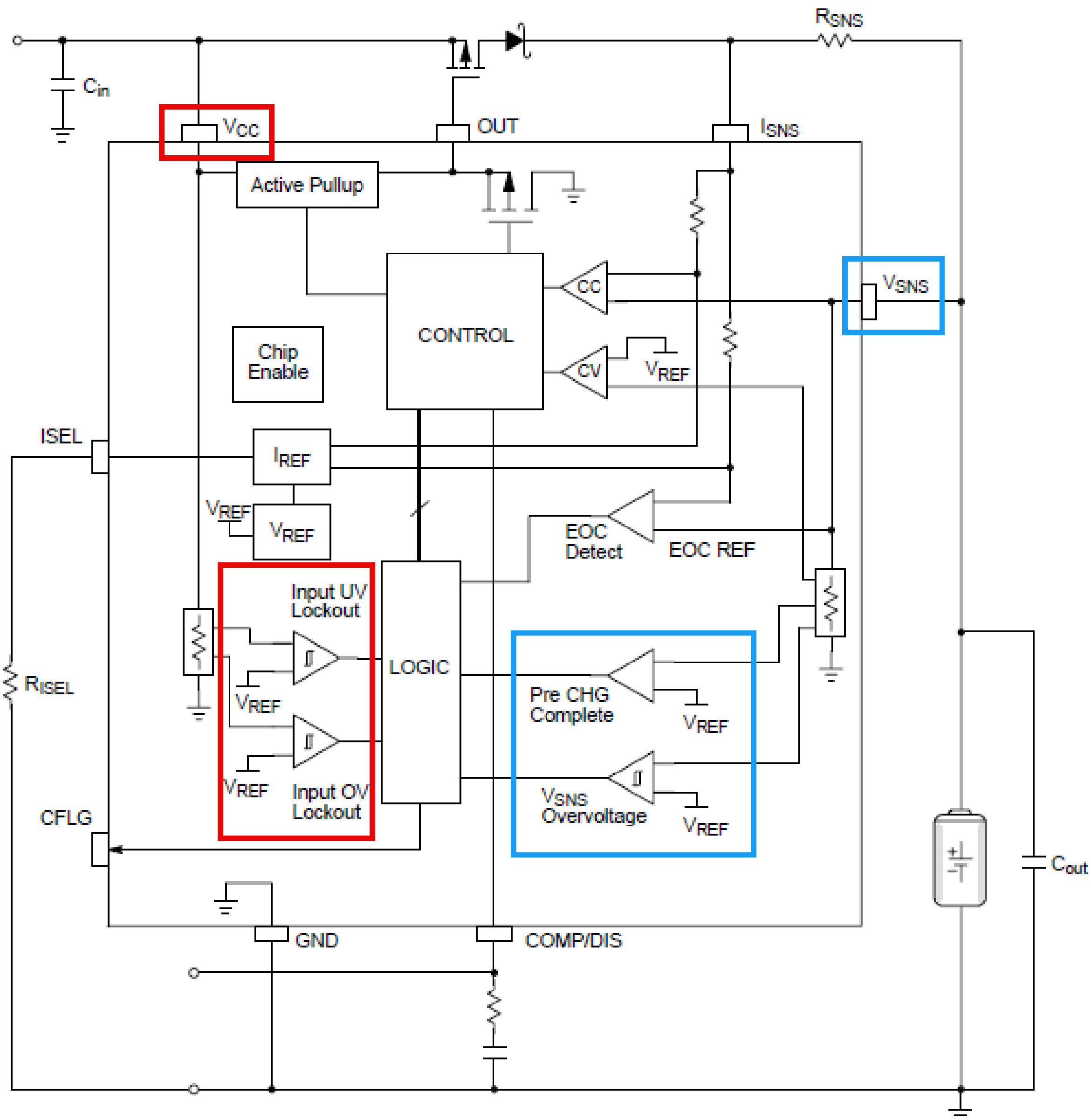


Figure 2. NCP1800 Internal Block Diagram

(EX1012, 1-4, Fig. 2 (annotated); EX1005, ¶66.)

The NCP1800 Datasheet discloses an "Input Over and Under Voltage Lockout" feature. (EX1012, 1; EX1005, ¶67.) For example, as illustrated, V_{CC} is detected and monitored by a logic circuit to determine overvoltage (OV) or undervoltage (UV) conditions; and V_{SNS} is detected and monitored by the logic circuit to determine overvoltage conditions, or whether a pre-charging state has been completed. (EX1012, 1-4, 8, Fig. 2; EX1005, ¶67.)

(ii) Microprocessor monitoring the detected voltages

In the combination of Baarman-878 and the NCP1800 Datasheet, controller 352 implements teachings of the logic circuit disclosed in the NCP1800 Datasheet as monitoring the detected voltages. (EX1005, ¶68.) Controller 352 meets the claimed microprocessor at least because Baarman-878 discloses that controller 352 can include a microcontroller, such as an Intel 8051 or Motorola 6811, which the POSITA would understand to include a microprocessor. (EX1007, 9:21-25; EX1005, ¶68; *see* EX1016, 347-48.) Moreover, the POSITA would have utilized the microcontroller to implement teachings of the "Logic" circuit of the NCP1800 Datasheet. (*See* EX1016, 347-48 (microcontrollers "can replace entire logic circuits" and are "significantly easier to program and are easier to interface with other circuits and devices"); EX1005, ¶68.)

As the NCP1800 Datasheet teaches, monitoring the detected voltages includes one or more of a determination that the first voltage (V_{CC}) exceeds a maximum voltage (V_{OVLO}); a determination that V_{CC} is below a minimum voltage (V_{UVLO}); a determination that the second voltage (V_{SNS}) exceeds a maximum voltage (V_{SOVLO}); and a determination that V_{SNS} has reached a pre-charging voltage (V_{PCTH}). (EX1012, 1-4, 7-10, Figs. 2, 14, 15; EX1005, ¶69.) The NCP1800

Datasheet discloses that these determinations are used to control the battery charging "precisely and safely." (EX1012, 10; EX1005, ¶69.) For example, the determinations are used to transition between various charging modes and fault modes, as illustrated in Fig. 14:

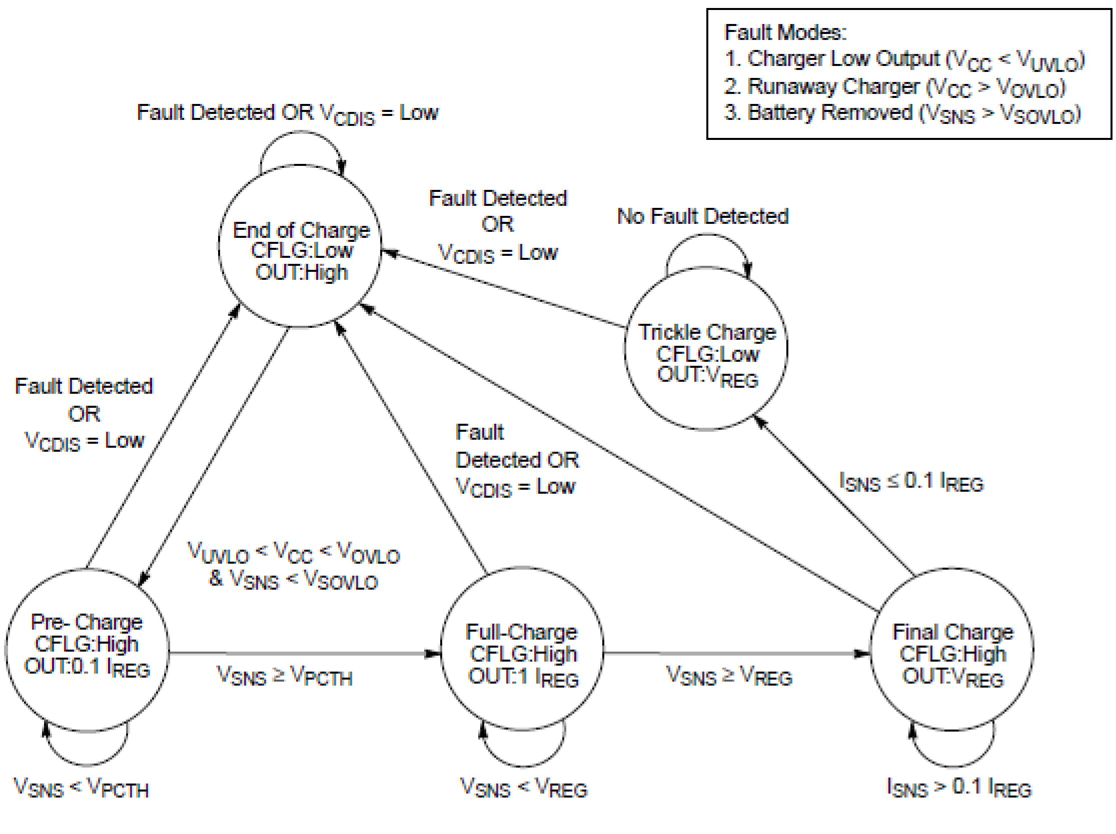


Figure 14. NCP1800 State Machine Diagram

(EX1012, Fig. 14; EX1005, ¶69.)

The NCP Datasheet also discloses disconnecting the power supply input if V_{CC} is determined to exceed the maximum voltage. (EX1012, 10; EX1005, ¶70.)

(iii) Transmitting a monitoring result to the charging device

Controller 352 wirelessly communicates with the power supply 305 via remote transceiver (S-RXTX) 356:

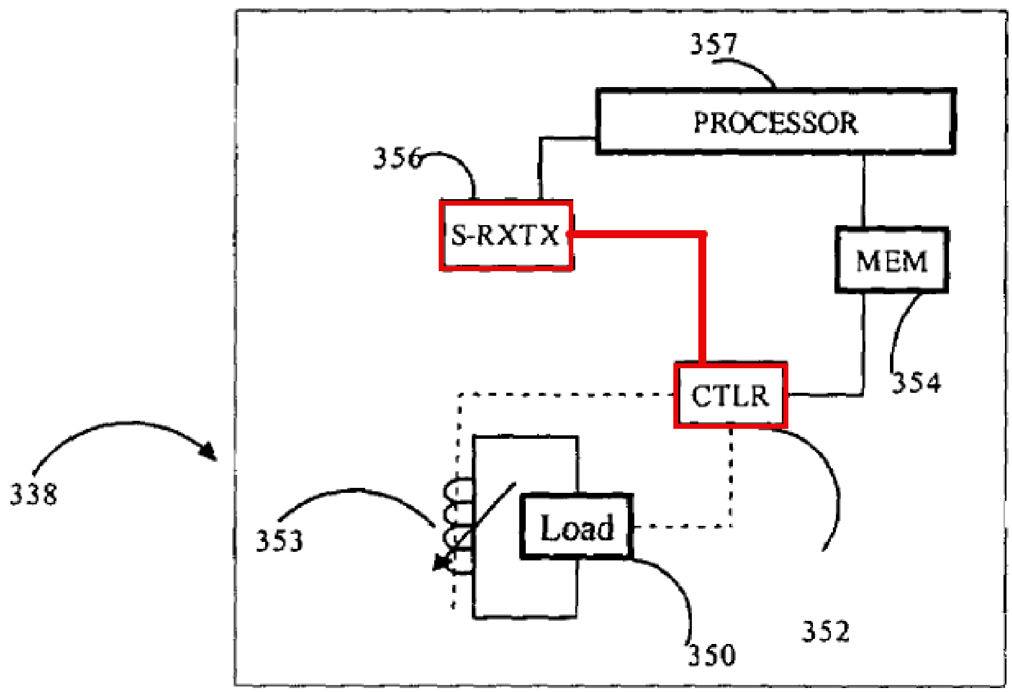


FIG. 8

(EX1007, 9:36-38, Fig. 8 (annotated); EX1005, ¶71.)

Remote transceiver 356 uses Wi-Fi, infrared, Bluetooth, or cellular communications to wirelessly transmit signals to the power supply's transceiver 336. (EX1007, 9:36-41, Fig. 8; EX1005, ¶72.) The two transceivers can also communicate wirelessly via the primary or secondary windings, or via power line communication systems. (EX1007, 9:41-45; EX1005, ¶72.) Power supply transceiver (P-RXTX) 336, in turn, provides signals received from the remote device 338 to the power supply controller 326:

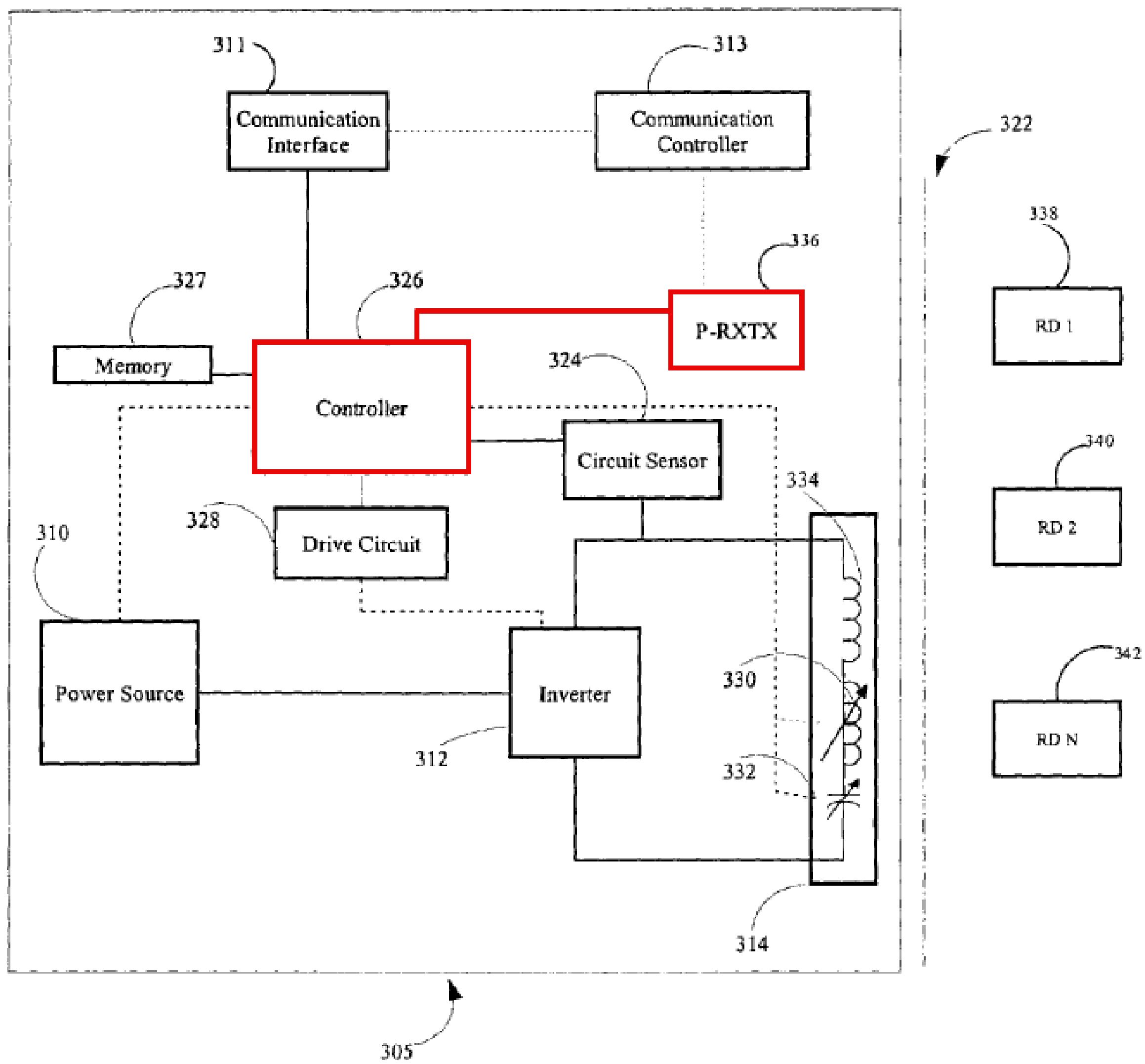


Fig. 7

(EX1007, 8:47-51, Fig. 7 (annotated); EX1005, ¶72.)

Baarman-878 teaches that in remote device 338, controller 352 controls the operation of battery 350 by "controlling the various functions within the adaptive inductive power supply," *i.e.*, by communicating control signals to the power supply controller 326. (EX1007, 9:17-29, Fig. 8; EX1005, ¶73.) The received signals can be used by power supply controller 326 to induce a change in intensity of the magnetic field generated at the primary winding 334. (EX1007, 8:8-12, 10:4-64, Fig. 9; (EX1005, ¶73.) For example, controller 326 can manipulate the rail voltage of the power source 310, thereby changing the amplitude of the inverter 312. (EX1007, 8:8-12; EX1005, ¶73.) As described above for element [A], inverter 312 supplies AC power to tank circuit 314. (EX1007, 7:46-51; EX1005, ¶73.) The POSITA would thus understand that changing the inverter amplitude will accordingly change the amplitude of the AC power; and thus the intensity of the magnetic field generated at the tank circuit's primary winding 334 by the Biot-Savart Law and Faraday's Law. (EX1007, 7:46-51, 8:41-46; EX1017, 589-601, 780-89; EX1005, ¶73.)

To the extent not expressly disclosed in Baarman-878 or the NCP1800 Datasheet, it would have been obvious for the controller 352 to use remote transceiver 356 to transmit to the power supply a result of the monitoring described above for element [C]. (EX1005, ¶74.) Baarman-878 does not detail the exact nature of the control signals transmitted to the power supply; the POSITA would thus have been motivated to look to prior art references, such as the NCP1800 Datasheet, to supply this information. (EX1005, ¶74.) As the NCP1800 Datasheet explains, the first and second voltages (V_{CC} and V_{SNS}) are monitored to control battery charging "precisely and safely," such as by protecting the circuit from overvoltage conditions. (EX1012, 10; EX1005, ¶74.) And controller 352 wirelessly transmits signals to control the power supply, in order to control the battery 350. (EX1007, 9:17-29, Fig. 8; EX1005, ¶74.) The POSITA would thus have utilized controller 352 to transmit a monitoring result—*e.g.*, an instruction to lower the rail voltage, thus reducing the AC current provided to the primary winding (and thus induced in the secondary winding), based on a determination that V_{CC} is too high—to the power supply, in order to control the battery precisely (*e.g.*, within defined input voltage parameters) and safely (*e.g.*, avoiding overvoltage conditions). (EX1005, ¶74.)

f. [E]

As described above for element [D], the monitoring result includes a wireless feedback control signal transmitted via transceiver 356, which adjusts a power applied to the primary winding 334 and thus induces a change of intensity of the magnetic field. (EX1005, ¶75.)

Inducing the change of intensity is based on relative positions of the chargeable battery 350 and the external charging device 305. (EX1005, ¶76.) As described above, battery 350 belongs to remote device 338, which also includes secondary winding 353. (EX1005, ¶76.) And charging device 305 includes primary winding 334. (EX1005, ¶76.) The POSITA would understand that, in typical implementations, by Faraday's Law, as the remote device 338 and the charging device 305 become closer, and the air gap accordingly becomes smaller, the magnetic flux of the secondary winding 353 increases, and the induced current in the secondary winding becomes greater (and vice versa). (EX1017, 784-85; EX1005, ¶76.) Thus, bringing the remote device 338 toward the charging device 305 closer can increase the induced signal and result in an overvoltage condition (*e.g.*, the first voltage and/or second voltage exceeding a maximum voltage), prompting the monitoring result and power supply adjustment signal as described above. (EX1005, ¶76.) This sequence is analogous to the admitted "prior art" charging method described in the '568 patent. (EX1001, 2:21-32; EX1005, ¶76.)

(i) *Ex parte* Reexamination

In the prior art combination, inducing the change of intensity based on relative positions of the battery and the charging device is analogous to representations made by the '568 patent's owner to the USPTO during the *ex parte* reexamination. (EX1005, ¶77.) In that proceeding, the claims were rejected under 35 U.S.C. §112 for lack of specification support. (EX1004B, 688-91) To overcome the rejection, the patent owner directed the Examiner to the '568 specification disclosure (*e.g.*, EX1001 at 2:21-32), and argued as follows:

> That is, the chargeable battery provides an adjustment request signal

> based on an excessive charging power being transmitted to the chargeable battery. This excessive charging power is generated based on the relative position of the secondary coil of the chargeable battery and the primary coil of the contact-less charging device. The contact-less charging device then adjusts the power applied to its primary coil based on the adjustment request signal, which is based on the relative positions of the chargeable battery and the contact-less charging device. ***Accordingly, the prior patent supports the claim language "adjusting a power applied to the primary coil of the external contact-less charging device based on relative positions of the contact-less chargeable battery and the external contactless charging device."***

(EX1004B, 1224-28 (emphasis added).)

The patent owner's argument is analogous to the combination of Baarman-878 and the NCP1800 Datasheet. (EX1005, ¶78.) That is, in the combination, the chargeable battery (of remote device 338) provides an adjustment request signal (via transceiver 356) based on an excessive charging power (*e.g.*, V_{CC} or V_{SNS} exceeding an overvoltage limit). (EX1005, ¶78.) The excessive charging power is generated based on the relative position of the primary and secondary windings (*e.g.*, based on primary winding 334 of charging device 305 approaching secondary winding 353 of remote device 338). (EX1005, ¶78.) And the charging device 305 adjusts the power applied to primary winding 334 based on the adjustment request signal (*e.g.*, by reducing a rail voltage). (EX1005, ¶78.)

(Notably, while these elements are found in the prior art, as demonstrated above, neither Baarman-878 nor the NCP1800 was before the Office during prosecution, including the reexamination.)

5. Claim 5

Claim 5 is met by Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶79.)

a. [Preamble]

See claim 1. (EX1005, ¶80.)

b. [A]

See claim 11[A]. (EX1005, ¶81.)

6. Claim 7

Claim 7 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶82.)

a. [Preamble]

The preamble is met at least by remote device 338 as described for claim 1. (EX1005, ¶83.)

b. [A]

See claim 1[A]. (EX1005, ¶84.)

c. [B]

See claim 1[B]. (EX1005, ¶85.)

d. [C]

See claim 1[C]. (EX1005, ¶86.)

e. [D]

See claim 1[D]. (EX1005, ¶87.)

f. [E]

See claim 1[E]. (EX1005, ¶88.)

7. Claim 8

Claim 8 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶89.)

a. [Preamble]

See claim 7. (EX1005, ¶90.)

b. [A]

See claim 1[A]. (EX1005, ¶91.) Magnetic flux of the magnetic field generated from power supply 305 (via primary winding 334) is inductively linked to secondary winding 353 by Faraday's Law. (*See* EX1017, 780-89; EX1005, ¶91.)

8. Claim 11

Claim 11 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶92.)

a. [Preamble]

The preamble is met as described above for claim 7. (EX1005, ¶93.)

b. [A]

See claim 1[D]. (EX1005, ¶94.) For example, controller 352 transmits a monitoring result to controller 326 to "control[] the various functions within the adaptive inductive power supply," *e.g.*, by requesting that controller 326 decrease the rail voltage of power source 310. (EX1007, 8:8-12, 9:17-29, 10:4-64, Figs. 8, 9; (EX1005, ¶94.)

9. Claim 13

Claim 13 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶95.)

a. [Preamble]

See claim 1. (EX1005, ¶96.) For example, charging device 305 meets the claimed charging device, and remote device 338 meets the claimed chargeable battery. (EX1005, ¶96.) The monitoring result is met as described for 1[D] and 1[E]; that is, voltages V_{CC} and V_{SNS} are monitored as taught by NCP1800 Datasheet, with the monitoring result transmitted wirelessly to Baarman-878's charging device as described for 1[D](iii). (EX1005, ¶96.)

b. [A]

See claim 1[A]. (EX1005, ¶97.) For example, primary winding 334 receives an AC current and forms a magnetic field as described for 1[A].

(EX1005, ¶97.)

c. [B]

In Baarman-878, inverter 312 "acts as an AC power source supplying the AC power to tank circuit 314," which includes the primary winding 334. (EX1007, 7:46-52, 8:41-46, EX1005, ¶98.) Inverter 312 and tank circuit 314 thus operate as a power driving unit to apply the high frequency AC current to the primary winding 334. (EX1005, ¶98.)

d. [C]

See claim 1[A] and [D]. (EX1005, ¶99.) At least the power supply controller 326 meets the claimed microprocessor; controller 326 wirelessly receives the monitoring result from the battery 350 (*i.e.*, via controller 352 of remote device 338), as described for claim 1[D][(iii). (EX1005, ¶99.) Power supply controller 326 controls the high frequency power driving unit (*i.e.*, inverter 312, tank circuit 314) as described for claim 1[D](iii). (EX1005, ¶99.)

e. [D]

See claim 1[E]. (EX1005, ¶100.)

10. Claim 14

Claim 14 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶101.)

a. [Preamble]

See claim 13. (EX1005, ¶102.)

b. [A]

See claim 13[A]. (EX1005, ¶103.) Inverter 312 applies a high frequency AC current to both sides of primary winding 334:

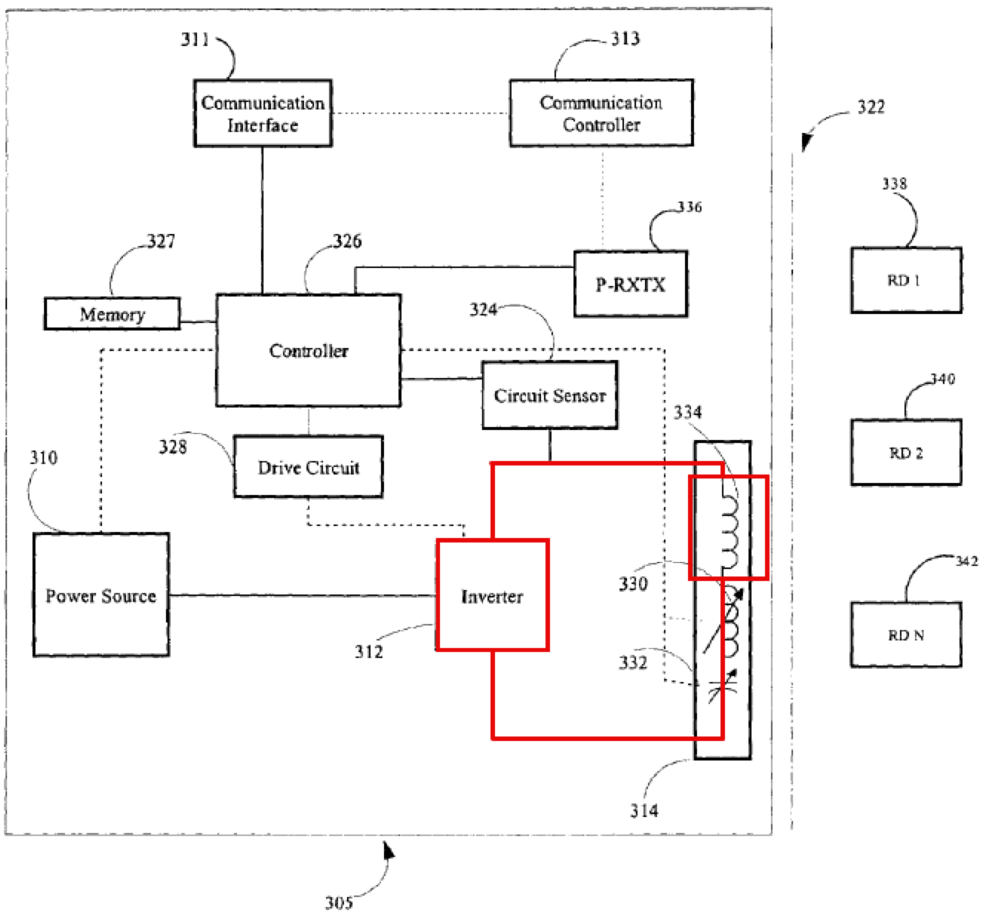


Fig. 7

(EX1007, 7:46-52, Fig. 7 (annotated); EX1005, ¶103.)

11. Claim 15

Claim 15 is met based on Baarman-878 in view of NCP1800 Datasheet and

Horowitz. (EX1005, ¶104.)

a. [Preamble]

See claim 13. (EX1005, ¶105.)

b. [A]

See claim 13[C]. (EX1005, ¶106.) Controller 326 receives the monitoring result via wireless transceiver 336; the POSITA would understand the result to be received via an antenna as for Ground 2, claim 3[A]. (EX1007, 8:47-52, Fig. 7; EX1005, ¶106.)

12. Claim 16

Claim 16 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶107.)

a. [Preamble]

See claim 15. (EX1005, ¶108.)

b. [A]

In Baarman-878, power source 310 provides DC current to inverter 312:

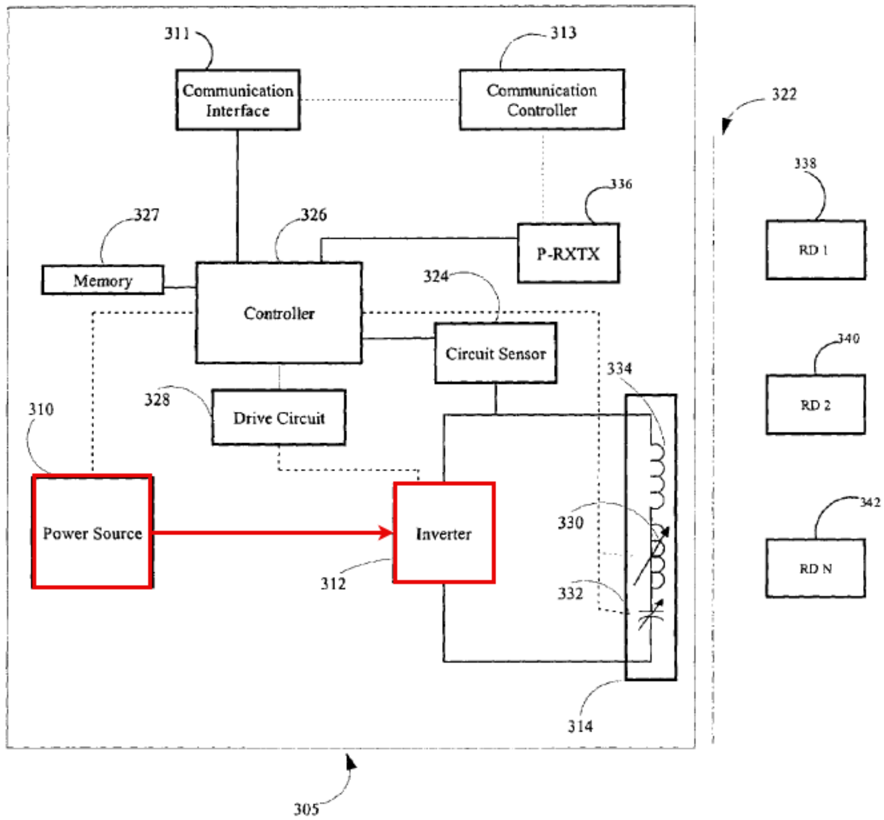


Fig. 7

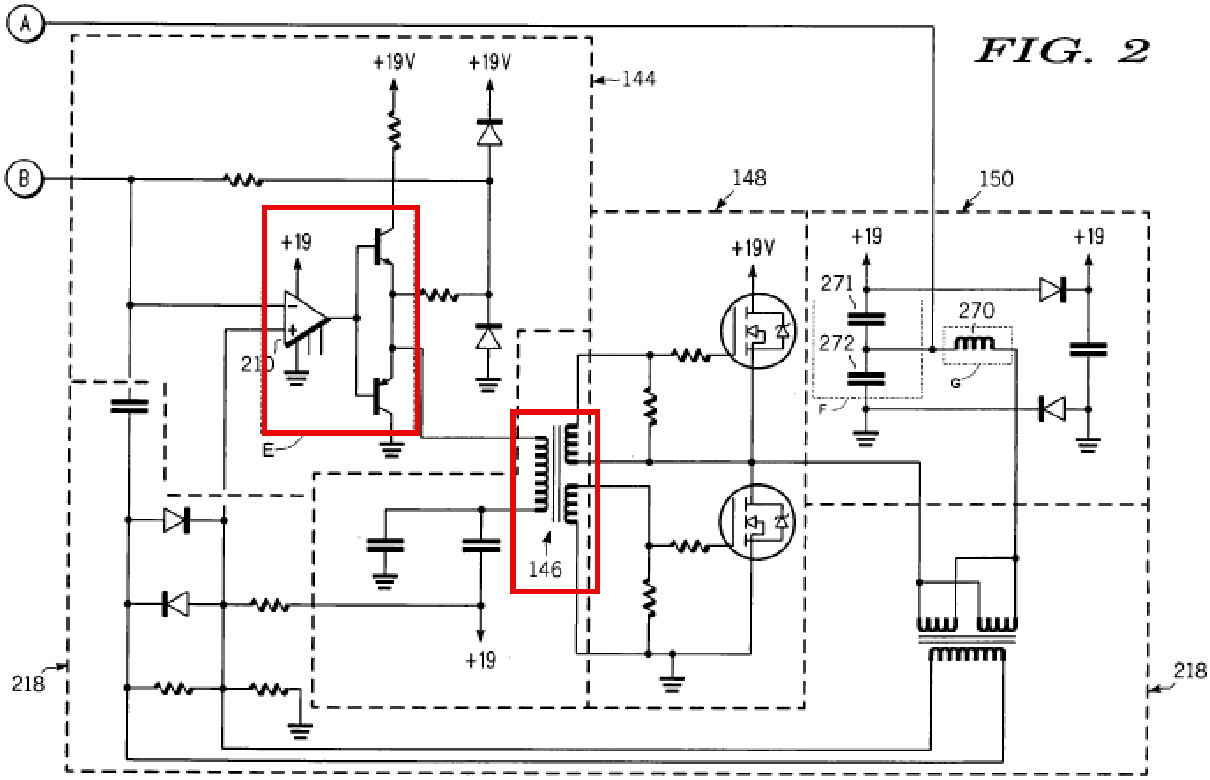
(EX1007, 7:46-50, Fig. 7 (annotated); EX1005, ¶109.)

The POSITA would understand power source 310 to receive a common AC current and convert that AC current to DC current. (EX1005, ¶110.) Baarman-878 discloses that power source 310 outputs DC current, which the POSITA would understand to be a constant-voltage current (*e.g.*, based on a constant rail voltage), to inverter 312. (EX1007, 7:46-50, 8:9-12, Fig. 7; EX1005, ¶110.) Baarman-878 incorporates Appl. No. 10/246,155, which discloses that in an embodiment, power is provided "from an external power source, such as a conventional power outlet," which the POSITA would understand to provide AC current. (EX1011, 12;

EX1007, 3:58-63; EX1005, ¶110.) This is analogous to the ’568 patent, which describes that, in a “conventional contact-less charging method,” a charger 10 receives power from a “common AC power source 20.” (EX1001, 1:64-2:4, Fig. 1; EX1005, ¶110.) To the extent not expressly disclosed, it would have been obvious for the power source 310 to receive AC current from a conventional power outlet as described in Appl. No. 10/246,155. (EX1005, ¶110.) This is at least because the POSITA would understand that power source 310 must have receive input power from somewhere, but Baarman-878 does not expressly disclose the input power source; the POSITA would have understood the conventional power output to be a desirable input power source at least due to its ubiquity. (EX1005, ¶110.) Further, it would have been obvious to the POSITA for the power source 310 to convert the AC current to DC current, because such conversion would be required for the power source 310 to provide the DC current to inverter 312 as described in Baarman-878. (EX1005, ¶110.)

c. [B]

Baarman-878 discloses that in an inductive ballast circuit, a phase delay can be inserted into the high frequency power driving unit (*e.g.*, at point E in the below figure, before drive 146), and used to “delay the signal”; this can be used to “throttle the phase and control secondary amplitude.”



(EX1007, 5:4-6, 6:36-42, Figs. 2 (annotated), 4; EX1005, ¶111.)

Baarman-878 discloses that the phase delay circuitry may include a delay line or a DSP that is connected to a wave shaper and drive circuit 16. (EX1007, 6:36-42, EX1005, ¶112.) The POSITA would understand the circuit including the phase delay, wave shaper, and drive circuit to meet the pulse signal generator at least by receiving a control signal from the microprocessor, *e.g.*, as shown in Fig. 4, and outputting a pulse signal (*i.e.*, a signal with pulses separated by the delays introduced by the circuit):

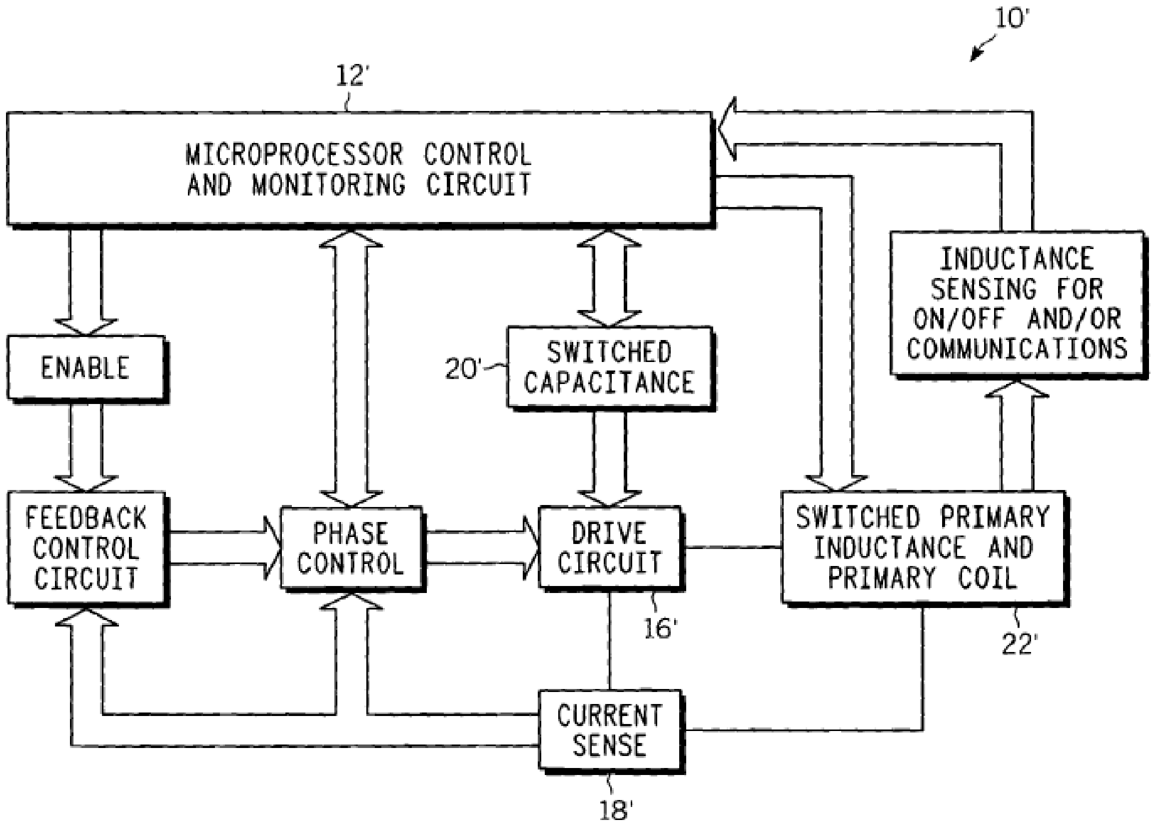


FIG. 4

(EX1007, 6:36-42, Fig. 4; EX1005, ¶112.)

d. [C]

This element is met based on Baarman-878. (EX1005, ¶113.) For example, as described above for element [B], phase delay circuitry may include a delay line or a DSP that is connected to a wave shaper and drive circuit. (EX1007, 6:36-42, EX1005, ¶113.) Baarman-878 discloses, with respect to Fig. 7, that an analogous drive circuit 328 regulates the operation of inverter 312. (EX1007, 8:5-8; EX1005, ¶113.) To the extent not expressly disclosed, it would have been obvious to the

POSITA for drive circuit 328 to receive a pulse signal via a phase delay circuit as described above for element [B]; and to thereby generate a high frequency AC current in a corresponding pulse pattern via inverter 312. (EX1005, ¶113.) This is at least because Baarman-878 explains that Fig. 7 (along with Figs. 6, 8, and 9) "enhance[s] and explain[s]" the system of Figs. 1-5, such that the drive circuit 328 of Fig. 7 describes an "enhanced" version of the drive circuit 16 or 16' shown in Figs. 1-5. (EX1007, 7:20-21; EX1005, ¶113.)

13. Claim 17

Claim 17 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶114.)

a. [Preamble]

See claim 16. (EX1005, ¶115.)

b. [A]

See claim 1[D]. (EX1005, ¶116.) For example, the microprocessor adjusts an amplitude of a pulse by adjusting the rail voltage as described for 1[D]. (EX1005, ¶116.)

14. Claim 18

Claim 18 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶117.)

a. [Preamble]

See claim 16. (EX1005, ¶118.)

b. [A]

See claim 16[A]. (EX1007, 4:58-5:3, Fig. 2; EX1005, ¶119.) To the extent not expressly disclosed, it would have been obvious for the power supply to include an overvoltage filter; the POSITA would have understood such a filter to be a basic and well-understood circuit protection component. (EX1005, ¶119.)

c. [B]

See claim 16[A]. (EX1005, ¶120.) To the extent not expressly disclosed, it would have been obvious to the POSITA for the power supply to include a rectifier, such as the bridge rectifier described in Horowitz, to convert AC current to DC current such as described for claim 1[B]. (EX1019, 44, 46-47, Fig. 1.74; EX1005, ¶120.)

d. [C]

Fig. 2 of Baarman-878 shows a ballast circuit configured to receive the converted DC current (*e.g.*, 19 volts) and output a constant voltage current (*e.g.*, to tank circuit 150). (EX1007, 4:61-65, Fig. 2; EX1005, ¶121.)

15. Claim 19

Claim 19 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶122.)

a. [Preamble]

See claim 13. (EX1005, ¶123.)

b. [A]

Baarman-878 teaches applying the AC current via a phase delay circuit, used to "delay the signal," as described above for claim 16[B]. (EX1007, 5:4-6, 6:36-42, Figs. 2, 4; EX1005, ¶124.) To the extent not expressly disclosed, it would have been obvious to the POSITA that the application of the phase delay circuit would (or could be readily configured to) result in intermittent application of the AC current. (EX1005, ¶124.)

c. [B]

See claim 13[C]. (EX1005, ¶125.) Further, the POSITA would understand that controller 326 receives the monitoring result without regard to whether the high frequency AC current is applied and including in intervals when the current is not applied. (EX1005, ¶125.)

16. Claim 21

Claim 21 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶126.)

a. [Preamble]

See claim 1[Preamble] and claim 13[Preamble]. (EX1005, ¶127.)

b. [A]

See claim 1[A]. (EX1005, ¶128.) Further, Baarman-878 teaches using a phase delay circuit to "delay the signal" used to drive the primary winding, as described above for claim 16[B]. (EX1007, 5:4-6, 6:36-42, Figs. 2, 4; EX1005, ¶128.) To the extent not expressly disclosed, it would have been obvious to the POSITA that the application of the phase delay circuit to "delay the signal" would (or could be readily configured to) result in intermittent application of the drive signal to the primary winding; which in turn will result in intermittent induction of the AC current in the secondary winding. (EX1005, ¶128.)

c. [B]

See claim 1[B]. (EX1005, ¶129.)

d. [C]

See claim 1[C]. (EX1005, ¶130.)

e. [D]

See claim 1[D]. (EX1005, ¶131.) Further, the POSITA would understand controller 353 to transmit the monitoring result without regard to whether the high frequency AC current is induced and including in intervals when the current is not induced. (EX1005, ¶131.)

f. [E]

See claim 13[A]. (EX1005, ¶132.)

g. [F]

See claim 19[A]. (EX1005, ¶133.)

h. [G]

See claim 13[C]. (EX1005, ¶134.)

i. [H]

See claim 13[D]. (EX1005, ¶135.)

17. Claim 23

Claim 23 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶136.)

a. [Preamble]

The preamble is met as for claim 13[Preamble]. (EX1005, ¶137.)

b. [A]

See claim 21[F]. (EX1005, ¶138.)

c. [B]

See claim 1[A] and 21[F]. (EX1005, ¶139.) As the POSITA would recognize, magnetic flux of the magnetic field generated from power supply 305 (primary winding 334) is inductively linked to secondary winding 353 by Faraday's Law. (*See* EX1017, 780-89; EX1005, ¶139.) Further, Baarman-878 teaches using a phase delay circuit to "delay the signal" used to drive the primary winding, as described above for claim 16[B]. (EX1007, 5:4-6, 6:36-42, Figs. 2, 4; EX1005, ¶139.) To the extent not expressly disclosed, it would have been obvious to the POSITA that the application of the phase delay circuit to "delay the signal" would (or could be readily configured to) result in intermittent application of the drive signal to the primary winding; which in turn will result in intermittent induction of the AC current in the secondary winding via the linked magnetic flux. (EX1005, ¶139.)

d. [C]

See claim 1[B]. (EX1005, ¶140.)

e. [D]

See claim 1[C]. (EX1005, ¶141.)

f. [E]

See claim 21[D]. (EX1005, ¶142.)

g. [F]

See claim 13[C]. (EX1005, ¶143.)

h. [G]

See claim 13[D]. (EX1005, ¶144.)

18. Claim 25

Claim 25 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶145.)

a. [Preamble]

See claim 1. (EX1005, ¶146.)

b. [A]

See claim 30[A] below. (EX1005, ¶147.)

19. Claim 26

Claim 26 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶148.)

a. [Preamble]

See claim 1. (EX1005, ¶149.)

b. [A]

See claim 1[D] and [E]. (EX1005, ¶150.)

20. Claim 27

Claim 27 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶151.)

a. [Preamble]

See claim 1. (EX1005, ¶152.)

b. [A]

See claim 32[A]. (EX1005, ¶153.)

21. Claim 28

Claim 28 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶154.)

a. [Preamble]

See claim 1. (EX1005, ¶155.)

b. [A]

See claim 33[A]. (EX1005, ¶156.)

22. Claim 29

Claim 29 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶157.)

a. [Preamble]

See claim 1. (EX1005, ¶158.)

b. [A]

See claim 34[A]. (EX1005, ¶159.)

23. Claim 30

Claim 30 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶160.)

a. [Preamble]

See claim 7. (EX1005, ¶161.)

b. [A]

See claim 1[C] and [D]. (EX1005, ¶162.) As described for 1[D](ii), at least the teachings of the "Logic" circuit disclosed in the NCP1800 Datasheet would be controlled by controller 352, which includes a microprocessor. (EX1005, ¶162.)

24. Claim 31

Claim 31 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶163.)

a. [Preamble]

See claim 7. (EX1005, ¶164.)

b. [A]

See claim 1[B], [C], and [D]. (EX1005, ¶165.) As described for 1[D], controller 352 can control the charging of battery 350 by controlling functions within the inductive power supply. (EX1007, 9:17-29; EX1005, ¶165.) For example, controller 352 can use wireless feedback control to manipulate the rail voltage of the power source 310, thereby changing the amplitude of the AC power provided to primary winding 334—and, thus, the amplitude of the induced AC current at secondary winding 353. (EX1005, ¶165.) This accordingly changes the DC input voltage (V_{CC}) provided to the front end of CCCV supply, as described in 1[B] and 1[C]. (EX1005, ¶165.)

By controlling V_{CC}, controller 352 also controls the battery voltage V_{SNS} at the rear end of the CCCV supply. (EX1005, ¶166.) For example, as the NCP1800 Datasheet teaches, the CCCV supply enters a battery charging mode (in which V_{SNS} increases with the battery charge) based on the value of V_{CC}. (EX1012, 1-4, 7-10, Figs. 2, 14-16; EX1005, ¶166.) For example, the CCCV supply will only charge the battery (*i.e.*, in a conditioning phase, current regulation phase, or voltage regulation phase) if V_{CC} is greater than V_{UVLO} and less than V_{OVLO} (indicating that a fault is not present):

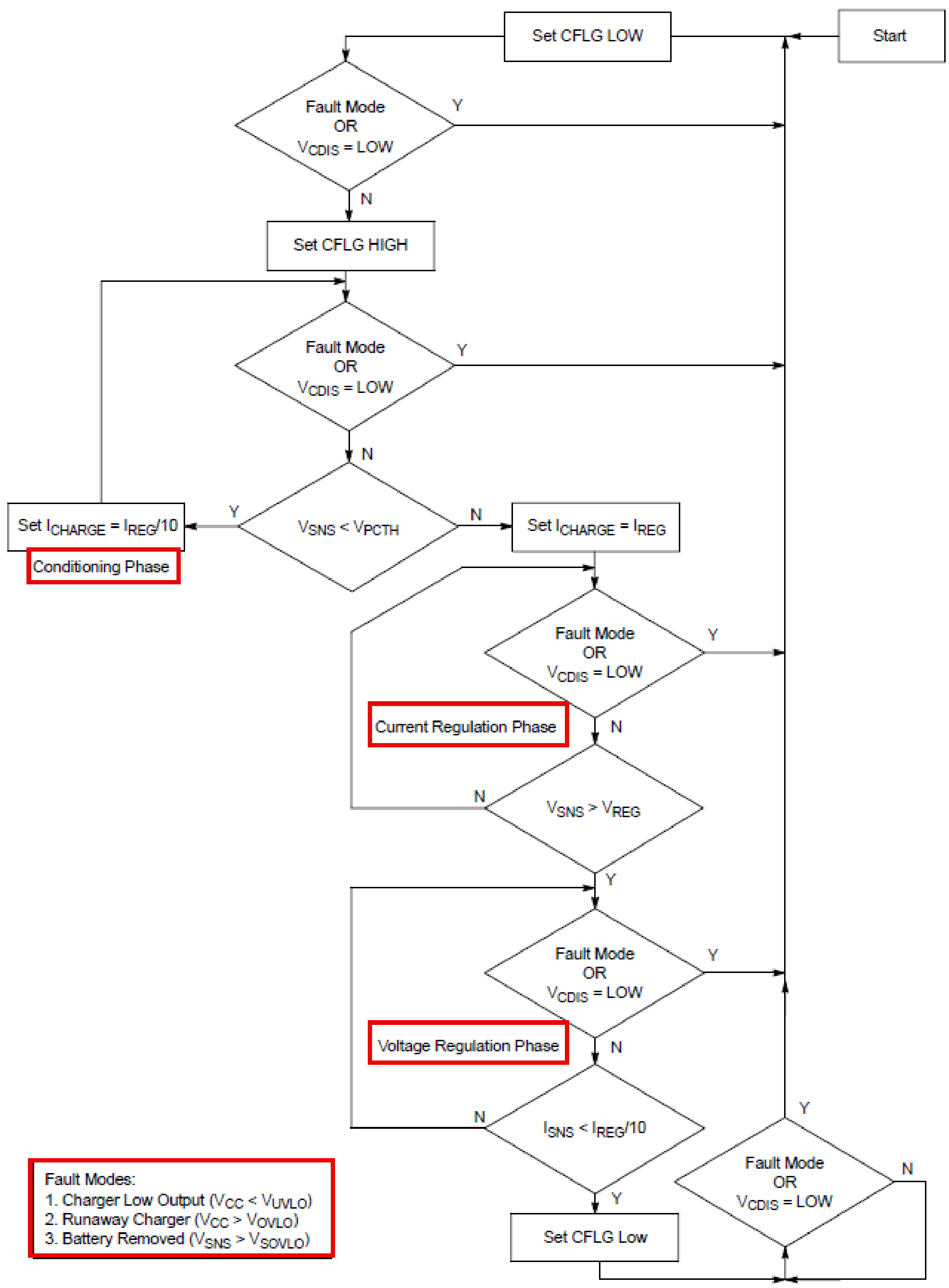


Figure 15. NCP1800 Charging Operational Flow Chart

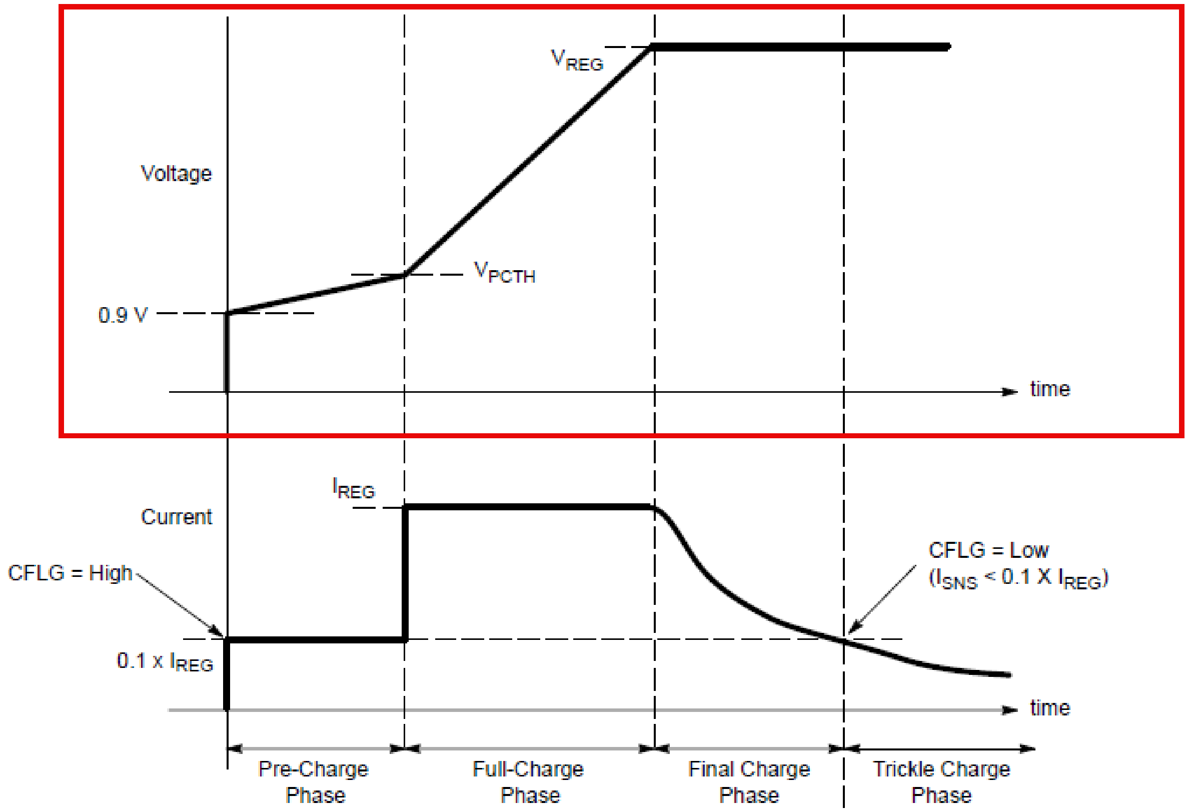


Figure 16. Typical Charging Algorithm

(EX1012, 1-4, 7-10, Figs. 15, 16 (annotated); EX1005, ¶166.)

25. Claim 32

Claim 32 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶167.)

a. [Preamble]

See claim 7. (EX1005, ¶168.)

b. [A]

See claim 1[B] and [C]. (EX1005, ¶169.) As described for 1[B], the rectifier of Horowitz converts an AC input signal to a DC output signal and thus provides a DC current:

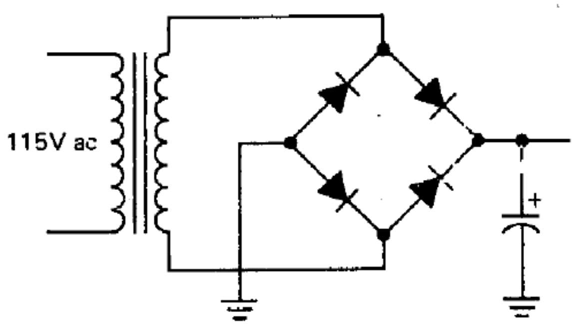


Figure 1.74. **Bridge rectifier circuit. The polarity marking and curved electrode indicate a polarized capacitor, which must not be allowed to charge with the opposite polarity.**

(EX1019, 46-47, Fig. 1.74; EX1005, ¶169.)

And as described for 1[C], the CCCV supply receives the DC signal (V_{in}) at its front end and charges the battery at the rear end:

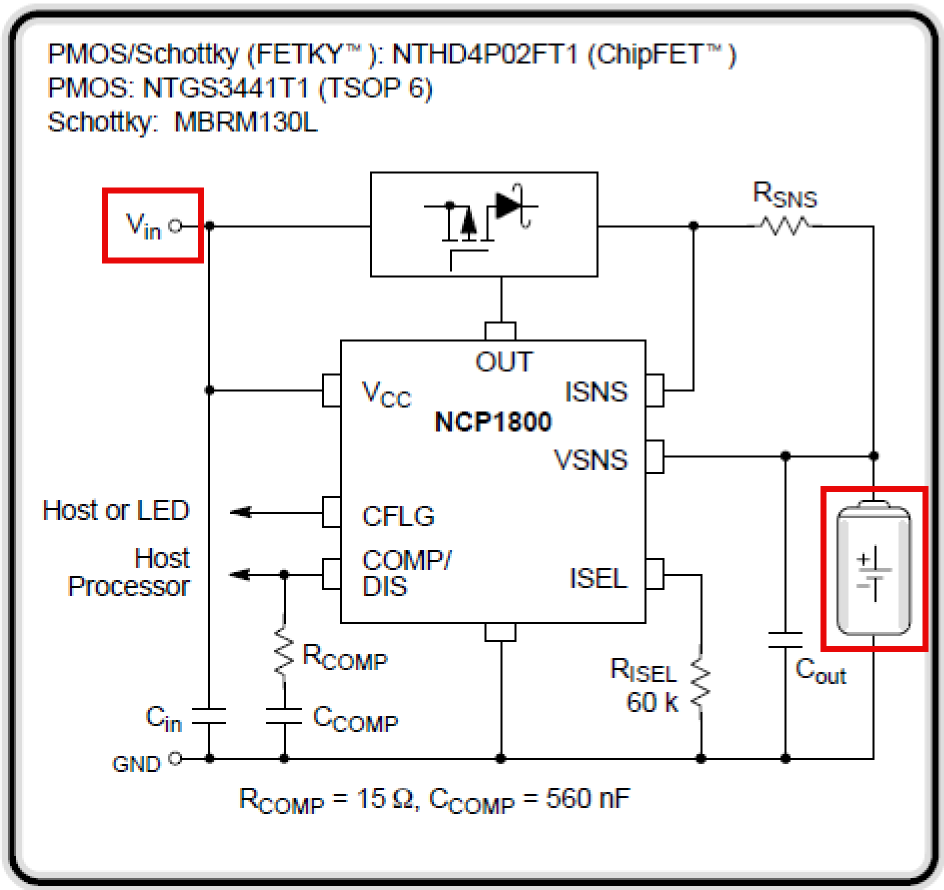


Figure 1. Typical Application

(EX1012, 1, 2, Figs. 1 (annotated), 2; EX1005, ¶170.)

26. Claim 33

Claim 33 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶171.)

a. [Preamble]

See claim 7. (EX1005, ¶172.)

b. [A]

See claim 1[C]. (EX1005, ¶173.) For example, the NCP1800 Datasheet discloses charging the battery in an initial constant-current mode (pre-charge phase and full-charge phase), followed by a constant-voltage mode (final charge phase):

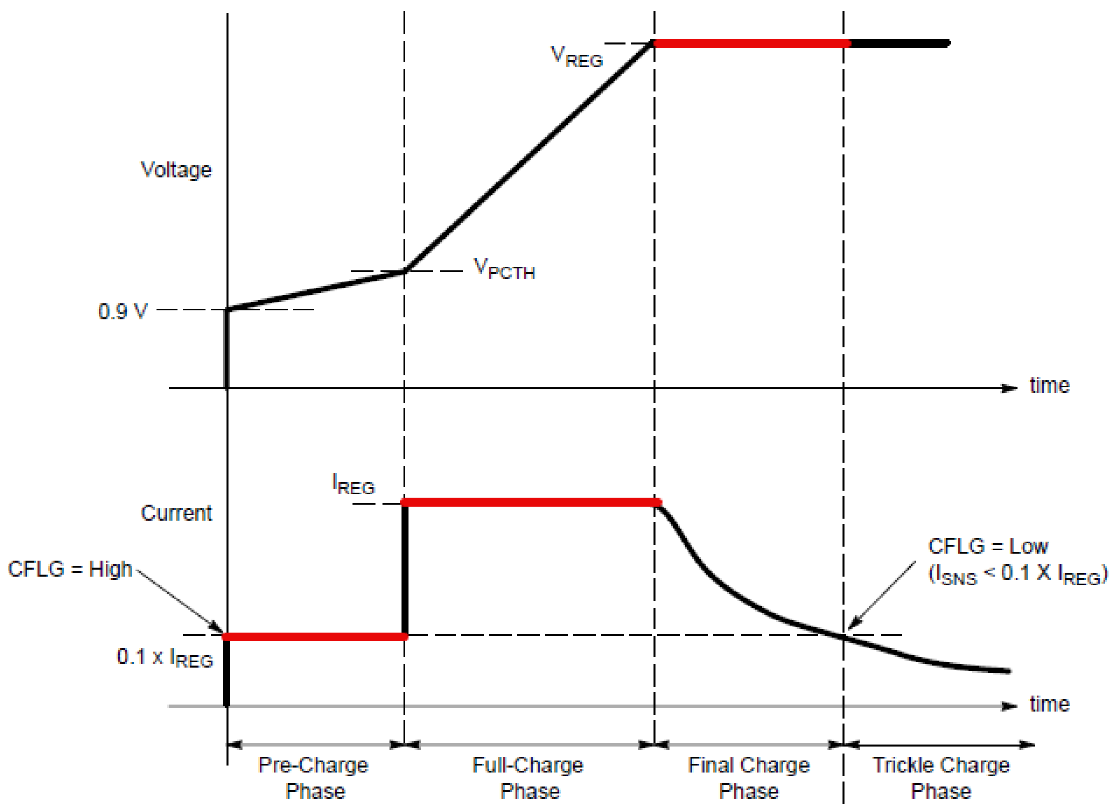


Figure 16. Typical Charging Algorithm

(EX1012, 8-10, Fig. 16 (annotated); EX1005, ¶173.)

27. Claim 34

Claim 34 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶174.)

a. [Preamble]

See claim 7. (EX1005, ¶175.)

b. [A]

See claim 1[C]. (EX1005, ¶176.) For example, the NCP1800 Datasheet discloses that once the battery voltage reaches a second threshold level (V_{REG}), charging power is then provided in a "final charge (voltage regulation)" phase:

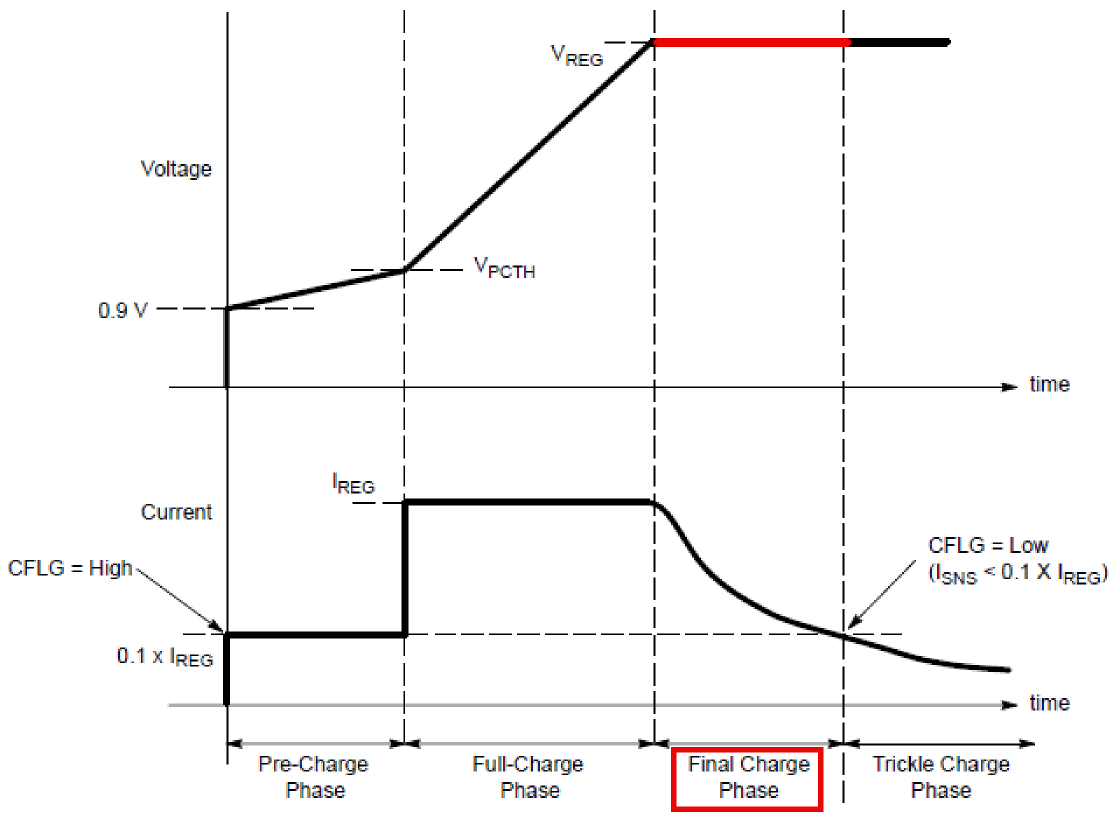


Figure 16. Typical Charging Algorithm

(EX1012, 8-10, Figs. 14, 15, 16 (annotated); EX1005, ¶176.)

28. Claim 35

Claim 35 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶177.)

a. [Preamble]

See claim 13. (EX1005, ¶178.)

b. [A]

See claim 30[A]. (EX1005, ¶179.)

29. Claim 36

Claim 36 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶180.)

a. [Preamble]

See claim 13. (EX1005, ¶181.)

b. [A]

See claim 31[A]. (EX1005, ¶182.)

30. Claim 37

Claim 37 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶183.)

a. [Preamble]

See claim 13. (EX1005, ¶184.)

b. [A]

See claim 27[A]. (EX1005, ¶185.)

31. Claim 38

Claim 38 is met based on Baarman-878 in view of NCP1800 Datasheet and

Horowitz. (EX1005, ¶186.)

a. [Preamble]

See claim 13. (EX1005, ¶187.)

b. [A]

See claim 28[A]. (EX1005, ¶188.)

32. Claim 39

Claim 39 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶189.)

a. [Preamble]

See claim 21. (EX1005, ¶190.)

b. [A]

See claim 29[A]. (EX1005, ¶191.)

33. Claim 40

Claim 40 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶192.)

a. [Preamble]

See claim 21. (EX1005, ¶193.)

b. [A]

See claim 30[A]. (EX1005, ¶194.)

34. Claim 41

Claim 41 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶195.)

a. [Preamble]

See claim 21. (EX1005, ¶196.)

b. [A]

See claim 31[A]. (EX1005, ¶197.)

35. Claim 42

Claim 42 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶198.)

a. [Preamble]

See claim 21. (EX1005, ¶199.)

b. [A]

See claim 27[A]. (EX1005, ¶200.)

36. Claim 43

Claim 43 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶201.)

a. [Preamble]

See claim 21. (EX1005, ¶202.)

b. [A]

See claim 28[A]. (EX1005, ¶203.)

37. Claim 44

Claim 44 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶204.)

a. [Preamble]

See claim 23. (EX1005, ¶205.)

b. [A]

See claim 27[A]. (EX1005, ¶206.)

c. [B]

See claim 27[A]. (EX1005, ¶207.)

38. Claim 45

Claim 45 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶208.)

a. [Preamble]

See claim 23. (EX1005, ¶209.)

b. [A]

See claim 28[A]. (EX1005, ¶210.)

39. Claim 46

Claim 46 is met based on Baarman-878 in view of NCP1800 Datasheet and

Horowitz. (EX1005, ¶211.)

a. [Preamble]

See claim 23. (EX1005, ¶212.)

b. [A]

See claim 29[A]. (EX1005, ¶213.)

40. Claim 47

Claim 47 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶214.)

a. [Preamble]

See claim 23. (EX1005, ¶215.)

b. [A]

See claim 1[C]. (EX1005, ¶216.)

41. Claim 48

Claim 48 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶217.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶218.)

b. [A]

See claim 1[A]. (EX1005, ¶219.)

c. [B]

See claim 1[B]. (EX1005, ¶220.)

d. [C]

See claim 1[C] and 33[A]. (EX1005, ¶221.)

e. [D]

See claim 1[D]. (EX1005, ¶222.)

f. [E]

See claim 1[D] and [E]. (EX1005, ¶223.)

42. Claim 49

Claim 49 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶224.)

a. [Preamble]

See claim 48. (EX1005, ¶225.)

b. [A]

See claim 8[A]. (EX1005, ¶226.)

43. Claim 52

Claim 52 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶227.)

a. [Preamble]

See claim 48. (EX1005, ¶228.)

b. [A]

See claim 11[A]. (EX1005, ¶229.)

44. Claim 54

Claim 54 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶230.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶231.)

b. [A]

See claim 7[A]. (EX1005, ¶232.)

c. [B]

See claim 7[B]. (EX1005, ¶233.)

d. [C]

See claim 7[C]. (EX1005, ¶234.)

e. [D]

See claim 1[D]. (EX1005, ¶235.)

f. [E]

See claim 7[E]. (EX1005, ¶236.)

45. Claim 55

Claim 55 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶237.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶238.)

b. [A]

See claim 1[A]. (EX1005, ¶239.)

c. [B]

See claim 1[B]. (EX1005, ¶240.)

d. [C]

See claim 1[C]. (EX1005, ¶241.)

e. [D]

See claim 1[D]. (EX1005, ¶242.)

f. [E]

See claim 1[E]. (EX1005, ¶243.)

g. [F]

See claim 1[E]. (EX1005, ¶244.)

46. Claim 56

Claim 56 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶245.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶246.)

b. [A]

See claim 7[A]. (EX1005, ¶247.)

c. [B]

See claim 7[B]. (EX1005, ¶248.)

d. [C]

See claim 7[C]. (EX1005, ¶249.)

e. [D]

See claim 1[D]. (EX1005, ¶250.)

f. [E]

See claim 1[E]. (EX1005, ¶251.)

47. Claim 57

Claim 57 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶252.)

a. [Preamble]

See claim 13[Preamble]. (EX1005, ¶253.)

b. [A]

See claim 13[A]. (EX1005, ¶254.)

c. [B]

See claim 13[B]. (EX1005, ¶255.)

d. [C]

See claim 13[C]. (EX1005, ¶256.)

e. [D]

See claim 13[D]. (EX1005, ¶257.)

48. Claim 58

Claim 58 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶258.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶259.)

b. [A]

See claim 1[A]. (EX1005, ¶260.)

c. [B]

See claim 1[B]. (EX1005, ¶261.)

d. [C]

See claim 1[C]. (EX1005, ¶262.)

e. [D]

See claim 1[D]. (EX1005, ¶263.)

f. [E]

See claim 1[E]. (EX1005, ¶264.)

B. Ground 2: Claims 3, 4, 6, 9, 10, 12, 20, 22, 24, 50, 51, and 53 are Rendered Obvious Based On Baarman-878 in View of NCP1800 Datasheet, Veselic, And Horowitz

1. Summary of Veselic

Veselic is a U.S. Patent issued to inventors Dusan Veselic and Martin G.A. Guthrie. The underlying application (Appl. No. 10/372,180) was filed on February 21, 2003; and the patent issued on September 7, 2010. Veselic is thus prior art to the ’568 patent under at least 35 U.S.C. §§102(a) and (e).

Veselic relates to battery charging circuits, such as for portable communication devices with internal batteries. (EX1013, 1:4-21.) Veselic describes monitoring a battery charging controller, such as the NCP1800, in order to modulate the current to the battery to keep the dissipated power below a predetermined level. (EX1013, 4:3-61; EX1005, ¶266.) This can be used to adapt the battery charger to current-limited power sources, such as computer data ports. (*Id.*) Veselic is analogous art to the claimed invention at least because it is directed to solving the same problem (battery charging) in the same field of endeavor (electronic circuits) as the ’568 patent. (EX1005, ¶267.)

2. Claim 3

Claim 3 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶268.)

a. [Preamble]

See Ground 1, claim 1. (EX1005, ¶269.)

b. [A]

See Ground 1, 1[D]. (EX1005, ¶270.) In Baarman-878, remote transceiver 356 wirelessly transmits the monitoring result via Wi-Fi, infrared, Bluetooth, cellular, or an RFID (Radio Frequency Identification) tag. (EX1007, 9:36-40, Fig. 8; EX1005, ¶270.) The POSITA would understand these wireless communication technologies to include propagating signals using an antenna. (*See* EX1018, 21-23; EX1005, ¶270.) For example, the POSITA would have understood that in a Wi-Fi network, computer devices use a radio modem and an antenna to wirelessly communicate data. (*See* EX1018, 21-23; EX1005, ¶270.) Similarly, the POSITA would have understood devices communicating via Bluetooth, cellular, and RFID to include an antenna for wireless transmission. (EX1005, ¶270.)

c. [B]

See Ground 1, claim 1[C]. (EX1005, ¶271.) The NCP1800 Datasheet describes the NCP1800 component, which is a CCCV supply; and teaches detecting a first voltage (VCC) at its front end, and detecting a second voltage (V_{SNS}) at its rear end:

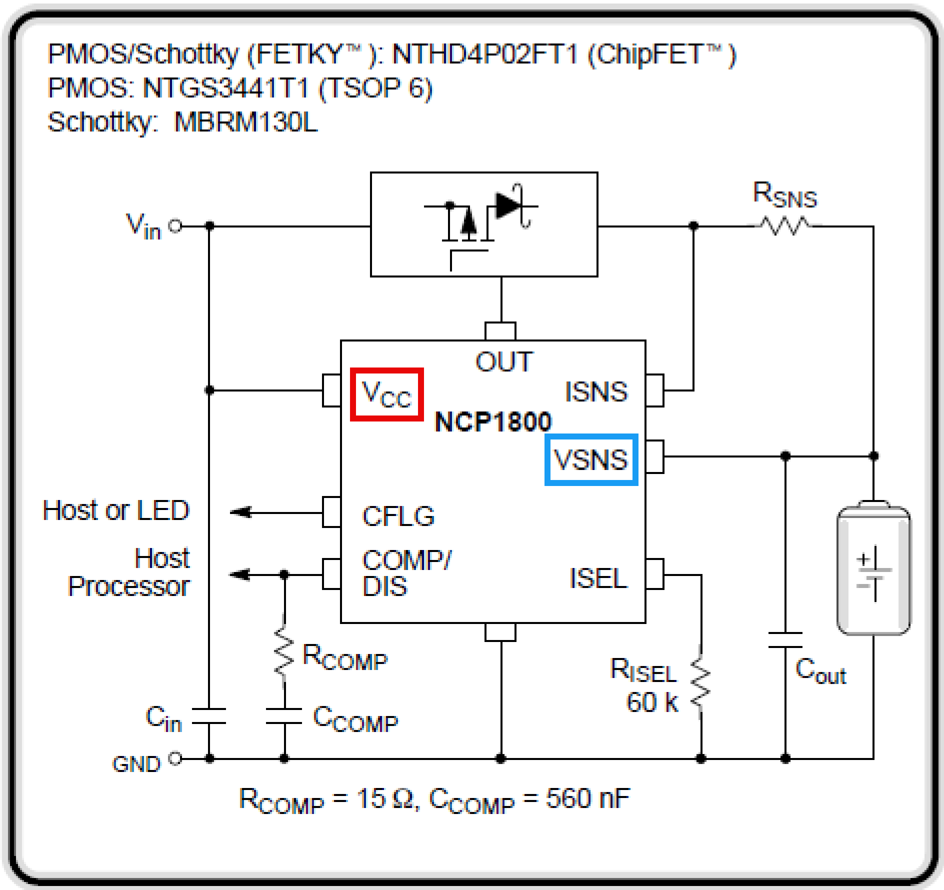
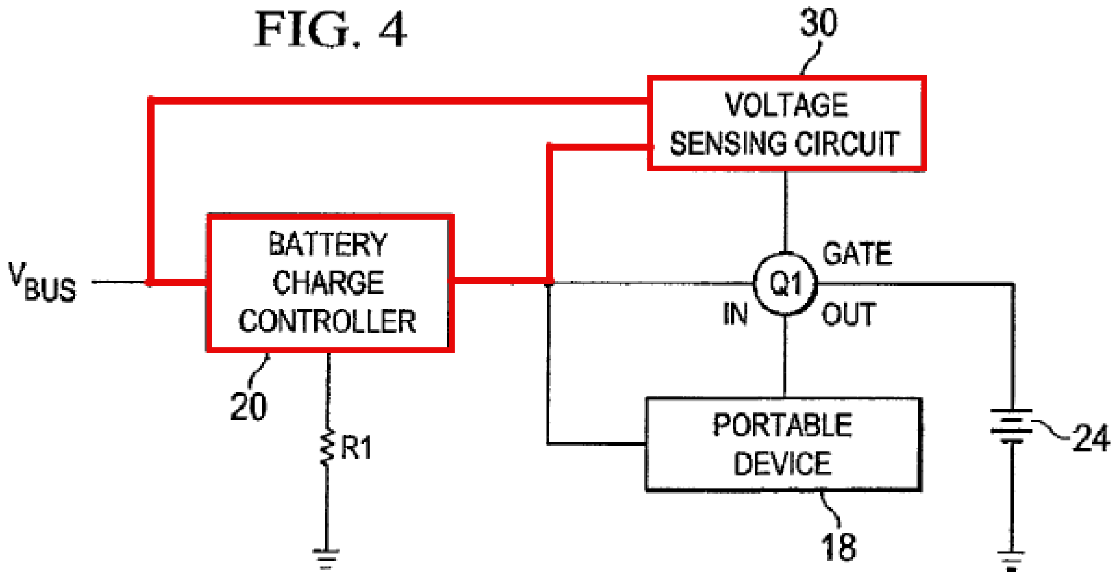


Figure 1. Typical Application

(EX1012, 1, 2, Fig. 1 (annotated); EX1005, ¶271.)

The NCP1800 Datasheet does not expressly disclose a voltage comparator for comparing the first and second voltages. (EX1005, ¶272.) However, Veselic discloses using a voltage sensing circuit 30 to measure a voltage drop across a battery charge controller 20 (such as the NCP1800 circuit):

FIG. 4



(EX1013, 5:30-64, 7:56-8:8, Figs. 4 (annotated), 6, 8; EX1005, ¶272.)

The voltage sensing circuit 30 measures the voltage drop by "comparing the voltage at the input and output of the battery charge controller 20," *e.g.*, using an op-amp. (EX1013, 5:55-60; EX1005, ¶273.) The POSITA would thus recognize voltage sensing circuit 30 as disclosing a voltage comparator. (EX1005, ¶273.)

d. [C]

See Ground 1, 1[D]. (EX1005, ¶274.) The POSITA would have combined Baarman-878, NCP1800 Datasheet, and Veselic such that controller 352 would implement Veselic's voltage sensing circuit 30; and would output a result via remote transceiver 356 according to Veselic's voltage comparison. (EX1005, ¶274.)

As described for Ground 1, claim 1[D], the POSITA would have utilized controller 352, in view of the NCP1800 Datasheet, to control the battery charging "precisely and safely" by communicating control signals to the power supply controller 326. (EX1005, ¶275.) For example, as described above, controller 352 would use the results of monitoring V_{CC} and V_{SNS} to reduce the rail voltage of power source 310, thus lowering the intensity of the induced AC current. (EX1005, ¶275.) Veselic's voltage comparison indicates the power consumption of the circuit (*i.e.*, as the product of the voltage drop and the current). (EX1013, 5:43-54; EX1005, ¶275.) Controller 352 thus would additionally use the results of Veselic's voltage comparison as taught by Veselic: to determine whether the power consumption of the circuit is too great; and if so, to accordingly reduce the current to the battery (*e.g.*, by reducing the rail voltage). (EX1013, 5:65-6:24, 13:15-57, Fig. 8; EX1005, ¶275.) Veselic expressly discloses that a microcontroller, such as controller 352, can be used to implement the voltage drop measurement. (EX1013, 13:41-45; EX1005, ¶275.)

(i) Motivation to combine

The POSITA would have been motivated to realize technical advantages described in Veselic: controlling power consumption to stay within the limits of the power source, and mediating power competition between the battery and a portable device. (EX1013, 5:65-6:24; EX1005, ¶276.) This is especially pertinent to Baarman-878, which discloses that remote device 338 may include a power-hungry portable device such as a digital camera or a PDA. (EX1007, 9:49-58; EX1005, ¶276.) Further, Veselic's voltage comparison also may beneficially permit a battery to be charged from a USB power source, such as a USB port of workstation 307, to which Baarman-878's charging device 305 may be connected. (EX1013, 2:3-3:67; EX1007, Fig. 6; EX1005, ¶276.)

Veselic relates to battery chargers for portable communication devices, such as described in Baarman-878 and the NCP1800 Datasheet; and incorporates well-known electronic components (batteries, microcontrollers) analogous to those of Baarman-878. (EX1013, 1:4-8, 13:15-26; EX1005, ¶277.) Further, Veselic expressly invites its combination with the NCP1800 circuit, describing it as a "standard" controller "known in the art," for which "application notes" are available to "assist the designer." (EX1013, 7:49-8:12, Fig. 6; EX1005, ¶277.) And Veselic explains that a benefit of its techniques is that it allows battery charge controllers to be used "off the shelf," without redesign. (EX1013, 6:9-17; EX1005, ¶277.) Thus the POSITA would have enjoyed a reasonable expectation of success in combining Veselic with Baarman-878 and the NCP1800 Datasheet. (EX1005, ¶277.)

3. Claim 4

Claim 4 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶278.)

a. [Preamble]

See claim 3. (EX1005, ¶279.)

b. [A]

See Ground 1, 21[A]. (EX1005, ¶280.)

c. [B]

To the extent not expressly disclosed, it would have been obvious to communicate to the controller 353 a time point signal indicating the timing of the phase delay described for Ground 1, claim 21[A], so that wireless communications from controller 353 could be coordinated accordingly. (EX1005, ¶281.) Further, it would have been obvious for this coordination to include transmitting the monitoring result while the AC current is not induced, so as to minimize electromagnetic interference between the wireless communication of the monitoring result and the induction of the AC current. (EX1005, ¶281.) This is especially so because Baarman-878 discloses that transceivers 336 and 356 can communicate wirelessly via coils on the primary and secondary windings; this configuration makes the risk of electromagnetic interference particularly acute, because common windings are utilized for inducing the AC current and communicating the monitoring result. (EX1007, 9:41-45; EX1005, ¶281.)

4. Claim 6

Claim 6 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶282.)

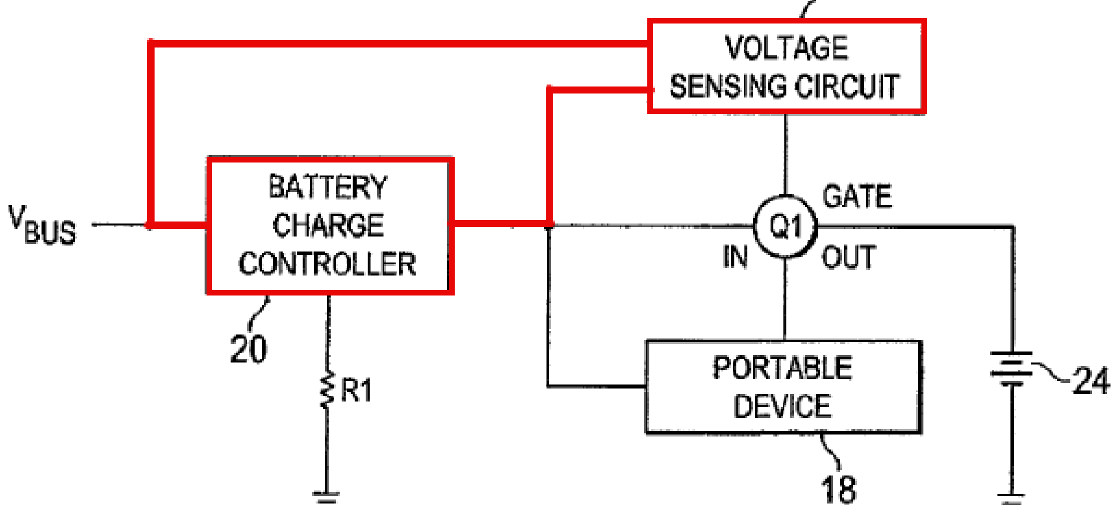
a. [Preamble]

See Ground 1, claim 1. (EX1005, ¶283.)

b. [A]

As described above for claim 3[B], Veselic discloses "monitoring the voltage drop across the battery charge controller 20":

FIG. 4



(EX1013, 5:30-6:3, 7:56-8:8, Figs. 4 (annotated), 6, 8; EX1005, ¶284.)

The POSITA would understand the voltage drop to be a difference of voltages at both ends of the battery charge controller 20, which is a constant voltage/constant current supplier to a battery. (EX1013, 6:25-52; EX1005, ¶285.)

To the extent not expressly disclosed, it would have been obvious to the POSITA for the monitoring result to be the voltage drop. (EX1005, ¶286.) For example, Veselic teaches monitoring the voltage drop, and using the result of that monitoring to "modulate the power to the battery 24," *e.g.*, to limit the amount of power provided to the battery. (EX1013, 5:65-6:17; EX1005, ¶286.) As described above for claim 1[D](iii), Baarman-878 performs an analogous function by using its controller 352 to wirelessly transmit control signals from remote device 338 to the power supply controller 326. (EX1007, 8:47-51, 9:17-29, Fig. 7; EX1005, ¶286.) As described, those control signals can manipulate the rail voltage of the power source 310, changing the amplitude of inverter 312 and thus the amount of power provided to the battery 350—analogous to the power modulation of Veselic. (EX1007, 7:46-51, 8:41-51; EX1005, ¶286.)

The POSITA would have applied Veselic's monitoring result (the voltage drop) to the wirelessly transmitted control signals of Baarman-878. (EX1005, ¶287.) That is, the POSITA would have applied the monitoring result of Veselic as a control signal transmitted to power supply controller 326, such that the power supply controller 326 adjusts a power applied to the primary winding 334, as described for claim 1[D]. The POSITA would have been motivated to make the combination as described above for claim 3. Further, as described above for

Ground 1, claim 1[D](iii), Baarman-878 does not detail the exact nature of the control signals transmitted to the power supply controller, motivating the POSITA to consult other prior art references, such as Veselic, for this information. (EX1005, ¶287.)

The POSITA would have applied Veselic's teachings in order to realize the specific benefits described in Veselic. (EX1005, ¶288.) For example, Veselic explains that the voltage drop can be used to compute and control the "total power" dissipated by the battery charge controller, such that the power source's limits are not exceeded, while ensuring that the target device receives the power it requires for operation. (EX1013, 5:65-6:17; EX1005, ¶288.) This beneficially avoids having to design "new and larger battery charge controllers," while allowing the battery charge controller to be kept physically small—advantages that the POSITA would have sought to realize by the combination. (EX1013, 6:9-17; EX1005, ¶288.)

5. Claim 9

Claim 9 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶289.)

a. [Preamble]

See Ground 1, claim 7. (EX1005, ¶290.)

b. [A]

See claim 3[A]. (EX1005, ¶291.)

c. [B]

See Ground 1, 1[D]. (EX1005, ¶292.)

d. [C]

See claim 3[B]. (EX1005, ¶293.)

e. [D]

See claim 3[C]. (EX1005, ¶294.)

6. Claim 10

Claim 10 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶295.)

a. [Preamble]

See claim 9. (EX1005, ¶296.)

b. [A]

See claim 4[A]. (EX1005, ¶297.)

c. [B]

See claim 4[B]. (EX1005, ¶298.)

d. [C]

See claim 4[B]. (EX1005, ¶299.)

7. Claim 12

Claim 12 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶300.)

a. [Preamble]

See Ground 1, claim 7. (EX1005, ¶301.)

b. [A]

See claim 6[A]. (EX1005, ¶302.)

8. Claim 20

Claim 20 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶303.)

a. [Preamble]

See Ground 1, claim 13. (EX1005, ¶304.)

b. [A]

See claim 6[A]. (EX1005, ¶305.)

9. Claim 22

Claim 22 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶306.)

a. [Preamble]

See Ground 1, claim 21. (EX1005, ¶307.)

b. [A]

See claim 6[A]. (EX1005, ¶308.)

10. Claim 24

Claim 24 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶309.)

a. [Preamble]

See Ground 1, claim 23. (EX1005, ¶310.)

b. [A]

See claim 6[A]. (EX1005, ¶311.)

11. Claim 50

Claim 50 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶312.)

a. [Preamble]

See Ground 1, claim 48. (EX1005, ¶313.)

b. [A]

See claim 3[A]. (EX1005, ¶314.)

c. [B]

See claim 3[B]. (EX1005, ¶315.)

d. [C]

See claim 3[C]. (EX1005, ¶316.)

e. [D]

See claim 3[A] and [C]. (EX1005, ¶317.)

12. Claim 51

Claim 51 is met based on Baarman-878 in view of NCP1800 Datasheet, Veselic, and Horowitz. (EX1005, ¶318.)

a. [Preamble]

See claim 50. (EX1005, ¶319.)

b. [A]

See claim 4[A]. (EX1005, ¶320.)

c. [B]

See claim 4[B]. (EX1005, ¶321.)

d. [C]

See claim 4[B]. (EX1005, ¶322.)

13. Claim 53

Claim 53 is met based on Baarman-878 in view of NCP1800 Datasheet and Horowitz. (EX1005, ¶323.)

a. [Preamble]

See Ground 1, claim 48. (EX1005, ¶324.)

b. [A]

See claim 6[A]. (EX1005, ¶325.)

VI. BAARMAN-267 IN VIEW OF VESELIC RENDERS OBVIOUS CLAIMS 1, 3, 7-9, 11, 12, 30-34, 48-50, 52, AND 53

A. Ground 3: Claims 1, 3, 7-9, 11, 12, 30-34, 48-50, 52, and 53 are Rendered Obvious Based On Baarman-267 in View of Veselic

1. Summary of Baarman-267

Baarman-267 is a U.S. Patent issued to inventor David W. Baarman. The underlying application (Appl. No. 10/689,375) was filed on October 20, 2003; and issued as a patent on April 14, 2009. Baarman-267 is thus prior art to the ’568 patent under at least 35 U.S.C. §§102(a) and (e).

Baarman-267 discloses an adapter for coupling a remote device with a rechargeable power source (*i.e.*, a battery) to a contactless power supply (CPS) via a contactless power interface, and a power regulator for supplying power to the remote device. (EX1014, 1:56-2:31; EX1005, ¶327.) The adapter may have a battery for powering the adapter, a first transceiver for communicating with the contactless power supply, and a second transceiver for communicating with the remote device. (*Id.*) The adapter obtains charging information from the remote device, and provides charging information to the CPS. (*Id.*) Power is then supplied to the remote device. (*Id.*) Baarman-267 is analogous art to the claimed invention at least because it is directed to solving the same problem (contactless battery charging) in the same field of endeavor (electronic circuits) as the ’568 patent; and provides disclosures analogous to those of the ’568 patent. (EX1005, ¶329.)

Baarman-267 incorporates by reference four contemporaneously-filed patent applications: Appl. No. 10/689,499 (EX1008); Appl. No. 10/689,224 (EX1009); Appl. No. 10/689,154 (EX1015); and Appl. No. 10/689,148, now Baarman-878 (EX1007). (EX1014, 1:14-21.)

2. Claim 1

Baarman-267 in view of Veselic meets Claim 1, as described below. (EX1005, ¶330.)

a. [Preamble]

Baarman-267 discloses a contactless chargeable battery in which a remote device 12 with an adapter 14 is powered wirelessly by CPS 10. (EX1014, 2:54-3:2, Fig. 2; EX1005, ¶331.) The contactless chargeable battery includes a charging circuit for charging battery cell 20, as shown in Fig. 3:

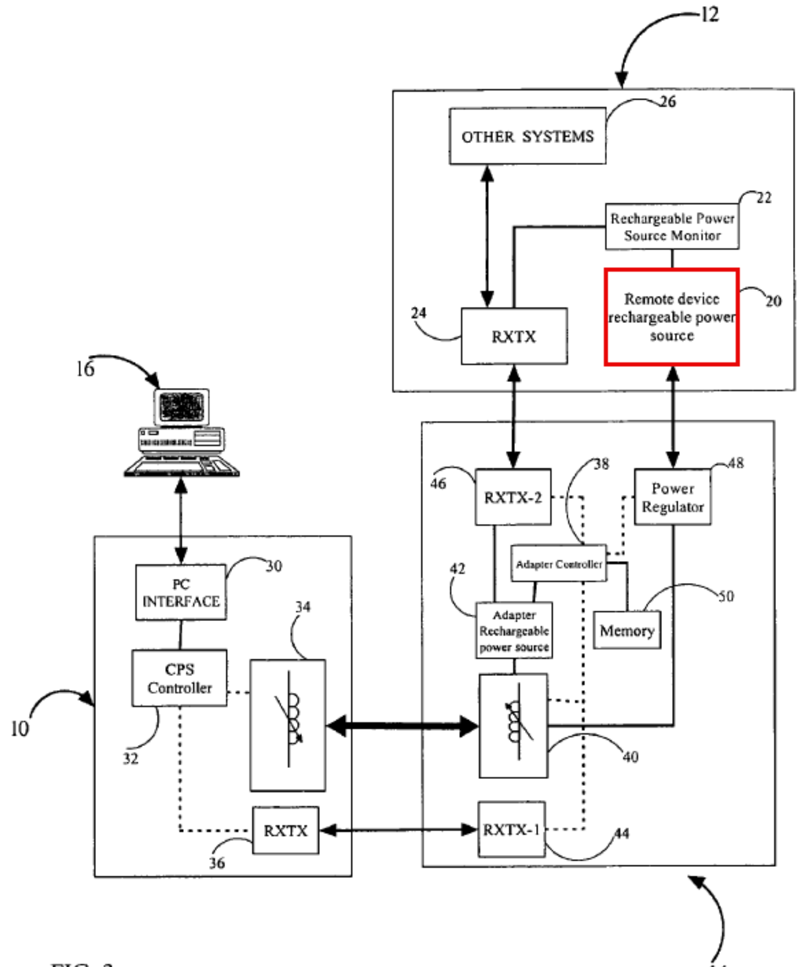


FIG. 3

(EX1014, 3:3-7, Fig. 3(annotated); EX1005, ¶331.)

b. [A]

Baarman-267's battery charging systems use magnetic induction to wirelessly transfer energy from a primary coil in the CPS 10 to a secondary coil in the adapter 14. (EX1007, 1:33-51; EX1005, ¶332.) Baarman-267 discloses that CPS 10 becomes inductively coupled to adapter 14 when in the presence of the adapter:

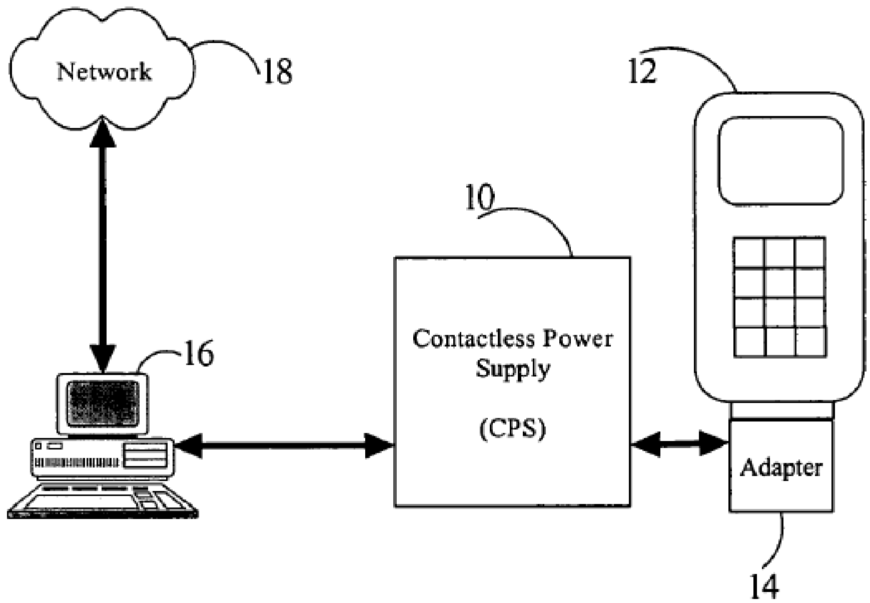


FIG. 2

(EX1014, 2:54-3:2, Fig. 2; EX1005, ¶332.)

CPS 10 includes power interface 34, which is "more fully described" in Appl. No. 10/689,499 (EX1008, "Baarman-499"), which is incorporated by reference by Baarman-267. (EX1014, 3:37-43.) Baarman-499, in the context of Baarman-267, explains that power interface 34 includes a primary coil that receives AC current from a power source and an inverter in the generation of a magnetic field. (EX1008, 11-14; EX1005, ¶333.) The POSITA would understand this to generate a magnetic field at the primary coil by the Biot-Savart Law. (*See* EX1016, 112-13; EX1017, 589-601; EX1005, ¶333.) The POSITA would further understand this magnetic field to induce an AC current in a nearby secondary coil of adapter 14 by Faraday's Law. (*See* EX1016, 112-13; EX1017, 780-89; EX1005, ¶333.)

Adapter 14 includes secondary coils (*e.g.*, 202, 204, 206) that are connected in parallel to the load and receive AC current from the primary coil via induction. (EX1014, 5:62-6:11, Figs. 6-8; EX1005, ¶334.) Current induced in the coils is combined and provided to the input of the power regulator 48 (218). (EX1014, 5:62-6:11, Figs. 6-8; EX1005, ¶334.) Fig. 6 illustrates:

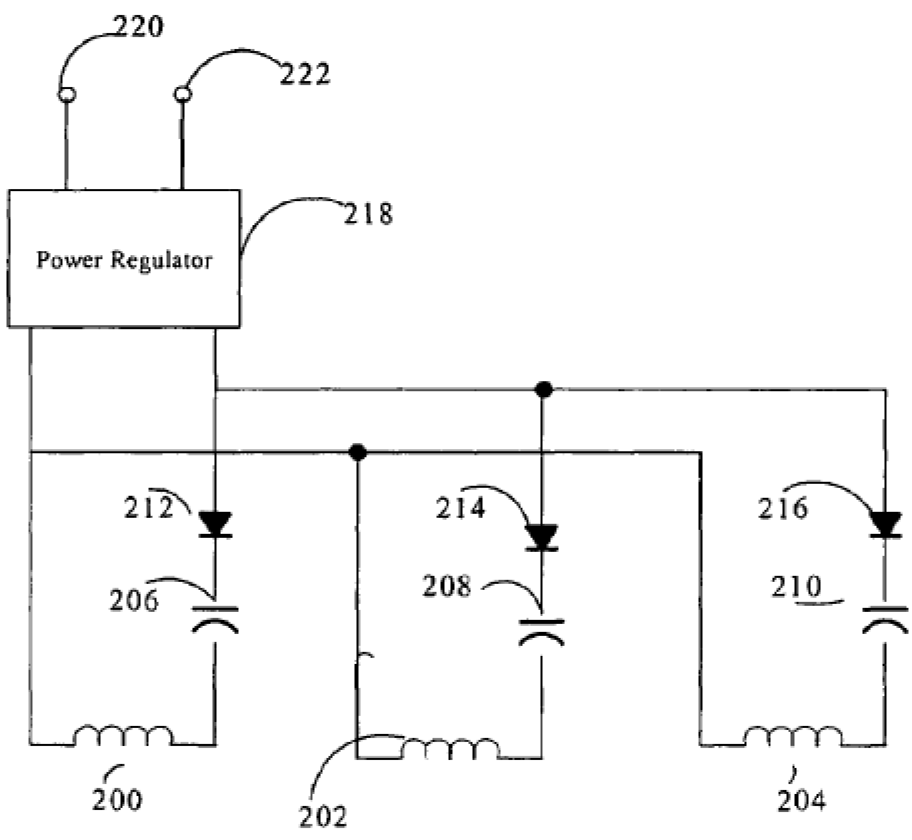


FIG. 6

(EX1014, Fig. 6; EX1005, ¶334.)

The induced AC current meets the claimed "high frequency" AC current at least as described for Ground 1, claim 1[A]. (EX1005, ¶335.) That is, Baarman-267 incorporates by reference a patent application that discloses an induced AC current of approximately 100 KHz, which is on the order of (and higher than) the example "high frequency AC current" provided in the '568 patent. (EX1011, 28; EX1007, 3:58-63; EX1014, 1:14-21; EX1005, ¶335.)

c. [B]

This element is met based on Baarman-267. (EX1005, ¶336.) Baarman-267 discloses that adapter 14 includes a rectifier circuit. (EX1014, 6:1-53, Figs. 6-8; EX1005, ¶336.) For example, Fig. 7 shows an adapter with a "half-wave rectifier":

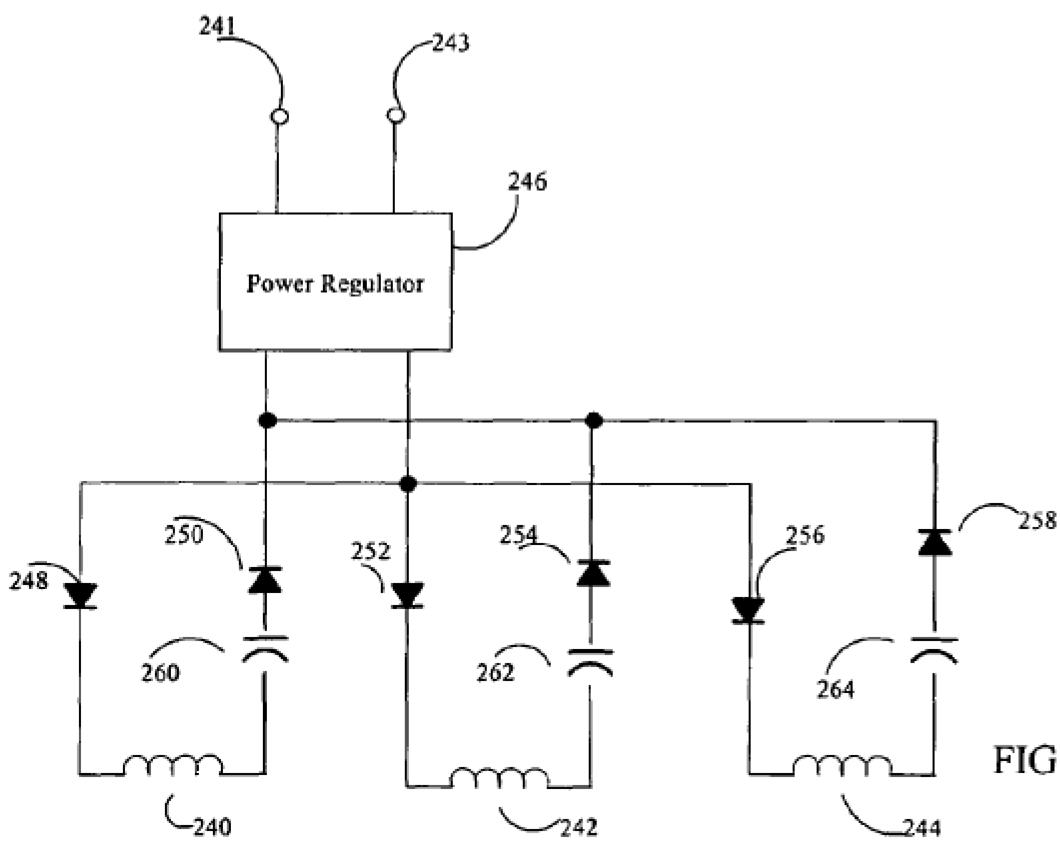


FIG. 7

(EX1014, 6:17-30, Fig. 7; EX1005, ¶336.)

As illustrated, the rectifier circuit receives induced AC current from secondary coils 240, 242, 244, which the POSITA would understand to be analogous to coils secondary 202, 204, 206 described above. (EX1014, 6:17-30, Fig. 7; EX1005, ¶337.) The rectifier converts (rectifies) the induced AC current to DC current via diodes (248, 250, 252, 254, 256, 258) and capacitors (260, 262, 264), and provides it to power regulator 246. (EX1014, 6:17-30, Fig. 7; EX1005, ¶337.)

d. [C]

Baarman-267 discloses that power regulator 246 receives DC current from a rectifier as described above for element [B]; and supplies charging power to the battery cell 20 by providing a "constant voltage and constant current" ("CCCV") at its output terminals 241, 243. (EX1014, 4:7-44, 6:17-26, 6:45-53, Fig. 7; EX1005, ¶338.)

e. [D]

The overvoltage monitoring unit is met by at least by adapter 14's power regulator 48 (which is controlled by adapter controller 38), implementing the teachings of Veselic. (EX1005, ¶339.)

(i) Motivation to combine Baarman-267 and Veselic

Baarman-267 discloses that power regulator 48 provides a constant voltage and constant current at its output, and that adapter controller 38 can control the voltage and current output of power regulator 48 to the battery cell 20; but Baarman-267 does not explain how this functionality is implemented. (EX1005, ¶340.) Accordingly, the POSITA would have looked to other references to guide the implementation of the power regulator 48 and adapter controller 38. (EX1005, ¶340.)

Veselic, in the same field of endeavor (contactless battery charging), discloses a circuit, including battery charge controller 20, that charges a battery 24 via a CCCV process. (EX1013, 5:30-42, 6:25-7:14; EX1005, ¶341.) Veselic's battery charge controller 20 is analogous to power regulator 48 and adapter controller 38 of Baarman-267, which work together to provide a CCCV output to charge Baarman-267's battery cell 20. (EX1014, 6:1-53; EX1005, ¶341.)

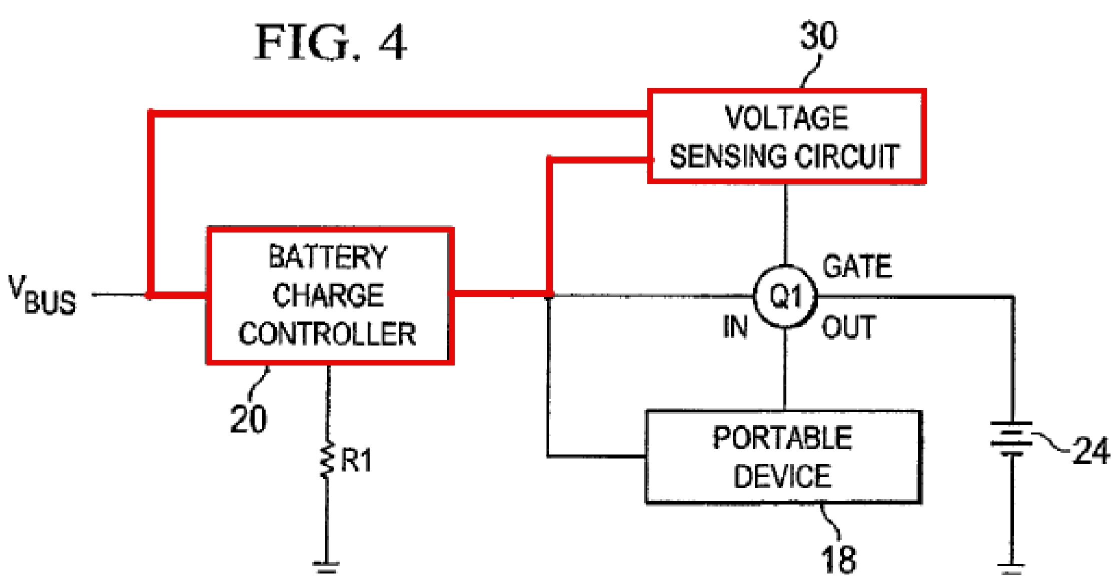
Veselic teaches implementing the CCCV supply using a voltage comparator to convey technical advantages: controlling power consumption to stay within the limits of the power source, and mediating power competition between the battery and a portable device. (EX1013, 5:65-6:24; EX1005, ¶342.) In particular, Veselic teaches charging a battery from a USB power source, such as a USB port of Baarman-267's PC 16, to which CPS 10 may be connected. (EX1013, 2:3-3:67; EX1014, Fig. 2; EX1005, ¶342.) The POSITA thus would have been motivated to combine Baarman-267 with the teachings of Veselic, *i.e.*, to implement power regulator 48 and adapter controller 38, to realize these specific advantages. (EX1005, ¶342.)

Further, the POSITA would have enjoyed a reasonable expectation of success in doing so, at least because Baarman-267 and Veselic both utilize well-known electronic components, such as batteries and microcontrollers, in analogous ways; and because Veselic provides specific guidance, including timing diagrams, flow charts, and schematics, for how to implement its teachings using such components. (EX1013, 1:4-8, 13:15-26, Figs. 4-8; EX1005, ¶343.)

(ii) First and second voltage detectors

Veselic teaches a voltage sensing circuit 30 that detects a voltage drop across a battery charge controller 20:

FIG. 4



(EX1013, 5:30-64, Figs. 4 (annotated), 6, 8; EX1005, ¶344.)

Veselic teaches first and second voltage detectors at least because the voltage sensing circuit 30 "compar[es] the voltage at the input and output of the battery charge controller 20". (EX1013, 5:55-64, Figs. 4, 6, 8; EX1005, ¶345.) That is, a first voltage detector detects the input voltage at the front end of the controller; and a second voltage detector detects the output voltage at the rear end of the controller. (*Id*.) In combination with Baarman-267, the first voltage detector would detect the input voltage at the front end of power regulator 246 (highlighted in red below); the second voltage detector would detect the output voltage at the rear end of power regulator 246 (blue):

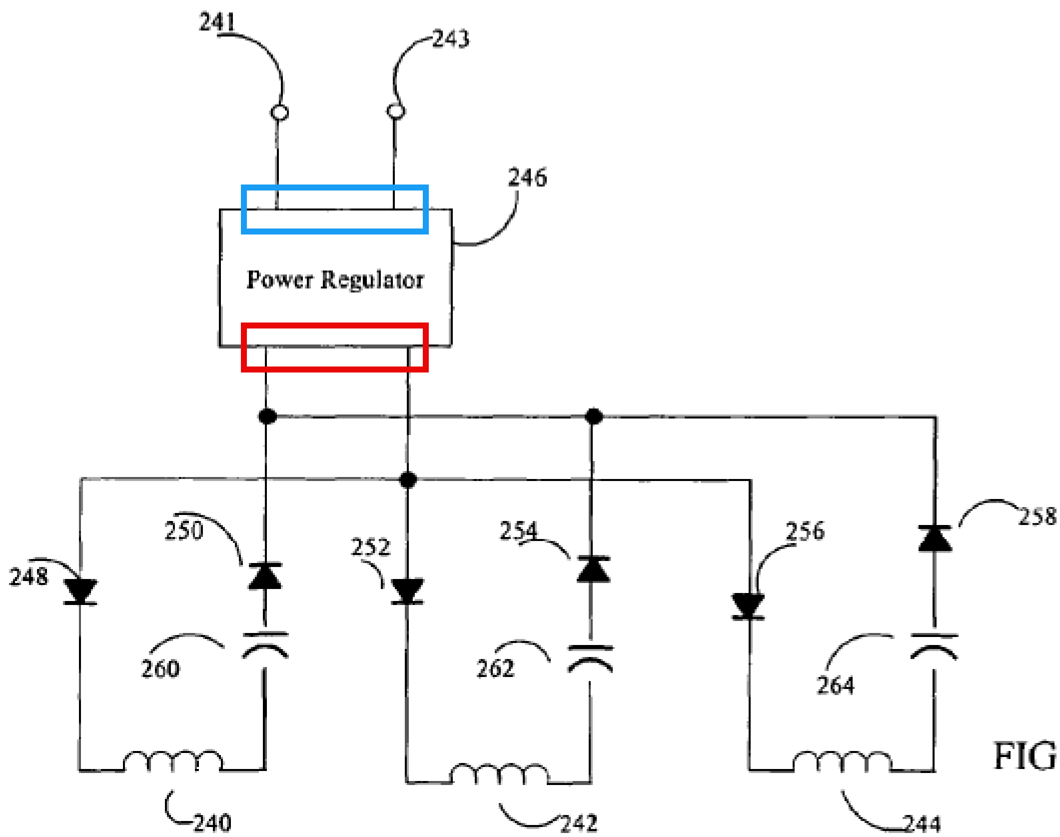


FIG. 7

(EX1014, Fig. 7 (annotated); EX1005, ¶345.)

(iii) Microprocessor monitoring the detected voltages

Baarman-267 discloses that the voltage and current output of power regulator 48 is controlled by adapter controller 38, which can be "a microprocessor in association with a microcontroller." (EX1014, 3:64-64, 4:37-44; EX1005, ¶346.) Similarly, Veselic discloses implementing its circuit using "programmable devices such as digital signal processors (DSPs) [and] micro-controllers," which the POSITA would understand to include a microprocessor. (EX1013, 13:15-22; EX1005, ¶346.) Accordingly, the POSITA would have implemented adapter controller 38 with a microprocessor to monitor the detected voltages, as described above. (EX1005, ¶346.)

(iv) Transmitting a monitoring result to the charging device

Adapter controller 38 wirelessly communicates with CPS transceiver 36 of CPS 10 via adapter transceiver 44:

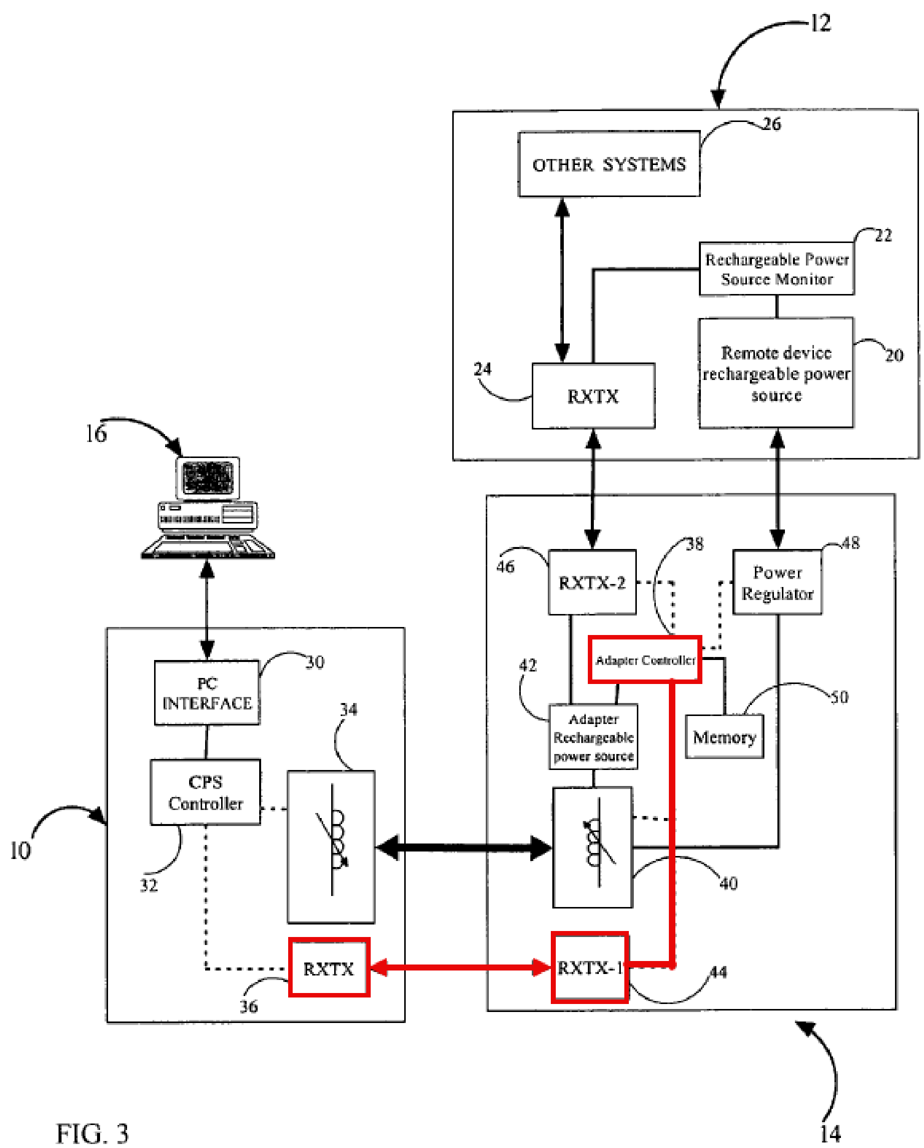


FIG. 3

(EX1014, 4:16-28, Fig. 3 (annotated); EX1005, ¶347.)

The communication is wireless at least because adapter transceiver 44 and CPS transceiver 36 communicate wirelessly; for example, Baarman-267 discloses that adapter transceiver 44 may be a wireless RFID device; and that CPS transceiver 36 can include an antenna for wireless communication. (EX1014, 3:45-51, 4:16-20; EX1005, ¶348.)

Baarman-267 teaches that adapter controller 38 wirelessly communicates with the CPS 10 in order to provide charging information, such as voltage and current requirements, which CPS 10 uses to configure the battery charging. (EX1014, 4:65-5:9, Fig. 4; EX1005, ¶349.) Baarman-267 further teaches, via its incorporation of Baarman-499, that signals received by CPS 10 can be used to induce a change in intensity of the magnetic field generated by the primary coil of the power interface 34, in a manner analogous to that described in Ground 1 for Baarman-878. (EX1008, 11-15, Figs. 4, 5A-5B; EX1005, ¶349.) For example, a controller of CPS 10 can manipulate the rail voltage of a power source, thereby changing the amplitude of an inverter that supplies AC power to the primary coil. (*Id.*) The POSITA would thus understand that changing the inverter amplitude will accordingly change the amplitude of the AC power; and thus the intensity of the magnetic field induced at the primary coil, by the Biot-Savart Law and Faraday's Law. (*See* EX1017, 589-601, 780-89; EX1005, ¶349.)

To the extent not expressly disclosed, it would have been obvious to combine Baarman-267 and Veselic such that adapter controller 38 would use the wireless connection to transmit a feedback signal to CPS 10, based on a result of the monitoring of the detected voltages, to lower the AC current. (EX1005, ¶350.) Veselic teaches that measuring the difference between the first and second voltages "allows the total power consumption of the circuit to be inferred," *i.e.*, as the product of the voltage drop and the current. (EX1013, 5:43-54; EX1005, ¶350.) Veselic would thus permit Baarman-267 to determine whether power consumption exceeds a maximum permissible limit; and to lower the current accordingly. (EX1005, ¶350.) As described above, adapter controller 38 wirelessly transmits signals to CPS 10, in order to control the current and voltage of the power regulator 48. (EX1005, ¶350.) The POSITA would have utilized adapter controller 38 to transmit a monitoring result—*e.g.*, an instruction to lower the rail voltage, thus reducing the AC current provided to the primary winding (and thus induced in the secondary winding), in response to a determination that power consumption is too high—to the power supply, in order to stay within the limits of a current-limited power source, such as a computer USB port. (EX1005, ¶350.)

f. [E]

As described above for element [D], the monitoring result includes a wireless feedback control signal transmitted via adapter transceiver 44, which adjusts a power applied to the primary winding of CPS power interface 34 and induces a change of intensity of the magnetic field. (EX1005, ¶351.)

Inducing the change of intensity is based on relative positions of the CPS 10 and the adapter 14. (EX1005, ¶352.) As described above, CPS 10 includes a primary winding of CPS power interface 34, and adapter 14 includes a secondary winding of adapter power interface 40. (EX1005, ¶352.) The POSITA would understand that, by Faraday's Law, as the adapter 14 and the CPS 10 become closer, the magnetic flux of the secondary winding increases, and the induced current in the secondary winding becomes greater (and vice versa). (EX1017, 784-85; EX1005, ¶352.) Thus, bringing adapter 14 toward CPS 10 closer can increase the induced signal and result in an overvoltage condition (*e.g.*, the first voltage and/or second voltage exceeding a maximum voltage), prompting the monitoring result and power supply adjustment signal as described above. (EX1005, ¶352.) This sequence is analogous to the "prior art" charging method described in the '568 patent. (EX1001, 2:21-32; EX1005, ¶352.) Further, it is analogous to the patent owner's explanation of specification support for this limitation, as described for Ground 1, claim 1[E][(i). (EX1005, ¶352.)

3. Claim 3

Claim 3 is met based on Baarman-267 in view of Veselic. (EX1005, ¶353.)

a. [Preamble]

See claim 1. (EX1005, ¶354.)

b. [A]

See claim 1[D]. (EX1005, ¶355.) Baarman-267 discloses that adapter transceiver 44 may be a wireless RFID device; and that CPS transceiver 36 can include an antenna for wireless communication. (EX1014, 3:45-51, 4:16-20; EX1005, ¶355.)

c. [B]

See claim 1[D]. (EX1005, ¶356.) Veselic discloses a voltage comparator as described for Ground 2, claim 3[B].

d. [C]

See claim 1[D]. (EX1005, ¶357.)

4. Claim 7

Claim 7 is met based on Baarman-267 in view of Veselic. (EX1005, ¶358.)

a. [Preamble]

The preamble is met at least by adapter 14 as described for claim 1. (EX1005, ¶359.)

b. [A]

See claim 1[A]. (EX1005, ¶360.)

c. [B]

See claim 1[B]. (EX1005, ¶361.)

d. [C]

See claim 1[C]. (EX1005, ¶362.)

e. [D]

See claim 1[D]. (EX1005, ¶363.)

f. [E]

See claim 1[E]. (EX1005, ¶364.)

5. Claim 8

Claim 8 is met based on Baarman-267 in view of Veselic. (EX1005, ¶365.)

a. [Preamble]

See claim 7. (EX1005, ¶366.)

b. [A]

See claim 1[A]. (EX1005, ¶367.) Magnetic flux of the magnetic field generated from primary coil 34 is inductively linked to secondary coils 202, 204, 206 by Faraday's Law. (*See* EX1017, 780-89; EX1005, ¶367.)

6. Claim 9

Claim 9 is met based on Baarman-267 in view of Veselic. (EX1005, ¶368.)

a. [Preamble]

The preamble is met as described above for claim 7. (EX1005, ¶369.)

b. [A]

See claim 3[A]. (EX1005, ¶370.)

c. [B]

See claim 1[D]. (EX1005, ¶371.)

d. [C]

See claim 3[B]. (EX1005, ¶372.)

e. [D]

See claim 3[C]. (EX1005, ¶373.)

7. Claim 11

Claim 11 is met based on Baarman-267 in view of Veselic. (EX1005, ¶374.)

a. [Preamble]

See claim 7. (EX1005, ¶375.)

b. [A]

See claim 1[D]. (EX1005, ¶376.) Adapter controller 38 transmits a monitoring result to CPS 10 to, *e.g.*, request that CPS 10 decrease the rail voltage of its internal power source. (EX1008, 11-15, Figs. 4, 5A-5B; EX1005, ¶376.)

8. Claim 12

Claim 12 is met based on Baarman-267 in view of Veselic. (EX1005, ¶377.)

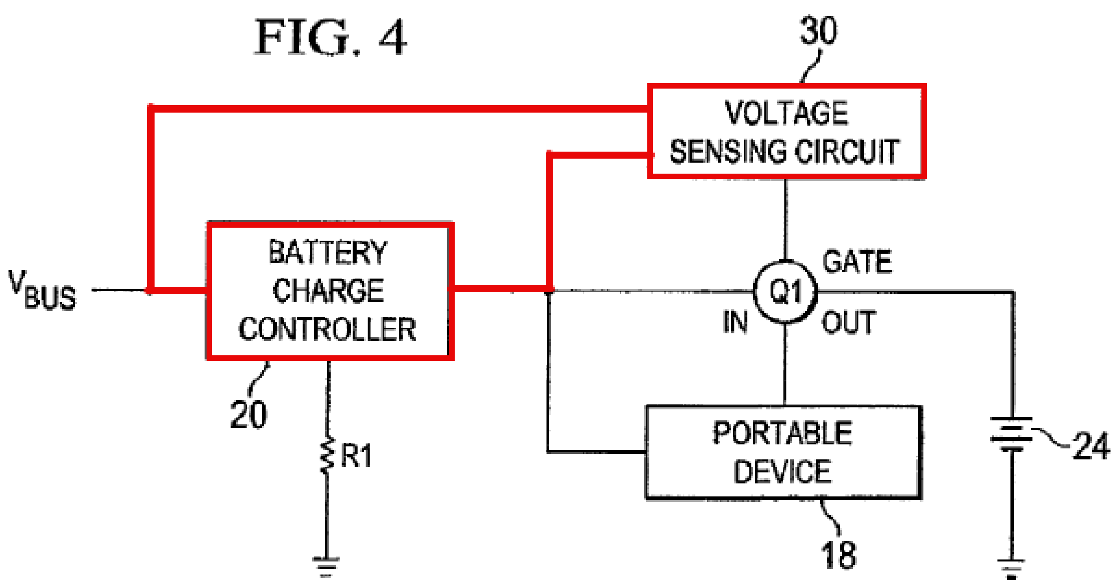
a. [Preamble]

See claim 7. (EX1005, ¶378.)

b. [A]

See claim 1[C] and [D]. (EX1005, ¶379.) For example, adapter controller 38 transmits a result of monitoring a voltage drop (difference of voltages) between the front and rear ends of the CCCV supply, as taught by Veselic:

FIG. 4



(EX1013, 5:30-64, Figs. 4 (annotated), 6, 8; EX1005, ¶379.)

9. Claim 30

Claim 30 is met based on Baarman-267 in view of Veselic. (EX1005, ¶380.)

a. [Preamble]

See claim 7. (EX1005, ¶381.)

b. [A]

See claim 1[C] and [D]. (EX1005, ¶382.) Adapter controller 38 includes a microprocessor. (EX1014, 4:37-44; EX1005, ¶382.)

10. Claim 31

Claim 31 is met based on Baarman-267 in view of Veselic. (EX1005, ¶383.)

a. [Preamble]

See claim 7. (EX1005, ¶384.)

b. [A]

See claim 1[C], and [D]. (EX1005, ¶385.) As described for 1[D], adapter controller 38 can use wireless feedback control to manipulate the rail voltage of CPS 10's internal power source, thereby changing the amplitude of the AC power provided to primary coil 34—and, thus, the amplitude of the induced AC current at secondary coils 202, 204, 206. (EX1005, ¶385.) This accordingly changes the input provided to the front end of power regulator 48, and the output of the power regulator 48 as described in 1[D] and Fig. 5 of Veselic. (EX1013, Fig. 5; EX1005, ¶385.)

11. Claim 32

Claim 32 is met based on Baarman-267 in view of Veselic. (EX1005, ¶386.)

a. [Preamble]

See claim 7. (EX1005, ¶387.)

b. [A]

See claim 1[B] and [C]. (EX1005, ¶388.)

12. Claim 33

Claim 33 is met based on Baarman-267 in view of Veselic. (EX1005, ¶389.)

a. [Preamble]

See claim 7. (EX1005, ¶390.)

b. [A]

See claim 1[C] and [D]. (EX1005, ¶391.) Veselic discloses charging the battery in an initial constant-current phase, followed by a constant-voltage phase:

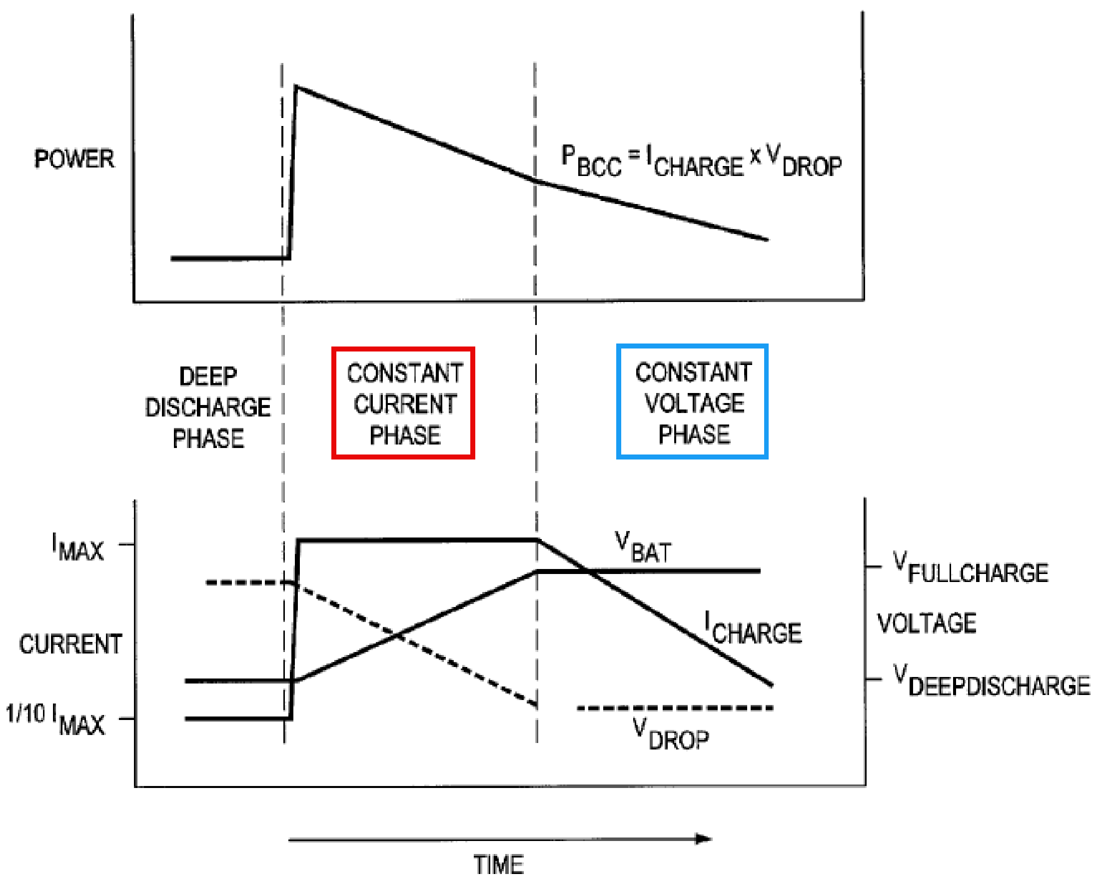


FIG. 5

(EX1013, 6:58-7:14, Fig. 5 (annotated); EX1005, ¶391.)

13. Claim 34

Claim 34 is met based on Baarman-267 in view of Veselic. (EX1005, ¶392.)

a. [Preamble]

See claim 7. (EX1005, ¶393.)

b. [A]

See claim 1[C] and [D]. (EX1005, ¶394.) Veselic discloses that once the battery voltage (V_{BAT}) reaches a threshold level ($V_{FULLCHARGE}$), charging power is provided in a constant voltage phase:

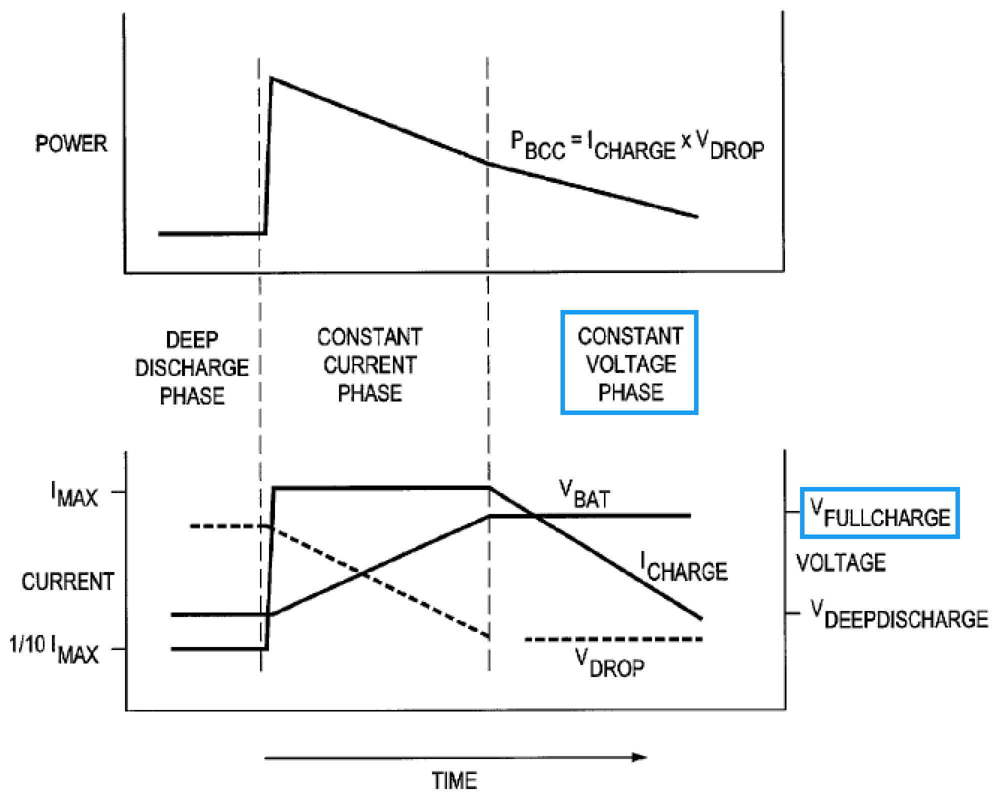


FIG. 5

(EX1013, 6:58-7:14, Fig. 5 (annotated); EX1005, ¶394.)

14. Claim 48

Claim 48 is met based on Baarman-267 in view of Veselic. (EX1005, ¶395.)

a. [Preamble]

See claim 7[Preamble]. (EX1005, ¶396.)

b. [A]

See claim 1[A]. (EX1005, ¶397.)

c. [B]

See claim 1[B]. (EX1005, ¶398.)

d. [C]

See claim 1[C] and 33[A]. (EX1005, ¶399.)

e. [D]

See claim 1[D]. (EX1005, ¶400.)

f. [E]

See claim 1[D] and [E]. (EX1005, ¶401.)

15. Claim 49

Claim 49 is met based on Baarman-267 in view of Veselic. (EX1005, ¶402.)

a. [Preamble]

See claim 48. (EX1005, ¶403.)

b. [A]

See claim 8[A]. (EX1005, ¶404.)

16. Claim 50

Claim 50 is met based on Baarman-267 in view of Veselic. (EX1005, ¶405.)

a. [Preamble]

See claim 48. (EX1005, ¶406.)

b. [A]

See claim 3[A]. (EX1005, ¶407.)

c. [B]

See claim 3[B]. (EX1005, ¶408.)

d. [C]

See claim 3[C]. (EX1005, ¶409.)

e. [D]

See claim 3[A] and [C]. (EX1005, ¶410.)

17. Claim 52

Claim 52 is met based on Baarman-267 in view of Veselic. (EX1005, ¶411.)

a. [Preamble]

See claim 48. (EX1005, ¶412.)

b. [A]

See claim 11[A]. (EX1005, ¶413.)

18. Claim 53

Claim 53 is met based on Baarman-267 in view of Veselic. (EX1005, ¶414.)

a. [Preamble]

See claim 48. (EX1005, ¶415.)

b. [A]

See claim 12[A]. (EX1005, ¶416.)

VII. DISCRETIONARY DENIAL

The Board should not deny institution under 35 U.S.C. § 314 on the basis of the litigation pending in the United States District Court for the Northern District of California. No trial date has been set in the litigation; thus, no *Fintiv* issues are presented. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020). Should the Patent Owner raise any issues related to *Fintiv* or any other discretionary denial considerations, Petitioner reserves all rights to respond in full. *See* March 26, 2025 PTAB Memorandum ("Interim Processes for PTAB Workload Management").

VIII. NOTICES AND STATEMENTS

Pursuant to 37 C.F.R. § 42.8(b)(1), Apple Inc. is the real party-in-interest for Petitioner.

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner identifies the following related matters. The '568 Patent is asserted in the following litigation matter: *LS Cable & System Ltd. v. Apple, Inc.*, Case No. 4:24-cv-09194 (N.D. Cal.).

Pursuant to 37 C.F.R. § 42.8(b)(3), Petitioner identifies the following counsel (and a power of attorney accompanies this Petition).

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Pursuant to 37 C.F.R. § 42.8(b)(4), service information for lead and back-up counsel is provided above. Petitioner consents to electronic service by email to Apple-LSCable-IPR@mofo.com.

Pursuant to 37 C.F.R. § 42.104(a), Petitioner certifies that the '568 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

The USPTO is authorized to charge any required fees, including the fee as set forth in 37 C.F.R. § 42.15(a) and any excess claim fees, to Deposit Account No. **03-1952,** referencing Docket No. **10684-0000878**.

IX. CONCLUSION

Petitioner requests that the Board initiate *inter partes* review and cancel all challenged claims of the ’568 Patent.

Dated: June 17, 2025

Respectfully submitted,

By /Alex S. Yap/

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X. CLAIMS APPENDIX

Claim 1

[Preamble] ***A contact-less chargeable battery including a charging circuit for charging an electric energy to a battery cell, the contact-less chargeable battery comprising:***

[A] ***a high frequency AC current inducing unit that includes a secondary coil to which a high frequency AC current is induced by means of a magnetic field generated from a primary coil of an external contact-less charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode; and***

[D] ***an overvoltage monitoring unit that includes first and second voltage detectors respectively detecting first and second voltages at both ends of the constant voltage/constant current supplier and a microprocessor monitoring the detected voltages at both ends of the constant voltage/constant current supplier and transmitting a monitoring result to the external contact-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field,***

[E] ***wherein the monitoring result includes a wireless feedback control signal to induce the change of intensity of the magnetic field by adjusting a power applied to the primary coil of the external contact-less charging device based on relative positions of the contact-less chargeable battery and the external contact-less charging device.***

Claim 2

(Canceled)

Claim 3

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein:***

[A] ***the overvoltage monitoring unit includes: a wireless transmitting unit for wirelessly propagating the monitoring result through an antenna; and***

[B] ***a voltage comparator for comparing the first and second voltages detected by the first and second voltage detectors and outputting a voltage comparison result; and***

[C] ***the microprocessor outputs the monitoring result according to the voltage comparison result to the wireless transmitting unit.***

Claim 4

[Preamble] ***The contact-less chargeable battery according to claim 3, wherein***

[A] ***the magnetic field generated by the external contact-less charging device is generated intermittently,***

[B] ***wherein the microprocessor receives an end time point signal indicating a time point when the induction of high frequency AC current ends, wherein the monitoring result is transmitted to the external contact-less charging device by means of wireless communication while a high frequency AC current is not induced after the end time point is input.***

Claim 5

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the monitoring result is a charging power adjustment request signal.***

Claim 6

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the monitoring result is a difference of voltages at both ends of the constant voltage/constant current supplier, voltage values of both ends, or a code indicating that the voltages at both ends are in an overvoltage state.***

Claim 7

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit to which a high frequency AC current is induced by a magnetic field generated from an external contact-less charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode; and***

[D] ***a microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier and wirelessly transmitting a monitoring result to the external contact-less charging device so as to induce a change of intensity of the magnetic field,***

[E] ***wherein the change of intensity of the magnetic field is based on relative positions of the contact-less charging circuit module and the external contact-less charging device.***

Claim 8

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the high frequency AC current inducing unit is a coil to which a magnetic flux of the magnetic field generated from the external contact-less charging device is linked.***

Claim 9

[Preamble] ***The contact-less charging circuit module according to claim 7, further comprising:***

[A] ***an antenna;***

[B] ***first and second voltage detectors for respectively detecting first and second voltages at front and rear ends of the constant voltage/constant current supplier; and***

[C] ***a voltage comparator for comparing the first and second voltages detected by the first and second voltage detectors and outputting a voltage comparison result, and***

[D] ***wherein the microprocessor outputs the monitoring result according to the voltage comparison result using the antenna.***

Claim 10

[Preamble] ***The contact-less charging circuit module according to claim 9, wherein***

[A] ***the magnetic field generated by the external contact-less charging device is generated intermittently,***

[B] ***wherein the microprocessor receives a time point indicating when the induction of high frequency AC current ends, and then outputs the end***

time point to the microprocessor, and

[C] ***wherein the monitoring result is wirelessly transmitted to the external contact-less charging device while a high frequency AC current is not induced after the end time point is input.***

<u>Claim 11</u>

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the monitoring result is a charging power adjustment request signal.***

<u>Claim 12</u>

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the monitoring result is a difference of voltages at front and rear ends of the constant voltage/constant current supplier, voltage values of the front and rear ends, or a code indicating that the voltages at both ends are in an overvoltage state.***

<u>Claim 13</u>

[Preamble] ***A contact-less charging device for transmitting a charging power by electromagnetic induction to a contact-less chargeable battery that has a constant-voltage/constant current supplier to be capable of being charged in a constant voltage/constant current mode and wirelessly transmits a monitoring result for voltages at both ends of the constant voltage/constant current supplier, the contact-less charging device comprising:***

[A] ***a magnetic field generating unit for receiving an AC current and forming a magnetic field in an outer space;***

[B] ***a high frequency power driving unit for applying a high frequency AC current to the magnetic field generating unit; and***

[C] ***a microprocessor wirelessly receiving the monitoring result from the contactless chargeable battery and controlling the high frequency power driving unit to adjust a power of the high frequency AC current applied to the magnetic field generating unit so that the charging power transmitted to the contact-less chargeable battery is adjusted;***

[D] ***wherein the adjustment to the power of the high frequency AC current applied to the magnetic field generating unit is based on relative positions of the contact-less chargeable battery and the contact-less charging device.***

Claim 14

[Preamble] ***The contact-less charging device according to claim 13, wherein***

[A] ***the magnetic field generating unit is a coil to both sides of which a high frequency AC current is applied.***

Claim 15

[Preamble] ***The contact-less charging device according to claim 13, further comprising:***

[A] ***an antenna coupled to the microprocessor and used to receive the monitoring result.***

Claim 16

[Preamble] ***The contact-less charging device according to claim 15, further comprising***

[A] ***a power supply receiving a common AC current, converting the common AC current into a DC current, and then supplying a constant-***

voltage current to the high frequency power driving unit,

[B] *wherein the high frequency power driving unit includes: a pulse signal generator for receiving a pulse driving signal from the microprocessor and outputting a pulse signal; and*

[C] *a power driving part for receiving the pulse signal to rapidly switch the constant-voltage current input from the constant voltage supplier, thereby generating a high frequency AC current in a pulse pattern.*

Claim 17

[Preamble] *The contact-less charging device according to claim 16, wherein*

[A] *the microprocessor adjusts the charging power by modulating a width of a pulse current, a frequency of the pulse current, an amplitude of a pulse, or a number of pulses.*

Claim 18

[Preamble] *The contact-less charging device according to claim 16, wherein*

[A] *the power supply includes: an overvoltage filter for receiving a common AC current and intercepting an overvoltage current;*

[B] *a rectifier for rectifying the AC current passing through the filter to convert the AC current into a DC current; and*

[C] *a constant voltage supplier that receives the converted DC current and outputs a constant voltage current.*

Claim 19

[Preamble] ***The contact-less charging device according to claim 13, wherein***

[A] ***the high frequency power driving unit intermittently applies a high frequency AC current to the magnetic field generating unit, and***

[B] ***wherein the microprocessor receives the monitoring result while a high frequency AC current is not applied to the magnetic field generating unit.***

Claim 20

[Preamble] ***The contact-less charging device according to claim 13, wherein***

[A] ***the monitoring result is a difference of voltages at both ends of the constant voltage/constant current supplier, voltage values at both ends, a code indicating that the voltages at both ends are in an overvoltage state, or a charging power adjustment request signal.***

Claim 21

[Preamble] ***A battery charging set including a contact-less chargeable battery and a contact-less charging device,***

[A] ***wherein the contact-less chargeable battery includes: a high frequency AC current inducing unit to which a high frequency AC current is induced by a magnetic field intermittently generated from an external contactless charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to a battery cell in a constant voltage/constant current mode; and***

[D] ***a first microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier and wirelessly transmitting a monitoring result to the external contact-less charging device while a high frequency AC current is not induced,***

[E] ***wherein the contact-less charging device includes: a magnetic field generating unit for receiving an AC current and forming the magnetic field in an outer space;***

[F] ***a high frequency power driving unit for intermittently applying a high frequency AC current to the magnetic field generating unit; and***

[G] ***a second microprocessor, while a high frequency AC current is not applied to the magnetic field generating unit, wirelessly receiving the monitoring result and controlling the high frequency power driving unit to adjust a power of the high frequency AC current applied to the magnetic field generating unit so that a charging power transmitted from the contact-less charging device to the contact-less chargeable battery is adjusted,***

[H] ***wherein the adjustment to the power of the high frequency AC current applied to the magnetic field generating unit is based on relative positions of the contact-less chargeable battery and the contact-less charging device.***

Claim 22

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the monitoring result is a difference of voltages at both ends of the constant voltage/constant current supplier, voltage values at both ends, a code indicating that the voltages at both ends are in an overvoltage state, or a charging power adjustment request signal.***

<u>Claim 23</u>

[Preamble] ***A method for controlling charging of a contact-less chargeable battery using a contact-less charging device by electromagnetic induction, the method comprising:***

[A] ***(a) intermittently applying a high frequency AC current to a primary coil provided to the charging device so as to intermittently generate a magnetic field in an outer region;***

[B] ***(b) linking a magnetic flux of the generated magnetic field to a secondary coil provided to the battery so as to intermittently output an electromagnetically-induced high frequency AC current;***

[C] ***(c) rectifying the output high frequency AC current to be converted into a DC current;***

[D] ***(d) applying the DC current to a battery cell through a constant voltage/constant current supplier so as to charge the battery cell in a constant voltage/constant current mode;***

[E] ***(e) monitoring voltages at both ends of the constant voltage/constant current supplier and wirelessly transmitting a monitoring result to the charging device while a high frequency AC current is not induced in the secondary coil; and***

[F] ***(f) adjusting a power of the high frequency AC current applied to the primary coil according to the transmitted monitoring result,***

[G] ***wherein the adjusting the power of the high frequency AC current applied to the primary coil is based on relative positions of the contact-less chargeable battery and the contact-less charging device.***

<u>Claim 24</u>

[Preamble] ***The method according to claim 23, wherein***

[A] ***the monitoring result is a difference of voltages at both ends of the constant voltage/constant current supplier, voltage values at both ends, a***

code indicating that the voltages at both ends are in an overvoltage state, or a charging power adjustment request signal.

Claim 25

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the constant voltage/constant current supplier includes circuitry controlled by at least one microprocessor.***

Claim 26

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the microprocessor controls, through wireless feedback control of the charging of the battery cell, the voltages at both ends of the constant voltage/constant current supplier by inducing the change of intensity of the magnetic field.***

Claim 27

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the constant voltage/constant current supplier has a front end and a rear end, wherein the constant voltage/constant current supplier receives the DC current at the front end from the rectifier and supplies the charging power at the rear end to the battery cell.***

Claim 28

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the constant voltage/constant current supplier supplies the charging power in a constant current mode at an initial charging stage and then supplies the charging power in a constant voltage mode at a later charging stage.***

Claim 29

[Preamble] ***The contact-less chargeable battery according to claim 1, wherein***

[A] ***the constant voltage/constant current supplier charges the battery cell in a constant voltage mode based on a charging voltage of the battery cell exceeding a predetermined level.***

Claim 30

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the constant voltage/constant current supplier includes circuitry controlled by at least one microprocessor.***

Claim 31

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the microprocessor controls, through wireless feedback control of the charging of the battery cell, the voltages at both ends of the constant voltage/constant current supplier by inducing the change of intensity of the magnetic field.***

<u>Claim 32</u>

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the constant voltage/constant current supplier has a front end and a rear end, wherein the constant voltage/constant current supplier receives the DC current at the front end from the rectifier and supplies the charging power at the rear end to the battery cell.***

<u>Claim 33</u>

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the constant voltage/constant current supplier supplies the charging power in a constant current mode at an initial charging stage and then supplies the charging power in a constant voltage mode at a later charging stage.***

<u>Claim 34</u>

[Preamble] ***The contact-less charging circuit module according to claim 7, wherein***

[A] ***the constant voltage/constant current supplier charges the battery cell in a constant voltage mode based on a charging voltage of the battery cell exceeding a predetermined level.***

<u>Claim 35</u>

[Preamble] ***The contact-less chargeable battery according to claim 13, wherein***

[A] ***the constant voltage/constant current supplier includes circuitry controlled by at least one microprocessor.***

Claim 36

[Preamble] ***The contact-less chargeable battery according to claim 13, wherein***

[A] ***the microprocessor controls, through wireless feedback control of the charging of the battery cell, the voltages at both ends of the constant voltage/constant current supplier by inducing the change of intensity of the magnetic field.***

Claim 37

[Preamble] ***The contact-less chargeable battery according to claim 13, wherein***

[A] ***the constant voltage/constant current supplier has a front end and a rear end, wherein the constant voltage/constant current supplier receives the DC current at the front end from the rectifier and supplies the charging power at the rear end to the battery cell.***

Claim 38

[Preamble] ***The contact-less chargeable battery according to claim 13, wherein***

[A] ***the constant voltage/constant current supplier supplies the charging power in a constant current mode at an initial charging stage and then supplies the charging power in a constant voltage mode at a later charging stage.***

Claim 39

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the constant voltage/constant current supplier charges the battery cell in a constant voltage mode based on a charging voltage of the battery cell exceeding a predetermined level.***

Claim 40

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the constant voltage/constant current supplier includes circuitry controlled by at least one microprocessor.***

Claim 41

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the microprocessor controls, through wireless feedback control of the charging of the battery cell, the voltages at both ends of the constant voltage/constant current supplier by inducing the change of intensity of the magnetic field.***

Claim 42

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the constant voltage/constant current supplier has a front end and a rear end, wherein the constant voltage/constant current supplier receives the DC current at the front end from the rectifier and supplies the charging power at the rear end to the battery cell.***

Claim 43

[Preamble] ***The battery charging set according to claim 21, wherein***

[A] ***the constant voltage/constant current supplier supplies the charging power in a constant current mode at an initial charging stage and then***

supplies the charging power in a constant voltage mode at a later charging stage.

__**Claim 44**__

[Preamble] ***The method of claim 23, further comprising:***

[A] ***receiving, by the constant voltage/constant current supplier, the DC current at a front end of the constant voltage/constant current supplier; and***

[B] ***supplying, by the constant voltage/constant current supplier, the DC current at a rear end of the constant voltage/constant current supplier to the battery cell.***

__**Claim 45**__

[Preamble] ***The method of claim 23, further comprising:***

[A] ***supplying, by the constant voltage/constant current supplier, the DC current to the battery cell in a constant current mode during an initial charging stage and then in a constant voltage mode at a later charging stage.***

__**Claim 46**__

[Preamble] ***The method of claim 23, further comprising:***

[A] ***charging, by the constant voltage/constant current supplier, the battery cell in a constant voltage mode based on a charging voltage of the battery cell exceeding a predetermined level.***

__**Claim 47**__

[Preamble] ***The method of claim 23, further comprising:***

[A] ***controlling, through wireless feedback control of the charging of the battery cell, the voltages at both ends of the constant voltage/constant current supplier by inducing a change of intensity of the magnetic field.***

<u>Claim 48</u>

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit that includes a secondary coil to which a high frequency AC current is induced by means of a magnetic field generated from a primary coil of an external contact-less charging device;***

[B] ***a rectifier receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode, wherein the constant voltage/constant current supplier supplies the charging power in a constant current mode at an initial charging stage and then supplies the charging power in a constant voltage mode at a later charging stage; and***

[D] ***an overvoltage monitoring unit that includes first and second voltage detectors respectively detecting voltages at both ends of the constant voltage/constant current supplier, and a microprocessor monitoring the detected voltages at both ends of the constant voltage/constant current supplier and transmitting a monitoring result to the external constant-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field,***

[E] ***wherein the microprocessor transmits the monitoring result to induce the change of intensity of the magnetic field by adjusting a power applied to the primary coil of the external contact-less charging device to solve an overvoltage state according to relative positions of the primary coil and the secondary coil.***

Claim 49

[Preamble] ***The contact-less charging circuit module according to claim 48, wherein***

[A] ***a magnetic flux of the magnetic field generated from the external contact-less charging device is linked to the secondary coil of the high frequency AC current inducing unit.***

Claim 50

[Preamble] ***The contact-less charging circuit module according to claim 48, wherein:***

[A] ***the overvoltage monitoring unit further comprises: a wireless transmitting unit wirelessly propagating the monitoring result through an antenna; and;***

[B] ***a voltage comparator for comparing the first and second voltages detected by the first and second voltage detectors and outputting a voltage comparison result, and***

[C] ***the microprocessor outputs the monitoring result according to the voltage comparison result to the wireless transmitting unit.***

[D] ***wherein the microprocessor outputs the monitoring result according to the voltage comparison result using the antenna.***

Claim 51

[Preamble] ***The contact-less charging circuit module according to claim 50, wherein***

[A] ***the magnetic field generated by the external contact-less charging device is generated intermittently,***

[B] ***wherein the overvoltage monitoring unit further includes a charging pause detecting unit receiving the high frequency AC current output from the high frequency AC current inducing unit to detect a time point when the induction of high frequency AC current ends, and then outputting the end time point to the microprocessor, and***

[C] ***wherein the monitoring result is transmitted to the external contact-less charging device by means of wireless communication while a high frequency AC current is not induced after the end time point is input.***

Claim 52

[Preamble] ***The contact-less charging circuit module according to claim 48, wherein***

[A] ***the monitoring result is a charging power adjustment request signal.***

Claim 53

[Preamble] ***The contact-less charging circuit module according to claim 48, wherein***

[A] ***the monitoring result is a difference of voltages at front and rear ends of the constant voltage/constant current supplier, voltage values of the front and rear ends, or a code indicating that the voltages at both ends are in an overvoltage state.***

Claim 54

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit to which a high frequency AC current is induced by means of a magnetic field generated from an external contact-less charging device;***

[B] ***a rectifier receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode,***

[D] ***an overvoltage monitoring unit that includes: a microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier, and a wireless transmitting unit transmitting a monitoring result to the external contact-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field.***

[E] ***wherein the change of intensity of the magnetic field is based on relative positions of the contact-less charging circuit module and the external contact-less charging device.***

<u>Claim 55</u>

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit including a secondary coil to which a high frequency AC current is induced by means of a magnetic field generated from a primary coil in an external contact-less charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode; and***

[D] ***an overvoltage monitoring unit that includes: a microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier, and a wireless transmitting unit transmitting a monitoring result***

to the external contact-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field,

[E] ***wherein the secondary coil is movable relative to the primary coil during the charging of the battery cell by the contact-less charging circuit module, and***

[F] ***wherein the monitoring result includes an adjustment request signal being transmitted repeatedly during the battery charging process for adjusting the intensity of the magnetic field.***

Claim 56

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit including a secondary coil to which a high frequency AC current is induced by means of a magnetic field generated from a primary coil in an external contact-less charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode; and***

[D] ***an overvoltage monitoring unit that includes: a microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier, and a wireless transmitting unit transmitting a monitoring result to the external contact-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field,***

[E] ***wherein the monitoring result includes an adjustment request signal being transmitted repeatedly during the battery charging process for adjusting a power applied to the primary coil of the external contact-less***

charging device based on relative positions of the contact-less chargeable battery and the external contact-less charging device.

Claim 57

[Preamble] ***A contact-less charging device for transmitting a charging power by means of electromagnetic induction phenomenon to a contact-less chargeable battery that has a constant-voltage/constant current supplier to be capable of being charged in a constant voltage/constant current mode and wirelessly transmits a monitoring result for voltages at both ends of the constant voltage/constant current supplier, the contact-less charging device comprising:***

[A] ***a magnetic field generating unit for receiving an AC current and forming a magnetic field in an outer space;***

[B] ***a high frequency power driving unit for applying a high frequency AC current to the magnetic field generating unit; and***

[C] ***a charging power adjusting unit that includes: a wireless receiving unit receiving the monitoring result from the contact-less chargeable battery by means of wireless communication, and a microprocessor controlling the high frequency power driving unit to adjust a power of the high frequency AC current applied to the magnetic field generating unit so that the charging power transmitted to the contact-less chargeable battery is adjusted,***

[D] ***wherein the adjustment to the power of the high frequency AC current applied to the magnetic field generating unit is based on relative positions of the contact-less chargeable battery and the contact-less charging device.***

Claim 58

[Preamble] ***A contact-less charging circuit module electrically connected to a battery cell and used for charging an electric energy to the battery cell in a contact-less method, the contact-less charging circuit module comprising:***

[A] ***a high frequency AC current inducing unit that includes a secondary coil to which a high frequency AC current is induced by means of a magnetic field generated from a primary coil of an external contact-less charging device;***

[B] ***a rectifier for receiving the induced high frequency AC current and converting the induced high frequency AC current into a DC current;***

[C] ***a constant voltage/constant current supplier receiving the DC current from the rectifier and supplying a charging power to the battery cell in a constant voltage/constant current mode; and***

[D] ***an overvoltage monitoring unit that includes a microprocessor, the microprocessor monitoring voltages at both ends of the constant voltage/constant current supplier and transmitting a monitoring result to the external contact-less charging device by means of wireless communication so as to induce a change of intensity of the magnetic field,***

[E] ***wherein the change of intensity of the magnetic field includes a change of intensity of the magnetic field by adjusting a power applied to the primary coil of the external contact-less charging device based on relative positions of the contact-less charging circuit module and the external contact-less charging device.***

Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this Petition for *Inter Partes* Review has 13,776 words (as counted by the "Word Count" feature of the Microsoft Word™ word-processing system), exclusive of a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing.

Dated: June 17, 2025

By */Bryan Blumenkopf/*
Bryan Blumenkopf

Certificate of Service (37 C.F.R. § 42.6(e)(4) and 42.205(a))

I hereby certify that the attached Petition for *Inter Partes* Review and supporting materials were served as of the below date by U.S. Express Mail, on the Patent Owner at the correspondence address indicated for U.S. Patent No. 8,013,568.

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Dated: June 17, 2025

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