

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Yossi Azancot et al.
U.S. Patent No.: 9,083,204 Attorney Docket No.: 46570-0022IP1
Issue Date: July 14, 2015
Appl. Serial No.: 14/152,368
Filing Date: January 10, 2014
Title: TRANSMISSION-GUARD SYSTEM AND METHOD FOR AN
INDUCTIVE POWER SUPPLY

Mail Stop Patent Board

Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 9,083,204 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

TABLE OF CONTENTS

I.	REQUIREMENTS FOR IPR—37 C.F.R. § 42.104.....	1
A.	Grounds for Standing—37 C.F.R. § 42.104(a)	1
B.	Challenge and Relief Requested—37 C.F.R. § 42.104(b)	1
II.	SUMMARY OF THE '204 PATENT	2
A.	Brief Description	2
B.	Prosecution History of the '204 Patent	4
III.	LEVEL OF ORDINARY SKILL	6
IV.	CLAIM CONSTRUCTION	6
A.	“substantially different” transmission frequency	7
V.	DETAILED EXPLANATION OF GROUNDS.....	9
A.	GROUND 1A: Onishi Anticipates Claims 1-6, 8, and 10-13.....	9
1.	Onishi	9
2.	Application to Challenged Claims.....	13
	Element [1.P]	13
	Element [1.1].....	15
	Element [1.2].....	18
	Element [1.3].....	20
	Element [1.4].....	21
	Element [1.5].....	23
	Element [1.6].....	25
	Element [1.7].....	33
	Element [1.8].....	35
	Claim [2]	37
	Claim [3]	37
	Claim [4]	38
	Claim [5]	39
	Claim [6]	40

Claim [8]	41
Element [10.P]	41
Element [10.1].....	42
Element [10.2].....	42
Element [10.3].....	43
Element [10.4].....	44
Element [10.5].....	44
Element [10.6].....	45
Claim [11]	46
Claim [12]	46
Claim [13]	46
B. GROUND 1B: Onishi in view of Purdy Renders Obvious Claims 1-6, 8, and 10-13	47
1. Purdy	48
2. The Onishi-Purdy Combination.....	48
3. Application to Challenged Claims	49
Claims [1], [10]	49
Claims [2], [3], and [4]	50
Claims [5]-[6], [8], [10]-[13]	52
C. GROUND 2: Baarman392 in view of Tocci Renders Obvious Claims 1-6, 8, and 10-13.....	52
1. Baarman392	52
2. Tocci.....	56
3. The Baarman392-Tocci Combination	57
4. Application to Challenged Claims	61
Element [1.P]	61
Element [1.1].....	62
Element [1.2].....	63
Element [1.3].....	65

Element [1.4].....	66
Element [1.5].....	67
Element [1.6].....	68
Element [1.7].....	71
Element [1.8].....	72
Claim [2]	73
Claim [3]	74
Claim [4]	75
Claim [5]	76
Claim [6]	77
Claim [8]	78
Element [10.P]	79
Element [10.1].....	79
Element [10.2].....	80
Element [10.3].....	80
Element [10.4].....	80
Element [10.5].....	81
Element [10.6].....	82
Claim [11]	82
Claim [12]	83
Claim [13]	84
VI. DISCRETIONARY DENIAL IS NOT JUSTIFIED.....	84
A. The Petition’s New Prior Art and Errors Made During Prosecution Warrant Institution—35 U.S.C. § 325(d).....	84
B. <i>Fintiv</i> Considerations Weigh in Favor of Institution—35 U.S.C. § 314(a).....	86
VII. PAYMENT OF FEES—37 C.F.R. § 42.103.....	86
VIII. CONCLUSION.....	87
IX. MANDATORY NOTICES UNDER—37 C.F.R § 42.8(a)(1).....	87

A.	Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)	87
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2)	87
C.	Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)	88
D.	Service Information	88

EXHIBITS

EX1001	U.S. Patent No. 9,083,204 to Azancot (“the ’204 patent”)
EX1002	Excerpts from the Prosecution History of the ’204 Patent (“the Prosecution History”)
EX1003	Expert Declaration of Gary Woods, Ph.D.
EX1004	U.S. Pub. No. 2008/0197804 (“Onishi”)
EX1005	U.S. Pub. No. 2007/0236169 (“Purdy”)
EX1006	U.S. Pub. No. 2008/0079392 (“Baarman392”)
EX1007	PCT Publication No. WO2006/031133 (“Malpas”)
EX1008	U.S. Pub. 2009/0212736 (“Baarman736”)
EX1009	Excerpts from Ronald J. Tocci et al., Digital Systems: Principles and Applications, Pearson Education International, 10 th Edition (2007) (“Tocci”)
EX1010	Declaration of June Munford
EX1011	U.S. Provisional App. Serial No. 61/064,618 (March 17, 2008)
EX1012	U.S. Provisional App. Serial No. 61/071, 151 (April 15, 2008)
EX1013	U.S. Provisional App. Serial No. 61/129,526 (July 2, 2008)
EX1014	U.S. Provisional App. Serial No. 61/129,859 (July 24, 2008)
EX1015	U.S. Provisional App. Serial No. 61/129,970 (August 4, 2008)
EX1016	U.S. Patent No. 9,048,696 to Azancot (“the ’696 patent”)

- EX1017 Complaint, *Powermat Technologies Ltd. v. Anker Innovations Ltd.*, Case No. 5:23-cv-00052 (E.D. Tex.), June 5, 2023
- EX1018 Waiver of Service, *Powermat Technologies Ltd. v. Anker Innovations Ltd.*, Case No. 5-23-cv-00052 (E.D. Tex.), September 27, 2023
- EX1019 Petitioner's *Sotera* Stipulation

LISTING OF CLAIMS

Claim Element	Language
[1.P]	An inductive power transfer system comprising
[1.1]	at least one inductive power outlet comprising at least one primary inductive coil wired to a power supply via a driver;
[1.2]	said primary inductive coil for forming an inductive couple having a characteristic resonant frequency with at least one secondary inductive coil wired to an electric load,
[1.3]	said secondary inductive coil associated with an inductive power receiver
[1.4]	wherein said driver is configured to provide a driving voltage across said primary inductive coil,
[1.5]	said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple,
[1.6]	wherein said inductive power outlet further comprises a signal detector adapted to detect a first signal and a second signal, and
[1.7]	said driver is configured to: provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector, and
[1.8]	provide more power by decreasing said non-resonant transmission frequency by an incremental value when said second signal is detected by the detector.
[2]	The system of claim 1 said signal detector being configured to adjust said transmission frequency in response to feedback signals.
[3]	The system of claim 2 wherein said feedback signals carry data pertaining to the operational parameters of said electric

Claim Element	Language
	load.
[4]	The system of claim 3 wherein said operational parameters are selected from the group consisting of: required operating voltage for said electric load; required operating current for said electric load; required operating temperature for said electric load; required operating power for said electric load; measured operating voltage for said electric load; measured operating current for said electric load; measured operating temperature for said electric load; measured operating power for said electric load; power delivered to said primary inductive coil; power received by said secondary inductive coil; and a user identification code.
[5]	The system of claim 1 wherein said signal detector is selected from the list comprising optical detectors, radio receivers, audio detectors and voltage peak detectors.
[6]	The system of claim 1 wherein said driver further comprises a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil.
[8]	The system of claim 1 comprising a power converter selected from the group comprising: a transformer, a DC-to-DC converter, an AC-to-DC converter, an AC-to-AC converter, a flyback transformer, a flyback converter, a full-bridge converter, a half-bridge converter and a forward converter.
[10.P]	A method for regulating inductive power transmission from a primary inductive coil, wired to a power supply via a driver, to a secondary inductive coil, wired to an electric load, said method comprising the following steps:
[10.1]	providing an oscillating voltage to said primary inductive coil at an initial transmission frequency f_t substantially different from a characteristic resonant frequency f_R of the system;

Claim Element	Language
[10.2]	inducing a secondary voltage in said secondary inductive coil;
[10.3]	monitoring power received by said electric load;
[10.4]	sending a feedback signal when the monitored power deviates from a predetermined range;
[10.5]	said driver receiving said feedback signal; and
[10.6]	said driver adjusting said non-resonant transmission frequency.
[11]	The method of claim 10 wherein the step of sending a feedback signal further comprises: sending a feedback signal of a first type Sa to said driver, whenever said power drops below a predetermined lower threshold, and sending a feedback signal of a second type Sb to said driver, whenever said power exceeds a predetermined upper threshold.
[12]	The method of claim 10 wherein said initial non-resonant transmission frequency f_t is higher than the characteristic resonant frequency f_R .
[13]	The method of claim 10 wherein the step of said driver adjusting said non-resonant transmission frequency further comprises: said driver reducing said non-resonant transmission frequency by an incremental value df_1 when the received feedback signal is of the first type Sa, and said driver increasing said non-resonant transmission frequency by an incremental value $+df_2$ when the received feedback signal is of the second type Sb.

Anker Innovations Ltd. (“Petitioner” or “Anker”) petitions for *Inter Partes* Review (“IPR”) of claims 1-6, 8, and 10-13 (“the Challenged Claims”) of U.S. Patent No. 9,083,204 (“the ’204 patent”).

I. REQUIREMENTS FOR IPR—37 C.F.R. § 42.104

A. Grounds for Standing—37 C.F.R. § 42.104(a)

Petitioner certifies that the ’204 Patent is available for IPR, and Petitioner is not barred or estopped from requesting IPR.

B. Challenge and Relief Requested—37 C.F.R. § 42.104(b)

Petitioner requests IPR on Grounds 1A-2 listed below. An expert declaration from Gary Woods, Ph.D., supports Grounds 1A-2. *See* EX1003.

Ground	Claims	Basis of Rejection
1A	1-6, 8, 10-13	§102 – Anticipated by Onishi (EX1004)
1B	1-6, 8, 10-13	§103 – Obvious based on Onishi in view of Purdy (EX1005)
2	1-6, 8, 10-13	§103 – Obvious based on Baarman392 (EX1006) in view of Tocci (EX1009)

The ’204 patent was filed on January 10, 2014 and claims priority to several earlier-filed applications, including a set of five provisional applications. EX1001, 1; EX1011-EX1015. The earliest provisional application (EX1011) in the priority chain was filed on **March 17, 2008**, but that provisional application lacks disclosure

of several elements in claims 1 and 10 of the '204 patent. For example, the claim elements that are supported by FIGS. 6a-6d and the corresponding text of the '204 patent were never contemplated in the provisional applications until—at the earliest—the **July 2, 2008** provisional application (EX1013). Regardless, Grounds 1A-2 all rely on prior art references that predate even the earliest March 17, 2008 provisional application. In particular, the references applied in Grounds 1A-2 qualify as prior art to the '204 Patent under at least the following provisions of pre-AIA 35 U.S.C. § 102:

Reference	Filed	Published	§102 Provision(s)
Onishi	02/15/2008	8/21/2008	§102(e)
Purdy	06/14/2007	10/11/2007	§§102(a), (e)
Baarman392	09/14/2007	04/03/2008	§102(e)
Tocci	--	2005	§102(a)-(b)

II. SUMMARY OF THE '204 PATENT

A. Brief Description

The '204 patent generally relates to inductive power transmission systems. EX1003, ¶¶25-28. As background, the specification describes an inductive power coupling in which “[a] power supply is wired to a primary coil and an oscillating electric potential is applied across the primary coil, thereby inducing an oscillating

magnetic field.” *Id.*, 1:27-32. “The oscillating magnetic field may induce an oscillating electrical current in a secondary coil placed close to the primary coil” and “[i]n this way, electrical energy may be transmitted from the primary coil to the secondary coil by electromagnetic induction without the two coils being conductively connected.” *Id.*, 1:32-37.

The specification further explains that “[t]he strength of an induced voltage in the secondary inductor of an inductive couple varies according to the oscillating frequency of the electrical potential provided to the primary inductor.” EX1001, 19:52-55. “The induced voltage is strongest when the oscillating frequency equals the resonant frequency of the system,” which “depends upon the inductance L and the capacitance C of the system.” *Id.*, 19:55-58. It can be difficult, however, to operate a system at resonance because “the resonant frequency ... may fluctuate during power transmission, for example in response to changing environmental conditions or variations in alignment between primary and secondary coils.” *Id.*, 19:66-20:3. Accordingly, the ’204 patent proposed a system in which “the driver ... is configured and operable to transmit a driving voltage which oscillates at a transmission frequency which is ***substantially different*** from the resonant frequency of the inductive couple.” *Id.*, 21:16-20 (emphasis added). For example, as shown in FIG. 6b (reproduced below), the transmission frequency of the inductive

power outlet is set to a frequency f_t offset from the characteristic resonant frequency f_R :

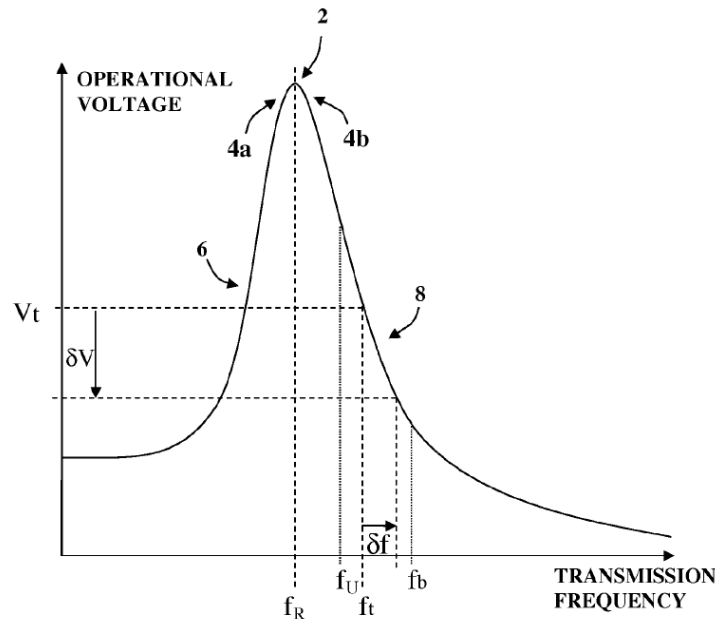


Fig. 6b

EX1001, FIG. 6b, 21:1-65; *see also id.*, 20:43-23:5, FIGs. 6a, 6d; EX1003, ¶¶26-27.

B. Prosecution History of the '204 Patent

The application that issued as the '204 patent was twice rejected before allowance. EX1003, ¶¶29-32. In a first action, the Examiner rejected the originally examined claims as obvious over Malpas (EX1007), and further found that the terms “significantly” and “substantially” as recited in the independent claims were indefinite. EX1002, 117-127. In response, the applicant amended the claims to require a “non-resonant transmission frequency higher than said characteristic resonant frequency of said inductive couple.” EX1002, 96-100. The applicant argued

that Malpas was distinguishable because “Malpas describes systems at which the transmission frequency is selected to be as close as possible to the resonant natural frequency” and does not “deliberately select[.]” a “transmission frequency ... higher than the characteristic resonant frequency.” *Id.*, 102-105.

In the next action, the Examiner found that the applicant’s amendments and arguments in reply to the first action failed to overcome Malpas. EX1002, 74-86. The applicant replied to the final action by amending the claims to recite a “non-resonant transmission frequency ***substantially different*** from said characteristic resonant frequency of said inductive couple.” EX1002, 55-64 (emphasis added). The applicant also submitted remarks regarding the scope of this phrase, which Petitioner addresses in further detail in the claim construction section below. *Infra*, Section IV.A.

The Examiner then issued a notice of allowance, although no reasons for allowance were expressed therein. Grounds 1A-2 of this Petition, however, confirm that the application never should have been allowed. The prior art cited in these grounds shows that the Challenged Claims are directed to features that were entirely conventional before the earliest alleged priority date of the ’204 patent (March 17, 2008). Indeed, Onishi and Baarman³⁹² each demonstrate that the purported point of novelty (e.g., using a “non-resonant transmission frequency substantially different from said characteristic resonant frequency”) was well known

in the prior art. EX1003, ¶162.

III. LEVEL OF ORDINARY SKILL

For purposes of this IPR, Petitioner submits that a person of ordinary skill in the art at the time of the alleged invention (“POSITA”) would have had a bachelor’s degree or higher in electrical engineering, at least 3 years of experience designing or researching electronic circuits, and familiarity with power electronics and inductive power transfer circuits. EX1003, ¶20.

IV. CLAIM CONSTRUCTION

All claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Given the noticeable overlap between the preferred embodiment of the ’204 patent and the prior art/predictable combinations articulated in Grounds 1A-2, Petitioner submits that most claim elements do not require a formal construction for purposes of resolving controversies in this proceeding. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Google Inc. v. Intellectual Ventures II LLC*, 701 Fed. Appx. 946, 956 (Fed. Cir. 2017) (“do not require construction” for purposes of “re-solv[ing] the parties’ patentability arguments”).

As noted above, the phrase “substantially different” in independent claims 1 and 10 (Elements [1.5] and [10.1]) was expressly addressed during prosecution of the ’204 patent. For that reason, Petitioner addresses below what was alleged to be

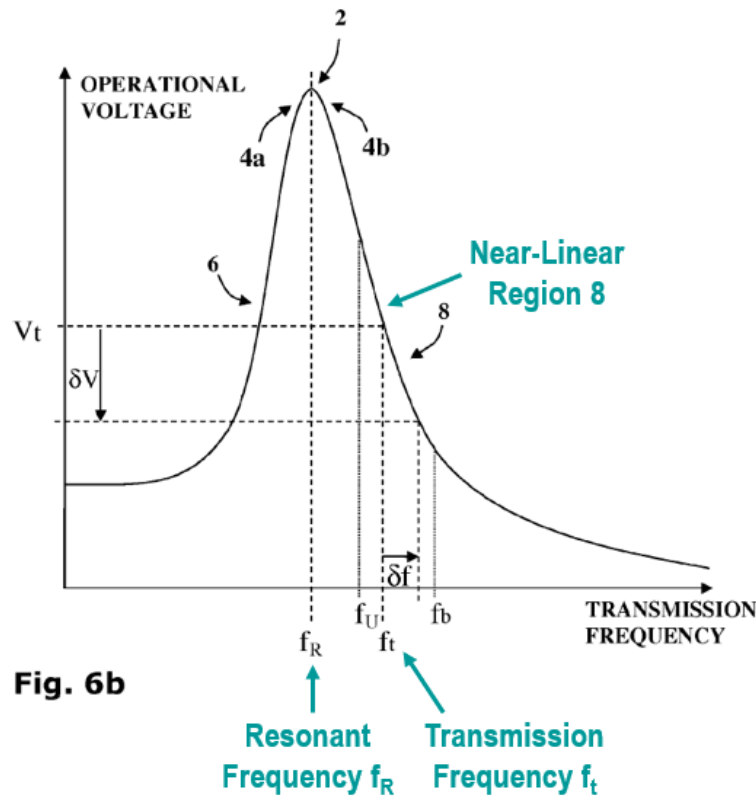
encompassed by this claim phrase.

Petitioner reserves the right to respond to any constructions raised by Patent Owner or the Board. Petitioner is not conceding that the Challenged Claims satisfy all statutory requirements, nor is Petitioner waiving any arguments concerning indefiniteness or claim scope that can only be raised in district court or otherwise outside the context of an IPR. *Mylan Pharm. Inc. v. Horizon Pharma USA, Inc.*, IPR2018-00272, Paper 35, 6-8 (PTAB 2019). Where, as here, the prior art aligns with the preferred embodiment of a patent and the patent's claim scope encompasses the preferred embodiment, the Board is equipped to compare that patent's vague claim language to the prior art for purposes of considering unpatentability. *See, e.g., Chicago Mercantile Exchange, Inc. v. 5th Market, Inc.*, CBM2013-00027, Paper 33, 3 (PTAB 2014); *SAP America, Inc. v. Lakshmi Arunachalam*, CBM2013-00013, Paper 61, 29 (PTAB 2014).

A. “substantially different” transmission frequency

Independent claim 1 recites “a non-resonant transmission frequency *substantially different* from [a] characteristic resonant frequency of [an] inductive couple.” EX1001, 28:33-36. Independent claim 10 recites “an initial transmission frequency ft *substantially different* from a characteristic resonant frequency fR.” *Id.*, 10:21-24. The specification and file history of the '204 patent inform what must fall within the scope of these claim elements.

In relevant part, the specification discloses, with reference to FIGS. 6a-6b, that “the transmission frequency is selected to lie within one of the near-linear regions 6, 8 where the slope of the frequency-amplitude graph is less steep.” EX1001, 21:16-23, 21:56-65. FIG. 6b, below, shows the transmission frequency f_t in the near-linear region 8 apart from the resonant frequency f_R :



EX1001, FIG. 6b (annotated).

During prosecution, Patent Owner argued that “the term ‘*substantially different from said characteristic resonant frequency*’ ... should be interpreted to mean that the frequency of the driving voltage is selected so as to lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive

couple.” EX1002, 62.

Thus, regardless of the outermost boundaries of the scope of a transmission frequency “substantially different” from a characteristic resonant frequency as claimed, the specification plainly establishes that it must at least encompass the frequencies within one of the near-linear regions of the frequency-amplitude graph. EX1003, ¶¶35-40. For example, the frequencies indicated by reference numerals 6 and 8 in FIG. 6b of the ’204 patent are non-resonant transmission frequencies “substantially different” from the characteristic reference frequency.

All grounds below include references that expressly disclose and/or align with FIG. 6b’s preferred embodiment of a transmission frequency that is “substantially different” from a characteristic resonant frequency. EX1003, ¶41. Simply put, the grounds below anticipate or render obvious the Challenged Claims under any construction that is consistent with the specification of the ’204 patent. For this reason, Petitioner acknowledges that the Board need not formally construe this claim phrase.

V. DETAILED EXPLANATION OF GROUNDS

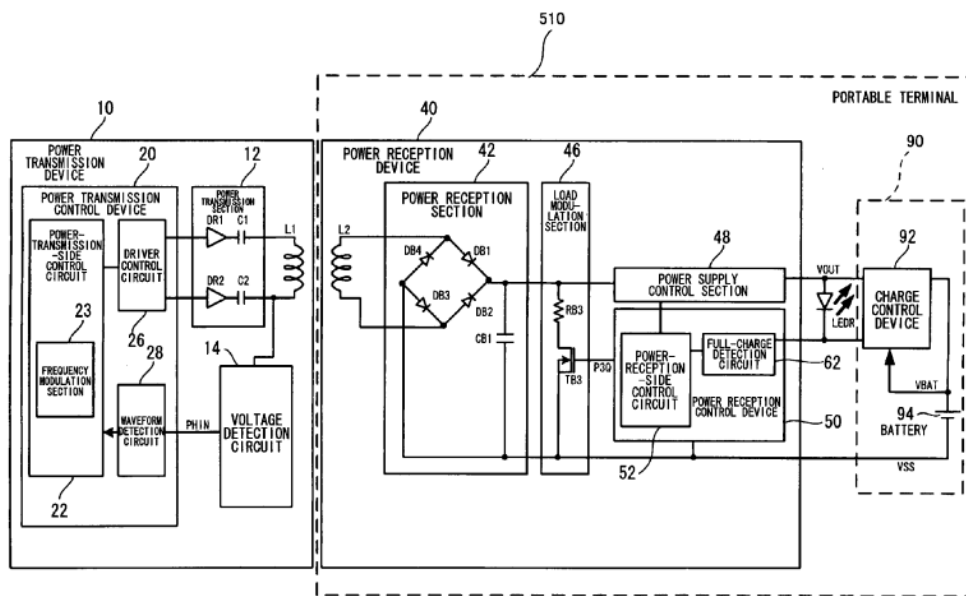
A. GROUND 1A: Onishi Anticipates Claims 1-6, 8, and 10-13

1. Onishi

Similar to the ’204 patent, Onishi describes techniques for controlling wireless power transmission from a power transmission device (e.g., device 10) to a power

reception device (e.g., device 40). EX1004, Abst.; EX1003, ¶42. The power transmission device transmits power to the power reception device through electromagnetic coupling of a primary coil in the power transmission device to a secondary coil in the power reception device. EX1004, [0128], FIGS. 2, 5; EX1003, ¶42.

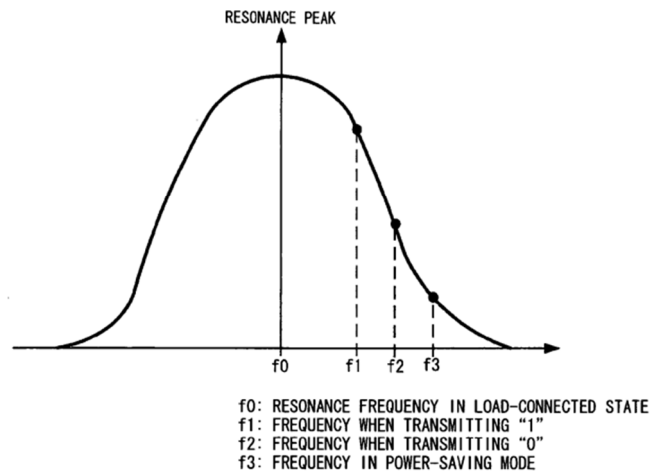
FIG. 5



EX1004, FIG. 5.

FIG. 4, reproduced below, depicts a power-transfer curve that illustrates how the level of power transfer from the primary coil to the secondary coil varies as a function of the drive frequency applied to the primary coil. FIG. 4. EX1004, [0180], FIG. 4; EX1003, ¶43. As shown in FIG. 4, power transfer is maximized at the resonant frequency f_0 and decreases at non-resonant frequencies (e.g., f_1 , f_2 , and f_3). EX1004, [0180]-[0181], FIG. 4; EX1003, ¶43.

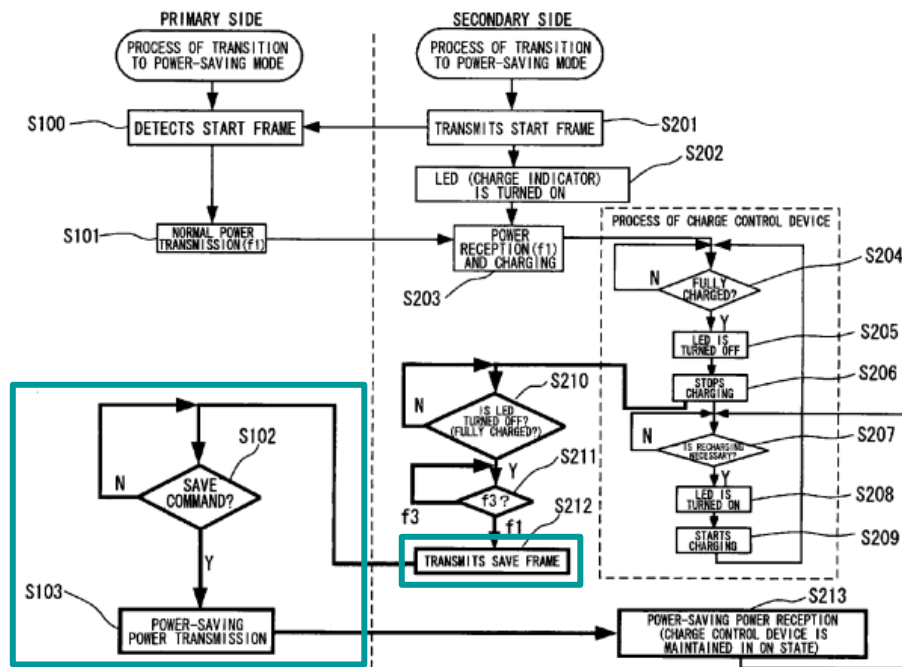
FIG. 4



EX1004, FIG. 4.

Onishi's power-transmission-side control device adjusts a transmission frequency to control the power transmitted to the power reception device based on detected signals from the power reception device. EX1004, [0142], [0196], [0215], [0223]-[0225]; EX1003, ¶44. A control circuit 22 in the power transmission device can "detect[a] [a] save command transmitted from the secondary-side instrument (step S102), and starts power-saving power transmission (power transmission frequency f3) (step S103)." EX1004, [0215], FIG. 7, *see also* EX1004, [0226], FIG. 9. As shown in FIG. 4 above, switching to the power-saving power transmission mode involves increasing the transmission frequency, e.g., from "f1" to "f3." EX1004, FIG. 4; EX1003, ¶44.

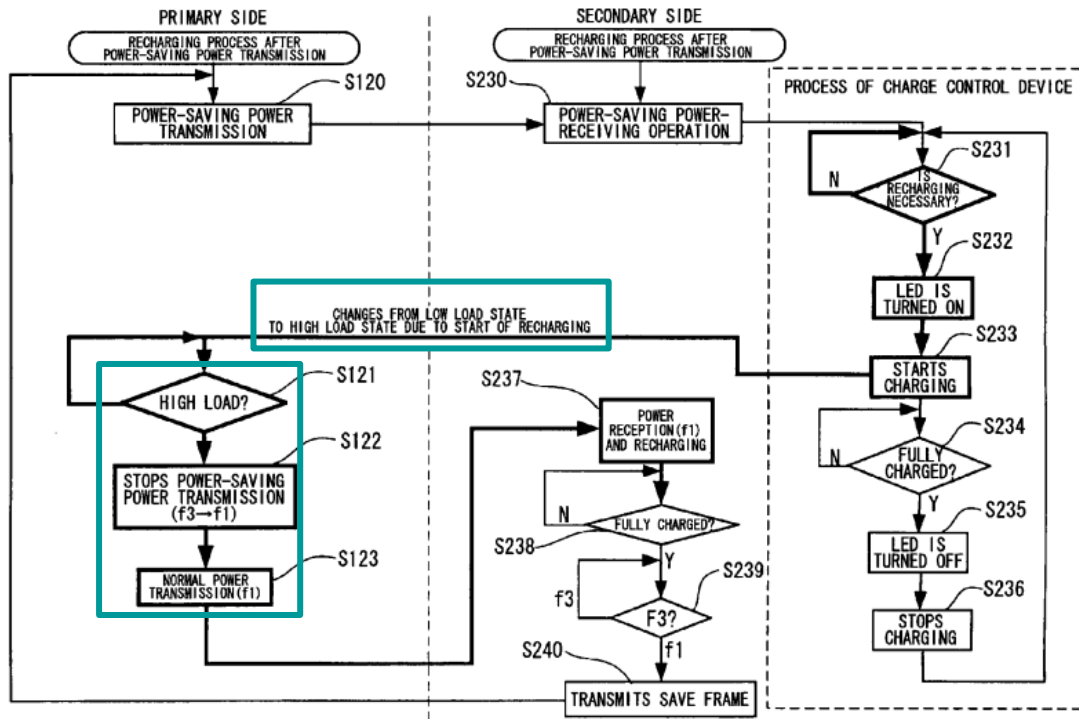
FIG. 7



EX1004, FIG. 7 (annotated); EX1003, ¶44.

Further, Onishi discloses that “[w]hen the load state of the power reception device 40 has changed from a low-load state to a high-load state due to recharging, the power transmission control device 20 quickly detects a change in load state (step S121), immediately changes power transmission from power-saving power transmission to normal power transmission (step S122).” EX1004, [0225], FIG. 9. As shown in FIG. 4, switching to the charging mode involves decreasing the transmission frequency, e.g., from “f3” to “f1.” EX1004, FIG. 4; EX1003, ¶45.

FIG. 9



EX1004, FIG. 9 (annotated); EX1003, ¶45.

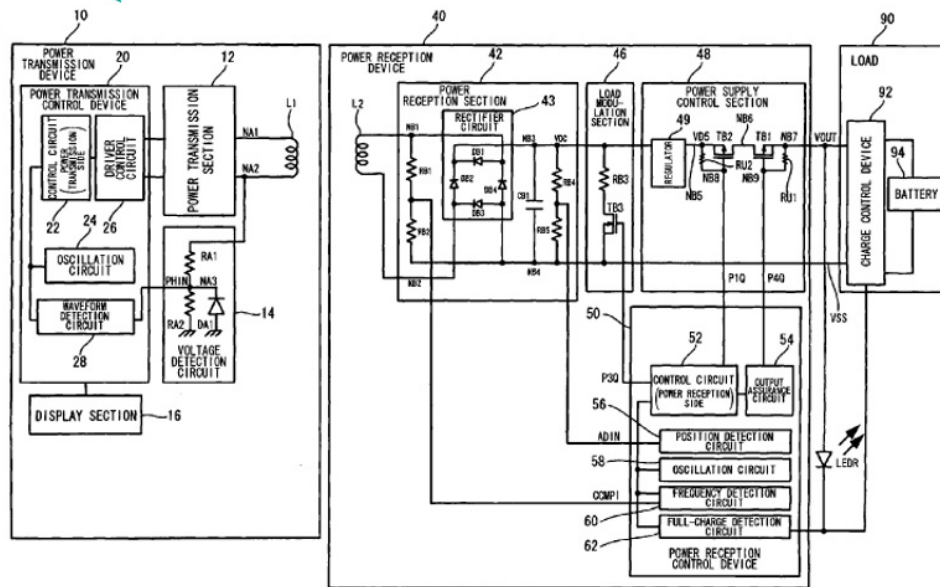
2. Application to Challenged Claims

Element [1.P]

To the extent the preamble is a limitation, Onishi discloses the recited “*inductive power transfer system*.” EX1003, ¶46. Onishi’s inductive power transfer system includes a “power transmission device 10” and a “power reception device 40.” EX1004, [0124]-[0131], FIGS. 1A, 2, 5; EX1003, ¶46.

Onishi's Inductive Power
Transfer System

FIG. 2



EX1004, FIG. 2 (annotated).

Onishi discloses that the power transmission device 10 can be disposed in a charger 500 and “[t]he power supplied to the charger 500 is transmitted from the power transmission device 10 to the power reception device 40 by means of non-contact power transmission.” EX1004, [0125]; EX1003, ¶47. Onishi explains that “non-contact power transmission (contactless power transmission) ... utilizes electromagnetic induction to enable power transmission without metal-to-metal contact.” *Id.*, [0003]; *see also id.*, [0128] (“power transmission from the power transmission device 10 to the power reception device 40 is implemented by electromagnetically coupling a primary coil L1 (power-transmission-side coil) provided in the power transmission device 10 and a secondary coil L2 (power-receiving-side coil)

provided in the power reception device 40 to form a power transmission transformer”), [0137] (“primary coil L1 (power-transmission-side coil) is electromagnetically coupled with the secondary coil L2 (power-receiving-side coil) to form a power transmission transformer”); EX1003, ¶47.

Element [1.1]

Onishi discloses that its inductive power transmission system includes a power transmission device 10 (***inductive power outlet***).¹ EX1004, [0131]; *generally id.*, [0125]-[0168], FIGS. 2, 5; EX1003, ¶48. The power transmission device 10 includes a primary coil L1 (***primary inductive coil***) wired to a power adapter 502 (***power supply***) via a power transmission section 12 (component of the ***driver***)².

¹ As another example, Onishi’s charger/cradle (e.g., charger 500), which includes power transmission device 10, provides the claimed “at least one inductive power outlet.” Here, Onishi anticipates claim 1 whether the entire charger/cradle or just the power transmission device 10 is mapped to the claimed inductive power outlet. EX1003, ¶51.

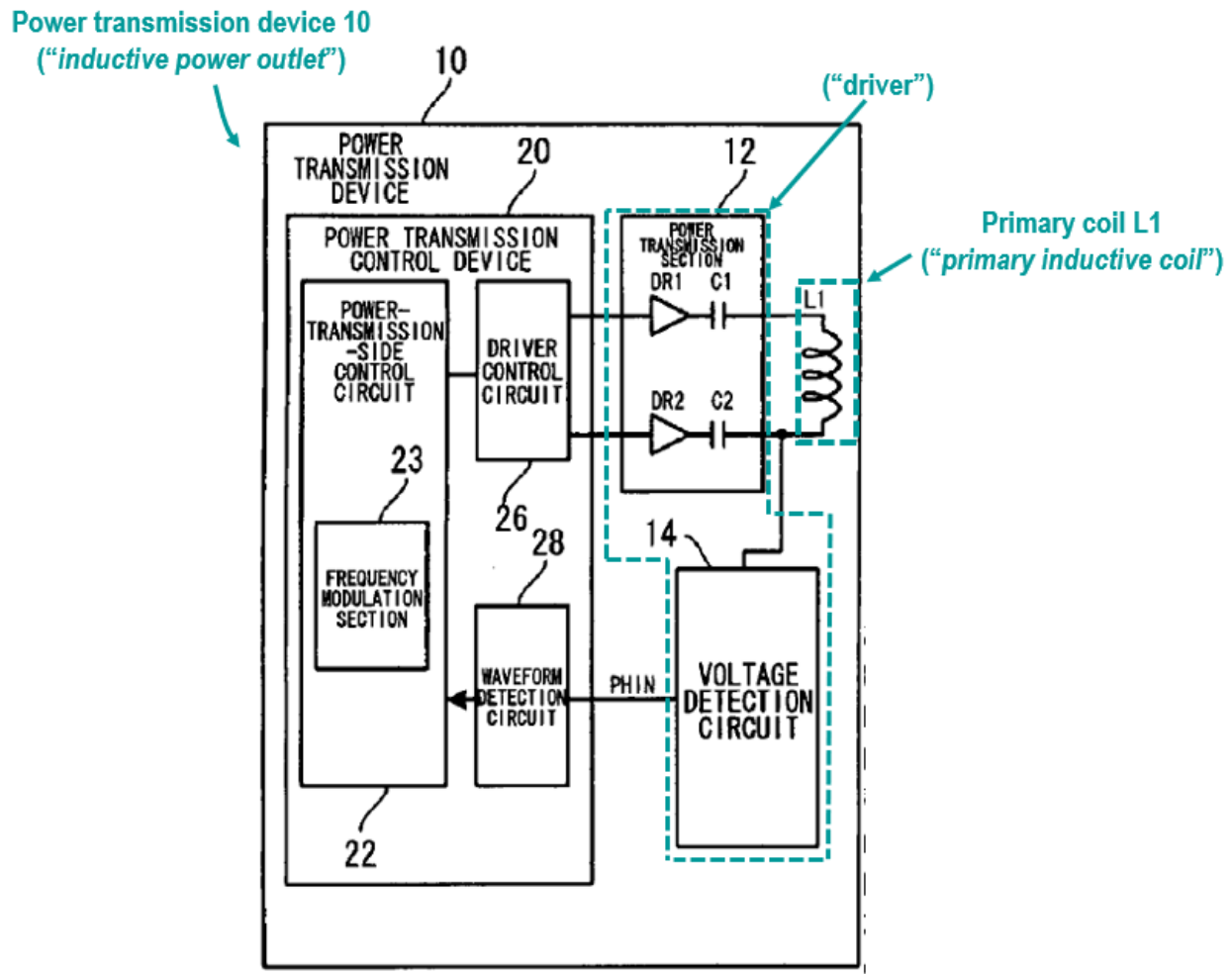
² Dependent claim 6 clarifies that the scope of the claimed “driver” is not restricted solely to the circuit component that directly drives the primary inductive coil; rather, it also includes, for example, a “voltage monitor” for monitoring a voltage of

EX1004, [0125]-[0168], FIGS. 1A, 2, 5; EX1003, ¶48.

Onishi discloses that “[p]ower is supplied to the charger 500 through an AC adaptor 502,” and that this power from the adaptor 502 is supplied to the primary coil L1 of the power transmission device 10 to thereby provide “non-contact power transmission” to the reception device 40. EX1004, [0126], FIG. 1A. This power supply path is confirmed by Onishi’s teaching that the power transmission section 12 “generates an alternating-current voltage” and “supplies the generated alternating-current voltage to the primary coil L1.” *Id.*, [0133]; *see also id.*, FIGS. 2, 5; EX1003, ¶50. “The power transmission section 12 may include a first power transmission driver which drives one end of the primary coil L1, a second power transmission driver which drives the other end of the primary coil L1.” *Id.*, [0135]; *see also id.*, [0143] (“primary coil L1 (power-transmission-side coil) is electromagnetically coupled with the secondary coil L2 (power-receiving-side coil) to form a power

the primary coil. EX1001, Cl. 6. In this context, Onishi’s power transmission section 12 together with at least the voltage detection circuit 14 (which provides a corresponding “voltage monitor[ing]” function) collectively provide the claimed “**driver.**” *Infra*, Claim [6]; EX1004, [0139], [0197]-[0200], [0224], FIGS. 2, 5-6; EX1003, ¶49.

transmission transformer”), FIGS. 2, 5, 6. “Each of the first and second power transmission drivers included in the power transmission section 12 is an inverter circuit (or buffer circuit) which includes a power MOS transistor, for example, and is controlled by a driver control circuit 26 of the power transmission control device 20.” *Id.*, [0136], [0197] (“The power transmission section 12 generates an alternating-current voltage and drives the primary coil (L1).”); EX1003, ¶50.



EX1004, FIG. 5 (cropped, annotated); EX1003, ¶50.

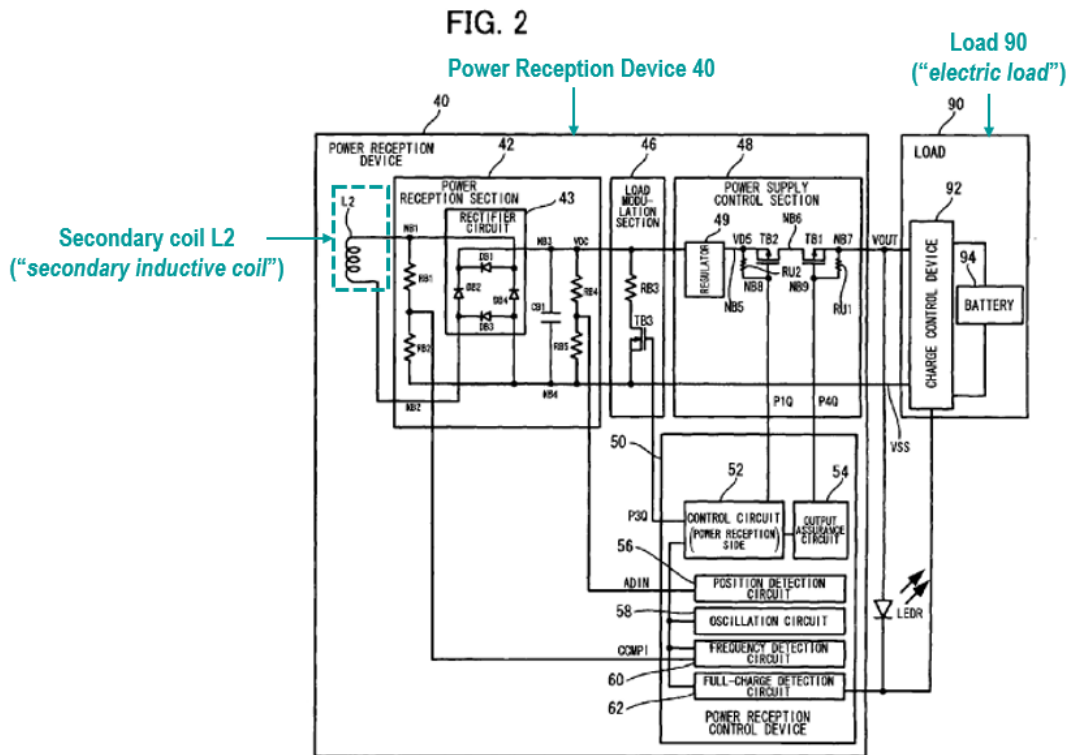
Element [1.2]

Onishi discloses that primary coil L1 (***primary inductive coil***) in power transmission device 10 forms an inductive couple with a secondary coil L2 (***secondary inductive coil***) in power reception device 40:

The primary coil L1 (power-transmission-side coil) is ***electromagnetically coupled*** with the secondary coil L2 (power-receiving-side coil) to form a power transmission transformer. For example, when power transmission is necessary, the portable telephone 510 is placed on the charger 500 so that a magnetic flux of the primary coil L1 passes through the secondary coil L2, as shown in FIGS. 1A and 1B.

EX1004, [0137] (emphasis added); *see also id.*, [0003], [0125], [0128], FIGS. 2, 5; EX1003, ¶52.

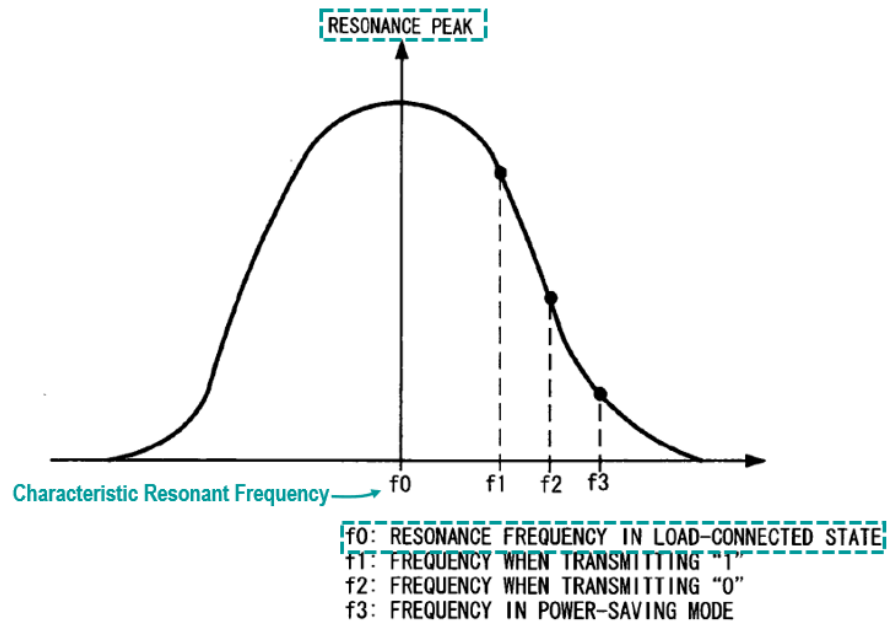
Onishi's secondary coil L2 (***secondary inductive coil***) is wired to a load 90 (***electric load***), as illustrated in FIG. 2:



EX1004, FIG. 2 (cropped, annotated); *see also id.*, [0128], [0131], [0137]-[0138], [0165]-[0168], FIG. 5; EX1003, ¶53.

Onishi further discloses that the inductive couple between primary coil L1 and secondary coil L2 has a characteristic resonant frequency “ f_0 ”, indicated by the “RESONANCE PEAK” in FIG. 4:

FIG. 4



EX1004, FIG. 4 (annotated); *see also id.*, [0171] (“the power value of the resonant circuit becomes a maximum at the resonance peak, and decreases as the resonance frequency moves away from the resonance peak”), [0053], [0180]; EX1003, ¶54.

Element [1.3]

Onishi discloses that secondary coil L2 (*secondary inductive coil*) is associated with the power reception device 40 (*inductive power receiver*).³ EX1004,

³ As another example, Onishi’s “portable telephone [] (i.e., electronic instrument),” which includes power reception device 40, provides the claimed “inductive power

EX1003, ¶55.

(“inductive power receiver”)



EX1004, FIG. 2 (cropped, annotated); EX1003, ¶55.

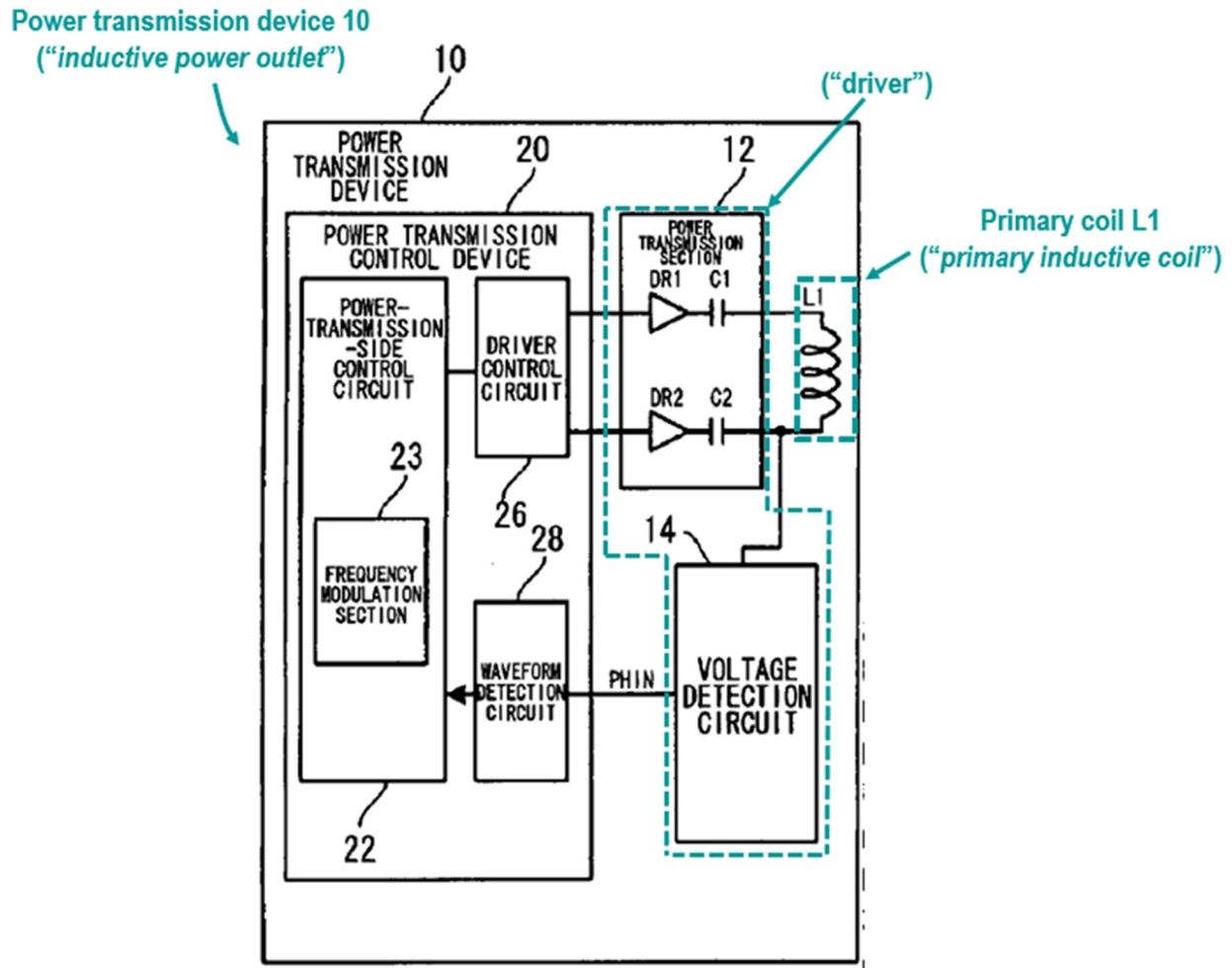
Element [1.4]

Onishi discloses that the power transmission section 12 (component of the

receiver.” Onishi anticipates claim 1 regardless of whether the entire electronic instrument or just the power reception device 40 is mapped to the claimed inductive power receiver. EX1003, ¶56.

driver)⁴ provides a driving voltage across primary coil L1 (*primary inductive coil*). EX1004, [0197] (“The power transmission section 12 generates an alternating-current voltage and drives the primary coil (L1).”), [0133], (“The power transmission section 12 generates an alternating-current voltage at a given frequency during power transmission, and generates an alternating-current voltage at a frequency which differs depending on data during data transfer. The power transmission section 12 supplies the generated alternating-current voltage to the primary coil L1.”), [0135] (“The power transmission section 12 may include a first power transmission driver which drives one end of the primary coil L1, a second power transmission driver which drives the other end of the primary coil L1”); *see also id.*, [0132]-[0136], [0143], FIGS. 2, 5; EX1003, ¶57.

⁴ *Supra*, footnote 2.

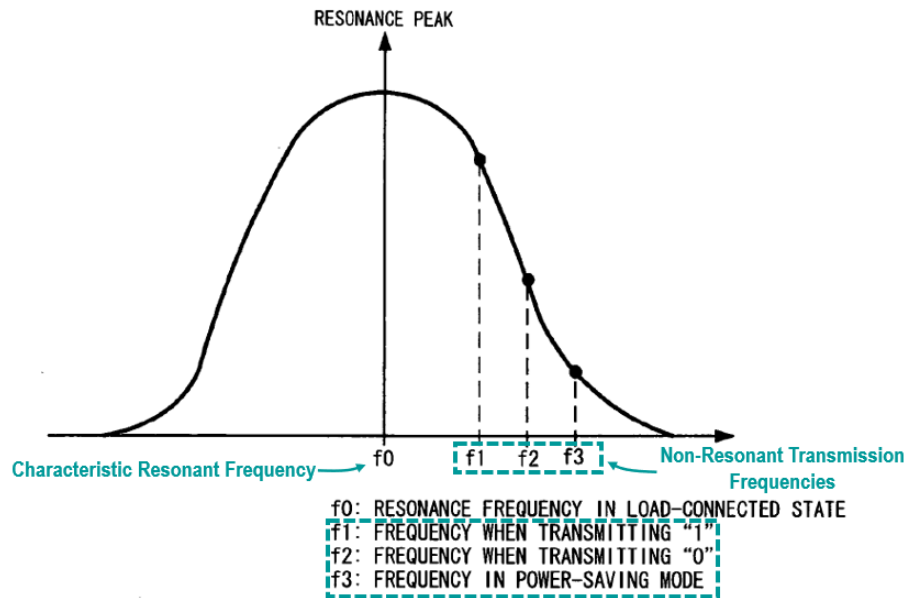


EX1004, FIG. 5 (cropped, annotated); EX1003, ¶57.

Element [1.5]

Onishi discloses that the driving voltage supplied by power transmission section 12 (component of the *driver*) to primary coil L1 (*primary inductive coil*) oscillates at a non-resonant transmission frequency (e.g., frequencies f_1 , f_2 , or f_3) substantially different from said characteristic resonant frequency (e.g., frequency f_0) of said inductive couple. EX1003, ¶58. This can be seen from the illustration provided in FIG. 4, for example:

FIG. 4



EX1004, FIG. 4 (annotated); EX1003, ¶58.

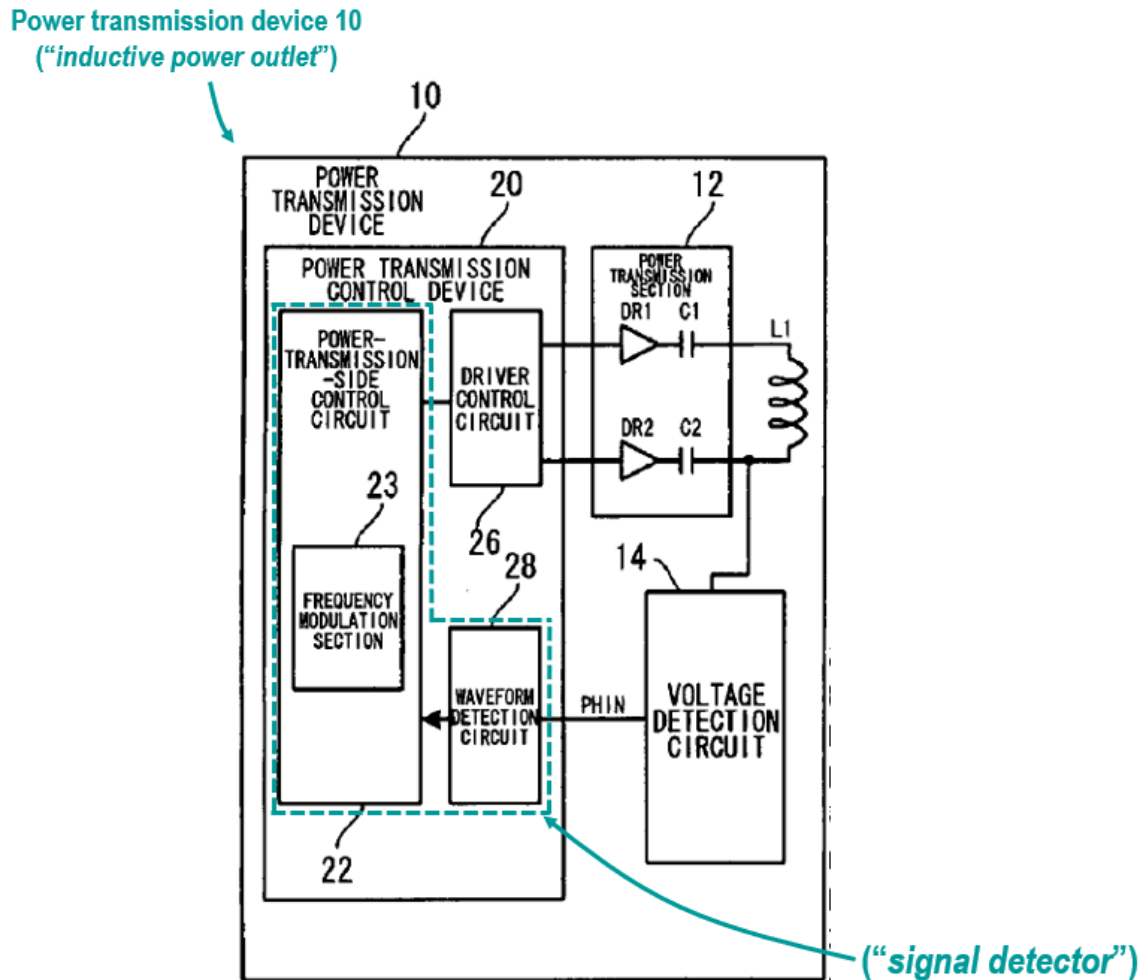
According to Onishi, “the frequency f_1 is a frequency used when transmitting ‘1’ during normal power transmission” and “is a basic frequency during power transmission.” EX1004, [0181]. “The frequency f_2 is a frequency used when transmitting ‘0’” and “[a] frequency F_3 is a frequency used in the power-saving mode.” *Id.*; *see also id.*, [0053] (“The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.”), [0171], FIG. 3A; EX1003, ¶59. Moreover, each of frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve and thus, as noted during pros-

ecution (*Supra*, Section IV (citing EX1002, 62)), fall within the scope of being “substantially different” from the characteristic resonant frequency f_0 . The strikingly similar positions of Onishi’s frequencies f_1 , f_2 , and f_3 in the frequency-response curve as the transmission frequency (e.g., f_t in FIG. 6B) identified as “substantially different” in the ’204 specification confirms that Onishi discloses a transmission frequency that is “substantially different” from the characteristic resonant frequency regardless of the outermost scope of this claim term. EX1001, 21:16-23, 21:56-65, FIG. 6b; EX1002, 62; EX1003, ¶59.

Element [1.6]

Onishi’s power transmission device 10 (***inductive power outlet***) includes a waveform detection circuit 28 that, in connection with power transmission-side control circuit 22, provides a “***signal detector***” adapted to detect the claimed first and second signals.⁵ EX1003, ¶60.

⁵ In the mapping above, the components of Onishi treated as the claimed “***signal detector***” are distinct from the components treated as the claimed “***driver***.” The evidence here confirms, however, that Onishi also anticipates the Challenged Claims when the claimed “***signal detector***” is taken as part of the claimed “***driver***,” as also



EX1004, FIG. 5 (cropped, annotated); EX1003, ¶60. For context, in Onishi, the

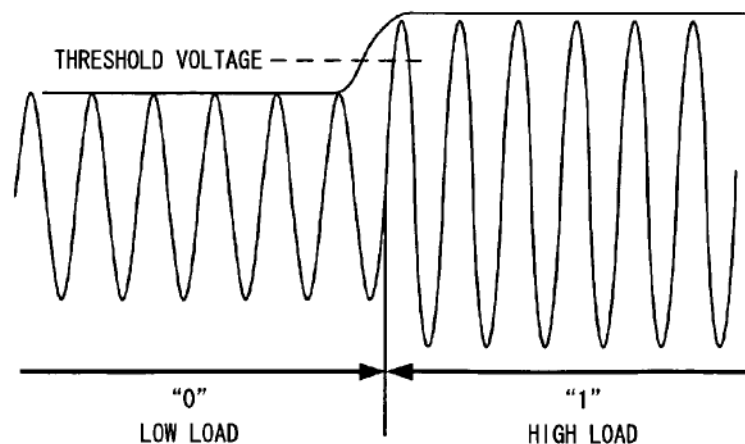
permitted by the claims. *Infra*, footnotes 11, 13; EX1003, ¶61. In this case, in addition to the power transmission section 12 and voltage detection circuit 14, the components of Onishi mapped to the claimed “*driver*” can further include Onishi’s “*signal detector*” components (i.e., power-transmission side control circuit 22 and waveform detection circuit 28), and optionally, the entire power transmission control device 20. EX1003, ¶61.

power transmission device 10 includes circuitry configured to detect information about the load state and charging status of a battery 94 electrically connected to the power reception device 40. EX1004, FIGS. 2, 5; EX1003, ¶62. While a battery 94 is being charged, the power transmission device 10 operates in a “normal power transmission” mode that delivers power to the power reception device 40 at a level sufficient to support charging of the battery 94. EX1004, [0053], [0064], [0224]-[0226]; EX1003, ¶62. When the battery 94 is fully charged such that it can no longer accept additional charge (e.g., charging is completed), the power transmission device 10 operates in a “power-saving power transmission” mode that delivers a smaller amount of power to the power reception device 40 at a level sufficient to support operation of a charge management function 92—but at a level that would be insufficient to support normal charging of the battery 94. EX1004, [0053], [0226]; EX1003, ¶62. Power transmission device 10 determines whether to operate in the “normal power transmission” mode or the “power-saving power transmission” mode based on signals communicated from the power reception device 40 to the power transmission device 10 over the inductive coupling between coils L1 and L2. EX1004, [0144]-[0146], [0223]-[0226], FIG. 3b; *see also id.*, [0053], [0064]; EX1003, ¶62.

More specifically, Onishi teaches that signals transmitted from power reception device 40 to power transmission device 10 induce different peak voltages in

primary coil L1. EX1003, ¶63. The peak voltage induced in primary coil L1 can be controlled by modulating a load at the power reception device 40, and Onishi applies this technique to transmit data to the power transmission device 10—including binary values “1” and “0”, which are represented by different ranges of peak voltages induced in primary coil L1. EX1004, [0145]-[0146]; EX1003, ¶63. “For example, when a load modulation section 46 of the power reception device 40 modulates load in order to transmit data to the power transmission device 10, the signal waveform of the induced voltage in the primary coil L1 changes as shown in FIG. 3B.” EX1004, [0144]-[0145].

FIG. 3B



EX1004, 3B.

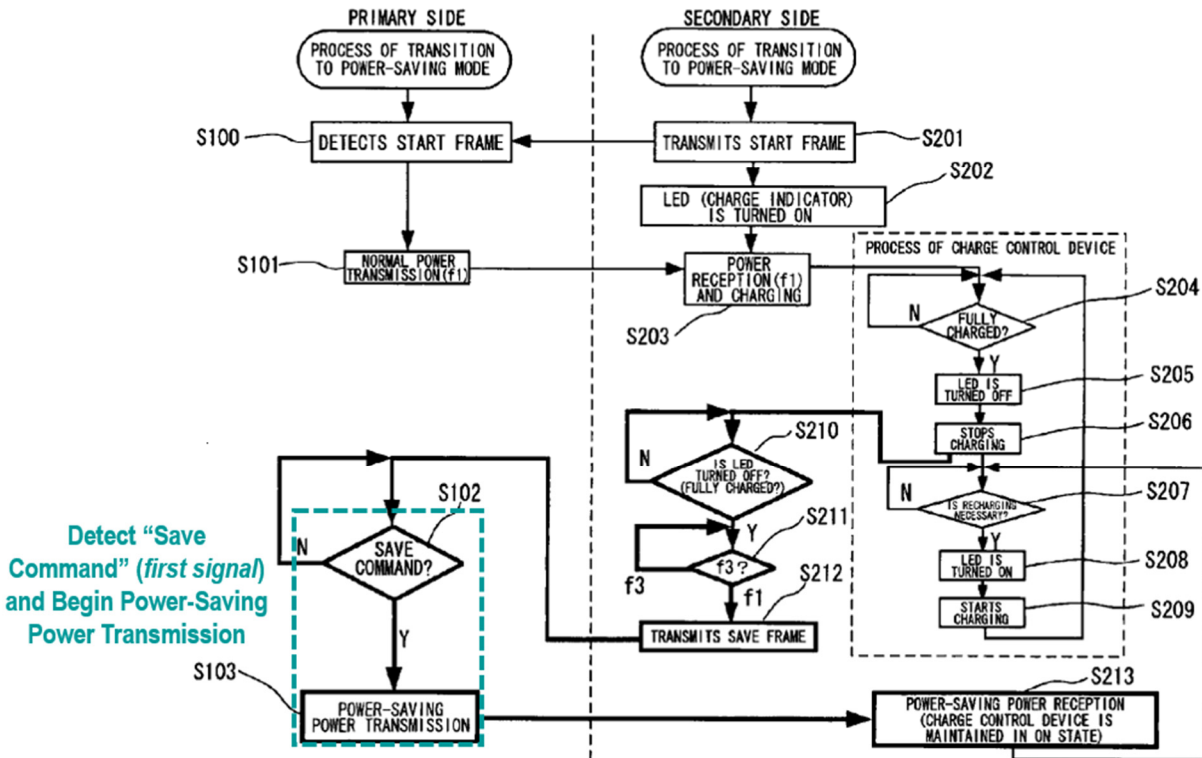
Onishi further explains that a “voltage detection circuit 14” in the power transmission device 10 “detects the voltage induced in the primary coil (L1).” EX1004,

[0197]; *see also id.*, [0139], [0199]-[200], FIGS. 2, 5-6. Detection circuit 14 produces a voltage PHIN corresponding to the induced voltage in the primary coil L1, and voltage PHIN is provided as input to a “waveform detection circuit 28.” *Id.*, [0144]; EX1003, ¶64. “The waveform detection circuit 28 monitors the waveform of the signal PHIN which corresponds to the induced voltage at one end of the primary coil L1, and performs load detection, foreign object detection, and the like.” EX1004, [0144]. “[T]he waveform detection circuit 28 can determine whether the data from the power reception device 40 is ‘0’ or ‘1’ by determining whether or not the peak voltage has exceeded a threshold voltage as a result of a peak-hold process on the signal waveform of the induced voltage, for example.” *Id.*, [0146]. The output of waveform detection circuit 28 is provided to control circuit 22, which “performs sequence control and a determination process necessary for power transmission, load detection, frequency modulation, foreign object detection, detachment detection, and the like.” *Id.*, [0142]; *see also id.*, [0143], [0159], [0223]-[0225], FIGS. 2, 5; EX1003, ¶64.

To cause the power transmitting device 10 to switch from normal power transmission mode to the power-saving power transmission mode (e.g., when the battery 94 completes charging), power reception device 40 transmits over the inductive channel a “save command” (*first signal*) that results in corresponding change(s) in the voltage induced in primary coil L1. EX1004, [0028], [0059]-[0060], [0071],

[0076]-[0079], [0099]-[0100], [0144]-[0146], [0151]-[153], [0192], [0215]; EX1003, ¶65. “[T]he waveform detection circuit 28 can determine whether the data from the power reception device 40 is ‘0’ or ‘1’ by determining whether or not the peak voltage has exceeded a threshold voltage as a result of a peak-hold process on the signal waveform of the induced voltage, for example.” EX1004, [0146], FIG. 3B. The output of the waveform detection circuit 28 is provided as input to control circuit 22, which “detects the save command transmitted from the secondary-side instrument (step S102), and starts power-saving power transmission (power transmission frequency f_3) (step S103).” *Id.*, [0215], FIG. 7; EX1003, ¶65.

FIG. 7

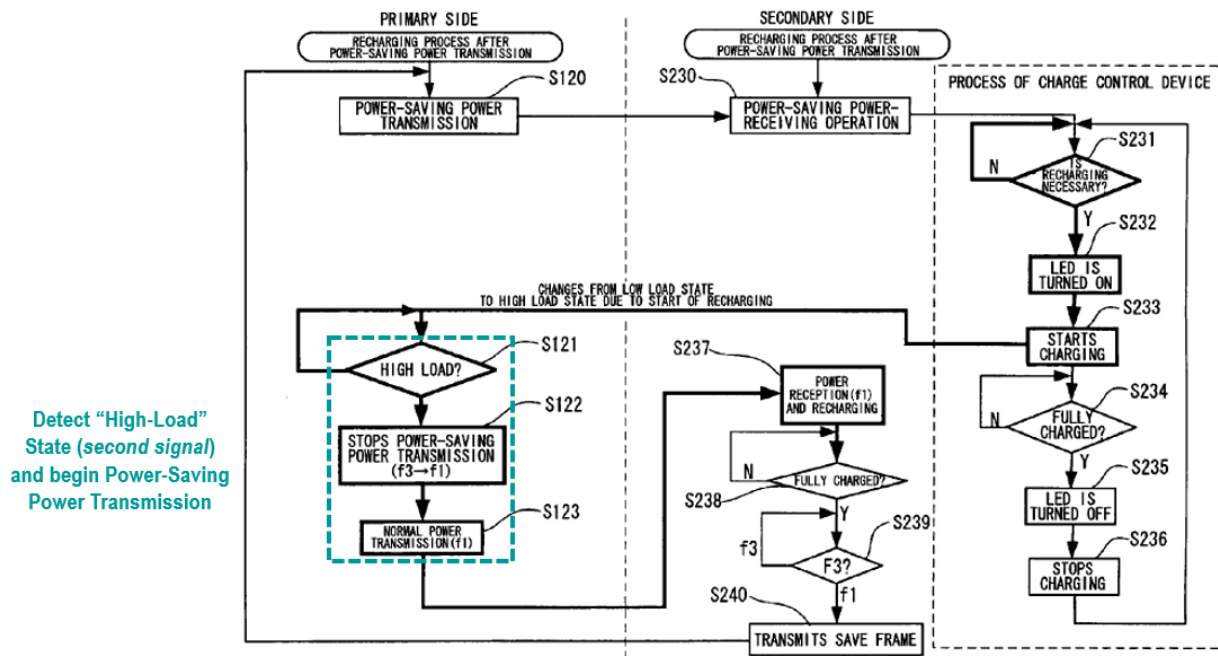


EX1004, FIG. 7 (annotated); *see also id.*, FIG. 9 (S120), FIG. 10 (S113, S110); EX1003, ¶65.

To cause the power transmitting device 10 to switch from power-saving power transmission mode to the normal power transmission mode, power reception device 40 transmits over the inductive channel an indication of a change to a “high-load state” (*second signal*) that results in corresponding change(s) in the voltage induced in primary coil L1. EX1004, [0027], [0063]-[0064], [0101], [0144]-[0146], [0151]-[0153], [0186]-[0187], [0225]; EX1003, ¶66. “[W]hen the power reception device has changed from a low-load state (power-saving state) to a high-load state (recharge

state), the amplitude of the induced voltage in the primary coil increases” and “[t]herefore, the power transmission device can reliably detect a change in load state by determining a change in amplitude using the threshold value, for example.” EX1004, [0064]. In particular, “the power transmission device 10 can detect that the power reception device has changed from a low-load state to a high-load state (i.e., recharging has started in the power-saving mode) by causing the waveform detection circuit 28 ... to determine whether or not the peak voltage has exceeded a threshold voltage as a result of a peak-hold process on the signal waveform of the induced voltage, for example.” *Id.*, [0186]; *see also id.*, [0187] (“cyclically monitors a change in the load of the power reception device 40” or “constantly monitor a change in load”), [0144] (“performs load detection”).

FIG. 9



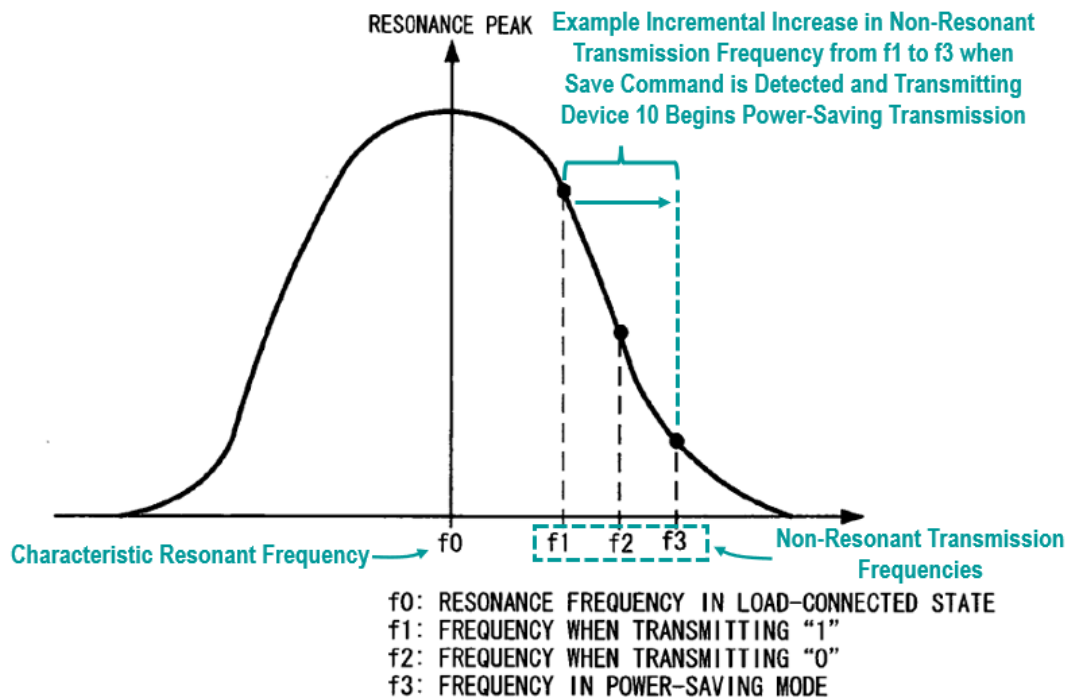
EX1004, FIG. 9 (annotated); EX1003, ¶66. Onishi's "save command" and indication of a change to a "high-load state" are noticeably similar to the preferred embodiments of the feedback signals disclosed in the specification of the '204 patent. EX1001, 22:40-44; EX1003, ¶67.

Element [1.7]

As described above with respect to Element [1.6], Onishi discloses that power transmitting device 10 switches from normal power transmission to power-saving power transmission in response to detecting change(s) in the voltage induced in primary coil L1 corresponding to a "save command" (*first signal*) transmitted from power reception device 40. EX1004, [0028], [0059]-[0060], [0071], [0076]-[0079],

[0099]-[0100], [0144]-[0146], [0151]-[153], [0192], [0215]; *supra*, [1.6]; EX1003, ¶68. When initiating power-saving power transmission, power transmission section 12 (component of the *driver*) provides less power by increasing the non-resonant transmission frequency by an incremental value from “f1” or “f2” to “f3,” as shown in FIG. 4:

FIG. 4



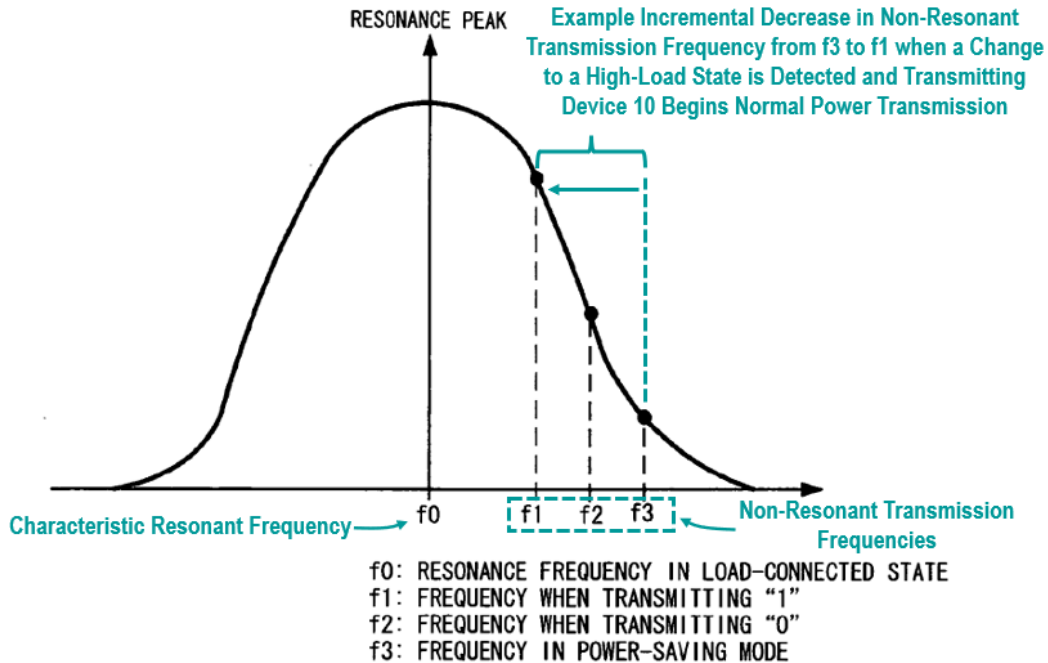
EX1004, FIG. 4 (annotated); *see also id.*, [0053] (“The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.”), [0171] (“The power to be transmitted may be reduced

by changing a transmission frequency (i.e., frequency of a drive clock signal of the power transmission section).”), [0181] (“In FIG. 4, the frequency f1 is a frequency used when transmitting ‘1’ during normal power transmission. The frequency f1 is a basic frequency during power transmission. The frequency f2 is a frequency used when transmitting ‘0’ (see FIGS. 3A and 3B). A frequency f3 is a frequency used in the power-saving mode.”), [0215] (“starts power-saving power transmission (power transmission frequency f3)”), [0133]-[0136] (details of power transmission section 12), FIGS. 2, 5-6; EX1003, ¶68.

Element [1.8]

As described above with respect to Element [1.6], Onishi discloses that power transmitting device 10 switches from power-saving power transmission to normal power transmission in response to detecting a change in the voltage inducted in primary coil L1 corresponding to a change to a “high-load state” (***second signal***) transmitted from power reception device 40. EX1004, [0027], [0063]-[0064], [0101], [0144]-[0146], [0151]-[0153], [0186]-[0187], [0225]; *supra*, [1.6]; EX1003, ¶69. When beginning normal power transmission, power transmission section 12 (component of the ***driver***) provides more power by decreasing the non-resonant transmission frequency by an incremental value from “f3” to “f1” or “f2”, as shown in FIG. 4:

FIG. 4



EX1004, FIG. 4 (annotated); *see also id.*, [0225] (“[I]mmediately changes power transmission from power-saving power transmission to normal power transmission (step S122)”), FIG. 9 (S122) (“STOP POWER-SAVING POWER TRANSMISSION ($f_3 \rightarrow f_1$)”), [0171] (“changing a transmission frequency (i.e., frequency of a drive clock signal of the power transmission section).”), [0181] (“In FIG. 4, the frequency f_1 is a frequency used when transmitting ‘1’ during normal power transmission. The frequency f_1 is a basic frequency during power transmission. The frequency f_2 is a frequency used when transmitting ‘0’ (see FIGS. 3A and 3B). A frequency f_3 is a frequency used in the power-saving mode.”), [0133]-[0136] (details of power transmission section 12), FIGS. 2, 5-6; EX1003, ¶69.

Claim [2]

As described in detail above with respect to Elements [1.6]-[1.8], Onishi's waveform detector 28, in connection with power transmission-side control circuit 22, provides a “***signal detector***” adapted to detect feedback signals (e.g., save commands, indications of a change in load) from the power reception device 40. *Supra*, Elements [1.6]-[1.8]; EX1004, [0027]-[0028], [0059]-[0060], [0063]-[0064], [0071], [0076]-[0079], [0099]-[0101], [0144]-[0146], [0151]-[153], [0186]-[0187], [0192], [0215], [0225], FIGS. 7, 9-10; EX1003, ¶70. Onishi further discloses that control circuit 22 is configured to adjust the transmission frequency in response to the feedback signals, e.g., by increasing the transmission frequency from f1 or f2 to f3 for power-saving transmission responsive to a save command or decreasing the transmission frequency from f3 to f1 for normal power transmission responsive to a signal indicating a change to a high-load state. EX1004, [0053], [0171], [0181], [0215], [0225], FIGS. 4, 7, 9-10; *supra*, Elements [1.7]-[1.8]; EX1003, ¶70.

Claim [3]

Onishi discloses that the feedback signals (e.g., save commands, indications of a change in load) from power reception device 40 pertain to the operational parameters of the electric load 90 (including battery 94). EX1003, ¶71. For example, the “save command” provides “information relating to the full-charge state of the battery” and “requests power-saving power transmission.” EX1004, [0060]; *see also*

id., [0025], [0072], [0076]-[0079]; EX1003, ¶71. The battery's full-charge state is an operational parameter of the battery that indicates charging is complete and the battery will accept no more charge. EX1003, ¶71. The "save command" pertains to at least this operational parameter of the battery 94 in load 90.⁶ EX1003, ¶¶71-72. Likewise, Onishi's feedback signals that indicate a change from a low-load state to a high-load state carry data pertaining to the operational parameters of the electric load, including data that indicates the battery 94's charge has decreased and that charging will resume. EX1004, [0053], [0064], [0173]-[0177]; *see also id.*, [0027], [0064], [0101], [0144]-[0146], [0151]-[0153], [0186]-[0187], [0225]; EX1003, ¶¶71-72.

Claim [4]

Onishi discloses that the feedback signals (e.g., save commands, indications of a change in load) from power reception device 40 pertain to the operational parameters of the electric load 90 (including battery 94). *Supra*, Elements [1.6]-[1.8], [2]-[3]; EX1003, ¶73. Among others, the feedback signals pertain to the measured

⁶ Notably, the additional language in claim 3 recites only that the feedback signals "carry data *pertaining to* the operational parameters of said electric load." (Emphasis added.) Claim 3 does not require that the feedback signals carry the operational parameters themselves. EX1003, ¶72.

operating voltage, required operating current, and required operating power of the load. EX1003, ¶73. For example, the “save command” is issued when the charging of battery 94 is completed, thereby indicating that the required operating current and required operating power of load 90 (and battery 94) can be decreased and that the measured operating voltage corresponds to a full-charge state. EX1004, [0053], [0064], [0168], [0173]-[0177]; *see also id.*, [0025], [0027], [0060], [0064], [0072], [0101], [0144]-[0146], [0151]-[0153], [0186]-[0187], [0225]; EX1003, ¶73. Likewise, the second signal corresponding to a change from a low-load state to a high-load state indicates that the electric load 90 requires more power and more current, e.g., because the measured operating voltage and charge of the battery 94 has dropped, thereby and indicating a need for battery recharging to resume. *Id.*; EX1003, ¶73.

Claim [5]

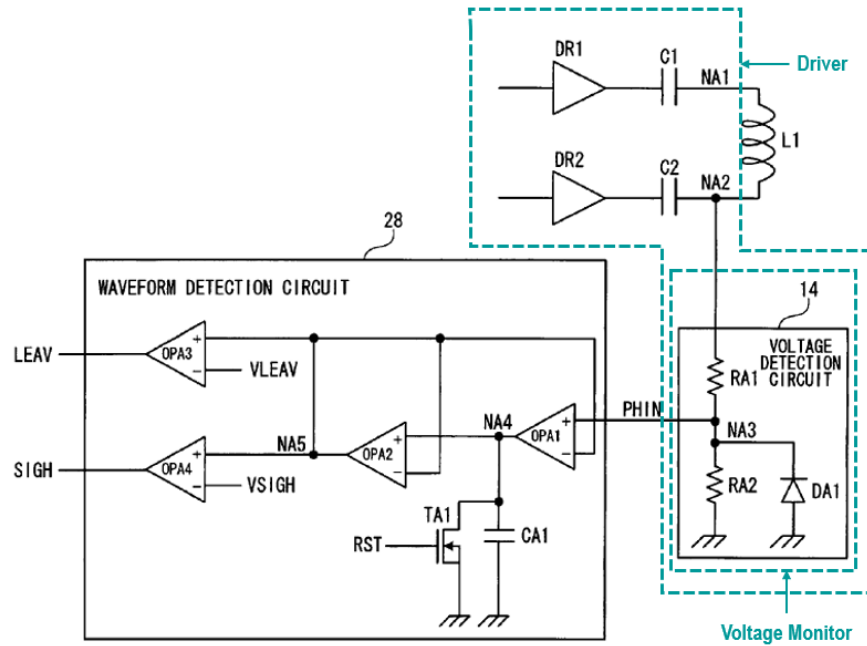
Onishi discloses that waveform detector 28—which in connection with control circuit 22 provides the recited “***signal detector***”—includes voltage peak detectors. EX1004, [0200] (“form a peak detection circuit”), FIGS. 2, 5-6; *see also id.*, [0144]-[0146]; EX1003, ¶74. For example, the waveform detector 28 implements a voltage peak detector configured to detect a data “0” from the voltage induced in primary coil L1 and a voltage peak detector configured to detect a data “1” for the

voltage induced in primary coil L1. *Id.*; EX1003, ¶74. Onishi also discloses a respective voltage peak detector at each of nodes NA4 and NA5. EX1004, [0200] (“[T]he peak voltage of the detection signal PHIN from the voltage detection circuit 14 is held by a node NA4, and the peak voltage signal held by the node NA4 is subjected to impedance conversion ... and is output to a node NA5.”); EX1003, ¶74.

Claim [6]

Onishi discloses that voltage detection circuit 14—which together with at least the power transmission section 12 provides the recited “*driver*”—comprises a voltage monitor for monitoring the amplitude of a primary voltage across primary coil L1. EX1004, [0197] (“The power transmission section 12 generates an alternating-current voltage and drives the primary coil (L1). The voltage detection circuit 14 detects the voltage induced in the primary coil (L1).”), [0139], [0199]-[0200], [0224], FIGS. 2, 5-6; *supra*, Element [1.1] (and footnote 2); EX1003, ¶75.

FIG. 6



EX1004, FIG. 6 (annotated).

Claim [8]

Onishi discloses a “power reception section 42” (including a “rectifier circuit 43”) that “converts an alternating-current induced voltage in the secondary coil L2 into a direct-current voltage,” and thus provides an “*AC-to-DC converter*” as claimed. EX1004, [0148], FIGS. 2, 5; EX1003, ¶76.

Element [10.P]

To the extent the preamble is a limitation, Onishi discloses the recited method. EX1003, ¶77. Onishi’s method involves regulating inductive power transmission from a primary coil L1 (*primary inductive coil*) to a secondary coil L2 (*secondary*

inductive coil). EX1004, [0053] (describing techniques for reducing “power consumption ... during power-saving power transmission ... by increasing the frequency difference between the resonance frequency (resonance peak) and the transmission frequency”), [0003], [0125], [0128], [0137], FIGS. 2, 5, 7, 9-10; *supra*, Element [1.P]; EX1003, ¶77. Further, as described above with respect to Elements [1.1]-[1.2], Onishi discloses that primary coil L1 is wired to a power supply via a “*driver*” (e.g., power transmission section 12 together with at least the voltage detection circuit 14) and secondary coil L2 is wired to an “*electric load*” (e.g., load 90). *Supra*, Elements [1.1]-[1.2]; EX1003, ¶77.

Element [10.1]

Onishi discloses that power transmission section 12 provides an oscillating voltage to the primary coil L1 at an initial transmission frequency f_1 , f_2 , or f_3 that is substantially different from a characteristic resonant frequency f_0 of the inductively coupled system. EX1004, [0133], [0053], [0134]-[0135], [0171], [0180]-[0181], FIGS. 3A, 4; *supra*, Section IV.A, Element [1.5]; EX1003, ¶78.

Element [10.2]

Onishi discloses inducing a secondary voltage in secondary coil L2. EX1004, [0034] (“an induced voltage in a secondary coil”), [0113] (same), [0137], (“The primary coil L1 (power-transmission-side coil) is electromagnetically coupled with the

secondary coil L2 (power-receiving-side coil) to form a power transmission transformer.”), [0148], [0161], FIGS. 2, 5; EX1003, ¶79.

Element [10.3]

Onishi’s system monitors power received by the electric load 90 (including battery 94). EX1003, ¶80. The system monitors power to determine whether it is in a low-load state or a high-load state and whether the battery 94 is charging or is fully charged. EX1004, [0060], [0086], [0101], [0164]-[0168], [0186]-[0187], [0225]; EX1003, ¶80. For example, “the waveform detection circuit 28 ... cyclically monitors a change in the load of the power reception device 40 (change from a low-load state to a high-load state) at short intervals, for example, the waveform detection circuit 28 can immediately detect that recharging has started in the power-saving mode so that the mode can be quickly changed to the charging mode.” EX1004, [0187]; EX1003, ¶80. Further, “[t]he full-charge detection circuit detects whether or not the battery has been fully charged based on whether or not a light-emitting device (e.g., LED) provided to the load has been turned ON. For example, when the light-emitting device has been successively turned OFF for five minutes or more, the full-charge detection circuit determines that the battery has been fully charged (this method is only an example).” *Id.*, [0086]; *see also id.*, [0060] (“the power reception device detects that the battery has been fully charged, and transmits a save command (i.e., information relating to the full-charge state of the battery) which

requests power-saving power transmission”), [0101], [0164]-[0168], [0186], [0225]; EX1003, ¶80.

Element [10.4]

As described in detail above with respect to Elements [1.6]-[1.8], Onishi’s power reception device 40 sends a feedback signal (e.g., a save command, or an indication of a change to a high-load state) when the monitored power deviates from a predetermined range. *Supra*, Elements [1.6]-[1.8]; EX1004, [0027]-[0028], [0059]-[0060], [0063]-[0064], [0071], [0076]-[0079], [0099]-[0101], [0144]-[0146], [0151]-[153], [0186]-[0187], [0192], [0215], [0225], FIGS. 7, 9-10; EX1003, ¶81. For example, power reception device 40 sends a save command when the battery 94 is in the full-charge state and the monitored power deviates from a predetermined range corresponding to charging power. *Id.* A feedback signal indicative of a change to a high-load state is sent when battery charging resumes and the monitored power deviates from a predetermined range corresponding to the non-charging power. *Id.*; EX1003, ¶81.

Element [10.5]

Onishi discloses that voltage detection circuit 14—which together with at least the power transmission section 12 provides the recited “***driver***”—receives feedback signals (e.g., a save command, or an indication of a change to a high-load state)

by monitoring the induced voltage of primary coil L1. EX1004, [0197] (“The voltage detection circuit 14 detects the voltage induced in the primary coil (L1).”), [0144] (“[W]hen a load modulation section 46 of the power reception device 40 modulates load in order to transmit data to the power transmission device 10, the signal waveform of the induced voltage in the primary coil L1 changes as shown in FIG. 3B.”), FIG. 3B; *see also id.*, [0139], [0145]-[0146], [0151]-[0153], [0199]-[0200], [0224], FIGS. 2, 5-6; *supra*, Elements [1.6]-[1.8] (and footnote 2); EX1003, ¶82.

Element [10.6]

Onishi discloses that power transmission section 12—which together with at least voltage detection circuit 14 provides the recited “*driver*”—can adjust the non-resonant transmission frequency between f1 and f2 to signal different data values and between f1/f2 and f3 to switch between normal and power-saving transmission modes. EX1004, [0053], [0133] (“The power transmission section 12 generates an alternating-current voltage at a given frequency during power transmission, and generates an alternating-current voltage at a frequency which differs depending on data during data transfer.”), [0134], [0171], [0180]-[0181], [0214]-[0215], [0232]-[0234], FIGS. 4, 7 (S103), 9 (S122) 10 (S110, S111); *supra*, Elements [1.7]-[1.8] (and footnote 2); EX1003, ¶83.

Claim [11]

As described above with respect to Elements [1.7] and [10.4], Onishi discloses sending a feedback signal of a first type Sa (e.g., a save command) to the driver (which includes Onishi's voltage detection circuit 14) whenever battery charging completes and power drops below a predetermined lower threshold corresponding to a change from a high-load state to a low-load state. *Supra*, Elements [1.7], [10.4]; EX1003, ¶84. Further, as described above with respect to Elements [1.8] and [10.4], Onishi discloses sending a feedback signal of a second type Sb (e.g., an indication of a change to a high-load state) to the driver (which includes Onishi's voltage detection circuit 14) whenever battery charging resumes and power exceeds a predetermined upper threshold corresponding to a change from a low-load state to a high-load state. *Supra*, Elements [1.8], [10.4]; EX1003, ¶84.

Claim [12]

Onishi discloses that an initial no-resonant transmission frequency (e.g., f_1 in normal power transmission mode or f_3 in power-saving transmission mode) is higher than the characteristic resonant frequency f_0 . EX1004, [0180]-[0181], FIG. 4; EX1003, ¶85.

Claim [13]

As described above with respect to Elements [1.8] and [10.4], Onishi discloses

that power transmission section 12 (component of the *driver*) reduces the non-resonant transmission frequency by an incremental value df_1 (e.g., from f_3 to f_1) when the received feedback signal is of a first type Sa ⁷ (e.g., an indication of a change to a high-load state). *Supra*, Elements [1.8], [10.4]; EX1003, ¶¶86-86. Further, as described above with respect to Elements [1.7] and [10.4], Onishi discloses that power transmission section 12 (component of the *driver*) increases the non-resonant transmission frequency by an incremental value $+df_2$ (e.g., from f_1 or f_2 to f_3) when the received feedback signal is of a second type Sb (e.g., a save command). *Supra*, Elements [1.7], [10.4]; EX1003, ¶¶86-87.

B. GROUND 1B: Onishi in view of Purdy Renders Obvious Claims 1-6, 8, and 10-13

⁷ The terms “the first type Sa ” and “the second type Sb ” lack antecedent basis in claim 13, which depends from claim 10 (not claim 11). Because claim 13 depends from claim 10, claim 13 does not include the further requirements of claim 11 in which a feedback signal of the first type Sa corresponds to a drop in power below a predetermined lower threshold and a feedback signal of the second type Sb corresponds to power that exceeds a predetermined upper threshold. EX1003, ¶87. For this reason, the prior art feedback signals identified for claim 13 need not be the same as those identified for claim 11. *Id.*

1. Purdy

Purdy is like Onishi in that both references are directed to systems for charging devices with a rechargeable battery. EX1005, [0024]; EX1003, ¶88. Purdy provides additional detail about feedback signals that were well-known in battery charging systems before the earliest possible priority date of the '204 patent. EX1005, FIGS. 1-2, [0006]-[0011], [0013]-[0014], [0024]-[0025], [0028], [0036]-[0038], [0046].

2. The Onishi-Purdy Combination

Multiple reasons would have prompted a POSITA to implement Onishi's charger in accordance with Purdy's suggestions to receive feedback signals that carry specific operational parameters for the device or battery inductively connected thereto, and to receive feedback that carry data allowing the charger to lookup and apply known parameters for charging the particular device/battery inductively connected to the charger. EX1003, ¶¶89-90.

First, a POSITA would have done so to accurately target/limit the amount of power transmitted to the charging target (e.g., portable terminal 510 / battery 94) and thereby reduce the risk of damaging the battery. EX1005, [0006], [0009] ("to avoid damaging one or the other"); EX1003, ¶91.

Second, a POSITA would have done so to more quickly charge the battery (e.g., in portable terminal 510) by transmitting higher power to the power reception

device 40 when the operational parameters indicate a higher power, voltage, and/or current limits. EX1005, [0011], [0036]-[0037]; EX1003, ¶92.

Third, a POSITA would have done so to adaptively customize different charging parameters optimized for different types of portable terminals inductively coupled thereto. EX1005, [0006], [0009]; EX1003, ¶93.

Finally, both Onishi and Purdy are directed to charging systems with circuitry that allows data and feedback signals to be transmitted from the charging target (e.g., a mobile terminal) to the charging device (e.g., a power transmitting device). *See, e.g.*, EX1004, [0144]-[0146], [0151]-[0153], [0171], [0180]-[0181]; EX1005, [0028], [0050], FIG. 3; EX1003, ¶94. A POSITA would have had a reasonable expectation of success in achieving the Onishi-Purdy combination in the manner described herein. *Id.*

3. Application to Challenged Claims

Claims [1], [10]

The Onishi-Purdy combination would have rendered obvious independent claims 1 and 10 for each of the reasons described above in Ground 1A. However, even if the “first signal” and “second signal” of claim 1 (Elements [1.6]-[1.8]) and the “feedback signal” of claim 10 (Elements 10.4]-[10.5]) were narrowly viewed to import particular embodiments from the ’204 patent specification to require that the signals communicate specific operational parameters, Purdy demonstrates that the

use of such feedback signals was commonly implemented in similar battery charger systems before the '204 Patent. EX1005, [0036], [0037]; *see also id.*, [0012]-[0013], [0045]-[0046], FIG. 3; *supra*, Section V.B.1; EX1003, ¶95. As described above (*supra*, Section V.B.2), it would have been obvious to apply Purdy's suggestion to Onishi, and in the resulting Onishi-Purdy combination, the power reception device 40 would predictably send feedback signals that carry specific operational parameters (e.g., charging parameters and a charge level) to the power transmitting device 12 (e.g., in a learning mode) and feedback signals (e.g., first and second signals) that identify the charging target whose parameters are known (e.g., as part of a save frame and signals indicating a change to a high-load state). *Id.*; *infra*, Claims [3], [4]; EX1003, ¶95.

Claims [2], [3], and [4]

For the same reasons detailed above, the Onishi-Purdy combination would have rendered obvious the feedback signals as recited in claim 2, including the feedback signals carrying data pertaining to operational parameters of the electric load as recited in claim 3, which include operational parameters selected from the group recited in claim 4. EX1003, ¶96; *supra*, Section V.B.2. For example, Onishi already teaches that its control circuit 22 is configured to adjust the transmission frequency in response to the feedback signals (*supra*, Ground 1A Element [2]), and Purdy further suggests the known benefits of adjusting the charging output characteristics

based on specific operational parameters communicated from the target device. *Supra*, Section V.B.2; EX1003, ¶96. Indeed, Purdy suggests that, in addition to its current charge level, the portable device can transmit feedback signals to the charger pertaining to each of the following charging parameters:

TABLE 1

<u>Exemplary Device Charging Parameters</u>		
Device Charging Parameter	Device Type #1	Device Type #2
Overvoltage limit (V)	6.0	5.25
Undervoltage limit (V)	4.0	4.8
Overcurrent limit (mA)	800	400
Constant current (mA)	750	350
Battery full (mA)	40	20
Battery full (V)	4.15	4.22

TABLE 2

<u>Exemplary Battery Charging Parameters</u>		
Battery Charging Parameter	Battery Type #1	Battery Type #2
Max. Charge time (Hours)	4.0	8.0
Battery Capacity (mAh)	1000	2000

EX1005, [0036], [0037]; *see also id.*, [0012]-[0013] & [0045]-[0046] (parameters transmitted in learning mode), [0028], [0050], FIG. 3; EX1003, ¶96. In the combination, the power transmitting device 10 would predictably adjust the transmission frequency in response to the feedback signals that identify specific operational parameters like those disclosed in Purdy. EX1005, [0049]; EX1004, [0053], [0171], [0180]-[0181], FIG. 4; EX1003, ¶96.

The evidence here shows that Purdy's suggestions for over- and under-voltage

limits pertain to a required operating voltage for the electric load, the over- and under-current limits pertain to a required operating current for the electric load, and each of the battery full parameters, current charge level, max. charge time, and battery capacity pertain to a required operating power for the electric load. EX1003, ¶97.

Claims [5]-[6], [8], [10]-[13]

For the same reasons detailed above in Ground 1A, the Onishi-Purdy combination would have provided the limitations recited in claims 5-6, 8, and 10-13. *Supra*, Ground 1A, Elements [5]-[6], [8], [10]-[13] (citing to Onishi's disclosure); EX1003, ¶98.

C. GROUND 2: Baarman392 in view of Tocci Renders Obvious Claims 1-6, 8, and 10-13

1. Baarman392

Similar to the 204 patent, Baarman392 describes “an inductive charging system for recharging a battery.” EX1008, Abst.; *see also* [0004], [0007], [0008], [0011], [0031]-[0035], [0047], FIGS. 2, 4A-4B; EX1003, ¶¶99-100.

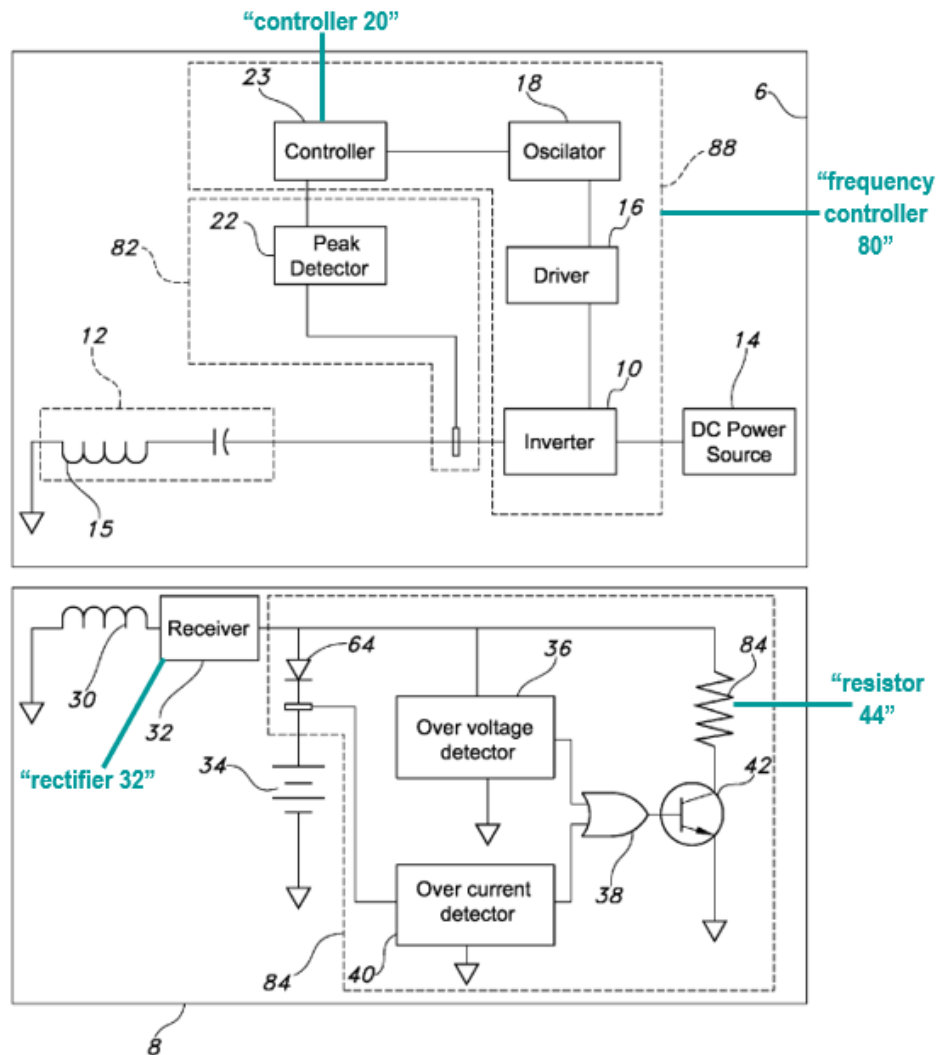


FIG. 2

EX1008, FIG. 2 (annotated⁸); EX1003, ¶¶99-100.

⁸ Several components depicted in FIG. 2 of Baarman392 have numeric identifiers that do not match the numerals given in the textual description of FIG. 2. For example, FIG. 2 as published labels the frequency controller as numeral “88” rather than “80” as described in the text, labels the controller as numeral “23” rather than

Baarman392 describes a power transfer curve for an electromagnetic couple between primary coil 15 and secondary coil 30. EX1008, [0038], FIG. 3; EX1003, ¶101. In operation, inverter 10 supplies an oscillating voltage at a non-resonant frequency between A and B in FIG. 3. EX1008, [0038], FIG. 3.

“20” as described in the text, labels the resistor as numeral “84” rather than “44” as described in the text, and labels component 32 as a “receiver” rather than a “rectifier” as described in the text. *Compare* EX1008, FIG. 2, *with id.*, [0032]-[0037]. These minor typographical errors do not meaningfully impact Baarman392’s applicability to the Challenged Claims. For clarity, Petitioner has annotated each of the reproductions of FIG. 2 in this Petition to depict the same reference numerals and labels as those used in the text of paragraphs [0032]-[0037]. Those annotations pertain to the reference numerals of controller “20,” frequency controller “80,” and resistor “44,” and the “rectifier” label of component 32. EX1003, ¶100.

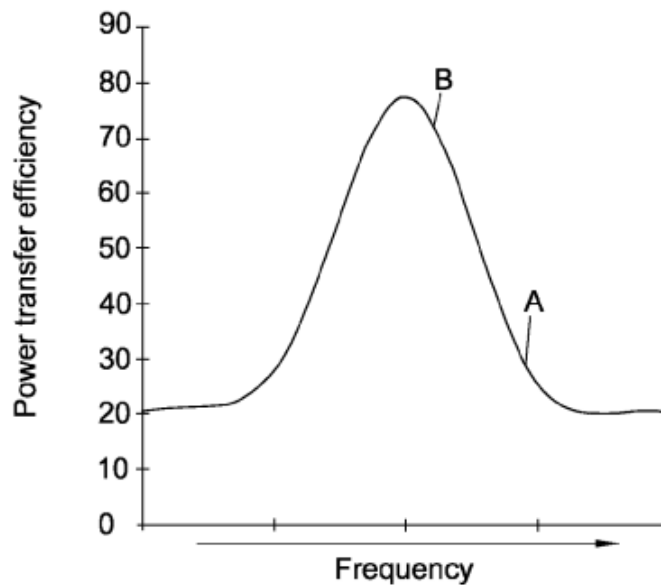


FIG. 3

Baarman392 further describes a method for operating an inductive charger at non-resonant frequencies that includes steps of “applying power to a primary coil at a frequency, evaluating feedback from the secondary circuit through the primary coil and secondary coil inductive coupling and adjusting the frequency of the power applied to the primary coil as a function of the feedback from the secondary circuit.” EX1008, [0016], *see also* [0048]-[0064], FIG. 7; EX1003, ¶102. The “feedback from the secondary circuit” indicates whether an over-voltage or over-current condition at the battery 34 had been detected. So long as no feedback indicating a battery over-voltage or over-current condition was detected, the controller 20 of the charger would decrease the frequency of the drive signal supplied to the primary coil 15 thereby increasing the power transferred to the secondary circuit.

EX1008, [0055]-[0058], FIG. 7; EX1003, ¶102. When feedback indicating a battery over-voltage or over-current condition was detected as a result of a current surge through the primary coil 15, the controller 20 of the charger would increase the drive frequency by an incremental amount (e.g., by $2 \cdot \Delta \text{FREQ}$) thereby increasing the power transferred to the secondary circuit. EX1008, [0059]-[0061], FIG. 7; EX1003, ¶102.

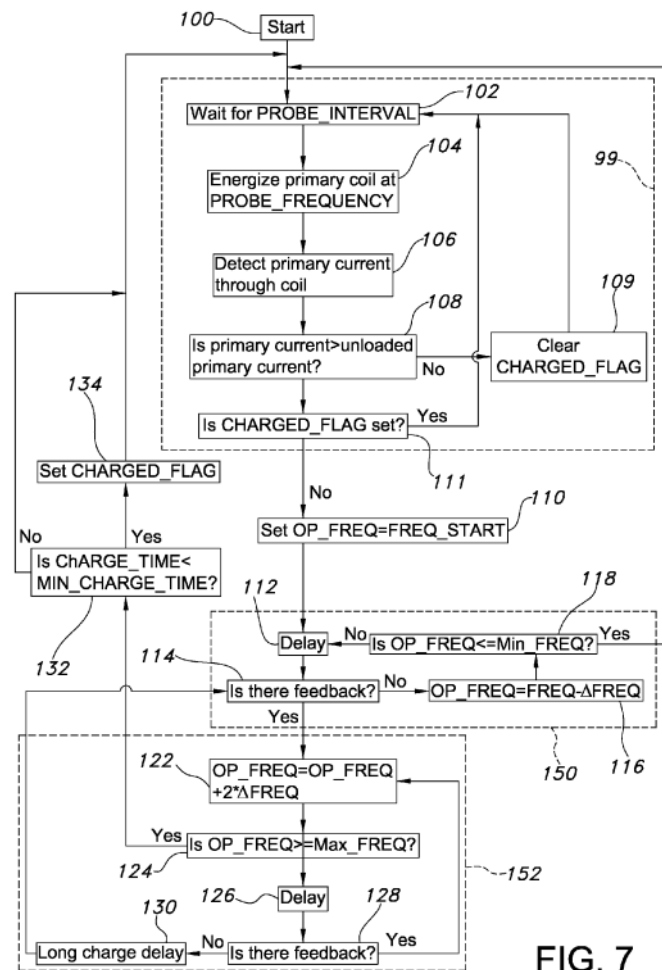


FIG. 7

2. Tocci

Tocci is a textbook that covered basic principles of digital systems before the

earliest possible priority date of the '204 patent. *See* EX1009; EX1010, ¶¶1-12 (confirming Tocci's textbook was published and publicly available); EX1003, ¶103. The topics covered in Tocci correspond to topics that would commonly be covered in an undergraduate course in digital systems design or analysis. EX1003, ¶103. Among other things, Tocci introduces the conventional concept of Boolean variables and their beneficial uses in digital logic circuits. EX1009, 57; *generally id.*, 208-219; EX1003, ¶103.

3. The Baarman392-Tocci Combination

Baarman392 discloses a charger circuit 6 that takes different actions to adjust its transmission frequency depending on whether it detects feedback from the secondary circuit 8 indicating the occurrence of an abnormal charging condition (e.g., a battery over-voltage or over-current condition). EX1006, [0019], [0055]-[0061], FIG. 7; *supra*, Section V.C.1; EX1003, ¶104. For example, when the charger circuit 6 detects feedback indicating an abnormal charging condition, it decreases the power transmitted to the secondary circuit 8 by adjusting the transmission frequency farther from resonance. EX1006, [0019], [0055]-[0061]. When the charger circuit 6 has not detected feedback indicating an abnormal charging condition, it incrementally increases the power transmitted to the secondary circuit 8 by adjusting the transmission frequency closer to resonance. *Id.*; EX1003, ¶104.

Although Baarman392 frames the description of its charger circuit 6 as either

receiving feedback indicating an abnormal charging condition or not receiving such feedback, Baarman392 does not expressly describe the underlying logic/form of such feedback. A POSITA, however, would have immediately recognized conventional techniques for expressing binary conditions like binary feedback options disclosed in Baarman392 (whether the battery charging status is normal or abnormal). EX1003, ¶105. For example, Tocci teaches the then-popular and well-established concept of expressing binary conditions as Boolean variables. EX1009, 57; EX1003, ¶105. Much like Baarman392’s teaching for binary options for the charging condition feedback, Tocci explains that a Boolean variable has two “states” or “logic levels,” as illustrated by Table 3-1:

Logic 0	Logic 1
False	True
Off	On
Low	High
No	Yes
Open switch	Closed switch

EX1009, 57; EX1003, ¶105.

Multiple reasons (articulated below) would have prompted a POSITA to implement Baarman392’s charging condition feedback using conventional Boolean variables as suggested by Tocci. EX1003, ¶¶106-111. In the resulting Baarman392-Tocci combination, the secondary circuit 8 would predictably provide feedback regarding the battery 34’s charging status—i.e., whether charging is normal (no over-

voltage or over-current condition detected) or abnormal (over-voltage or over-current condition detected)—according to the logic levels defined by a conventional Boolean variable. *Id.* In one predictable example, a LOW logic level feedback signal would represent a normal charging condition while a HIGH logic level feedback signal would represent an abnormal charging condition.⁹ *Id.*

⁹ This example is supported by the fact that Tocci further explains that the logic levels of a Boolean variable can correspond to different electrical variables (e.g., different voltage levels). EX1009, 57. Considering these teachings, in the context of Baarman392, it would have been obvious, for example, for a LOW logic level feedback to be communicated to the charger circuit 6 by inducing or maintaining a current in the primary coil at a first level (or range), and for the HIGH logic level feedback to be communicated to the charger circuit 6 by inducing a current in the primary coil at a second level (or range). EX1003, ¶107. The evidence here confirms that predictable current ranges for Baarman392's system would have been ordinarily selected to correspond to the LOW and HIGH logic levels, although no changes would necessarily be required to the configuration of the circuits disclosed in Baarman392 because the LOW logic level would predictably correspond to the primary coil currents when no over-current or over-voltage condition is detected at

As a first reason, a POSITA would have been motivated to implement Baarman392's charging condition feedback using a conventional Boolean variable because Tocci expressly suggests that it would advantageously enable "relatively easy" Boolean algebra to be performed with the detected logic levels (e.g., at Baarman392's feedback detector 82). EX1009, 57; EX1003, ¶108.

Second, a POSITA would have been motivated to implement Baarman392's charging condition feedback using a conventional Boolean variable (as suggested by Tocci) so as to advantageously align Baarman392's system with traditional digital logic circuits ordinarily used to construct such charger devices. EX1003, ¶109. Indeed, the evidence here confirms that Boolean variables had been used in digital logic circuits for decades before the '204 patent. *Id.*

Third, a POSITA would have been motivated to implement Baarman392's charging condition feedback using a conventional Boolean variable (as suggested by Tocci) because assigning disparate ranges of primary coil currents to the respective logic levels of Baarman392's charging condition feedback would have reduced noise and ensured that different charging conditions could be readily discerned by the

the battery and the HIGH logic level would predictably correspond to the primary coil currents when these currents are detected. EX1003, ¶107.

charger circuit 6 based on the different ranges of primary coil currents. EX1003, ¶110.

Finally, considering the traditional conventional “textbook” nature of Boolean variables suggested by Tocci’s textbook and Baarman392’s original solution for detecting the binary charging feedback conditions provided in Baarman392’s original solution, the level of predictability at the time was high. EX1003, ¶111. The predictable implementation of Baarman392’s system using integrated circuits/digital logic (FIGS. 4A-5, [0036]-[0049]) and the classic Boolean variables/Boolean algebra suggested by Tocci the plain evidence here establishes that a POSITA would have had a reasonable expectation of success implementing the Baarman392-Tocci combination as described. EX1003, ¶111.

4. Application to Challenged Claims

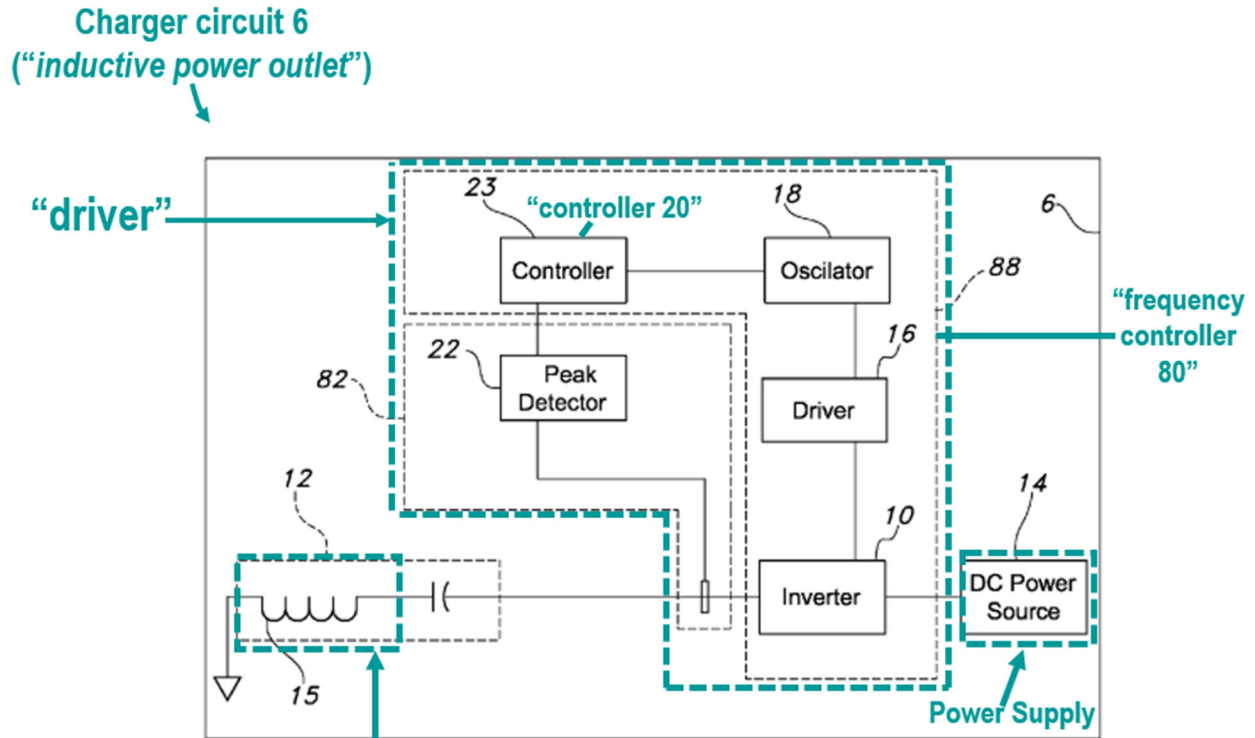
Element [1.P]

To the extent the preamble is a limitation, Baarman392 discloses an inductive charging system 4 (***inductive power transfer system***) that transfers power from a charger circuit 6 to a secondary circuit 8. EX1006, [0032] (“The inductive charging system 4 is configured to inductively charge a battery having a nonlinear charging profile, such as a Li-Ion battery. The system 4 generally includes a charger circuit 6 and secondary circuit 8.”), Abstract, FIGS. 2, 4A-4B; EX1003, ¶112.

Element [1.1]

Baarman392 discloses an inductive battery charger that incorporates a charger circuit 6 (***inductive power outlet***) having a primary coil 15 (***primary inductive coil***) wired to a DC power source 14 (***power supply***) via an inverter 10—which together with Baarman392’s driver 16, oscillator 18, controller 20 and peak detector 22—provides the recited “***driver.***”¹⁰ EX1006, [0032]-[0037], FIG. 2; *see also id.*, FIGS. 4A-4B; EX1003, ¶113.

¹⁰ The evidence here shows that Baarman392’s inverter 10 together with Baarman 392’s driver 16, oscillator 18, controller 20, and peak detector 22 perform the functions of the claimed “driver.” EX1003, ¶114. As explained above (footnote 1), dependent claim 6 clarifies that the scope of the claimed “driver” is not restricted solely to the circuit component that directly drives the primary inductive coil; rather, it also includes, for example, a “voltage monitor” for monitoring a voltage of the primary coil. EX1001, Cl. 6. In this context, Petitioner thus addresses the claimed “driver” as including the peak detector 22 in connection with the inverter 10, the driver 16, oscillator 18, and controller 20 (i.e., the frequency controller 80). EX1003, ¶114.



EX1006, FIG. 2 (cropped, annotated); EX1004, [0033] (“[I]nverter 10 provides AC (alternating current) power to the tank circuit 12 from a source of DC (direct current) power 14. The tank circuit 12 includes the primary coil 15. ... [T]he driver 16 provides the signals necessary to operate the switches within the inverter 10.”).

Element [1.2]

Baarman³⁹² discloses that secondary circuit 8 includes a secondary coil 30 (*secondary inductive coil*) that forms an inductive couple with primary coil 15 in the charger circuit 6. EX1006, FIG. 2; EX1003, ¶115. In particular, “the primary coil 15 and the secondary coil 30 are loosely coupled” to provide a power transfer

curve like that shown in FIG. 3 (reproduced below). As FIG. 3 shows, the inductive coupling of the primary and secondary coils in Baarman392's system yields a characteristic resonant frequency where the power transfer efficiency is greatest. EX1006, [0038] ("the power transfer is highest when the inverter 10 is operating at resonance"); EX1003, ¶115.

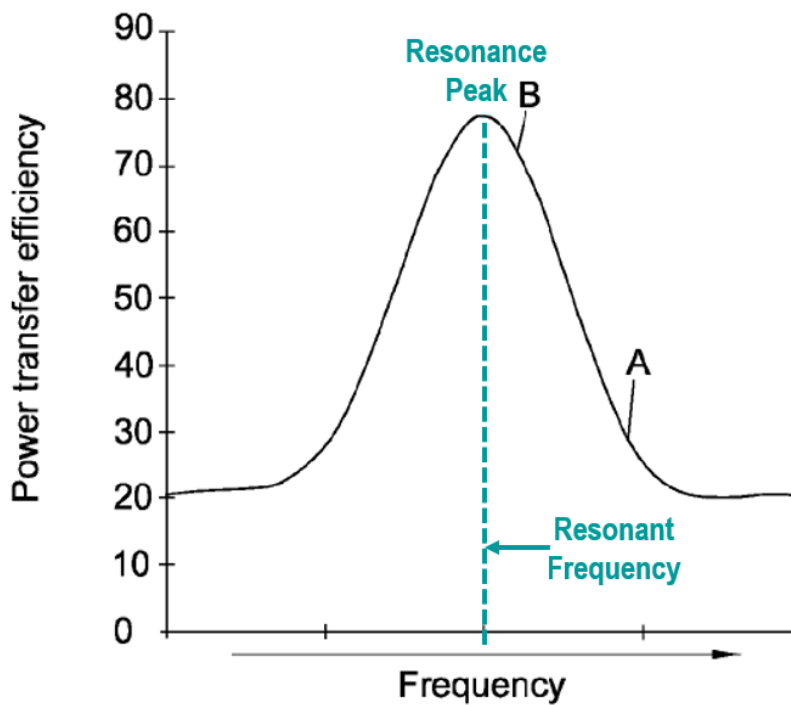
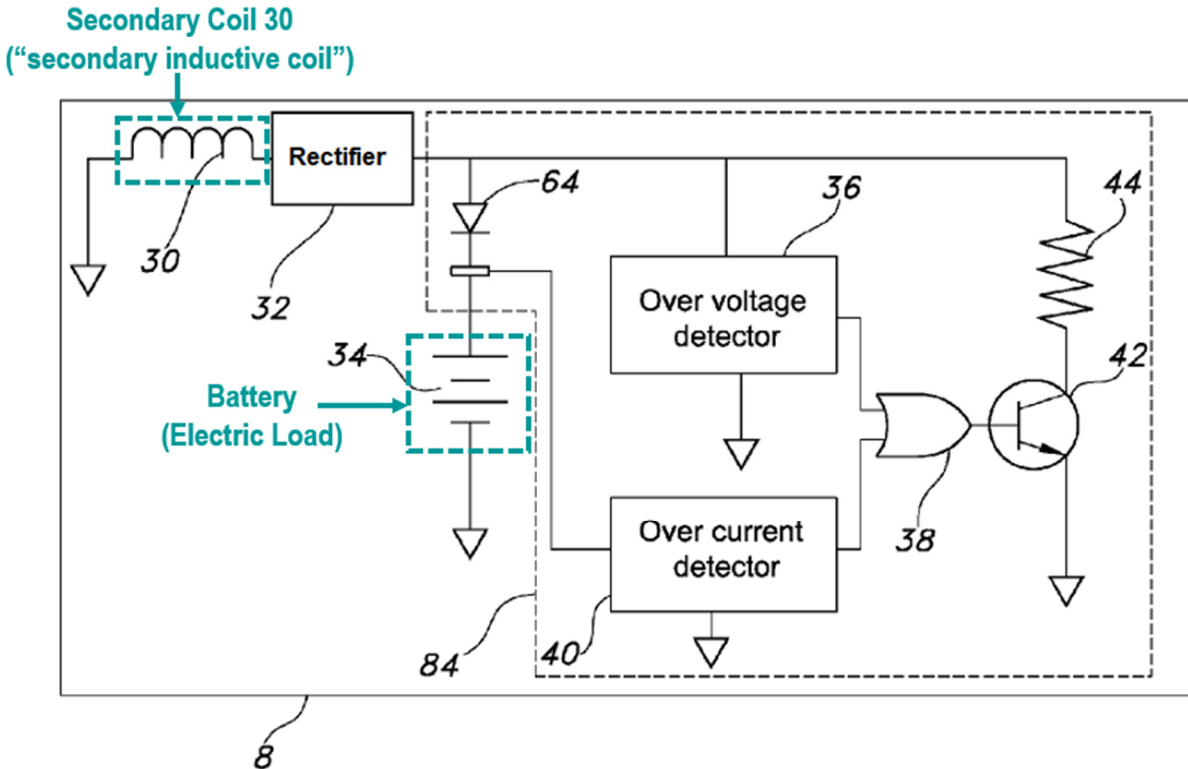


FIG. 3

EX1006, FIG. 3 (annotated).

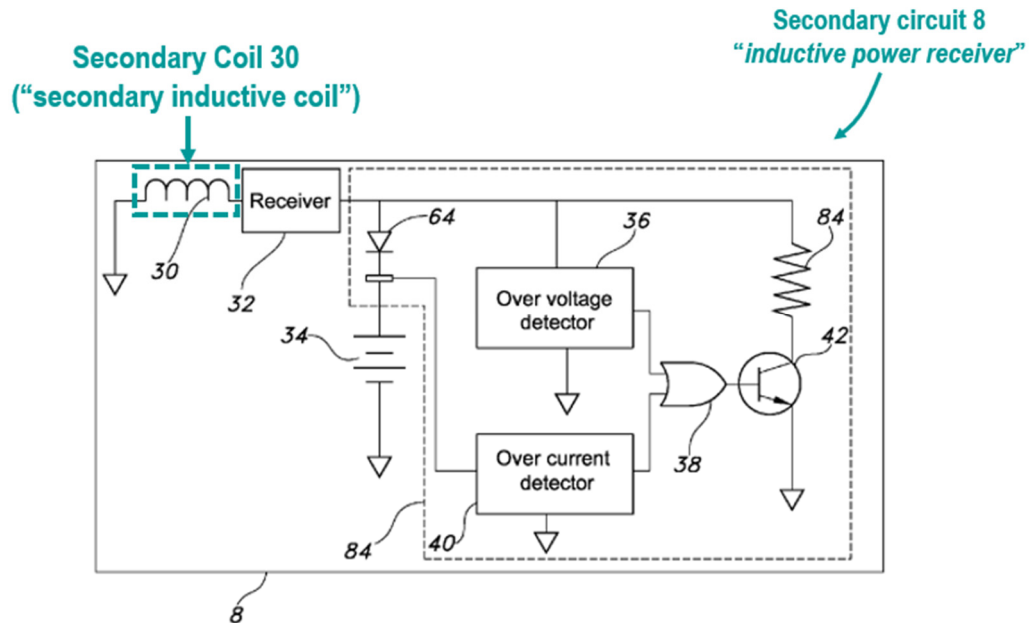
Baarman392 further discloses that the secondary coil 30 is wired to a battery 34 (*electric load*), as shown in FIG. 2:



EX1006, FIG. 2 (modified, cropped, annotated); *see also id.*, [0032], [0040]-[0044], FIG. 5; EX1003, ¶116.

Element [1.3]

Baarman392 discloses Element [1.3]. EX1003, ¶117. For example, as described above with respect to Element [1.2], Baarman392 discloses a secondary coil 30 (*secondary inductive coil*) associated with a portable electronic device including a secondary circuit 8 (*an inductive power receiver*). *Supra*, Element [1.2]; EX1004, [0032], [0035], [0038], [0040], FIGS. 2, 5.

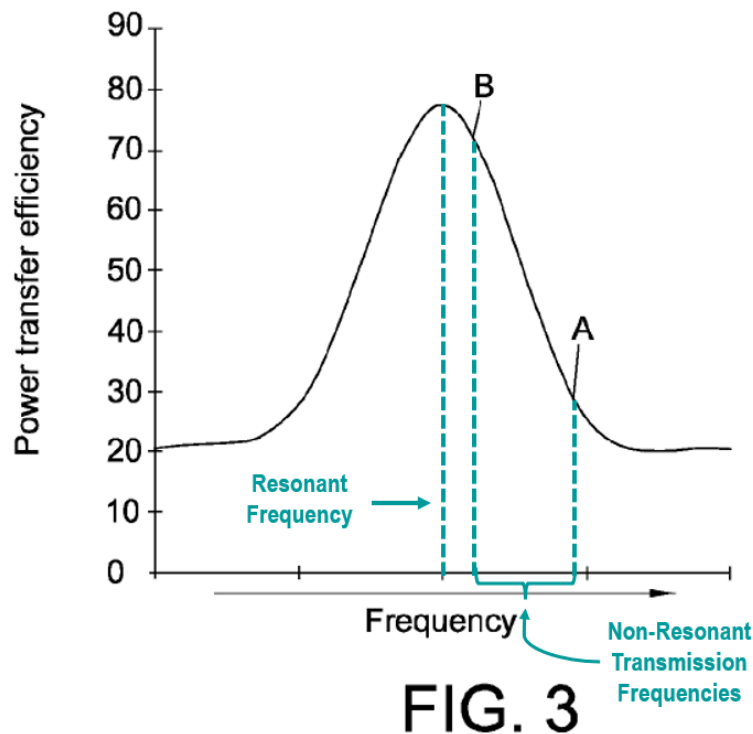


Element [1.4]

Baarman392 discloses that the inverter 10 in charger circuit 6 “provides AC (alternating current power to the tank circuit 12 from a source of DC (direct current) power 14.” EX1006, [0033]. “The tank circuit 12 may be either a series resonant tank circuit or a parallel resonant tank circuit.” *Id.* “[T]he driver 16 provides the signals necessary to operate the switches within the inverter 10,” and “[t]he driver 16 in turn operates at a frequency set by the oscillator 18.” *Id.*; *see also id.*, [0038], [0049], [0061], FIGS. 2, 4A-4B. Baarman392 thus discloses how the inverter 10 in connection with driver 16 (components of the recited “**driver**” as described in Element [1.1] above) provides a driving voltage across the primary inductive coil 15, whether in series resonant or parallel resonant tank circuit configuration. EX1003, ¶118.

Element [1.5]

Baarman392 discloses that “even if the inverter 10 is not operating at resonance, significant power transfer can occur when the inverter is operating off-resonance.” EX1006, [0038]. With reference to FIG. 3, Baarman392 explains that “[g]enerally, the inverter 10 is operated between frequency A and frequency B.” *Id.*; EX1003, ¶119.



EX1006, FIG. 3 (annotated).

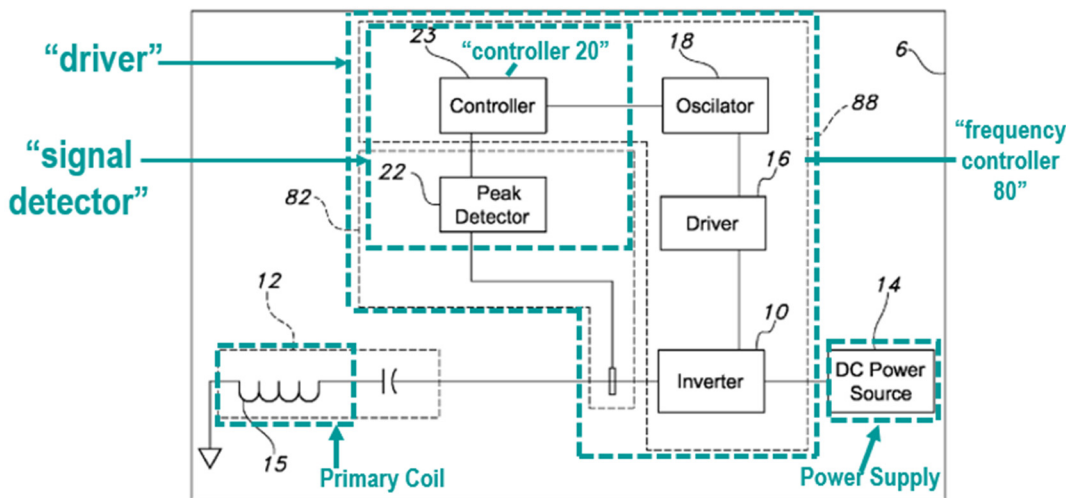
Baarman392 further teaches that “[b]etween frequency A and frequency B, the power transfer curve can be piece-wise linearized by a software lookup table located in the controller 20” such that “a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred

from the primary coil 15 to the secondary coil 30.” EX1006, [0038]; *see also id.*, [0015]-[0019], [0055]-[0057], FIG. 7; EX1003, ¶120. The evidence here demonstrates that Baarman392 inverter 10 (in connection with driver 16) produces a driving voltage at a non-resonant transmission frequency within a near-linear region of the power transfer curve. EX1003, ¶120. Consistent with the specification and file history of the ’204 patent, Baarman392’s operating frequencies (e.g., between frequencies A and B) fall within the scope of being “substantially different” from the characteristic resonant frequency of the inductive couple. *Supra*, Section IV.A; EX1003, ¶120. Indeed, the strikingly similar positions of Baarman392’s transmission frequencies between A and B in the frequency-response curve as the transmission frequency (e.g., f_t in FIG. 6B) identified as “substantially different” in the ’204 specification confirms that Onishi discloses and renders obvious a transmission frequency that is “substantially different” from the characteristic resonant frequency regardless of the outermost scope of this claim term. EX1001, 21:16-23, 21:56-65, FIG. 6b; EX1003, ¶120.

Element [1.6]

For the reasons articulated above, the predictable Baarman392-Tocci combination provides Element [1.6]. EX1003, ¶121. For example, Baarman392 discloses that its peak detector 22 and a controller 20 of the charger circuit 6 (*inductive power*

outlet) collectively operate to provide a “*signal detector*”¹¹ adapted to detect feedback from the secondary circuit 8 indicative of an abnormal charging condition (e.g., a battery over-voltage or over-current state). EX1006, [0034]-[0037], [0039], [0045]-[0046], FIGS. 2, 4A-4B, 5; EX1003, ¶121.



EX1006, FIG. 2 (annotated); EX1003, ¶121; *see also infra*, Element [2]. When “the output of the over-voltage detector 36 or the output of the over-current detector 40 indicate an over-voltage or an over-current situation” associated with the battery 34, a switch 34 is turned on at the secondary circuit 8 that causes a surge of current through secondary coil 30 and a corresponding surge through the primary coil 15 (due to inductive coupling). EX1006, [0036]-[0037]; EX1003, ¶121. “The current surge [through the primary coil 15] is detected by the peak detector 22,” and the

¹¹ See footnote 13 below.

“controller 20 uses signals from the peak detector 22 to assist in determining the frequency of operation for the oscillator 18, and thereby the frequency of the inverter 10.” EX1006, [0037], [0034], FIG. 6; *see also id.*, [0045] (describing how “[t]he controller 20 continuously samples the output of the peak detector 22” and uses flags and latches to detect and record feedback indicated by the peak detector), [0057] (“checks for the occurrence of a feedback signal”), FIG. 7 (S114); EX1003, ¶121.

To the extent Baarman392 does not *expressly* disclose that its **signal detector** (e.g., peak detector 22 in connection with controller 20) is adapted to detect first and second signals as claimed, these features were nonetheless predictable and would have been obvious based on the Baarman392-Tocci combination. EX1003, ¶122; *supra*, Section V.C.3. For the multiple reasons articulated above, a POSITA would have been motivated to implement Baarman392’s charging condition feedback as a conventional Boolean variable (as suggested by Tocci) to achieve known benefits. EX1009, 57; EX1003, ¶122. Therefore, in the predictable combination, an abnormal charging condition indicative of a battery over-current or over-voltage situation would have been represented by a first Boolean logic signal (**first signal**) such as LOW, while a normal charging condition would have been represented by a second Boolean logic signal (**second signal**) such as HIGH. *Supra*, Section V.C.3; EX1009, 57; EX1003, ¶122.

Consistent with the teachings of Baarman392, the second Boolean logic signal

(*second signal*) would have been provided to the charger circuit 8 by maintaining switch 42 closed and not surging current through secondary coil 30 or primary coil 15. *Supra*, Section V.C.3. In contrast, the first Boolean logic signal (*first signal*) would have been communicated to the charger circuit 8 by turning on switch 42 and inducing a current surge in coils 15 and 30. *Id.*. Thus, consistent with Baarman392's ordinary operation for detecting feedback information, Baarman392's peak detector 22 and controller 20 (collectively, the *signal detector*) would have detected the second Boolean logic signal corresponding to a normal charging condition when the peak current through the primary coil 15 does not exceed a certain level; likewise Baarman392's peak detector 22 and controller 20 (collectively, the *signal detector*) would have detected the first Boolean logic signal corresponding to an abnormal charging condition when the peak current through the primary coil 15 exceeds a certain level. *Id.*; EX1006, [0020]; EX1003, ¶123.

The first and second Boolean logic signals in the Baarman392-Tocci combination are noticeably similar to the preferred embodiments of the feedback signals disclosed in the specification of the '204 patent. EX1001, 22:40-44; EX1003, ¶124.

Element [1.7]

The Baarman392-Tocci combination provides Element [1.7]. EX1003, ¶125. For example, Baarman392 discloses that the frequency controller 80 (a component of the claimed *driver*) is configured to provide less power by increasing the non-

resonant transmission frequency by an incremental value when a feedback signal is detected that indicates an abnormal charging condition (e.g., an over-current or over-voltage situation). EX1004, [0015] (“frequency of the inverter is increased”), [0019], [0059], [0056], [0033], [0038], FIGS. 3, 7; EX1003, ¶125.

Furthermore, as described above in Element [1.6], the predictable Baarman392-Tocci combination would have been implemented so that an abnormal charging condition would be represented by a first Boolean logic signal (*first signal*) such as LOW. *Supra*, Section V.C.3; Element [1.6]; EX1009, 57; EX1003, ¶126. In this context, Baarman392-Tocci’s driver would have predictably provided less power by increasing the non-resonant transmission frequency by twice the value of ΔFREQ when the first Boolean logic signal is detected by the peak detector 22 and controller 20 (collectively, the claimed *signal detector*). EX1003, ¶126.

Element [1.8]

The Baarman392-Tocci combination provides Element [1.8]. EX1003, ¶127. For example, Baarman392 discloses that the frequency controller 80 (a component of the claimed *driver*) of the charger circuit 6 is configured to provide more power by decreasing the non-resonant transmission frequency by an incremental value when there is no indication of an abnormal charging condition (e.g., an over-current or over-voltage situation). EX1004, [0015] (“frequency of the inverter is reduced”), [0019], [0055], [0056], [0033], [0038], FIGS. 3, 7; EX1003, ¶127.

And, as described above in Element [1.6], the predictable Baarman392-Tocci combination would have been implemented so that a normal charging condition would be represented by a second Boolean logic signal (*second signal*) such as HIGH. *Supra*, Section V.C.3; Element [1.6]; EX1009, 57; EX1003, ¶128. In this context, Baarman392-Tocci's driver would have predictably provided more power by decreasing the non-resonant transmission frequency by ΔFREQ when the second Boolean logic signal is detected by the peak detector 22 and controller 20 (collectively, the claimed *signal detector*). EX1003, ¶128.

Claim [2]

The Baarman392-Tocci combination renders obvious claim 2 and its additionally recited features. EX1003, ¶¶129-130. For example, Baarman392 discloses that controller 20—which together with peak detector 22 provides the recited “*signal detector*”—increases or decreases the non-resonant transmission frequency by an incremental value depending on the detection of feedback signals indicating either a normal or abnormal charging condition associated with battery 34.¹² EX1004,

¹² Given the usage of “said signal detector” in claim 2 (“said signal detector being configured to adjust ...”) compared to the usage of “said driver” in other claims of

[0033], [0034] (“the controller 20 uses signals from the peak detector 22 to assist in determining the frequency of operation”), [0037] (“The controller 20 then changes the frequency of the oscillator 18.”), [0038], [0055]-[0059], FIGS. 3, 7; EX1003, ¶¶129-130. Based on Tocci’s suggestions, the signal detector of the Baarman393-Tocci combination would have predictably adjusted the transmission frequency in response to Boolean logic signals (*feedback signals*) that indicate either a normal or abnormal charging condition. *Supra*, Section V.C.4; Elements [1.6]-[1.8]; EX1003, ¶¶129-130.

Claim [3]

The Baarman392-Tocci combination renders obvious claim 3 and its addition-

the ’204 patent (e.g. claim 10 (“said driver adjusting ...”)) and the related ’696 patent’s claim 3 (“said driver being configured to adjust ...”), the ’204 patent contemplates that the “*signal detector*” may be a part of the “*driver*.” EX1003, ¶130; EX1001, Cl. 10; EX1016, Cl. 3. This is consistent with the fact that the specification describes the “driver” as adjusting the transmission frequency and then claim 2 recites the “signal detector being configured to adjust said transmission frequency.” EX1001, 4:14-17, 4:65-5:7, 21:47-55, 22:40-44; 27:51-61; EX1003, ¶130.

ally recited features. EX1003, ¶¶131-132. For example, in the resulting combination detailed above, the first Boolean logic signal (a first “*feedback signal*”) is communicated to and detected by the signal detector at charger circuit 6 in response to a detected over-voltage or over-current situation with respect to battery 34 at secondary circuit 8. EX1006, [0013]-[0014], [0035]-[0036], [0046], FIGS. 2, 5, 7; *supra*, Section V.C.3, Elements [1.6]-[1.7], [2]; EX1003, ¶131. The first Boolean logic signal thus carries data pertaining to the operating voltage and current (*operational parameters*) of the battery 34 (*electric load*). EX1003, ¶131.

Similarly, in the resulting combination detailed above, the second Boolean logic signal (a second “*feedback signal*”) is communicated to and detected by the signal detector at charger circuit 6 when the battery 34 is not operating in an over-current or over-voltage situation. EX1006, [0013]-[0014], [0035]-[0036], [0046], FIGS. 2, 5, 7; *supra*, Section V.C.3, Elements [1.6], [1.8], [2]; EX1003, ¶132. The second Boolean logic signal thus also carries data pertaining to the operating voltage and current (*operational parameters*) of the battery 34 (*electric load*). EX1003, ¶132.

Claim [4]

The Baarman392-Tocci combination renders obvious claim 4 and its additionally recited features. EX1003, ¶133. For example, as discussed above with respect

to claim 3, the first and second Boolean logic signals representing normal or abnormal charging conditions in the Baarman392-Tocci combination carry data pertaining to the operating voltage and current (*operational parameters*) of the battery 34 (*electric load*). *Supra*, Element [3]; *see also* EX1006, [0013]-[0014], [0035]-[0036], [0046], FIGS. 2, 5, 7; *supra*, Section V.C.3, Elements [1.6]-[1.8], [2]; EX1003, ¶133. The evidence here confirms that the operating voltage and current parameters in this context are a “*measured operating voltage for said electric load*” and a “*measured operating current for said electric load*,” as recited in claim 4. EX1006, [0035] and FIG. 2 (describing “over-voltage detector 36” and “over-current detector 40” that respectively measure an operating voltage and operating current of the battery 34 to assess whether the voltage and current fall within acceptable or unacceptable ranges), [0043]-[0044], [0050], FIG. 5; EX1003, ¶133.

Claim [5]

Baarman392 discloses that peak detector 22 (a component of the claimed *signal detector*) “provides a signal by way of the transformer 50 that is proportional to the current through the primary coil 15.” EX1008, [0039], FIGS. 2, 4A-4B. “The signal is rectified by a diode 52 and then used to charge capacitor 54” and “operational amplifiers 56, 58 are used to smooth the signal for sampling by the controller 20.” *Id.* Thus, while the signal produced by transformer 50 is “proportional to the current through the primary coil 15” to facilitate measurements relating to current

through the primary coil 15, a POSITA would have understood and found obvious that Baarman392's peak detector 22 circuitry comprises voltage peak detectors as recited in claim 5. EX1003, ¶¶134-142. As Dr. Woods explains, in Baarman392's system as depicted in FIGS. 4A-4B, the voltage at node G is proportional to the amplitude of the current in and voltage across primary inductor coil 15 and reflects any current and voltage spikes generated in the secondary circuit 8. *Id.* If the peak value of the voltage spike at node G is less than the threshold voltage, then amplifier 56 does not output a pulse. However, if the peak value of the voltage spike at node G does exceed the threshold voltage, the amplifier 56 generates a digital pulse that can be read by controller 20 at port RB5 (Fig. 4A). *Id.* Baarman392 thus discloses voltage peak detectors at amplifier 56 and controller 20. *Id.*

Claim [6]

Baarman392 discloses that peak detector 22 (a component of the claimed *driver*) “provides a signal by way of the transformer 50 that is proportional to the current through the primary coil 15.” EX1008, [0039], FIGS. 2, 4A-4B. “The signal is rectified by a diode 52 and then used to charge capacitor 54” and “operational amplifiers 56, 58 are used to smooth the signal for sampling by the controller 20.” *Id.*; EX1003, ¶¶143-150. As Dr. Woods explains, in Baarman392's system as depicted in FIGS. 4A-4B, the voltage at node G is effectively proportional to the amplitude of the current in and voltage across primary inductor coil 15. *Id.* The voltage

at node G is buffered by unity-gain amplifier 48 and then recorded by port RA3 on controller 20. *Id.* Thus, controller 20 can continuously monitor the voltage across inductor 15 and Baarman392's driver circuitry provides a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil. *Id.* As another example, the peak detectors described below with respect to claim 6 likewise provide the claimed voltage monitor. *Supra*, Claim 5; EX1003, ¶150.

Even if it is argued that Baarman392 does not expressly describe its peak detector 22 as a voltage monitor, Baarman 392 nonetheless contemplates monitoring “other characteristics of the power in the charger circuit 6 may be evaluated to provide charge information regarding the battery.” EX1008, [0034]. In this context, the use of a voltage monitor for monitoring a voltage across primary coil 15 would have been obvious to a POSITA—especially since each would be effective to detect feedback when current is surged through secondary coil 30 to indicate a battery overcurrent or over-voltage situation. EX1003, ¶150.

Claim [8]

The Baarman392-Tocci combination renders obvious claim 8 and its additionally recited features. EX1003, ¶151. For example, Baarman392 discloses a “rectifier 32” (***AC-to-DC converter***) in the secondary circuit 8 that receives AC power from the secondary coil 30 and rectifies the AC power to “provide[] DC power to charge the battery 34.” EX1006, [0035], FIG. 2; *see also id.*, [0040] (“A rectifier 32

produces a DC current from the AC current supplied by secondary coil 30.”), FIG. 5; EX1003, ¶151.

Element [10.P]

To the extent the preamble is a limitation, Baarman392 discloses an inductive charging system 4 comprising a primary inductive coil 15, wired to a power supply (e.g., DC power source 14) via a driver (e.g., inverter 10 in connection with driver 16 and peak detector 22), to a secondary inductive coil 30, wired to an electric load (e.g., battery 34). *Supra*, Elements [1.P]-[1.3]; EX1003, ¶152. Baarman392 further discloses the recited method for regulating inductive power transmission. *See, e.g.*, EX1006, [0019], [0038], [0048]-[0064], FIG. 7 (flowchart depicting method for regulation of inductive power transmission); EX1003, ¶152.

Element [10.1]

For the same reasons detailed above in the analysis of Elements [1.4]-[1.5], Baarman392 discloses providing an oscillating voltage to the primary inductive coil 15 at an initial transmission frequency (e.g., a frequency between “A” and “B” in FIG. 3) substantially different from a characteristic resonant frequency of the system. EX1006, [0038]; *see also id.*, [0015]-[0019], [0055]-[0057], FIGS. 2-3, 7; *supra*, Elements [1.4]-[1.5]; Section IV.A; EX1003, ¶153.

Element [10.2]

Baarman392 discloses inducing a secondary voltage in secondary inductive coil 30. EX1006, [0035] (“secondary coil 30 inductively receives power”), [0038], FIGS. 2-3, 7; EX1003, ¶154.

Element [10.3]

Baarman392 discloses that secondary circuit 8 includes an over-voltage detector 36 and an over-current detector 40 to monitor for over-voltage and over-current conditions with respect to the battery 34. EX1006, [0035]-[0036], [0043]-[0044], [0050], FIGS. 2, 5. Voltage and current are each a component of electrical power and detectors 36, 40 thus monitor power received by the battery 34. EX1003, ¶155.

Element [10.4]

For the same reasons detailed above in the analysis of Elements [1.6]-[1.7], the Baarman392-Tocci combination provides Element [10.4]. EX1003, ¶156. For example, Baarman392 discloses that secondary circuit 8 sends a feedback signal to charger circuit 6 indicative of an abnormal charging condition when detectors 36, 40 detect an over-current or over-voltage situation with respect to the battery 34. EX1006, [0035]-[0036], [0043]-[0044], [0050], FIGS. 2, 5; *supra*, Elements [1.6]-[1.7]. In the predictable Baarman392-Tocci combination, this feedback signal is expressed as a Boolean logic signal (e.g., HIGH). EX1009, 57; *supra*, Section

V.C.3. Voltage and current are each a component of electrical power, and the feedback signal is thus sent when the monitored power deviates from a predetermined range (e.g., when the voltage across and/or current received by the battery 34 exceeds a threshold value that defines the recited “predetermined range”). EX1006, [0035]; EX1003, ¶156.

Element [10.5]

The Baarman392-Tocci combination renders obvious Element [10.5]. EX1003, ¶157. For example, Baarman392 discloses that peak detector 22—i.e., a component of the recited “*driver*” along with inverter 10, driver 16, and oscillator 18—receives feedback signals communicated from the secondary circuit 8 (including feedback signals represented by surging current induced in primary coil 15). EX1006, [0034]-[0037], [0039], [0045]-[0046], FIGS. 2, 4A-4B, 5. “The current surge [through the primary coil 15] is detected by the peak detector 22,” and the “controller 20 uses signals from the peak detector 22 to assist in determining the frequency of operation for the oscillator 18, and thereby the frequency of the inverter 10.” *Id.*, [0037], [0034], FIG. 6; *see also id.*, [0039], [0045]-[0046], FIG. 6. Further, in the system resulting from the predictable Baarman392-Tocci combination, the feedback signal that the peak detector 22 receives is a measure of current through the primary coil 15 within a range defined for a first Boolean logic signal. EX1009, 57; *supra*, Section V.C.3, Elements [1.6], [10.4]; EX1003, ¶157.

Element [10.6]

The Baarman392-Tocci combination renders obvious Element [10.6]. EX1003, ¶158. For example, Baarman392 discloses that frequency controller 80 (component of the “*driver*”) adjusts the non-resonant transmission frequency depending on whether feedback is received from the secondary circuit 8 indicating an abnormal charging condition (e.g., an over-voltage or over-current state of battery 34). EX1006, [0015] (“the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency”), [0019], [0032]-[0033], [0038], [0056], [0059], FIGS. 3, 7.; *supra*, Section V.C.3, Elements [1.7]-[1.8]; EX1003, ¶158.

Claim [11]

The Baarman392-Tocci combination renders obvious claim 11 and its additionally recited features. EX1003, ¶159. As described above in the overview of the Baarman392-Tocci combination (Section V.C.3) and with respect to Elements [1.7]-[1.8], the Baarman392-Tocci system predictably sends to the charger circuit 6 (including peak detector 22—a component of the claimed “*driver*”) a first form of feedback corresponding to a first Boolean logic signal (*a feedback signal of a first type Sa*) indicative of a normal charging condition, whenever the voltage and current of

the battery 34 do not exceed a threshold value (i.e., *whenever said power drops below a predetermined lower threshold*). *Supra*, Section V.C.3; Elements [1.7]-[1.8]; EX1006, [0034]-[0037], [0050], [0019], [0055], FIG. 7; EX1003, ¶159. The resulting Baarman392-Tocci system also predictably sends to the charger circuit 6 (including peak detector 22—a component of the claimed “*driver*”) a second form of feedback corresponding to a second Boolean logic signal (*a feedback signal of a second type Sb*) indicative of an abnormal charging condition, whenever the voltage or current of the battery 34 exceed a threshold value (i.e., *whenever said power exceeds a predetermined upper threshold*). *Id.*; see also EX1006, [0059]; EX1003, ¶159. .

Claim [12]

The Baarman392-Tocci combination renders obvious claim 12 and its additionally recited features. EX1003, ¶160. For example, Baarman392 discloses that an initial non-resonant transmission frequency f_t is a frequency in the near-linear region (e.g., between frequencies A and B in FIG. 3) is higher than the characteristic resonant frequency f_R . EX1006, (“In this embodiment, the operating frequency of the inverter is reduced to move the frequency of the power applied to the primary coil closer to the resonant frequency of the tank circuit, while the operating frequency of the inverter is increased in order to move the frequency of the power applied to the primary coil away from the resonant frequency of the tank circuit.”),

[0038] (“Generally, the inverter 10 is operated between frequency A and frequency B.”), [0054]-[0055] (“FREQ_START”), FIG. 7 (110), FIG. 3; EX1003, ¶160.

Claim [13]

The Baarman392-Tocci combination renders obvious claim 13 and its additionally recited features. EX1003, ¶161. For example, the combination provides a driver that reduces the non-resonant transmission frequency by an incremental value $df1$ when the received feedback signal is of the first type Sa for the reasons described above with respect to Element [1.8]. *Supra*, Element [1.8]; EX1003, ¶161. The combination also provides that the driver increases the non-resonant transmission frequency by an incremental value $+df2$ when the received feedback signal is of the second type Sb for the reasons described above with respect to Element [1.7]. *Supra*, Element [1.7]; Section V.C.3; EX1003, ¶161. Here, the feedback signal of the first type Sa of claim 13 corresponds to the second signal in claim 1 and the feedback signal of the second type Sb of claim 13 corresponds to the first signal in claim 1. EX1003, ¶161.

VI. DISCRETIONARY DENIAL IS NOT JUSTIFIED

A. The Petition’s New Prior Art and Errors Made During Prosecution Warrant Institution—35 U.S.C. § 325(d)

This Petition does not present a situation where “the same or substantially the

same prior art or arguments” were previously presented. 35 U.S.C. § 325(d); *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 7-8 (Feb. 13, 2020). Regarding part 1 of the *Advanced Bionics* framework, all Grounds 1A-2 are based upon prior art references that were absent during prosecution of the ’204. The file history contains no indication that Onishi, Purdy, Baarman³⁹², or Tocci were presented to the Examiner during examination—and those references were certainly never addressed in any claim rejection or office action. *Supra*, Section II.B (office actions addressing the Malpas reference); EX1001, face.

The Board need not reach part 2 of the *Advanced Bionics* framework because part 1 is not satisfied. But even if the Board evaluates part 2, institution is still warranted in view of material errors made during prosecution. *Supra*, Section II.B. For example, the Examiner was led to the erroneous conclusion that the prior art did not disclose or suggest the claimed “non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.” *Id.* (citing EX1002, 55-64 and 35-39). But here, Grounds 1A-2 plainly demonstrate why this conclusion was flawed—including that at least Onishi and Baarman³⁹² plainly disclose prior art examples of this conventional option. The ’204 patent is ripe for review.

B. *Fintiv* Considerations Weigh in Favor of Institution—35 U.S.C. § 314(a)

The USPTO issued updated discretionary denial guidance in view of the *Fintiv* factors and confirmed that “the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB.” See June 21, 2022 Memorandum to Members of the PTAB, 3 (available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf). Here, Petitioner has eliminated any risk of duplicated effort by voluntarily presenting a *Sotera* stipulation to Patent Owner. EX1019; *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020). For at least this reason, and considering the compelling merits of the above-detailed Grounds, discretionarily denial is unwarranted and would be unjust.

VII. PAYMENT OF FEES—37 C.F.R. § 42.103

Petitioner authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and further authorizes payment for any additional required fees to be charged to this Deposit Account.

VIII. CONCLUSION

IPR should be instituted here and the Challenged Claims determined unpatentable based on Grounds 1A-2.

IX. MANDATORY NOTICES UNDER—37 C.F.R. § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioner, Anker Innovations Ltd. is the real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

The '204 patent is the subject of a civil action against Petitioner in *Powermat Technologies Ltd. v. Anker Innovations Ltd.*, 5:23-cv-00052 (E.D. Tex.), filed June 5, 2023 (EX1017). The waiver of service was not executed and filed at the district court until September 27, 2023 (EX1018), so “[t]his is the date that Petitioner is deemed to have been served.” *Brinkmann Corp. v. A&J Manufacturing, LLC*, IPR2015-00056, Paper 10, 6-7 (citing FED. R. CIV. P. 4(d)(4)).

Petitioner is not aware of any other disclaimers, reexamination certificates or petitions for *Inter Partes* Review for the '204 Patent.

Petitioner previously filed a petition for *Inter Partes* Review of U.S. Patent No. 9,048,696 (IPR2024-00994) on June 5, 2024. The '696 Patent, which Patent Owner has also asserted against Petitioner in the E.D. Texas litigation, is a sibling of the '204 Patent and was filed on the same day (January 10, 2014).

Petitioner is additionally filing a petition for *Inter Partes* Review of U.S. Patent No. 8,626,461 on the same day as the present Petition. The '461 Patent is also asserted in the E.D. Texas litigation.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel:

Lead Counsel	Backup Counsel
Michael T. Hawkins, Reg. No. 57,867 Fish & Richardson P.C. 60 South Sixth Street, Suite 3200 Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR46570-0022IP1@fr.com	Nicholas W. Stephens, Reg. No. 74,320 Joseph W. Bauer, Reg. No. 81,218 Thomas H. Reger II, Reg. No. 47,892 Fish & Richardson P.C. 60 South Sixth Street, Suite 3200 Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 PTABInbound@fr.com

D. Service Information

Please address all correspondence and service to the address listed above. Petitioners consent to electronic service by email at IPR46570-0022IP1@fr.com (referencing No. 46570-0022IP1 and cc'ing PTABInbound@fr.com, hawkins@fr.com, nstephens@fr.com, jbauer@fr.com, and reger@fr.com).

Respectfully submitted,

Dated 08/14/2024

/Nicholas W. Stephens/
Michael T. Hawkins, Reg. No. 57,867
Nicholas W. Stephens, Reg. No. 74,320
Joseph W. Bauer, Reg. No. 81,218
Thomas H. Reger II, Reg. No. 47,892
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

(Case No. IPR2024-00995)

Attorneys for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,992 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated 08/14/2024

/Nicholas W. Stephens/
Michael T. Hawkins, Reg. No. 57,867
Nicholas W. Stephens, Reg. No. 74,320
Joseph W. Bauer, Reg. No. 81,218
Thomas H. Reger II, Reg. No. 47,892
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on August 14, 2024, a complete and entire copy of this Petition for *In-ter partes* Review, Power of Attorney, and all supporting exhibits were provided by Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

Volpe Koenig - Powermat
30 South 17th Street, Suite 1800
Philadelphia, PA 19103

/Diana Bradley/
Diana Bradley
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
(858) 678-5667