

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INDUCTEV, INC.,
Petitioner,

v.

WITRICITY CORPORATION,
Patent Owner.

IPR2023-01208
Patent 8,912,687 B2

Before JAMESON LEE, ROBERT J. WEINSCHENK, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

InductEV, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–18 (“the challenged claims”) of U.S. Patent No. 8,912,687 B2 (Ex. 1001, “the ’687 patent”). WiTricity Corporation (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”) to the Petition. We instituted an *inter partes* review of the challenged claims on February 20, 2024. Paper 9, (“Dec. on Inst.”), 14. After institution, Patent Owner filed a Response (Paper 20, “PO Resp.”) to the Petition, Petitioner filed a Reply (Paper 25, “Pet. Reply”) to the Response, and Patent Owner filed a Sur-reply (Paper 29, “PO Sur-reply”) to the Reply. We held an oral hearing on November 19, 2024, and a transcript of the hearing is included in the record. Paper 31 (“Tr.”).

For the reasons set forth below, Petitioner has shown by a preponderance of the evidence that claims 1–18 of the ’687 patent are unpatentable.

B. *Real Parties in Interest*

The parties identify themselves as the only real parties in interest. Pet. 68; Paper 3, 1.

C. *Related Matters*

The parties indicate that the ’687 patent is the subject of the following district court case: *WiTricity Corporation v. InductEV, Inc.*, No. 2:23-cv-01099-CMR (E.D. Pa.) (“District Court Litigation”). Pet. 68; Paper 3, 1. The parties also indicate that another patent asserted in the District Court Litigation, U.S. Patent No. 8,461,719 B2, is the subject of a petition for *inter partes* review in IPR2023-01182. Pet. 68; Paper 3, 1. Petitioner indicates

that the claims of U.S. Patent No. 8,304,935 B2, which is related to the '687 patent, were found unpatentable in IPR2021-01166. Pet. 68.

D. The '687 Patent

The '687 patent relates to “wireless energy transfer.” Ex. 1001, 2:52–53. The '687 patent describes “systems and methods” that “provide for near-field wireless energy transfer via strongly coupled [high quality factor ('Q-factor')] resonators . . . with the potential to transfer power . . . over distances much larger than have been achieved using traditional induction techniques.” *Id.* at 4:47–52. The '687 patent states that such systems and methods “may be sized and configured for . . . a car charging system.” *Id.* at 130:3–8. For example, a “source resonator may be mounted in an enclosure,” “placed on the floor of a garage or parking space,” and “connect[ed] to a power source” to “allow[] wireless power transfer . . . when a vehicle drives over” the enclosure. *Id.* at 130:29–36. A “device resonator . . . may be mounted on the underside of [the] vehicle” and “configured to receive energy from [the] source resonator” in order to “recharge batteries [and] power electronics or devices.” *Id.* at 130:8–14.

E. Illustrative Claim

Of the challenged claims, claims 1, 7, and 13 are independent. Claim 13 is reproduced below.

13. A vehicle wireless power system, comprising:
- a power supply, the power supply configured to supply power at a rate sufficient to charge the battery of a vehicle that is driven at least in part by electrical power;
 - a first electromagnetic resonator coupled to the power supply and having a mode with a resonant frequency ω_1 , an intrinsic loss rate Γ_1 , and a first Q-factor $Q_1 = \omega_1 / 2\Gamma_1$, the first

electromagnetic resonator housed in a housing configured to be disposed in proximity to the vehicle;

a load configured to power the drive system of the vehicle using electrical power;

a second electromagnetic resonator adapted to be housed upon the vehicle and configured to be coupled to the load, the second electromagnetic resonator having a mode with a resonant frequency ω_2 , an intrinsic loss rate Γ_2 , and a second Q-factor $Q_2 = \omega_2 / 2\Gamma_2$;

wherein the second electromagnetic resonator is configured to be wirelessly coupled to the first electromagnetic resonator to provide resonant, non-radiative wireless power to the second electromagnetic resonator from the first electromagnetic resonator; and

an authorization facility to confirm compatibility of the resonators and provide authorization for initiation of transfer of power.

Ex. 1001, 230:29–53.

F. Evidence

Petitioner submits the following evidence:

Evidence	Exhibit No.
Declaration of Mark Allen in Support of Petition (“Allen Declaration”)	1003
Bennett, US 2010/0036773 A1, published Feb. 11, 2010 (“Bennett”)	1005
Cook, US 2009/0299918 A1, published Dec. 3, 2009 (“Cook”)	1007
Declaration of Mark Allen in Support of Petitioner’s Reply (“Allen Reply Declaration”)	1036

Patent Owner submits the Declaration of Mark N. Horenstein.
Ex. 2001 (“Horenstein Declaration”).

G. Asserted Grounds

Petitioner asserts that the challenged claims are unpatentable on the following ground:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–18	103(a) ¹	Cook, Bennett

II. ANALYSIS

A. Legal Standards

A claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any objective indicia of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art “would have had at least a bachelor’s degree in electrical engineering (or equivalent) and at least two years of industry or equivalent research experience in the field of

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Based on the effective filing date of the ’687 patent, we apply the pre-AIA version of § 103.

wireless energy transfer,” but “a higher level of education or skill might make up for less experience, and vice-versa.” Pet. 6 (citing Ex. 1003 ¶¶ 37–41). Petitioner’s description of the level of ordinary skill in the art is supported by the testimony of Petitioner’s declarant, Dr. Mark Allen. Ex. 1003 ¶¶ 37–41. Patent Owner “does not disagree with Petitioner’s definition of the level of ordinary skill in the art.” PO Resp. 9–10. We adopt Petitioner’s description for purposes of this Decision.

C. Claim Construction

In an *inter partes* review proceeding, a patent claim is construed using the same standard used in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of the claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b).

1. Confirm compatibility of the resonators and provide authorization for initiation of transfer of power

Patent Owner proposes construing the phrase “confirm compatibility of the resonators and provide authorization for initiation of transfer of power” in independent claims 1, 7, and 13 to mean “verify that parameters of the resonators will permit power transfer and provide authorization prior to initiating the transfer of power.” PO Resp. 7. Patent Owner argues that the claim language “recit[es] two functions—confirming resonator compatibility and providing authorization,” which “indicates that confirming compatibility of the resonators must be different than providing authorization.” *Id.* at 7–8. Patent Owner also argues that the specification distinguishes “the confirmation of resonator compatibility” from “merely verifying that the vehicle to be charged is authorized to receive charging

(e.g., because it is linked with a subscription account).” *Id.* at 8–9 (citing Ex. 1001, 102:14–21; Ex. 2001 ¶¶ 25–30); *see* PO Sur-reply 3–4.

Petitioner contends the phrase “confirm compatibility of the resonators and provide authorization for initiation of transfer of power” in independent claims 1, 7, and 13 “does not need construction.” Pet. Reply 1–2. Petitioner argues that “[t]he ’687 patent teaches that compatibility should be confirmed by establishing encrypted communications between the source and device resonators.” *Id.* at 3–4 (citing Ex. 1001, 102:14–17, 102:20–26; Ex. 1036 ¶ 11). Petitioner also argues that Patent Owner’s proposed construction “relies almost solely on the testimony of its declarant” and “introduces unnecessary ambiguities.” *Id.* at 4–6.

We need not resolve this claim construction issue in order to resolve the parties’ disputes about the asserted ground of unpatentability. As discussed below, even if we assume for purposes of this Decision that the disputed claim phrase means “verify that parameters of the resonators will permit power transfer and provide authorization prior to initiating the transfer of power,” the asserted prior art still teaches the disputed claim limitation. *See* Section II.D.3.

D. Obviousness of Claims 1–18 over Cook and Bennett

Petitioner argues that claims 1–18 would have been obvious over Cook and Bennett. Pet. 10–67. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 1–18 would have been obvious over Cook and Bennett.

1. Overview of Cook

Cook relates to “[a] system that automatically detects the presence of an automobile” and “can operate wirelessly to recharge the battery therein.”

Ex. 1007, code (57). Cook teaches a “charger” that “may be located within the ground near a parking space.” *Id.* ¶ 12. The charger may include a coil, a capacitor, and a charging circuit that produces a “signal of appropriate frequency for magnetic transmission.” *Id.* ¶ 13. “Whenever an appropriate vehicle comes into range of the magnetic field” produced by the charger, “it may receive power from that magnetic field, and hence be charged thereby.” *Id.* Cook also teaches a controller that “verifies the [vehicle’s identification] as being one that is associated with an account.” *Id.* ¶ 15.

2. Overview of Bennett

Bennett relates to “[a] power delivery system [that] wirelessly deliver[s] electric power and a communication signal to a target device.” Ex. 1005, code (57). Bennett’s system includes a power transmitting unit that employs magnetic waves to deliver power wirelessly to a target electronic device. *Id.* ¶ 29. Bennett teaches that “[t]he power transmitting unit . . . is capable of dynamically tuning the power transmission to the target resonant frequency associated with the target electromagnetic device.” *Id.* For example, the target electronic device “communicates a request for resonant power signal” along with “its identity and its (tuned) resonant frequency information to the power transmitting unit.” *Id.* ¶ 57. The power transmitting unit “then generates power employing the requested resonant frequency and delivers it in the form of magnetic field/waves.” *Id.* ¶ 58.

3. *Claim 13*

Claim 13 recites “[a] vehicle wireless power system.”² Ex. 1001, 230:29. Cook teaches “[w]ireless delivery of power . . . to a load.” Ex. 1007 ¶ 1; Pet. 30. Patent Owner does not dispute that the Cook and Bennett combination teaches the recitations in the preamble of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the recitations in the preamble of claim 13.

Claim 13 recites “a power supply, the power supply configured to supply power at a rate sufficient to charge the battery of a vehicle that is driven at least in part by electrical power.” Ex. 1001, 230:30–32. Cook teaches a charging circuit that “produces [a] signal of appropriate frequency for magnetic transmission” so that “an appropriate vehicle . . . may receive power from that magnetic field, and hence be charged thereby.” Ex. 1007 ¶ 13; Pet. 30–31. Cook also teaches that the vehicle is “[a]n electrically powered automobile [that] includes at least one battery” as “the primary power source of the automobile.” Ex. 1007 ¶ 9; Pet. 31. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “a first electromagnetic resonator coupled to the power supply.” Ex. 1001, 230:33–34. Cook teaches a first electromagnetic resonator that includes a coil and a capacitor and is coupled to the charging circuit. Ex. 1007 ¶ 13; Pet. 32–33. Patent Owner does not dispute that the

² We need not decide whether the preamble of claim 13 is limiting because Petitioner shows sufficiently that the prior art teaches the recitations in the preamble.

Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites the “first electromagnetic resonator . . . having a mode with a resonant frequency ω_1 , an intrinsic loss rate Γ_1 , and a first Q-factor $Q_1 = \omega_1 / 2\Gamma_1$.” Ex. 1001, 230:35–36. Cook teaches that the first electromagnetic resonator includes “a magnetically *resonant* antenna.” Ex. 1007, cl. 6 (emphasis added); Pet. 34. The evidence of record indicates that a resonant antenna has a resonant frequency ω . Ex. 1003 ¶ 138; Ex. 1021, 5:12–22³ (disclosing “the well known resonance equation . . . where ω denotes the angular frequency of resonance”); Pet. 34. Cook also teaches that the first electromagnetic resonator has a Q-factor where $Q = \omega / 2\Gamma$. Ex. 1003 ¶ 151; Ex. 1007, cl. 6, cl. 13; Ex. 1021, 13:1–8; Pet. 37. The evidence of record indicates that an electromagnetic resonator with a resonant frequency ω and a Q-factor also has an intrinsic loss rate Γ . Ex. 1003 ¶¶ 141–144; Ex. 1021, 13:1–8; Pet. 35–37. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “the first electromagnetic resonator housed in a housing configured to be disposed in proximity to the vehicle.” Ex. 1001, 230:36–38. Cook teaches locating the first electromagnetic resonator

³ Cook incorporates by reference U.S. Patent Application No. 12/018,069, which issued as U.S. Patent No. 9,774,086 B2 (Ex. 1021, “Cook ’086”). Ex. 1007 ¶ 1; Pet. 33. Cook ’086 teaches that a resonant antenna has a resonant frequency ω . Ex. 1021, 5:12–22; Pet. 34.

“within the ground near a parking space,” so that “[w]hen an appropriate vehicle comes into range of the magnetic field . . . , it may receive power from that magnetic field.” Ex. 1007 ¶¶ 12–13; Pet. 37–38. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “a load configured to power the drive system of the vehicle using electrical power.” Ex. 1001, 230:39–40. Cook teaches a battery that “driv[es] an electric motor,” which “drive[s] [the] vehicle wheels.” Ex. 1007 ¶¶ 9–10; Pet. 39–40. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “a second electromagnetic resonator adapted to be housed upon the vehicle and configured to be coupled to the load.” Ex. 1001, 230:41–43. Cook teaches a second electromagnetic resonator housed in the vehicle and coupled to the battery. Ex. 1007 ¶ 11, Fig. 1; Pet. 41–43. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “the second electromagnetic resonator having a mode with a resonant frequency ω_2 , an intrinsic loss rate Γ_2 , and a second Q-factor $Q_2 = \omega_2/2\Gamma_2$.” Ex. 1001, 230:43–45. Cook teaches that the second electromagnetic resonator includes a “magnetic *resonant* antenna.” Ex. 1007 ¶ 11 (emphasis added); Pet. 43. The evidence of record indicates

that a resonant antenna has a resonant frequency ω . Ex. 1003 ¶ 167; Ex. 1021, 5:12–22 (disclosing “the well known resonance equation . . . where ω denotes the angular frequency of resonance”); Pet. 43. Cook also teaches that the second electromagnetic resonator has a Q-factor where $Q = \omega/2\Gamma$. Ex. 1003 ¶¶ 151, 172; Ex. 1007 ¶ 11; Ex. 1021, 13:1–8; Pet. 44. The evidence of record indicates that an electromagnetic resonator with a resonant frequency ω and a Q-factor also has an intrinsic loss rate Γ . Ex. 1003 ¶¶ 141–144, 169; Ex. 1021, 13:1–8; Pet. 35–37, 44. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “wherein the second electromagnetic resonator is configured to be wirelessly coupled to the first electromagnetic resonator to provide resonant, non-radiative wireless power to the second electromagnetic resonator from the first electromagnetic resonator.” Ex. 1001, 230:46–50. Cook teaches that the first electromagnetic resonator “produce[s] a magnetic field,” so that when the second electromagnetic resonator housed in the vehicle “comes into range of the magnetic field . . . , it may receive power from that magnetic field.” Ex. 1007 ¶¶ 11, 13; Pet. 45–46. Patent Owner does not dispute that the Cook and Bennett combination teaches the above limitation of claim 13. Petitioner shows sufficiently that the Cook and Bennett combination teaches the above limitation of claim 13.

Claim 13 recites “an authorization facility to confirm compatibility of the resonators and provide authorization for initiation of transfer of power” (“the compatibility limitation”). Ex. 1001, 230:51–53. Bennett teaches a

“user authorization module” that “facilitates the authentication of the target electronic device . . . for resonant power delivery” by exchanging “authentication information with the power transmitting unit.”

Ex. 1005 ¶ 37; Pet. 49–50. Specifically, Bennett teaches that “the target electronic device . . . communicates a request for resonant power signal” and “sends its identity and its (tuned) resonant frequency information to the power transmitting unit.” Ex. 1005 ¶ 57; Pet. Reply 18–20. The power transmitting unit “compares the information . . . with the subscriber’s information in its database.” Ex. 1005 ¶ 37; Pet. 49–50. The power transmitting unit “then generates power employing the requested resonant frequency,” thereby verifying that the resonant frequency will permit power transfer to the target electronic device. Ex. 1005 ¶ 58; Ex. 1036 ¶¶ 28–29; Pet. Reply 18–20. The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s resonant frequency tuning. Ex. 1003 ¶¶ 113–114; Pet. 21–22, 24–25; *see* Section II.D.10.a.

Patent Owner argues that the “Petition is ambiguous” because it “initially points to Cook . . . but then identifies portions of Bennett” as teaching the compatibility limitation. PO Resp. 18–19. Patent Owner’s argument is unavailing. The Petition explains that Cook teaches a controller for authorizing power transfer, but acknowledges that Cook does not teach all the features of the compatibility limitation. Pet. 47–48 (“Cook . . . left the details of those vehicle-side components to a [person of ordinary skill in the art].”). The Petition thus expressly relies on the Cook and Bennett combination as teaching the compatibility limitation. *Id.* at 48–50.

Patent Owner argues that the Cook and Bennett combination does not teach the compatibility limitation. PO Resp. 18–24; PO Sur-reply 6–16. As discussed above, Patent Owner proposes construing the compatibility limitation to mean “verify that parameters of the resonators will permit power transfer and provide authorization prior to initiating the transfer of power.” *See* Section II.C.1. Patent Owner argues that Bennett’s resonant frequency tuning “is an optional step that occurs after authentication has occurred,” and thus does not verify that parameters of the resonators will permit power transfer *prior to* initiating power transfer. PO Resp. 23–24 (citing Ex. 1005 ¶¶ 37–38, Ex. 2001 ¶¶ 60–63); PO Sur-reply 12–13 (citing Ex. 2001 ¶¶ 45, 48–49).

Patent Owner’s argument is unavailing. Bennett teaches that the resonant frequency tuning occurs prior to initiating power transfer. Ex. 1005 ¶¶ 57, 58, Fig. 3. Bennett’s Figure 3 is reproduced below.

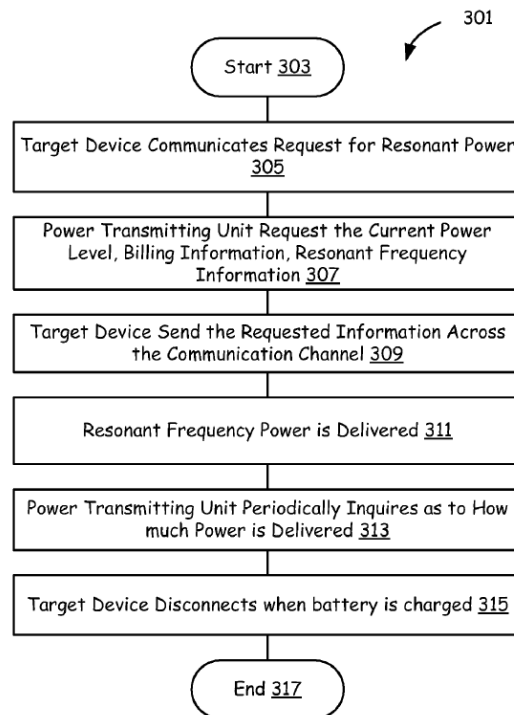


FIG. 3

Id. at Fig. 3. Bennett’s Figure 3 “is a flowchart illustrating resonant power transfer operations performed using the power system of [Figure] 1.” *Id.* ¶ 57. Bennett teaches that at “block 305, the target electronic device 115 communicates a request for resonant power signal,” and “[d]uring this step[,] the target electronic device 115 sends its identity and *its (tuned) resonant frequency information* to the power transmitting unit 103.” *Id.* (emphasis added). According to Bennett, “[t]he power transmitting unit 103 then generates powering employing *the requested resonant frequency* and *delivers it . . . at . . . block 311.*” *Id.* ¶ 58 (emphases added). Thus, Bennett’s power transmitting unit tunes its resonant frequency to the target electronic device’s requested resonant frequency prior to initiating power transfer, thereby verifying that the resonant frequency will permit power transfer.⁴ *Id.* ¶¶ 57–58, Fig. 3; Ex. 1036 ¶¶ 28–29.

Patent Owner argues that although Bennett teaches that “‘resonant frequency information’ is sent to the power transmitting unit, Bennett fails to disclose that the power transmitting unit confirms resonator compatibility based on the received resonant frequency information.” PO Sur-reply 15. According to Patent Owner, “the power transmitting unit ‘generates power employing the requested resonant frequency,’” but “generating power at the resonant frequency of the target device does not explicitly or inherently

⁴ Patent Owner’s declarant, Dr. Mark Horenstein, suggested during his deposition that just verifying the resonant frequency does not satisfy the compatibility limitation. Ex. 1035, 36:12–37:9. Patent Owner, though, does not present that argument in the Response or Sur-reply. *See* PO Resp. 18–29; PO Sur-reply 6–20. Further, Dr. Horenstein acknowledges that “[t]here are many different ways” to confirm compatibility, and “it would be up to the designer of the system to decide what is compatible and what is not.” Ex. 1035, 22:21–23:19.

disclose that resonator compatibility is confirmed beforehand.” *Id.* (citing Ex. 1005 ¶ 58). Patent Owner asserts that even if “the power source 105 of Bennett ‘provides power to the sending resonant couples component 131,’ . . . the resonant frequency of the transmitting resonator depends on its inductance and capacitance, and not the frequency of the power signal applied to the resonator.” *Id.* at 15–16 (citing Ex. 1005 ¶ 32; Ex. 2001 ¶¶ 32, 39).

Patent Owner’s argument is unavailing. Bennett does not teach simply adjusting the frequency of the power signal applied to the resonator. Rather, Bennett teaches adjusting the *resonant* frequency. Ex. 1005 ¶ 29 (“The power transmitting unit 103 is capable of dynamically tuning the power transmission to the target *resonant* frequency associated with the target electronic device 115”) (emphasis added); Pet. 48. And, as discussed above, Bennett teaches that the power transmitting unit tunes its resonant frequency to the target electronic device’s requested resonant frequency prior to initiating power transfer. Ex. 1005 ¶¶ 57–58, Fig. 3; Ex. 1036 ¶¶ 28–29.

Patent Owner argues that Petitioner’s reliance on Bennett’s Figure 3 in the Reply is an improper new argument. PO Sur-reply 15. We disagree. The Petition expressly relies on Bennett’s resonant frequency tuning as teaching the compatibility limitation. Pet. 49–50 (citing Ex. 1005 ¶¶ 37–38, 41). Patent Owner responds by arguing that Bennett’s resonant frequency tuning is an optional step that occurs *after* initiating power transfer. PO Resp. 23–24. In the Reply, Petitioner responds by pointing to Bennett’s Figure 3 as evidence that the resonant frequency tuning occurs *before* initiating power transfer. Pet. Reply 18–21 (citing Ex. 1005 ¶¶ 37, 57,

Fig. 3; Ex. 1036 ¶¶ 28–29). Petitioner’s argument in the Reply properly relies on the same feature (i.e., Bennett’s resonant frequency tuning) and the same embodiment (i.e., the system shown in Figures 1 and 3) as the Petition. Ex. 1005 ¶¶ 29, 37–38, 57 (“FIG. 3 is a flowchart illustrating resonant power transfer operations performed using the power system of FIG. 1 . . .”). Thus, Petitioner’s reliance on Bennett’s Figure 3 is a proper response to arguments in Patent Owner’s Response, not an improper new theory of unpatentability. *See Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1008 (Fed. Cir. 2023) ([T]he arguments and evidence in the reply must not be part of a *new* theory of unpatentability” and “must be *responsive* to the patent owner’s contentions or the Board’s institution decision.”).

For the foregoing reasons, Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitations of claim 13.

4. Claim 14

Claim 14 depends from claim 13, and recites “wherein the authorization facility uses public key infrastructure.” Ex. 1001, 230:54–55. Cook teaches a “real-time token type system” where the vehicle sends an “encrypted message” containing the vehicle’s identification using an “encryption key” that the charger decrypts with a “decryption key.” Ex. 1007 ¶ 17; Pet. 56–57. Patent Owner does not dispute that the Cook and Bennett combination teaches the limitation of claim 14. Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitation of claim 14.

5. Claim 15

Claim 15 depends from claim 13, and recites “wherein the authorization facility uses a secure communication channel.” Ex. 1001,

230:57–58. Cook teaches wirelessly communicating information using “encryption” and “decryption.” Ex. 1007 ¶¶ 17–18; Pet. 60–61. Patent Owner does not dispute that the Cook and Bennett combination teaches the limitation of claim 15. Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitation of claim 15.

6. Claim 16

Claim 16 depends from claim 15, and recites “wherein the channel is an in-band communication channel.” Ex. 1001, 230:58–59. Bennett teaches “communicating the power and a control signal” using “the same frequency, or in other words, on the same channel, i.e. the wireless field.” Ex. 1005 ¶ 31; Pet. 63–64. The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s in-band communication channel. Ex. 1003 ¶¶ 117, 207; Pet. 26, 63–64; *see* Section II.D.10.b. Patent Owner does not dispute that the Cook and Bennett combination teaches the limitation of claim 16. Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitation of claim 16.

7. Claim 17

Claim 17 depends from claim 15, and recites “wherein the channel is an out-of-band communication channel.” Ex. 1001, 230:60–61. Bennett teaches that “the power link (such as the magnetic field), the control signal, and the normal communication (i.e. the normal function) operation take[] place in separate channels.” Ex. 1005 ¶ 31; Pet. 64–65. The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s out-of-band communication channel. Ex. 1003 ¶ 117; Pet. 26, 64–65; *see* Section II.D.10.b. Patent Owner does not dispute that the Cook and Bennett combination teaches the

limitation of claim 17. Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitation of claim 17.

8. Claim 18

Claim 18 depends from claim 13, and recites “wherein the authorization facility further determines a safety condition for initiation of transfer of power.” Ex. 1001, 230:62–64. Bennett teaches a “target device power manager” that “manages the battery level of the rechargeable battery . . . by regulating the battery discharge and by initiating resonant power charge operation.” Ex. 1005 ¶ 39; Pet. 65–66. Bennett teaches initiating power transfer only when the target electronic device’s battery charge is at a safe level. Ex. 1005 ¶¶ 26, 40; Pet. 65–66. The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s battery management. Ex. 1003 ¶¶ 119, 215; Pet. 27–28, 66–67. Patent Owner does not dispute that the Cook and Bennett combination teaches the limitation of claim 18. Petitioner shows sufficiently that the Cook and Bennett combination teaches the limitation of claim 18.

9. Claims 1–12

Claims 1–12 recite limitations similar to those discussed above for claims 13–18. Ex. 1001, 229:30–230:28. Petitioner relies on evidence similar to that discussed above for claims 13–18, which shows that the Cook and Bennett combination teaches the limitations of claims 1–12. Pet. 50–67. Other than the arguments discussed above for claim 13, Patent Owner does not dispute that the Cook and Bennett combination teaches the limitations of claims 1–12.

10. Reason to Combine

Petitioner asserts that a person of ordinary skill in the art would have had reason to combine the cited teachings of Cook and Bennett. Pet. 21–29 (citing Ex. 1003 ¶¶ 107–123). We agree with Petitioner’s rationale.

a. *Bennett’s resonant frequency tuning*

The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s resonant frequency tuning. Ex. 1003 ¶ 114; Pet. 21–22. Specifically, Cook teaches that its wireless charging system requires “the right frequency” to charge a vehicle’s battery. Ex. 1007 ¶ 12; Pet. 24. But Cook does not teach how to adjust the resonant frequency of its wireless charging system to work with different vehicles. Ex. 1003 ¶ 114; Pet. 24. As discussed above, Bennett teaches tuning the power transmitting unit’s resonant frequency to the target electronic device’s requested resonant frequency. Ex. 1005 ¶¶ 37–38, 57–58, Fig. 3. A person of ordinary skill in the art would have recognized that Bennett’s resonant frequency tuning would improve Cook’s wireless charger by making it compatible with different vehicles. Ex. 1003 ¶ 114; Pet. 24–25. In addition, a person of ordinary skill in the art would have reasonably expected the combination to work because Bennett explains that its techniques apply generally to battery-powered devices. Ex. 1003 ¶ 121; Ex. 1005 ¶ 3; Pet. 28–29.

Patent Owner argues that Petitioner does not show sufficiently that it would have been obvious to combine the cited teachings of Cook and Bennett. PO Resp. 24–29; PO Sur-reply 16–20. First, Patent Owner contends that “tuning to a frequency is not equivalent to confirming resonator compatibility to initiate power transfer.” PO Resp. 25 (citing

Ex. 1001, 4:18–21, 23:7–11); *see* PO Sur-reply 16–17. According to Patent Owner, “unlike the claimed authorization facility that confirms resonator compatibility for initiating power transfer, Petitioner’s reliance on frequency tuning relates to [a] different process of optimizing energy transfer *after charging has begun*.” PO Resp. 26 (citing Ex. 2001 ¶¶ 60–63) (emphasis added). Patent Owner’s argument is unavailing. As discussed above, Bennet teaches that the power transmitting unit tunes its resonant frequency to the target electronic device’s requested resonant frequency *prior to* initiating power transfer. Ex. 1005 ¶¶ 37–38, 57–58, Fig. 3; Ex. 1036 ¶¶ 28–29; *see* Section II.D.3.

Second, Patent Owner contends that Petitioner’s assertion that Cook and Bennett are analogous art to the ’687 patent is insufficient because “Petitioner must separately explain why one skilled in the art would have combined Cook and Bennett in the manner proposed.” PO Resp. 27; *see* PO Sur-reply 16. Patent Owner’s argument is unavailing. Petitioner does not merely argue that Cook and Bennett are analogous art to the ’687 patent. *See* Pet. 21–22, 24–25. As discussed above, Petitioner explains specifically why a person of ordinary skill in art would have made the combination, namely, to improve Cook’s wireless charging system by making it compatible with different vehicles. Ex. 1003 ¶ 114; Pet. 24–25.

b. *Bennett’s in-band and out-of-band communication channels*

The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s in-band or out-of-band communication channel. Ex. 1003 ¶¶ 117, 207; Pet. 25–26, 63–65. Specifically, Cook teaches that its wireless charging system exchanges information with a vehicle. Ex. 1007 ¶¶ 14, 17–18; Pet. 25. But Cook does

not teach how to communicate that information in the presence of a resonator's magnetic field. Ex. 1003 ¶ 115; Pet. 25. A person of ordinary skill in the art would have recognized that using Bennett's in-band communication channel to exchange information would improve Cook's wireless charging system by reducing the number of necessary components. Ex. 1003 ¶ 117; Pet. 26. A person of ordinary skill in the art would have recognized that using Bennett's out-of-band communication channel would improve Cook's wireless charging system by maintaining the resonator's quality factor as high as possible. Ex. 1003 ¶ 117; Pet. 26.

Patent Owner argues that Petitioner does not show sufficiently that it would have been obvious to combine the cited teachings of Cook and Bennett. PO Resp. 26. Specifically, Patent Owner contends that "there is no indication in Cook that the use of in-band versus out-of-band channels was an issue that would have prompted a POSA to combine Bennett with Cook." *Id.* Patent Owner also contends that "whether signals are transmitted using in-band versus out-of-band channels is entirely unrelated to confirming resonator compatibility, which is the feature Petitioner alleges is disclosed by Bennett and would have been obvious to combine with Cook." *Id.* (citing Ex. 2001 ¶ 71).

Patent Owner's argument is unavailing. First, Petitioner relies on Bennett's in-band and out-of-band communication channels as teaching the limitations of claims 4, 5, 10, 11, 16, and 17. Pet. 63–65; *see* Sections II.D.6. II.D.7. Second, as discussed above, Petitioner provides specific reasons why Bennett's in-band and out-of-band communication channels would improve Cook's wireless charging system. Ex. 1003 ¶ 117; Pet. 26; *see KSR*, 550 U.S. at 417 ("[I]f a technique has been used to improve one

device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

c. *Bennett’s battery management*

The evidence of record indicates that it would have been obvious to implement Cook’s wireless charging system using Bennett’s battery management. Ex. 1003 ¶¶ 119, 215; Pet. 27–28, 66–67. Specifically, the evidence of record indicates that overcharging a vehicle’s battery presents a safety risk. Ex. 1003 ¶ 119; Pet. 27–28. Thus, a person of ordinary skill in the art would have recognized that using Bennett’s battery management would improve Cook’s wireless charging system by maintaining the vehicle’s battery charge at a safe limit. Ex. 1003 ¶ 119; Pet. 27–28.

Patent Owner argues that Petitioner does not show sufficiently that it would have been obvious to combine the cited teachings of Cook and Bennett. PO Resp. 29. Patent Owners contends that “the alleged benefit of preventing overcharging by monitoring the charge level of the vehicle battery is unrelated to confirming resonator compatibility, which is the feature from Bennett that Petitioner purports to combine with Cook.” *Id.* Patent Owner’s argument is unavailing. First, Petitioner relies on Bennett’s battery management as teaching the limitations of claims 6, 12, and 18. Pet. 65–66; *see* Section II.D.8. Second, as discussed above, Petitioner provides a specific reason why Bennett’s battery management would improve Cook’s wireless charging system. Ex. 1003 ¶ 119; Pet. 27–28; *see KSR*, 550 U.S. at 417.

11. Summary

For the foregoing reasons, Petitioner has shown by a preponderance of the evidence that claims 1–18 would have been obvious over Cook and Bennett.

III. CONCLUSION⁵

Petitioner has shown by a preponderance of the evidence that claims 1–18 of the '687 patent are unpatentable.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–18	103	Cook, Bennett	1–18	

IV. ORDER

It is hereby

ORDERED that claims 1–18 of the '687 patent are shown unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

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