

Filed on behalf of: InductEV, Inc.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INDUCTEV, INC.,
Petitioner,

v.

WITRICITY CORPORATION,
Patent Owner.

Case IPR2024-00105
Patent 10,027,184

PETITIONER'S REPLY

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1006	U.S. Patent Application Publication No. 2009/0299918 A1 (“Cook”)
1007	U.S. Patent No. 6,075,433 (“Ono”)
1008	Chwei-Sen Wang, <i>Design Considerations for Inductively Coupled Power Transfer Systems</i> (2004) (Ph.D. dissertation, University of Auckland) (“Wang Thesis”)
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1017	Exhibit 6 to Complaint: Claim Chart, <i>WiTricity Corp. v. InductEV, Inc.</i> , No. 2:23-cv-01099-CMR (E.D. Pa. Mar. 21, 2023), ECF No. 1-8 (“Complaint Chart”)
1018	D. Ferrazzin, et al., <i>Hall Effect Sensor-Based Linear Transducer</i> , Proceedings of the 1999 IEEE, Int’l Workshop on Robot and Human Interaction (IEEE, Sept. 1999), 219-224 (“Ferrazzin”)

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1019	A.W. Green & J.T. Boys, <i>10kHz Inductively Coupled Power Transfer – Concept and Control</i> , Power Electronics and Variable-Speed Drives, Conf. Pub. No. 399 (IEE, Oct. 26-28, 1994), 694-699 (“Green”)
1020	Aiguo Patrick Hu, <i>Selected Resonant Converters for IPT Power Supplies</i> (Oct. 2001) (Ph.D. dissertation, University of Auckland) (“Hu”)
1021	Byung-Song Lee & Kyung-Hee Han, <i>Modeling and Analysis of IPT System Used for PRT</i> , Proceedings of the Eighth International Conference on Electrical Machines and Systems – ICEMS 2005, vol. 1 (ICEMS, Sept. 27-29, 2005), 839-842 (“Lee”)
1022	James E. Lenz, <i>A Review of Magnetic Sensors</i> , Proceedings of the IEEE, vol. 78, no. 6 (June 1990), 973-989 (“Lenz”)
1023	Excerpts from <i>McGraw-Hill Dictionary of Scientific and Technical Terms</i> (6th ed. 2003)
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I. Introduction

The Petition demonstrated that the challenged claims would have been obvious over the prior art.

For Ground 1, Patent Owner disputes only one limitation: the “magnetic field sensor is positioned within the magnetic field.” But Patent Owner concedes that Fells teaches sensors that “detect the presence of a metallic object by ... monitoring changes in an electromagnetic field.” POR 26. Patent Owner further argues that these sensors are not located “within the magnetic field of the wireless power supply” (POR 29) but Fells discloses—and in the alternative, a POSA would have considered it obvious—to place Fells’ sensors within that magnetic field because that is the area where foreign objects have the most potential to cause damage during charging, and the sensors must be placed within the field to detect objects there.

For Ground 2, Patent Owner argues that Fells does not check the status “of the resonator” (POR 42), but claims 4-6 only require checking the status “of the wireless energy transfer source,” which is broader. Regardless, and as required by claim 16, Fells teaches status checks “of a source resonator” because its checks indicate whether or not the resonator is currently capable of being activated. It is undisputed that these checks “ensure[] that the sense circuit can be potentially triggered,” and that “[t]he resonator’s ability to deliver power depends on the sense

circuit being functional.” POR 48. Thus, Fells’ checks indicate the current status (the “ability to deliver power”) of the resonator.

For Ground 3, Patent Owner disputes that Fells and Ono render obvious “an enclosure housing at least a portion of the wireless energy transfer source, wherein the foreign object debris detection system is integrated into the enclosure.” But Patent Owner does not dispute that it was obvious to place the debris detection system within the enclosure housing the wireless energy transfer source. Instead, Patent Owner argues that the term requires some unspecified further arrangement, which is not supported by the ’184 Patent or any other evidence.

II. Ground 1: Fells Renders Obvious Claims 1, 8, and 11

The Petition explained that Fells renders obvious claims 1, 8, and 11. Pet. 6-32. In particular, Fells discloses the claimed “magnetic field sensor positioned within the magnetic field of the wireless energy transfer system” by teaching a proximity detector configured to “detect a change in magnetic field indicative of presence of an object” using either 1) a “Hall Effect sensor” or 2) an “inductive proximity sensor.” Pet. 14-23. Fells teaches that these sensors are “within the magnetic field of the wireless energy transfer system” because they are positioned to detect devices “placed on” the power supply and/or foreign objects that would interfere with wireless power transfer within the magnetic field. Pet. 14-24. The Petition also explained that, to the extent Fells does not disclose that these sensors

are within the magnetic field, it would have been obvious to place them there, in order to detect foreign objects in the most critical parts of the charging system. Pet. 22-23.

Patent Owner's arguments otherwise are incorrect.

A. Fells Discloses a “magnetic field sensor positioned within the magnetic field”

1. Fells Discloses A Magnetic Field Sensor

Patent Owner agrees that Fells' Hall Effect sensor is a “magnetic field sensor,” but contends Fells' alternative “inductive proximity sensor” is not. POR 25; Horenstein Dep. (Ex. 1038) 34:15-21. Although Fells' Hall Effect sensor is alone sufficient to satisfy the claims, Patent Owner is wrong as to the inductive proximity sensor. Patent Owner concedes that the inductive proximity sensor “rel[ies] on magnetic principles” and “detect[s] the presence of a metallic object by ... monitoring changes in an electromagnetic field.” POR 26, 27. That makes it a magnetic field sensor, and should be dispositive. Allen Supp. (Ex. 1037) ¶¶20-29.

Patent Owner's contrary argument relies on an implied claim construction argument that a “magnetic field sensor” must “respond to *external* magnetic fields,” as opposed to producing a magnetic field and then detecting objects by sensing changes in that produced magnetic field. POR 25-26. That is not required by the claim language itself and there is no basis for that narrow construction. See '184 Patent (Ex. 1001) cl. 1. The plain meaning of “magnetic field sensor” is a device

that senses magnetic fields. Allen Supp. ¶¶9-17. The '184 Patent confirms this meaning: magnetic field sensors are “sensors for measuring small changes in the magnetic field in the proximity of the FOD objects.” '184 Patent 5:25-29; *see id.* 5:34-38 (“measuring magnetic field changes ... in the vicinity of the FOD”), 2:20-26 (system “may measure perturbations in the magnetic field around the resonators of a wireless energy transfer system using magnetic field sensors and/or gradiometers”). Nothing in the '184 Patent requires a “magnetic field sensor” to monitor externally-generated magnetic fields.

Patent Owner points to portions of the '184 Patent specification describing sensors that can detect external fields, POR 25, but it would be legal error to import that limitation into the claims. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1319-20 (Fed. Cir. 2005) (en banc) (“reading a limitation from the written description into the claims” is “one of the cardinal sins of patent law”). That is particularly true here, as Patent Owner's cited passages expressly state that they are “exemplary and non-limiting embodiments.” '184 Patent 5:39-49.

Patent Owner relies on a series of textbooks, but where, as here “the meaning of a claim term is clear from the intrinsic evidence, there is no reason to resort to extrinsic evidence.” *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1287 (Fed. Cir. 2021). In any event, Patent Owner's evidence does not support its implied construction. The Carstens textbook explains that “magnetic-field

sensing devices” are “sensors that *either use or interact with* a magnetic field”—not merely those that respond to externally-generated magnetic fields. Carstens (Ex. 2007) 119 (emphasis added); Allen Supp. ¶13.

Even if Patent Owner's implied construction were correct, Fells' “inductive proximity sensor” responds to external magnetic fields. As Fells explains, “an inductive proximity sensor could be formed using another coil in the wireless power supply 200 which is independent of the coil used to transfer power.” Fells (Ex. 1005) [0288]-[0290]. This is what Carstens calls an “inductive pickup coil,” which “is used primarily as a proximity sensor.” Ex. 2007 (Carstens) 130. As a POSA would have known, such an inductive proximity detector “is a coil that generates a current proportional to the change in flux of a magnetic field” and “is used to sense the presence of a magnetic field.” *Id.*; Allen Supp. ¶¶22-24; Horenstein Dep. 34:22-35:4 (agreeing that inductive pickup coil is a magnetic field sensor).¹

¹ Patent Owner relies on other portions of Carstens describing a different inductive proximity sensor, used to detect underground metals. Carstens 250. But a POSA would not interpret Fells' “inductive proximity sensor” to be a metal-detector-style sensor, as opposed to the “inductive pickup coil ... used primarily as a proximity sensor” described earlier in Carstens, which senses external magnetic fields. Carstens 130-31; Allen Supp. ¶24

Patent Owner's other references confirm the same. Staugaard explains that an inductive proximity sensor "generates an alternating magnetic field," and "[w]hen a metallic object enters the proximity of the magnetic field, eddy currents are created within the object." Staugaard (Ex. 2008) 8-25. "The eddy currents in the object *create a magnetic field that opposes the original magnetic field*," which induces voltage in the inductive proximity sensor "that oppose[s] the original oscillating voltage," indicating the presence of a foreign object. *Id.* (emphasis added). Thus, even in this case, what is being detected is a magnetic field "create[d]" by an external object – the foreign metal object, meeting Patent Owner's "external" definition. *Id.*; *see also* Carr (Ex. 2011) 191 (foreign object eddy currents "create a magnetic field around the target, and this field will [be sensed by] the sensor coil"); Allen Supp. ¶26.

Lastly, Patent Owner sets up a strawman, arguing Fells inductive proximity sensor is actually an "eddy current sensor," and Dr. Allen purportedly testified eddy-current sensors are not magnetic field sensors. POR 26-27. Patent Owner mischaracterizes both Fells and Dr. Allen. Fells does not include *any* discussion of sensing "eddy currents." Rather, the inductive proximity sensor detects changes in inductance caused by nearby objects altering the magnetic field close to the sensor. Fells [0288]-[0289], [0291]; Pet. 16. In any event, Dr. Allen confirmed that even an eddy-current sensor that does not "directly sens[e] a magnetic field," nonetheless

“generates a magnetic field in the presence of a conductor that is then sensed.” Allen Dep. (Ex. 2015) 33:13-21. And Dr. Allen has reiterated that a POSA would have understood this constitutes a magnetic field sensor as the term is used in the '184 Patent. Allen Supp. ¶¶14-16, 25-29.

2. Fells' Proximity Detector is Positioned Within the Magnetic Field

Patent Owner next contends that Fells' proximity detector, whether an “inductive proximity sensor” or “Hall Effect sensor,” is not “positioned within the magnetic field of the wireless energy transfer system” as claimed. POR 29. Patent Owner is wrong.

Fundamentally, Patent Owner's argument misrepresents the purpose of Fells and its proximity detector. Allen Supp. ¶¶30-41. The device serves—as Patent Owner does not dispute—to “detect when a device or foreign object has been placed in the vicinity of the wireless power supply” or “is removed from the wireless power supply.” Fells [0288]; Ex. 1003 ¶¶131-133. Fells' design goals are directed to the detection of “foreign objects that would get hot or hinder power transfer” or “otherwise interfere with the system.” Fells [0002]; *see also id.* [0189] (explaining that the system “detect[s] the presence of foreign objects which could adversely affect operation”); Stevens (Ex. 1016) 2:8-13 (“foreign objects” that are “in proximity with the primary coil” will “have eddy currents induced therein ... which will cause heating of the object”). Because the purpose of the proximity detector is

to determine when objects are placed such that they would interact with or interfere with the transfer of wireless power (or when they need power), and acts by detecting “change[s] in magnetic field,” the proximity sensor would be placed within the magnetic field of the wireless power supply. Fells [0288]-[0289]; Ex. 1003 ¶¶131-133; Allen Supp. ¶36.

Patent Owner argues that Fells’ disclosure of detecting objects “in the vicinity of the wireless power supply” means that the detector is positioned only near, but not inside of, the magnetic field of the wireless power supply. POR 34. Patent Owner is wrong. As explained in Stevens, which Fells incorporates by reference, the area in the “vicinity” of the wireless power supply is where the primary coil “generates an electromagnetic field.” Stevens 24:26-28 (“In the operating mode, the primary coil 12 generates an electromagnetic field in the vicinity of the primary unit.”); *see also id.* 1:10-18, 2:8-10 (items in “proximity with the primary coil” will “coupl[e] to the coil”), 4:1-12 (the area “in proximity to the primary unit” is where “power can be received inductively by the secondary device”), 17:12-26 (“induced electromagnetic field in the proximity of the primary coil”); Fells [0192] (incorporating Stevens by reference); Allen Supp. ¶¶31-34.

A POSA also would not have interpreted the “vicinity” of Fells power supply to exclude the area within the magnetic field because that interpretation would make Fells’ proximity detector unable to detect objects placed “on or over” the power

supply. Ex. 2005 ¶98; Horenstein Dep. 79:14-21. That is not how a POSA would have understood Fells' disclosure. Dr. Horenstein admitted that Patent Owner's interpretation creates blind spots in Fells' system: devices could "enter the field of the primary coil before being detected," which "would be a problem" for the system. Horenstein Dep. 81:21-82:11; Allen Supp. ¶¶32-35, 39.

Fells' disclosure of a Hall Effect sensor further confirms the proximity detector's placement within the magnetic field of the primary coil. Fells' Hall Effect sensor produces "a change in voltage in response to a change in magnetic field," and therefore must be positioned within that magnetic field in order to detect those changes. Fells [0289]; Pet. 20-22; *see also* Carstens 123 (Hall Effect sensor works by being "immersed in a magnetic field"). The same is true of the inductive proximity detector, which detects the proximity of foreign objects by having its "coil" placed within a magnetic field. Fells [0289]; Ex. 1003 ¶131; Carstens 130 (proximity detector works by "sens[ing] the presence of a magnetic field").

Patent Owner argues that when Fells' Hall Effect sensor detects "a change in magnetic field," that is not "the magnetic field of the wireless power supply," but rather a magnetic field "from the ferrite core within the portable device ... that is detected in the vicinity of the wireless power supply." POR 32. That is contrary to Fells' disclosure. As Fells explains, "[t]he presence of a ferrite core or other material with similar properties within the portable device may result in *altering the magnetic*

field.” Fells [0289] (emphasis added). Thus, on its face, the ferrite core of a portable device does not *generate* the magnetic field that is being sensed, but only “alter[s]” that existing field, which change can be detected by the Hall Effect sensor. Fells [0289]; Allen Supp. ¶40. When Fells discusses a magnetic field being “generated,” it refers to the magnetic field of the wireless power supply. Fells [0295]; Allen Supp. ¶40. This makes sense, as Patent Owner does not dispute that Fells sensors will “verify that foreign object debris has not moved onto or over the source resonator during generation of the oscillating magnetic field.” Pet. 23-30 (discussing Element 1[f]).

Patent Owner next argues that this limitation is not met because the proximity detector operates during “standby mode,” during which “the wireless power supply is not powered to generate its magnetic field.” POR 30. That is wrong because there is no requirement in the claims that the magnetic field sensor be active at the same time as the wireless power supply. All that is required is that the magnetic field sensor be “positioned within the magnetic field of the wireless energy transfer system,” ’184 Patent cl. 1, which Fells teaches. Specifically, a POSA would have understood Fells’ proximity detector is placed within the magnetic field, because it is the area for “power transfer” and where foreign objects would “get hot” (as a result of the magnetic field used for power transfer generating eddy currents in the foreign object) that is explicitly designed to be monitored. Fells [0288], [0002], [0189];

Stevens 2:8-20; Allen Supp. ¶¶36, 53. As Dr. Horenstein admitted, if the proximity detector were *not* positioned within this magnetic field, it could not detect objects within that field. Horenstein Dep. 79:14-21.

Patent Owner's argument that Fells' system would "detect[] the foreign object in the vicinity of the wireless power supply ... before the foreign object reaches the magnetic field," but not provide any detection within the magnetic field itself, is not how a POSA would understand Fells' disclosure. Allen Supp. ¶33. Fells states that the proximity detector can detect "if a device or foreign object is *removed from the wireless power supply*" – not if it is merely removed from "the vicinity of the wireless power supply". Fells [0288]. Thus, the area monitored by the proximity detector includes the area of the magnetic field of the wireless power supply – i.e. the area where charging will occur. Allen Supp. ¶33; *see also* Fells [0194]-[0195], [0248], [0250], [0259], [0267]-[0268] (each confirming that Fells detects objects "placed on" the wireless power supply); Stevens 24:26-28.

By contrast, Patent Owner's interpretation undercuts the purpose of Fells by depriving the system of any ability to monitor the area where power transfer and foreign object heating occurs. Allen Supp. ¶32.

B. Fells Renders Obvious a "magnetic field sensor positioned within the magnetic field"

To the extent Fells does not expressly disclose that its Hall effect sensor or inductive proximity sensor are positioned "within the magnetic field" of the wireless

power supply, it would have been obvious to a POSA to place them there, to most effectively detect foreign debris. Pet. 22-23; Allen Supp. ¶¶50-54. As described above, the area within the magnetic field of Fells' wireless power supply is the area with the highest concentration of magnetic flux during charging, and therefore the area that presents the highest concern of "foreign objects that would get hot or hinder power transfer" or "otherwise interfere with the system." Fells [0002]. In order to make sure that this most critical area is properly being measured for foreign debris, Fells would have placed its proximity detector within the magnetic field created when the primary coil is activated. Pet. 22-23; Ex. 1003 ¶¶131-133; *supra* 7-11; As Dr. Horenstein confirmed, if the sensor is *not* in the field, it cannot detect in this critical area. Horenstein Dep. 79:14-21.

Patent Owner argues that this modification would not have been obvious because "a proximity detector positioned within the magnetic field would in fact itself become a foreign object that Fells seeks to detect and avoid." That is not correct.² An intentionally-placed component of the wireless charging system is not

² Patent Owner does not dispute that it would have been within a POSA's skill to make this modification, or that they would have had a reasonable success in doing so. *See* POR 35-37. The only dispute is whether a POSA would have been motivated to do so.

a “foreign object,” and would not present any impediment to Fells’ system. Allen Supp. ¶¶42-48. For example, Fells taught that the primary coil can be designed to operate when a sense coil is coupled to the primary coil by “winding a few turns of a sense coil around each primary coil.” Fells [0283], [0197]. As another example, Fells states that “[f]oreign objects may be detected using a method disclosed in” the Stevens reference, which it incorporates by reference. Fells [0192]. Stevens explains, as a POSA would have known, that the foreign object detection system can detect and account for “friendly parasitic loads” in the form of “electronic device[s]” that are present in the magnetic field, but are not foreign objects and should not be treated as such. Allen Supp. ¶¶45-47; Stevens 21:13-30, 25:25-31, 27:35-28:8, 32:12-30, Fig. 4. Patent Owner’s assumption is also logically flawed: a sensor is not going to detect itself, otherwise no proximity sensor would ever function correctly. Allen Supp. ¶¶48.

Lastly, Patent Owner argues that it would not be obvious to place Fells’ proximity detector within the magnetic field because a POSA “would instead position the Fells’ proximity detector outside (but in proximity) of the magnetic field.” POR 36. Even if that were also a suitable alternative—or even a better alternative—as a matter of law that would not defeat Petitioner’s obviousness argument. “That ‘better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.’” *Bayer Pharma AG v.*

Watson Labs., Inc., 874 F.3d 1316, 1327 (Fed. Cir. 2017); *see also Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) (“[I]t’s not necessary to show that a combination is the *best* option.”).

Regardless, Patent Owner’s proposal is not a suitable alternative. As described in the previous section, placing Fells’ proximity detector outside the magnetic field of its wireless power supply fails to offer detection within the magnetic field of the charger – the area where the presence of foreign objects is most concerning. *Supra* 7-11. And Dr. Horenstein admits that this will result in false positives – the detection of foreign objects that do not encroach into the magnetic field. Ex. 2005 ¶45. It will also result in false negatives – devices wanting to be charged that Fells’ system fails to detect – which Dr. Horenstein conceded “would be a problem.” Horenstein Dep. 81:21-82:11; Allen Supp. ¶¶38-39, 52-53.

III. Ground 2: Fells and Cook Render Obvious Claims 2-7, 9-10, and 16

The Petition explained that Fells and Cook render obvious claims 2-7, 9-10, and 16. Pet. 32-60. Patent Owner disputes two limitations, relating only to claims 4-6 and 16. Both are wrong.

A. Claims 4-6: “health and/or status check of the wireless energy transfer source”

The Petition identifies two features of Fells, each of which constitutes a “health and/or status check of the wireless energy transfer source,” and either of which is sufficient for obviousness: 1) a “sense circuit calibration” check, and 2) a

status check of the energy storage element. Pet. 52-53 (incorporating Pet. 40-42 discussing similar Element 16[a]).

1. Sense circuit calibration

Patent Owner argues that “the sense circuit calibration is specific to the embodiment shown and described with respect to FIG. 2,” and therefore “Fells does not disclose that its proximity detector carries out the sense circuit calibration.” POR 39-40. That is not correct. Figure 2 of Fells “shows a wireless power supply 200 of one embodiment of the invention” including a “[s]ense [c]ircuit 206” that “detects when an object is placed in (or removed from) the proximity of the [w]ireless power supply 200.” Fells [0191]. The Figure 2 embodiment, as Patent Owner does not dispute, “performs a calibration inductance measurement,” also referred to as a “sense circuit calibration.” Fells [0194]-[0196], Fig. 3. Thus, Figure 2 on its face includes both a device that detects “when an object is placed in (or removed from) the proximity of the wireless power supply,” and also the sense circuit calibration. Allen Supp. ¶¶56-57.

Fells' Figure 40 is merely a variant of Figure 2: “FIG. 40 shows an embodiment of FIG. 2 using a proximity sensor.” Fells [0182]. As Fells explains, in this variant of Figure 2 the “sense circuit ... acts as a proximity detector” which can “detect that a device or foreign object has been placed in the vicinity of the wireless power supply.” Fells [0288]. Fells is clear that this proximity detector

remains a “sense circuit,” and Figure 40 remains “an embodiment of FIG. 2,” and therefore a POSA would understand that the proximity detector example performs all of the functionality described with respect to Figure 2, including the sense circuit calibration, and thus discloses every element of claims 4-6. Allen Supp. ¶¶58-60. Dr. Horenstein conceded at his deposition that “paragraph 193 and the surrounding paragraphs through 196” – which describe the sense circuit calibration – “are also applicable to the Figure 40 embodiment of Fells.” Horenstein Dep. 46:22-47:2.

2. Status check of energy storage elements

Patent Owner does *not* repeat its argument regarding Figure 40 for the Petition's second proposal, in which Fells teaches a “health and/or status check of the wireless energy transfer source” in the form of a status check of the energy storage element. POR 41-44. Instead, Patent Owner argues that “[t]his check ... does not directly relate to the health and/or status of the resonator itself.” POR 42.

Patent Owner misunderstands the claim language. None of claims 4-6 require a health or status check that “directly relate[s] to ... *the resonator* itself.” See '184 Patent cls. 4-6. Instead, they claim “a health and/or status check of the *wireless energy transfer source*.” '184 Patent cl. 4. The claim term “wireless energy source” is undisputedly broader than just the resonator. Allen Supp. ¶¶61-62, 66; Horenstein Dep. 96:18-97:2.

Patent Owner does not dispute that Fells' status check of the energy storage element is, at least, a "check [that] ensures that the sense circuit can properly function" and a "check of the energy storage element's energy level." POR 42. It also does not dispute that the sense circuit and the energy storage element are part of Fells' wireless power supply. Horenstein Dep. 19:22-20:22. Accordingly, because the Petition explained that the claimed "wireless energy transfer source" corresponds to Fells' entire "wireless power supply 200," this check is a "health and/or status check of the wireless energy transfer source." Pet. 10; Ex. 1003 ¶102-111; Allen Supp. ¶62.

Although irrelevant to the outcome given the above, Patent Owner's argument that Fells' energy storage check is not a check of the resonator because Fells "expressly does not allow its energy storage element to fully deplete" is incorrect. POR 43. Although "[i]n one embodiment, the MPU ... ensures that its power supply is not depleted" by "recharg[ing]," other embodiments have a "battery that needs replacing." Fells [0203]; *see also id.* [0191] (describing recharging as "[o]ptional[]"); Fells [0201] ("energy storage element" may need to be "recharged or replaced"). Indeed, Fells expressly considers the scenario where "the Energy Storage element 1604 is depleted," such that "the system temporarily does not use the Sense Circuit 206." Fells [0262].

B. Claim 16: “health and/or status check of a source resonator”

With respect to claim 16, the Petition again explains that Fells teaches two different features that constitute a “health and/or status check of a source resonator”: 1) a “sense circuit calibration,” and 2) a status check of the energy storage element. Pet. 40-42.

1. Sense circuit calibration

Patent Owner argues that the sense circuit calibration performed by Fells is not a “status check of the source resonator” because it is not “a test to verify the functioning status of that source resonator.” POR 45.

Patent Owner is incorrect. As the Petition explains, the “sense circuit calibration” is a check of the health and/or status of the resonator because it requires not just “perform[ing] a calibration inductance measurement,” but “mak[ing] sure that the calibration measurement is a valid one and not a rogue measurement,” in order to ensure that incoming devices will be properly detected and charged by the resonator. Pet. 40-41; Fells [0196]; Ex. 1003 ¶188. It is this “sense circuit calibration” that allows the system to continue to detect incoming objects, which in turn leads to closing the switch to provide power to the wireless power supply, including the resonator. Fells [0191], [0196], Fig. 3; Allen Supp. ¶63. In other words, as Patent Owner admits, this check determines whether the sense circuit is

functional, without which the resonator is not ready to operate. POR 48; Allen Supp. ¶63.

Moreover, Fells explains that in some embodiments, this calibration check can be performed by the resonator itself (i.e. primary coil 212 of the LC tank circuit). Fells [0259]; Allen Supp. ¶¶64; Ex. 2005 ¶108 (agreeing that “the sense circuit ... detects an object by change in inductance across the primary coil”). Thus, when Fells’ system performs the “calibration inductance measurement,” it can do so by measuring the inductance across primary coil Lp 212 – the same coil that forms the resonator. Fells [0196]; Allen Supp. ¶64. In this manner, too, a POSA would understand that the “sense circuit calibration” is a status check of the resonator, in that it uses the resonator to set a baseline inductance measurement and determine if devices are present. Fells [0196]; Allen Supp. ¶64.

Patent Owner’s demand that the claimed check “verify the functioning status of the source resonator” is contradicted by the ’184 Patent, which describes no such thing. The *only* explanation of a health and/or safety check in the ’184 Patent is that “[l]ow-power diagnostic tests can be performed without the vehicle present to check the health and status of the charging station.” ’184 Patent 11:42-45. And such “diagnostic testing” is performed, in the only example given, by “a dielectric sensor,” not by the resonator. ’184 Patent 10:50-55. Thus, there is no support for

interpreting “health and/or status check of a source resonator” to require “verify[ing] the functioning status of the source resonator.”

2. Status check of energy storage elements

Patent Owner contends that a “check of the energy level in the energy storage element” does not constitute a health and/or status check of the source resonator. POR 48. That is incorrect. As the Petition explained, checking that the energy storage element is not fully depleted provides the health and/or status of the resonator because if the energy storage element is depleted, the sense circuit will be unable to function, and thus unable to close the circuit that allows the resonator to function. Pet. 41-42; Ex. 1003 ¶¶195-196. In other words, if the energy storage element is depleted, the “status” of the source resonator is that it is currently unable to be turned on to charge devices. Allen Supp. ¶¶65-67.

Patent Owner does not dispute this functionality. It concedes that “a check of the energy storage element’s energy level ... ensures that the sense circuit can be potentially triggered,” and “the resonator’s ability to deliver power depends on the sense circuit being functional.” POR 48. That chain of causation is dispositive. It is undisputed that the resonator’s status (i.e. its current ability to deliver power) depends on the sense circuit being functional, which is in turn indicated by the status

check of the energy storage element. Thus, the resonator's status is indicated (even if indirectly) by the status check of the energy storage element.³ Allen Supp. ¶67.

IV. Ground 3: Fells and Ono Render Obvious Claim 12

The Petition explained that Fells and Ono render obvious “the foreign object debris detection system is integrated into the enclosure” in two ways. First, Fells depicts the claimed components within a dotted line block, which Fells explains indicates that the components are “integrated.” Pet. 61-63. Alternatively, it would have been obvious to place Fells' components within a single integrated enclosure, as taught in Ono. Pet. 61-63.

Patent Owner disputes that Fells' dotted lines indicate an integrated enclosure, but its only evidence is the say-so of Dr. Horenstein and a reference to Figure 7. Patent Owner contends that Figure 7 refers has a “ULP circuit” and a “main circuit,” and refers to the latter as a “circuit board.” POR 53. That does not alter a POSA's understanding that Fells' dotted lines indicate an integrated enclosure. The main circuit on a circuit board and the separate ULP circuit can be – and are shown in

³ For this reason, Patent Owner's hypertechnical contention that “the sense circuit does not ‘turn on’ or ‘activate’ the resonator” because of intervening switches, POR 43, is irrelevant. The parties agree that “the resonator's ability to deliver power depends on the sense circuit being functional.” POR 48.

Figure 7 to be – in two separate enclosures connected by wires. Fells [0206], Fig. 7; Allen Supp. ¶¶68-70.

Patent Owner further contends that the claim language “integrated into the enclosure” requires not just that the recited components be within the same enclosure, but that “the foreign object debris detection system is *united with the enclosure to form a functioning or unified whole.*” POR 55 (emphasis added). That is not correct. In the context of the '184 patent, a POSA would have understood the claim language to use the other definition of “integrate” from Patent Owner’s dictionary: “to unite with something else” or “to incorporate into a larger unit.” Ex. 2014 at 4; Allen Supp. ¶¶71-74. That is, the foreign object debris system is “incorporate[d] into,” and thereby “unite[d] with,” some portion of the wireless energy transfer source within the same enclosure. Allen Supp. ¶74.

The '184 Patent specification confirms Petitioner’s understanding: a “FOD detector system (not shown) can be integrated into the system in a variety of places,” including being “integrated ... into the housings or enclosures of the source resonator and the like.” '184 Patent 11:4-10; Allen Supp. ¶73. That is what Fells and Ono render obvious: integration of the foreign object detection system by placing it within the same housing that encompasses the source resonator. Pet. 61-63. Other portions of the specification similarly confirm that “integrating” refers to placing a component within a particular physical enclosure or space. '184 Patent

4:24-28 (“increasing a resonator size may not be practical owing to the ... desire to integrate a resonator into a system of a specified volume”); Allen Supp. ¶73.

No other interpretation is reasonable. Patent Owner does not offer any explanation of what it means for a foreign object detection system to be “united with the enclosure to form a functioning or unified whole,” nor does Patent Owner cite to any portion of the ’184 Patent as even purportedly supporting its interpretation. At his deposition, Dr. Horenstein testified that the claim requires “the sensors would actually have to be molded into the plastic housing of the resonator.” Horenstein Dep. 116:14-117:17. That is not how a POSA would understand the term, nor does the ’184 patent describe any such thing. Allen Supp. ¶¶71-75.

Lastly Patent Owner contends that under *CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000), the phrase “integrated into the enclosure” must mean something other than “an enclosure housing” the recited components. POR 54-55. *CAE Screenplates* does not support Patent Owner’s construction, for three reasons. First, the phrase “wherein the foreign object debris detection system is integrated into the enclosure” already means something other than merely within an enclosure: it means incorporated into the same larger enclosure that already houses the wireless energy transfer source. ’184 Patent cl. 1. Second, *CAE Screenplates* states that claim terms are presumed to have different meaning only “absent[] ... evidence to the contrary.” 224 F.3d at

1317. Here, there is evidence to the contrary: the '184 Patent specification whose only relevant usage of the term “integrate” aligns with Petitioner's interpretation. '184 Patent 4:24-28, 11:4-10; Allen Supp. ¶73. Third, like all canons of claim construction, this rule does not apply when the result would be nonsensical. *See ERBE Elektromedizin GmbH v. Canady Tech. LLC*, 629 F.3d 1278, 1286 (Fed. Cir. 2010) (“[N]o canon of claim construction is absolute in its application.”). That would be case here, as Patent Owner's construction is unintelligible to a POSA and injects requirements not supported by the specification. Allen Supp. ¶¶71-75.

V. Conclusion

The Board should find each challenged claim obvious for the reasons set forth above and in the Petition.

Respectfully submitted,

Dated: January 27, 2025

By: / David A. Zucker /

David A. Zucker (Reg. No. 74,095)
david.zucker@lw.com
Latham & Watkins LLP
555 Eleventh Street, NW, Ste. 1000
Washington, D.C. 20004-1304
Telephone: 202.637.2200
Fax: 202.637.2201

*Counsel for Petitioner
InductEV, Inc.*

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I hereby certify that this Petitioner's Reply complies with the word count limitation of 37 C.F.R. § 42.24(c)(1) because it contains 5,596 words using Microsoft Word's counting feature, excluding the cover page, signature block, and the parts of the Petitioner's Reply exempted by 37 C.F.R. § 42.24(c).

By: / David A. Zucker /

David A. Zucker (Reg. No. 74,095)
david.zucker@lw.com
Latham & Watkins LLP
555 Eleventh Street, NW, Ste. 1000
Washington, D.C. 20004-1304
Telephone: 202.637.2200
Fax: 202.637.2201

*Counsel for Petitioner
InductEV, Inc.*

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 27th day of January, 2025, a true and correct copy of the foregoing **Petitioner's Reply and all Exhibits** were served by electronic mail on Patent Owner's lead and backup counsel at the following email addresses:

Lance A. Lawson, P.E. (Reg. No. 44,862)
Andrew T. Spence (Reg. No. 45,699)
Burr & Forman LLP
One South at the Plaza, Suite 2610
101 S. Tryon Street
Charlotte, North Carolina 28280
Tel.: 704.347.6475
llawson@burr.com
aspence@burr.com
ip-docket@burr.com

Ryan M. Corbett (Reg. No. 63,724)
Burr & Forman LLP
201 North Franklin Street, Suite 3200
Tampa, FL 33602
Tel.: 813.221.2626
rcorbett@burr.com

Misha Hill (Reg. No. 59,737)
57 Water Street
Watertown, MA 02472
Tel.: 617.926.2700
misha.hill@witricity.com

By: / David A. Zucker /

David A. Zucker (Reg. No. 74,095)
david.zucker@lw.com
Latham & Watkins LLP

555 Eleventh Street, NW, Ste. 1000
Washington, DC 20004-1304
Telephone: 202.637.2200
Fax: 202.637.2201

Counsel for Petitioner
InductEV, Inc.