

Filed on behalf of: InductEV, Inc.

Entered: March 28, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INDUCTEV, INC.,
Petitioner,

v.

WITRICITY CORPORATION,
Patent Owner.

Case IPR2024-00140
Patent 8,466,654

**PETITIONER'S REPLY TO
PATENT OWNER'S PRELIMINARY RESPONSE**

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Exhibit List

Ex.	Description
1001	U.S. Patent No. 8,466,654 B2 (“’654 patent”)
1002	File History for U.S. Patent No. 8,466,654 B2 (“’654 FH”)
1003	Declaration of Mark Allen in Support of Petition for <i>Inter Partes</i> Review (“Allen Decl.”)
1004	Curriculum Vitae of Mark Allen (“Allen CV”)
1005	U.S. Patent No. 5,617,003 (“Odachi”)
1006	U.S. Patent No. 7,952,322 B2 (“Partovi”)
1007	U.S. Patent No. 5,669,470 (“Ross”)
1008	Chwei-Sen Wang, <i>Design Considerations for Inductively Coupled Power Transfer Systems</i> (2004) (Ph.D. dissertation, University of Auckland) (“Wang”)
1009	U.S. Patent No. 5,821,638 (“Boys-638”)
1010	Declaration of Ingrid Hsieh-Yee in Support of Petition for <i>Inter Partes</i> Review (“Hsieh-Yee Decl.”)
1011	U.S. Patent No. 5,573,090 (“Ross-090”)
1012	U.S. Patent No. 9,774,086 B2 (“Cook-086”)
1013	U.S. Patent Application Publication No. 2010/0231163 A1 (“Mashinsky”)
1014	Malik Elsammany Elbuluk, <i>Resonant Converters: Topologies, Dynamic Modeling and Control</i> (Sept. 22, 1986) (D.Sc. dissertation, Massachusetts Institute of Technology) (“Elbuluk”)
1015	U.S. Patent No. 8,159,183 B2 (“Choi”)
1016	U.S. Patent Application Publication No. 2007/0182367 A1 (“Partovi App.”)

1017	O.H. Stielau & G.A. Covic, <i>Design of Loosely Coupled Inductive Power Transfer Systems</i> , Proceedings of the PowerCon 2000 International Conference on Power System Technology, vol. 1 (Dec. 2000), 85-90 (“Stielau”)
1018	RESERVED
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	RESERVED
1023	RESERVED
1024	Excerpts from James W. Nilsson & Susan A. Riedel, <i>Electrical Circuits</i> (8th ed. 2008) (“Nilsson”)
1025	Chwei-Sen Wang, et al., <i>Investigating an LCL Load Resonant Inverter for Inductive Power Transfer Applications</i> , IEEE Transactions on Power Electronics, vol. 19, no. 4 (IEEE, July 2004), 995-1002 (“Wang-IEEE”)
1026	<i>Horizontal</i> , Collins English Dictionary, https://www.collinsdictionary.com/us/dictionary/english/horizontal (last visited Nov. 3, 2023)
1027	<i>Horizontal</i> , Cambridge English Dictionary, https://dictionary.cambridge.org/us/dictionary/english/horizontal (last visited Nov. 3, 2023)
1028	<i>Horizontal</i> , The Britannica Dictionary, https://www.britannica.com/dictionary/horizontal (last visited Nov. 3, 2023)

1029	Email from Board to Counsel Authorizing Unopposed Request for Reply in IPR2024-00105, IPR2024-00140 (Mar. 14, 2024)
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Pursuant to the Board's authorizing email (Ex. 1029), Petitioner respectfully submits this reply to Patent Owner's Preliminary Response ("POPR") to confirm that institution is warranted. For Ground 1, Patent Owner's sole argument against institution relies on overly narrow constructions of "transmitting antenna" and "receiving antenna" that are not supported by, and in fact contrary to, both the specification of the '654 patent and Patent Owner's own submitted evidence. Regardless, Odachi discloses both antennas even under Patent Owner's incorrect constructions. For Ground 2, Patent Owner incorrectly contends that the Petition combines a "parking embodiment" of Ross, and a "separate embodiment" for "being driven down the road." POPR 2. In fact, the relevant passages describe one single embodiment that functions both while "being driven ... and even when the vehicle is stopped." Ross (Ex. 1007) 12:33-13:32.

I. Ground 1: Odachi Teaches Transmitting and Receiving Antennas

The Petition showed—and Patent Owner does not dispute—that Odachi discloses the claimed "transmitting antenna" and "receiving antenna" under their plain meanings, *i.e.* an antenna that transmits energy, and an antenna that receives energy. *E.g.* Pet. 7-8, 11-13, Allen Decl. (Ex. 1003) ¶¶58-59, 103-105. Thus, if the Board properly rejects Patent Owner's narrow and unsupported constructions, Patent Owner has no remaining arguments against institution. Regardless, Odachi discloses the claimed antennas even under Patent Owner's incorrect constructions.

First, Patent Owner's narrow constructions of "transmitting antenna" and "receiving antenna" (POPR 10) are unsupported. Patent Owner does not contend there has been lexicography or disclaimer, and Patent Owner's constructions are not rooted in either the specification or the prosecution history of the '654 patent. For example, Patent Owner construes "transmitting antenna" as "a primary coil that produces a near-field component of flux into free space that is intercepted by a secondary coil to effect resonant inductive coupling" (POPR 10), whereas the specification states only that the "transmit antenna ... provid[es] a means for energy transmission." '654 Patent 2:26-39. Patent Owner's construction of "receiving antenna" as "a secondary coil that intercepts and receives a near-field component of flux in free space that is generated by a primary coil to effect resonant inductive coupling" is similarly unsupported by the specification. '654 Patent 2:26-39 ("receive antenna ... provid[es] a means for energy reception."). Patent Owner's "into free space" requirement is particularly flawed because the specification contradicts it: the purported invention "coupl[es] energy from the near-field of the transmitting antenna to the receiving antenna ... rather than propagating the energy from the transmitting antenna into free space." '654 Patent 3:14-23; *see Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (construction that excludes the preferred embodiment is "rarely, if ever, correct").

Second, Patent Owner's contrived constructions are contrary to its own

admission that “antenna” had a “well understood definition” and was “a well-known technical term.” POPR 8, 10. Patent Owner’s submitted dictionaries confirm that the “well-understood definition” of antenna was not Patent Owner’s litigation-inspired constructions, but rather any “device used for radiating or receiving radio waves” (Ex. 2004) or “device that radiates and/or receives radio waves” (Ex. 2003). Odachi discloses transmitting and receiving antennas under these definitions. Pet. 11-47.

Third, Odachi teaches the claimed antennas even under Patent Owner’s proposed constructions. For example, Odachi discloses a receiving antenna in the form of a “secondary inductive device” comprising “a coil” that “engage[s] with” a “primary inductive device” also comprising a “coil,” thereby “form[ing] a magnetic circuit” that inductively charges a vehicle. Odachi 8:1-48, 12:8-52; Pet. 11-13, Allen Decl. ¶¶103-109, 143-144. During charging, “a space is formed between the primary and secondary coils on both sides.” Odachi 8:40-54, Pet. 22-25. Thus, Odachi matches Patent Owner’s and its expert’s own description: “a transmitting coil may be formed of one coil of wire ... and a receiving antenna may be formed of another coil of wire ... with the coils separated by air.” POPR 8-9.

Patent Owner is left with the contention that Odachi’s coils are not transmitting or receiving antennas because they include a “magnetic core.” POPR 12-14. But nothing in the ’654 patent, or even in Patent Owner’s construction, prevents two inductively coupled coils comprising magnetic cores from serving as

transmitting and receiving antennas. To the contrary, the '654 patent expressly states that the invention may use “‘magnetic’ antenna[s]” with a “ferrite core[s].” '654 Patent 2:59-66. Patent Owner's attempt to exclude Odachi as not transmitting “flux into free space” (POPR 14) is similarly contradicted by its own explanation that, even with magnetic cores, “leakage flux ... may be produced by the primary but not be contained in the core,” thus being transmitted into free space. POPR 12-13.

II. Ground 2: Ross Discloses Moving Antenna Based On Coupling

As the Petition explained, Ross discloses moving its receiving antenna from a first alignment position to a second alignment position in response to detecting a degree of coupling at the receiving antenna, in order to improve alignment and coupling. Specifically, after the vehicle is parked such that its vehicle-mounted receiving coil is within “rough tolerance” of the road-embedded transmitting coil, the vehicle-mounted coil assembly moves horizontally to “the optimum lateral position,” which can be determined by “monitoring the change in the amplitude of the inductively received power signal” (i.e. the degree of coupling). Ross 12:33-62, 13:5-32; Pet. 54-56, 64-66; Allen Decl. ¶¶ 206-212, 242-249.

Patent Owner's three arguments to the contrary mischaracterize both Ross and the claim language. *First*, Patent Owner argues that the Petition “combine[s] embodiments of Ross.” POPR 19. That is untrue. The relied-on portions of Ross are consecutive paragraphs that consistently refer to Ross's “roadway-powered electric

vehicle” (RPEV) described and shown in Figs. 1-2. Ross 12:33-13:32; *see also* Figs. 1-2, 6:53-56 (explaining that Fig. 2 is a “more detailed block diagram” of the same RPEV). These passages neither refer to separate “embodiments,” nor otherwise suggest that they describe disparate versions of the invention. Contrary to Patent Owner’s argument that Ross uses a different embodiment when “driven” than when “parking,” POPR 2, 19, Ross monitors the inductively received power signal both when “being driven” and “even when the vehicle is stopped” or parked. Ross 13:15-32; Pet. 48-56; *see also* Ross 12:32-62 (both “driving” and “loading/unloading”).

Second, Patent Owner argues that Ross’s alignment “us[es] vehicle sensors 60, not a signal based on any detected degree of coupling.” POPR 20. This too is incorrect. Ross “monitor[s] the change in the amplitude of the inductively received power signal” (i.e., the degree of coupling), and does so “instead of using the sensors 60, or in combination with the sensors 60.” Ross 13:15-32 (emphases added).

Third, Patent Owner argues that Ross does not disclose “that the receiver/transmitter antenna is moved into a first position responsive to the detected degree of coupling.” POPR 19. That is not required by the claims. Claims 8 and 13 each recite moving an antenna from a first position to a second position based on a degree of coupling, for improved alignment. But no claim requires that an antenna be moved “into a first position” based on a detected degree of coupling. *See* ’654 Patent cls. 8-13. Patent Owner’s argument misreads the claim language.

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 28th day of March, 2024, a true and correct copy of the foregoing **Petitioner's Reply to Patent Owner's Preliminary Response and Exhibit 1029** were served by electronic mail on Patent Owner's lead and backup counsel at the following email addresses:

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