NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

WITRICITY CORP.,
Appellant

v.

INDUCTEV INC.,
Appellee

2023-1916

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2021-01165.

Decided: April 16, 2025

DANIEL GEORGE VIVARELLI, JR., Butzel Long, PC, Washington, DC, argued for appellant. Also represented by AARON KAMLAY.

DAVID ZUCKER, Latham & Watkins LLP, Washington, DC, argued for appellee. Also represented by GABRIEL K. BELL, MAXIMILIAN A. GRANT, INGE A. OSMAN; JEFFREY G. HOMRIG, Austin, TX.

Before DYK, CHEN, and CUNNINGHAM, *Circuit Judges*.

CUNNINGHAM, *Circuit Judge*.

WiTricity Corp. ("WiTricity") appeals from a final written decision by the Patent Trial and Appeal Board in an *inter partes* review of U.S. Patent No. 7,741,734. *InductEV Inc. v. WiTricity Corp.*, No. IPR2021-01165, 2023 WL 2607675 (P.T.A.B. Mar. 6, 2023) ("*Decision*"). The Board found claims 1–7, 13, 19–22, 25–26, 29–30, 33–34, 37–38, 41–42, 45–46, 49–50, 53–54, 57–62, 64–65, and 67–70 of the '734 patent (collectively, the "challenged claims") unpatentable under 35 U.S.C. § 103. *Id.* at *31–32. For the reasons below, we *affirm* the Board's decision.

I. BACKGROUND

The '734 patent is titled "Wireless Non-Radiative Energy Transfer." The patent was filed on July 5, 2006, and claims a priority date of July 12, 2005. '734 patent col. 1 ll. 4–8. The '734 patent is generally directed at "method[s] of transferring electromagnetic energy" and "electromagnetic energy transfer system[s]." *Id.* col. 11 ll. 39–58, col. 11 l. 65 to col. 12 l. 18. Independent claims 1 and 6, from which the rest of the challenged claims ultimately depend, are illustrative and recite:

> 1. A method of transferring electromagnetic energy comprising:
>
> providing a first electromagnetic resonator structure receiving energy from an external power supply, said first resonator structure having a first mode with a resonant frequency ω_1, an intrinsic loss rate Γ_1, and a first Q-factor $Q_1=\omega_1/(2\Gamma_1)$,
>
> providing a second electromagnetic resonator structure being positioned distal from said first resonator structure and not electrically wired to the first resonator

structure, said second resonator structure having a second mode with a resonant frequency ω_2, an intrinsic loss rate Γ_2, and a second Q-factor $Q_2=\omega_2/(2\Gamma_2)$,

transferring electromagnetic energy from said first resonator structure to said second resonator structure over a distance D that is smaller than each of the resonant wavelengths λ_1 and λ_2 corresponding to the resonant frequencies ω_1 and ω_2, respectively,

wherein the electromagnetic resonator structures are designed to have $Q_1>100$ and $Q_2>100$.

6. An electromagnetic energy transfer system comprising:

a first electromagnetic resonator structure receiving energy from an external power supply, said first resonator structure having a first mode with a resonant frequency ω_1, an intrinsic loss rate Γ_1, and a first Q-factor $Q_1=\omega_1/(2\Gamma_1)$,

a second electromagnetic resonator structure being positioned distal from said first resonator structure and not electrically wired to the first resonator structure, said second resonator structure having a second 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 said first resonator transfers electromagnetic energy to said second resonator over a distance D that is smaller than

> each of the resonant wavelengths λ_1 and λ_2 corresponding to the resonant frequencies ω_1 and ω_2, respectively,
>
> *wherein the electromagnetic resonator structures are designed to have $Q_1>100$ and $Q_2>100$.*

Id. col. 11 ll. 39–58, col. 11 l. 65 to col. 12 l. 18 (emphases added); J.A. 92–94 ('734 patent, Certificates of Correction). Claims 2–5, 20–22, 25–26, 29–30, 33–34, 37–38, 58, 61–62, 67, and 69 directly or indirectly depend from claim 1. *See* '734 patent col. 11 l. 39 to col. 14 l. 49. Claims 7, 13, 19, 41–42, 45–46, 49–50, 53–54, 57, 59–60, 64–65, 68, and 70 directly or indirectly depend from claim 6. *Id.* col. 11 l. 65 to col. 14 l. 52.

On June 21, 2021, InductEV Inc. ("InductEV")[1] filed the IPR petition underlying this appeal, challenging claims 1–7, 13, 19–22, 25–26, 29–30, 33–34, 37–38, 41–42, 45–46, 49–50, 53–54, 57–61, 64, and 67–70 of the '734 patent as obvious over Stark[2] (ground 1) and claims 61–62, 64, and 65 of the '734 patent as obvious over either Stark alone or the combination of Stark and Mecke[3]

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[1] Appellee changed its name from Momentum Dynamics Corporation to InductEV Inc. during the course of the underlying proceedings. *See Decision* at n.1; J.A. 97. For simplicity, we refer to Appellee as InductEV throughout this opinion.

[2] Joseph C. Stark, III, *Wireless Power Transmission Utilizing a Phased Array of Tesla Coils* (2004) (M. Eng. thesis, Massachusetts Institute of Technology), J.A. 1557–8579 ("Stark").

[3] R. Mecke & C. Rathge, *High Frequency Resonant Inverter for Contactless Energy Transmission over Large*

(ground 2).[4] J.A. 113, 118, 181. The Board initially denied institution of the IPR on December 10, 2021. J.A. 236–61. However, the Board later granted a request for rehearing and instituted the IPR on March 16, 2022. J.A. 287–302. On March 6, 2023, the Board issued its Final Written Decision concluding that InductEV had shown by a preponderance of the evidence that all challenged claims were unpatentable as obvious over either Stark alone or the combination of Stark and Mecke. *Decision* at *1, *31–32.

WiTricity timely appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

II. STANDARD OF REVIEW

"We review the Board's legal conclusions de novo and its fact findings for substantial evidence." *Game & Tech. Co. v. Wargaming Grp. Ltd.*, 942 F.3d 1343, 1348 (Fed. Cir. 2019). "Whether a claimed invention is unpatentable as obvious is a question of law that is reviewed de novo, based on underlying findings of fact reviewed for substantial evidence." *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015). "Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016).

"Substantial evidence means such relevant evidence as a reasonable mind might accept as adequate to support

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Air Gap, 2004 IEEE 35TH ANNUAL POWER ELECS. SPECIALIST CONF. (June 20, 2004) ("Mecke"), *see Decision* at *2; J.A. 109.

[4] Grounds 1 and 2 of the IPR petition both allege that claims 61 and 64 are unpatentable under 35 U.S.C. § 103 over Stark.

a conclusion." *FanDuel, Inc. v. Interactive Games LLC*, 966 F.3d 1334, 1343 (Fed. Cir. 2020) (internal quotation marks and citation omitted). "The substantial evidence standard . . . involves examination of the record as a whole, taking into account evidence that both justifies and detracts from an agency's decision." *OSI Pharms., LLC v. Apotex Inc.*, 939 F.3d 1375, 1381 (Fed. Cir. 2019) (internal quotation marks and citation omitted).

"Decisions related to compliance with the Board's procedures are reviewed for an abuse of discretion." *Ericsson Inc. v. Intell. Ventures I LLC*, 901 F.3d 1374, 1379 (Fed. Cir. 2018). "An abuse of discretion is found if the decision: (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact finding; or (4) involves a record that contains no evidence on which the Board could rationally base its decision." *Bilstad v. Wakalopulos*, 386 F.3d 1116, 1121 (Fed. Cir. 2004) (internal quotation marks and citations omitted).

III. DISCUSSION

On appeal, WiTricity argues that the Board erred by finding the challenged claims obvious over Stark. Appellant's Br. 13–30. WiTricity also contends that the Board erred by determining that WiTricity's sur-reply raised a new argument and declining to consider this new argument. *Id.* at 31–41. We find both arguments unpersuasive.

A.

WiTricity challenges the Board's obviousness determination, focusing on the Board's findings based on Stark. *See* Appellant's Br. 13–30. Specifically, WiTricity argues that the Board erred in finding that an ordinarily skilled artisan would have been motivated to modify the prototype system described in Stark to utilize Q-values greater than 100, as required by the claims at issue. *See, e.g.*, *id.*

at 13–14; Oral Arg. 1:01–40, https://oralarguments.cafc.uscourts.gov/default.aspx?fl=23-1916_12022024.mp3. We disagree.

Stark is a master's thesis that generally "discusses the theory and design of coupled resonant systems and how they can be linked in a phased array for the wireless transmission of electrical power." J.A. 1559. Chapters one through six of Stark cover the underlying theory behind coupled resonant systems and include discussion of simulations of hypothetical circuits. *See generally* J.A. 1567–700. In chapters seven and eight, Stark then goes on to describe a prototype circuit built by the author and to compare experimental test data from the prototype with the earlier-discussed theoretical models. *See generally* J.A. 1701–76.

In concluding that an ordinarily skilled artisan would have been motivated to modify Stark's prototype circuit to utilize Q-values greater than 100, the Board identified Figures 3-9 and 4-3 of Stark as disclosing "Q_1=Q_2=1,000" and "the benefits of having high Q values," respectively. *Decision* at *17 (referring to J.A. 1609 (Figure 3-9); J.A. 1657 (Figure 4-3) (disclosing that higher Q-values correspond to improved energy transfer efficiency)); *see also id.* at *8–9, *14–16. The Board relied on Stark's explanation that "[t]here is no fundamental limit to the unloaded energy transfer efficiency save for constraints on the quality factors and the coupling coefficient." *Id.* at *17 (quoting J.A. 1657) (alteration in original); *see also id.* at *9, *15. The Board further stated that chapter five of Stark instructs that "[u]sing the results of the previous chapters, it is now possible to design a coupled resonant system." *Id.* at *8 (quoting J.A. 1665) (alteration in original); *see also id.* at *17.

The Board also credited the testimony of Dr. Young, InductEV's expert, that an ordinarily skilled artisan would have been able to use the formulas disclosed in

Stark to select hardware components to achieve a circuit with Q-values of 1,000. *Id.* at *9 (citing J.A. 1295–99 ¶¶ 195–98); *see also* J.A. 9371–72 ¶¶ 24–25. Dr. Young further testified that ordinarily skilled artisans have known for decades that high Q-values from ten thousand to the order of a hundred thousand were attainable. J.A. 1227–30 ¶¶ 82–84 (explaining that a 1955 article called "The Story of Q," *see* J.A. 2009–22, disclosed "cavity resonators" as being able to operate with Q-values up to 10,000); *see also* J.A. 1779 (discussing cavity resonators). Dr. Young and Dr. Toliyat, WiTricity's expert, also both agreed that ordinarily skilled artisans commonly use simulations to predict real circuit behavior. *See* J.A. 9259 at 122:10–23; J.A. 9370–71 ¶ 23.

The portions of Stark cited by the Board and the testimony of the parties' experts suffice as substantial evidence to support the Board's conclusion that an ordinarily skilled artisan would have been motivated to modify the prototype system described in Stark to utilize Q-values greater than 100. We do not agree with WiTricity's assertion that the Board improperly cherry-picked sections of Stark in performing its analysis. Appellant's Br. 15 (quoting *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 448 (Fed. Cir. 1986)). Rather, the Board's thorough discussion demonstrates that it considered the relevant sections of Stark in reaching its conclusion. *See, e.g., Decision* at *4–20; *see also Novartis AG v. Torrent Pharms. Ltd.*, 853 F.3d 1316, 1328 (Fed. Cir. 2017) ("[F]ailure to explicitly discuss every issue or every piece of evidence does not alone establish that the tribunal did not consider it."). WiTricity also provides no expert testimony to support its proposed reading of Stark. *See* Oral Arg. 2:45–6:41; Appellant's Reply Br. 9–10.

At bottom, WiTricity disagrees with the Board's reasonable interpretation of Stark's disclosure. However, "it

is not for us to second-guess the Board's assessment of the evidence." *Velander v. Garner*, 348 F.3d 1359, 1378 (Fed. Cir. 2003). In sum, we conclude that substantial evidence supports the Board's obviousness determination.

B.

WiTricity argues that the Board abused its discretion by declining to address its sur-reply argument that "increasing the number of beats could render the output of the Stark Tesla coils 'useless.'" Appellant's Br. 31–32 (quoting J.A. 511–12); *see Decision* at *19. Contrary to the Board's determination, WiTricity argues that this argument was not a new argument raised for the first time in the sur-reply, but merely "clarified and elaborated" on arguments in its patent owner's response. Appellant's Br. 32. WiTricity also contends that its sur-reply argument merely responded to the InductEV's petitioner's reply argument that "increasing Q was a suitable option for increasing efficiency." Appellant's Br. 36 (quoting J.A. 474) (cleaned up). We disagree.

In its patent owner's response, WiTricity argued that "increasing the Q values to, for example, 1000, . . . would alter the voltage waveform of the prototype circuit by drastically increasing the number of beats in the waveform" and that "[t]here is no teaching in Stark that it would be desirable to alter the waveform of the prototype circuit in this way." J.A. 383; *see* Appellant's Br. 33. By contrast, WiTricity argued in its sur-reply that "increasing Q_1 and Q_2 . . . in Stark's prototype circuit to values in the 'hundreds or thousands' . . . . will produce voltage waveforms having many 'beats,' which renders 'useless' the output of the Stark Tesla coils, according to Stark." J.A. 511–12 (emphases omitted); *see* Appellant's Br. 34.

The Board reasonably understood WiTricity's sur-reply as raising a new theory of patentability, as opposed to merely responding to arguments in InductEV's petitioner's reply or expanding WiTricity's patent owners'

response position. *See, e.g.*, *Rembrandt Diagnostics, LP v. Alere, Inc.*, 76 F.4th 1376, 1383 (Fed. Cir. 2023) ("We have held that in some circumstances the Board acts within its discretion when declining to consider . . . a new theory of patentability raised by patent owner in sur-reply."). "A sur-reply may only respond to arguments raised in the corresponding reply . . . ." 37 C.F.R. § 42.23(b); *see ParkerVision, Inc. v. Vidal*, 88 F.4th 969, 980–81 (Fed. Cir. 2023) (holding the Board did not abuse its direction in excluding ParkerVision's sur-reply arguments "because they proceeded in a 'new direction' relative to ParkerVision's patent owner's response"). In short, a sur-reply "may be proper if it is responsive and simply expands on previously raised arguments." *Rembrandt,* 76 F.4th at 1384. Comparing the positions in WiTricity's patent owner's response and sur-reply, it is evident that WiTricity changed its posture from arguing that Stark provides no teachings regarding the desirability of altering the circuit's waveform by increasing Q-values to asserting that Stark affirmatively teaches away from altering the waveform in this manner. *Compare* J.A. 383 *with* J.A. 511–12. Accordingly, we conclude that the Board did not abuse its discretion by declining to consider WiTricity's new sur-reply argument.

Even if we were to consider WiTricity's sur-reply argument, we agree with the Board that it is unpersuasive. *Decision* at *19. There is substantial evidence to support the Board's conclusion that Q-values greater than 100 would not render the prototype circuit's output useless. *See, e.g.*, J.A. 1609 (disclosing Q-values greater than 100); J.A. 1227–30 ¶¶ 82–84 (explaining that Q-values up to the hundreds of thousands have been attainable for decades). WiTricity again directs our attention to various sections of Stark that purportedly support the opposite conclusion. *See, e.g.*, Oral Arg. 13:47–14:24 (referring to J.A. 1586–89, 1763); Appellant's Br. 40–41 (citing J.A. 1586–89, 1645–46). Here too, WiTricity points to no

expert testimony in support of its proposed interpretation. *See* Oral Arg. 9:42–10:20, 12:23–45. WiTricity's argument, at its core, is another improper request for us to depart from the Board's reasonable interpretation of Stark. *See Velander*, 348 F.3d at 1378. Accordingly, we conclude that the Board did not err in its treatment of WiTricity's sur-reply argument.

IV. CONCLUSION

We have considered WiTricity's remaining arguments and find them unpersuasive. We *affirm* the Board's final written decision.

AFFIRMED