

NOTE: This disposition is nonprecedential.

**United States Court of Appeals  
for the Federal Circuit**

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**UNIVERSAL ELECTRONICS, INC.,**  
*Appellant*

v.

**ROKU, INC.,**  
*Appellee*

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2024-1426

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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2022-00943.

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Decided: April 10, 2026

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JAMES J. LUKAS, JR., Greenberg Traurig LLP, Chicago, IL, argued for appellant. Also represented by BENJAMIN GILFORD; MICHAEL NICODEMA, West Palm Beach, FL.

SCOTT ANTHONY MCKEOWN, Wolf, Greenfield & Sacks, PC, Washington, DC, argued for appellee. Also represented by ELIZABETH DIMARCO.

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Before CUNNINGHAM, LINN, and STARK, *Circuit Judges*.

CUNNINGHAM, *Circuit Judge*.

Universal Electronics Inc. (“UEI”) appeals a final written decision of the Patent Trial and Appeal Board (“Board”) in an *inter partes* review brought by Roku, Inc. (“Roku”). The Board determined that claims 1–7, 9–13, 15, and 16 of U.S. Patent No. 10,930,276 (“the ’276 patent”) are unpatentable as obvious.<sup>1</sup> *Roku, Inc. v. Universal Elecs., Inc.*, No. IPR2022-00943, 2023 WL 8242606, at \*17 (P.T.A.B. Nov. 28, 2023) (“*Decision*”). For the reasons below, we *affirm*.

## I. BACKGROUND

Because the parties are familiar with the general background facts of this case, we do not repeat them here. Claim 1 of the ’276 patent recites:

1. A method for controlling a controllable appliance resident in an environment which includes a device adapted to receive speech input, comprising:

using a first sound data captured from the environment in which the device is operating to establish a noise threshold;

receiving at the device a speech input;

using a second sound data captured from the environment in which the device is operating at the time the speech input is received by the device to determine a noise level;

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<sup>1</sup> The Board also determined that claims 8 and 14 of the ’276 patent are not unpatentable as obvious. *Decision* at \*17. Those claims are not at issue in this appeal. See ECF No. 1-2, at 2; Appellant’s Br. 19 (“This [c]ourt should reverse the Board’s obviousness conclusion for each of the claims 1–7, 9–13, and 15–16 of the ’276 patent.”).

determining if the determined noise level is greater than the established noise threshold; and

in direct response to it being determined that the determined noise level is greater than the established noise threshold, causing one or more commands to be automatically issued to the controllable appliance to thereby cause the controllable appliance to transition from a first state having a first volume level to a second state having a second volume level that is less than the first volume level.

'276 patent col. 22 ll. 36–56.

In its final written decision, the Board determined that Roku demonstrated by a preponderance of the evidence that claims 1–7, 9–11, 13, 15, and 16 are unpatentable as obvious over Hart-787,<sup>2</sup> Fu,<sup>3</sup> and Rosenberg,<sup>4</sup> and claim 12 is unpatentable as obvious over Hart-787, Fu, Rosenberg, and Hart-286.<sup>5</sup> *Decision* at \*17.

UEI timely appealed. 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

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<sup>2</sup> U.S. Patent No. 9,251,787 (“Hart-787”).

<sup>3</sup> U.S. Patent App. Pub. No. 2017/0126192 (“Fu”).

<sup>4</sup> U.S. Patent No. 9,509,269 (“Rosenberg”).

<sup>5</sup> U.S. Patent No. 9,466,286 (“Hart-286”).

evidence.” *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015). Whether a person of ordinary skill in the art would have been motivated to combine prior art references is a factual question that we review for substantial evidence. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1378 (Fed. Cir. 2023).

“Substantial evidence means such relevant evidence as a reasonable mind might accept as adequate to support 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).

### III. DISCUSSION

UEI argues that: (1) the Board improperly adopted Roku’s proposed modification to Hart-787 in view of Fu and Rosenberg that was advanced for the first time in Roku’s reply, Appellant’s Br. 27–34; (2) the Board’s finding that a person of ordinary skill in the art would have been motivated to modify Hart-787 and Fu in view of Rosenberg is legally erroneous and not supported by substantial evidence, *id.* at 34–37; and (3) the Board’s finding that a person of ordinary skill in the art would have been motivated to modify Hart-787 in view of Fu is legally erroneous and not supported by substantial evidence, *id.* at 37–43. We address each argument in turn.

#### A.

First, UEI argues that Roku’s proposed modification to Hart-787 in view of Fu and Rosenberg “was not included in Roku’s Petition and [was] advanced for the first time in Roku’s Reply,” and the Board’s adoption of that modification “is not supported by substantial evidence and is in

violation of the APA and 35 U.S.C. § 312.” Appellant’s Br. 27–28. Specifically, UEI argues that Roku’s petition “did not propose using a predetermined/preset threshold in Hart-787 as modified by F[u] and Rosenberg.” *Id.* at 28–29. We disagree.

The Board did not adopt a theory that was raised for the first time in Roku’s reply brief before the Board. Roku’s petition proposed modifying Hart-787 with Fu’s predetermined threshold, J.A. 136–37, and then further modifying the Hart-787 and Fu combination such that the threshold is established using environmental noise level as taught in Rosenberg, J.A. 137–38. Specifically, Roku argued that, although Hart-787 discloses an audio modification engine that “may alter output audio in many ways,” “Hart-787 leaves it to a [person of ordinary skill in the art] to implement an appropriate method of determining when and how to attenuate audio,” J.A. 143–44, and “in the same field of endeavor, F[u] and Rosenberg teach specifically advantageous methods for voice-activated environments.” J.A. 135. In its petition, Roku explained that Fu discloses a “voice-controlled device,” “wherein the device adjusts the audio output of a linked audio-producing device if the captured environmental sounds exceed[] a predetermined threshold.” J.A. 135–36. Roku’s petition further argued that a person of ordinary skill in the art would have found it obvious to modify Hart-787 with Fu’s teaching of adjusting volume based on comparison of a noise level to a predetermined threshold. J.A. 136; J.A. 144. The petition then proposed “*further modify[ing]* the combination of Hart-787 and F[u] to apply a threshold determined according to an environmental noise level, as disclosed by Rosenberg.” J.A. 137–38 (emphasis added). The Board adopted the same reasoning in its decision: “The Petition relies upon a combination of elements of Hart-787 with the predetermined threshold as taught in Fu and with establishing such a threshold based on the operating environment of a device as in Rosenberg.” *Decision* at \*11. Accordingly, we

reject UEI's argument that the Board adopted a modification that was advanced for the first time in Roku's reply.

Additionally, UEI argues that "Hart-787 as modified by F[u] and Rosenberg fails to disclose, teach, or suggest claim 1 of the '276 patent . . . under the theory actually advanced in the Petition" because "the proposed combination fails to perform the claimed method steps in order." Appellant's Br. 32–33. Specifically, UEI argues that Rosenberg's volume threshold is established after the device receives and processes the user's speech input, not before, as claimed. *Id.* at 33–34. But, as the Board explained, the proposed combination is "Fu's teaching of an adjustment unit that compares the volume of the ambient noise received to a predetermined threshold with Rosenberg's teaching that such a threshold may be determined based on the volume of an ambient audio signal." *Decision* at \*11 (cleaned up). Thus, the combination only uses Rosenberg's teaching that a threshold may be set based on volume, while relying on teachings of other prior art for the usage of that threshold. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references."). Accordingly, we see no reversible error in the Board's finding that UEI's argument does not address the proposed combination. *Decision* at \*11; *see also* J.A. 1609 at 57:8–13.

## B.

Second, UEI argues that "the Board's finding that a [person of ordinary skill in the art] would have been motivated to modify Hart-787 and F[u] in view of Rosenberg is legally erroneous and is not supported by substantial evidence because the Board's sole identified rationale for modifying Hart-787 and F[u] in view of Rosenberg has no bearing on, and is inconsistent with, Roku's new, untimely proposed modification to Hart-787 in view of F[u] and

Rosenberg which the Board improperly adopted in the Decision.” Appellant’s Br. 35. We disagree.

Substantial evidence supports the Board’s finding that a person of ordinary skill in the art would have been motivated to combine Rosenberg with Hart-787 and Fu. The Board found that “the record supports a determination that the Rosenberg technique is at least a suitable option for providing [the advantage of adjusting to changing environmental noise levels], and in fact, provides a threshold based on the dynamic operating environment, unlike the preset threshold of Hart-787 and Fu.” *Decision* at \*13 (citing J.A. 137–38, J.A. 148 (Roku’s petition); J.A. 831–32 ¶ 91, J.A. 847 ¶ 108 (declaration from Roku’s expert)). The testimony from Roku’s expert and disclosures of the references support the Board’s finding. Specifically, Roku’s expert opined that “Hart-787 left it to a user to deploy known audio output volume adjustment techniques based upon ambient noise volumes detected in real-time. J.A. 828 ¶ 88. “In the same field of endeavor, F[u] discloses a voice-controlled device . . . with a microphone capturing environmental sounds, wherein the device adjusts the audio output of a wirelessly-linked audio-producing device if the captured environmental sounds exceed[ ] a predetermined threshold.” J.A. 828–29 ¶89 (citing J.A. 935–36 ¶¶ 3, 24, 32; J.A. 938 ¶ 54). Roku’s expert further explained that “[a]djusting output audio when ambient noise is greater (or less) than a predetermined threshold was well-known in the art, and a person of ordinary skill in the art would have understood that such a method of determining when to attenuate the volume of output audio advantageously allows a user to set a threshold at a preferable point . . . according to what the user desires, or a threshold advantageous for the environment in which the device is operating.” J.A. 830 ¶ 90. Accordingly, Roku’s expert opined that a “person of ordinary skill in the art would have been motivated to further modify the combination of Hart-787 and F[u] to apply a threshold determined

according to an environmental noise level . . . as disclosed by Rosenberg.” J.A. 831 ¶ 91; *see also* J.A. 958 col. 14 ll. 28–30 (Rosenberg teaching a method “wherein the volume threshold is determined based on the volume of the ambient auto signal.”). Therefore, the Board’s motivation to modify Hart-787 and Fu in view of Rosenberg is supported by substantial evidence.

### C.

Third, UEI argues that the Board legally erred with respect to the motivation to modify Hart-787 in view of Fu because the Board did not explain why a person of ordinary skill in the art would have picked out Fu’s technique to improve the signal-to-noise ratio (“SNR”) to replace Hart-787’s techniques, Appellant’s Br. 40. Moreover, UEI contends that the Board’s finding that a person of ordinary skill in the art would have been motivated to modify Hart-787 in view of Fu is not supported by substantial evidence because Fu’s technique actually decreases the SNR. *Id.* at 42.

Contrary to UEI’s argument, the Board did not commit reversible error in finding a motivation to combine Hart-787 and Fu. “Our caselaw is clear. It’s not necessary to show that a combination is ‘the best option, [but] only that it be a suitable option.’” *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021) (emphasis omitted) (quoting *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014)). Specifically, the Board explained that Roku demonstrated by a preponderance of the evidence that Fu’s “technique to improve the SNR by adjusting volume based on an environmental noise threshold” was a “suitable option to replace the techniques in Hart-787.” *Decision* at \*13. In other words, the Board articulated a reason why a person of ordinary skill in the art would be motivated to combine these prior art references.

In addition, the Board did not err in relying on our precedent in *Intel Corp. v. PACT XPP Schweiz AG*,

61 F.4th 1373 (Fed. Cir. 2023). *See Decision* at \*12. UEI argues that “[h]ere, unlike the petition in *Intel*, the Board’s decision and Roku’s Petition contain no evidence or analysis demonstrating that both Hart-787 and F[u] addressed the same known problem.” Appellant’s Br. 41. UEI misreads our precedent. *Intel* does not require that each piece of prior art in an asserted combination must be directed to the same known problem but acknowledges that there is a motivation to combine when there is a known technique addressing a known problem and using prior art elements based on their established functions. *Intel*, 61 F.4th at 1379. *Intel* further reiterates the well-known principle that “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 1379 (quoting *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007)) (cleaned up).

Roku’s expert characterized the problem as “[e]nvironmental noise[, which] is . . . undesirable because it may interfere with a user’s enjoyment of audio produced by a device such as a television.” J.A. 776 ¶ 47. Roku’s expert and Roku’s petition explained that Fu discloses this problem, and in view of Fu’s “teaching of adjusting the volume of audio output based upon the volume level of environmental noise with thresholds, a [person of ordinary skill in the art] would have been motivated and found it obvious to modify Hart-787’s device to include automatically adjusting the audio output volume of a wirelessly-linked audio producing device” when the ambient noise level is above a threshold. J.A. 136; J.A. 829 ¶ 89 (quoting J.A. 935 ¶ 3). In other words, Roku’s expert and petition explained that there was a known problem; Fu helped to address that problem; and combining the teachings of Fu and Hart-787 was not beyond the skill of a person of ordinary skill in the art. *See Intel*, 61 F.4th at 1381. Because the Board correctly relied on our precedent in *Intel*, we see no legal error in the Board’s analysis. *See Decision* at \*12 (“That [two

prior art references] address the same problem and that [one of the references] was a known way to address that problem is precisely the reason that there's a motivation to combine under *KSR* and our precedent.” (alteration in original) (quoting *Intel*, 61 F.4th at 1380–81)).

Furthermore, substantial evidence supports the Board's finding that Fu's technique to improve SNR is a suitable option to replace the techniques in Hart-787. *Decision* at \*13. The Board relied on Roku's petition, where Roku argued that “Hart-787 left it to a user to deploy known audio output volume adjustment techniques based upon ambient noise volumes detected in real-time,” and that a person of ordinary skill in the art would have used Fu, in the same field of endeavor, in order to “achieve Hart-787's goal of improving the SNR, while not lowering the volume of the wirelessly-linked audio-producing device in a situation where it may be unnecessary to do so.” *Id.* (quoting J.A. 135–36). Roku's expert declaration and the disclosures in Fu support these findings. *See, e.g.*, J.A. 814 ¶ 81; J.A. 826–30 ¶¶ 88–89; J.A. 840–44 ¶¶ 101–06; J.A. 935–36 ¶¶ 3, 24, 32; J.A. 938 ¶ 54. Therefore, the Board's finding that a person of ordinary skill in the art would have been motivated to modify Hart-787 in view of Fu is supported by substantial evidence.

#### IV. CONCLUSION

We have considered UEI's remaining arguments and find them unpersuasive. For the above reasons, we *affirm*.

**AFFIRMED**