NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

ST CASE1TECH, LLC,
Appellant

v.

JOHN A. SQUIRES, UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE,
Intervenor

2023-2387

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2022-00253.

Decided: February 18, 2026

TIMOTHY DEVLIN, Devlin Law Firm LLC, Wilmington, DE, for appellant. Also represented by ANDREW PETER DEMARCO, ROBERT J. GAJARSA, JASON MITCHELL SHAPIRO.

OMAR FAROOQ AMIN, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, for

intervenor. Also represented by PETER J. AYERS, MAI-TRANG DUC DANG.

Before REYNA, TARANTO, and STARK, *Circuit Judges*.

STARK, *Circuit judge*.

Appellant ST Case1Tech, LLC ("ST1") appeals from a final written decision ("FWD") of the Patent Trial and Appeal Board ("Board") in an *inter partes* review ("IPR") of its U.S. Patent No. 9,491,542 (the "'542 patent"), which found claims 1-9 and 11-18 unpatentable as obvious. As to ST1's request that we vacate the Board's decision with respect to claims 11 and 12, which the petitioners, Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. (together, "Samsung"),[1] did not petition to invalidate, relief is unopposed, and we grant it. In all other respects we affirm the Board.

I

ST1 is the owner of the '542 patent, entitled "Automatic Sound Pass-Through Method and System for Earphones." J.A. 93. The '542 patent aims to address a problem associated with the use of sound isolating earphones: that "user[s] may be acoustically detached from their local sound environment[s]," which may negatively impact their ability to "communicat[e] with people in [their] immediate environment." J.A. 101 at 1:33-36. To solve this problem, the patent discloses an earphone device with: (1) an ambient sound microphone that captures environmental sound; (2) a signal processing system that receives an audio

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[1] Although Samsung filed a response brief and cross appealed, ECF Nos. 1, 23, it later withdrew its participation, ECF No. 37. The Director of the United States Patent and Trademark Office intervened, adopting Samsung's brief. ECF No. 40.

content signal from a remote device; and (3) the ability to detect voice activity by analyzing microphone signals to determine when the user is speaking. *Id.* at 1:53-67.

When the system detects that the user is speaking, it turns up the volume (or "gain") of the ambient sound signal (i.e., sound from the user's surroundings picked up by the earphone's microphone), turns down the volume ("gain") of the audio content signal (i.e., audio content, such as music, from a remote device), and then combines the two signals into one signal that plays through a small speaker in the user's ear. *Id.* at 1:60-67. Claims 1-6 and 13-21 further require that when the system subsequently detects that the user has stopped speaking, it retains the same settings for a set time. *See id.* at 11:56-58, 13:22-25.

Claim 1 is reproduced below (with emphasis added to the disputed claim term):

> A method for passing ambient sound to an earphone device configured to be inserted in an ear canal of a user, the method comprising the steps of:
>
> [1a] capturing the ambient sound from an ambient sound microphone (ASM) proximate to the earphone device to form an ASM signal;
>
> [1b] receiving an audio content (AC) signal from a remote device;
>
> [1c] detecting voice activity of the user of the earphone device;
>
> [1d] mixing the ASM signal and the AC signal to form a mixed signal, such that, in the mixed signal, an ASM gain of the ASM signal is increased and an AC gain of the AC signal is decreased when the voice activity is detected;

> [1e] *detecting a cessation of the voice activity*;
>
> [1f] delaying modification of the ASM gain and the AC gain for a predetermined time period responsive to the detected cessation of the voice activity; and
>
> [1g] directing the mixed signal to an ear canal receiver (ECR) of the earphone device.

J.A. 106 at 11:42-60 (internal bracketed numbering added).

Claims 7-9 recite a similar method but add that the system must first smooth (i.e., average) the ambient sound signal over time, compare that smoothed level to a set threshold, and treat sound levels above that threshold as voice activity. When voice activity is detected, the signal adjustment behavior described above is triggered; that is, the ambient sound signal is increased and the audio content signal is decreased.

ST1 sued Samsung for infringement of the '542 patent. Samsung then petitioned for IPR and the Board instituted. In its petition, Samsung alleged that claims 1-10 and 13-20 of the '542 patent are invalid due to obviousness based on (as relevant to this appeal) three prior art references: U.S. Patent App. Pub. No. 2007/0189544 ("Rosenberg"), U.S. Patent App. Pub. No. 2011/0096939 ("Ichimura"), and U.S. Patent App. Pub. No. 2011/0264447 ("Visser").

Rosenberg, "Ambient Sound Responsive Media Player," discloses "adjusting an output of a media player" through "processing the ambient audio signal to determine whether one or more characteristic forms are present within the ambient audio signal." J.A. 605. If such characteristic forms are present, the disclosed system "reduc[es] an output of [the] media player from a first volume to a second volume." *Id.* Some characteristic forms Rosenberg detects are the voice of the user of the media player,

an alarm, or a siren. Rosenberg further discloses maintaining the reduced output of the media player so "long as the first user's voice continues to be identified without a time gap of more than some threshold amount of time." J.A. 612 at ¶ 51. Rosenberg notes that "[t]he threshold is generally set such that if the first user speaks at a typical speaking pace, the volume reduction will be maintained until the first user finishes talking." *Id.*

Ichimura, "Reproducing Device, Headphone and Reproducing Method," discloses a headphone system "configured to detect that the headphone [wearer] has started or finished talking with [a] person depending on whether the headphone [wearer] speaks to the person." J.A. 617; J.A. 630 at ¶ 93. Once the system has identified that the person wearing the headphone is speaking, the system shifts into a talking mode. When the person has stopped speaking for a fixed period, the system switches back into listening mode.

Visser, "Systems, Methods, and Apparatus for Speech Feature Detection," discloses "detect[ion of] a transition in a voice activity state" of an audio signal, based on changes in the signal. J.A. 686; J.A. 694 at ¶ 124. Its techniques involve the analysis of "segments of an audio signal that carry speech information." J.A. 688 at ¶ 75. In one embodiment, Visser's system performs "a temporal smoothing operation." J.A. 698 at ¶ 163.

The Board found that Samsung had shown by a preponderance of the evidence that claims 1-6 of the '542 patent are obvious in view of Rosenberg in combination with Ichimura. It further found claims 7-9 obvious based on Rosenberg in combination with Visser. It ruled claims 13-20 were obvious based on Rosenberg in combination with Ichimura, Visser, and another reference not pertinent to this appeal. The FWD also declared claims 11 and 12 unpatentable, though it identified no reason for this conclusion.

ST1 timely appealed. We have jurisdiction under 35 U.S.C. § 141(c) and 28 U.S.C. § 1295(a)(4)(A).

II

We review the Board's legal determinations *de novo*. *See In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004). We review the Board's factual findings for substantial evidence. *See Acceleration Bay, LLC v. Activision Blizzard, Inc.*, 908 F.3d 765, 769 (Fed. Cir. 2018). Substantial evidence "means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951) (internal quotation marks and citation omitted).

"Claim construction is a question of law with underlying questions of fact." *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1278 (Fed. Cir. 2017). Where "the intrinsic record fully governs the proper construction of a term," our review is *de novo*. *Id.* Obviousness is a legal question based on underlying factual findings. *See In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). "The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact." *Id.*

III

A

ST1 first alleges error in the Board's construction of the claim term "detecting a cessation of the voice activity" (the "cessation limitation"), step [1e], as used in independent claims 1 and 13. ST1 proposes that the cessation limitation should be construed to mean "detecting an end of speech," which "does not encompass momentary pauses within speech," i.e, "word gaps." J.A. 6-7 (discussing exemplary word gaps). The Board rejected ST1's proposal and instead sided with Samsung, concluding that the cessation limitation "is broad enough to also encompass detecting the end

of a word within a sentence or conversation." J.A. 13-14. We agree with the Board.

The claim language supports the Board's construction. As the Board observed, claim 1 recites "detecting *voice activity* of the user of the earphone device" and then "detecting a cessation of *the voice activity*." J.A. 14 (quoting J.A. 106 at 11:50, 11:55) (emphasis added). The patent describes "voice activity" as occurring when a microphone signal, such as the ASM microphone signal, is greater than a threshold value. Thus, as the Board concluded, "'detecting a cessation of the voice activity' refers to detecting that the ASM . . . microphone signal level has fallen below the threshold value." J.A. 14. Because an ASM microphone signal level may fall below a threshold in between words when a speaker is speaking, it follows that such "word gaps" are included within "cessation of voice activity."

The specification provides further support. In Figure 7, for example, once voice activity is detected, a "VAD [Voice Activity Detection] timer" begins counting up to a value referred to as $T_{initial}$, and when the system later detects that voice activity has ceased, the timer counts back down; only when it reaches zero do the modified signals revert to their original levels. The specification explains that in "exemplary embodiments," such as the one depicted in Figure 7, the "time period of the . . . delay" (i.e., $T_{initial}$) may be proportional to a period of continuous user voice activity before cessation and may be bounded above by a set period of time. J.A. 102 at 3:63-67; *see also* J.A. 105 at 10:51-57. As the Board explained:

> the switching of the VAD status to an "off" state when the user stops speaking corresponds to the claimed "detecting a cessation of the voice activity" (limitation 1[e]) and the decrementing of the VAD timer before reverting the AC and ASM gains to their original values corresponds to the claimed "delaying modification of the ASM gain and the AC

> gain for a predetermined time period responsive to the detected cessation of the voice activity" (limitation 1[f]).

J.A. 20. The specification teaches that, in exemplary embodiments, when the ASM signal level is greater than a given threshold (i.e., when "voice activity" is detected), the VAD "may be set to an on state. Otherwise[,] the VAD may be set to an off state." J.A. 102 at 4:14-21. This further supports that, when the ASM signal drops below a threshold such that voice activity is no longer detected, the VAD timer is started. This understanding of the claims supports the Board's construction, as the VAD timer itself would alleviate ST1's concern that allowing word gaps to constitute "cessations" would lead to "too frequent and too abrupt" adjustments, as the timer itself delays any modification and can be set for extended periods. J.A. 105 at 10:51-57, 1173 (Patent Owner Response).

Neither side claims to find support for its position in the prosecution history. And there is no need here to consult the extrinsic evidence, which cannot change the construction compelled by the intrinsic evidence. *See Kara Tech. Inc. v. Stamps.com Inc.*, 582 F.3d 1341, 1348 (Fed. Cir. 2009) ("[E]xtrinsic [evidence] like expert testimony cannot overcome more persuasive intrinsic evidence.").

In opposition to our conclusions, ST1 argues that the Board's construction is so broad that it undermines the very purpose of the invention. *See generally Sequoia Tech., LLC v. Dell, Inc*, 66 F.4th 1317 (Fed. Cir. 2023) ("[A] patent's express purpose of the invention informs the proper construction of claim terms.") (internal quotation marks and citation omitted). The patent describes the invention as a hands-free way to let the earphone user maintain situational awareness by automatically increasing the level of ambient sound and decreasing the level of audio content a user is listening to when speaking, and then restoring those levels after the

conversation ends, without the user having to manually alter the volume. ST1 asserts that if "cessation of the voice activity" is broad enough to cover ordinary pauses between words, the system would repeatedly and rapidly change the relative loudness of ambient sound and audio content during the user's utterances, a result at odds with the patent's express goal of supporting natural, continuous communication while preserving awareness of the local sound environment.

This argument is unpersuasive because, as the Board correctly found, and as we have discussed, another claim limitation, 1[f], addresses this concern. We agree with the Board's analysis on this point: "The concept of determining whether gains should be reverted to their original values is addressed not by step 1[e] ["detecting a cessation of the voice activity"], but rather by step 1[f], which recites 'delaying modification of the ASM gain and the AC gain for a predetermined period responsive to the detected cessation of the voice activity." J.A. 16. "By using a timer to delay modification of the AC and ASM gains, the system can prevent the gains from reverting to their original values too quickly, because the gains will not revert until the timer expires." J.A. 17.

ST1 also points us to the construction entered in parallel district court litigation, where the parties stipulated to the essentially same construction proposed here by ST1. As the Board rightly noted, it was not obligated to adopt the same construction as the district court, only to give it consideration, which the Board plainly did here. Nor is the Board bound by any disclaimer ST1 may have made in this very IPR proceeding. *See CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1383 (Fed. Cir. 2022) ("To be clear, a disclaimer in an IPR proceeding is binding in later proceedings, whether before the PTO or in court. We hold only that a disclaimer is not binding on the PTO in the very IPR proceedings in which it is made . . . .") (internal citations omitted).

As the claim construction issue is the only challenge ST1 raises to the Board's finding that claims 1-6 and 13-18 are unpatentable, we affirm these determinations of unpatentability.

B

As to claims 7-9, ST1 argues that the Board's finding of a motivation to combine Rosenberg and Visser lacks substantial evidence support because incorporating Visser would disadvantageously impact Rosenberg. We disagree.[2]

The Board, relying on Samsung's expert, found that Rosenberg expressly tells one of ordinary skill in the art that its ambient microphone signal can be subjected to "noise reduction, filtering, and/or other commonly known signal processing steps" before any voice or identity recognition occurs. J.A. at 68-69 (citing J.A. 611 at ¶¶ 44, 45). Visser, in turn, teaches that applying a simple temporal smoothing to a microphone-based gain measure "may help to increase reliability of the onset and/or offset detection" by deemphasizing brief, noisy spikes like a door slam. J.A. 690 at ¶ 90. The Board found that a skilled artisan would treat Visser's smoothing as just one kind of filtering that fits comfortably within Rosenberg's stated framework. The disclosures of Rosenberg and Visser themselves, along with the expert opinion credited by the Board, constitute substantial evidence supporting this motivation to combine.

We therefore affirm the Board's obviousness determination as to claims 7-9.

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[2] The Director argues that ST1 waived this argument by focusing on the purported inoperability of a Rosenberg-Vissar combination below. We do not agree. *See* J.A. 2011-12 (ST1 arguing that disadvantages of combination would "frustrate the purpose of Rosenberg").

C

The Board additionally determined that claims 11 and 12 "have been proven by a preponderance of the evidence to be unpatentable." J.A. 91. The parties agree that claims 11 and 12 were not challenged in Samsung's petition. "[T]he Board may not invalidate patent claims on grounds it identifies *sua sponte* that are not actually raised by the petitioner." *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1011 (Fed. Cir. 2023). Thus, we vacate the Board's invalidity finding as to claims 11 and 12.

IV

We have considered ST1's remaining arguments and find they lack merit. Accordingly, we affirm the Board's finding of invalidity of claims 1-9 and 13-18. We vacate its invalidity finding as to claims 11 and 12.

AFFIRMED-IN-PART AND VACATED-IN-PART

COSTS

Each party to bear its own costs.