UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,

Petitioner,

v.

JAWBONE INNOVATIONS, LLC,

Patent Owner.

Patent No. 8,019,091
Filing Date: September 18, 2003
Issue Date: September 13, 2011

Inventor: Gregory C. Burnett and Eric F. Breitfeller
Title: VOICE ACTIVITY DETECTOR (VAD)-BASED MULTIPLE-MICROPHONE ACOUSTIC NOISE SUPPRESSION

PATENT OWNER'S SUR-REPLY

Case No. IPR2023-01127

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EXHIBIT LIST

Exhibit No.	Description of Document
2001	Joint Motion to Dismiss, *Jawbone Innovations, LLC v. Apple Inc.*, No. 6:21-cv-00984-ADA, Dkt. 110 (W.D. Tex. Dec. 23, 2022)
2002	Declaration of Akbar M. Sayeed, Ph.D.
2003	CV of Akbar M. Sayeed, Ph.D.
2004	Transcript of the Deposition of Richard M. Stern, Ph.D., taken March 26, 2024

I. INTRODUCTION

Petitioner's obviousness arguments all fail because they add the outside sensor that Petitioner's primary reference, Ikeda, is specifically designed to avoid. In seeking to add the sensor, Petitioner ignores Ikeda's disclosure, which is entirely devoted to designing a new circuit that obviates any need for an outside sensor.

Ikeda's disclosure forecloses Petitioner's obviousness arguments in multiple ways. Most critically, a POSITA would not modify Ikeda to remove its unique configuration and thereby defeat the purpose of Ikeda's invention. Indeed, Petitioner's first combination and third combination would replace Ikeda's innovative circuits with the exact hardware Ikeda is designed to avoid. Separately, though similarly, Ikeda teaches away from including any outside sensor.

Moreover, Ikeda's design renders any outside sensor useless. Ikeda is designed so that its filters adapt based on the ratio of signal to noise. All of Petitioner's combinations remove that functionality. Indeed, Petitioner's second combination would result in the system trying to remove air-pressure noise from a non-air-pressure signal (from an accelerometer). The other combinations remove the signal-to-noise functionality entirely. In each case, the resulting device no longer can adapt its filters based on the signal-to-noise ratio.

In its Reply, Petitioner's only proposed motivations to combine are based on the mistaken and unsupported view that the outside sensor would improve Ikeda's

performance in some way. But as explained in detail in the POR, including the sensor would actually render the resulting device's performance worse than an unmodified Ikeda. Petitioner's other supposed motivations are simply irrelevant statements that the sensors were available.

Petitioner further tries to sidestep the problems with its combination by asserting that its nebulous reference to combining the "teachings" of the prior art renders its combination operable. However, Petitioner's expert testified clearly as to the structure of the combinations and explained exactly what teachings were included. Petitioner does not explain what further teachings would be incorporated into the combination. Apparently, Petitioner would simply ignore the portions of the teachings that explain why its combination would not function and keep the rest. The Board should reject Petitioner's redefinition of its combinations.

Accordingly, the Board should issue a Final Written Decision finding all the Challenged Claims not unpatentable.

II. GROUND 1: PETITIONER'S FIRST IKEDA/PUTHUFF COMBINATION

The POR explained in detail that a POSITA would not make Petitioner's first Ikeda/Puthuff combination because the resulting device would destroy Ikeda's basic objective and because Ikeda itself teaches away from including an outside sensor, such as Puthuff's vibration sensor.

The Reply fails to rebut these arguments. Petitioner incorrectly argues that Jawbone analyzed the wrong combination, but Jawbone analyzed the combination exactly as set forth in the Petition and as confirmed by Petitioner's expert. Moreover, Petitioner does not explain how its combination is different from the one Jawbone analyzed.

Petitioner next focuses on teaching away. According to Petitioner, Ikeda only teaches away from a specific type of outside sensor. This is contrary to the Petition itself, which defines "outside" as any "sensor other than the physical microphones." Pet., 21. In any event, Puthuff's sensor suffers from the same problems as the sensor disparaged in Ikeda.

A. Jawbone Addressed Petitioner's Combination as Confirmed by the Petition and Dr. Stern

As the Petition sets out, the first combination simply replaces Ikeda's "signal-to-noise power ratio estimator and [optionally the] step size output circuit" with Puthuff's accelerometer vibration sensor. POR, 14-15; Pet. 32. Petitioner's expert, Dr. Stern, unambiguously confirmed on cross-examination that the first combination used Puthuff's accelerometer 30 in place of boxes 10 and 11 of Ikeda.

> Q. So in your combination that you're proposing here, you would take Puthuff's accelerometer number 30 from Figure 1 of Puthuff and put that in place of boxes 10 and 11 of Ikeda; is that right?
>
> A. That's correct.

Ex. 2004, 34:22-35:4. Dr. Stern further confirmed that no further alterations were made to Ikeda in this combination. *Id.*, 36:3-23. As Dr. Stern explained, "no additional modifications, ***just a straight up replacement***." *Id.* (emphasis added).

Petitioner now argues that Jawbone analyzed the wrong combination, and, confusingly, states that the combination uses Puthuff's "vibration sensor" but also that "the Petition relies on Puthuff's acoustic signal." Reply, 2. According to the Reply, the combination relies on "the bone conduction component of the audio signal, which is an ***acoustic signal***." Reply, 4. Thus, according to Petitioner, "[b]oth of the proposed Ikeda/Puthuff combinations rely on Puthuff's sensor as providing an ***acoustic signal***." Reply, 4. To the extent that Petitioner argues the combination imports more than the accelerometer, it contradicts its own Petition and Dr. Stern's testimony. The Petition explains that:

> A POSITA would have immediately recognized that one could combine the teachings of Ikeda and Puthuff and use ***Puthuff's vibration sensor***[1] either (a) in place of, or (b) in addition to, Ikeda's VAD.

[1] There is no dispute that Puthuff discloses an accelerometer as the vibration sensor. Pet. 30 ("Puthuff discloses . . . ***a 'vibration sensor' such as an 'accelerometer.'***" (emphasis added)).

Pet. 32 (emphasis added). The Petition provides no description of any of Puthuff's teachings that would be incorporated besides the accelerometer, and, unsurprisingly, Petition never characterizes Puthuff's output (or the output of the Puthuff accelerometer) as an acoustic signal. Indeed, even in reply, Petitioner and its expert simply aver that Puthuff generates an acoustic signal without supplying any sort of definition for such a signal or explaining how it affects Jawbone's analysis.

Petitioner cannot have it both ways. Petitioner cannot use a broad scope of "outside" to bolster its obviousness case, but then argue that the same phrase is limited when it comes to analyzing a motivation to combine.

B. Petitioner's Combination Would Destroy Ikeda's Objective to Avoid the Need for an Outside Sensor

The Reply ignores Jawbone's primary argument—lack of motivation to combine. As Jawbone explained, both experts agree that the objective of Ikeda is to create a noise canceller that does not require a command from the outside. POR, 16-20. It is well-established that a POSITA would not create a combination that destroys the objective of the prior art. *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (finding insufficient motivation to combine two references by "substitut[ing] the recessed barbs of [one reference] with the protuberances of [another reference], since [the petitioner's] ***proposed substitution would destroy the basic objective*** of the barbs" (emphasis added)); *ASUSTek Comput. Inc. v. LiTL LLC*,

IPR2024-00532, 2024 WL 2410004, at *9 (P.T.A.B. May 23, 2024) (finding no motivation to combine where combination's hinges lacked features because "[reference] identifies these features as objects of its invention and criticizes prior art hinges that lack these features").

As explained in the POR, the proposed combination would destroy Ikeda's objective of providing a system that does not require a command from the outside. POR, 16-20. Ikeda explains that its advance over the prior art is its unique configuration that adapts filters based on SNR ratios to avoid using an outside sensor. By substituting the estimator and step size circuit for the outside sensor, Petitioner makes the same misstep as the petitioner in *TriVascular*. *TriVascular*, 812 F.3d at 1067-68. There, the prior art's barbs were designed to penetrate a blood vessel wall while the patented invention avoided such penetration. *Id.* at 1066-67. The Federal Circuit explained that a POSITA would not have replaced the penetrating barbs for non-penetrating barbs because that would "destroy the basic objective of the barbs, which is to *penetrate* surrounding tissue." *Id.* at 1068. Here, the objective of Ikeda's circuit is avoiding the need for a command from the outside. POR 16-18. A POSITA would not destroy that objective by removing Ikeda's inventive functionality. *TriVascular*, 812 F.3d at 1067-68; *see also ASUSTek*, 2024 WL 2410004 at *9 (finding no motivation because "Petitioner's proposed modification results in a computer much like the prior art computers Lane criticized,

renders Petitioner's modified computer incapable of fulfilling Lane's objectives, and, indeed, destroys the entire premise of Lane's invention.")

Petitioner does not substantively address this point, or even attempt to distinguish *TriVascular*. Instead, Petitioner simply argues that Ikeda does not teach away from including the sensor. Reply, 2-14. But the argument here[2] is that there is ***no motivation to combine***, not that Ikeda teaches away. POR, 16-20. Even if Ikeda does not reach the standard of teaching away, its statements are still highly relevant to motivation to combine. *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1051 n.15 (Fed. Cir. 2016) (*en banc*) (holding statements that do not teach away are still relevant to motivation).

Accordingly, a POSITA would not make the first Ikeda/Puthuff combination.

C. Petitioner Admits That Puthuff's Sensor Would Not Provide a Benefit to Ikeda

Petitioner admits that Puthuff's sensor cannot detect the presence or absence of noise. Reply, 6-7. That deficiency is exactly why a POSITA would not combine Puthuff with Ikeda. POR, 15-20. Using Puthuff's accelerometer in place of Ikeda's signal-to-noise power ratio estimator and step size circuit would result in a device that could only command the filters based on vibrations, not the relative signal levels. POR, 17; Ex. 2002, ¶ 69. In other words, the resulting combination would

[2] Teaching away is a separate basis to find the claims non-obvious. POR, 20-22.

have no way to measure the noise levels and properly adapt the filters to denoise the signal. Petitioner, even in Reply, does not explain any way that the system could compare the relative signal/noise strengths and, thus, adapt the filters correctly. Reply, 5-9.

Instead, Petitioner simply avers that "Puthuff's sensor can command the filters based on its acoustic signals, by indicating when there is intelligible speech and when other acoustic conditions are met." Reply, 8 (citing Ex. 1021, ¶¶ 3-4). But Puthuff's sensor, even if it detects voice activity, cannot indicate when intelligible speech is received at the microphones because it does not know the relative noise level. POR 17-18. Indeed, Petitioner's combination removes Ikeda's functionality—the estimator—that makes that determination.

The ***only*** contrary evidence Petitioner cites is Dr. Stern's reply testimony at ¶¶ 3-4. But Dr. Stern not only fails to provide evidence that the combination's use of Puthuff can "indicat[e] when there is intelligible speech," he does not even assert that it can. Ex. 1021, ¶¶ 3-4. Dr. Stern simply states, "[t]hus, even at high acoustic noise levels, the signal that is output by Puthuff is 'the bone conduction component of the audio signal,' which is an acoustic signal" (*id.*, ¶ 3), and contradicts his sworn testimony by stating, "[i]nstead of simply incorporating the hardware from Puthuff into Ikeda's system, the proposed combinations combine the teachings from Puthuff and Ikeda, relying on Puthuff's acoustic signal and Ikeda's acoustic system, which

are compatible with each other." *Id.*, ¶ 4; Ex. 2004, 36:21-23 ("just a straight up replacement"). Dr. Stern's conclusory statements are not sufficient evidence to prove non-obviousness. *E.g.*, *In re Magnum Oil Tools Int'l Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) ("[C]onclusory statements cannot satisfy the petitioner's burden of demonstrating obviousness"). Moreover, neither averment solves, or addresses, that the Ikeda/Puthuff combination cannot determine whether the signal received at the first microphone is intelligible speech.

Even taking Dr. Stern's new testimony at face value, the combination must fail. Dr. Stern states that "even at high acoustic noise levels, the signal that is output by Puthuff is 'the bone conduction component of the audio signal.'" Ex. 1021, ¶ 3. Petitioner's combination thus creates the exact problem Jawbone identified in the POR: the lack of any means to determine the relative level of signal and noise. POR, 15-20. Indeed, Petitioner's combination—as described in the Reply—would result in a high level of "signal," even if the ambient noise was overwhelming. Ex. 2002, ¶ 69; *see also id.*, ¶ 102.

D. Petitioner's Combination Is a "Straight Up Replacement" of Ikeda's Circuitry for Puthuff's Accelerometer with No Modifications Necessary

As a side note, Petitioner argues that Jawbone somehow misrepresents its combination as bodily incorporating Puthuff's "vibration signal." Reply, 8-9.

Petitioner's expert was clear: the first Ikeda/Puthuff combination is simply replacing boxes 10 and 11 of Ikeda with Puthuff's accelerometer:

> Q. So in your combination that you're proposing here, you would take
> Puthuff's accelerometer number 30 from Figure 1 of Puthuff and put that in place of boxes 10 and 11 of Ikeda; is that right?
> A. That's correct.

Ex. 2004, 34:22-35:4. Dr. Stern further testified explicitly that the combination required "no additional modifications, ***just a straight up replacement.***" *Id.*, 36:21-23 (emphasis added). Petitioner utterly ignores this testimony and does not explain how "a straight up replacement" can be anything other than what it is: inserting Puthuff's accelerometer, which outputs a vibration signal, into Ikeda.

E. Ikeda Teaches Away from Puthuff's Outside Sensor

Petitioner further argues that Ikeda does not teach away from an outside sensor or, if it does, that the outside sensor it teaches away from is—somehow—different than Puthuff's accelerometer.

Puthuff's accelerometer is exactly the kind of outside sensor that Ikeda teaches against. As Petitioner explained, "Ikeda discloses that one way to control when W1(z) is calculated is by determining from ***'outside,' e.g., using a sensor other than the physical microphones***, whether S(z) is absent." Pet., 21 (emphasis added); POR, 17. Petitioner now suggests that Ikeda was only teaching away from

a specific outside sensor. Reply, 3. Petitioner does not explain what Ikeda's outside sensor is, only that it does not include Puthuff's vibration sensor. *Id.*

Petitioner further argues that Ikeda does not teach away from an outside sensor because it does not "articulate that there are any deficiencies" with those sensors. Reply, 8. No such articulation is required. Instead, the inquiry is whether a POSITA "upon reading the reference . . . would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich., Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999). As explained in the POR, a POSITA reading Ikeda—whose stated purpose is to avoid the need for any outside sensor—would be led away from the '091 Patent's invention. POR, 20-22.

Ikeda's invention is its "unique configuration in which a relation in size between a desired signal, . . . and the noise signal to be canceled is determined. This relation is used to control a step size to be fed to the adaptive filter." Ex. 1003, 9:18-24. All of Ikeda's disclosure is devoted to demonstrating that design. Dr. Stern agreed:

> Q. But I think we agree Ikeda's invention, just looking at Ikeda itself, what Ikeda purports to invent is a system that doesn't need a command from the outside; is that right?
>
> A. Yes, that's indeed the objective, as you pointed out, and it accomplishes that objective and that's a system that provides

> useful functionality in some circumstances but not in all circumstances.

Ex. 2004, 27:14-24.

Petitioner argues that all of Ikeda's disclosure should be put aside because prior art systems included outside sensors. Reply, 8-9. There is no dispute that prior art systems made use of outside sensors. But it does not follow that the existence of those systems or sensors, or the discussion of them within Ikeda, would lead a POSITA to use one with Ikeda. Indeed, Petitioner does not advocate that a POSITA would use the prior art noise cancellers, only that a POSITA would replace portions of Ikeda with an accelerometer.

Petitioner attempts to liken this case to *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1383 (Fed. Cir. 2017) (affirming because substantial evidence supported Board's determination of no teaching away). But there, both references included statements noting the value of the "text descriptions" at issue. Indeed, Finseth, on which Petitioner relies, describes the text descriptions as "cursory," but, as the Federal Circuit noted, also describes the graphical thumbnails of its invention as cursory. *Id.* Finseth further stated that its "cursory" thumbnails "provide a significant amount of information." *Id.* Similarly, the second reference, Hill, noted that text descriptions could be useful. *Id*. Critically, neither reference was built on ***replacing*** the text descriptions, but instead on adding to them. *Id.* at 1381-82.

Here, Ikeda's invention is explicitly to avoid using an outside sensor. A POSITA would not read Ikeda and immediately reverse Ikeda's improvement. *ASUSTek*, 2024 WL 2410004 at *9; *TriVascular*, 812 F.3d at 1068.

F. Petitioner's Stated Motivations Are Insufficient

Petitioner does not substantively address the deficiencies of the Petitioner's suggested motivations to combine. Indeed, Petitioner only proposes one possible motivation—the supposed reduction of false triggering. The remainder of the so-called motivations simply establish the undisputed notion that accelerometers were in the prior art.

First, as explained in the POR, Puthuff and Ikeda do not address the "same problem." Ikeda is a noise canceller. *E.g.*, Ex. 1003, Title, Abstract. Puthuff, conversely, is a "pickup system" that seeks to output a reasonable facsimile of a user's voice. Ex. 1004, Abstract; Ex. 2002, ¶ 78; Ex. 2004, 30:3-9 ("A. Yes, the aim of Puthuff is to generate a signal that approximates the speech under a wide range of acoustic conditions using a combination of sensors."). Neither reference is directed toward detecting voice activity. POR, 22. Petitioner does not address this issue at all. Further, even if the references were directed to solving the same problem—they are not—more is required to motivate a POSITA to combine them.

Second, Petitioner states that Puthuff would reduce false triggering. But Dr. Stern's statements—the only cited evidence—on this issue are related solely to

the second Ikeda/Puthuff combination. Ex. 1021, ¶ 17 ("the ***input signal*** already represents a cleaner signal with effectively reduced noise" (emphasis added)). The Puthuff sensor in the first combination (or the Alcivar sensor in the Ikeda/Alcivar combination) does not affect the input signal, only the adaptation of the filters. Pet., 32 (proposing "a vibration sensor as a VAD in Ikeda's system *instead of* Ikeda's signal-to-noise power ratio estimator for at least the following reasons. . . .").

Third and fourth, Petitioner tacitly admits that the fact that accelerometers were known cannot by itself provide a motivation to combine. Reply, 14.

Finally, Petitioner still provides no basis for using Puthuff's statement regarding "dual microphone systems" as a motivation to combine. Simply stating that the sensor is "useful" in such systems does not provide a motivation for replacing Ikeda's signal-to-noise power ratio estimator with the sensor.

In sum, Petitioner provides no motivation to combine. Its only supposed benefit—reduction in false triggering—does not apply to the first combination because that supposed benefit is only realized if the sensor is applied to the input signal, not in place of the Ikeda circuitry. Ex. 1021, ¶ 17. Every other "motivation" is merely a statement that Puthuff or accelerometers existed in the prior art. POR, 22-24. With no motivation to combine (either individually or as a group), Petitioner's arguments on the first Ikeda/Puthuff combination must fail.

III. GROUND I – SECOND PUTHUFF/IKEDA COMBINATION

The second Ikeda/Puthuff combination uses the output of the Puthuff circuit as the XA(z) input into Ikeda. Pet., 34-36; Ex. 2004, 37:15-39:2.

A. The Board Should Disregard Petitioner's Attempts to Redefine its Combination

As explained in the POR, Petitioner's combination, as described in the Petition and by its expert, would cause signal distortion and be inoperable. Petitioner redefines its combination into some undefined and nebulous amalgam of the two references. But Dr. Stern's testimony set out the combination in clear terms, and Jawbone's arguments are based on that combination.

Dr. Stern testified unequivocally that the second Ikeda/Puthuff combination was merely "dropping" Puthuff's Figure 1 circuit into Ikeda Figure 1:

> Q. Sure. ***For the second combination, you propose taking Puthuff's circuit as shown in Figure 1 and dropping it into Ikeda Figure*** 1 essentially where the letters XA and Z appear, basically where that's pointing; is that right?
>
> A. Looks like as described, we replace the PD microphone channel. The output would be used as the output of the microphone 20. So ***yeah, the PD microphone would be replaced by the signal XA from the first microphone in the Ikeda reference and then everything would proceed as before.***

…

> Q. The ***entire body of Puthuff Figure 1 minus the PD microphone would be incorporated into Figure 1 of Ikeda;*** do I now have it right?
>
> THE WITNESS: ***Yes, that's correct***.

Ex. 2004, 37:15-38:18 (objection omitted) (emphasis added). Dr. Stern further dispelled any doubt by testifying that the output signal 40 from Puthuff would be routed into boxes 8 and 10 of Ikeda. *Id.*, 38:20-39:2.

The POR properly analyzed this combination. POR, 15, 25-26. Petitioner's assertion that Jawbone argued that the second combination "bodily incorporate[s] solely Puthuff's accelerometer signal" is demonstrably false and a strawman. Indeed, Jawbone explicitly stated that "[i]n Petitioner's proposed system, therefore, the signal-to-noise power ratio estimator would receive the 'amplified, faded' signal from the microphone after it is 'combined with the signal from the accelerometer 30 at the adder circuit 38.'" POR, 26.

Accordingly, Jawbone analyzed the correct combination.

B. The Second Combination Would Be Inoperable

Despite Petitioner's attempt at obfuscation above, it does not substantively challenge Jawbone's analysis of how the combination would work. There is no dispute that, in the combination, Ikeda's main signal is "composed of the faded-in and faded-out microphone and accelerometer signals." POR, 26; Reply, 16.

As Patent Owner explained in the POR, inputting this main signal leads to signal distortion. POR, 27-29. In the combination, XA(z) includes noise and signal received from the accelerometer. *Id.* Because the XA(z) signal includes different types of signals, the adaptive filters will adapt to the wrong signal and cause distortion. *Id.*

Petitioner argues that this problem will not occur because "by combining Puthuff's acoustic signal with Ikeda's system, the combination's input is simply a cleaned up acoustic version of itself." Reply, 16. Petitioner's argument is nonsensical and contradicts Puthuff's disclosure. Puthuff explains that bone conduction and air pressure signals have different characteristics. Ex. 1004, 3:7-9; 4:19-24 ("It is only when acoustic noise levels are high that the quality of air pressure microphone detection is degraded enough to make bone conduction a better alternative."); *id.*, 6:11-12 ("Yet another advantage of the [Puthuff] invention derives from the use of the two modalities of sound transfer--namely, air pressure waves and bone conduction."). Thus, the output of Puthuff is not a "cleaned up acoustic version of itself," but a signal with different characteristics than the purely air pressure acoustic signal Ikeda expects. Moreover, the noise characteristics of the signal from Puthuff, being received or generated by the accelerometer, are vastly different from those received at the reference microphone.

Petitioner next argues that the adaptive filters of Ikeda would solve any incompatibilities. Reply, 17-18. Petitioner's own formulation reveals the problem:

> [T]he adaptive filters manipulate the undesirable component in the reference channel that correlates with the undesirable component in the primary channel, so as to cause the output of the adaptive filter to resemble the undesirable component in the primary channel

Reply, 17-18.

But in the combination, the undesirable component in the reference channel (received from an air-pressure microphone) does not correlate with the undesirable component in the primary channel (received from an accelerometer).[3] POR, 28-29. Thus, the "noise" that is later removed in the subtractors is unpredictable in relation to the primary signal and can lead to distortion. *Id.*, 29.

This leads to the problem Dr. Sayeed identified in cases of high ambient noise, where the "noise" removed from the accelerometer signal bears no resemblance to the noise components actually within the signal, causing distortion or, at best, no reduction in noise. *Id.*

[3] At high ambient noise levels, the "the accelerometer signal dominates." Ex. 1004, 12:12-16.

C. Including Puthuff's Sensor Would Not Reduce False Triggering

Petitioner's suggested motivations to combine are discussed above. *See* Section II.F. Petitioner's "false triggering" motivation is inapplicable to the second Ikeda/Puthuff combination; indeed, Petitioner provides no evidence that including Puthuff's vibration sensor into Ikeda would reduce false triggering. Reply, 13-14. Dr. Stern states that false triggering is caused when noise in the system resembles the desired signal. Ex. 1021, ¶ 17. Puthuff explains that it decreases false triggering by avoiding cases where voice-activated applications are mistakenly activated. Ex. 1004, 6:6-10 ("The invention realizes power conservation advantages by for example turning off a radio transmitter in the absence of the user's voice."). Dr. Stern does not provide any reason that such a problem could occur with Ikeda. Ikeda cancels noise by subtracting a filtered XB(z) signal from the XA(z) signal; that subtraction is not controlled by voice. *E.g.*, Ex. 1003, Fig. 1, 5:6-63. False triggering thus cannot occur in Ikeda; if the system registers high noise in the main input signal, it will adapt the filter 3 more rapidly. Ex. 1003, 5:64-6:5. Including Puthuff, however, breaks Ikeda's system and results in unpredictable adaptation—for example, in the case where a user is speaking in an extremely noisy environment, it is not possible to determine how the filters would adapt. *See* Section III.B, *supra*.

Thus, a POSITA would not make the second Ikeda/Puthuff combination.

D. The Second Combination Does Not Disclose or Render Obvious the Transfer Function Limitations

As explained in the POR, the combination does not disclose or render obvious generating transfer functions in response to a determination that voicing activity is absent or present. POR, 30-31. This occurs because the relationship between environmental noise and the SNR for XA(z) and XB(z) is unpredictable. *Id.*

Petitioner spares one sentence on this argument, and mischaracterizes it as "based on PO's incorrect assumption that the combination involves mixed modalities of the two signals." Reply, 18. But there is no dispute that the input into Ikeda is the mixed accelerometer/microphone signal of Puthuff. And, as explained in the POR, at high ambient noise levels, that signal will be "dominate[d]" by the accelerometer signal which does not include ambient noise. Ex. 1004, 12:12-16. In such a case, the filters will update unpredictably. POR, 30.

Moreover, the transfer functions will not be generated based on whether voicing activity is present in the ***acoustic*** signals. While Petitioner characterizes the output of Puthuff as an acoustic signal, it cannot be the acoustic signal of the claims, which must be received from the "at least two acoustic microphones." There is no dispute that the accelerometer is not an acoustic microphone. Thus, even if the Ikeda/Puthuff combination makes such a determination, it is not a determination of whether voicing activity is present (or absent) in the acoustic signals as claimed.

E. The Second Combination Does Not Disclose or Render Obvious Claim 1's "generating a voice activity detection (VAD) signal using the voice activity signal"

As explained in the POR, Ikeda lacks the claimed voice activity signal. Petitioner's Reply argument simply points to Ikeda and Puthuff. As no voice activity signal reaches the Ikeda circuit even in the second Ikeda/Puthuff combination, the combination does not disclose this element.

IV. GROUND 2: IKEDA WITH ALCIVAR

As set out in the POR, the Ikeda/Alcivar combination is simply replacing Ikeda's signal-to-noise power ratio estimator and "optionally" its step size output circuit with Alcivar's tissue-conduction microphone and VAD. POR, 31 (citing Pet., 49-50). Dr. Stern confirmed this understanding:

> Q. So your proposal is to replace boxes 10 and 11 of Figure 1 of Ikeda with components 54, 56, 58, 60, 62 and 68 of Figure 1 of Alcivar?
>
> A. Yes, that's correct.
>
> THE WITNESS: I'm sorry. Also possibly boxes 72 and 74. I need to determine what 72 and 74 actually do.

Ex. 2004, 48:7-19 (objection omitted). Figure 1 of Alcivar shows that these components are associated with the tissue-conduction microphone and Schmitt trigger circuitry:

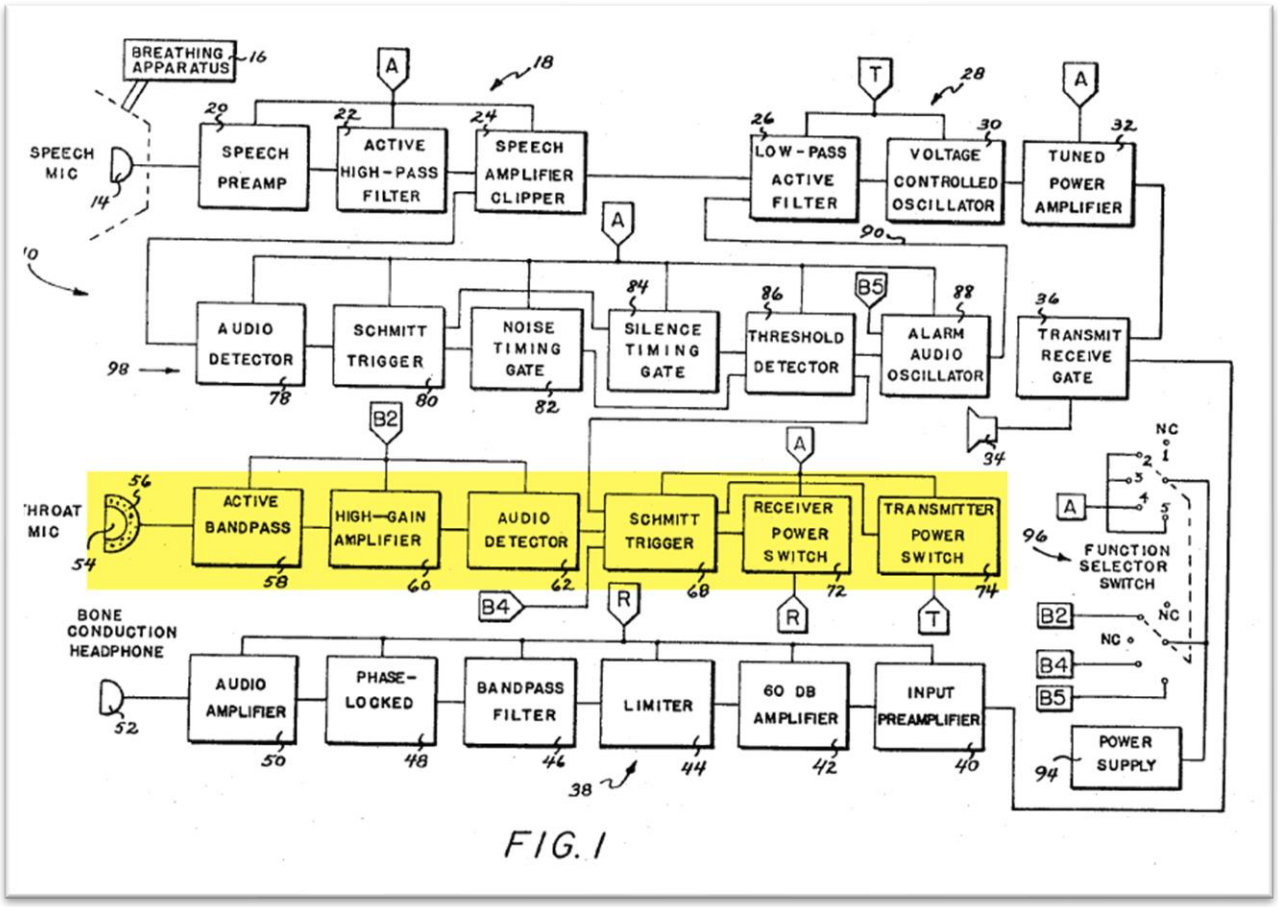

FIG. 1

Ex. 1005, FIG. 1 (highlighting added).

As with Ikeda/Puthuff discussed above, Petitioner attempts to widen its combination beyond that disclosed in the Petition. Reply, 19. But Jawbone's arguments apply even if the combination is merely "us[ing] Alcivar's tissue conduction microphone to determine when a voice signal is present or absent . . ." Reply, 19-20. Petitioner, for example, ignores Alcivar's explanation of the specific requirements for use of the tissue conduction microphone.

The Alcivar tissue conduction microphone requires contact with a user's throat or chest, and further requires insulation. POR, 32. Dr. Stern confirmed the

necessity of physical contact and insulation. Ex. 2004, 50:10-24, 42:19-43:11, 44:19-45:11. Indeed, Dr. Stern specifically recited that element 56—the insulation—would be incorporated into the combination. *Id.*, 48:7-19.

Petitioner now argues that a POSITA would discard the required insulation, apparently because, if not, Petitioner's combination makes little sense. Reply, 20. But there is no evidence that Alcivar's tissue conduction microphone would function properly without the insulation.

A. A POSITA Would Not Include Alcivar's Sensor

As discussed above, and in the POR, a POSITA reading Ikeda's disclosure would not incorporate an outside sensor like Alcivar's tissue conduction microphone. POR, 32-33. Accordingly, a POSITA would not be motivated to make the combination.

B. Ikeda/Alcivar Is Not Useful

As discussed in the POR, the proposed combination would not be useful. Dr. Stern's examples of use cases all involve far-field noise. POR, 33. Petitioner attempts to avoid this reality by i) changing its combination so that it might work with far-field noise; ii) mischaracterizing Ikeda; and iii) attempting to wave away its expert's testimony. The Board should decline to accept any of these arguments.

Petitioner first argues that its combination would not include Alcivar's insulation. Reply, 19-20. But Dr. Stern testified that it would. Ex. 2004, 48:7-19.

Moreover, the Petition is clear that the microphone must be in contact with the user's neck or chest, just as in Alcivar. Pet. 52-53. Insulation would therefore be required to avoid the microphone picking up outside sounds. Further, Petitioner relies on the reverberations from the diving mask for various limitations, which further support the need for insulation to isolate the tissue conduction microphone from outside sounds. Pet., 55.

Next, Petitioner mischaracterizes Ikeda by stating that Ikeda might be used to cancel near-field noise. Reply, 20-21. But Ikeda's design is expressly intended to pick up close-in sounds, such as speech in a headset, while canceling ambient or background noise from the far field. Ex. 1003, 1:3-9 ("The present invention relates to a noise canceler and, more particularly, to a noise canceler for canceling, by use of an adaptive filter, a ***background noise signal*** introduced into a speech signal input via ***a microphone, a handset, or the like***." (emphasis added)). The background noise is in the far-field, while the desired signal is in the near-field. Indeed, if both noise and signal were in the near-field, it would be impossible to determine what to cancel, as both microphones would receive exactly the same inputs. *See, e.g.*, Ex. 1003, Fig. 1; 5:31-63. Indeed, Ikeda relies on the reference microphone receiving noise and speech signals differently than the primary microphone. *See, e.g.*, Ex. 1003, 1:42-65 (explaining that primary microphone is "adjoining speaker's mouth," while reference microphone is "remote from the speaker"); 2:43-51 (signal distortion

caused when reference microphone includes signal as well as noise); 5:31-63. Accordingly, Alcivar's near-field noise cancellation is not relevant to Ikeda.

Finally, Petitioner attempts to wave away Dr. Stern's testimony as to the combination's use cases. Dr. Stern testified that the device would be used for "noisy restaurant[s]," "train station[s]", "airport[s], just talking to a cell phone on the street." Ex. 2004, 51:24-52:7. While Dr. Stern stated that there are "many, many, many use cases," he did not name any such case where the noise would be in the near-field. *Id.*

As there is no actual use for the Ikeda/Alcivar device, a POSITA would not be motivated to make it.

C. Petitioner's Stated Motivations Are Insufficient

As with the Ikeda/Puthuff combinations above, Petitioner fails to substantively address its deficient motivations to combine.

First, the mere existence of both references is not a motivation to combine. It simply means they are available to combine if sufficient motivation is found. *Virtek Vision Int'l., ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 887 (Fed. Cir. 2024).

Second, Petitioner provides no evidence that adding extra hardware (Alcivar's sensor and surrounding circuitry) would be cheaper or simpler. Reply, 21-22. In Reply, Petitioner simply asserts that "combining with Alcivar's microphone would

have saved processing time, energy consumption, and would have provided a simpler circuit." *Id.* But Petitioner only cites Dr. Stern's unsupported testimony; Dr. Stern himself does not cite any evidence that adding Alcivar's microphone saves processing time, recues energy consumption, or makes the circuitry simpler. Ex. 1021, ¶ 25. It is beyond dispute that adding additional hardware would add costs. Ex. 2002, ¶ 122. Petitioner provides no evidence that those costs would be balanced by any savings. *E.g.*, *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (affirming the Board's finding of no motivation to combine where "following [one reference's] method of diverting and cooling the oil in [another reference's] system would introduce 'additional plumbing and complexity'").

Third, Petitioner still provides no evidence that Alcivar's tissue conduction microphone performs well in high noise environments. Petitioner merely cites Dr. Stern, who parrots Petitioner's argument verbatim, without citing further evidence. Reply, 21; Ex. 1021, ¶ 25.

Finally, Petitioner states that vibration sensors were known. As explained above, the existence of a prior art system is not motivation to combine it to reach the patented invention.

In sum, the only proposed motivations Petitioner provides are the unsupported notions that: i) using the sensor would be cheaper or simpler, and ii) the system would perform better in a high-noise environment with the sensor. The remainder

of the motivations are simply meant to establish the undisputed notion that vibration sensors were known. Petitioner has provided no evidence to support its assertion that the sensor would be cheaper, simpler, or more effective. Thus, even considering all the "motivations" together, a POSITA would not be motivated to make the combination.

V. GROUNDS III-V

Grounds III-V fail for the reasons stated above. POR, 36.

VI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board issue a Final Written Decision finding the Challenged Claims not unpatentable.

Respectfully submitted,

Dated: August 26, 2024 By: /*Peter Lambrianakos* /

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned PATENT OWNER'S SUR-REPLY specified in 37 C.F.R. § 42.24 has 5,590 words in compliance with the 5,600 word limit set forth in 37 C.F.R. § 42.24. This word count was prepared using Microsoft Word for Office 365.

Respectfully submitted,

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