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Paper 11
Date: January 19, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY ELECTRONICS INC.,
Petitioner,

v.

JAWBONE INNOVATIONS, LLC,
Patent Owner.

IPR2023-01229
Patent 8,503,691 B2

Before GEORGIANNA W. BRADEN, SHEILA F. McSHANE, and JASON M. REPKO, *Administrative Patent Judges*.

REPKO, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314
Dismissing Motion for Joinder
35 U.S.C. § 315(c); 37 C.F.R. § 42.122

I. INTRODUCTION

Sony Electronics Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 23–28 and 41–46 of U.S. Patent No. 8,503,691 B2 (Ex. 1001, "the '691 patent"). Paper 1 ("Pet." or "Petition"). Jawbone Innovations, LLC ("Patent Owner") filed a Preliminary Response. Paper 10 ("Prelim. Resp.").

To institute an *inter partes* review, we must determine "that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). For the reasons discussed in this Decision, Petitioner has met this standard. Thus, we institute an *inter partes* review.

II. MOTION FOR JOINDER

Petitioner filed a Motion for Joinder (Paper 3), requesting joinder as a petitioner in IPR2023-00561. IPR2023-00561 had been joined to IPR2022-01061. IPR2023-00561, Paper 9 (Granting Motion for Joinder). On August 10, 2023, the Board terminated both IPR2022-01061 and IPR2023-00561. IPR2023-00561, Paper 30. Thus, the Motion for Joinder is dismissed as moot.

III. BACKGROUND

A. Real Parties-in-Interest

Petitioner identifies Sony Electronics Inc., Sony Group Corporation, Sony Corporation, and Sony Corporation of America as the real parties-in-interest. Pet. 77. Patent Owner identifies itself as the sole real party-in-interest. Paper 7, 2 (Patent Owner's Mandatory Notices).

B. Related Matters

The parties identify the following related matters:

- *Jawbone Innovations, LLC v. Google LLC*, No. 6:21-cv-00985-ADA (W.D. Tex.);
- *Jawbone Innovations, LLC v. Sony Electronics Inc.*, No. 2:21-cv-00186 (D.N.J.);
- *Jawbone Innovations, LLC v. Amazon.com*, No. 2:21-cv-00435-JRG (E.D. Tex.);
- *Jawbone Innovations, LLC v. Amazon.com, Inc.*, No. 5:22-cv-06727 (N.D. Cal., transferred from E.D. Tex. on Nov. 1, 2022);
- *Jawbone Innovations, LLC v. Google LLC*, No. 3:23-cv-00466 (N.D. Cal., transferred from W.D. Tex. on Feb. 1, 2023);
- *Jawbone Innovations, LLC v. Meta Platforms, Inc.*, No. 6:23-cv-00158 (W.D. Tex.);
- *Jawbone Innovations, LLC v. ZTE Corporation*, No. 3:23-cv-00082 (E.D. Tex.);
- *Jawbone Innovations, LLC v. Panasonic Holdings Corporation*, No. 2:23-cv-00081 (E.D. Tex.);
- *Jawbone Innovations, LLC v. Guangdong Oppo Mobile Telecommunications Corp., Ltd.*, No. 3:23-cv-00079 (E.D. Tex.);
- *Jawbone Innovations, LLC v. LG Electronics, Inc.*, No. 2:23-cv-00078 (E.D. Tex.);
- *Jawbone Innovations, LLC v. HTC Corporation*, No. 3:23-cv-00077 (E.D. Tex.);

- *Jawbone Innovations, LLC v. Sony Electronics Inc.*, No. 2:23-cv-01161 (D.N.J.) ("the Sony Litigation");
- *Google LLC v. Jawbone Innovations, LLC*, IPR2022-01061 (PTAB June 9, 2022);
- *Google LLC v. Jawbone Innovations, LLC*, IPR2022-01060 (PTAB June 9, 2022);
- *Amazon.com, Inc. v. Jawbone Innovations, LLC*, IPR2023-00561[1] (PTAB Feb. 3, 2023);
- *Amazon.com, Inc. v. Jawbone Innovations, LLC*, IPR2023-00559[2] (PTAB Feb. 3, 2023); and
- *Sony Electronics Inc. v. Jawbone Innovations, LLC*, IPR2023-01229 (PTAB July 24, 2023).

Pet. 77–78; Paper 7, 2–3.

In IPR2023-01228, Petitioner challenges claims 1–22 and 29–40 of the '691 patent, which are the remainder of the claims in the patent not challenged in this proceeding. *See* IPR2023-01228, Paper 1.

[1] Petitioner identifies IPR2022-00561 in which Apple Inc. was the Petitioner. *See* Pet. 78. We list IPR2023-00561 here instead of IPR2022-00561 because Amazon.com, Inc. is the Petitioner in IPR2023-00561, which matches the petitioner's name in the case citation in the Petition. *See id.*

[2] Petitioner identifies IPR2022-00559, which does not involve Amazon.com, Inc. or Jawbone Innovations, LLC. *See* Pet. 78. We list IPR2023-00559 here instead of IPR2022-00559 because Amazon.com, Inc. is the Petitioner in IPR2023-00559, which matches the petitioner's name in the case citation in the Petition. *See id.*

C. Overview of the '691 Patent

The '691 patent relates to noise suppression in a system that uses a dual omnidirectional microphone array (DOMA). Ex. 1001, code (57). According to the patent, conventional microphone systems increase the signal-to-noise ratio (SNR) of speech by steering nulls to the strongest noise source. *Id.* at 4:63–64. The system of the '691 patent, though, uses two virtual microphones, and the DOMA forms only one null, which is used to remove the user's speech from the second virtual microphone. *Id.* at 4:67–5:2. The two virtual microphones have similar noise responses but dissimilar speech responses. *Id.* The first virtual microphone is a virtual directional speech microphone. *Id.* at 5:53–54. The second virtual microphone is a virtual directional noise microphone. *Id.* at 5:55–56. This microphone's spatial response has the null for a user's speech. *Id.* According to the '691 patent, the system's benefits include improvements in the SNR of the desired speech over conventional systems and flexibility in microphone-pattern choice, among other things. *See id.* at 5:2–11.

D. Illustrative Claim

Challenged claims 23, 27, 28, and 41 are independent, claims 24–26 depend directly or indirectly from claim 23, and claims 42–46 depend directly or indirectly from claim 41. Claim 23 is reproduced below.

23. [23P] A microphone array comprising:

[23A] a first virtual microphone formed from a first combination of a first microphone signal and a second microphone signal,

[23B] wherein the first microphone signal is generated by a first omnidirectional microphone and the second microphone signal is generated by a second omnidirectional microphone; and

[23C] a second virtual microphone formed from a second combination of the first microphone signal and the second microphone signal,

[23D] wherein the second combination is different from the first combination;

[23E] wherein the first virtual microphone has a first linear response to speech that is substantially similar across a plurality of frequencies for a speech source within a predetermined angle relative to an axis of the microphone array and devoid of a null, and a first linear response to noise that is devoid of a null,

[23F] wherein the second virtual microphone has a second linear response to speech that has a single null oriented in a direction toward a source of the speech and a second linear response to noise that is devoid of a null,

[23G] wherein the second linear response to noise is substantially similar to the first linear response to noise and the second linear response to speech is substantially dissimilar to the first linear response to speech,

[23H] wherein the speech is human speech.

Ex. 1001, 36:42–37:3 (formatting modified and Petitioner's identification of limitations added); *see* Pet. 11–43.

E. Asserted Challenge to Patentability

The table below summarizes Petitioner's challenges. Pet. 1.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
23–28, 41–46	103(a)[3]	Kanamori,[4] McCowan[5]

Petitioner relies on the declaration of Jeffrey S. Vipperman, Ph.D. *See* Ex. 1003.

IV. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have had "a minimum of a bachelor's degree in computer engineering, computer science, electrical engineering, mechanical engineering, or a similar field, and approximately three years of industry or academic experience in a field related to acoustics, speech recognition, speech detection, or signal processing." Pet. 4 (citing Ex. 1003 ¶ 25). According to Petitioner, "Work experience can substitute for formal education and additional formal education can substitute for work experience." *Id.* at 4–5 (citing Ex. 1003 ¶ 25).

[3] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), amended 35 U.S.C. § 103 effective March 16, 2013. Here, the'691 patent has a filing date earlier than AIA's effective date (Ex. 1001, code (22)), and Petitioner relies on the pre-AIA version of the statute (Pet. 1).

[4] U.S. Patent Application No. 2004/0185804 A1, published Sept. 23, 2004 (Ex. 1005, "Kanamori").

[5] Iain A. McCowan et al., *Near-Field Adaptive Beamformer for Robust Speech Recognition*, Digital Signal Processing, Vol. 12, Number 1 (2002), 87–106 (Ex. 1006, "McCowan").

According to Patent Owner,

> A person of ordinary skill in the art ('POSITA') would have a bachelor's degree in computer engineering, computer science, electrical engineering, mechanical engineering, or a similar field, and approximately three years of industry or academic experience in a field related to acoustics, speech recognition, speech detection, or signal processing. Work experience can substitute for formal education and additional formal education can substitute for work experience.

Prelim. Resp. 15. In Patent Owner's view, this agrees with Petitioner's definition. *Id.* (citing Pet 4–5; Ex. 1003 ¶¶ 24–25).

We see no meaningful differences in the parties' proposed qualifications that would affect our decision here. In this decision, we adopt a definition of one of ordinary skill in the art consistent with the parties' proposals. *See* Pet. 4–5; Prelim. Resp. 15. To the extent that the parties disagree about the level of ordinary skill in the art during trial, they are encouraged to explain how the differences affect the Board's assessment of Petitioner's obviousness analysis.

B. Claim Construction

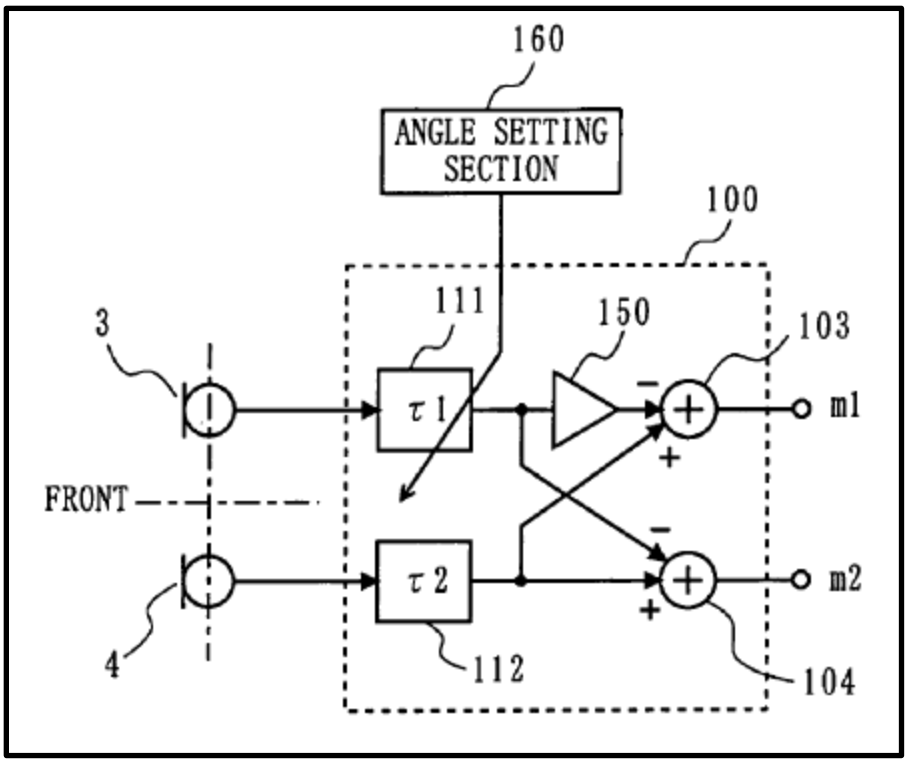
"The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy." *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (quoting *Vivid Techs., Inc. v. Am. Sci. Eng'g, Inc.*, 200 F.3d 795, 803) (Fed. Cir. 1999)). Both parties state that no term needs to be construed at this stage. Pet. 5; Prelim. Resp. 15. We agree.

C. Alleged Obviousness over Kanamori and McCowan

Petitioner asserts that claims 23–28 and 41–46 are unpatentable as obvious over Kanamori and McCowan. Pet. 5–70.

1. Kanamori

Kanamori describes a noise-suppression technique. Ex. 1005 ¶ 2. The technique generates a main signal and a noise-reference signal. *Id.* ¶ 18. To collect these signals, Kanamori uses microphones with the same directivity characteristic. *Id.* ¶ 172. Figure 17A, below, is a diagram showing "Embodiment 8." *Id.* ¶¶ 66, 172.



In Embodiment 8, section 100 constructs main signal m1 and noise-reference signal m2 from microphone units 3 and 4. *Id.* ¶¶ 172–173. This involves delaying microphone unit 4's output by τ2 at signal-delaying section 112, delaying microphone unit 3's output by τ1 at signal-delaying section 111, and multiplying signal-delaying section 111's output by an amplification ratio of 0.85 at signal-amplifying section 150. *Id.* ¶¶ 166, 169, 174. To form main signal m1, signal-subtracting section 103 takes the difference of the output from signal-amplifying section 150 and signal-delaying section 112. *Id.* ¶¶ 166, 174. To form noise-reference signal m2,

signal subtracting section 104 takes the difference of the output from signal delaying section 111 and signal delaying section 112. *Id.*

2. McCowan

McCowan relates to adaptive-noise cancellation for near-field speech using a standard generalized sidelobe canceler (GSC). Ex. 1006, 87.[6] The GSC uses a blocking matrix as its first element. *Id.* at 93. The blocking matrix's purpose is to block the desired signal from the adaptive noise estimate. *Id.* Complete blocking requires aligning the desired signal across all channels. *Id.* To do this, McCowan applies a near-field compensation to the input channels before blocking. *Id.* After near-field compensation, the standard GSC matrix blocks the desired signal from the adaptive path. *Id.*

3. Independent Claim 23

As for claim 23, Petitioner asserts that Kanamori discloses, teaches, suggests, or renders obvious all claim limitations except for [23F] and [23G]. Pet. 11–43. In particular, claim 23 recites, in part,

> [23F] wherein the second virtual microphone has a second linear response to speech that has a single null oriented in a direction toward a source of the speech and a second linear response to noise that is devoid of a null,
>
> [23G] wherein the second linear response to noise is substantially similar to the first linear response to noise and the second linear response to speech is substantially dissimilar to the first linear response to speech . . . .

Ex. 1001, 36:18–26. For limitations [23F] and [23G], Petitioner asserts that it would have been obvious to modify Kanamori's Embodiment 8 (Figure 17A) with McCowan's near-field compensation for near-field speech sources. Pet. 25 (limitation [23F]), 39 (limitation [23G]). According

[6] The citations are to the numbers printed in the upper corners of McCowan rather than the exhibit page numbers added by Petitioner.

to Petition, doing so would result in the second linear response recited in limitation [23F] (*id.* at 25) and "substantially similar linear responses to noise and substantially dissimilar linear responses to speech," as in limitation [23G] (*id.* at 40). Petitioner argues that doing so would allow Kanamori to better suppress noise originating from the same direction as speech (*id.* at 38), which would be beneficial in devices intended to receive near-field speech, such as headsets, among other reasons (*see id.* at 29–38). For the reasons that follow, Petitioner's obviousness rationale is sufficient at this stage. *See id.*

Patent Owner argues that Petitioner does not "identify legitimate motivations" to combine Kanamori and McCowan. Prelim. Resp. 18–23. In Patent Owner's view, "the Petition does not argue that any of [the references disclosing headsets and omnidirectional microphones] would have motivated a POSITA to modify Kanamori to make a headset." *Id.* at 18–19 (citing Pet. 20–21; Ex. 2001 ¶¶ 57–59).

At this stage, we disagree with Patent Owner because "[a] suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art . . . ." *In re Kahn*, 441 F.3d 977, 987–88 (Fed. Cir. 2006). Although "demonstrating a teaching, suggestion, or motivation to combine known elements" by an identification of language in a reference that specifically states a motivation can be a "helpful insight," "[t]he obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19 (2007). Instead, "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 420.

Patent Owner further argues that, instead of a headset, McCowan describes a 40-centimeter-wide, 15-centimeter-deep microphone array that has 11 microphones. Prelim. Resp. 19 (citing Ex. 1006, 94–96; Fig. 5). According to Patent Owner, a headset could not incorporate a microphone array with those dimensions, and Petitioner does not propose modifying Kanamori to create a headset with improved noise suppression at low frequencies, which is McCowan's purpose. *Id.* at 19–20 (citing Ex. 2001 ¶ 61–63; Ex. 1006, 87, 104). Patent Owner, likewise, argues that Kanamori assumes that speech is in the far field, and a person of ordinary skill in the art would recognize that Kanamori's reference to "calling" refers to far-field devices, like a speakerphone. *Id.* at 20–21 (citing Ex. 1005 ¶¶ 151, 159; Ex. 2001 ¶¶ 62–63).

At this stage, we disagree with Patent Owner's argument for two principal reasons.

First, even assuming that the dimensions of Kanamori's and McCowan's devices are not compatible with each other or for use in a headset, it is well settled that "a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements." *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citations omitted); *see also In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (explaining that whether one prior art reference can be physically incorporated into another is "basically irrelevant"); *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973) ("Combining the teachings of references does not involve an ability to combine their specific structures."). Patent Owner's argument assumes that Petitioner's combination requires physical

substitution of the disclosed components without further modification to arrive at a headset. Prelim. Resp. 19–21. A person of ordinary skill in the art, though, is a person of ordinary creativity, not an automaton. *KSR*, 550 U.S. at 421.

Second, although Patent Owner focuses on headsets (Prelim. Resp. 18–21), Petitioner cites a headset as only one example of a device intended to receive near-field speech (*see, e.g.*, Pet. 21, 27, 31). For instance, Petitioner explains that "Kanamori discloses a variety of 'use environments' and 'purposes' for its microphone devices." Pet. 29. According to the Petition, "It would have been obvious to implement Kanamori's microphone device in a device intended to receive near-field speech, *such as* a headset." *Id.* at 27 (citing Ex. 1003 ¶ 82) (emphasis added). That is, creating a headset is not the sole basis for Petitioner's obviousness rationale. *See id.* Rather, Petitioner proposes modifying Kanamori to account for near-field speech applications generally. *See id.*

Petitioner's explanation is sufficient for the Board to institute trial in this case. Specifically, Petitioner asserts that, for speech and noise with far-field origins, Kanamori's microphone device would struggle to differentiate and suppress noise coming from the same direction as the speech. *Id.* at 30 (citing Ex. 1005 ¶ 168; Ex. 1003 ¶ 87). According to the Petition, it would have been obvious to modify Kanamori's noise-reference signal m2 to account for different amplitudes, which may be significant for near-field cases. *Id.* at 31 (citing Ex. 1006, 90; Ex. 1003 ¶ 89). Petitioner's rationale relies upon McCowan to show that it would have been obvious to modify Kanamori's noise-reference signal m2 in those near-field cases. *Id.*

Petitioner's arguments are adequately supported by the record at this stage. Citing Dr. Vipperman's plots of linear-responses to near-field speech,

Petitioner argues that noise-reference signal m2 is relatively sensitive to near-field speech. *Id.* (citing Ex. 1003 ¶ 89). The Petition explains that Kanamori's m2 signal would be a poor noise-reference signal at the distance shown in the plots (0.1 m) because noise suppression is mainly accomplished though directivity combining. *Id.* (citing Ex. 1005 ¶¶ 83, 182). Indeed, Kanamori discloses that "[i]f the target sound enters the second microphone unit 2, detrimental effects, such as distortion or reduction in level, will occur in the processed sound." Ex. 1004 ¶ 83, *quoted in* Pet. 31–32. According to the Petition, McCowan recognizes this problem and teaches a solution that applies near-field compensation via its blocking matrix. Pet. 32–33 (citing Ex. 1006, 88, 87, 90, 91, 93; Ex. 1003 ¶ 90).

Patent Owner disagrees with Petitioner's reasoning about near-field applications and characterizes Kanamori's purpose as "providing noise cancelation *in the far-field*." Prelim. Resp. 21 (emphasis added). In Patent Owner's view, Petitioner's proposed modification defeats this purpose. *Id.* Patent Owner argues that Kanamori's m2 signal is used for denoising speech in the far field and, under Petitioner's combination, m2 is modified to improve denoising in the near field. *Id.* at 22. According to Patent Owner, Petitioner's combination introduces distortion into Kanamori's intended far-field application. *Id.* at 21–22 (citing Pet. 30, 38; Ex. 2001 ¶¶ 67, 68). Patent Owner argues that "either McCowan's status as a near-field device is irrelevant and does not support the combination, or Kanamori's status as a far-field device undermines a motivation to combine to arrive at a near-field device." *Id.* at 22–23 (citing Ex. 2002 ¶ 68).

Petitioner, though, has a different view of Kanamori's objective: "suppressing 'the inclusion of the target sound in the noise reference signal.'" Pet. 37 (citing Ex. 1005 ¶ 83; Ex. 1003 ¶ 93). During trial, the

parties may address the issue of whether Patent Owner is correct that Kanamori's objective is limited to far-field applications. But, at this stage, we find that Petitioner's reliance on a more general objective is adequately supported.

For example, Petitioner explains that Kanamori already discloses techniques for varying the delays. *Id.* at 38–39 (citing Ex. 1005 ¶¶ 175, 180; Figs. 17A, 18A; Ex. 1003 ¶ 101). At this stage and on this record, we agree with Petitioner that this provides "a reasonable expectation that similar techniques could be used to adjust the difference in propagation time to account for different speaker positions." *Id.*; *see also id.* at 35 (citing Ex. 1003 ¶ 96; Ex. 1005 ¶ 175; Ex. 1006, 89–90) (discussing delaying and aligning in time). At this stage, we see no reason on the current record that making these adjustments would impair Kanamori's objective to suppress noise. *See id.* at 37–38; Ex. 1005 ¶ 83; Ex. 1003 ¶ 93. Rather, Petitioner sufficiently explains that the proposed modification would further that objective by suppressing noise when the speaker is at a different distance relative to the microphone. *See* Pet. 38.

Also, Petitioner argues that Kanamori already has a signal-amplifying section and that a similar amplifying section could be added to account for amplitude decay caused by different distances. *Id.* at 39 (citing Ex. 1003 ¶ 101; Ex. 1005 ¶ 169); *see also id.* at 36–37 (citing Ex. 1003 ¶ 97; Ex. 1005 ¶ 169; Ex. 1006, 90, 93–94) (discussing ensuring equal amplitude). Petitioner identifies similarities between Kanamori's signal noise-reference signal and McCowan's technique to generate a noise estimate that completely blocks the desired signal. *Id.* at 39 (citing Ex. 1006, 93; Ex. 1003 ¶ 101). According to the Petition, its proposed modification would add the function of canceling noise originating from the same direction but

at a different distance, and there would be a reasonable expectation of success. *Id.* at 38–39. Thus, we preliminarily determine that Petitioner's characterization of Kanamori's objective and corresponding obviousness rationale are both sufficiently supported for institution. *See id.* at 35–39.

Patent Owner argues that "Kanamori ***already*** allows the cancellation of noise originating from the same direction but at a different distance than the speech" because Kanamori's m2 signal has the null in the far field, where the speech originates, but not the near field. Prelim. Resp. 23–24 (citing Pet. 30–31; Ex. 2001 ¶¶ 74–75). In Patent Owner's view, "Without a null at 0.1m in the speech direction (zero degrees, in [the example in the plots]), Kanamori will cancel noise originating from that same speech direction but at a different distance (here, 0.1m)." *Id* at 24. Patent Owner argues that the Petitioner relies solely on impermissible hindsight in its obviousness rationale. *Id.* (citing 2001 ¶¶ 76–77).

At this stage in the proceeding and on this record, we disagree. Petitioner sufficiently explains why Kanamori would have difficulty differentiating between noise and speech coming from the same direction. *See, e.g.*, Pet. 30–32 (citing Ex. 1003 ¶¶ 88, 90; Ex. 1005 ¶ 186; 1006, 88). For example, Petitioner explains that, in noise-cancellation systems, McCowan recognizes that leakage of the desired signal is a common problem for speech signals. *Id.* at 32 (citing Ex. 1003 ¶ 90; Ex. 1006, 88). So, even if Kanamori already allows at least some cancellation of noise originating from the same direction but at a different distance (Prelim. Resp. 23–24), Petitioner sufficiently explains, at this stage and on this record, why one of ordinary skill in the art would want to improve this capability by using McCowan's technique. *See* Pet. 32.

Apart from the arguments discussed above, Patent Owner does not present arguments specifically directed to the subject matter recited in the rest of the claim. Even so, Petitioner has the burden to show that the challenged claims are unpatentable. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Thus, we have reviewed Petitioner's arguments and evidence submitted in connection with the remaining limitations.

At this stage and on this record, Petitioner sufficiently shows that Kanamori discloses a microphone device corresponding to the recited microphone array in [23P] (Pet. 11), Kanamori's main signal is a first virtual microphone as recited in [23A] and it would have been obvious to use omnidirectional microphones as recited in [23B] (*id.* at 11–16), Kanamori's noise-reference signal m2 is a second virtual microphone as recited in [23C] (*id.* at 16–17), Kanamori's second combination is different from the first as recited in [23D] because, unlike m1's formation, m2's formation does not involve multiplication by an amplification ratio (*id.* at 17–18), Kanamori discloses or suggests the first linear response recited in [23E] as discussed above and shown by the plots in the Petition (*id.* at 18–25), Kanamori discloses or suggests human speech, as in [23H], because Kanamori states that the voice is "from the talker" (*id.* at 43). Thus, Petitioner has shown a reasonable likelihood of prevailing as to the unpatentability of claim 23. *See id.* at 11–43.

4. Independent Claims 27, 28, and 41

Petitioner contends that independent claims 27, 28, and 41 would have been obvious over the combination of Kanamori and McCowan and provides explanation as to how the prior art teaches or suggests each claim limitation. *Id.* at 45–68. Petitioner refers to its analysis of claim 23 for

limitations of claims 27, 28, and 41 that are similar to those of claim 23 and provides additional explanation for how the combination of Kanamori and McCowan teaches or suggests the remaining limitations. *Id.*

Apart from the arguments discussed above, Patent Owner does not present arguments specifically directed to the subject matter recited in the rest of the claim. *See* Prelim. Resp. 24–25. Even so, Petitioner has the burden to show that claims 27, 28, and 41 are unpatentable. We have reviewed Petitioner's challenges to claims 27, 28, and 41. *See* Pet. 45–68. For reasons similar to those discussed in Section IV.C.3 discussing claim 23, we preliminarily conclude that Petitioner demonstrates a reasonable likelihood of prevailing with respect to its challenges to independent claims 27, 28, and 41.

5. Dependent Claims 24–26 and 42–46

Petitioner contends that the subject matter recited in claims 24–26 and 42–46 would have been obvious over the combination of Kanamori and McCowan. Pet. 43–45, 68–70. Patent Owner does not present arguments specifically directed to claims 24–26 and 42–46. *See* Prelim. Resp. Even so, Petitioner has the burden to show that the challenged claims are unpatentable. We have reviewed Petitioner's arguments made in connection with claims 24–26 and 42–46 and find them to be sufficient at this stage of the proceeding and on this record. *See* Pet. 43–45, 68–70.

V. CONCLUSION

Petitioner has shown a reasonable likelihood of prevailing as to the unpatentability of at least one of the challenged claims. Thus, we institute an *inter partes* review on all claims challenged in the petition and on all grounds in the petition.

VI. ORDER

It is

ORDERED that, under 35 U.S.C. § 314(a), an *inter partes* review is instituted for claims 23–28 and 41–46 of the '691 patent on the unpatentability ground asserted in the Petition;

FURTHER ORDERED that, under 35 U.S.C. § 314(a), *inter partes* review of the '691 patent is instituted on this Decision's entry date, and under 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the trial's institution; and

FURTHER ORDERED that Petitioner's Motion for Joinder (Paper 3) is dismissed.

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