

Filed on behalf of: Meta Platforms, Inc.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner,

v.

EIGHT KHZ, LLC,
Patent Owner.

Case IPR2023-01019
Patent 10,368,179 B1

PETITIONERS' REPLY

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I. Introduction

The Challenged Claims are invalid because they lack written description support in the parent ('140 Application) and there is no dispute the claims are invalid if not entitled to claim priority to that Application. Each claim recites: (1) the WED/HMD determining/sensing when the user is leaving the environment/3D virtual environment, and (2) alerting/warning the user of that fact by reducing the sound's volume and/or altering binaural sound. Pet.37. Neither limitation is disclosed in the '140 Application.

Faced with the reality of a specification that does not support its claims, Patent Owner ("PO") proposes strained claim constructions to try to rewrite them. But even PO's rewritten claims are unsupported, and PO is left attempting to "derive written description support from an amalgam of disclosures plucked selectively from the" '140 Application. *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1349 (Fed. Cir. 2013).¹ But, even if this approach were proper (it is not), PO fails to show it had possession of the full scope of its alleged inventions at the time of the '140 Application.

¹ Emphasis added and internal citations omitted unless otherwise noted.

In addition, claim 14 is invalid based on the combination of Clement and Osman, and because there is no teaching away, claims 1, 3-4, 6-10, and 15-19 are also invalid in view of Sauk.

II. The Board Should Reject PO's Claim Constructions

To try to manufacture written description support, PO proposes three claim constructions that depart from the terms' plain meanings. The Board should reject PO's constructions.

A. "Environment" is Not Limited to a Physical Environment

PO proposes to limit "environment" to solely a *physical* environment. POR 8. PO's construction departs from the plain meaning and is inconsistent with the record. The plain meaning of "environment" encompasses physical and virtual environments. Ex.1067, 55-56; Roginska Suppl. (Ex.1146) ¶¶10-18. PO admits as much. POR 9-10; Ex.1001, 28:9-38; Roginska Suppl.¶17. And PO does not (and cannot) identify any lexicography or disclaimer that would merit a departure from plain meaning. *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014).

The claimed environment includes a "virtual image" that is "display[ed], by a display of a [WED]." Ex.1001, cls.7, 14. That "virtual image" is necessarily a *visual* image because it is displayed by a WED's display, while the claimed binaural sound is "provided to the user" and "localizes ... to the virtual image." *Id.* PO agrees.

POR 41 (“visibility of the virtual image”). The specification also distinguishes between images and sounds, confirming images are visual. *E.g.*, Ex.1001, 6:20-22, 6:65-67, 11:14-17, 12:4-9; Roginska Suppl.¶23. Thus, the claimed environment must be either a virtual environment or a physical environment that includes a virtual visual image, i.e., an augmented reality environment. Ex.1001, 11:4-5, 12:4-9, 21:22-25, 28:31-34. This is consistent with claim 12, which limits the claimed environment to a physical room and the virtual image to an augmented reality character. *Id.*, cl.12; Roginska Suppl.¶11.

Claim differentiation does not require a different result. POR 7. The terms “3D virtual environment” and “environment” have different meanings and scope: an “environment” can be either physical (with a virtual image) or virtual while a “3D virtual environment” cannot be a physical environment—it must be three dimensional and virtual. Indeed, the use of “3D virtual environment” in claim 1 means that “environment” expressly includes virtual environments. Roginska Suppl.¶11.

Finally, PO’s extrinsic evidence, which cannot outweigh the intrinsic record as a matter of law, fails to support PO’s construction. PO’s dictionary definition only reinforces that the plain meaning of “environment” encompasses physical and virtual environments. POR 8; Roginska Suppl.¶¶15-16. PO cites to its expert, Dr. Begault, POR 10, but Dr. Begault took the opposite position in his first declaration

opining that “environment” in the claims “refer[s] to [an] immersive virtual world context that the user interacts within.” Ex.2006 ¶13; *see also* Ex.2012 ¶64; Begault IPR Dep. (Ex.1147), 119:5-120:15.

B. “3D Virtual Environment” Cannot Be Sound-Only

PO proposes to construe “3D virtual environment” to include a 3D *sound-only* environment. POR 10. PO’s strained construction is a transparent attempt to create written description support where none exists and is inconsistent with plain meaning and the intrinsic and extrinsic record.

“3D virtual environment” read in the context of the claims cannot be a sound-only environment. The claimed 3D virtual environment “includes *a virtual image*[.]” and the binaural sound “externally localizes in empty space *to the virtual image* in the 3D virtual environment[.]” Ex.1001, cl.1. The claimed virtual image is visual, Section II.A, and because the 3D virtual environment must include a visual virtual image, it cannot be sound-only.

Further, claim 1 recites that the 3D virtual environment is “display[ed], with a display” of a HMD, which likewise requires that the 3D virtual environment includes visual image(s). Roginska Suppl.¶23. This is consistent with the specification, which describes using displays to show images. Ex.1001, 36:6-7, Fig.

17, 6:20-22, 6:65-7:7, 11:4-41, 20:53-55.² Further, the claims treat images and sound differently: “displaying” the 3D virtual environment “with a display,” and “provid[ing]” binaural sound. *Id.*, cl.1; Roginska Suppl.¶¶22-23.

The specification’s disclosure of a “[3D] soundscape or 3D sound environment,” which PO emphasizes (POR 10), does not suggest a different result. PO asserts Dr. Roginska “acknowled[ged] that a 3D soundscape could be a 3D virtual environment.” POR 10. But Dr. Roginska testified that a 3D soundscape “could be *in* a virtual environment[.]” Ex.2014, 175:19-176:6. That does not mean a 3D soundscape is *itself* a 3D virtual environment. *Id.*, 173:8-175:1. Regardless, Dr. Roginska was not opining on the meaning of 3D virtual environment in the claims. Roginska Suppl.¶26.

PO flags examples of what it asserts are “virtual localized sound sources ... within a 3D environment,” contending—through faulty circular logic—that virtual sound sources constitute a 3D virtual environment because a 3D virtual environment can include virtual sound sources. POR 10. But even the examples PO

² While the specification refers to a “Virtual Audial Display,” the audio display is not displayed with a display of a HMD, as claimed. Ex.1001, 30:26-31:10; Roginska Suppl.¶24.

identifies simply disclose virtual sound source(s) in a physical environment, not the claimed 3D virtual environment. *Id.*; Roginska Suppl.¶27.

Finally, the extrinsic record does not support PO's sound-only 3D environment construction, which departs from the plain meaning of the claims. Indeed, here too, PO's expert previously took the opposite position. *Compare* Ex.2006 ¶13 (3D virtual environment is an "immersive virtual world"), *with* POR 11 ("does not require ... a 3D virtual world"); *see also* Ex.1038, 7-11, Fig. 1.7; Roginska Suppl.¶30.

C. "Determining, with the WED, when the user is leaving the environment" does not require independently determining

Attempting to sidestep the prior art, PO proposes that determining, with the WED, when the user is leaving the environment/3D virtual environment requires a WED that makes determinations "independent of a stationary tracking device." POR 12. The requirement PO conjures is inconsistent with the challenged claims' language and the intrinsic and extrinsic records.

PO's only purported support for its proposal is a description of a device that PO asserts shows the WED "**can** be used to determine when a user is leaving the environment." *Id.* 13. But the disclosures PO identifies are exemplary—not limiting. Ex.1001, 2:13-14, 39:9-40:34, Fig. 20. And the fact that a WED **can** independently determine when a user is leaving an environment does not limit claims requiring determinations made "with" WEDs to **only** WEDs that independently

determine. In fact, this Board has already correctly rejected PO's position in concurrent IPR proceedings addressing analogous claim language. *See, e.g.*, IPR2023-01023, Paper 10, *18 (“determining, ‘*with*’ the WED, when the user is ... leaving the zone ... does not expressly preclude other devices from being involved in those determinations”). Even PO's expert does not agree with PO's construction. Ex.1147, 157:9-158:1, 159:19-160:12.

The Board should (again) reject PO's results-oriented construction. Roginska Suppl. ¶¶32-34.

III. Ground 1: Clement, Osman, and Sauk Render Claims 1, 3-4, 6-10, and 14-19 Obvious

A. POSAs Would Have Combined Clement and Osman with Sauk³

PO incorrectly asserts that Sauk “teaches away from removing the binaural audio to alert the user he is leaving the environment,” POR 22, conflating two discrete portions of Sauk to fabricate conflict where none exists.

First, Sauk teaches that changing from binaural to mono/stereo signals “signif[ies] a different level of relevancy or importance for such audio[,]” Sauk's “Relevance Signal.” Sauk (Ex.1007), 11:36-38. Mono/stereo and binaural audio are “perceived differently” and “[t]he user can use this distinction to selectively

³ The Petition does not depend on Sauk for claim 14 and thus this argument is not relevant for claim 14. Pet.15-24.

focus” on more relevant sounds. *Id.*, 11:64-12:3; Roginska Suppl.¶¶36. Second, Sauk teaches binaural alerts when users approach real-world hazards—Sauk’s Hazard Alert. Sauk, 12:14-51; Pet.14, 23-24; Roginska (Ex.1003) ¶¶111-113; Roginska Suppl.¶37.

Clement teaches similar signals. First, like Sauk’s Relevance Signal, Clement teaches that as users are leaving an environment, the audio volume is reduced/lowered, alerting/warning users they are leaving. Pet.22-25, 14; Roginska ¶¶112-113; POR 24 (Clement “disclose[s] reducing the volume of the virtual audio ... as an alert to the user.”). Second, like Sauk’s Hazard Alert, Clement teaches that a distinct warning, which could be “an ‘audible indicator’” or buzzer, can be used to alert the user of an obstacle or a hazard. Pet.14; Clement (Ex.1005), 8:4-35; Roginska ¶¶111-113, 175; Roginska Suppl.¶37.

As shown in the Petition, POSAs would have combined Clement with Sauk’s Relevance Signal, switching sounds from binaural to mono/stereo as the user leaves the environment and environment sounds become less relevant to provide additional layers of warnings and ensure user safety. Pet.14, 24. POSAs would have understood this switch would alert/warn that the user is leaving. *Id.* PO does not dispute POSAs could and would have used this signal as an alert/warning. Ex.1095, 208:20-209:8; Roginska Suppl.¶¶38, 47. POSAs would have been motivated to use

the Relevance Signal to “provide various levels of transitions/warnings to ensure user safety.” Pet.25-26.

This combination does not “ignore[]” Sauk’s Hazard Alert as PO contends (POR 22-23). Sauk’s Relevance Signal would have been obvious to apply when a user leaves an environment because the environment’s audio necessarily becomes less relevant.⁴ Roginska Suppl.¶¶40-41. Sauk’s Hazard Alerts also would have been obvious to apply, but primarily where directional indicators would be useful, e.g., when users are approaching a hazard. *Id.* ¶41.

Alerting/warning the user he/she is leaving the environment is essential to user safety, even if the user is not approaching an immediate hazard requiring clear directional alerting/warning. Pet.24-25; Roginska ¶¶171-183, Roginska Suppl.¶42. As Clement explains, without smooth transitions between environments, users may become disoriented or have motion sickness. Clement, 2:50-62. Sauk’s Relevance Signal changes would obviously help with such transitions, by providing the user a warning/alert that he/she is leaving, as claimed. Roginska Suppl.¶42.

Moreover, Sauk’s Relevance Signal changes are equally, if not more, important when the user is approaching an immediate hazard. Both Clement and

⁴ While the fact that the user is leaving the environment remains relevant, as PO asserts, POR 23, the *audio* from the environment is not. Roginska Suppl.¶41.

Sauk teach adding an indicator (Hazard Alert) to warn the user of a directional danger. Sauk, 12:14-51. Sauk's Relevance Signal enables users to "selectively focus" on more relevant sounds, *id.*, 11:64-12:3, e.g., the immediate hazard. Ex.2014, 270:4-271:13. In this scenario, the Relevance Signal and Hazard Alert are complementary, helping the user focus and avoid hazards. Pet.14, 25-26 ("various levels of transitions/warnings"); Roginska ¶¶112-113; Roginska Suppl.¶42.

B. Clement, Osman, and/or Sauk Render the Claims Obvious

PO argues that Ground 1 lacks various claim limitations but largely relies on its teaching away argument or improperly attacks the references in isolation, ignoring the proposed combinations. Under Petitioner's actual combination, the claims are undisputedly obvious.⁵

1. Claims 1, 7, and 14

PO argues two parallel limitations from each of the independent claims are missing from Ground 1. POR 21-31. PO's arguments are meritless.

⁵ PO does not rely on its incorrect constructions for "environment" or "3D virtual environment" for Ground 1. To the contrary, PO attempts to distinguish Sauk (which uses binaural sound), from Clement's "virtual reality." POR 6. Sauk is analogous art. Pet.14.

a. lower[ing]/reducing a volume of sound to warn/alert (claims 1 and 14)

The combination teaches this limitation. Pet.23-24, 31. PO asserts, first, that there is no motivation to combine Clement with Sauk. PO is wrong. Section III.A. Moreover, the Petition does not depend on Sauk for claim 14. Pet.23-24.

Next, PO improperly attacks each reference in isolation. PO asserts Clement “does not disclose binaural audio.” POR 25-26. But the combination of Clement with Osman teaches binaural audio that is reduced in volume as the user leaves the environment. Pet.24 (“In the combination, this audio (that has its volume reduced) is the binaural sound generated in 14[c] above.”), 18-22.

Then, PO turns to Sauk, complaining it doesn’t teach “lowering the volume of [a] binaural audio warning.” POR 26, 24. But the claims recite warning/alerting by lowering/reducing volume of binaural **sound** (not warning), which is exactly what the combination teaches. Pet.23-24, 31. Sauk does not teach away from “alerting by reducing the volume of binaural audio[.]” POR 24; Section III.A. Indeed, lowering the volume of less relevant sound is consistent with Sauk’s goal of deemphasizing less relevant audio. Sauk, 11:25-40; Roginska Suppl.¶97.

b. determining/sensing, with a WED, when a user is leaving a environment/3D virtual environment (claims 1, 14)

The combination teaches this limitation. Pet.22-23, 27-28, 30-31. PO's argument is based on its flawed claim construction.⁶ Section II.C. PO does not dispute that the combination teaches this limitation under the term's plain meaning.

Regardless, this limitation is rendered obvious even under PO's incorrect construction. Clement expressly teaches that its HMD includes a sensor that detects "the user's proximity to a boundary of the tracking area 320, or that the user is within a threshold distance of a boundary of the tracking area 320." Clement, 7:4-16; Pet.22. PO complains that Clement does not describe *how* its HMD *could* make this determination without a stationary tracking device. POR 27. But POSAs would have known how to use an HMD to make this determination. Ex.2014, 193:8-198:8, 202:15-205:16; Roginska ¶¶154-161; Roginska Suppl.¶99. PO ignores the record evidence demonstrating that such sensors and tracking techniques were well-known. Pet.22.

⁶ PO asserts, without argument, that "sensing, with one or more sensors in the HMD, when the user leaves the 3D virtual environment[]" should likewise be construed to be "independent of a stationary tracking device[.]" POR 35. It is wrong for the same reasons discussed for the "determining" limitation. Section II.C.

Notably, the '179 patent is entirely silent on how to perform this limitation, but PO asserts in its priority- and written description-related arguments that a POSA *would* have been able to determine with the WED when the user is leaving an environment. POR 58, 60-61. PO cannot have it both ways. Pet.22-23; *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020). PO tries to explain away its inconsistent positions, pointing to various trackers in the '179 patent's WED. POR 30. But the trackers PO identifies were known in the art, so PO's arguments apply equally to the prior art. Roginska Suppl.¶100. POSAs would have known how to use Clement's sensors and trackers to implement an HMD that independently determines when the user is leaving the environment. *Id.* ¶¶99-100; Ex.1080, 4:49-5:24.

c. degrading audio cues to prevent external localization of binaural sound to alert (claim 7)/filtering by the DSP, the binaural sound to warn (claim 1)

The combination teaches this limitation and there is no teaching away. Pet.28, 31; Section III.A. POSAs would have combined Clement, Osman, and Sauk to “provide various levels of transitions/warnings to ensure user safety.” Pet.25-26. These various levels require different warnings when the user is “heading towards ... danger[.]” as “opposed to a less important transition.” *Id.* 25. Degrading audio cues (Sauk's Relevance Signal) would alert/warn users they were leaving the environment if there was no immediate danger and would work *with* Sauk's Hazard

alert as an additional layer of warning if the user was heading towards danger. Roginska Suppl.¶¶102, 47; Pet.25. And PO does not dispute that Sauk teaches degrading audio cues to prevent external localization of binaural sound. Pet.28.

PO asserts that Clement does not disclose filtering binaural sound to alter audio cues. POR 37. But the Petition relies on the combination of Clement, Osman, and Sauk for this disclosure. Pet.31. Sauk teaches that spatial cues are removed from the audio when transitioning from binaural to stereo/mono, which discloses and renders obvious the claimed filtering. *Id.*

2. Claims 10, 15-19

PO groups together claims 8, 10, and 15-19 as “all requir[ing] alerting the user by altering the binaural sound received by the user.” POR 40. PO repeats its claim 14 and teaching away arguments, which have no merit for reasons discussed above. *Id.*; Section III.A-III.B.1.

PO asserts Sauk's Relevance Signal is based on user selection, not “associated with Sauk's ‘Alerts and Warnings[.]’” POR 40. But the Petition does not rely on user selection; it relies on Clement's disclosure of automatic determination of relevance by detecting that the user is leaving the environment. Pet.23-24. POSAs would have applied Sauk's Relevance Signal teachings to Clement's automatic determination that the user is leaving the environment because the environment's audio would become irrelevant. *Id.* 25-27; Section III.A; Roginska Suppl.¶47. And

while Sauk does not expressly refer to its Relevance Signal as an alert/warning, POSAs could and would have used it as one. Roginska Suppl.¶¶47, 50, 51; Ex.1095, 208:20-209:8; Ex.1147, 87:6-88:10, 240:6-15. Indeed, PO's expert testified that any "salient" change in sound, e.g., switch from binaural to mono/stereo, was an alert/warning. Ex.1147, 217:10-15, 236:22-237:19, 266:15-20, 279:4-18.

PO asserts Sauk does not "disclose changing the existing binaural audio ... to a different format." POR 40. The Board properly rejected this argument. ID 23. Sauk does not generate "new reproductions" of data as PO asserts (POR 30). Roginska Suppl.¶48. PO ignores Sauk's disclosures that "a user could *change* the less relevant audio" to mono/stereo and that "[t]his process also *removes* any localization cues for that audio." ID 23. POSAs would have understood this process involves degrading binaural sound (cl.15), altering binaural processing (cl.16), removing ITDs (cl.17), eliminating audio cues (cl.18), and switching from binaural to stereo (cls.10, 19). Pet.25-27, 30; Roginska Suppl.¶¶48, 102.

Furthermore, even if PO were correct that Sauk teaches replacing the binaural sound with stereo/mono (it is not), that meets the claims. Indeed, the '179 patent discloses that one "way of changing a sound" from binaural to non-binaural is "to render the original source with different spatial parameters or to re-render a sound source with different spatial parameters in order to adjust, degrade, or eliminate ... audio cues." Ex.1001, 5:33-62; Roginska Suppl.¶49; ID 24-25.

3. Claims 4, 6, 9

The combination renders these claims obvious. PO argues Sauk teaches away from claims requiring switching based on visibility of the virtual image because it teaches adding sounds “so the user knows a direction in which the character may have disappeared into.” POR 42. There is no teaching away. Section III.A. While Sauk uses binaural sound when members of a group “lose sight of each other,” POR 43 (quoting Sauk, 10:52-60), this disclosure does not relate to a “virtual image” that has disappeared or is no longer visible. The members of Sauk’s group remain relevant because they continue to exist when not in view. In contrast, virtual images, as in games, often become irrelevant and no longer exist when they disappear. Roginska Suppl.¶¶64. That the virtual images are no longer displayed (and the user is leaving the environment) suggests that the sound emanating from those images is *less* relevant, not more, as in Sauk’s Hazard Alert. Pet.62-64, 57.

PO argues that the fact that a virtual image is not displayed “does not inherently” mean the sound is irrelevant. POR 42. But the Petition does not rely on inherency and PO does not dispute that virtual images that are not visible are often less relevant. Pet.62-64, 57; Roginska Suppl.¶¶64-65.

Additionally, Osman does not teach that “providing that spatial awareness is more important when objects are not in view,” as PO argues (POR 43-44). Rather, Osman teaches that in order to provide sound localization for an object outside the

field of display, it is desirable to use a “good HRTF model” because there will be no visual feedback to mitigate “inaccuracies” in the model. Osman (Ex.1006), 7:31-42. This does nothing to rebut the fact that, because characters and images that are not displayed are typically less relevant, it would have been obvious to POSAs to make their audio mono/stereo. Roginska Suppl.¶65.

4. Claim 3

The combination renders claim 3, which recites warning when the user is leaving a virtual area, obvious. Instead of addressing the Petition's arguments, PO attacks a background reference (Jang) the Petition and Dr. Roginska cited to demonstrate the knowledge of POSAs, state of the art, and to corroborate Dr. Roginska's testimony. POR 44; Pet.31-33. PO does not (and cannot) dispute that “a POSA would have understood that transitions between virtual rooms were commonplace in VR environments” or that “a POSA would have signaled the immediacy or the relevance of the transition by also altering audio cues[,]” as discussed for limitation 1[e]. Pet.32-33. Petitioners' citations to Jang were proper. *See, e.g., Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337-38 (Fed. Cir. 2020) (expert evidence properly corroborated by prior art).

PO also attacks Clement in isolation, asserting it does not disclose leaving a virtual area while remaining in the 3D virtual environment. POR 44-45. But the Petition explained that Clement teaches fading out a virtual environment's audio and

POSAs understood that the same technique was used for transitioning between rooms within a 3D virtual environment, as in, for example, in the VR game, “Second Life.” Pet.31-33. PO does not rebut or dispute that this technique was known in the art and would have been obvious to apply. *Id.*; Roginska Suppl.¶¶60-62.

5. Claim 8

As discussed above for claims 1 and 14, Clement teaches alerting the user by reducing volume, as recited in claim 8. Pet.29; Section III.B.1.a.

IV. Ground 2: All Claims Are Unpatentable Over Lyren and Reif

The only dispute in Ground 2 is whether Lyren and Reif qualify as prior art, which hinges on whether the '140 Application satisfies the written description requirement. It does not. Pet.36-39.

A. Alerting/Warning by Altering Binaural Sound and/or Reducing/Lowering Volume

There is no disclosure in the '140 Application of changing binaural sound and/or reducing/lowering the volume of sound as an alert/warning to the user that they are leaving an environment/3D virtual environment, as recited by every independent claim. PO effectively concedes this, arguing instead that the disclosure is “implicit[.]” POR 59, 61. But “implicit” disclosure is insufficient for written description as a matter of law. *Novartis Pharms. Corp. v. Accord Healthcare, Inc.*, 38 F.4th 1013, 1017 n.2 (Fed. Cir. 2022) (“[PO] fails to identify any case holding that ‘implicit disclosure’ (whatever that means) is sufficient [for written

description].”). Because PO has failed to identify, or even assert, any express or inherent disclosure of warning or alerting the user according to the claims, PO has failed to meet its burden of production. *See id.*, *1017 (“Silence is generally not disclosure.”). Consequently, the Board’s evaluation of this issue can and should end here.

Regardless, there is no disclosure in the ’140 Application—implicit or otherwise—of altering binaural sound and/or reducing/lowering volume as a warning/alert. PO asserts that “actions, such as altering binaural sound, may be taken in response to detecting an event[,]” POR 59, but there’s no suggestion these alterations are alerts/warnings. PO’s expert admitted that not every alteration of binaural sound is an alert/warning, Ex.1147, 86:22-87:5, 311:19-14, 316:10-317:1; 266:5-14, and a switch in binaural sound is not necessarily an alert/warning the user is leaving an environment, as claimed, *id.* 86:22-87:5. PO fails to even argue that there is any disclosure of lowering/reducing volume as an alert/warning, either alone or in combination with an alteration to binaural sound. Ex.1001 cls.1, 14; Ex.1147, 93:7-17; Roginska Suppl.¶¶77-79.

While the ’140 Application identifies numerous examples of alerts, notably absent is altering binaural sound and/or reducing/lowering volume. POR 59-60. The only example of an alert related to binaural sound PO identifies does the exact opposite of the claims: an existing audio alert is changed *from* stereo *to* binaural.

Id. 60 (citing Ex.1028, 138:24-27). Thus, even if PO's "implicit" disclosure-based arguments are considered, they fail. Roginska Suppl.¶¶77-79.

B. Warning that the User is Leaving the 3D Virtual Environment (Claim 1)

As discussed in Section II.B, PO proposes a contorted claim construction to try to manufacture written description support for claim 1, contending the claimed "3D virtual environment" can be a sound-only environment. POR 10-12. PO is wrong. Section II.B. And PO fails to identify—or even assert that there is— any written description support for this limitation if, as required by the claims, a 3D virtual environment must include virtual images.

Regardless, PO's argument fails even under PO's strained construction. PO's construction encompasses not just sound-only environments, but also completely immersive 3D environments that include sound and images. And there is undisputedly no disclosure of warning the user that they are leaving an immersive environment with virtual images. At best, PO has attempted to show support for leaving one form of environment (sound) encompassed by the claims. But this, too, is insufficient as a matter of law. *See D Three Enters., LLC v. SunModo Corp.*, 890 F.3d 1042, 1048-52 (Fed. Cir. 2018) (holding claims encompassing both washerless assemblies and assemblies with washers lacked adequate written description for their full scope and were thus invalid because the specification failed to disclose any washerless embodiments); *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1319-21

(Fed. Cir. 2017) (claims invalidated for lack of “the necessary written description support for the[ir] **full breadth**”); *see also LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1346 (Fed. Cir. 2005); *Google LLC v. Valtrus Innovations Ltd.*, IPR2022-01406, Paper 40, *60-62 (P.T.A.B. Apr. 3, 2024).

PO does not show that the '140 Application discloses structural features common to the genus, nor disclosure of a representative number of species. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1350 (Fed. Cir. 2010) (en banc). It does not. POSAs would not have understood that the inventors had possession of warning/alerting the user that he/she leaving a 3D virtual (visual) environment based on the '140 Application, and PO does not assert otherwise. Roginska Suppl.¶¶81, 105.

PO identifies an example in which there are no images and a user (“Alice”) is not wearing an HMD (because she is getting ready to drive a car). POR 53; *see* Ex.1028, 120:13-27. PO asserts that this example includes a “3D virtual environment” (sound around “Alice”) and “need not include a visual display” to provide written description support. POR 55. PO is wrong—in fact, the claims expressly require a virtual image that is “display[ed], with a display of the HMD,” Ex.1001, cl.1, and PO’s environment does not include a virtual image. Roginska Suppl.¶83.

PO also tries—but fails—to manufacture support with scattershot arguments combining various parts of the specification. POR 54-57. For example, PO points to the statement that “[e]xamples herein can take place in physical spaces, in computer rendered spaces (VR), in partially computer rendered spaces (AR), and in combinations thereof.” *Id.* 54. But this general disclosure is not sufficient to show that the inventors had possession of the specific claimed invention. *See D Three*, 890 F.3d, *1050-51 (“boilerplate language at the end of the ... specification is not sufficient”). PO relies on this general disclosure to assert that the method in Figure 6 can take place in “a combination of physical and virtual spaces.” POR 54-55. But there is no suggestion of the specific claimed combination nor that a POSA would alter Figure 6 in the precise way PO proposes to try to match the claims. Roginska Suppl.¶82. Nor there is there disclosure that 3D audio would not be permitted in a 3D virtual space, as PO asserts. *Id.*

The other general disclosures PO cites likewise fail. For instance, “a change in the ability to detect ... position in a physical or virtual environment,” POR 56, “encompasses detecting a difference in position *within* the virtual environment, not necessarily a user *leaving* a virtual environment.” ID 31; Roginska Suppl.¶85. Similarly, “cues indicating ... a changing [*sic*] in a physical or virtual environment,” POR 57, do not disclose the challenged claims’ recitations. Indeed, the rest of the clause PO cites is instructive, as it provides examples of those changes: “shape,

acoustic properties, noise level, or placement of objects or structures in the environment.” Ex.1028, 141:4-10. POSAs would have understood this discloses changes *within* an environment, not leaving an environment. ID 25; Roginska Suppl.¶86. And POSAs understood that a “degradation in the visibility of a user’s physical or virtual environment,” which PO emphasizes (POR 57), does not disclose leaving a 3D virtual environment, but instead a “[c]hange in a user’s ability to associate visual cues or images with the associated audio cues[.]” Ex.1028, 141:15-20; Roginska Suppl.¶87.

C. Alerting that the User is Leaving the Environment (Claims 7, 14)

The ’140 Application fails to disclose alerting the user that he/she is leaving the environment. PO proposes a narrow construction of “environment” to try to manufacture support.⁷ PO’s construction is wrong. Section II.A. Properly

⁷ PO suggests the Board should disregard Petitioner’s argument because of a singular use of the term “3D environment” to characterize the independent claims. POR 51. But PO does not distinguish any claims based on not being “3D,” nor does this singular use of “3D environment” imply any claim construction requiring a virtual environment. The Petition showed that the specification does not support the claims under their plain meaning. Pet.38-39 (referring to the user leaving “the environment” multiple times).

interpreted, the claims lack written description support because the '140 Application does not show that the inventors had possession of their full breadth, which include fully immersive 3D virtual environments, as discussed in the immediately preceding section. *See* Section IV.B; *D Three*, 890 F.3d, *1048-52.

Even under PO's incorrect construction of "environment," however, there is insufficient support for the claims. PO identifies examples in which the user is leaving a physical environment, but none discloses a physical environment including a virtual image displayed by a WED, i.e., an augmented reality environment. Ex.1001, cls.7, 14; Section III.A. The user is not even wearing a WED capable of displaying a virtual image in PO's examples. Ex.1028, 120:20-27 (earphones, no virtual image), 119:18-120:11 (no virtual image), 140:2-3, Figs. 6, 16. The '140 Application does not contemplate displaying virtual images as a user moves into restricted areas (Fig. 6). *Id.*, 119:18-120:11. And Figure 16, which PO highlights, does not disclose a user leaving any kind of environment, much less one with the claimed virtual image. *Id.*, 140:16-141:28; Section IV.B; Roginska Suppl.¶¶85, 93. PO improperly attempts to derive written description support from "amalgam of disclosures plucked selectively from the" '140 Application. *Novozymes*, 723 F.3d, *1349; Roginska Suppl.¶¶88-92.

D. Determining/sensing, with the WED/HMD, when the User is Leaving the Environment/3D Virtual Environment

The '140 Application does not disclose the “determining” limitations recited in each independent claim. Ex.1001, cls.1, 7, 14. As addressed above, there is no disclosure of a user leaving the claimed environment/3D virtual environment. Section IV.B-C. There is also no disclosure of determining a user is leaving any such environment with a WED/HMD. Pet.38; Section IV.A. PO asserts that POSAs would “clearly understand” that the '140 Application’s embodiments “may be implemented with the WED or HMD.” POR 58. But PO improperly relies on boilerplate language to modify disclosed embodiments in specific (and unidentified) ways. *See D Three*, 890 F.3d, *1050-51. The '140 Application’s disclosure that blocks/methods could be preformed in myriad ways, including by a user, software application, electronic device, computer, etc., or even automatically, does not show possession of the specific claimed invention. Ex.1028, 167:9-14.

Tellingly, PO fails to explain which specific embodiment(s) it proposes modifying and in what manner. For example, PO asserts that Figure 6 can be implemented by a WED. POR 61. But Figure 6 does not disclose determining/sensing the user is leaving the claimed environment/3D virtual environment, which must include a virtual image. Section IV.B-C. And it would be illogical to modify the “Alice” embodiment PO emphasizes (discussed above) to use a WED/HMD that displays virtual images. POR 51 (citing Ex.1028, 120:20-27), 53.

In that embodiment, Alice enters her car, and “the car has a sensor that determines Alice is on a binaural call and instructs an HPED ... to switch the call to mono.” Ex.1028, 120:13-27. To fit the claims, PO would need to exchange Alice’s earphones and HPED for an HMD/WED (illogical for a driver) and remove the car’s sensor (or the GPS/object recognition device) so that, instead, the determination of Alice leaving an environment is made with the HMD/WED. But even this falls short: Alice never leaves the claimed environment/3D virtual environment with virtual images. Roginska Suppl.¶107.

At base, because there is no support for the alleged inventions recited by the challenged claims, all PO’s written description arguments sound in obviousness. But “[o]ne shows that one is ‘in possession’ of *the invention* by describing *the invention*, with all its claimed limitations, not that which makes it obvious.” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). Thus, even if the Board were to credit PO’s errant arguments, including PO’s incorrect claim constructions, the challenged claims are invalid.

V. Conclusion

For the reasons set forth above, the Board should cancel each of the challenged claims.

Respectfully submitted,

Dated: June 26, 2024

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CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I hereby certify that this Petitioners' Reply complies with the word count limitation of 37 C.F.R. § 42.24(c)(1) because the Petitioners' Reply contains 5,600 words using Microsoft Word's counting feature, excluding the cover page, signature block, and the parts of the Patent Owner's Preliminary Response exempted by 37 C.F.R. § 42.24(c).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 26th day of June, 2024, a true and correct copy of the foregoing **Petitioners' Reply and all Exhibits** were served by electronic mail on Patent Owner's lead and backup counsel at the following email addresses:

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