

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner,

v.

EIGHT KHZ, LLC,
Patent Owner.

Case IPR2023-01023
Patent 10,798,509

Roadmap

1. '509 Patent

2. Background

(Grounds/Abbreviations/Art/Claim Construction)

3. Law

4. Ground 1

5. Ground 2

‘509 Patent

Fig. 9B: a person capturing audio impulse responses and surrounded by SLPs

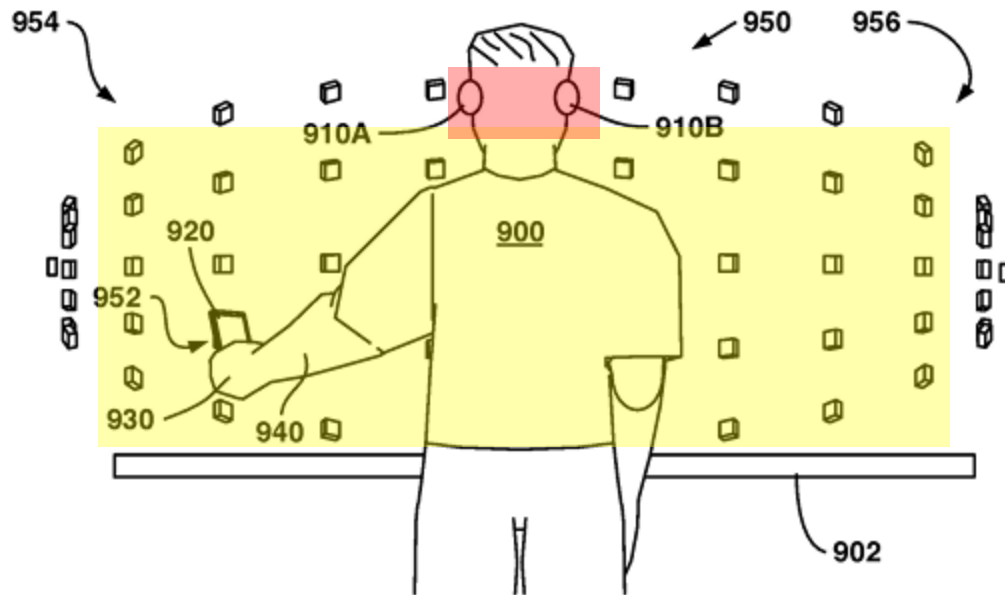


Figure 9B

FIGS. 9A-9D show a person **900** standing next to a table **902** and capturing audio impulse responses with microphones **910A** and **910B** in his left and right ears. The person **900** holds a hand held portable electronic device (HPED) **920** in his hand **930** with his left arm **940** straight and extended away from his body. 25:64-26:2.

FIGS. 9A-9D show a plurality of SLPs **950** formed around the person **900**. Each SLP represents a location where the person generated a sound or tone with the HPED **920** and captured the impulse response with the microphones **910A** and **910B** located in his ears. By way of example, the figures show the person **900** activating the HPED **920** to generate a sound or tone at SLP **952**. The HPED **920** or another electronic device (such as a cloud server) stores the locations of the SLPs and other information associated with them. 26:16-25.

Claim 1 (with labeling)

1[pre] A method comprising:

1[a] dividing, with a portable electronic device (PED) held in a hand of a user, an area around the user into a zone that includes multiples sound localization points (SLPs) from where binaural sound originates to the user;

1[b] determining, with a wearable electronic device (WED) worn on a head of the user, when the user is located inside the zone;

1[c] highlighting, while the user is located in the zone and with a display of the WED, one of the multiple SLPs in the zone when the PED held in the hand of the user is pointed at the one of the multiple SLPs in the zone; and

1[d] playing, with the WED worn on the head of the user, the binaural sound that emanates from the one of the multiple SLPs in response to the one of the multiple SLPs being pointed at by the PED held in the hand of the user.

Ex. 1001, 40:58–41:7.

Claims 2-8

2. The method of claim 1 further comprising : tracking , with one or more sensors in the WED worn on the head of the user , the PED to determine when the PED moves outside the zone ; and displaying , with the WED worn on the head of the user , a three dimensional (3D) virtual image that shows a size and a shape of the zone in response to the WED determining that the PED moved outside the zone.
3. The method of claim 1 further comprising : tracking , with the WED worn on the head of the user , the user to determine when the user moves outside the zone ; and displaying , with the WED worn on the head of the user , a three dimensional (3D) virtual image that shows a size and a hape of the zone in response to the WED determining that the user moved outside the zone.
4. The method of claim 1 further comprising : storing , in memory of the WED , a location of the zone , a size and a shape of the zone , and locations of the multiple SLPs in the zone from where the binaural sound originates to the user ; and displaying , with the WED , a virtual image having the size and the shape of the zone in response to the WED determining that the user is located in the zone.
5. The method of claim 1 further comprising : designating , with the PED held in the hand of the user , locations of the multiple SLPs in the zone from where the binaural sound originates to the user ; and displaying , with the WED , virtual images at the location of the multiple SLPs in the zone.
6. The method of claim 1 further comprising : selecting the one of the multiple SLPs in the zone when the PED held in the hand of the user is pointed at the one of the multiple SLPs in the zone ; and displaying , with the WED worn on the head of the user , a virtual image at the one of the multiple SLPs in 45 response to the one of the multiple SLPs being pointed at by the PED held in the hand of the user.
7. The method of claim 1 , wherein the zone has one of a three - dimensional (3D) shape of a cylinder and a 3D shape of a rectangle , and the user is centered in the zone.
8. The method of claim 1 further comprising : playing , with speakers in the WED worn on the head of the user , a verbal instruction indicating the user should move back into the zone in response to the WED determining that the user moved outside the zone.

Claim 9 (with labeling)

9[pre] A non-transitory computer readable storage medium storing instructions that one or more electronic devices execute as a method, the method comprising:

9[a] dividing, with a portable electronic device (PED) held in a hand of a user, an area around the user into a zone that includes sound localization points (SLPs) in empty space from where binaural sound originates to the user;

9[b] determining, with a wearable electronic device (WED) worn on a head of the user, when the user is located inside the zone;

9[c] determining, with the WED worn on the head of the user, when the user is leaving the zone; and

9[d] displaying, with the WED worn on the head of the user, a three dimensional (3D) virtual image of the zone in response to the WED determining that the user is leaving the zone.

Claims 10-14

10. The non - transitory computer readable storage medium of claim 9 in which the method further comprises : determining , with the WED , when the PED is pointed at one of the SLPs while the user is located in the zone ; and playing the binaural sound that originates from the one of the SLPs in the zone in response to the WED determining that the PED is pointed at the one of the SLPs.
11. The non - transitory computer readable storage medium of claim 9 in which the method further comprises : highlighting , while the user is located in the zone and with a display of the WED , a virtual image at one of the SLPs in the zone when the PED held in the hand of the user is pointed at the one of the multiple SLPs in the zone.
12. The non - transitory computer readable storage medium of claim 9 , wherein the 3D virtual image of the zone is shaped as a cylinder with the user being centered in the cylinder , and the WED is one of a head mounted display and 25 electronic glasses.
13. The non - transitory computer readable storage medium of claim 9 , wherein the 3D virtual image of the zone is shaped as a rectangle with the user being centered in the rectangle , and the WED is one of a head mounted display 30 and electronic glasses.
14. The non - transitory computer readable storage medium of claim 9 in which the method further comprises : playing , with the WED worn on the head of the user , a verbal instruction indicating the user should move back 35 40 50 55 65 into the zone in response to the WED determining that the user moved outside the zone.

Claims 15 and 16 Not Part of IPR

Claim 17 (with labeling)

17[pre] An electronic system comprising:

17[a] a portable electronic device (PED) held in a hand of a user that divides an area around the user into a three-dimensional (3D) zone that includes sound localization points (SLPs) in empty space from where binaural sound originates to the user; and

17[b] a wearable electronic device (WED) that is worn on a head of the user,

17[c] wirelessly communicates with the PED,

17[d] includes speakers that play the binaural sound to the user that emanates from the SLPs in empty space,

17[e] includes one or more sensors that sense when the PED leaves the zone,

17[f] and includes a display that displays a 3D virtual image of the zone in response to sensing that the PED leaves the zone,

17[g] wherein the display displays the 3D virtual image of the zone to warn the user that the user is leaving the zone.

Claims 18-20

18. The electronic system of claim 17, wherein the display of the WED highlights a virtual image at one of the SLPs in response to the WED determining that the PED is pointing 5 to the one of the SLPs.
19. The electronic system of claim 17, wherein the WED tracks a location of the user with respect to the SLPs , and automatic ally display a virtual image at a location of one of the SLPs in response to determining that the user is proxi- 10 mate to the location of the one of the SLPs.
20. The electronic system of claim 17, wherein the speakers in the WED play the binaural sound that emanates from one of the SLPs in empty space in response to the WED determining that the PED is pointed to the one of the SLPs 15 in empty space.

Background

(Grounds/Abbreviations/Art/Claim Construction)

Grounds

	<u>Claims Challenged</u>	<u>35 U.S.C. §</u>	<u>Reference(s)</u>
GROUND 1	1–14, 17–20	103	Pedrotti, Jang, Begault
GROUND 2	1–14, 17–20	103	McCulloch, Pedrotti, Flaks

Abbreviations Used in the Petition and Prior Art

Term	Abbreviation
wearable electronic device	WED
head mounted display	HMD
portable electronic device	PED
handheld portable electronic device	HPED
three-dimensional	3D
sound localization point	SLP
head-related transfer function	HRTF
virtual reality	VR

Overview of Cited References

Pedrotti

- Pedrotti is a U.S. patent for a “System and Method for Assisting a User in Remaining in a Selected Area While the User is in a Virtual Reality Environment” that seeks to aid a user in avoiding physical obstacles while in a virtual environment. Ex. 1005. Institution Decision at 11.
- Pedrotti discloses an embodiment in which the user “wear[s] a head-mounted display ([“]HMD[”]) and hold[s] a handheld controller” that includes a tracker that “provides information regarding a position of the handheld controller.” Id. at 2:44–49. Institution Decision at 11.
- Pedrotti further discloses determining a selected area, for example, a “safe area,” in “which the user or another person has determined is clear of physical obstacles in the physical world so that the user may move freely without coming into contact with such physical obstacles.” Ex. 1005, 4:3236. Additionally, Pedrotti discloses that the handheld controller may be in the shape of an object that appears in the virtual world. Id. at 16:35–42. Institution Decision at 11.
- As suggested by the foregoing, Pedrotti is directed toward safety while using a VR headset and has nothing to do with producing realistic sound in VR.

Jang

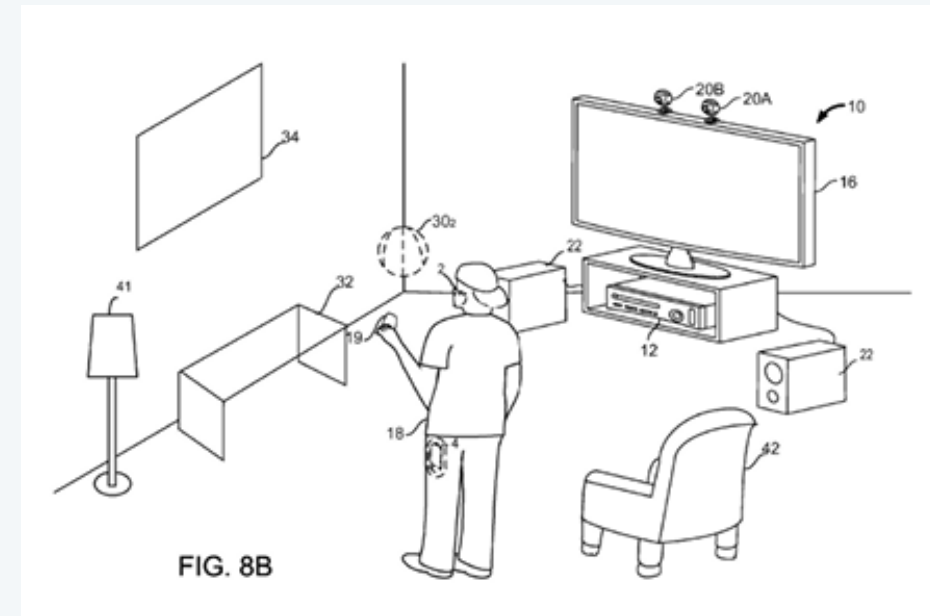
- Jang is a U.S. patent for an “Apparatus and Method for Sound Processing in a Virtual Reality System.” Ex. 1006.
- Jang describes the generation of sound in a virtual reality system, which “may use a localization technique capable of expressing the virtual location.” *Id.* at 1:42–45.
 - Specifically, Jang uses a sound processing unit to generate a sound output from a “focus area” that is different from a sound output generated from an “unfocused area.” *Id.* at 2:32–3:4.
 - For example, as a control unit detects a space shift from a first space to a second space in the virtual reality space, the volume of sound from the first space may be gradually decreased as the volume of sound from the second space is gradually increased. *Id.*

Begault

Begault is a book titled “3-D Sound for Virtual Reality and Multimedia.” Ex. 1007, 1–2. Begault discloses “a sound subsystem in a virtual reality system” that includes a signal source, a signal processor, and active noise cancellation technology. Id. at 12–13. Begault discloses an example in which “[a]ll types of sonic input could be directionalized to a specific location, controlled by the user.” Ex. 1007, 172. In this example, “the audio spatial mapping can correspond to a prioritization scheme.” Id. (emphasis omitted). Begault further discloses that the user may hear different sound inputs from different spatial locations, such that “spatial location informs the listener as to the prioritization” of the sound. Id. at 172–173.

McCulloch

- McCulloch is a U.S. Patent for “Controlling a Virtual Object with a Real Controller Device” and relates to the use of a real controller device that controls an object displayed by a near-eye, augmented reality display. Ex. 1008, 1:19–20.
- Figure 8B is a perspective view of a user controlling a virtual object with a real controller device.
- Figure 8B shows user 18 in his living room which includes lamp 41, table 32, wall hanging 34, basketball 30, chair 42 and home entertainment system 10 including 3D image capture devices 20A and 20B, television 16, speakers 22, and game console 12. Ex. 1008, 28:55–60. User 18 wears head mounted display device 2, has companion processing module 4 in his pocket, and holds real controller device 19 in his left hand. Id. at 28:63–66, Fig. 8B.
- As further shown in Figure 8B, virtual object 302 is controlled with real controller device 19. Ex. 1008, 29:4–6. “The changes in position and orientation of the handheld controller causes its inertial motion unit to generate one or more signals which are converted by the handheld IMU real controller device 19 to be user input requesting display of an action by the 34 virtual object 302.” Id. at 29:6–10.



Flaks

- Flaks is a U.S. Patent for a “System and Method for High-Precision 3-Dimensional Audio for Augmented Reality.” Ex. 1009.
- Flaks collects data from sensors, including a listener’s location within a room and the room’s characteristics, in order to generate a three-dimensional (“3D”) audio signal. *Id.* at code (57).
- Flaks further discloses that “[i]n some embodiments, sensor data may be used to collect physical characteristics of the listener such that a suitable HRTF may be determined from a library of HRTFs.” *Id.*

Claim Construction

“We agree with Patent Owner that at this point in this proceeding, ‘no express constructions of the claims are necessary.’” Institution Decision, p. 10.

Law

- Petitioner bears the burden to demonstrate unpatentability, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).
- A claim is unpatentable for obviousness if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103; see also *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).
- The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).
- claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).
- The prior art may reflect an appropriate level of skill in the art. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Ground 1 Arguments

(Pedrotti, Jang, and Begault)

Dr. Welch's Improper Approach

- Petitioner's expert Dr. Welch admitted he did not attempt to understand scope and meaning of claim limitations.
- Instead, Dr. Welch deconstructed the claims which is not allowed.
- *See Patent Owner's Response (POR), p. 4.*

Ground 1 Fails for at Least Two Reasons

- The combination of Pedrotti, Jang, and Begault fails to teach:

1[c] highlighting, while the user is located in the zone and with a display of the WED, one of the multiple SLPs in the zone when the PED held in the hand of the user is pointed at the one of the multiple SLPs in the zone; and

1[d] playing, with the WED worn on the head of the user, the binaural sound that emanates from the one of the multiple SLPs in response to the one of the multiple SLPs being pointed at by the PED held in the hand of the user. Ex. 1001, 40:58–41–7.

(POR, p. 5)

Pedrotti Does Not Disclose Highlighting an SLP as Required by 1[c]

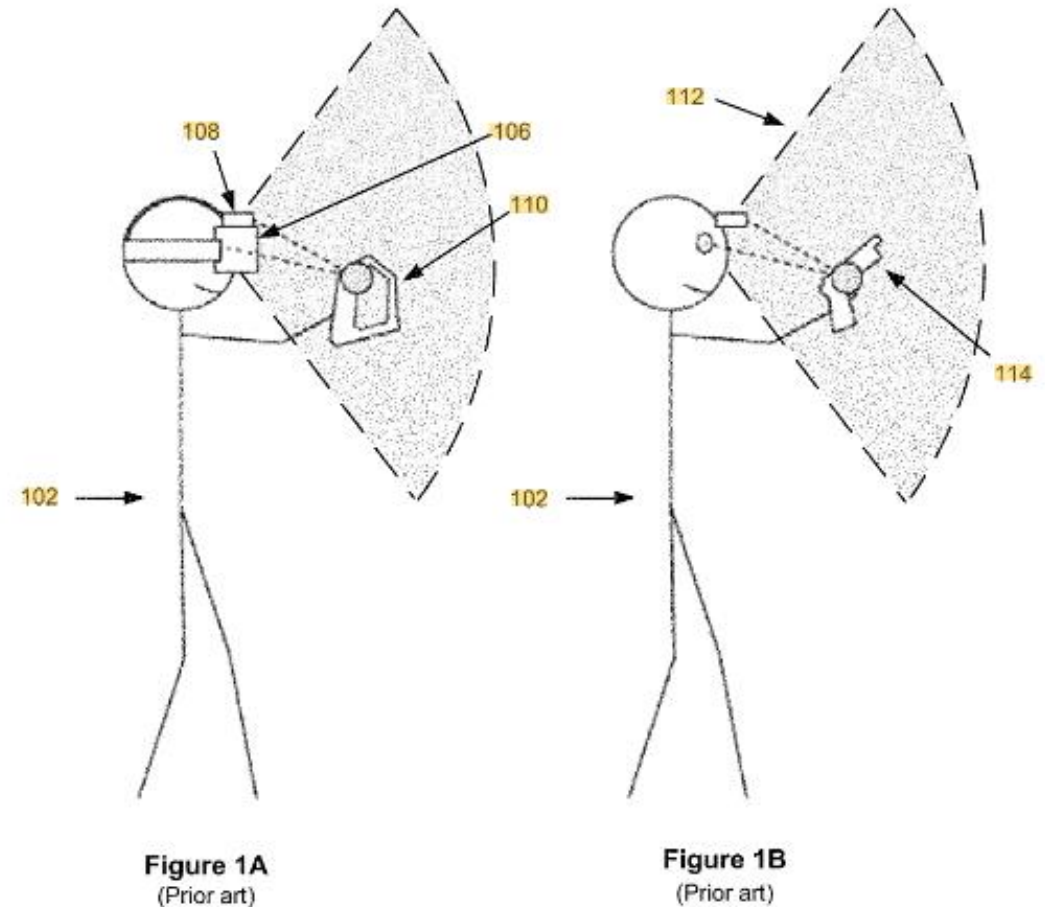
- Petitioner relies upon Pedrotti's disclosure that its virtual fence "can be glowing or colored if desired to be more visible," Pet., p. 20, to teach the concept of highlighting.
- However, Pedrotti's virtual fence is not a sound localization point and thus does not teach or suggest "highlighting... one of the multiple SLPs." POPR, p. 6.

Pedrotti Does not Disclose Highlighting an SLP When Pointed to as Required by 1[c]

- Petitioner claims that “Pedrotti’s controllers (PEDs) manipulate and control virtual objects in VR.” Pet., p. 20.
- Petitioner has mischaracterized the manipulation and control of the “virtual objects” described in Pedrotti, construing these objects as items that can be “selected” and then bridging the selection to a statement not found in the references that the pointing pattern is often-used for selection. POR, p. 8.

Petitioner Misinterpreted Pedrotti's Virtual Object

- Pedrotti's "virtual object" is a virtual representation of the controller, not an SLP that the controller can point to. POR, p. 7.
- Virtual objects / enemies in games examples – these result from striking the enemy, not pointing at them. Patent Owner Sur Reply (POSR), p. 8.
- Other hypothetical examples not based in the prior art are simply based in the expert's imagination and are thus inadmissible. POSR, p. 8.



Jang Also Does Not Disclose 1[c]

- Jang does not disclose dynamic selection of audio sources. Rather, Jang relates to moving a character's perspective. POR, p. 9.
- Petitioner does not even argue that Jang teaches selecting an SLP by pointing at it, as expressly required by this claim. POSR, p. 6.

Neither Jang nor Pedrotti Teach Highlighting “in the zone”

- No references teach highlighting SLP while user is located “in the zone.”
- Pedrotti’s system is used by the user in a zone, but doesn’t disclose highlighting only while the user is in the zone, or while user is in the zone and PED is pointed at an SLP.
- See POR at 9.

Neither Pedrotti nor Jang Teach the Features of 1[d]

- 1[d] requires “playing, with the WED worn on the head of the user, the binaural sound that emanates from the one of the multiple SLPs in response to the one of the multiple SLPs being pointed at by the PED held in the hand of the user.”
- Neither Jang nor Pedrotti teach pointing to an SLP, and for that reason alone 1[d] is not taught. POR, p. 10.
- Pedrotti has nothing to do with SLPs inside its safety zone, while Jang teaches only changing the prioritization of sound based on user perspective changes, and Begault provides a user interface that enables configuration of sound sources. None of the cited art disclose the claimed limitation. POSR, pp. 8-9.
- Petitioner turns to non-cited art and its expert to fill this obvious gap in the art.

Pedrotti Does not Teach the Features of 1[d]

- Petitioner argues that the “audio warning ... to the user approaching the fence” satisfies this limitation.
- This argument makes no sense—the SLPs are located inside the zone, while Pedrotti’s virtual fence defines the zone. POSR, p. 7.
- Moreover, approaching the virtual fence is different than pointing at it. POSR, p. 7.

Petitioner Erroneously Relies on References Not Part of Ground 1

- The Petitioner improperly relies on references not included in the prior art combinations, such as the VR Book, as a basis for demonstrating obviousness. POPR, p. 23.
- Petitioner's repeated reliance on the VR book demonstrates that the Grounds themselves do not disclose or render obvious the features of the independent claims. POSR, p. 17.
- In *In re IPR Licensing*, the Federal Circuit overturned the Board's decision where the Board relied upon a new reference in its final written decision despite the petition not mentioning it in the ground on which the Board instituted review. *In re IPR Licensing*, 942 F.3d at 1369. POSR, p. 16.
- In a footnote, Petitioner attempts to excuse its improper reliance on Dr. Begault's testimony and the VR Book, stating that these are background references within the "general knowledge" of a PHOSITA. Reply, at 12 n.2. But the Board must reject "a conclusory assertion ... about general knowledge in the art **without evidence on the record**, particularly where it is an important limitation that is not evidently and indisputably within the common knowledge of those skilled in the art." *Arendi S.A.R.L.*, 832 F.3d at 1362-64 (quoting *K/S HIMPP v. Hear-Wear Technologies, LLC*, 751 F.3d 1362, 1365-66 (Fed.Cir.2014)). POSR, p. 16.
- VR Book was not presented as prior art in an instituted ground; petitioner tries to get it in on the argument that it is "general knowledge." But there is no evidence of record that the VR Book is within the general knowledge of a PHOSITA, and so it cannot be considered. POSR, p. 17.

Petitioner Erroneously Relies on References Not Part of Ground 1

- Even if the VR Book were to be properly considered as part of Petitioner's Ground 1 prior art combination, it does not disclose a WED using Sensors to track a PED and determine when it leaves the zone. POSR, pp. 17-18.
- Petitioner's arguments on the VR book focus on how controllers have sensors, but do not explain how a WED itself tracks a PED to determine when it leaves the zone as required by claims 2, 9, and 17. POSR, pp. 17-18.
 - Petitioner's expert Welch testified that “no sane person” would do this. POSR, pp. 17-18.

Pedrotti and Jang do not Teach Selection of Virtual Objects via Pointing

- Neither Pedrotti nor Jang teach user selection of virtual objects via pointing from a hand-held PED. POR, p.10.
- Even if playing a sound for facilitating user selection was well known, claim limitation 1[d] requires playback in response to pointing at, NOT in response to selection of, of an SLP. POR, p. 10.

Pedrotti, Jang, and Begault do not Teach Playback of Binaural Sounds that emanate from SLP in Response to Pointing

- Even if playback based on selection was well known, limitation 1[d] requires playback of binaural sounds that emanate from one of the SLPs in response to being pointed at. Pedrotti, Jang, and Begault do not teach this. POR 10-11 and POSR 8.

Lack of Motivation to Combine Pedrotti and Jang

- There is no reason why a person of ordinary skill would combine Pedrotti with Jang because Jang does not address a virtual reality user physically moving in a physical space, but instead is directed to sound processing when a character moves within a virtual world to minimize lag. POPR, p. 5.
- In contrast, Pedrotti is directed to a system that allows a virtual reality user to define a “safe area” clear of physical obstacles using a stationary base station as a reference point. POPR, p. 6.

Pedrotti Teaches Away from the Claimed Tracking Method

- Pedrotti discourages the type of tracking system claimed in the '509 Patent because it relies on external base stations rather than an integrated approach. (POPR, p. 28)

Petitioner does not Properly Address Limitations 17[e], 9[c], or 2[a]

- Petitioner fails to establish the obviousness of claims 17-20 by not considering all limitations, particularly 17[e]. POR, p. 11.
- 17[e] requires “sensors that sense when the PED leaves the zone.” POR, p. 11.
- Petitioner fails to establish the obviousness of claims 9-14 and fails to address limitation 9[c].
- Petitioner refers to its analysis of limitation 2[a] to establish its burden for limitations 9[c] and 17[e]. But they say different things. 17[e] requires sensors in the WED to sense when PED leaves the zone. But 2[a] doesn’t require that, 2[a] requires tracking to determine when PED moves outside the zone.
- 9[c] states determining with the WED when the user is leaving the zone. 2[a] doesn’t say that the determining happens in the WED.
- Petitioner only refers to previous discussions about “tracking ... to determine when PED moves outside the zone.”
- These limitations are different, and Petitioner’s failure does not meet its burden to make a prima facie case. POR, p. 11-13.
- Specifically:
 1. Petitioner points to §IV.E.2 of the petition, but that doesn’t teach limitation 2[a]. POR, p. 15.
 2. §IV.E.3 doesn’t talk about sensors on the WED or tracking of PED by the sensors. POR 16. Petitioner admits here that in Pedrotti, the processor – not the sensors – tracks the controllers. POR 16.
 3. Petitioner references “chaperone systems” but doesn’t include discussion of this in the petition, instead attempts to incorporate by reference the Welch declaration. POR 16-17. This is not permitted. Also refers to VR book, but that’s not part of the combination in the petition. But even if it were, it doesn’t show that the WED’s sensors track the PED held by the user.
 4. §IV.E.4 discusses limitation 1[c] which recites “highlighting,” which has nothing to do with 2[a]. POR 18. Petitioner admits that the processor in Pedrotti tracks, but in 2[a] the WED’s sensors must track the PED.

Petitioner does not Properly Address Limitations 17[e], 9[c], or 2[a]

- A PHOSITA would not combine Pedrotti's HMD with sensors to track the controller. POR 19.
- Pedrotti doesn't teach that the HMD uses sensors within the HMD to track controllers. POR 19. Pedrotti teaches tracking happens in the base station, not the HMD/WED. POR 20-23.
- PHOSITA would not combine Pedrotti's HMD with sensors. POR 24.
 - Welch says you can either put the sources on the head and sense them with sensors somewhere else, OR put the sensors on the head and mount sources in the environment. POR 24 – 25. Welch says a POSA would think it is "hopeless" to track when both sensors and trackers are moving. See POR at 25.
 - Using sensors on HMD to track controller was not well known. Welch points to AMBRUS, but AMBRUS says that the sensors were used to track the HMD itself, not the controller. POR 26.
 - Welch points to McCulloch, but McCulloch is also used to track HMD, not the controller. POR 26-27.
 - References to VR book are inappropriate because it isn't part of the combinations in the petition. But even if it were, VR Book doesn't disclose PEDs tracked by sensors in WED. POR 28.
- Petitioner's argument that Pedrotti discloses HMD determining position of controllers confuses "tracking with sensors" with "determining" with a processor. POR 28-29. They are different.

The Proposed Combination Does Not Render Claims 9-14 Obvious

- The proposed combination fails to address the specific limitations in claims 9-14. (POR, p. 29)
- Limitations 9[b] and 9[c] require that the determination of whether the user is inside / outside the zone be made exclusively with the WED. POR, p. 29-30.
- Pedrotti doesn't show this because the processor is not in the WED. POR, p. 30.
- Petitioner's argument shows – at best – that Pedrotti determines whether controllers are inside the zone, but a user can wear the WED without holding the controllers. The claim limitations are directed toward determining the user's location, not the PED. POR, p. 30.
- Pedrotti can only determine location of controllers, not the HMD. POR, p. 30-31.
- Pedrotti does not state that a processor in the HMD performs the determining step. POR, p. 31.

Other Claim Limitations Are not Taught

- The proposed combination also fails to teach various other limitations, including those found in claims 10-11. POR, p. 32.
- Limitation 10[b], relating to binaural sound, is not disclosed for the same reasons discussed in §II.A.2.ii. POR at 9-11.
- Limitation 11[a], relating to highlighting ... in response to pointing at SLP, is also not disclosed as explained in §II.A.2.i. POR at 5-9.

Ground 2 Arguments

(McCulloch, Pedrotti, and Flaks)

Proposed Combination Does Not Render Claims 1-8 Obvious

- For the same reasons as with Ground 1, the Board found Petitioner's showing insufficient to meet the burden for obviousness in these claims. POR, p. 33.

McCulloch, Pedrotti, and Flaks do not Teach the Features of 1[c]

- Claim limitation 1[c] requires “highlighting, while the user is located in the zone and with a display of the WED, one of the multiple SLPs in the zone when the PED held in the hand of the user is pointed at the one of the multiple SLPs in the zone.”
- Board noted that Petitioner failed to make a sufficient showing for Claims 1-8 on Ground 2. POR, p. 33.
- McCulloch does not disclose highlighting an SLP when pointed at by PED. POSR, p. 5.
- Pedrotti also silent on these features, as discussed with respect to Ground 1. POR, p. 33.
- Flaks is unrelated to 1[c].

McCulloch, Pedrotti, and Flaks do not Teach the Features of 1[d]

- 1[d] requires “playing, with the WED worn on the head of the user, the binaural sound that emanates from the one of the multiple SLPs in response to the one of the multiple SLPs being pointed at by the PED held in the hand of the user.”
- The prior art does not teach the features of limitation 1[d]. POR, p. 34.
- Petitioner argues that these features were well known, but there is no teaching or suggestion in Pedrotti or McCulloch of either of these features. POR, p. 34.

Petitioner Erroneously Relies on References Not Part of Ground 2

- The Petitioner improperly relies on references not included in the prior art combination of McCulloch, Pedrotti and Flaks, such as the VR Book, as a basis for demonstrating obviousness. POPR, p. 34.
- Petitioner's repeated reliance on the VR book demonstrates that the Grounds themselves do not disclose or render obvious the features of the independent claims. POSR, p. 17.
- In *In re IPR Licensing*, the Federal Circuit overturned the Board's decision where the Board relied upon a new reference in its final written decision despite the petition not mentioning it in the ground on which the Board instituted review. *In re IPR Licensing*, 942 F.3d at 1369. POSR, p. 16.
- In a footnote, Petitioner attempts to excuse its improper reliance on Dr. Begault's testimony and the VR Book, stating that these are background references within the "general knowledge" of a PHOSITA. Reply, at 12 n.2. But the Board must reject "a conclusory assertion ... about general knowledge in the art **without evidence on the record**, particularly where it is an important limitation that is not evidently and indisputably within the common knowledge of those skilled in the art." *Arendi S.A.R.L.*, 832 F.3d at 1362-64 (quoting *K/S HIMPP v. Hear-Wear Technologies, LLC*, 751 F.3d 1362, 1365-66 (Fed.Cir.2014)). POSR, p. 16.

Pedrotti does not Teach the Features of 2[a] Including Tracking with Sensors in WED

- Pedrotti does not disclose tracking with sensors in the WED to detect the PED's position relative to the zone. POSR, p. 9.

McCulloch, Pedrotti, and Flaks Does Not Render Claims 17-20 Obvious

- Similar to Ground 1, Petitioner has not considered all limitations, and failed to address the differences between limitations 17[e] and 2[a], which have different meanings. POR, p. 35.
- McCulloch doesn't disclose 17[e] or 2[a]. Petitioner interprets 17[e] and 2[a] as equivalent, and presents the same arguments for its disclosure as for 2[a]. But the limitations are not equivalent so the argument fails. POR 35-36. Even so, the portions of the references cited to don't teach the limitations.
 - Petitioner argues that limitation 2[a] is taught by the same reference as 1[a], which recites “dividing, with a portable electronic device (PED) held in a hand of a user, an area around the user into a zone that includes multiples [sic] sound localization points (SLPs) from where binaural sound originates to the user.” This has nothing to do with 2[a] which requires tracking sensors in the HMD to track the controllers.
 - Petitioner cites McCulloch's discussion of “computing environment” but this doesn't disclose tracking sensors in the HMD, only discussion of software. POR 37.
 - Petitioner cites McCulloch's “inertial motion sensors” as tracking controllers, but those are for tracking the HMD. POR 38
 - Petitioner offers bulk cites to McCulloch but none disclose sensors in the HMD to track the PED to determine or sense when PED leaves the zone. POR 39.
 - McCulloch 8:17-28 doesn't disclose this. POR 40. Those sensors are for tracking the HMD.
 - Section V.D.4 (discussing Lim. 1[c]) relate to highlighting, has nothing to do with tracking the controller. POR 41. McCulloch's controllers (joystick, computer mice) do not disclose tracking of the controller by the HMD. POR 41-42.
 - McCulloch's HMD sensors do not track controllers. POR 42. Welch testified they don't. POR 42-43. The sensors in McCulloch are used to track the HMD, NOT the controllers. The “companion processing module” is not a disclosure of tracking controllers. POR 44.
 - Using sensors on an HMD to track a moving controller was not well known. Welch testified that no sane person would try it. POR 45.

Proposed Combination Does Not Render Claims 9-14 Obvious

- 9[b] requires “determining, with a wearable electronic device (WED) worn on a head of the user, when the user is located inside the zone.” Thus, the processor that is determining user location must be located in the WED. POR, p. 46.
- In Ground 2, Petitioner advances the same argument for 9[b] as it does for 1[b], which in turn refers to its argument for Ground 1. As such, for the same reasons discussed in §II.a.4, this argument fails. See POR at 29-33.
- McCulloch does not teach that the determination step occurs by way of a processor located in the HMD. POR, p. 46.

Limitation 9[c] is also Not in the Prior Art

- As with 9[b], the features of 9[c] are also not taught by the prior art in Ground 2
- 9[c] requires “determining, with the WED worn on the head of the user, when the user is leaving the zone”
- Specifically, nowhere in the prior art is it taught that the WED can be used to determine that the user left the zone. In the prior art, the processor within the WED does not track user position. POSR, p. 11.
- Sensors in WED as described in Pedrotti are not positioned to detect PED leaving the zone. POSR, p. 13.
- McCulloch does not teach using WED sensors to track PED. POSR, p. 14.

Limitation 17[e] is also Not in the Prior Art

- Limitation 17[e] recites that the WED “includes one or more sensors that sense when the PED leaves the zone.”
- As with 9[c], nowhere in the prior art is it taught that the WED can be used to determine that the user left the zone. In the prior art, the processor within the WED does not track user position. POSR, p. 11.
- Sensors in the WED as described in Pedrotti are not positioned to detect PED leaving the zone. POSR, p. 13.

VR Book Does Not Disclose WED Tracking

- The VR Book does not disclose WED using sensors to track PED leaving the zone. POSR, p. 17.

The Proposed Combination of McCulloch, Pedrotti, and Flaks do not teach the features of Claim 10

- Limitation 10[a] recites “determining, with the WED, when the PED is pointed at one of the SLPs while the user is located in the zone.” POR, p. 47.
- Petitioner argues that McCulloch’s controllers communicate information to HMD, but even if so, this doesn’t mean the HMD can determine when the PED is pointed at one of the SLPs while the user is located in the zone. POR, p. 47.
- Limitation 10[b] recites “and playing the binaural sound that originates from the one of the SLPs in the zone in response to the WED determining that the PED is pointed at the one of the SLPs.”
- Petitioner’s proposed combination suffers from the same deficiencies as with Ground 1. Specifically, there is no disclosure of playing binaural sound emanating from the pointed to SLP. POR, p. 47.

CERTIFICATE OF SERVICE

I hereby certify that on October 14, 2024, I caused a true and correct copy of the foregoing Patent Owner's Demonstratives to be served via electronic mail upon the following attorneys of record for the Petitioner:

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