

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SUZHOU MOJAWA INTELLIGENT ELECTRONIC CO., LTD.,

Petitioner,

v.

SHENZHEN SHOKZ CO., LTD.,

Patent Owner.

PTAB Case No. IPR2025-00842

Patent No. 11,197,084 B2

**PATENT OWNER'S RESPONSE TO PETITION FOR *INTER PARTES*
REVIEW**

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UPDATED EXHIBIT LIST

No.	Exhibit Description
Ex. 2001	Chinese patent no. CN107484054 A (“Li ’054”), original
Ex. 2002	Chinese patent no. CN107484054 A (“Li ’054”), certified translation
Ex. 2003	U.S. Patent Application Publication No. 2016/0329041A1 (“Qi”)
Ex. 2004	Declaration of Wei Yuan
Ex. 2005	<i>Shenzhen Shokz Co. Ltd. v. Shenzhen Wenming Tech. Co. Ltd. et al.</i> , Case No. 1:24-cv-06717 (N.D.Ill.), Opposition to Motion to Stay dated July 1, 2025, ECF No. 69
Ex. 2006	<i>Shenzhen Shokz Co. Ltd. v. Shenzhen Wenming Tech. Co. Ltd. et al.</i> , Case No. 1:24-cv-06717 (N.D.Ill.), Minute Order setting case deadlines dated March 13, 2025, ECF No. 50
Ex. 2007	Judge Pacold estimated trial schedule
Ex. 2008	<i>Shenzhen Shokz Co. Ltd. v. Shenzhen Wenming Tech. Co. Ltd. et al.</i> , Case No. 1:24-cv-06717 (N.D.Ill.), District Court case docket (accessed July 29, 2025)
Ex. 2009	September 20, 2024 Declaration of Wei Yuan Regarding Alternative Service, ECF No. 22
Ex. 2010	Mojawa Initial Invalidity Contentions cover pleading dated January 30, 2025
Ex. 2011	Comparison of text portions of Ex. 1004 (Li ’492 certified translation) and Ex. 2002 (Li ’054 certified translation)
Ex. 2012	Mojawa June 12, 2025 Final Unenforceability and Invalidity Contentions
Ex. 2013	Mojawa June 12, 2025 Final Unenforceability and Invalidity Contentions, Ex. B6 (AfterShokz AS800)
Ex. 2014	Mojawa June 12, 2025 Final Unenforceability and Invalidity Contentions, Ex. B7 (AfterShokz AS600)

Ex. 2015	U.S. District Court for the Northern District of Illinois Local Patent Rules, https://www.ilnd.uscourts.gov/_assets/_documents/_rules/localpatentrules-preamble.pdf , last accessed July 24, 2025
Ex. 2016	Petitioner Stipulation dated July 24, 2025
Ex. 2017	Patent Owner Stipulation regarding non-asserted claims dated Jul. 30, 2025
Ex. 2018	File History of U.S. Patent No. 11,310,582 (the “’582 patent”)
Ex. 2019	U.S. Patent No. 11,310,582 (the “’582 patent”)
NEW EXHIBITS	
Ex. 2020	Declaration of Dr. Michael Scordilis, PhD (“Scordilis”), in support of Patent Owner Response
Ex. 2021	Transcript of Patent Owner’s Deposition of Dr. Chris Kyriakakis on January 29, 2026
Ex. 2022	<i>The American Heritage Dictionary of the English Language</i> (5 th Ed.), 2011.
Ex. 2023	Mojawa’s Opening Claim Construction Brief

I. INTRODUCTION

Patent Owner, Shenzhen Shokz Co., Ltd., hereby submits its Response under 35 U.S.C. § 316(a)(8) and 37 C.F.R. § 42.120 to the Petition filed by Suzhou Mojawa Intelligent Electronic Co., Ltd. (“Petitioner”), challenging Claims 1-10 and 12-20 (“Challenged Claims”) of U.S. Patent No. 11,197,084 (“the ’084 Patent”) (Ex. 1001). *Inter partes* review (IPR) of the ’084 Patent was instituted by the Board on November 19, 2025.

Petitioner has failed to show the unpatentability of any of the Challenged Claims under the preponderance of evidence threshold across its five Grounds. Specifically, Ground 1 rests on a shaky combination that attempts to fuse a dual-ear bone-conduction headset device (Li) with a much older handheld bone-conduction phone accessory (Fujita). The references are incongruent: Fujita’s speaker features would materially compromise Li’s headset, including its waterproofing. Petitioner’s rationale—that Li lacks specifics on the speaker design and therefore any speaker, including Fujita’s, would suffice—does not supply a reasoned motivation to combine. The absence of a credible motivation is a facial and fatal defect; Ground 1 fails on that basis alone.

Ground 1’s combination also omits two principal aspects of claim 1. The first aspect relates to a particular segmentation pattern in which an ear-hook component is separated at both ends, with plugs, from housings that accommodate

electronics. Li teaches something far removed: an intentionally-structured unitary component that fully integrates the ear hook with the housings and lacks any segmentations in that vicinity. To bridge this gap, Petitioner attempts to use the knowledge of a person of ordinary skill in the art (POSITA) to fill-in for limitations that are clearly not described in the combination's references. But tellingly, none of the seven references used by Petitioner teaches what the claims actually require: plugs at both ends of an ear hook component segmenting it from adjacent housings.

The second claimed aspect missing from Ground 1's prior art combination relates to waterproofing features of the earphone, and specifically to the claim requirement that the core housing of the device be elastically abutted against the protective sleeve. Petitioner's analysis is fatally flawed because it disregards what the claim actually requires and incorrectly points to the prior art's description of potential contact between different components.

Grounds 2 to 5 against the challenged dependent claims contain additional, independent errors. For example, Ground 2 proposes replacing Fujita's piezoelectric speaker driver with a magnetic driver (via Fukuda) that is divorced from Fujita's design objectives and erases a key operational benefit of Fujita's speaker tied to Fujita's specialized piezoelectric function. Ground 5 repeats the same mistake, relying on different magnetic-driver references but offering the

same unsupported rationale.

Ground 4 likewise fails to meet dependent claims 9 and 10 limitations. Notably, Petitioner urges a redesign of Li's dual-speaker headset based on a prior-art plug meant for a single-ear reversible earpiece, but that redesign would yield unwearable configurations in Li's dual-ear device—outcomes that would deter a POSITA rather than motivate the change.

For these and additional reasons explained in this Response, Petitioner has failed to establish unpatentability of any claim by a preponderance of the evidence under any of its grounds.

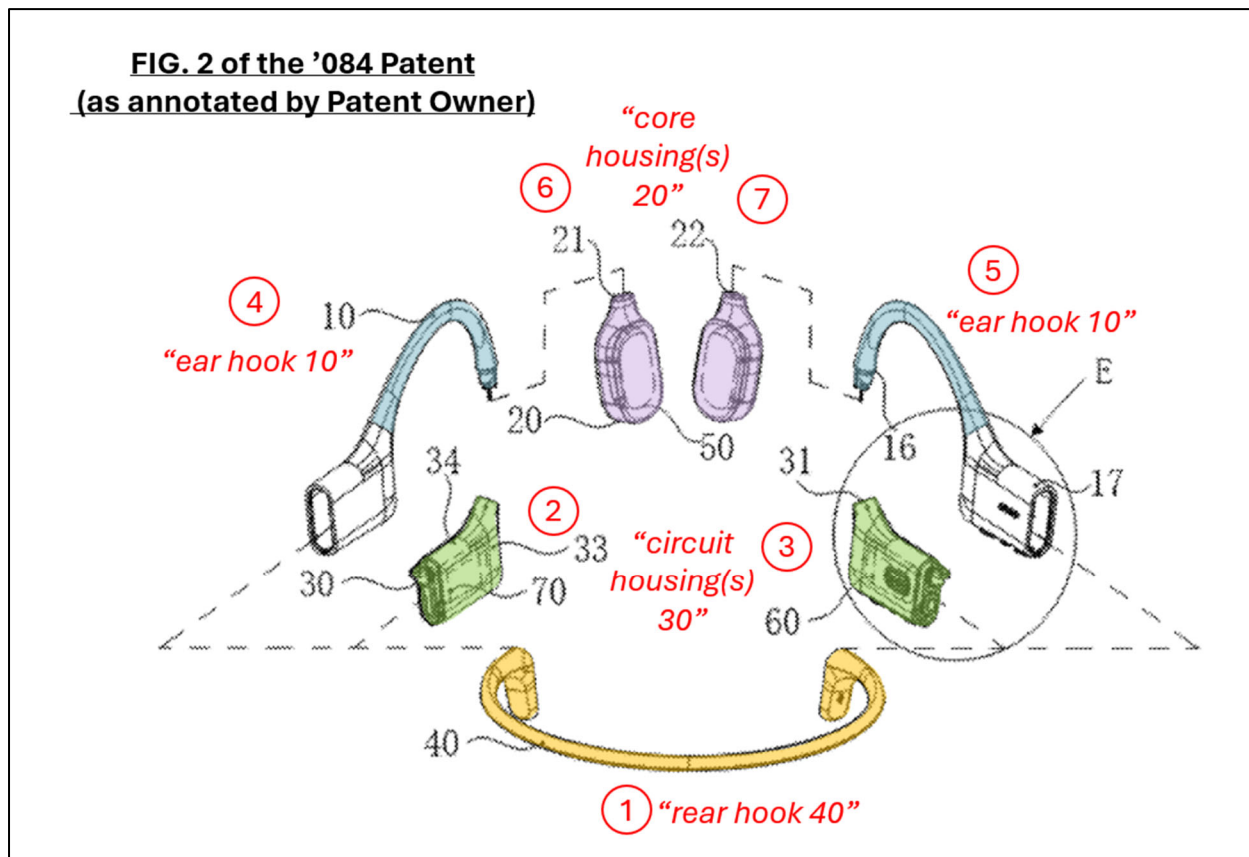
II. BACKGROUND OF THE CHALLENGED PATENT

A. The '084 Patent

The '084 Patent teaches a loudspeaker apparatus, such as an earphone, which may use bone conduction technology. Ex. 1001, Abstract, 5:66-6:1. The '084 Patent notes a desire to provide earphones with a waterproof function so that such earphones can be used in special situations such as swimming and on rainy days. *Id.*, Abstract, 1:14-32. These loudspeaker devices improve upon several aspects of prior bone conduction devices based on (1) a reduction in mold sizes needed for manufacturing due to segmentation and separation of an ear hook component from a core housing component, (2) waterproofing achieved by a protective sleeve “elastically abut[ting] against the core housing,” and (3) sound

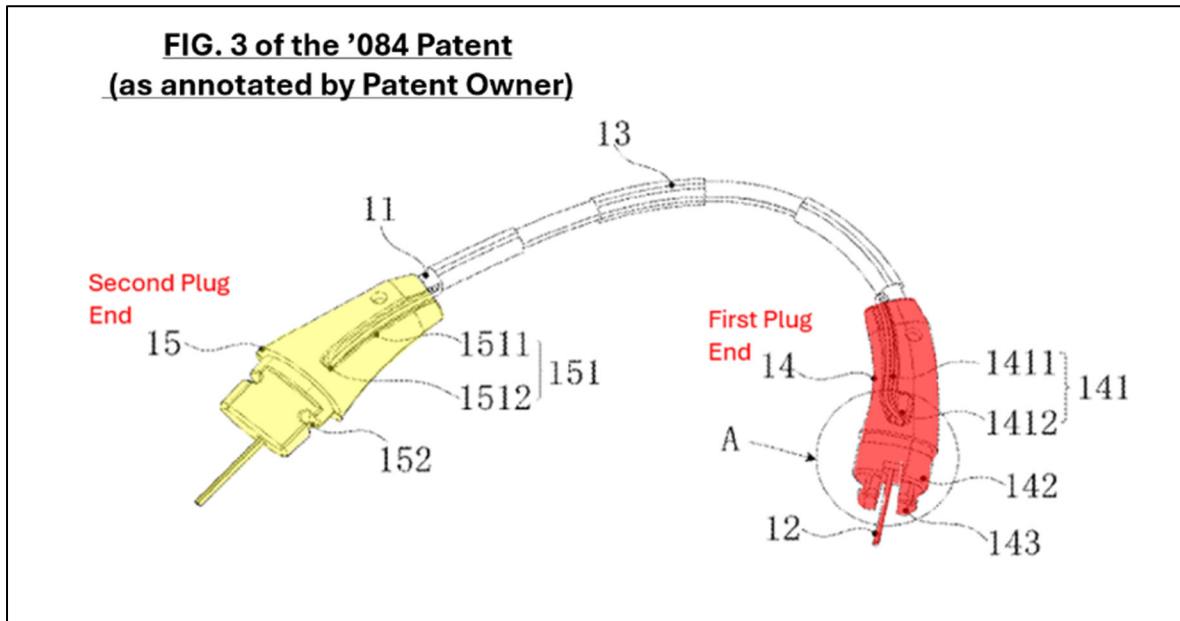
quality improvement by adjusting the angle between the normal line of the earphone's panel and the driving force generated by driving device. *Id.*, 36:13-36.

The first improvement relates to providing a highly segmented device composed of many (e.g., ***seven***) connectable components. *See, e.g., id.*, FIG. 2 (annotated below showing the segments). Core housings 20 are segmented and separated from ear hooks 10, which are also segmented and separated from circuit housings 30. *Id.*, Abstract, 8:44-9:4, FIG. 2. Rear hook 40 is also a separate component that connects the two halves of the device via circuit housings 30. *Id.*



The '084 Patent describes the benefits of this highly segmented device lie in each component, such as ear hook 10 and core housing 20, being formed with a corresponding mold. *Id.*, 11:66-12:3. The molds for individual components are smaller than a mold for multiple integrated/combined components (*id.*), which means “the difficulty of mold process” is reduced. *Id.*, 12:2-3. Additionally, as updates or modifications to specific features are needed, “it is sufficient to adjust the mold corresponding to the [specific] structure instead of adjusting the mold of another structure, so as to reduce the cost of production.” *Id.*, 12:3-9.

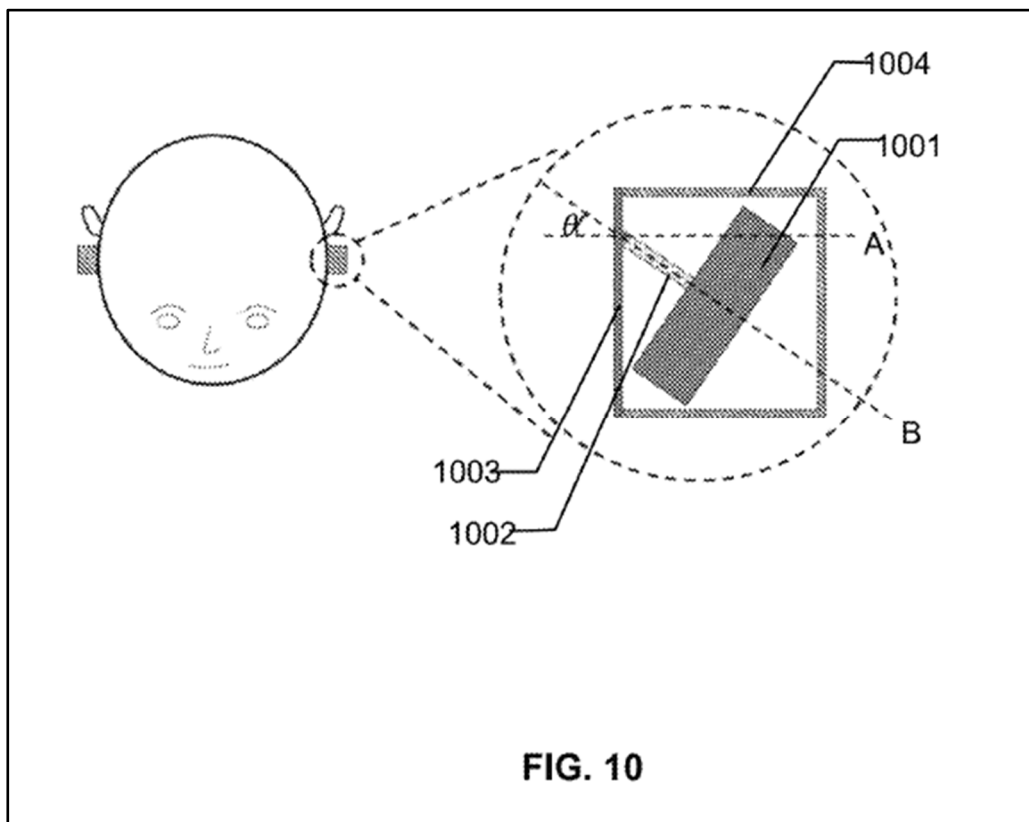
In segmenting an ear hook component for the above-described benefits, the '084 Patent describes an ear hook structure comprising a first plug end 14 (annotated in red in FIG. 3 below) connectable to a core housing and a second plug end 15 (annotated in yellow in FIG. 3 below) connectable to a circuit housing. *Id.*, 9:5-9, FIGs. 2-5.



The second improvement relates to waterproofing aspects of the earphone. The '084 Patent explains that normal earphone devices no longer meet the needs of users “in some special scenes (e.g., swimming, rainy days, etc.)” and seeks to provide earphones with waterproofing function, which are becoming “more popular with consumers.” *Id.*, 1:27-30. The '084 Patent explains the need for waterproofing in view of the segmented design of the earphone device, and particularly for the connection location between the ear hook 10 and the core housing 20 (i.e., the first plug end). *See, e.g., id.*, 13:12-67. For instance, the elastic abutment of an ear hook's protective sleeve against the core housing, where the elastic expansion of the protective sleeve ***fills and seals*** the connection space. *Id.*; *see also id.*, 36:13-17.

The third improvement relates to sound quality that can be achieved based

on “adjusting the angle between the normal line A of the panel or the normal line A' of the contact surface contacting human skin of the panel and the line B of the driving force generated by the driving device.” *Id.*, 36:21-26, FIG. 10 (reproduced below). This angling of a housing panel with respect to a loudspeaker driver improves the frequency response by balancing the sensitivities of the low and high frequency portions of the frequency response curve. *Id.*, 22:15-57.



Each improvement is reflected in the claims of the '084 Patent:¹

(1) improved manufacturability is reflected in at least elements [1a] and [1c] which recite the segmentation/separation of the ear hook and the core housing;

(2) improvements in waterproofing function are reflected in at least elements [1b] and [1c], and particularly with [1c]'s elastic abutment of the protective sleeve and the core housing; and

(3) sound quality improvements are reflected in at least element [1d]'s housing panel and the driving force generated by the earphone vibration that is not parallel to a normal line of the housing panel.

B. Claim Interpretation

A claim is construed “using the same claim construction standard that would be used to construe the claim in a civil action,” 37 C.F.R. § 42.100(b), which is governed by *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc).

¹ Patent Owner is using Petitioner's labels to identify individual limitations of claim 1. *See* Petition, *vi*.

Petitioner indicates claim 5 includes a typo and the “surface of the first plug end” recited in claim 5 should be construed as the “surface of the second plug end.” Ex. 1001, 37:21-22. Patent Owner agrees with Petitioner's interpretation.

Under the standard set out in *Philips*, Patent Owner applies the plain and ordinary meaning to each term in the '084 Patent.

Because both the Petition and the Institution Decision appear to have misconstrued or overlooked the express recitation of “elastically abutted against” in the Challenged Claims, Patent Owner provides the following explanations regarding the plain and ordinary meaning of this term.

Discussion:

“[C]laim construction must begin with the words of the claims themselves.” *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 457 F.3d 1293, 1301 (Fed. Cir. 2006). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970).

The term “elastically abutted against” appears in element [1c] of claim 1, which is the only independent claim of the '084 patent:

[1c] a core housing for accommodating an earphone core, the core housing being fixed to the first plug end and elastically abutted against the protective sleeve.

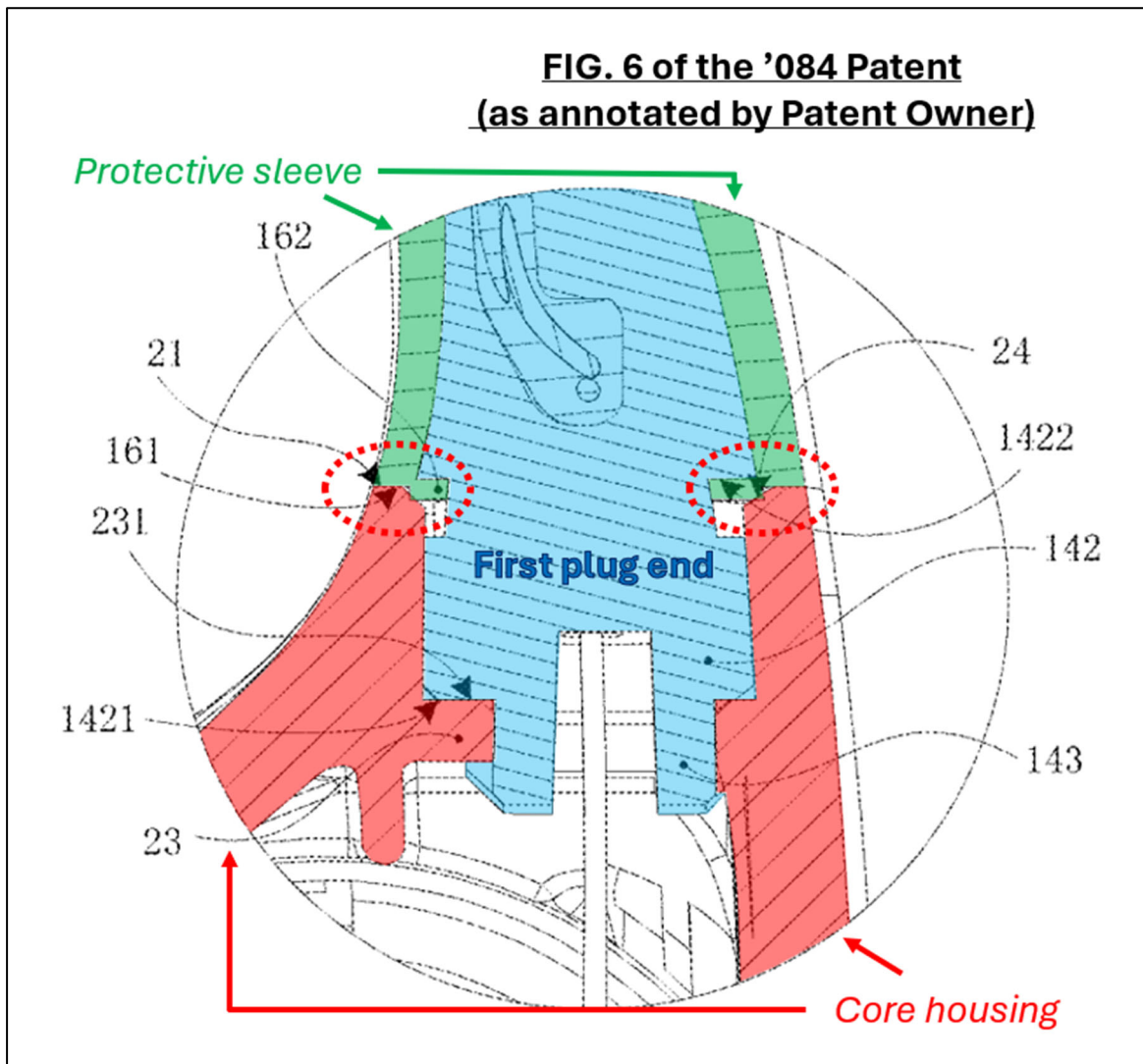
Ex.1001, 36:54-56.

A plain reading of element [1c] makes clear the express requirement of “elastically abutting against” where neither “elastically” nor “abutting” can be omitted from the meaning and scope of this claim limitation. Critically, it is improper to ignore the adverb “elastically” when interpreting “elastically abutting;” it is equally improper to ignore “abutting” by, for example, interpreting this term as “covering” a portion of an outside surface. *See* Paper 15, Institution Decision (“ID”), 60.

The word “elastically” is an adverb that functions to modify or add meaning to the word “abutted.” Together, “elastically abutted” means more than the core housing and the protective sleeve merely contacting or touching each other; rather, it requires that the core housing and the protective sleeve be in contact in an elastic manner. Ex. 2020 (“Scordilis”), ¶¶69, 72-73. A person of ordinary skill in the art (POSITA) would have been familiar with the concept of elasticity and would have understood that abutment with elasticity involves contact characterized by an elastic deformation of the protective sleeve (which the claim recites as being made of elastic waterproof material). *Id.* Furthermore, the plain and ordinary meaning of abutting is different than, for example, surrounding or covering. *Id.* As explained below, the detailed description of the present application explains in its example embodiments, that abutting of the core housing and the protective sleeve is a contact between an end surface of the housing and the protective sleeve. This

is in agreement with the dictionary definition of abut: “to touch or end at one end or side.” *See* Ex. 2022.

The '084 Patent's specification and figures include many sections that describe both elastic deformation—specifically, an elastic compression—and contact of the elastic sleeve along the end surface of the housing. *E.g.*, Ex. 1001, FIG. 6 (reproduced below with annotations). For instance, the '084 Patent illustrates and describes that a portion of the protective sleeve (annular abutting surface 161 and annular boss 162 – annotated in green in FIG. 6 below) fills the space between an end surface 21 of the core housing 20 (annotated in red in FIG. 6 below) and the annular plug surface 1422 of first plug end (annotated in blue in FIG. 6 below) when the first plug end is at least partially inserted into the core housing 20. *Id.* In annotated FIG. 6 below, the red ovals show where the core housing (red) is abutted against the protective sleeve (green).



See also *id.*, 13:14-31 (“the protective sleeve 16 may be at least partially filled in the space between the annular table surface 1422 and the outer end surface 21 of the core housing 20, and elastically abut against the core housing 20. ... the protective sleeve 16 forms an annular abutting surface 161 on the outer end surface 21 of the annular table surface 1422 facing the outer end surface of the core housing 20. The annular abutting surface 161 may be the end surface of the

protective sleeve 16 facing the core housing 20.” (emphasis added)); 13:12-14

(“the protective sleeve 16 may extend to the side of the annular table surface 1422

facing the outer end surface 21 of the core housing 20.” (emphasis added));

13:54-58 (“Specifically, *when the core housing 20 and the plug end 14 are*

plugged and fixed, the annular abutting surface 161 and the annular boss 162

may elastically abut against the outer end surface of the core housing 20 and the

connecting slope 24, respectively.” (emphasis added)).

As a result of such elastic abutting, “it is difficult for external liquid to enter the core housing 20 from the junction of the protective sleeve 16 and the core housing 20, and further enter the earphone core 50, so as to improve the waterproof effect of the MP3 player, protect the inner functional structure, and extend the lifetime of the MP3 player.” Ex. 1001, 13:19-25, 13:54-67.

Additionally, in the context of the remaining limitations of claim 1, it is clear that the ear hook itself is “surrounded” by the protective sleeve that is made of an elastic waterproof material (element [1b]), which differentiates the term “surround” from “abut.” Also, elements [1a] and [1c] provide the remaining context: in connecting (fixing) the first end of the ear hook to the core housing, the protective sleeve that surrounds the ear hook elastically abuts against the core housing.

Therefore, a POSITA at the time of the invention, by examining the claim

language itself, consistent with the examples provided with in the detailed description, would have understood that “the core housing being ... elastically abutted against the protective sleeve” describes an end surface of the core housing being in contact with the protective sleeve under an elastic force. Scordilis, ¶¶66-73.

C. Level of Skill in the Art

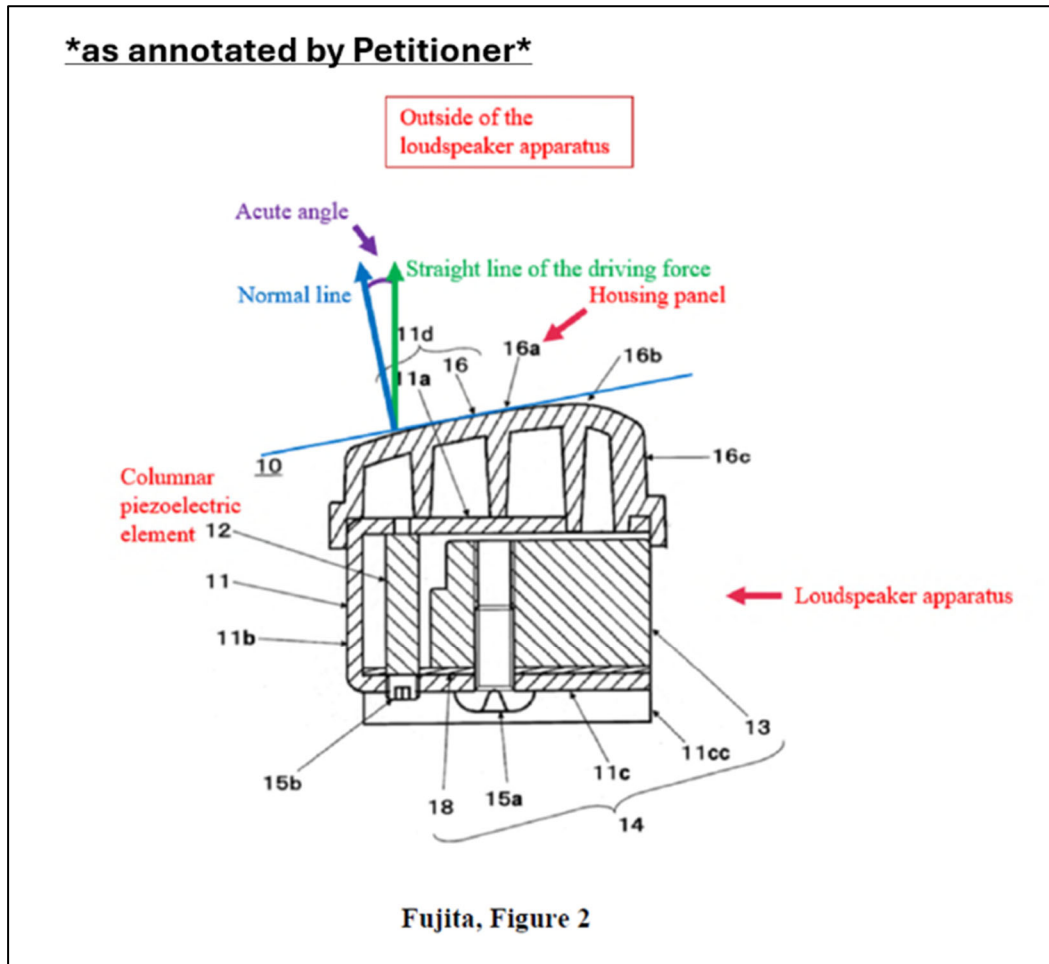
Petitioner asserts that a POSITA would have had “a Bachelor’s degree in electrical or computer engineering, or a comparable field of study, plus approximately two to three years of professional experience with acoustic technology. Additional graduate education could substitute for professional experience, and significant experience in the field could substitute for formal education.” Petition, 5. For the purpose of this IPR, Patent Owner adopts the definition proposed by Petitioner.

III. GROUND 1 FAILS TO SHOW THAT CLAIM 1 IS UNPATENTABLE OVER LI AND FUJITA.²

A. Petitioner Fails To Show That a POSITA Would Have Been Motivated To Combine Li and Fujita.

Ground 1 purports a combination in which Fujita's speaker would be simply inserted into Li's bone conduction earphone, for the alleged reason that Li "lacks details on the bone conduction speaker design, including the design of the vibration mechanism." Petition, 20-22. The Petition acknowledges that Li does not teach or suggest element [1d] that recites in-part: "*...the control circuit or the battery driving the earphone core to vibrate, the vibration of the earphone core generating a driving force to drive a housing panel of the core housing to vibrate, the driving force being not parallel to a normal line of the housing panel.*" See *id.*, 39-42. The Petition then contends that Fujita's speaker design, and specifically Figure 2 (reproduced below), teaches or suggests those limitations. *Id.*

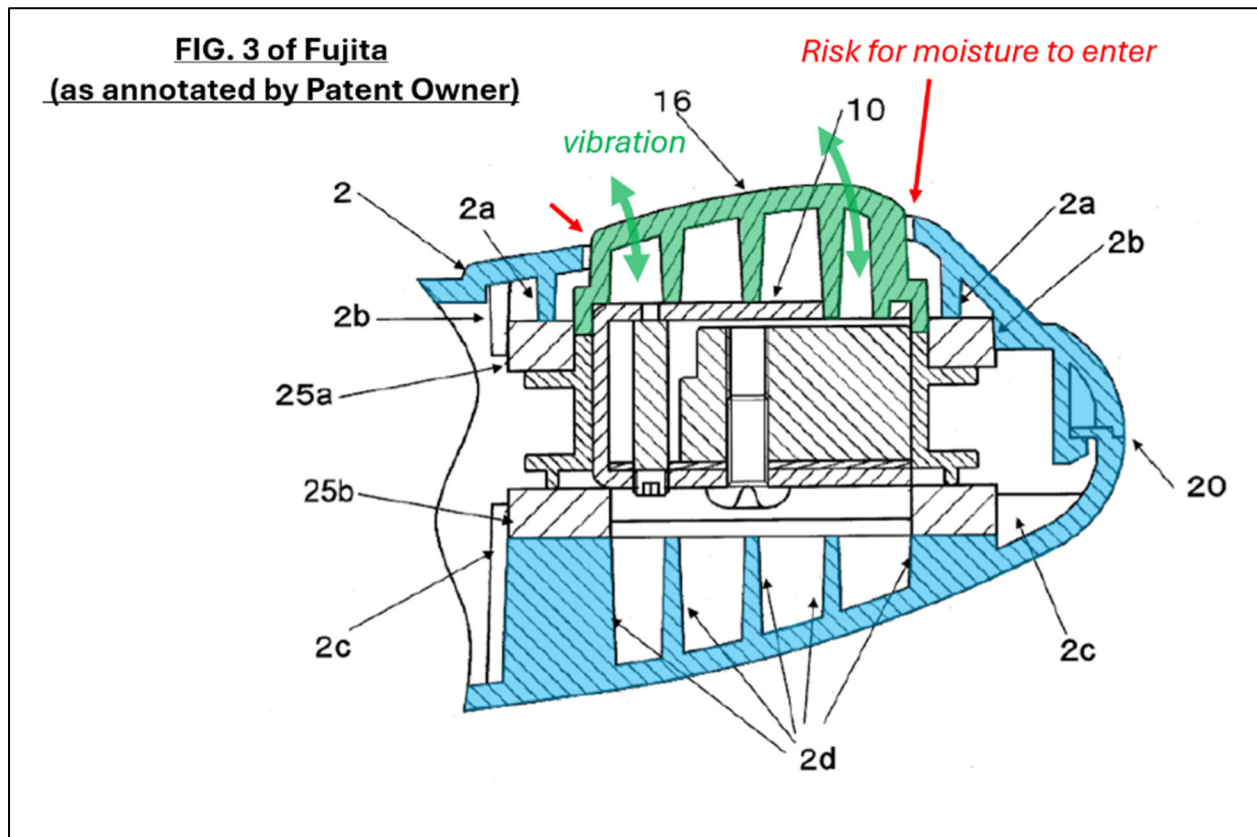
² Petitioner's Ground 1 heading indicates claims 1 and 11 are obvious. Petition, 20. But the Petition lacks any explanations for claim 11, which is also omitted from the listing of Challenged Claims. *Id.*, 1.



However, this combination would not have been obvious to a POSITA because, as explained below, Fujita's design would have introduced significant problems rendering the combined earphone ineffective or inoperable, and deterring POSITA's from making this combination. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (declining to find obviousness when the proposed modification rendered the prior art apparatus inoperable).

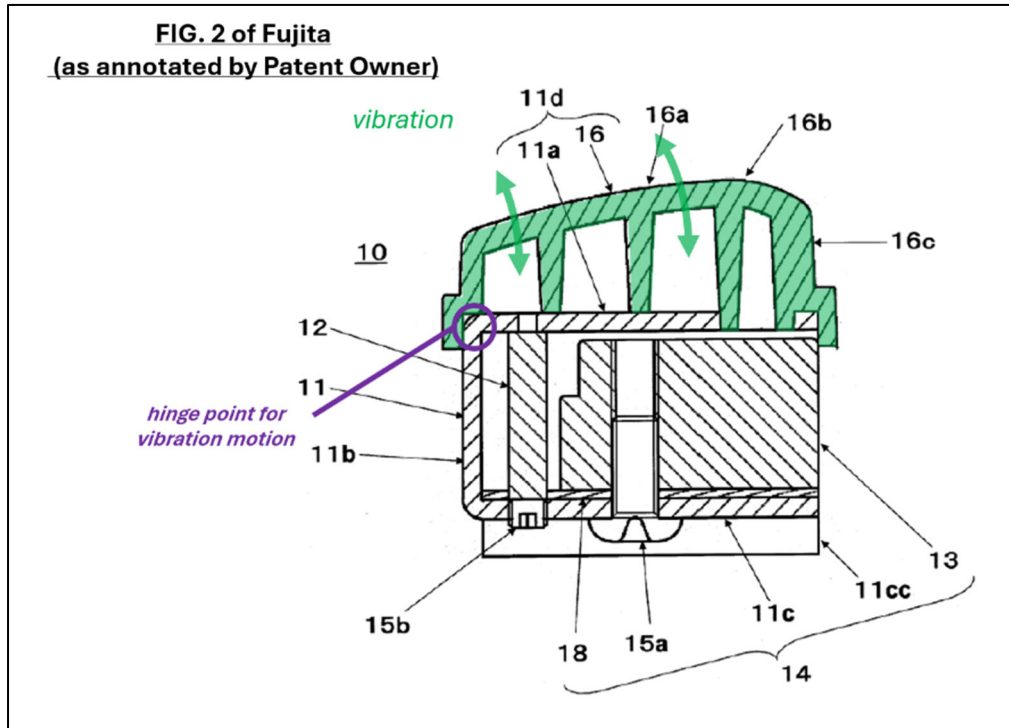
1. Fact: Fujita cannot be imported into Li without an open gap between the Fujita speaker and the Li housing.

Petitioner's proposed combination only points to Fujita's Figure 2, while ignoring the fundamental design and operation of Fujita's bone conduction speaker, which the Petition purports is part its combination because Li "lacks details on the bone conduction speaker design, including the design of the vibration mechanism." Petition, 20-22, 39-42. Fujita's Figure 3 (reproduced below) provides a more complete illustration of Fujita's bone conduction speaker including a vibrating cushion (16) which is held against the user's skin to deliver bone-conducted sound. Fujita, ¶28, FIGs. 6-8. This vibrating cushion (16) (green) protrudes out of the surrounding casing (2) (blue) in order to make contact with the user's skin. *Id.*, FIG. 3, ¶28.



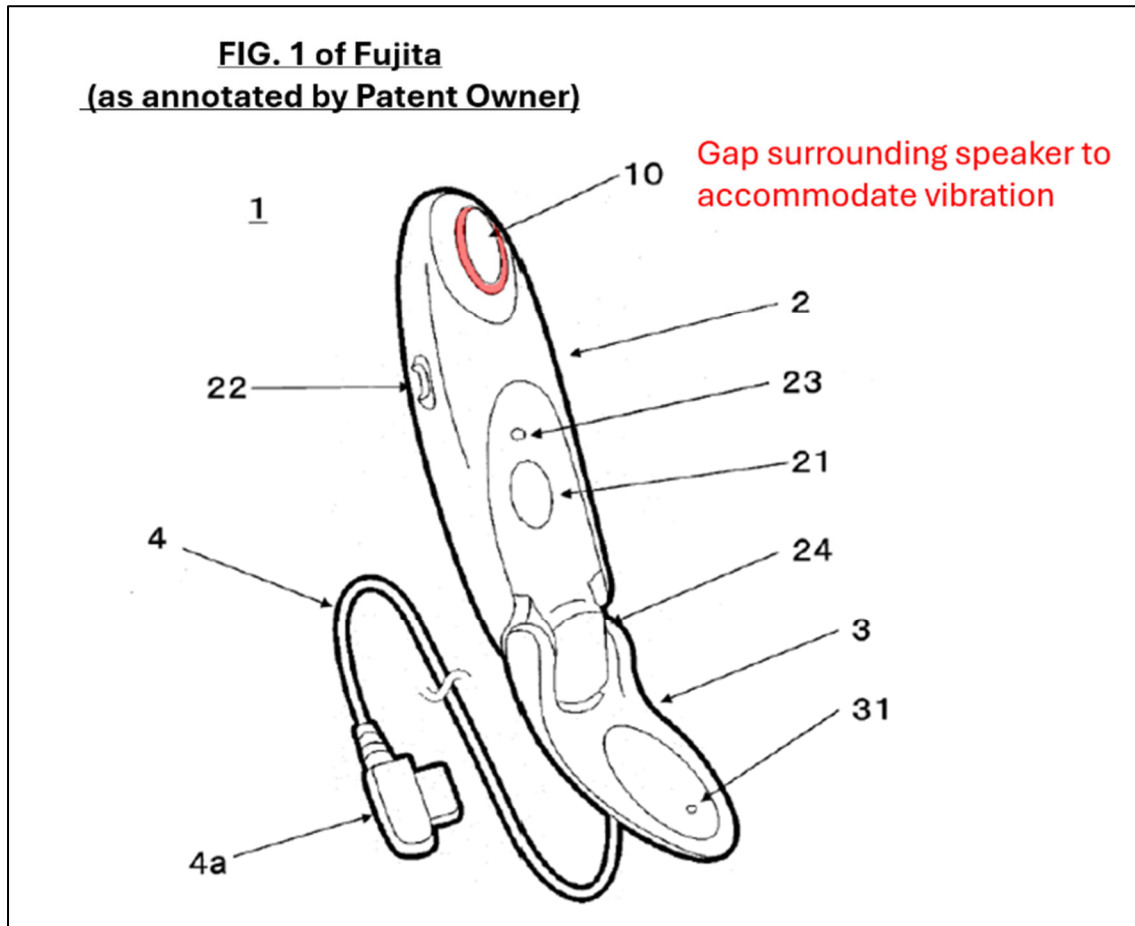
Because the vibrating cushion (16) needs to vibrate to transmit sound, it cannot be connected to the surrounding casing (2). *See, e.g.,* Fujita, FIG. 3. Specifically, as annotated Figure 3 (above) shows, the vibration motion of cushion (16) (green) necessitates a gap between the edges of cushion (16) (green) and the surrounding casing (2) (blue). *Id.* The vibration motion of cushion (16) is hinge-like and includes both a vertical component and a horizontal component. Fujita, ¶¶27, 41, FIG. 2 (reproduced below with annotation). Accordingly, a gap between cushion (16) and casing (2) is needed to allow and accommodate the vibration motion of the cushion. Petitioner's combination of Li with Fujita must therefore

allow for the movement of cushion (16) and necessarily a gap between cushion (16) and earphone's housing (2). *Id.*; see also Scordilis, ¶¶77-79.



2. Problem #1: Importing Fujita into Li results in significant waterproofing issues that deter a POSITA from the combination.

A POSITA would have recognized this gap as a significant waterproofing vulnerability. Scordilis, ¶¶80-86. Clearly, the open space between cushion (16) and surrounding casing (2) would allow moisture to enter the interior portions of the casing where sensitive electronics are located. *Id.*; see also Fujita, FIG. 1 (annotated below). The annotated Figure 1 below also shows Fujita's gap as part of Fujita's housing hand-held device; this (or a similar) gap would necessarily be present in Li's modified design based on Fujita's teachings. Scordilis, ¶¶80-86.



Fujita itself is not concerned with waterproofing and is silent with respect to any waterproofing solutions or the need therefor. *Id.* Indeed, Fujita (dated over a decade before Li and the '084 Patent) would not have been concerned with waterproofing, as waterproofing was not recognized as a viable option for the older and ordinary applications to which Fujita is directed, including *Fujita's handheld phone* illustrated in its Figure 1. *See* Ex. 1001, 1:27-29 ("Ordinary earphones can no longer meet the normal use of users in some special scenes (e.g., swimming, rainy days, etc.)."). For instance, Fujita's device requires a wired connection to a

mobile phone and also needs a user to actively hold it by hand. *See* Fujita, ¶¶22-23, 40, FIG. 8. Clearly, Fujita did not intend or design its device to be applicable to the later-developed special applications, such as swimming or exercise, in which waterproofing requirements arose. Scordilis, ¶¶80-86.

Yet, a POSITA seeking to improve or modify Li's device would have sought to maintain the waterproofing of Li's device (which is also part of the Challenged Claims limitations). *Id.* Li's device had wireless capabilities that enabled hands-free use, and included ear hooks (Li, Abstract, ¶38) and repeatedly-described waterproofing features including an elastic coating layer, waterproof screens, and waterproof lining boards. *See e.g., id.*, ¶37; *see also, id.*, ¶¶56, 71, 73, 75, Claim 14.

As such, a POSITA would not have found Fujita's speaker design concept as appropriate for Li's device whatsoever, as it would have devolved Li's device from a waterproof one to a non-waterproof one, rendering it unsuitable for its intended applications. Even if a POSITA wanted to force the issue, they would have had no reasonable expectation of success, and it would have been well beyond the POSITA's skill and knowledge how this annular and elliptical gap could be made waterproof while still allowing the bone conduction speaker in the center to freely vibrate. Scordilis, ¶¶80-86.

Critically, while the Petition relies on Li's elastic coating layer in purporting

that element [1b] is obvious (Petition, 30-32), it fails to provide any explanation as to how a POSITA would have overcome the significant waterproofing flaws, or why a POSITA would have sought such a combination in the first place, given that it would have been completely useless for waterproofing applications.

3. Problem #2: Importing Fujita into Li requires complex sound leakage mitigation considerations that were not obvious to a POSITA.

By the time of invention's priority date in 2019, a POSITA would have recognized that the open gap between vibrating speaker and surrounding casing would lead to unpredictable and irremediable sound leakage. Scordilis, ¶¶87-88. The importance of sound quality and considerations of sound leakage caused by open air spaces would have also been readily understood by a POSITA based on Li alone:

Generally, bone conduction speaker transmits sound to *the surrounding environment* during vibration ... For example, the vibration of the bone conduction speaker causes the *vibration of the air in the second accommodating space 117* and the vibration of the fourth housing 115, *resulting in sound leakage and affecting the sound quality of the bone conduction earphone.*

Li, ¶50 (emphasis added).

In modifying Li based on the teachings of Fujita, Petitioner proposes using

Fujita's cushion (16) in Li's device. But as explained above, this combination would have required a gap between the housing and cushion (16) to allow it to move in-and-out as it vibrated. A POSITA would have found it *beyond their ordinary skill and knowledge* to manage the sound leakage acoustic effects from Fujita's open gap, which is annular, elliptical and surrounds the moving cushion. The inclusion of such annular and elliptical gap between the housing and the vibrating surface that moved up-and-down would have produced complicated acoustic effects that a POSITA having a bachelor's degree and 2-3 years of experience with acoustic technology would not have been able to mitigate. Scordilis, ¶¶87-88.

Importantly, the Petition fails to account for this critical design consideration and has no explanation whatsoever to account for the sound quality deterioration in its proposed combination that would have dissuaded a POSITA from using Fujita's speaker in Li's device.

4. Petitioner's alleged motivations to combine fail to overcome the deterrents recognized by a POSITA.

Although waterproofing and sound leakage were widely recognized parameters in Li's earphone device design, Petitioner wholly ignores these aspects in its hypothetical Li-Fujita combination. *See* Paper 1, 20-22. Petitioner focuses on superficial benefits such as the ability to make "accurate contact with the face"

or to contact similar locations on a user's head based on Fujita's *hand-held* device, which are of marginal or no relevance to Li's *hands-free* device. Scordilis, ¶85.

These and any other superficial benefits and perfunctory explanations provided by Petitioner are not comparable to, and cannot be balanced against, the significant waterproofing and sound leakage drawbacks of Fujita discussed above. As explained (*see, e.g., infra* §III.B.2), waterproofing and sound leakage are essential features of Li's earphone and appear prominently in its disclosure with descriptions of specific components and design features that avoid moisture leakage and mitigate sound quality deterioration due to open gaps.

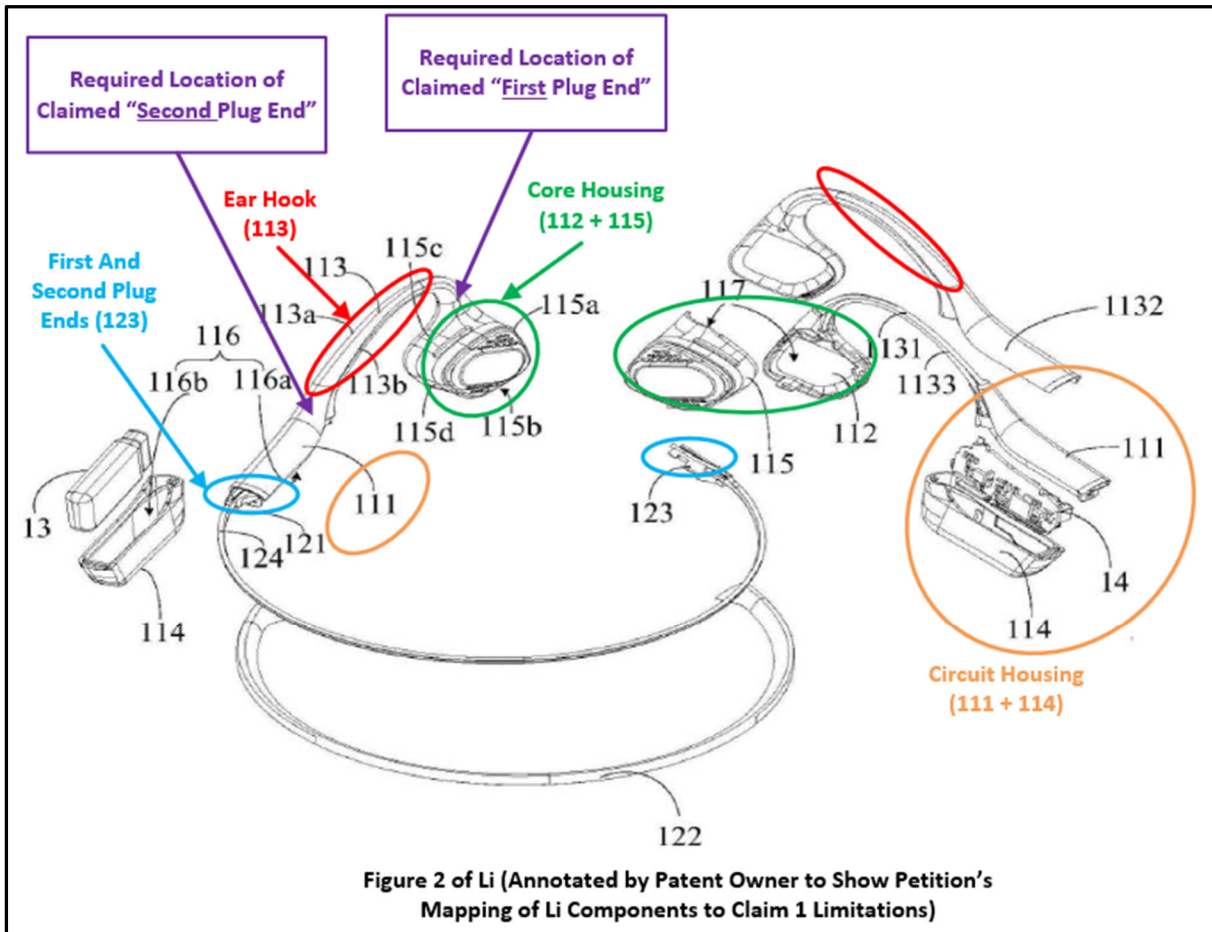
Furthermore, both Li and the Challenged Claims include waterproofing features that a POSITA cannot ignore when attempting to combine Li with Fujita in asserting that the Challenged Claims are obvious. Yet, the Petition opts to completely sidestep these serious flaws in the combination and instead provides unsubstantiated statements, such as "Fujita's bone conduction speaker would enhance the efficiency of transmitting sound using the Li earphones" (Petition, 21), or mechanically state that "applying known techniques (Fujita's bone conduction speaker) to a known device ready for improvement (Li's bone conduction earphones) to yield predictable results operating bone conduction earphones with improved sound efficiency)." *Id.*

As shown above, Petitioner has failed to establish that a POSITA would

have been motivated to combine Li and Fujita, or would have had any reasonable expectation of success. Ground 1 therefore fails.

B. Li Fails to Teach or Suggest a First or a Second Plug End at the Claimed Locations, and Neither Does Any of Petition's Interchangeable Modularity Prior Art

Petitioner's mappings of the relevant Li's components to the limitations of claim 1 are illustrated in the annotated Figure 1 below. Petition, 24-30, 32-35.



One of the fundamental shortcomings of Li is its failure to teach or suggest a "first plug end" or the "second plug end" at the claimed locations that (1) provide a

segmented and separate ear hook component and (2) allow the “core housing” to be “fixed to the first plug end,” as recited in element [1c] and the “circuit housing” to be “fixed to the second plug end,” as recited in element [1d].

The Petition appears to acknowledge these shortcomings but asserts that “it would have been obvious for a POSITA to add an ear hook including a first plug [and a second plug] end to Li [at the claimed locations] ... given that modular speaker portions of headsets were well-known as of the priority date of the '084 Patent.” *Id.*, 27, 28.

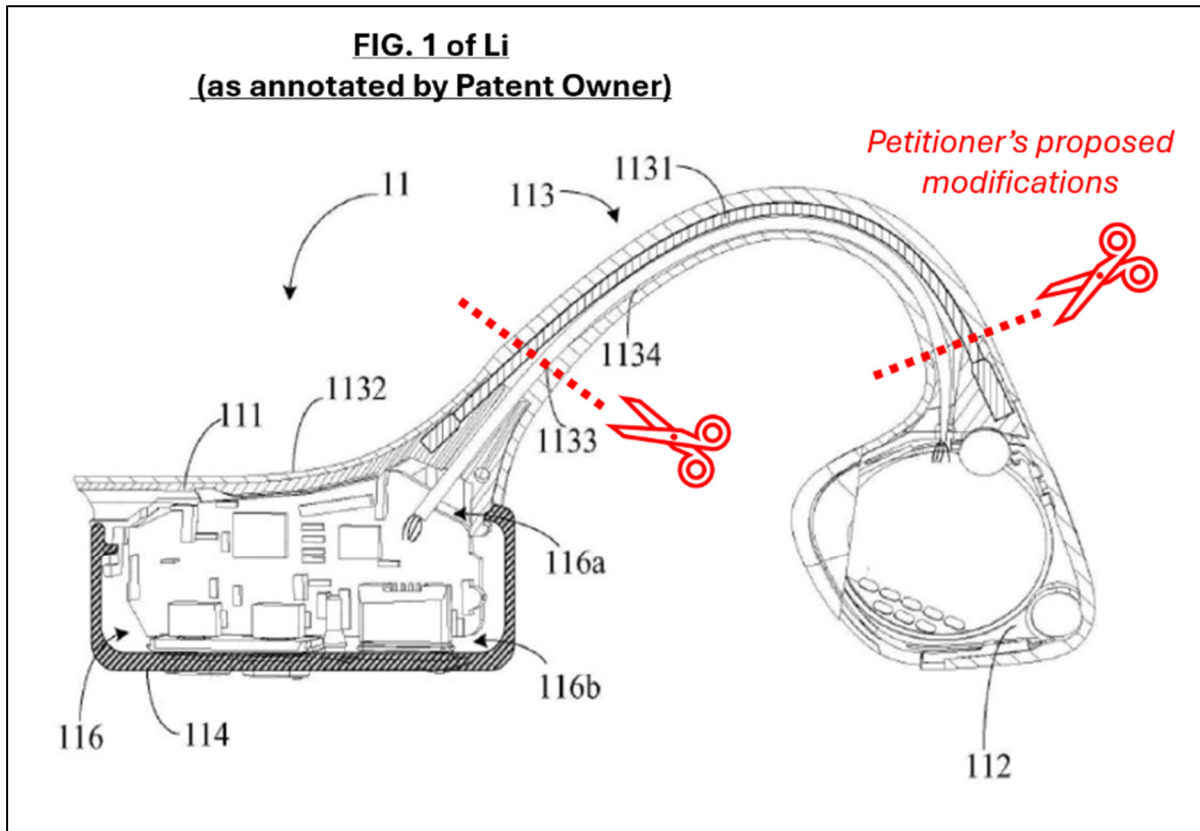
Petitioner's assertions are flawed for several reasons as further explained below.³

³ The Institution Decision indicated that there is a *reasonable likelihood* that claim 1 is unpatentable, despite Patent Owner's arguments in its Preliminary Response regarding Petitioner's failure to render the claimed first and second plug ends obvious. *See, e.g.*, ID, 45. Patent Owner submits that this Response includes ***additional rationale*** for why the Petition has failed to show obviousness of the first and second plug ends, which provides an even more compelling case illustrating Petitioner's failure under the higher *preponderance of the evidence* threshold under 35 U.S.C. § 316(e).

1. A POSITA would not have found it obvious to add additional segmentations to Li's configuration in contradiction to Li's teachings related to structural stability of its design.

“Evidence suggesting reasons to combine cannot be viewed in a vacuum apart from evidence suggesting *reasons not to combine*.” *Arctic Cat Inc. v. Bombardier Recreational Prods.*, 876 F.3d 1350, 1363 (Fed. Cir. 2017) (emphasis added).

A POSITA would not have found it obvious to arbitrarily add four additional segments to Li's earphone given Li's emphasis on structural integrity and express teachings about having an integrated design. Scordilis, ¶¶94-95. Specifically, Petitioner's proposed modification to Li's earphone design would have required, on each side of the earphone, cutting the connecting component 113—an integrated single-piece component—into three segments, as illustrated in FIG. 1 of Li below.



This arbitrary segmentation would have been in direct contradiction to what Li described in having “*the first housing 111 and the second housing 112 are fixedly connected to both ends of the first elastic metal wire 1131 by injection molding.*” Li, ¶29 (emphasis added). As Li explains, this type of integrated design improves the structural stability of the earphone. *Id.*, ¶¶34, 35 (“...the first housing 111 and the second housing 112 are *formed by injection molding and fixed to the two ends of the first elastic metal wire 1131* arranged in a flat shape ... *making the first elastic metal wire 1131 and the first housing 111 and the second housing 112 more stably fixed to each other.*” (emphasis added)).

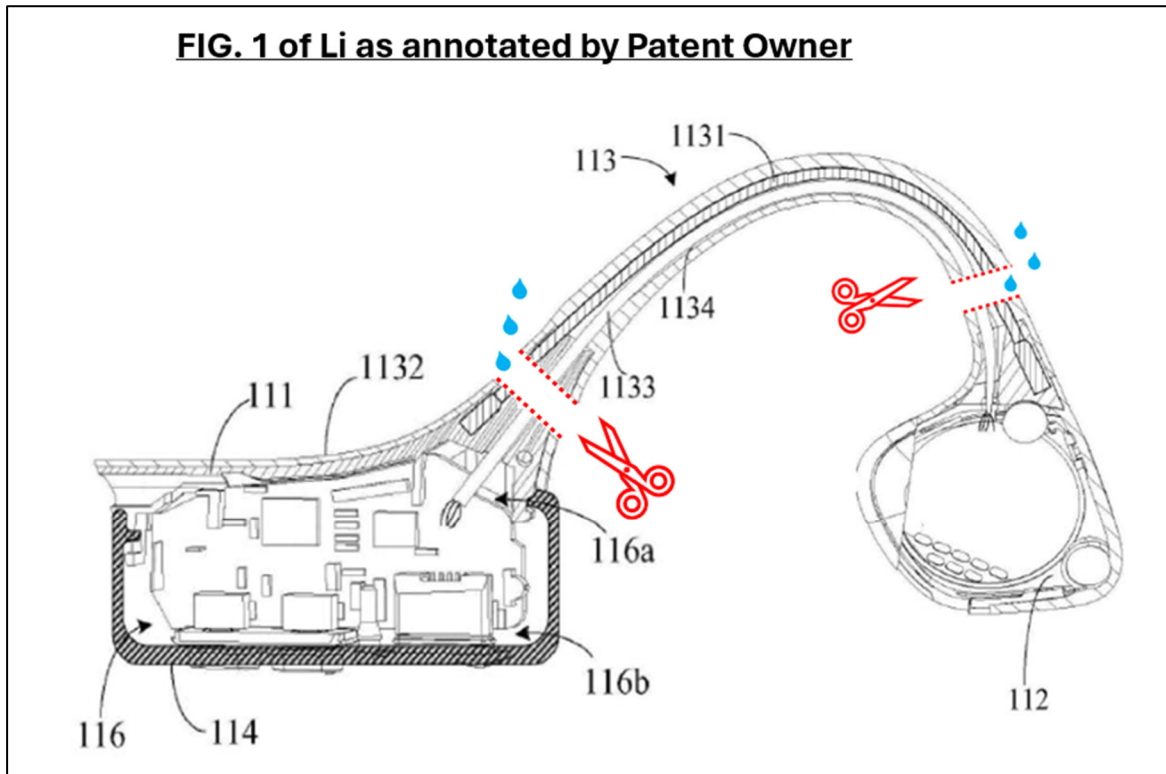
In fact, improving structural stability of the bone conduction earphone was a major theme in Li's description, which would have cautioned a POSITA against attempting to modify Li's unitary structure. Scordilis, ¶¶98-102; *see also* Li, ¶26 (“...effectively enhance the bending performance and ***structural stability*** of the bone conduction earphone...”), ¶29 (“...makes the connection ... more stable, and enhances ***the sense of unity*** and texture of the bone conduction earphone...”), ¶35 (“making the first elastic metal wire 1131 and the first housing 111 and the second housing 112 ***more stably*** fixed to each other”), ¶62 (“...enhancing the ***structural stability*** of the bone conduction earphone”) (emphasis added).

It is unclear—and the Petition fails to provide any reasons beyond its general assertions of “well-known” benefits of modularity—why a POSITA would act in contradiction to Li's preference for a unitary ear hook structure by segmenting each ear hook into **three pieces** while risking mechanical issues such as relative displacement, shaking, or parasitic noise. The general knowledge of modular design alone would not have made it obvious to arbitrarily create multiple segments in Li's connecting component 113 at the claimed locations. Scordilis, ¶¶98-102. Any such specific modifications would be based on impermissible hindsight because none of the Petition's interchangeable modular prior art (as explained below) teaches or even suggests segmentation of an earphone **at the claimed locations**. *See infra* § III.B.3.

2. A POSITA would not have found it obvious to add additional segments to Li's configuration because of waterproofing concerns.

Aside from structural integrity issues, separation of an integrated structure into multiple components, as Petitioner proposes, would have increased the number of openings and points from which water could have entered the internal portions of the structure. In earphone device design, additional entry points are a concern when placed near electronic components that are sensitive to moisture. Scordilis, ¶¶103-109.

Again, the Petitioner-proposed modifications would have segmented the one-piece design of element 113 (on each side of the earphone) into three separate sections, as shown in Patent Owner's annotations to FIG. 1 of Li below. These modifications, however, would have necessarily created multiple seams in Li's elastic coating layer 1132, thereby allowing water or moisture to seep through into the electronic components residing in the housings at both sides of element 13. Scordilis, ¶105.



Notably, Li touted the unitary design of its elastic coating layer 1132 that “fixedly wrapped around the first elastic metal wire 1131 by injection molding” (Li, ¶29), further covering the surfaces of the housings 111 and 112 (*id.*, ¶36), and providing a waterproofing mechanism. *Id.*, ¶37; *see also id.*, FIG. 1 (showing uniform coverage of coating layer 1132 over Li’s entire hook assembly and adjacent housings); *see also*, Petition, 35 (“Li acknowledges the benefits of having a coating of the protective sleeve **over the entirety** of the ear hook and the core housing, such as wear-resistance”) (bold emphasis added).

The seams in Li’s elastic protective layer 1132 necessitated by Petitioner’s proposed modifications would have been yet another point of failure for the

Petitioner-proposed modifications to Li's earphone that contradicted common sense and were at odds with Li's teachings. Therefore, a POSITA would not have been motivated to make such modifications, and in fact would have been dissuaded from making such problematic design changes.

The adverse effects of a three-segmented structure would have been even more pronounced in Petitioner's purported combination of Li with Fujita, where Li's housing 112 would contain Fujita's piezo-based speaker. *See* Petition, 20-22. As Patent Owner's expert Dr. Scordilis explains, water entering into Li's housing 112 would have interfered with the conduction of signals for the piezoelectric element driving Fujita's speaker, for instance, with short circuiting and electric field interference. Scordilis, ¶80. Beyond electrical problems, water infiltrating Li's housing and Fujita's speaker would degrade the operation of the complex and intricate moving parts, by affecting driving precision, reducing piezoelectric conversion efficiency, dampening vibration, and distorting the audio output. *Id.*

Furthermore, Fujita's speaker relied on a specific hinge-like vibration motion driven by the piezoelectric element (Fujita, ¶¶36-38), and moisture within the speaker housing 112 would have dampened the vibration motion and affected the speaker's sound quality. Scordilis, ¶80.

Additionally, none of the seven interchangeable references teach or suggest segmentation of an earphone at the claimed locations or address waterproofing

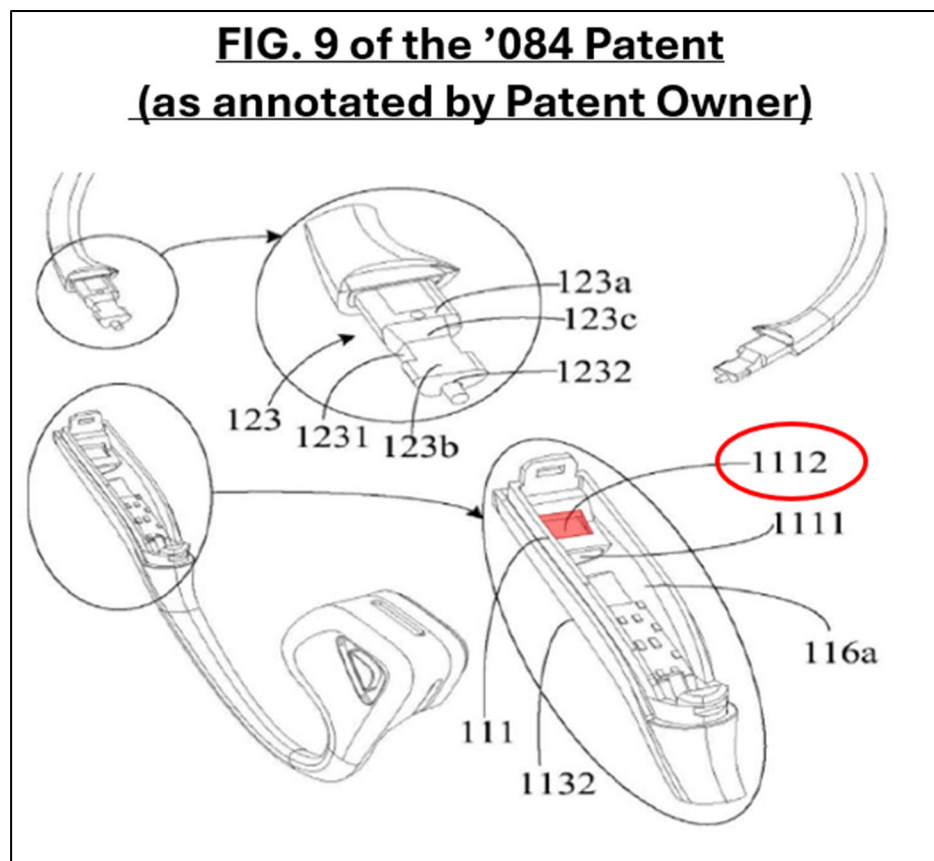
issues that result from such modifications. Notably, not a single one of the seven interchangeable references is concerned with or discusses how their modular components might be waterproofed. Therefore, those references would not have motivated a POSITA to create extra segments in the uniform waterproof sleeve of Li that rendered the device susceptible to water damage.

3. Li's strong preference for a unitary structure is inconsistent with the interchangeable modularity represented by Petitioner's seven-reference motley.

Notwithstanding the previously discussed deterrents against Li's plugs being replicated at two ends of Li's connecting component (113), Petitioner asserts that the general knowledge of interchangeable modularity for audio headsets—as purportedly demonstrated by a motley of seven different references—would have been sufficient to motivate a POSITA to replicate Li's plugs. Petitioner's assertion fails, because this principle of interchangeable modularity is inconsistent and incompatible with Li's own teachings. Scordilis, ¶¶110-113.

As explained above, a major theme throughout Li's description is structural stability, arising with mentions of “*fixedly* connected,” “more stably *fixed*,” “formed by injection molding and *fixed*,” and more. *See* Li, ¶¶29, 34 (emphasis added); *see also id.*, ¶¶26, 35, 62. This focus of Li not only is manifested by Li's emphasis on having a unitary ear hook structure, as well as a unitary protective layer that covers the entirety of the ear hook and its two housings (*see supra*

§ II.B.1; Li, ¶36), but fixation and stability particularly also arises with Li's plug connections on its rear suspension assembly, where Li teaches in detail that *adhesives and locking pieces are used to secure the plugs once connected. See id.*, ¶¶60, 61. For instance, Li specifically provides an opening (1112) in housing (111) receiving plug-in portion (123) "to allow the application of adhesive or the installation of a locking piece ... into the plug-in hole 1111 from the outside via the opening 1112, so that the plug-in portion 123 is fixed in the plug-in hole 1111 under the action of adhesive or locking piece." *Id.*; *see also id.*, FIGs. 9-10 (annotated below).



Interchangeability is inconsistent with Li's adhesive-based or locked plug connections. Notably, Petitioner purported "benefits" of modularity as allowing "component replacements and removability, upgrades" (Petition, 26) would have been completely irrelevant to Li's unitary and locked-in-place earphones. A plug secured "under the action of adhesive or locking piece" would not have been understood to provide interchangeability or modularity because such a connection is not reversible or readily disconnectable. There is no suggestion whatsoever in Li that the plug-in portions (123) would be removed once assembled and once the adhesive or locking piece is added, making any assertion of interchangeability irrelevant. Scordilis, ¶¶110-113.

4. None of the interchangeable modularity prior art describes plug ends at the claimed locations.

Additionally, not one of the seven-reference motley teaches the actual claimed configuration of plugs being located at two ends of an ear hook component, and Petitioner's use of the seven-reference motley does not even stretch to that extent.

Petitioner simply relies upon the seven references to demonstrate that the general principle of interchangeable modularity existed, meanwhile declining to even assert that any of the references teaches this modularity being realized at plug connections at two ends of an ear hook component. *See, e.g.,* Petition, 19-20, 25-

30. When referring to these seven references, the Petition speaks in broad strokes:

“The speaker portions were modular for various reasons, such as component replacements and removability, upgrades, and reducing manufacturing and production costs due to the simple shape of components.” *See id.*, 26. But it fails to rely on any particular element(s) or configuration(s) that include ear hook plug locations that are recited in claim 1. *See id.*

Petitioner's expert Dr. Kyriakakis confirmed as much in deposition:

Q: You're relying on the Hupkes reference to show interchangeability as a general principle, not the specific location of a junction of an ear hook. Correct?

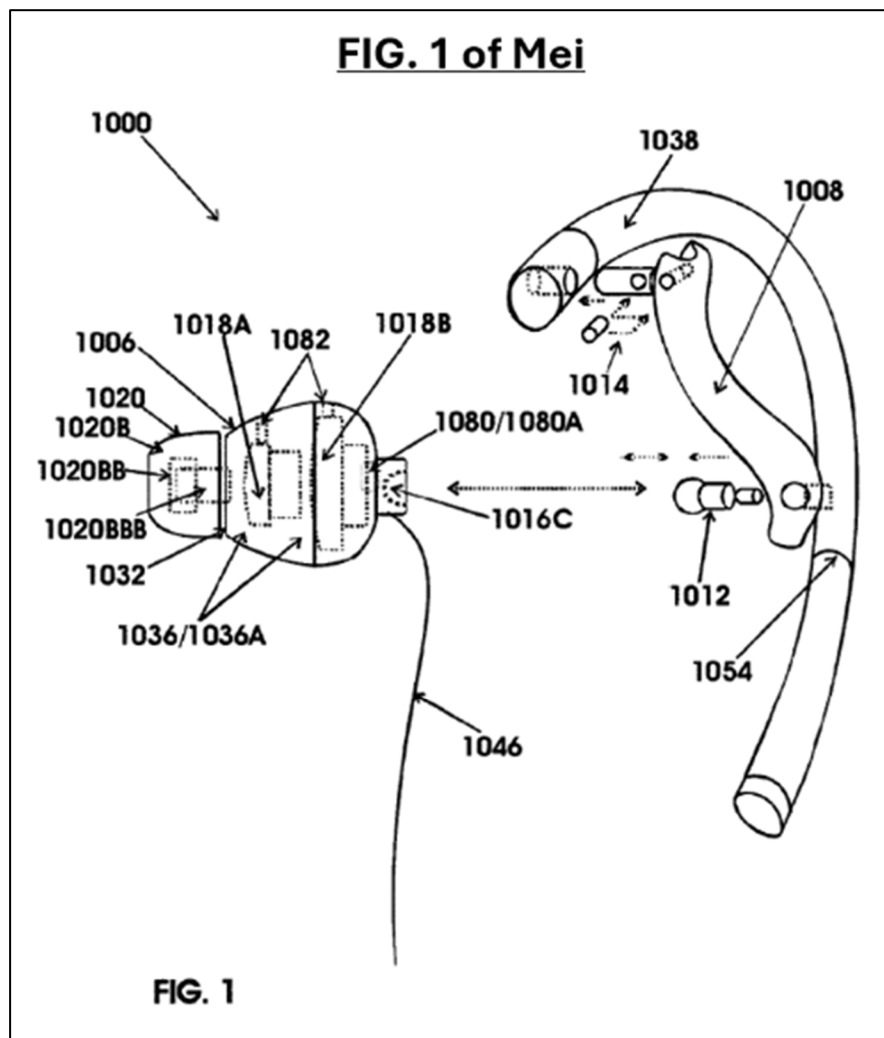
A: Not just the Hupkes. I'm relying on *all those seven examples* to show--it was my attempt to show that a POSITA understands very well *the concept of interchangeability*, and here are seven different types of product examples where that happens.

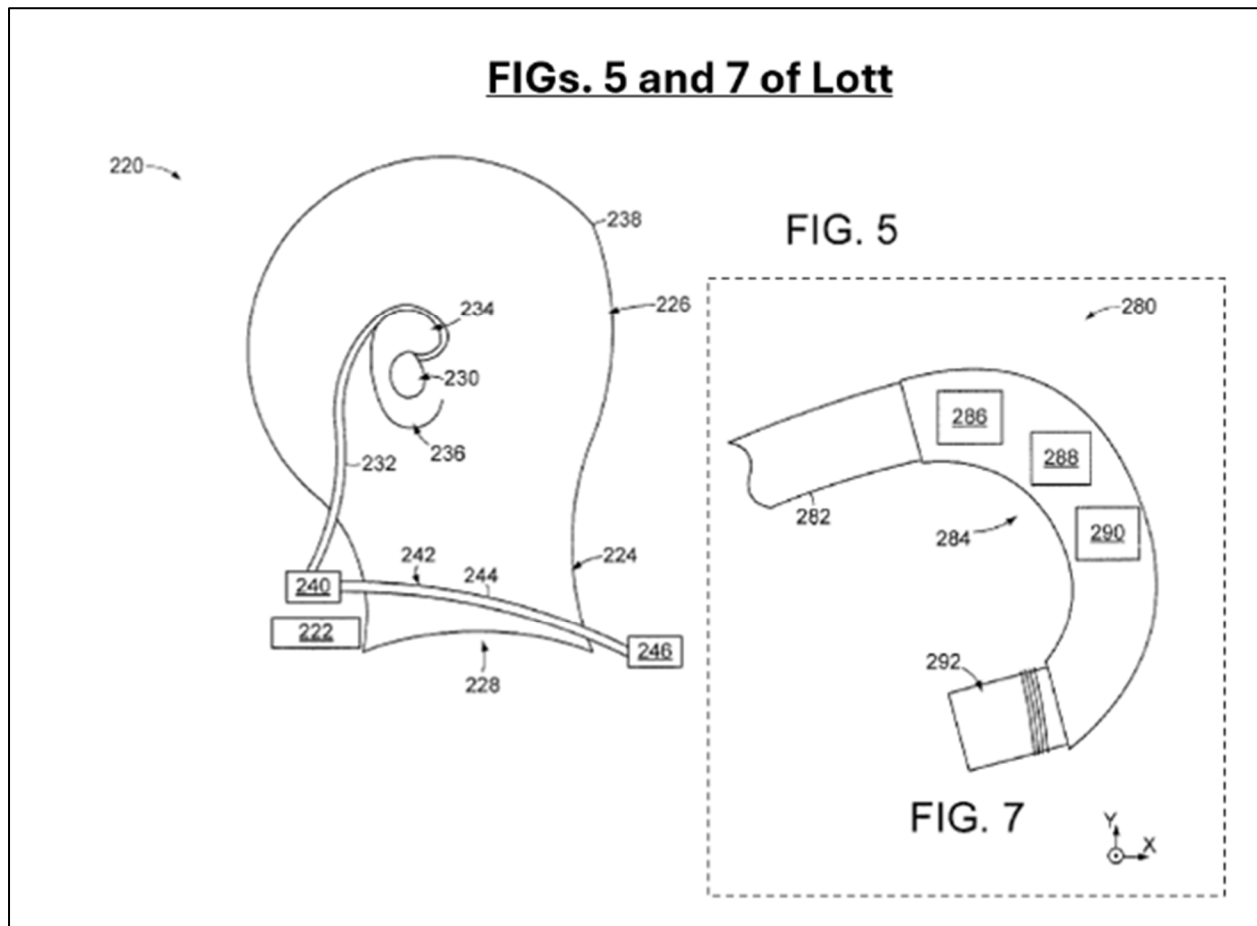
Ex. 2021, 77:4-13, 81:24-82:15 (emphasis added).

Tellingly, none of the seven references teaches the claimed configuration. Of the seven “interchangeable” prior art references, five references fail to disclose any component that even resembles an ear hook component at all: Hupkes (Ex. 1011) and Dyer (Ex. 1012) are directed to *in-ear earbuds*; Chen (Ex. 1014) and Bellas (Ex. 1016) are directed to *over-ear headphone earcups*; and Eggebraaten

(Ex. 1019) is directed an audio cable input jack. Petitioner does not allege otherwise and only relies upon these references to argue that “speakers were modular for various reasons” and that “control circuit and/or battery portions were modular for various reasons.” *See* Petition, 19-20, 25-30.

Of the two remaining references, Mei (Ex. 1013) discloses an ear band unit (1038), and Lott (Ex. 1015) discloses an auxiliary ear hook extension (280). *See* Mei, FIG. 1 (reproduced below); Lott, FIGs. 5, 7 (reproduced below).





Neither Mei's ear band unit nor Lott's ear hook extension teaches the claimed configuration of a separate ear hook component with plugs on both ends fixable to adjacent housings. Notably, Petitioner *never* relies on Mei or Lott for any specific teaching related to modularly separated ear hooks.

Given that Li describes none of the two plug ends at the claimed locations, and contrary to Li's emphasis on a unitary ear hook design (*see supra* § III.B.1), a POSITA would have needed to make, not just one, but *two cuts* in Li's ear hook assembly to satisfy the claimed limitations. There is no explanation in the Petition

as to why a POSITA would be motivated to modify Li's ear hook assembly *multiple times at multiple locations*.

In essence, Petitioner's argument, at best, is predicated on the tangential premise that two references, Mei and Lott, describe earphone devices with segmented modules at some location different than what claim 1 recites, and therefore, a POSITA would have found it obvious to segment Li's earphone at the exact two locations recited the claims. Such a conclusion not only is legally wrong (*see infra* § III.B.4) but also fails to account for the serious problems associated with making such modifications to Li's earphone (*see supra* §§ III.B.1 and III.B.2 *supra*), and contradicts Li's teachings about a unitary design preference (*see supra* § III.B.1).

5. Interchangeable modularity as a general principle is legally insufficient to show connections at specific locations between specific components.

The thrust and extent of Petitioner's argument is a POSITA had general knowledge that modularity of various headset components "such as speaker portions and control circuit housing portions" had certain benefits. Petition, 25-27. Petitioner, however, declines to take the required next step of showing why a POSITA would apply that general knowledge to arrive at the exact claimed configuration with plug connections at both ends of the ear hook component.

"[K]nowledge of a problem and motivation to solve it *are entirely different*

from motivation to combine particular references to reach the particular claimed [invention.]" *Innogenetics, N.V. v. Abbott Lab 'ys*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (emphasis added). Similarly, obviousness requires that a POSITA "would have combined elements from specific references ***in the way the claimed invention does.***" *ActiveVideo Networks, Inc. v. Verizon Commc 'ns, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)) (emphasis in original). In *ActiveVideo*, the Federal Circuit rejected obviousness arguments based upon a similar modularity argument by the patent challenger for being "conclusory and factually unsupported," as well as "fraught with hindsight bias." *Id.*, 1327. The expert supporting obviousness had concluded that "[t]hese are all components that are modular, and when I add one, it doesn't change the way the other one works," and meanwhile, the expert failed to explain the combinations of prior art references and the results thereof with any specificity. *Id.* The Federal Circuit determined that this approach boiled down to a conclusory statement that a POSITA would have known how to combine any of a number of references to achieve the claimed inventions "based on the 'modular' nature of the claimed components." *Id.* The Federal Circuit disapproved of this "modularity" approach, finding it fatally infected with hindsight bias and lacking in a proper motivation to combine. *Id.*

Similarly, here, there is a tangible difference between a general knowledge

of headset modularity and the specific motivation to apply that general knowledge in a certain way by adding plug ends *at specific claimed locations*.

Petitioner has failed to provide any explanations connecting the general knowledge of headset modularity to the specific claim requirements. Therefore, Petitioner has failed to meet its burden of showing obviousness of the Challenged Claims.

6. Petitioner improperly relies on POSITA's knowledge to backfill missing descriptions in the prior art.

The Petition's over-reliance of a knowledge of a POSITA to account for missing teachings or suggestions in the Petition's prior art is impermissible under Federal Circuit law and is inconsistent with USPTO practice. In the Petition, the references that actually form the combination in Ground 1 (Li and Fujita) fail to teach the claimed first and second plug ends, and their connections to the core housing and the circuit housing. Also, none of the interchangeable modularity prior art describes those plug ends at the recited locations. *See supra* § III.B.4. Instead, the Petition relies on a POSITA's general knowledge as a fill-in for the missing prior art description that spans across multiple claim elements [1a], [1c]

and [1d], as annotated below in red.⁴

[1pre] A loudspeaker apparatus, comprising:

[1a] an ear hook including *a first plug end and a second plug end*,

[1b] the ear hook being surrounded by a protective sleeve, the protective sleeve being made of an elastic waterproof material;

[1c] a core housing for accommodating an earphone core, *the core housing being fixed to the first plug end* and elastically abutted against the protective sleeve; and

[1d] a circuit housing for accommodating a control circuit or a battery, *the circuit housing being fixed to the second plug end*, the control circuit or the battery driving the earphone core to vibrate...

Petitioner's use of the interchangeable modularity prior art, however, is a clear instance demonstrating the Petition's reliance on a POSITA's purported general knowledge of modular earphone design to substitute for limitations that are

⁴ Beyond the "plug" limitations of claim 1, Petitioner's positions against other claim 1 elements, as well as Petition's other Grounds profess to rely upon "the knowledge of a POSITA." See Petition, 20, 42, 60, 81, and 101 (section headers for each Ground); see also Petition, Table of Contents.

nowhere to be found in the prior art references, including in any of the interchangeable modularity prior art themselves.

The USPTO has identified this specific practice as contravening the requirement that an IPR petition “must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” *See* 37 C.F.R. § 42.104(b)(4). Acting Director Coke Morgan Stewart issued a Memorandum dated July 31, 2025,⁵ clarifying that under enforcement of this Rule 104 (b)(4), “general knowledge”[] may not be used to supply a missing claim limitation.”

While the July 31 memo provides an express prohibition for IPR petitions filed on or after September 1, 2025, its reasoning and rationale derive directly from Federal Circuit law. Memorandum, 2 (“past efforts by the Office to permit limited use of general knowledge to satisfy a missing claim limitation are ***no longer***

⁵ Memorandum from Coke Morgan Stewart, *Enforcement and Non-Waiver of 37 C.F.R. § 42.104(B)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews* (Jul. 31, 2025)

https://www.uspto.gov/sites/default/files/documents/aapa_memo_final_signed.pdf?utm_campaign=subscriptioncenter&utm_medium=email&utm_source=govdelivery

consistent with Federal Circuit precedent.”) (emphasis added).

The guiding principle that the Federal Circuit and the USPTO have outlined—that IPR grounds cannot be based upon a POSITA’s general knowledge—applies here. Petitioner’s reliance on general knowledge to supply the missing limitations of a separate ear hook component with plug ends fixable to housings is legally impermissible, and Ground 1 thusly fails.

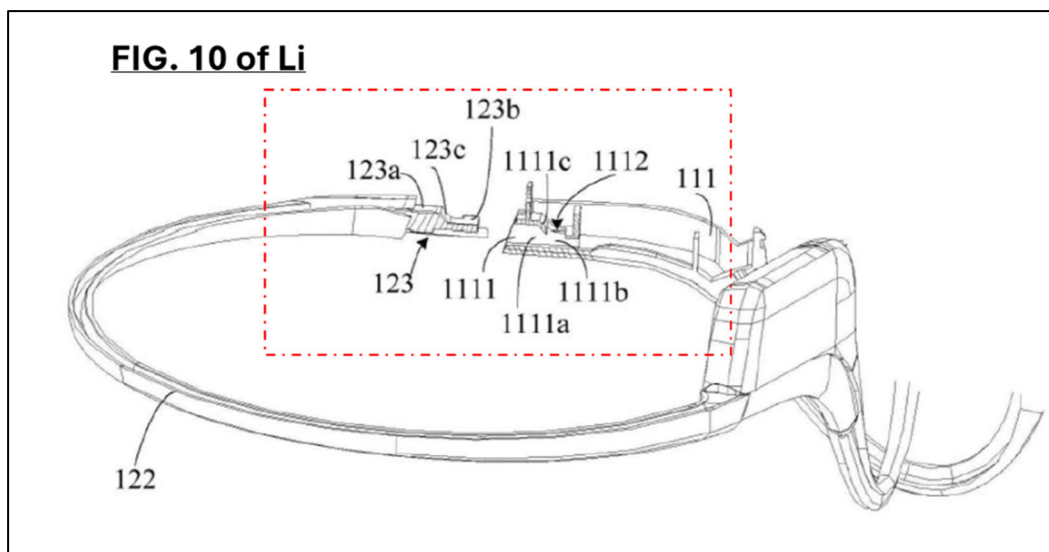
C. Li Fails to Teach “The Core Housing Being ... Elastically Abutted Against the Protective Sleeve” (Element [1c]).

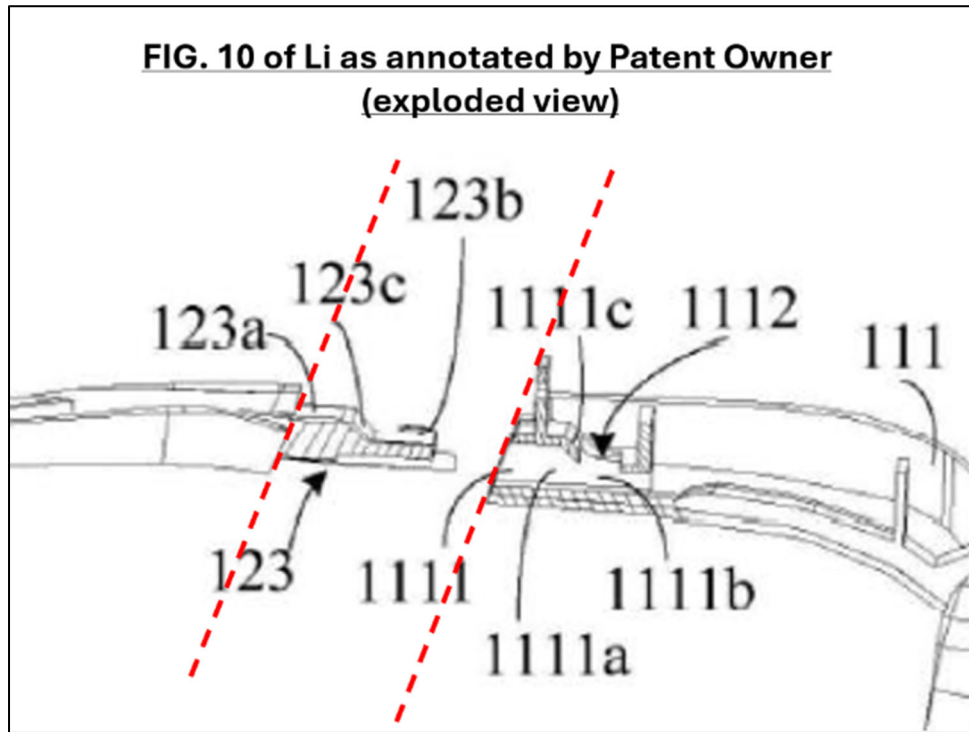
Element [1c] recites “a core housing for accommodating an earphone core, the core housing being fixed to the first plug end and elastically abutted against the protective sleeve.” Element [1c] reflects an improvement to waterproofing function in reciting the elastic abutment between the protective sleeve and the core housing. *See infra* § II.A. As explained above, this elastic abutment involves an end surface of the core housing being in contact with the protective sleeve under an elastic force, thus providing a waterproof sealing function. Nothing in the Petition, or the references it relies on, teaches or suggests that the core housing is **abutted** against the protective sleeve, or that it is **elastically** abutted against the protective sleeve. Scordilis, ¶¶118-129.

1. Li lacks any teaching or suggestion that its rear plug connection is “elastically abutted.”

Li discloses a rear hook assembly with plug-in portions for connecting a rear

hook assembly to two behind-ear housings of a bone conduction earphone. Li, FIG. 10 (reproduced below, including an exploded view of the red dotted rectangle), ¶58. The rear hook assembly has an elastic coating layer 122 up to the plug-in portions 123, which remain uncovered. *Id.* Notwithstanding that the plug-in portion 123 of Li is located at the back of the earphone and not at the claimed location, there is nothing in Li to suggest that Li's elastic coating layer 122 is elastically abutted (e.g., compressed) against the housing 111 (“*elastically* abut”). Scordilis, ¶¶119-125.





The extent of what Li's figures themselves show is that the respective ends of the elastic coating layer 122 and the housing have matching profiles. *See, e.g., supra* Li, FIG. 10 (exploded view with annotations). Given the matching profiles (see red dashed lines in the annotated figure above), a POSITA would have expected that, at best, the ends of the elastic coating layer 122 on both sides of the gap would contact each other when the plug was fully inserted into the housing. But this is far from the claimed "*elastically* abut," which requires contact under an elastic force. Not only is the description of Li absolutely void of any relevant explanation, but also nothing in Li's figures shows or suggests elastic abutting of the relevant components. Scordilis, ¶¶119-125.

Specifically, Li's figures do not clearly show a fully inserted plug (123)

positioned within the plug-in hole (1111). *See, e.g.,* Li, FIG. 2 (left plug inserted but without elastic coating layer present), FIG. 9 (showing plug 123 separated from plug-in hole 1111), FIG. 10 (failing to show how far the plug 123 inserts into plug-in hole 1111). Any speculations about the length of the elastic coating layer 122 and plug 123 based on the drawings would be impermissible, making it impossible to derive any teaching that the elastic coating layer 122 elastically abuts against the housing. *See Hockerson-Halbertstadt, Inc. v. Avia Group Int'l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000) (“patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.”).

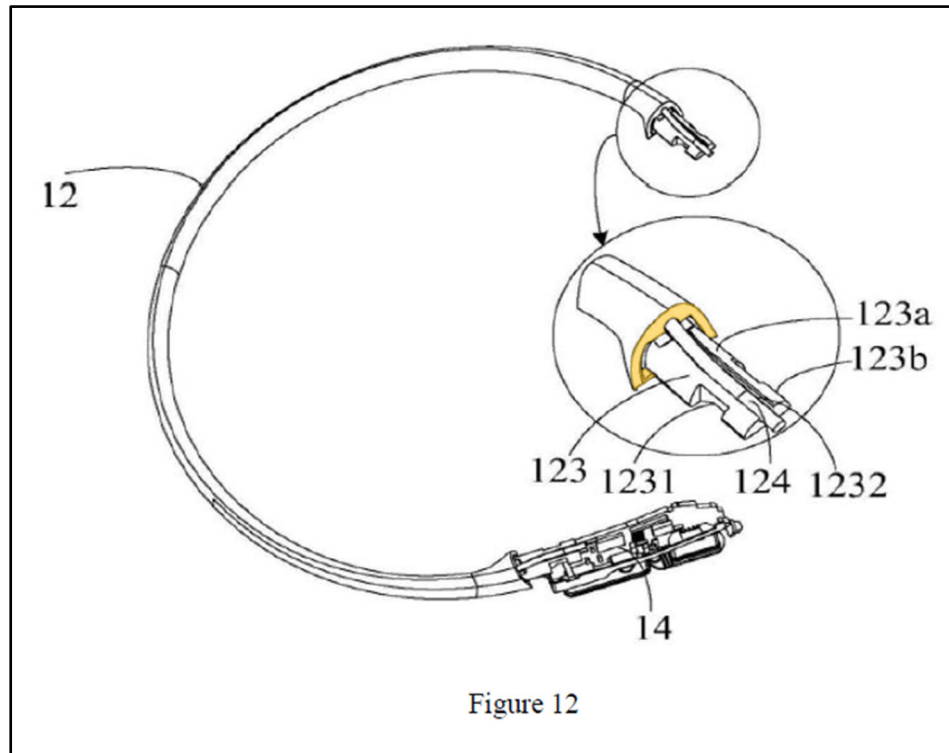
Meanwhile, Li's specification remains silent on where and how the elastic coating layer 122 is disposed when the plug-in portion 123 is fully inserted. *See* Li, ¶¶58-69. For example, while Li's detailed description explains that the depth of insertion of the plug-in portion can be between 6-11 mm (Li, ¶60), there is no mention of the elastic coating's length and no explanation about the length of the unexposed plug end (123). Li also mentions an elastic convex portion that is located *inside* the plug-in hole 1111 and is compressed when the plug-in portion 123 is fully inserted. *Id.*, ¶60. But rather this element is 6-11mm deep inside of housing 111 (i.e., part of plug-in hole 1111) and not even a part of the elastic coating layer 122. *Id.* Thus, under no interpretation, this elastic convex

component inside of Li's housing can be confused with the claimed elastic protective sleeve that is wrapped around the outside of the ear hook assembly. Scordilis, ¶122.

Patent Owner also respectfully notes that the Board is incorrect when it briefly assumes that Li discloses "second elastic coating layer 122 with end portions ***extending over*** each plug-in portion 123." *See* ID, 59 (citing Li, FIG. 10) (emphasis added). As explained in Section II.B, the plain and ordinary meaning of the term "elastically abutting" means elastic contact at an end surface of the housing. Therefore, while Li's provides no teachings that the coating layer 122, at the location of the plug, covers or extend over the plug junction, even if the coating layer 122 "extended over" or "covered" the housing, it still would not satisfy the elastic abutting requirement in the context of claim 1.

Furthermore, Li's figures do not show the elastic coating layer extending past the furthest point up to where the plug-in portion can be inserted into the housing. *Id.* Instead, Li at FIG. 12 actually shows an end surface of the elastic coating layer 122 being approximately flat and not protruding past the base of the plug-in portion. *See* Li, FIG. 12 (annotated below to show a flat end surface of the elastic coating layer). Critically, Li's specification does not describe that the elastic coating layer extends over or extends past the plug-in portions. As a result, Li fails to teach a configuration that results in the elastic coating layer being

“elastically abutted against” the core housing, and fails to render the Challenged Claims obvious.



Beyond these deficiencies, Li also would not have inspired a POSITA to add this feature. As Li professes, the disclosed plug connection is designed for “the structural stability of the bone conduction earphone” by ensuring “a tight fit” between the rear hook assembly and the behind-ear housings. Li, ¶¶62, 64. Li teaches structural considerations but does not guide a POSITA towards a waterproofing solution recited in the Challenged Claims. In fact, Li already provides a separate waterproofing solution with a waterproof lining board within the housings. Li, ¶¶71-73. Given that Li already described a waterproofing

solution, a POSITA would have had no reason to redesign Li's plug and or to, in hindsight, rely on "elastic abutting" to waterproof Li's plug connection. Scordilis, ¶125.

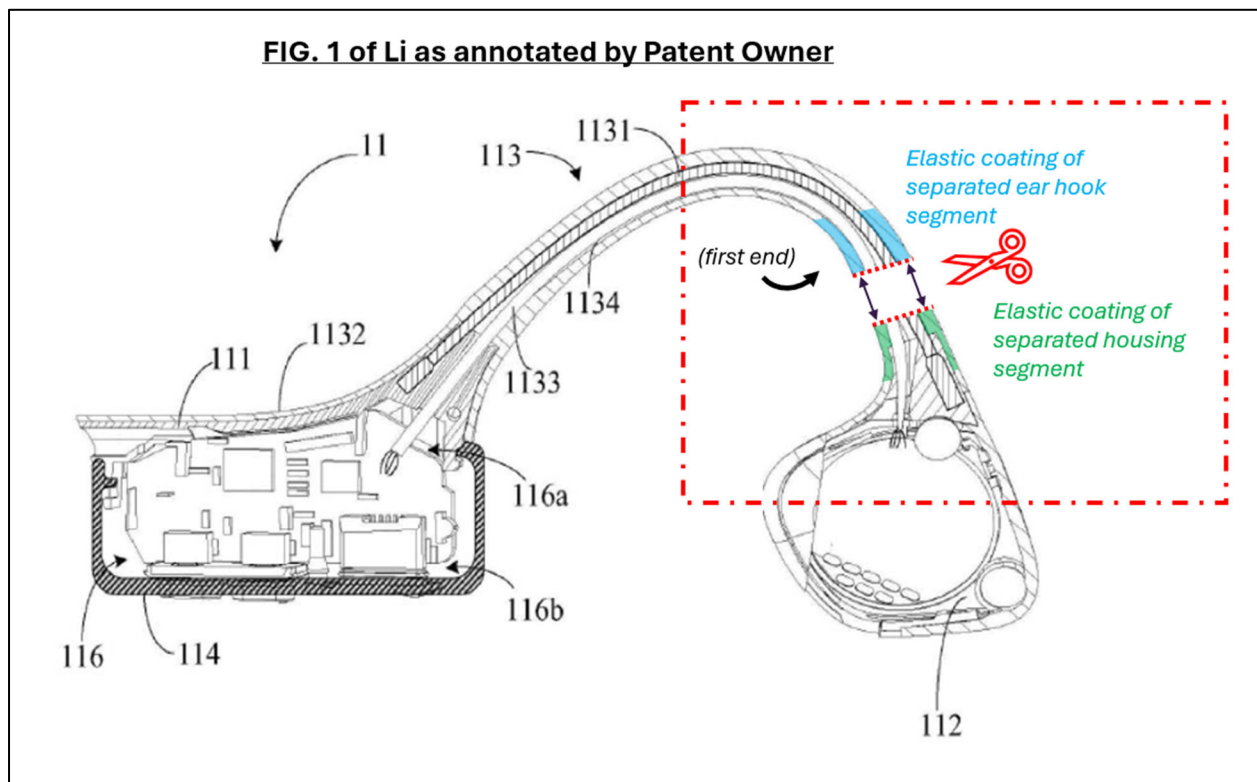
Therefore, the back-side plug connections of Li, even if implemented at the claimed locations, would still fail to render [1c] obvious because there are no teachings or suggestions in Li (or elsewhere) that the core housing would be elastically abutted against the elastic coating layer.

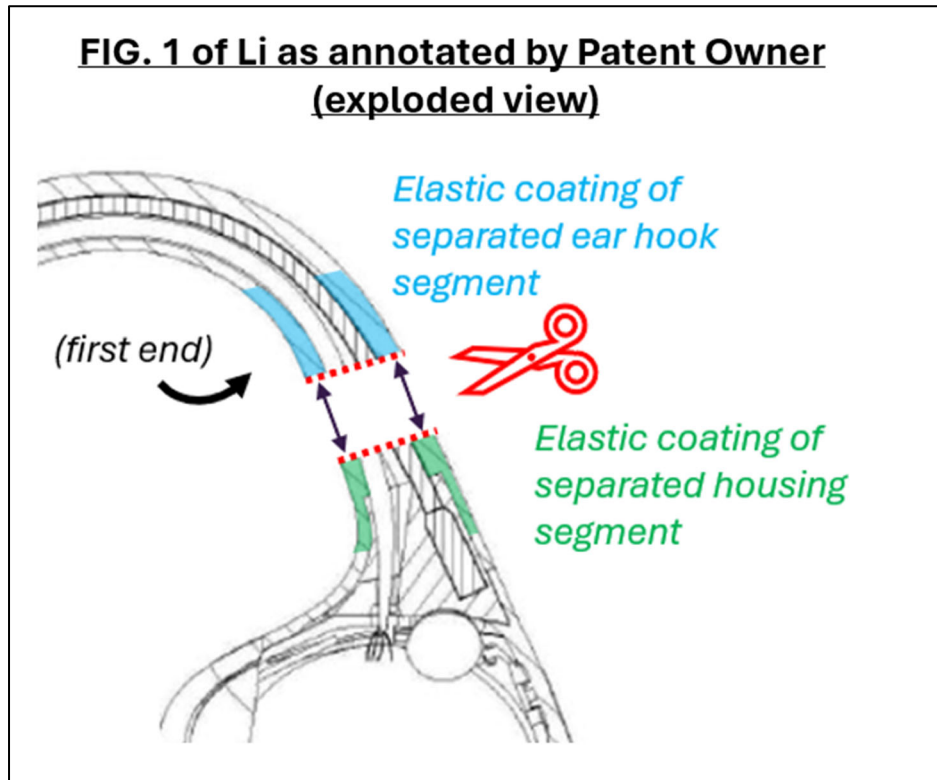
2. **Even if Li elastic coating layer was capable of "elastic abutting," the combination would not have resulted in *the core housing* being elastically abutted *against the protective sleeve*."**

The Petition contends that it would have been obvious to segment the one-piece ear hook assembly of Li to produce three segments and then add plug ends to the middle segment connecting it to a core housing and a circuit housing, respectively. Petition, 24-30. One of several significant flaws with Petitioner's position is that it would ***not*** have resulted in the ***core housing*** being elastically abutted ***against the protective sleeve*** that is required in Claim 1. Even under the most favorable view of the combination for Petitioner, only the two elastic coating layers at opposite sides of the segmented connection would be in contact and purportedly abut. That is, given that Li's elastic coating layer 122 (or elastic coating layer 1132 at the proposed location of the cut) covers both the connecting

component 113 and the housing (Li, ¶36), once the connecting component 113 is segmented to accommodate the plug ends, any purported abutting—elastic or otherwise—would be between the ends of the elastic coating layer, and not against the core housing. Scordilis, ¶¶126-128.

This is illustrated in annotated figures below, where elastic coating layer (1132) of Li at the two sides at the “cut” are annotated in blue and green; when the first end that accommodates the “first plug end” is brought into contact with the housing (i.e., when the core housing is fixed to the first plug end), it is only the elastic coatings that make contact, and not the core housing and the elastic coating as required in Claim 1.





Therefore, the Petition has failed to show that the “core housing ... [is] elastically abutted against the protective sleeve” in its Li-Fujita combination.

IV. GROUNDS 2-5 FAIL TO SHOW THAT THE CHALLENGED DEPENDENT CLAIMS ARE UNPATENTABLE.

Grounds 2-5 of the Petition purport that dependent claims 2-10 and 12-20 are allegedly obvious. As explained above, Petitioner has failed to establish that claim 1 is obvious. This failure propagates to Grounds 2-5 which also fail for at least the same reasons discussed in connection with claim 1, as well as for the additional flaws that are discussed below.

A. GROUND 2: The Li-Fujita-Fukuda Combination Fails to Render Claims 12-15 Obvious.

Ground 2 fails because it does not provide any additional explanation (in Fukuda or otherwise) to cure the deficiencies of the Li-Fujita combination, and it also fails for the additional reasons explained below.

1. Invalidity assertions against claims 12-13 are improper because the Petition fails to rely on any sections of Fukuda.

The Petition contends that claims 12-13 are obvious based on the Li-Fujita-Fukuda combination (Petition, 45-49) but fails to point to any sections of Fukuda that purportedly render those claims obvious. *Id.* Petitioner's obviousness assertions are improper.

Notably, Petitioner's obviousness analysis is devoid of a feature-by-feature showing and untethered to the factors articulated in *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and reiterated in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). The court has "repeatedly emphasized that an obviousness inquiry requires examination of all four *Graham* factors and that an obviousness determination can be made only after consideration of each factor." *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1335 (Fed. Cir. 2016). Here, the Petition lacks articulation of the second *Graham* factor (ascertaining the differences between the claimed invention and the prior art). Specifically, the Petition has failed to articulate any deficiency in the Li-Fujita combination that would prompt a

POSITA to seek their combination with Fukuda against claims 12-13.

This flaw in the Petition's invalidity assertions is self-evident as the Petition does not cite any sections of Fukuda against claims 12-13, and it thus fails.

2. The Petition's assertions in Ground 2 against claim 14 do not clearly identify the combination with particularity.

In combining Fukuda with the Li-Fujita combination, it is unclear whether the Petition is replacing only piezoelectric transducer (12) of Fujita with Fukuda's magnetic circuit system, whether the modification includes removal of additional elements of Fujita such as its base weight (13) (Petition, 43), or whether the combination includes using Fujita's entire "piezoelectric mechanism" in place of the entire magnetic-based system of Fukuda. Petition, 42.

Notably, Petitioner's motivation to combine relies on the advantages provided by Fukuda's "invention" as a whole (e.g., simple construction, low manufacturing costs, etc.) by citing to Fukuda at 3:6-28, which describes elements other than the magnetic circuitry, such as an elastic plate, a thick-walled part, a plate yoke, an elastic, and others, to achieve the described benefits. Petition, 43. This is in contrast to other sections of the Petition that describe replacing (only) Fujita's piezoelectric transducer (12) but retaining Fujita's rotating U-shaped frame and top cushion (*id.*, 43, 53-54), while another section of the Petition seems to require both piezoelectric transducer (12) and base weight (13) of Fujita to be

replaced. *Id.* 43.

This flaw in the Petition alone warrants the dismissal of Ground 2 because Petitioner has not met its burden under 35 U.S.C. § 312(a)(3) and has failed to identify with particularity the evidence that supports its obviousness assertions.⁶ This improper articulation of Ground 2 not only requires Patent Owner to respond to multiple ambiguous scenarios within the limited word count requirements, but also would impel the Board to analyze and opine on multiple configurations. Petitioner has improperly shifted its burden to the Board and to the Patent Owner. Therefore, Ground 2 fails altogether.

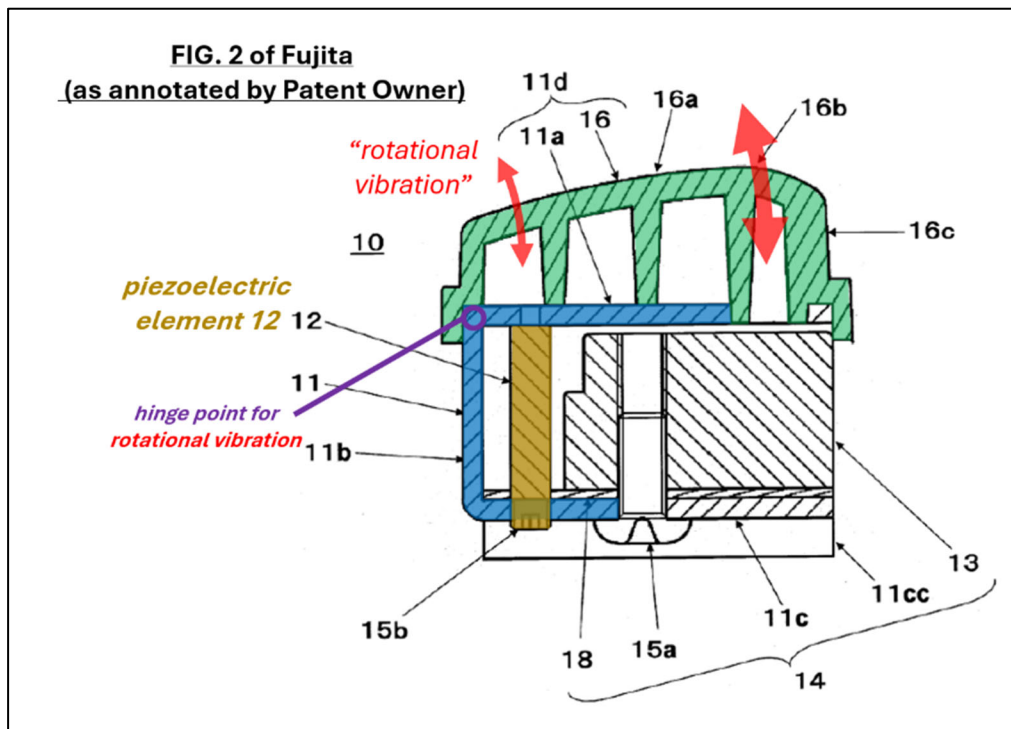
3. Fukuda's magnetically driven speaker destroys Fujita's key benefit which requires rotational or hinged vibration.

A prior art combination fails to establish obviousness if the combination “would be rendered inoperable for [the prior art's] intended purpose.” *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984); *see also Medtronic, Inc. v. Teleflex*

⁶ 35 U.S. Code § 312(a) Requirements of Petition.—A petition filed under section 311 *may be considered only if*— . . . (3) *the petition identifies, in writing and with particularity*, each claim challenged, the grounds on which the challenge to each claim is based, and *the evidence that supports the grounds for the challenge to each claim*, . . . (emphasis added).

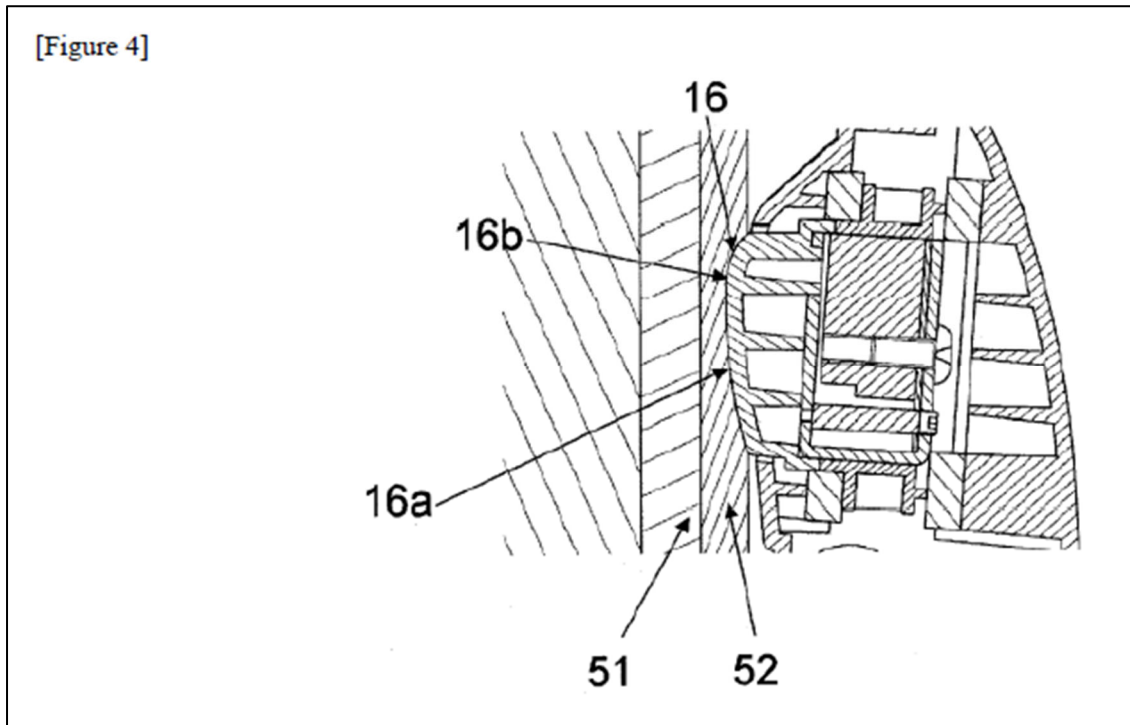
Innovations S.A.R.L., 69 F.4th 1341, 1350 (Fed. Cir. 2023) (affirming that a prior art reference ***taught against a modification*** where the modification destroyed the “entire premise” of the prior art reference).

Petitioner's prior art combination fails to accomplish the intended purpose and entire premise of Fujita. Scordilis, ¶¶131-156. Petitioner alleges that a POSITA would have been motivated to replace the piezoelectric mechanism in Fujita's speaker design with Fukuda's magnetic speaker driver. Petition, 42-45. Fujita derives its speaker design, including its convex cushion (16), all from a rotational or hinged vibration motion, which would be impossible or impractical for Fukuda's magnetic speaker driver to provide. *See* Fujita, FIG. 3 (annotated below to show the rotational or hinged vibration motion).



Fujita teaches that the vibration motion of its bone conduction speaker is a rotation around a rotation center on side of the speaker. *Id.*, ¶27, FIG. 2. Figure 2 illustrates the bone conduction speaker that includes a “U-shaped frame 11 structure” (annotated in blue), and a piezoelectric element (12) (annotated in brown) is wedged between the top and bottom prongs of the U-shaped frame. *Id.* The piezoelectric element (12) pushes the top prong (11a) up, and this displacement hinges by virtue of the top prong's connection to the vertical frame part (11b). *Id.* Fujita also describes this as a lever motion. *Id.*, ¶¶27, 36.

This rotational (or hinging or levering) motion forms the central purpose of Fujita by optimizing the transmission of sound signals from the convex contact surface to the user. Specifically, Fujita teaches that with the rotational motion, the vertex or peak of the convex surface is displaced more than the lower parts of the convex surface. *Id.*, ¶34, 37. Combined with the increased contact pressure at the vertex, this allows “the vibration of the bone conduction speaker 10 [to] be more effectively transmitted to the perception part of the user.” *Id.*, ¶37; *see also id.*, FIG. 4 (reproduced below), ¶¶33-34. Thus, the rotational motion is needed to displace portions of the convex contact surface more than other portions.

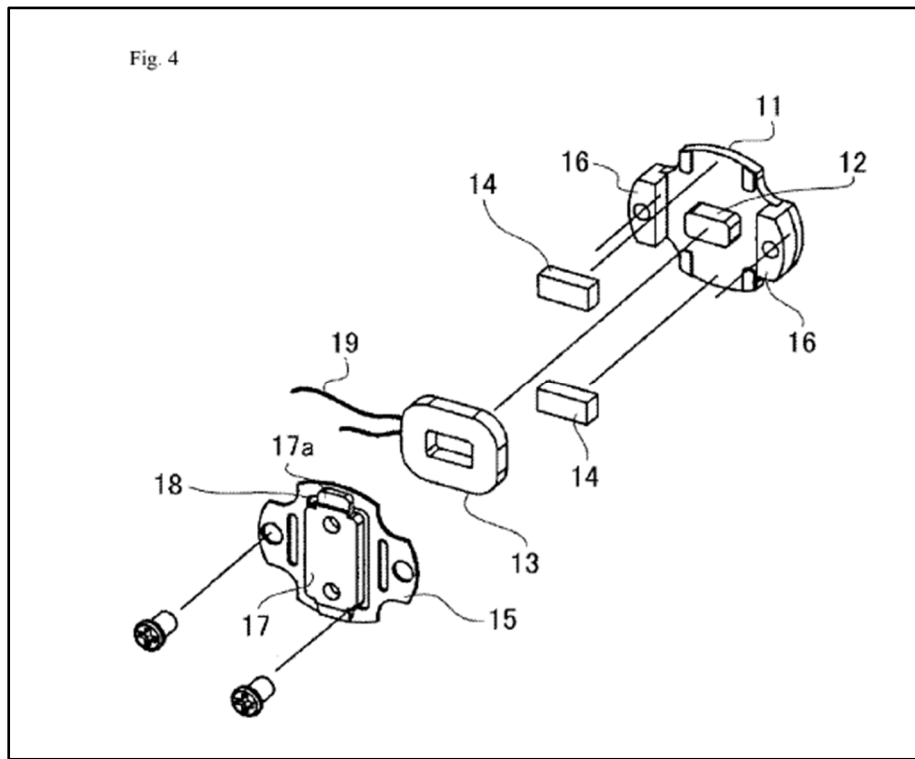


As noted above, it is unclear whether Petitioner is proposing that Fujita's entire speaker design (besides the convex speaker cushion part (16)) be replaced with Fukuda's magnetic driver or that only Fujita's piezoelectric element 12 is replaced with Fukuda's magnetic driver. But in either case, it would not have been obvious to a POSITA to implement Fukuda's magnetic driver.

First, if replacing the entire speaker design in Fujita save for the convex cushion part (16), Fukuda's magnetic driver would be utterly incapable of providing the rotational vibration mechanism that forms the essential premise of Fujita's design. Again, the entire reason why Fujita discloses a convex speaker cushion is inextricably tied to the rotational motion, which causes the peak of the cushion to displace more than the non-peak portions for optimized transmission of

sound signals. Fujita, ¶¶36-37; Scordilis, ¶¶135-138. But Fukuda's magnetic driver only provides a linear displacement, so there would be no reason to drive Fujita's convex cushion using Fukuda's magnetic driver.

Specifically, a POSITA would recognize that Fukuda's magnetic speaker driver (i) only provides linear displacement, and (ii) would only be useful for linear outputs. Scordilis, ¶¶139-144. In each of its illustrations, Fukuda depicts the components of the magnetic driver, such as the voice coil 13, a pair of magnets 14, and the elastic cover 3 (held against plate yoke 17), being vertically aligned. *See* Fukuda, FIGs. 1-4. Consistent with general magnetic driver operation, vibration output of the speaker originates with the linear movement of the voice coil as induced by the magnets, and the linear movement of the voice coil drives a corresponding linear movement of the elastic cover 3.



As such, replacing Fujita's entire piezoelectric-based speaker mechanism with Fukuda's linear magnetic driver would not result in the cushion peak being displaced more than the non-peak portions of the cushion, thus destroying the entire premise of Fujita. Scordilis, ¶¶139-144. Notably, Petitioner's expert, Dr. Kyriakakis, stated that he had not considered this lever-action/hinge-like/rotational vibration of Fujita in his original declaration:

Q: That teaching in Paragraph 41 explicitly says that (as read):

"The vibration output part 11a of frame 11 and the frame fixing part 11c continuously displace relative to each other."

Correct?

A: I--I don't see how they're connected to be displacing relative to each other. As I said, I didn't--this isn't a part that I analyzed. I was just looking at the driving force and normal alliance of the surfaces for purposes of my report, but--so I haven't looked at this in depth, but I just don't see how they're connected to be moving relative to each other.

Q: Okay. So this wasn't something that you--the relationship between the--the Cushion 16 and the rest of the--the structure of the--the device shown in Fujita wasn't something you analyzed for your declaration?

MR. BURNS: Objection, form.

THE WITNESS: No. I was just interested in the two angles between the force and the normal to the surface.

Ex. 2021, 131:11-132:9.

Second, in the alternative version of Petitioner's vague and ambiguous combination, there would also be no reason to substitute just Fujita's piezoelectric element 12 with Fukuda's magnetic driver. Fujita discloses that the piezoelectric element 12 has "displacement in the length direction" and is fixed between the two "prongs" of the U-shaped frame. Fujita, ¶25. Thus, Fujita discloses that the length-wise displacement of the piezoelectric element 12 is converted to or

transformed into the rotational hinged motion provided by the U-shaped frame.

In this scenario, however, given that the piezoelectric element's displacement is converted to rotational motion, there would be no reason for a POSITA to substitute the piezoelectric element with another linear driver such as Fukuda's magnetic driver. Scordilis, ¶¶139-144. The usefulness and benefit of magnetic speaker drivers such as Fukuda's lie in their linear vibration output, and this usefulness is negated if applied for non-linear vibration outputs. As Petitioner purports, "[m]agnetic circuit systems were commonly found ... in order to provide *efficient, high-quality sound*." Petition, 42. Petitioner asserts that because the linear vibration output (vibration of the elastic cover 3 in Fukuda) is directly connected to linear displacement of the magnetic coil (voice coil 13 in Fukuda), a magnetic speaker driver has improved "electromechanical conversion efficiency." *Id.*, 42-43.

The innate efficiency assumed in using Fukuda's magnetic speaker driver for linear vibration disappears when forcing Fukuda's magnetic speaker driver to provide the necessary rotational vibration taught in Fujita. That is, there would be no suggestion to a POSITA that Fukuda's magnetic speaker driver would be a more efficient stand-in for Fujita's piezoelectric element, because Fukuda's magnetic speaker driver would be *blunted* by the rotational vibration output. Scordilis, ¶¶139-144.

Therefore, in either interpretation of Petitioner's Fukuda-based modification of Fujita, Fukuda's magnetic speaker driver would have been unsuitable and/or ineffective as the driving mechanism in Fujita's speaker. Petitioner's proposed combination based on Fukuda therefore would not have been obvious to a POSITA.

4. Petitioner's motivations to combine Fukuda's magnetic system with Li-Fujita combination are unavailing.

Petitioner devotes about three pages of its Petition arguing why a POSITA would have been motivated to combine Fukuda with the Li-Fujita combination (Petition, 42-45), but Petitioner's arguments mischaracterize the sections of the references purported to support Petitioner's assertions.

Alleged Improvement in Sound Quality: The Petition asserts that magnetic circuits in bone conduction speakers were known to provide "high-quality sound" and "high-density permanent magnets" in bone conduction speaker achieve better sound quality," while citing to Ex. 1005, ¶¶52, 53, 143, 145, 148-152, 171, and Figures 11, 18-A, 18-B, 22-A. Petition, 42-43. These sections of Ex. 1005 (Liao), however, ***do not*** compare a piezoelectric-based system (or the specific system of Fujita) with Fukuda's magnet-based system.

For instance, Liao at ¶52 explains "[t]he energy conversion methods of the energy conversion device include but are not limited to ***dynamic coil, electrostatic,***

piezoelectric, dynamic iron, pneumatic, electromagnetic, etc.” Liao, ¶52

(emphasis added). Liao then provides an example of “*a dynamic coil energy conversion device*, [where] the wound cylindrical coil is connected to the vibrating plate” (*id.*), and explains “[f]or example, *using high-density permanent magnets, more ideal vibrating plate materials, and designs can achieve better sound quality.*” *Id.*, ¶¶52, 53 (emphasis added). Reading the full paragraphs of Liao reveals that the purported improvement in Liao’s sound quality is not described in the context of comparison with a piezoelectric system, and is in connection with a magnetic-coil-based system described in the preceding paragraph ¶52. And even then, the supposed improvement is attributed to the type of magnets, i.e., *high-density* magnets, in combination with other elements, i.e., *vibrating plate materials, and designs*. *Id.* The remaining paragraphs of Liao cited by Petitioner merely describe the operation of the speaker, without further insight into any alleged improvements over piezoelectric-based speakers.

Alleged Improvement in electromechanical conversion efficiency: The Petition points to ¶¶2, 3 of Xu (Ex.1009), section 4:1-12 of Nielsen (Ex.1010), and Abstract, Fig. 2(b), and paragraphs ¶¶16-29 of Nakada (Ex.1018) for the assertion that “magnetic steels in the middle of the voice coil” in a loudspeaker “significantly improv[es] the electromechanical conversion efficiency.” Even if Petitioner’s assertion is correct, such improvement is not described in comparison

to a piezoelectric system (let alone Fujita's specific system).

Notwithstanding a lack of such comparison, reading ¶¶2, 3 of Xu reveals that Xu's improvement is *over an existing magnetic-based system* (i.e., an "existing micro loudspeaker comprises a vibration system and a magnetic circuit system," Ex. 1005, ¶2). *Id.*, ¶¶2, 3. Similarly, Neilsen's description on pages 3 and 4 makes clear that Neilsen provides improvements *over existing magnet based systems*. Nielsen, 3:15-4:12. Turning to Nakada, this reference also describes improvements *over a prior magnetic based speaker design* ("Conventionally, the magnetic circuit of a speaker," Ex. 1018, ¶2) having a configuration that "reduces the volume of the magnet and results in low magnetic flux density within the magnet ... leading to low output efficiency and large size." *Id.*, ¶3. The sections of Nakada cited in the Petition further describe Nakada's new design, with no discussions about piezoelectric based systems. *Id.*, Abstract, ¶¶16-29, Fig. 2(b).

Accordingly, given that Xu, Neilsen, and Nakada all describe improvements over prior magnetic-based systems, the Petition's reliance on those references (and alleged improvement of electromechanical efficiency) is unrelated to a POSITA's motivation to replace Fujita's piezoelectric system.

Alleged Improvements Provided by Fukuda: The Petition purports that a "POSITA would have looked to Fukuda to improve the speaker in the Li-Fujita earphones ... in order to provide the benefits of a magnetic circuit system, such as

efficient, high-quality sound, and simple construction,” while citing to Fukuda’s 3:6-28 that explains its bone conduction system is “simple in construction, allowing the manufacturing cost to be held at a minimum, and yet is completed as an independent unit with minimized sound leakage.” Petition, 43.

However, the improvements alleged by Fukuda are attributable to Fukuda’s *entire* system, and not to Fukuda’s magnetic mechanism for replacing a piezoelectric system. Indeed, the entire section of Fukuda that Petitioner points to (Ex.1023, 3:6-28) is under the title “Advantages of the Invention,” and describes various components of Fukuda’s system (not just the magnetic elements). *See also id.*, FIGs. 3 and 4. The relied-upon section of Fukuda concludes with:

Further, the bone conduction speaker in accordance with the present invention is simple in construction, allowing the manufacturing cost to be held to a minimum, and yet is completed as an independent unit with minimized sound leakage, allowing it to be incorporated, as it is, in a casing of mobile phones, and the like.

Id., 3:23-28. Not only are Fukuda’s purported benefits associated with its system as a whole, nothing in the above section (or any other section of Fukuda) informs (or makes obvious to) a POSITA that Fukuda’s magnet circuit would be advantageous compared to a piezoelectric system, and clearly not compared to Fujita’s system which relied on the rotational pivoting motion of its top cover.

It is clear that none of Petitioner's purported reasons to combine support a POSITA's motivation to replace a transducer-based system with a magnetic one. Scordilis, ¶¶145-155. Absent relevant reasoning, Petitioner's position merely withers down to a POSITA having a general knowledge that a magnetic-based speaker design existed, which is not sufficient to render the Challenged Claims obvious. *See Virtek Vision International ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 888 (Fed. Cir. 2024) (concluding that the mere existence of prior art elements does not provide a reason that a skilled artisan would have combined them to form a claimed invention).

B. GROUND 4: The Li-Fujita-Numata Combination Fails to Render Claims 7-10.

Ground 4 does not rely on any additional teachings of Numata to address the deficiencies of the Li-Fujita combination, nor does this ground provide any additional explanation (in Numata or otherwise) that establishes a motivation to combine Li and Fujita.

Ground 4 is also flawed for the additional reasons explained below.

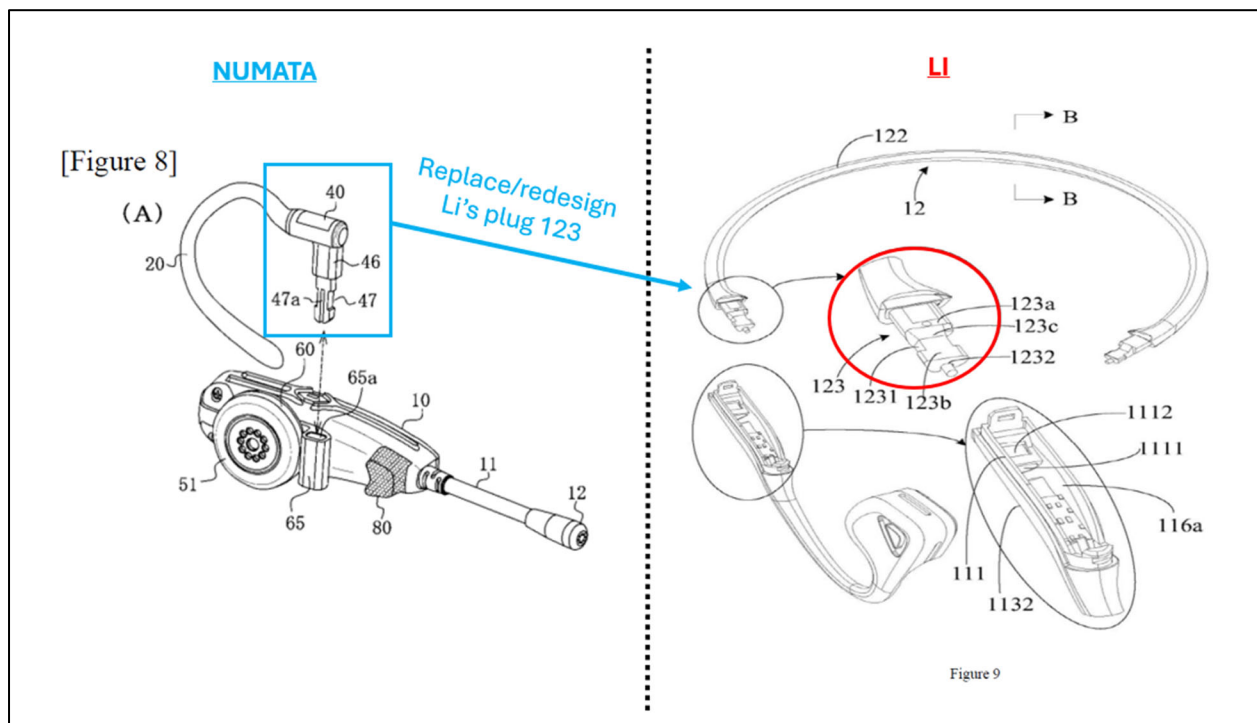
1. Numata's bi-directional plugging would not have motivated a POSITA to add Numata's plugs to Li.

Petitioner's proposed combination of Li and Numata results in a permanently unusable device. Scordilis, ¶157.

Under Petitioner's theory, a POSITA would redesign Li's plug-in portions

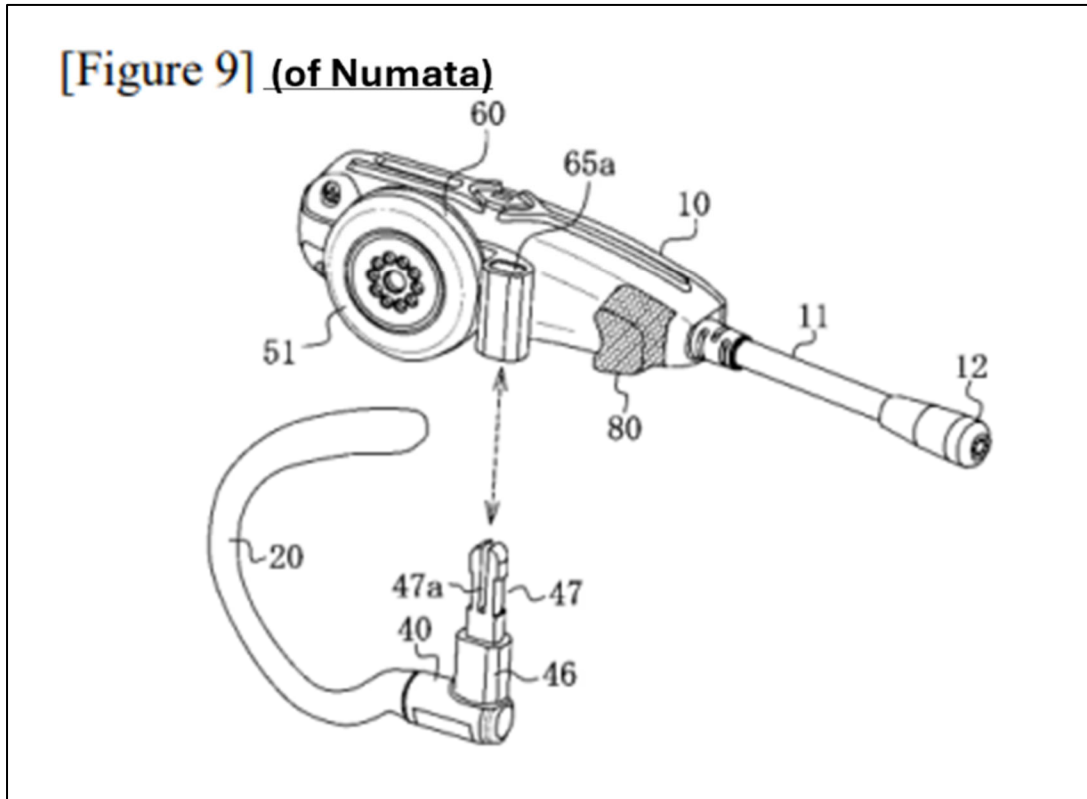
by using Numata's insertion part in their places. Petition, 81-84; *compare* Numata, FIG. 8 *with* Li, FIG. 9 (shown side-by-side below). According to Petitioner, the POSITA would be looking to “improve wear-resistance” in Li's plugs and would have turned to “Numata's convenient bi-directional plugging.” *Id.*, 83.

Petitioner's claim is far from accurate, because Numata's bi-directional plugging makes Li's earphone device impossible to wear and/or unable to transmit bone conducted sound.



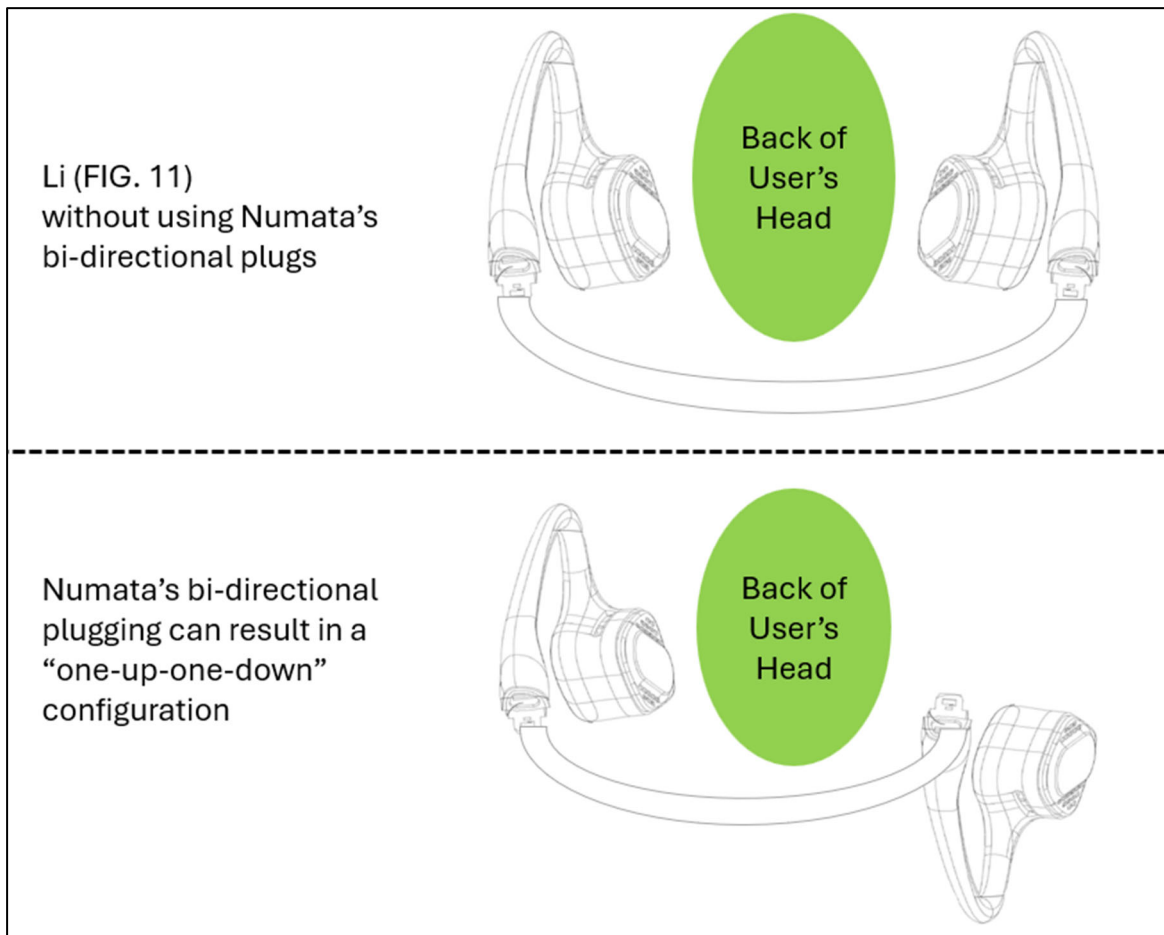
Numata is directed to a single-ear earpiece, for which “Numata's convenient bi-directional plugging” is uniquely suitable. *See, e.g.*, Ex. 1007, FIG. 3. The earhook's insertion part 47 can be inserted from above the receiving cylinder (65) for *left-ear wearing* or from below the receiving cylinder for *right-ear wearing*.

Id., ¶¶33-34, FIGs. 8-9 (annotated above). That is, Numata's bi-directional connection is designed to allow both *upside-down* and *right-side-up* orientations.

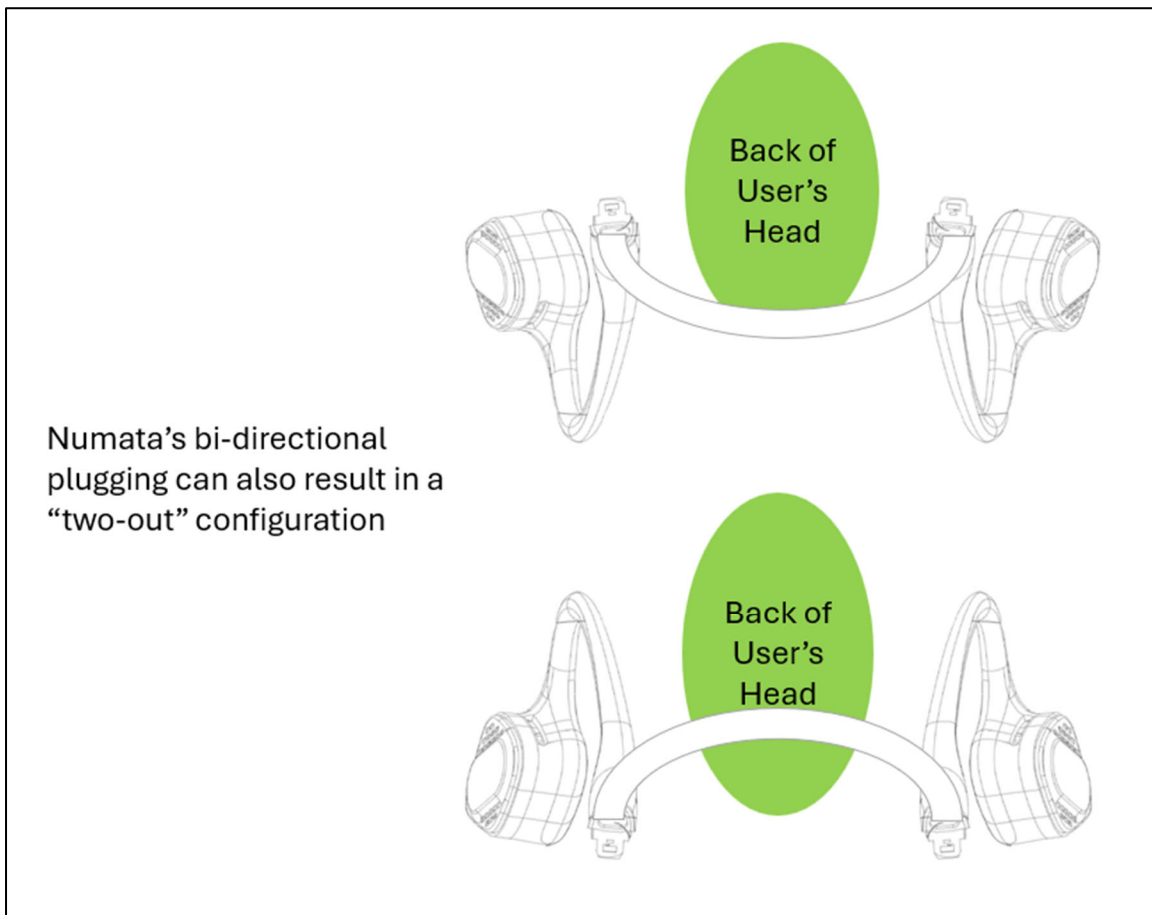


But while this orientation flexibility is useful for single-ear devices, it is significantly problematic for dual-ear earphones, and especially for dual-ear bone conduction devices. Specifically, unlike Li where there is only one way to insert the plug-in end into its corresponding socket, Numata's bi-directional connection would allow, for example, a "one-up-one-down" configuration of Li's dual-ear earphone device where one of the ear hook assemblies is inverted, as illustrated in the below figures. In this configuration, the entire device would be unwearable because the inverted ear hook could not hang over an ear and the bone conduction

speaker would be off-target. Scordilis, ¶¶158-165.



Even worse, Numata's bi-directional connections would allow connectors on both sides of Li's device to be improperly connected, causing both speakers to point outwards and not make contact with the user's face, as illustrated in the figures below. *Id.*



Implementing the bidirectional connectors in Li's device is problematic as explained above, and there is also not a single scenario where use of Numata's bi-directionality improves the wearability of Li's dual-ear device. The risk of unwearable configurations would also complicate the assembly and manufacturing process. Notably, additional checks and validations would be needed to ensure the dual-ear devices are not being assembled in the unwearable configurations—a possibility only arising from the incorporation of Numata's bi-directional connection. Scordilis, ¶¶162-164.

Therefore, Petitioner's proposed combination would have resulted in an inferior product prone to misconnections and user confusion.

The Combination Would Have Also Rendered the Earphones Useless:

The backwards connection of the plug ends would not have been a mere inconvenience, but it would have *rendered the earphones unusable*. Numata emphasizes its bi-directional plugs provided the benefit that they could be removed and reattached in another direction to allow the earphone to be placed on either the left or the right ear. Numata, ¶17. Notably, Numata discloses that the engagement of the insertion part “can be easily released *by inserting a tool from the opening in the opposite direction of the relevant insertion part 47 of the through-hole 65A* to reduce the slit 47A, so the above assembly is easy to attach and detach and change.” Numata, ¶34 (emphasis added). As such, an essential part of Numata's plug was the accessible “through-hole” at the other end of the plug, which allowed the release and detachment of the plug by inserting a tool into the hole.

However, in Petitioner's proposed combination, Numata's plugs would be inserted *into Li's housings* (i.e., an enclosed space) which did not (and could not) have such an accessible through-hole to allow the release of the plug. In other words, in the Petitioner-proposed combination, once Numata's plugs were inserted into the core housing, it would not have been possible to remove them. Therefore, once a plug that had been inserted in the wrong direction (as illustrated in the

above figures), there would have been no practical way to detach or remove the plug, rendering the earphones permanently useless. Scordilis, ¶¶162-163.

Therefore, a POSITA would not have found Petitioner's proposed combination a suitable choice and would not have been motivated to combine Numata's insertion part with Li's device. Aside from this "benefit" of bi-directionality, Petitioner does not provide any other reason that a POSITA would have combined Numata with Li. *See* Petition, 83. As such, Petitioner fails to establish a proper motivation to combine for Ground 4, and Ground 4 thusly fails.

2. Numata's plugs did not provide electrical connectivity to Li's housings.

A POSITA also would not have found Numata's insertion part suitable for replacing the plugs disclosed in Li because a POSITA would immediately conclude that Numata's insertion did not provide electrical connectivity across its connection.

According to Petitioner's proposed combination, Numata's insertion part would be inserted into a socket in Li's core housing. Petition, 83. Without the proposed modification, Li discloses a wire set 1133 that passes through the ear hook section and into the core housing. Li, ¶¶39-40. Li's explicit disclosure of this wire set, as well as the general understanding that speaker components in a core housing require wired electrical connections, reflect the requirement that a

plug connection to the core housing must be able to pass wiring or provide some electrical connection.

However, as implemented in Numata's design, the insertion part 47 does not pass wiring and is not used whatsoever to establish electrical connectivity across both sides of the structural connection. *See, e.g.,* Numata, FIGs. 8-9. Numata discloses that, one side of the connection, the main unit part 10 contains all the necessary circuitry such as communication circuits, amplification circuits, and power circuits, but on the other side of the connection, earhook part 20 is devoid of any circuitry. As such, Numata's insertion part 47 did not provide electrical connectivity when inserted into the receiving cylinder 46, nor was there any need for Numata's insertion part 47 to do so.

Furthermore, Numata's insertion part 47 fits and connects with the device's main unit based on insertion part 47 having two sides that are divided by a slit and are pushed together during the insertion action. Numata, ¶¶33-34. It would not have been obvious to a POSITA how these moving and dynamic parts of Numata's insertion part 47 would accommodate any necessary wiring. For instance, passing wiring through the slit dividing the two sides of the insertion part 47 could possibly obstruct the two sides and preclude the insertion part 47 from being inserted into the holly cylinder 65. Scordilis, ¶¶165-169.

Therefore, a POSITA would not have found Numata's insertion part

functionally suitable to replace the plugs in Li's device.

3. Numata fails to teach the elements of claim 9.

Element [9a] recites: “*the inserting portion is partially inserted into the first socket,*” and element [9b] recites: “*an exposed part of the inserting portion is arranged in a stepped manner to form **an annular table surface spaced apart from the outer end surface of the core housing.***” Numata fails to teach these elements.

The partial insertion (element [9a]) and the spacing apart (element [9b]) produces the junction space within which the protective sleeve is abutted against the core housing in an elastic manner (element [1c]). Ex. 1001, 12:62-13:25, FIGs. 4, 6 (annotated below). For instance, the '084 Patent explains “the protective sleeve 16 may be at least partially filled in *the space between the annular table surface 1422 and the outer end surface 21* of the core housing 20, and elastically abut against the core housing 20.” *Id.*, 13:16-19; *see* annotated FIGs. 4 and 6 below, where FIG. 4 shows the plug end by itself and FIG. 6 shows the plug end inserted into the core housing's socket, illustrating elements 1422 (blue) and 21 (red) are spaced apart.

FIG. 4 of the '084 Patent
(as annotated by Patent Owner)

Annular table
surface 1422

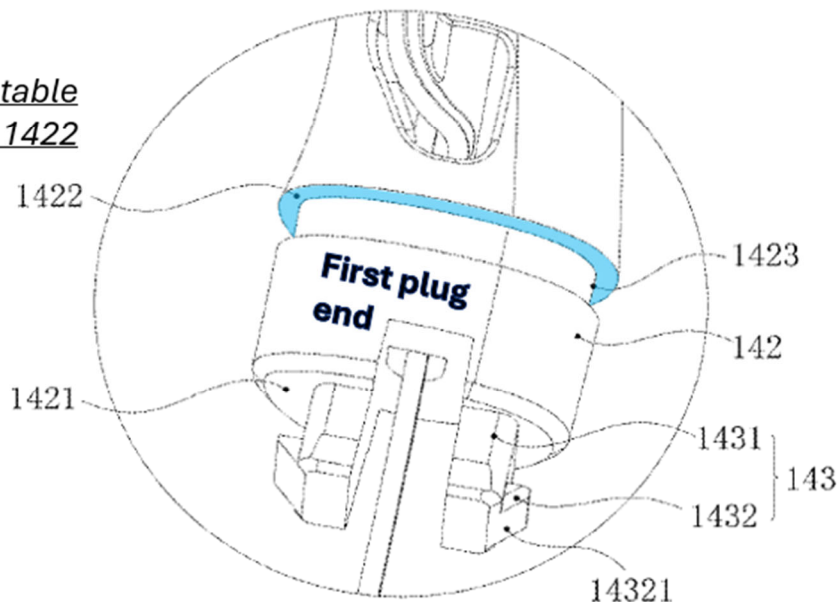
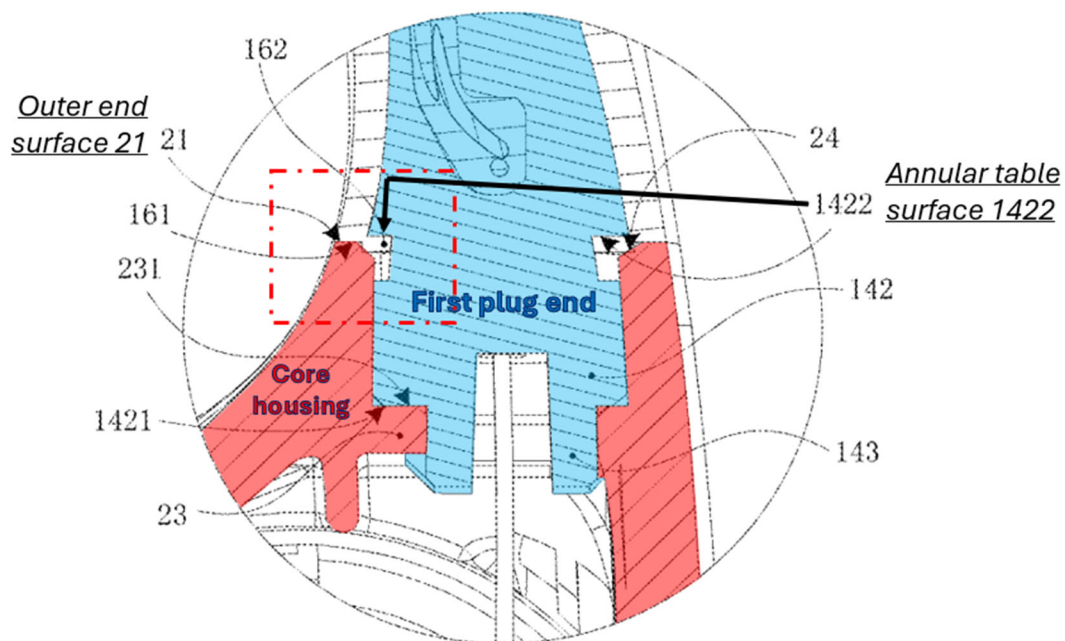
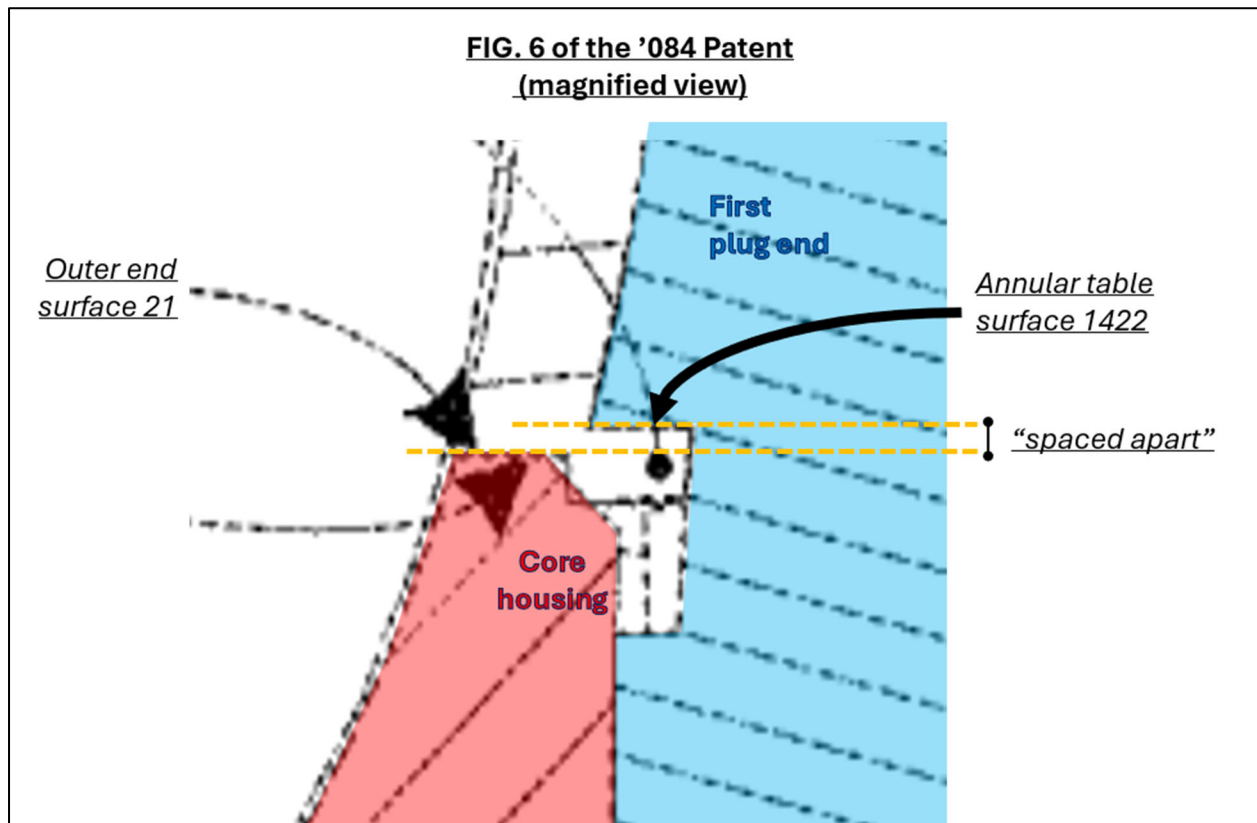


FIG. 6 of the '084 Patent
(as annotated by Patent Owner)

Outer end
surface 21

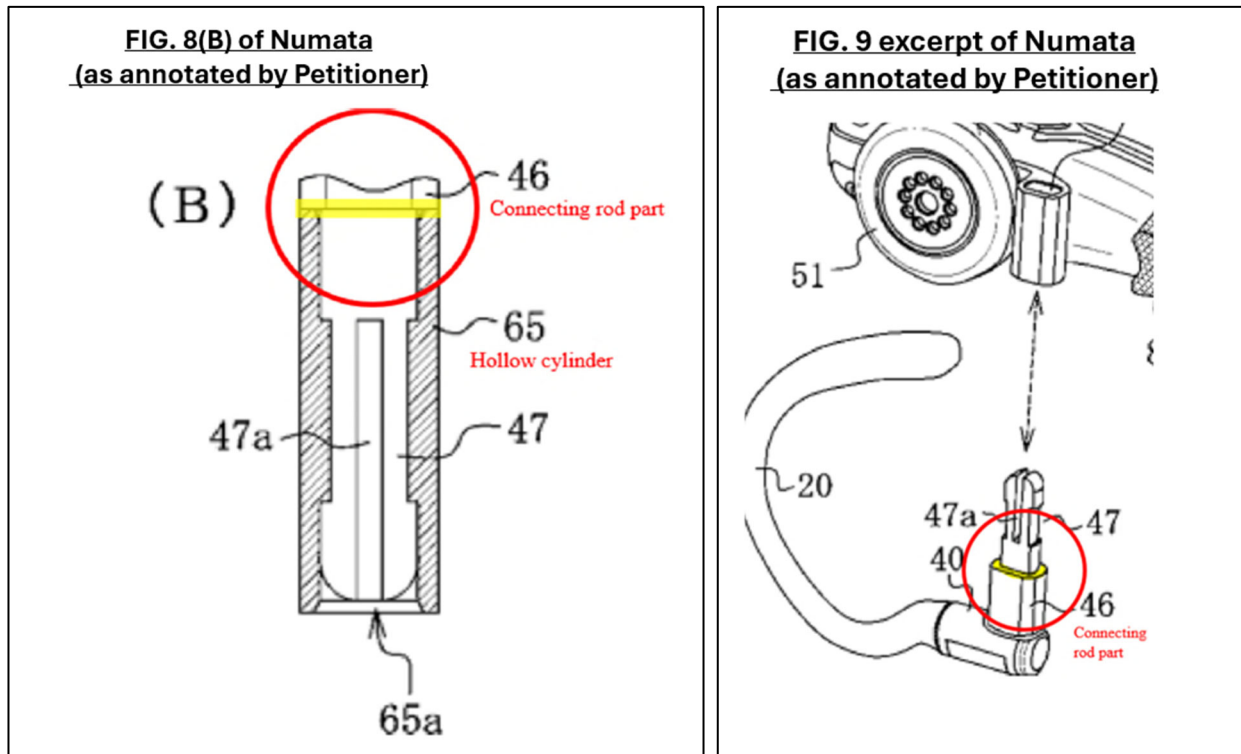




Petitioner only relies upon Numata as allegedly disclosing element [9b], but Numata is plainly deficient. *See* Petition, 95-97. Rather than disclosing an arrangement in which a surface of an inserting portion is “*spaced apart*” from the outer end surface of the socket, Numata teaches the opposite: the inserting surface being *flush against* the socket. Notably, there is no teaching or suggestion in Numata about the “spaced apart” limitation, and the Petition only relies on Numata’s figures. But Numata’s FIGs. 8(B) and 9 depict the surface of connecting rod part 46 (allegedly “the exposed part of the inserting portion”) is flush against the end surface/rim of the hollow cylinder 65 (allegedly “the outer end surface of

the core housing”), as shown below by yellow highlights made by Petitioner. *Id.*

Numata’s FIG. 8(B) clearly does not show any space between the two opposing surfaces. *See* Numata, FIG. 8(B); Scordilis, ¶¶172-173.



Therefore, even if *arguendo* Numata described an annular table surface, it would not teach or suggest the “spaced apart” arrangement of element [9b], and therefore Claim 9 is not obvious.

4. The Li-Fujita-Numata combination fails to teach the elements of claim 10.

Claim 10 is also patentable for additional reasons explained below.

Element [10a] recites: “*the protective sleeve further extends to a side of the annular table surface facing the outer end surface of the core housing,*” and

element [10b] recites: “*when the core housing and the first plug end are fixed, the protective sleeve elastically abuts against the core housing to realize sealing.*”

Petitioner's assertions for element [10b] refer back to element [1c] and Li's rear assembly plugs, while specifically admitting:

As shown in Figure 2, *the second elastic coating layer 122 abuts the first elastic coating layer 1132 at the plug-in portion 123. Because Li's first elastic coating layer 1132 abuts the second elastic coating layer 122*, Li teaches when the circuit housing and the plug end are fixed, the protective sleeve elastically abuts against the circuit housing to realize sealing.

Petition, 100 (emphasis added); see also *id.*, 98-99.

However, as also explained in [1c], neither claim 1 nor claim 9 recite abutting of two elastic sleeves, as would be necessitated by the Petition's combination and as admitted by Petitioner. *See, e.g., supra* § III.C.2; *see also* Scordilis, ¶¶174-177. Rather, element [10b] recites “*the protective sleeve elastically abuts against the core housing.*” The Li-Fujita-Numata combination therefore fails to teach or suggest dependent claim 10, and Petitioner has failed to show that dependent claim 10 is unpatentable.

C. GROUND 5: The Li-Fujita-Wang-Xu-Nielsen Combination Fails to Render Claims 16-20 Obvious.

Ground 5 does not rely on any additional teachings of Wang, Xu, or Nielsen

to address the deficiencies of the Li-Fujita combination, and this Ground also fails for the additional reasons explained below.

1. Obviousness assertions against claims 16-19 are improper because the Petition fails to rely on any sections of Nielsen.

The Petition contends that claims 16-19 are obvious based on the Li-Fujita-Wang-Xu-Nielsen combination (Petition, 101) but fails to identify any sections of Nielsen that purportedly render those claims obvious. *Id.* Petitioner's obviousness assertions are improper for the same reasons discussed in Section IV.A.1.

Notably, Petitioner's obviousness analysis is devoid of a feature-by-feature showing and untethered to the factors articulated in *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and reiterated in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). The court has "repeatedly emphasized that an obviousness inquiry requires examination of all four *Graham* factors and that an obviousness determination can be made only after consideration of each factor." *Nike*, 812 F.3d at 1335. Here, the Petition lacks articulation of the second *Graham* factor (ascertaining the differences between the claimed invention and the prior art). Specifically, the Petition has failed to articulate any deficiency in the Li-Fujita-Wang-Xu combination against claims 16-19 that would prompt a POSITA to seek their further combination with Nielsen.

This flaw in the Petition's invalidity assertions is self-evident as the Petition

fails to cite any sections of Nielsen against claims 16-19, which thus also fail.

2. The magnetic drivers of Wang, Xu, and Nielsen destroy Fujita's key benefit which requires rotational or hinged vibration.

For similar reasons that Petitioner's Li-Fujita-Fukuda combination fails, the combination here of Li, Fujita, Wang, Xu, and Nielsen also fails. Wang, Xu, and Nielsen are all directed to linear magnetic drivers, and as discussed above in Section IV.A.3, a POSITA would not have replaced Fujita's piezoelectric driver with a linear magnetic driver.

For instance, Petitioner's overbroad assertion that the magnetic drivers of Wang, Xu, and Nielsen provide higher sound quality than Fujita's piezoelectric driver has no basis as a motivation to combine. Fujita's piezoelectric driver has its length-wise displacement transformed into a rotational hinge-like vibration motion, which is the entire reason and premise of Fujita's convex cushion (which Petitioner applies with respect to element [1d], which is incorporated in these dependent claims). There would be no reason to implement the magnetic drivers of Wang, Xu, and Nielsen for any efficiency and sound quality reasons, when the magnetic driver's efficiency would be blunted when the magnetic driver's output is transformed immediately to a rotational motion. Scordilis, ¶¶178-179.

**V. PETITIONER HAS FAILED TO ACCOUNT FOR ITS
CONTRADICTORY CLAIM CONSTRUCTION POSITIONS.**

In the parallel district court proceeding, Petitioner proposed a very specific claim construction for part of element 1[d], “the control circuit or the battery driving the earphone core to vibrate,” to mean “either the control circuit or the battery, but not both, driving the earphone core to vibrate.” *See* Ex. 2023, 17-20. This position is in contrast to Petitioner’s position in this IPR; not only does the Petition offer no specific claim construction for this term, but when questioned about this limitation’s requirement to include the control circuit “or” the battery, Petitioner’s expert responded by stating that having “both” is not required:

Q: Okay. So as long as--so when you say “to satisfy the or part”--“or part,” *your testimony is as long as you have at least one of the two, that that claim is satisfied, that claim element is satisfied?*

A: *Right. That's how I read “or.”*

Q: Okay.

A: Or the other, yeah.

Q: So you say that you read “or” as one or the other?

MR. BURNS: Objection, form.

MR. DAY: I'll--I'll withdraw that and start again.

BY MR. DAY:

Q: Would you--when you say “one or the other,” does that mean--just mean it can be at least one of the two?

MR. BURNS: Objection, form.

THE WITNESS: Yes

BY MR. DAY

Q: Okay. And it doesn't exclude both?

MR. BURNS: Objection, form.

THE WITNESS: You mean can they both be there?

BY MR. DAY

Q: Correct.

A: Is it--*it doesn't exclude it, but it doesn't require it.*

Ex. 2021, 70:9-71:9 (emphasis added).

Petitioner has failed to explain its contradictory claim construction positions, which is yet another flaw in Petitioner's IPR filing that warrants dismissal of the Petition altogether. The Office has made its position regarding this issue clear in *Revvo Technologies v. Cerebrum*, IPR2025-00632, Order, Paper 20 (Precedential) (Nov. 3, 2025). Similar to *Revvo Technologies*, Petitioner, here has decided to

pursue differing claim construction positions without any explanations.

VI. CONCLUSION

Petitioner has failed to show that the Challenged Claims are unpatentable.

Dated: February 11, 2026

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CERTIFICATION OF WORD COUNT UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing PATENT OWNER'S RESPONSE totals 13,985 words, excluding the parts exempted by 37 C.F.R. § 42.24(a). This word count was made by using the built-in word count function tool in the Microsoft Word 365 software used to prepare the document.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that true copies of the foregoing PATENT OWNER'S RESPONSE and EXHIBITS 2020-2023 were served in their entirety by electronic mail on the Patent Owner via its attorneys of record:

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