

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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PEAG LLC (d/b/a JLab Audio), AUDIO PARTNERSHIP LLC and  
AUDIO PARTNERSHIP PLC (d/b/a Cambridge Audio)  
Petitioner,

v.

VARTA MICROBATTERY GMBH,  
Patent Owner.

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IPR2020-01214  
Patent 9,799,913 B2

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Before CHRISTOPHER L. CRUMBLEY, JON B. TORNQUIST, and  
AVELYN M. ROSS, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining All Challenged Claims Unpatentable  
Granting Patent Owner's Motion to Amend  
*35 U.S.C. § 318(a)*

ORDER

Dismissing In Part and Denying In Part  
Patent Owner's Motion to Exclude Evidence  
*37 C.F.R. § 42.64(c)*

## I. INTRODUCTION

PEAG LLC (d/b/a JLab Audio), Audio Partnership LLC and Audio Partnership PLC (d/b/a Cambridge Audio) (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting the Board institute an *inter partes* review of claims 1–8 of U.S. Patent No. 9,799,913 B2 (Ex. 1001, “the ’913 patent”). Varta Microbattery GmbH (“Patent Owner” or “VARTA”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).<sup>1</sup>

Upon consideration of the Petition, Preliminary Response, and the parties’ evidence, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the ’913 patent. Paper 8 (“Decision on Institution” or “DI”). Thus, pursuant to the Supreme Court’s decision in *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018), and USPTO Guidance,<sup>2</sup> we instituted review of all challenged claims on all asserted grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 14, “PO Resp.”), Petitioner filed a Reply (Paper 23, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 28, “Sur-reply”). In support of their respective positions, Petitioner relies on the testimony of Mr. William H. Gardner (Ex. 1003, “Gardner Declaration”; Ex. 1041,

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<sup>1</sup> Petitioner identifies PEAG LLC (d/b/a JLab Audio), Audio Partnership LLC, Audio Partnership PLC (d/b/a Cambridge Audio), and Guangdong Mic-Power New Energy Co. Ltd., as the real parties-in-interest. Pet. 1. Patent Owner identifies VARTA Microbattery GmbH, as the real party-in-interest. Paper 5, 2.

<sup>2</sup> In accordance with USPTO Guidance, “if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.” *See* USPTO, Guidance on the Impact of SAS on AIA Trial Proceedings (April 26, 2018) (available at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>) (“USPTO Guidance”).

“Gardner Supplemental Declaration”; Ex. 1032, “Gardner Deposition I”; Ex. 1033, “Gardner Deposition II”; Ex. 2051, “Gardner Deposition III”), and Patent Owner relies on the testimony of Dr. Martin C. Peckerar (Ex. 2043, “Peckerar Declaration”; Ex. 2050, “Peckerar Supplemental Declaration”; Ex. 2060, “Peckerar Second Supplemental Declaration”; Ex. 1034, “Peckerar Deposition I”; Ex. 1035, “Peckerar Deposition II”; Ex. 1042, “Peckerar Deposition III”). Patent Owner also relies on the declaration testimony of Mr. Philipp Miehllich (Ex. 2045) and Dr. Hans Jurgen Lindner (Ex. 2046), and their respective deposition testimony (Exs. 1036, 1037).

After institution, Patent Owner filed a Contingent Motion to Amend and Petitioner filed an Opposition to Patent Owner’s Contingent Motion to Amend. Paper 15; Paper 22. We provided Preliminary Guidance on that motion. Paper 25. Thereafter, Patent Owner filed a Revised Contingent Motion to Amend, proposing substitute claims 9–16 for original claims 1–8, contingent on those original claims being found unpatentable. Paper 27 (“Motion to Amend” or “MTA”). Subsequently, Petitioner filed an Opposition to Patent Owner’s Motion to Amend (Paper 34, “MTA Opp.”), Patent Owner filed a Reply in Support of its Motion (Paper 36, “MTA Reply”), and Petitioner filed a Sur-reply (Paper 41, “MTA Sur-reply”).

Patent Owner also filed a Motion to Exclude certain testimony contained in Mr. Gardner’s Supplemental Declaration (Ex. 1041). Paper 37 (“MTE”). Thereafter, Petitioner filed an Opposition to Patent Owner’s Motion to Exclude (Paper 40, “MTE Opp.”) and Patent Owner filed a Reply in Support of its Motion to Exclude (Paper 42, “MTE Reply”).

An oral hearing was held on November 2, 2021, and a transcript of the hearing is included in the record (Paper 46, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–8 of the '913 patent are unpatentable. We grant Patent Owner's Revised Contingent Motion to Amend as to proposed substitute claims 9–16.

*A. Related Proceedings*

The parties indicate that the '913 patent is the subject of the following pending consolidated district court actions: *VARTA Microbattery GmbH v. Costco Wholesale Corporation*, No. 2:20-cv-0051-JRG (E.D. Tex.); *VARTA Microbattery GmbH v. Amazon.com, Inc.*, No. 2:20-cv-0052-JRG (E.D. Tex.); *VARTA Microbattery GmbH v. Best Buy Co., Inc.*, No. 2:20-cv-0054-JRG (E.D. Tex.); *VARTA Microbattery GmbH v. PEAG, LLC*, No. 2:20-cv-0071-JRG (E.D. Tex.); *VARTA Microbattery GmbH v. Audio Partnership LLC, et al.*, No. 2:20-cv-00138-JRG (E.D. Tex.); and *VARTA Microbattery GmbH v. Samsung Electronics America, Inc.*, No. 2:20-cv-00029-JRG (E.D. Tex.) (collectively, "the District Court Action"). Pet. 1; Paper 5, 2–3; Ex. 2002. Petitioner also filed petitions challenging claims of other patents asserted in the District Court Action in IPR2020-01211, IPR2020-01212, and IPR2020-01213. Pet. 2; Paper 5, 3.

*B. The '913 Patent (Ex. 1001)*

The '913 patent is titled "Button Cells and Method of Producing Same" and issued October 24, 2017, with claims 1–8. Ex. 1001, codes (54), (45), 13:6–14:46. The '913 patent describes a button cell that includes a housing cup and a housing top separated by a seal to form a housing having parallel flat bottom and top areas, and an electrode-separator assembly

including a flat positive and negative electrode and connected by one flat separator, wherein the electrodes are aligned essentially at right angles to the flat bottom and top areas and the assembly is a spiral winding having end faces defining surfaces of the winding facing in an axial direction relative to the flat bottom and top areas. *Id.* at code (57), 10:26–31, 12:4–26. The '913 patent further describes that the positive and negative electrodes are each in the form of flat electrode layers and connected to one another via a flat separator, and the electrodes are preferably laminated or adhesively bonded onto this separator. *Id.* at 4:4–19.

Figure 4 of the '913 patent, reproduced below, illustrates a button cell according to an embodiment of the claimed invention.

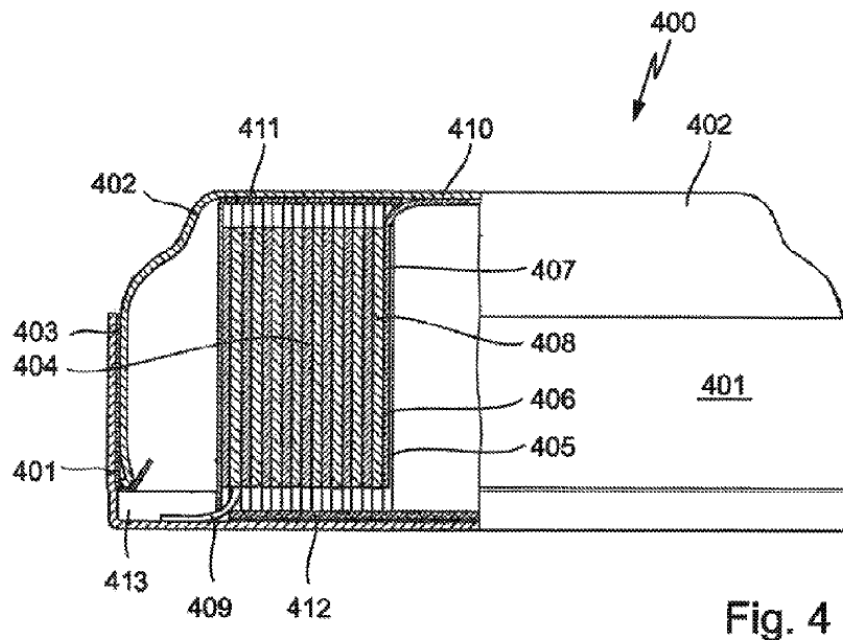


Fig. 4

Figure 4 of the '913 patent, above, shows button cell 400 including a housing comprising cup part 401 and top part 402, with seal 403 arranged therebetween, and an assembly of electrodes 407 and 408 and separators 405

and 406, contained as spiral winding 404 within the housing. *Id.* at 12:4–23, Fig. 3.

The '913 patent discloses that electrode 407 is connected via output conductor 410 to top part 402 and electrode 408 is connected via output conductor 409 to cup part 402. *Id.* at 12:13–16. The '913 patent further discloses that insulating means 411 and 412 are arranged between the end faces of the winding and cup part 401 and top part 402. *Id.* at 12:20–23. The '913 patent also discloses that the insulating means may be a flat layer composed of plastic, for example, a plastic film. *Id.* at 7:27–28.

### *C. Illustrative Claims*

Petitioner challenges claims 1–8 of the '913 patent. Pet. 8, 9. Of the challenged claims, claims 1, 4, and 6 are independent claims. Claim 1, reproduced below, is illustrative of the subject matter of the challenged claims:

1. A button cell comprising:

a housing cup and a housing top separated from one another by an electrically insulating seal and which form a housing with a flat bottom area and a flat top area parallel to it,

an electrode-separator assembly within the housing comprising at least one positive and at least one negative electrode in the form of flat layers and connected to one another by at least one flat separator, and

wherein the electrode layers are aligned essentially at right angles to the flat bottom area and the flat top area and the electrode-separator assembly is a spiral winding having end faces defining side surfaces of the spiral winding facing in an axial direction relative to the flat bottom area and the flat top area,

one of the electrodes connects to the flat bottom area or the flat top area via an output conductor comprising a foil resting

flat between an end face of the spiral winding and the flat top or the flat bottom area to which it is connected, and

at least one insulating means preventing direct mechanical and electrical contact between the end faces of the winding and the flat bottom and flat top areas.

Ex. 1001, 13:7–30.

*D. Prior Art and Asserted Grounds of Unpatentability*

Petitioner contends that claims 1–8 are unpatentable based on the following grounds:

| Claim(s) Challenged | 35 U.S.C. § <sup>3</sup> | Reference(s)/Basis           |
|---------------------|--------------------------|------------------------------|
| 1–8                 | 103                      | Kobayashi <sup>4</sup>       |
| 1–8                 | 103                      | Kaun, <sup>5</sup> Kobayashi |

Pet. 9.

II. PATENT OWNER’S MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude Sections III–IV of Mr. Gardner’s Supplemental Declaration, because Patent Owner alleges the identified sections do not advance proper “reply” arguments and, instead, amount to new opinions “to fill the gaps in Petitioner’s obviousness grounds set forth in the Petition.” MTE 1. Specifically, Patent Owner states that

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<sup>3</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’913 patent issued was filed before this date, the pre-AIA version of § 103 applies.

<sup>4</sup> Yoshikazu Kobayashi, JP 2007-294111 A, published Nov. 8, 2007 (Ex. 1006). Citations herein are to the certified English translation portion of Kobayashi, i.e., pages 1–14.

<sup>5</sup> Thomas D. Kaun, US 2005/0233212 A1, issued Oct. 20, 2005 (Ex. 1005, “Kaun”).

Mr. Gardner “provides new opinions and theories that a [person of ordinary skill in the art] would have been motivated to combine Kaun (Ex. 1005) and Kobayashi (Ex. 1006) and would have expected success in making the combination.” *Id.*

Patent Owner first alleges that Mr. Gardner offers new opinions regarding (1) the motivation to combine Kaun with Kobayashi based on dendrite formation (*id.* at 2–4), (2) additional motivations to modify Kaun with Kobayashi (*id.* at 4–6), (3) a reasonable expectation of success relating to Kaun’s central fastener (*id.* at 6–7), and (4) a reasonable expectation of success regarding Kobayashi’s modified electrode assembly (*id.* at 7–9). Because we do not reach Petitioner’s challenge based on the combination of Kaun and Kobayashi, as discussed below, we similarly need not reach Patent Owner’s Motion to Exclude Mr. Gardner’s opinions as they relate to the Kaun/Kobayashi combination. Accordingly, we dismiss Patent Owner’s Motion to Exclude these purportedly new opinions as moot. We address Patent Owner’s remaining concerns, relating to Mr. Gardner’s allegedly new testimony regarding Kobayashi, below.

Patent Owner argues that “[t]he Petition failed to explain why a [person of ordinary skill in the art] would have been motivated to replace Kobayashi’s conductor plates 4a, 5a with metal foils” and “lacked explanation for how a [person of ordinary skill in the art] would have combined metal foil conductors with other components of Kobayashi to yield an operable assembly.” *Id.* at 9. Patent Owner alleges that “Mr. Gardner’s Supplemental Declaration attempts to fill these gaps with new opinions addressing the following defects in the proposed combination: (1) metal foils lack rigidity to permit the electrodes to be wound around the

winding axis (¶¶ 71, 81); and (2) metal foils would be entirely embedded in the insulating plate grooves 8a, 9a (¶¶ 53, 70, 86–87).” *Id.* According to Patent Owner, these new opinions are untimely and should be excluded. *Id.*

Petitioner explains that “the opinions are directly responsive to arguments made by Patent Owner in its Response” and, therefore, are not new. MTE Opp. 8. In particular, Petitioner explains that in its Patent Owner Response, Patent Owner argues that replacing Kobayashi’s metal plates with metal foils would not have been successful because “the metal foils lack sufficient rigidity to facilitate winding of the electrodes around the winding axis and that the metal foils ‘would be entirely embedded in the grooves [of the insulating plates], preventing the foils from making any connection whatsoever’ with the cell housing.” *Id.* at 9. Petitioner explains that Mr. Gardner’s opinions at paragraphs 71, 81, and 88–89 address the structural stability issues and paragraphs 53, 70, and 84–87 address the depth of the grooves of Kobayashi’s insulating plates. *Id.*

We are not persuaded that the identified portions of Mr. Gardner’s Supplemental Declaration are improper. In the Petition, Petitioner alleged that a person of ordinary skill in the art would have had reason to substitute known metal foils for the metal conductor plates of Kobayashi in order to reduce the size of inactive materials and improve performance. Pet. 31 (citing Ex. 1003 ¶ 323). In its Response, Patent Owner argued, among other things, that the metal foil lacks the requisite rigidity to support the remaining components of the winding axis core (PO Resp. 27–30, 35) and that because metal connecting plates 4a and 5b are positioned within recesses of insulating plates 8 and 9, replacing the metal connecting plates with metal foils would result in an unreliable connection because the metal foil would

become embedded within the grooves of the insulating plates (*id.* at 30–33, 35). Mr. Gardner’s supplemental testimony specifically addresses Dr. Peckerar’s and Patent Owner’s concerns that metal foils would be unsuitable in Kobayashi due to their flexibility and thickness as compared to the insulating plates. Ex. 1041 ¶¶ 53 (“the depth of the grooves can be altered in order to better accommodate metal foil output conductors”), 70, 71 (explaining that it is the winding core that provides structure not the output conductor plates), 81, 86 (explaining that the person of ordinary skill in the art could either adjust the size of the output conductors or the depth of the cavities themselves), 87. Therefore, Mr. Gardner’s testimony that the ordinarily skilled artisan would have understood how to account for the technical challenges Patent Owner identified properly responds to arguments raised by Patent Owner in its Patent Owner response. Accordingly, we deny Patent Owner’s Motion to Exclude as it relates to Mr. Gardner’s allegedly new supplemental testimony regarding Kobayashi’s modified electrode assembly.

### III. ANALYSIS

#### A. *Legal Standards*

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the

claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418–419.

On the other hand, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined or modified the prior art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *see also Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (“In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have

made the combination.”); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

*B. Level of Ordinary Skill in the Art*

In the Decision on Institution, we determined that a person of ordinary skill in the art at the time of the invention of the ’913 patent

would have had at least a bachelor’s degree in mechanical engineering, or a similar field, such as materials engineering, chemical engineering, or physics with at least five years of experience in the field of battery design and manufacturing. A person with a master’s degree in one of the above fields could have less practical experience of approximately three years. A person with a PhD could have less practical experience, about two years. A person with less education but more relevant practical experience may also meet this standard.

DI 20–21 (adopting Petitioner’s proposed definition). For purposes of this Final Written Decision, we maintain our determination from the Decision on Institution because neither party asserts that our decision depends on that determination and because the level of skill is consistent with the record. *See* PO Resp. 8 (stating that “[t]he claims are patentable regardless of which definition is used.”); *see generally* Pet. Reply; MTA Opp. 1–2 (“Regardless of which definition is used, however, Patent Owner’s Substitute Claims are still not patentable.”).

*C. Claim Construction*

In an *inter partes* review filed on or after November 13, 2018, we construe claims “using the same claim construction standard that would be

used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Furthermore, we expressly construe the claims only to the extent necessary to resolve the parties’ dispute. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

In their briefing, the parties dispute the meaning of three claim terms or phrases—(1) “insulating means”, (2) “connected to one another by at least one flat separator,” and (3) “button cell.” *See* Pet. 17–21; PO Resp. 9–12.

We discern no material difference between the parties’ respective constructions. Additionally, Patent Owner, during the hearing, expressed a general view that claim construction was unlikely to affect the parties’ positions.<sup>6</sup> In particular, Patent Owner states that “[o]ur position is that really nothing turns on claim construction. You don’t have to engage in claim construction in this case.” Tr. 56:18–20, 56:21–24 (explaining that

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<sup>6</sup> The parties disagree as to what the newly added phrase “the cup casing include[ing] a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the casing being disposed radially inward with respect to the second part” means. *See generally* MTA Opp.; MTA Reply; MTA Sur-reply. Neither party proposes an express construction for this phrase. *Id.* We address the interpretation of this phrase below and only to the extent necessary to resolve the dispute raised by the parties’ substantive arguments.

limitations were submitted for construction “to gain some benefit in the co-pending litigations.”). Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) in the context of an *inter partes* review). Because the outcome of our decision does not depend on either parties’ claim construction position, we determine that none of the identified claim terms require construction to resolve the issues in dispute in this proceeding.

*D. Alleged Obviousness over Kobayashi (Claims 1–8)*

Petitioner contends claims 1–8 would have been obvious over Kobayashi in view of the knowledge of a person of ordinary skill in the art. Pet. 9, 31–48. Petitioner directs us to portions of Kobayashi that purportedly disclose each of the limitations in the challenged claims. *Id.* at 31–48. Petitioner also relies on the declaration testimony of Mr. Gardner to support its arguments. *See id.*

*1. Kobayashi (Ex. 1006)*

Kobayashi is a Japanese Patent Application titled “Small Battery,” and published November 8, 2007. Ex. 1006, codes (43), (54).<sup>7</sup> Kobayashi relates to a small battery capable of improving heavy load characteristics without impairing productivity. *Id.* at code (57). The small battery of Kobayashi may be a button cell or a coin cell comprising a container and a spirally wound flat electrode group stored in the container, including a

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<sup>7</sup> Petitioner provides a certified English translation of Kobayashi in the record. Ex. 1006, 1. All citations to Kobayashi are to the certified translation rather than the Japanese language original.

positive electrode and a negative electrode connected via a separator and in the form of a spiral winding. *Id.* at code (57), ¶¶ 1, 9, 12, 14, 17, 32.

Figure 1 of Kobayashi, reproduced below, illustrates an embodiment of a battery according to Kobayashi's disclosure.

FIG. 1

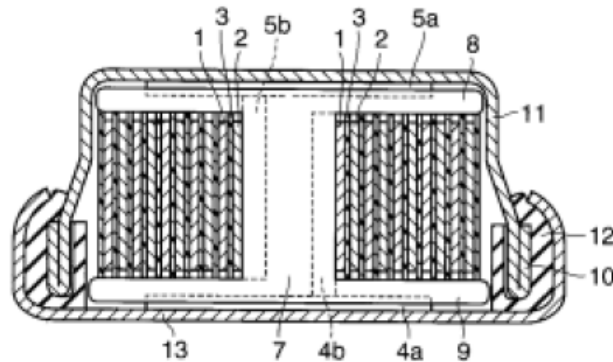


Figure 1 of Kobayashi, above, shows a battery including the container (housing) formed by top case 11 and bottom case 13, sealed by gasket 12 therebetween, and an electrode group comprising positive electrode 1 and negative electrode 2, connected via separator 3, in the form of a spiral winding, and housed within the container. *Id.* ¶¶ 9, 12, 32, 47. Kobayashi discloses that electrode layers 1 and 2 of the wound electrode group are arranged within the container at right angles to top case 11 and bottom case 13, and insulating members 8 and 9 are disposed on the top and bottom surfaces of the wound electrode group. *Id.* ¶¶ 10, 19, 32, Fig. 1.

Figure 1 of Kobayashi also depicts the container formed by top case 11 and bottom case 13 having a flat bottom area and a flat top area and top case 11 inserted into bottom case 13 such that the edge of bottom case 13 is crimped radially inward towards the edge of top case 11. *Id.* ¶¶ 9, 33, 34, 47.

2. *Analysis of Claim 1*

Petitioner contends Kobayashi teaches or suggests the limitations of claim 1 and, relying on the testimony of Mr. Gardner, explains why the button cell of claim 1 would have been obvious in view of Kobayashi's disclosure and the knowledge of a person of ordinary skill in the art. Pet. 31–40.

Petitioner alleges that Kobayashi suggests a button cell, as described in the preamble, where it discloses “a button-type battery or a coin-type battery.” *Id.* at 32 (citing Ex. 1006 ¶ 1); *see also* Ex. 1006 ¶ 12 (disclosing “a small battery such as a button cell”). Further, according to Petitioner, Kobayashi teaches metal container 11 (i.e., the claimed “housing top”), aluminum container 13 (i.e., the claimed “housing cup”) and insulating gasket 12 (i.e., the claimed “electrically insulating seal”), where metal container 11 and aluminum container 13 have a flat top and flat bottom area, respectively. Pet. 32–33 (citing Ex. 1006 ¶¶ 4, 33, 34, Fig. 1, claim 2, Fig. 1; Ex. 1003 ¶¶ 151–152).

Petitioner contends Kobayashi discloses an electrode group placed within the housing that includes positive electrode 1 and negative electrode 2, each in the form of flat layers, and where positive electrode 1 and negative electrode 2 are spirally wound with a separator 3 located between electrode layers. *Id.* at 33–34 (referring to *id.* at 39 (citing Ex. 1006 ¶ 32, Figs. 1, 9)). *Id.* at (citing Ex. 1006 ¶ 32, Figs. 1, 9). Petitioner explains that Kobayashi laminates the positive and the negative electrodes layers together to form a flat electrode group. *Id.* at 34–35 (citing Ex. 1006 ¶¶ 7, 9, Fig. 1; Ex. 1003 ¶¶ 102, 106, 154; Ex. 1017, 4:9–16).

Petitioner argues that when the spiral wound electrode is placed within the housing, the electrode layers of Kobayashi are aligned at right angles to the flat bottom and flat top areas of the housing. *Id.* at 36 (citing Ex. 1006, Fig. 1; Ex. 1003 ¶¶ 157–158). Further, Petitioner states that Kobayashi describes an alignment such that “when the spiral wound [electrode group] is inserted into the cell housing, the end surfaces of electrode layers 1, 2 . . . located closest to the flat top and bottom areas of containers 11, 13 (*i.e.*, end faces) face axially relative to container 11, 13.” *Id.* (citing Ex. 1006 ¶ 33, Fig. 1; Ex. 1003 ¶¶ 157–158).

Petitioner also alleges Kobayashi discloses that insulating plates 8 and 9 are “disposed between the positive electrode case and the electrode group, between the negative electrode case and the electrode group, or both” and are used to prevent the spiral wound electrode assembly from short-circuiting. *Id.* at 39 (referring to (citing Ex. 1006 ¶¶ 19, 32, Figs. 1). Petitioner alleges that Kobayashi discloses insulation plates 8a and 9a correspond to the claimed “insulating means.” *Id.* (citing Ex. 1006 ¶¶ 19, 32, Fig. 1).

With respect to the claimed “output conductor comprising a foil,” Petitioner asserts that “Kobayashi discloses ‘a disc-shaped positive electrode terminal plate 4a’ and ‘a disc-shaped negative electrode terminal plate 5a’” where “[t]he positive electrode plate 4a connects the positive electrodes 1 of the electrode group to container 13, while negative electrode terminal plate 5a connects negative electrodes 2 of the electrode group to container 11.” *Id.* at 37 (citing Ex. 1006 ¶ 28, Fig. 6; Ex. 1003 ¶ 321. Petitioner therefore asserts that “electrode terminal plates 4a, 5a rest flat between the end face of the spiral winding and their respective housing area,” as claimed.” *Id.*

Though Kobayashi does not describe its output conductor as a foil, Petitioner explains that foils were known in the prior art and commonly used by persons of ordinary skill in the art to reduce the thickness of various conductor components. *Id.* at 38 (citing Ex. 1003 ¶¶ 322–323; Ex. 1009 at 35, 879, 1294). Petitioner notes that Kobayashi itself discloses the use of foils as part of its electrode assembly. *Id.* (citing Ex. 1006 ¶¶ 7, 21).

And, relying on the testimony of Mr. Gardner, Petitioner reasons that a person of ordinary skill in the art would have been motivated to modify Kobayashi’s cell to substitute metal electrode terminal plates 4a and 5a with metal foil to reduce the thickness of the metal plates which improves certain properties of the cell, including “improv[ing] the energy density of the plates, reduc[ing] resistance of the other components of the electrode assembly, and improv[ing] the ratio of active to inactive components of the cell battery.” *Id.* (citing Ex. 1003 ¶¶ 322–323; Ex. 1009, 35, 879, 1294); *see also id.* at 31 (explaining “[a] well-known goal in the art is to reduce the size of inactive materials within the button cell, which can result in improved cell performance” and “[o]ne known form of these output conductors are foils, which can achieve the goal of reducing the size of inactive components of the cell without compromising other features”).

Patent Owner does not challenge many of Petitioner’s allegations regarding the teachings of Kobayashi. *See generally* PO Resp. We have reviewed the evidence and argument of record and determine that Petitioner establishes, by a preponderance of the evidence, that each uncontested limitation of claims 1–8 of the ’913 patent is present in Kobayashi.

Patent Owner, however, does argue that Petitioner has not demonstrated Kobayashi teaches “an output conductor comprising a foil

resting flat between an end face of the spiral winding and the flat top or flat bottom area” (PO Resp. 24) or provide a reason one of ordinary skill in the art would have modified Kobayashi to include foil output conductor (*id.* at 27). We address these contested issues below.

- a) *Whether Petitioner has shown that Kobayashi describes “an output conductor comprising a foil resting flat between an end face of the spiral winding and the flat top or flat bottom area”*

First, Patent Owner argues that Petitioner has failed to show that metal conductor plates 4a and 5a of Kobayashi can be foils. PO Resp. 24. Specifically, Patent Owner argues that Mr. Gardner’s testimony is based on inapplicable teachings “directed to conventional battery design, not to button cell design,” and “considerations relating to thickness of the electrodes, not of output conductors.” *Id.* at 24–25.

Petitioner alleges that “a [person of ordinary skill in the art] would have been motivated to use metal foils as the metal plates . . . at least because Kobayashi already discloses the use of metal foils within the electrode assembly.” Pet. Reply 6–7, 9. Petitioner explains that “a [person of ordinary skill in the art] would find it obvious to apply the lessons and advantages using techniques from conventional battery design to button cells” and that any necessary modifications or adjustments would be well within the skill set of one of ordinary skill in the art. *Id.* at 7. Petitioner, relying on the testimony of Mr. Gardner, states that a person of ordinary skill in the art “would understand the ‘terminal plates’ of Kobayashi could also be foils, because a [person of ordinary skill in the art] would understand that the designation as ‘plates’ was merely a convention, and whether such ‘plates’ could also be considered metal foils was merely a question of thickness.” *Id.*

at 10. According to Mr. Gardner, Kobayashi's electrode terminal plates could be easily modified to reduce its thickness. *Id.*

Upon review of Petitioner's arguments and supporting evidence, we find that Petitioner adequately shows that a person of ordinary skill in the art would have modified Kobayashi to include metal foils in place of its terminal electrode plates. Petitioner explains that one of ordinary skill in the art would have known that metal foil may be used in batteries because the use of metal foil as a conductor is common in the art. Pet. 31, 38 (citing Ex. 1003 ¶¶ 322–323). Petitioner directs our attention to Kobayashi which details use of metal foil for conducting elements. *Id.* at 38; *see also* Ex. 1006 ¶¶ 7, 21, 26, 27 (describing metal foil electrodes). Furthermore, Mr. Gardner testifies that “reducing the thickness of the output conductors has the effect of reducing the ratio of inactive to active components within the cell, which improves energy density . . . [and is] a well-known goal in the art.” Ex. 1003 ¶ 323. Mr. Gardner further opines that a person of ordinary skill in the art “would be motivated to reduce the thickness of the output conductors of Kobayashi in order to increase energy density within the cell” and “to use metal foils as the output conductors, as this furthers the well-known goal in the art of reducing the size of internal battery components.” *Id.* We acknowledge Patent Owner's argument that Mr. Gardner relies on teachings related to conventional battery design—not button cell batteries—and that he discusses “considerations relating to thickness of the electrodes, not of output conductors.” PO Reply 24–25. But, Mr. Gardner's testimony similarly relies on passages directed to “basic concepts” of battery operations and, as a whole, focuses on the concept that reducing the thickness of the terminal electrode plates would “maximize the

space available inside the cell for active components,” thereby increasing electrode density and improving battery performance. Ex. 1003 ¶ 323 (citing Ex. 1009, 35). According to Mr. Gardner, “these adjustments would be well within the skill of a [person of ordinary skill in the art].” Ex. 1041 ¶¶ 103–104. We credit Mr. Gardner’s testimony. “Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person’s skill.” *KSR*, 550 U.S. 401.

Second, Patent Owner asserts that “Mr. Gardner does not explain how—without modification to the cavities formed in Kobayashi’s insulating members—the metal foils would rest flat between the end face of the winding and the flat top or bottom of the housing.” PO Resp. 25 (alteration in original); Sur-reply 7–8. Patent Owner accuses Petitioner of relying on “only unsupported opinion testimony that ‘[a] POSA would recognize a number of shapes which would fit between the electrode assembly and the housing.’” PO Resp. 25; Sur-reply 8. According to Patent Owner, “[c]onventional battery teachings cannot simply be applied to miniature button cell design” and “numerous factors unique to button cell design” must be (and were not) considered by Mr. Gardner. PO Resp. 25; Sur-reply 8. Patent Owner directs our attention to various references to show “that conventional battery designs are ‘difficult to apply’ to coin or button cells, particularly for secondary or rechargeable batteries.” PO Resp. 26.

Petitioner asserts that “[a] [person of ordinary skill in the art] would have understood the output conductors rest flat on the housing halves, on

both lateral ends of the winding” and that the cavity depth in the housing could be adjusted to accommodate a metal foil. Pet. Reply 11.

On this issue, we agree with Petitioner. Mr. Gardner explains that the skilled artisan “would further recognize that the output conductor can be comprised of various materials . . . . which could be metal or various materials . . . . [and] the shape of the output conductor is not particularly limited.” Ex. 1003 ¶ 322. Mr. Gardner further testifies that a person of ordinary skill in the art “would recognize, not only that metal foil conductors could be inserted into these grooves without difficulty, but also that the depth of the grooves can be altered in order to better accommodate metal foil output conductors.” Ex. 1041 ¶¶ 53, 70. We recognize Patent Owner’s argument that numerous factors must be considered and that conventional battery design does not necessarily translate to button cell designs (PO Resp 25–26), but as Mr. Gardner testifies, “this may be true in some cases, [but] the lessons and advantages of using techniques from conventional battery design and applying it to button cell would be obvious to a [person of ordinary skill in the art].” Ex. 1041 ¶ 103. He continues to explain that “[n]aturally, such transposition of techniques would require some modification and adjustments. . . . [and that] each of these adjustments, . . . would be well within the skill of a [person of ordinary skill in the art].” *Id.* ¶ 104 (describing, for example, “reducing the thickness of the conductor plates of Kobayashi”). We credit Mr. Gardner’s testimony. Moreover, Patent Owner does not allege that any proposed modification would be beyond the skill of a person of ordinary skill in the art or explain how any of the “constraints unique to . . . button cell design” (PO Resp. 25) are relevant

to the proposed substitution of a metal foil for a metal terminal electrode plate. *See generally id.*; Sur-reply.

Finally, Patent Owner argues that “[r]eliance upon the general knowledge of a [person of ordinary skill in the art] to provide a missing element in a combination of references is an exception rather than the rule” and “is particularly true where the proposed modification goes to the essence of the claims.” PO Resp. 26. Patent Owner states that “Petitioners have provided no more than ‘conclusory statements and unspecified expert testimony’ to supply a metal foil that is admittedly missing from Kobayashi, and is not shown in any other button cell art.” *Id.* at 27.

We disagree. As the Federal Circuit has explained

‘common sense and common knowledge have their proper place in the obviousness inquiry,’ (a) invoking ‘common sense . . . to supply a limitation that was admittedly *missing* from the prior art’ should generally only be done when the [missing] limitation in question [is] unusually simple and the technology particularly straightforward;’ and (b) references to common sense ‘cannot be used as a wholesale substitute for reasoned analysis and evidentiary support’

*Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1338 (Fed. Cir. 2020)(quoting *Arendi S.A.R.L v. Apple Inc.*, 832 F.3d 1355, 1361–1362 (Fed. Cir. 2013)). Here, Petitioner proposes to substitute a *metal foil* for a *metal terminal electrode plate* to provide contact with the inner surface of the button cell housing. Ex. 1006 ¶ 34. As detailed above, Petitioner and Mr. Gardner direct our attention to the prior art of record which suggests use of foil within small battery cells to provide electrical contact was well-known and explains why the skilled artisan would have reduced the thickness of the terminal electrode plate to maximize the available space for active electrode components. Accordingly, unlike the expert in *Arendi*,

Petitioner here provides more than “conclusory statements and unspecific expert testimony.” *Arendi*, 832 F.3d at 1366.

Thus, based on the evidence and argument of record, we determine that the combination of Kobayashi and the general knowledge of those skilled in the art would suggest the use of foil in place of Kobayashi’s terminal electrode plates.

*b) Whether Petitioner has established a reason to modify Kobayashi to include a foil output conductor*

As described above, Petitioner contends, *inter alia*, that a person of ordinary skill in the art would have been motivated to modify Kobayashi’s metal plates 4a and 5a and replace them with a metal foil in order to “reduce the size of inactive materials within the button cell, which can result in improved cell performance.” Pet. 31. Patent Owner asserts that Petitioner has failed to establish a reason to modify Kobayashi. PO Resp. 27. Specifically, Patent Owner alleges such a modification would eliminate the goal of Kobayashi, renders it inoperable for its intended use, and that Petitioner’s reason to modify Kobayashi is without merit. *Id.* at 27–33. Patent Owner also contends that no reasonable expectation of success exists in the modification. *Id.* at 27–36.

*(1) does the modification “destroy the basic objective” or render Kobayashi inoperable for its intended purpose*

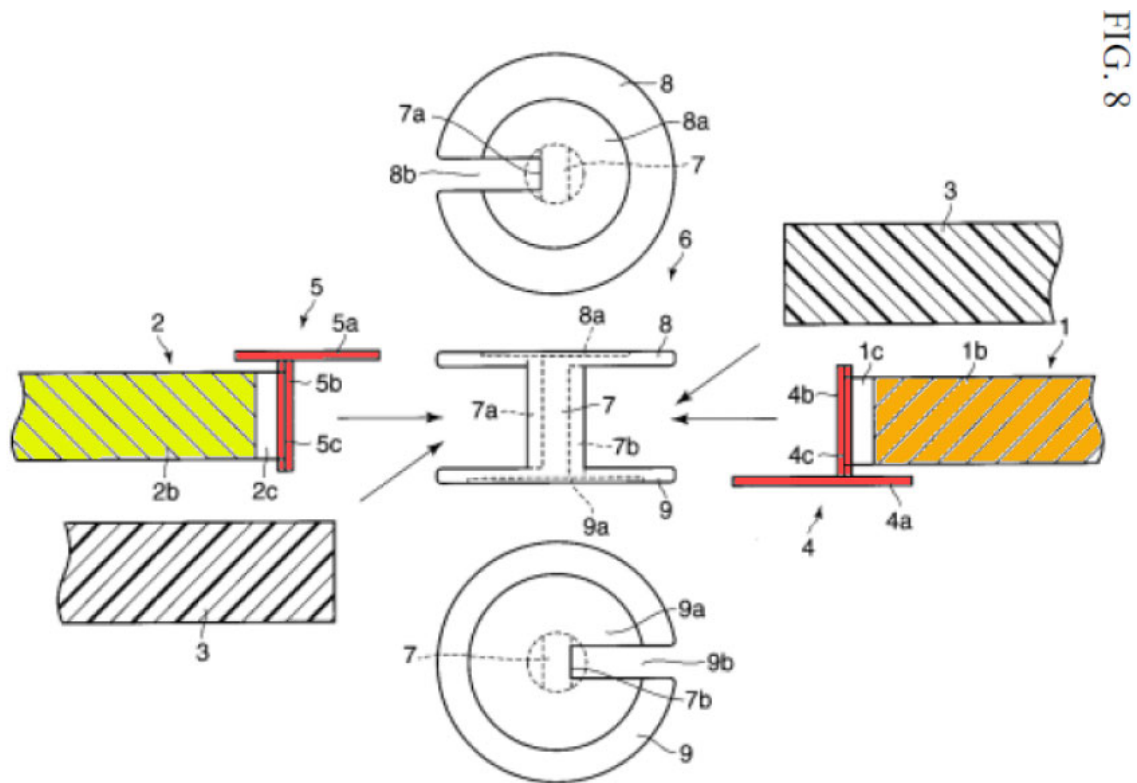
Patent Owner argues that Petitioner’s proposed modification to replace Kobayashi’s metal plates 4a and 5a with a foil “would have destroyed the basic objective of Kobayashi, which is to provide an integrated assembly to wind the electrodes about a core.” PO Resp. 27. Patent Owner asserts that Kobayashi’s winding core, including metal plates 4a and 5a, provide for a rigid connection system which is “necessary to enable winding

of the electrode assembly and its functioning within a cell housing.” *Id.* at 27–28. Patent Owner explains that “[a] [person of ordinary skill in the art] would have understood that, as the electrodes are wound, mechanical forces place the electrode assembly in tension in a direction generally perpendicular to the winding axis” and “[t]he electrode assembly could not be wound according to Kobayashi’s teachings in the absence of the rigid metal conducting plates to stabilize the assembly.” *Id.* at 29–30. Petitioner also contends that because Kobayashi requires a rigid connection system, Petitioner’s combination also teaches away. *Id.* at 33. Patent Owner similarly asserts that the proposed modification to replace Kobayashi’s terminal plates with a metal foil “would have rendered Kobayashi inoperable for its intended purpose” because metal foil would not provide the requisite stability to permit winding of the electrode ribbon and provide strength for the winding core within the housing. *Id.* at 34.

Petitioner contends that “Kobayashi does not disclose any degree of ‘rigidity’ which must be maintained by the components, nor does [Patent Owner] cite to any portion of Kobayashi which allegedly discloses this feature.” Pet. Reply 7. According to Petitioner, it is the “insulating member[s] (elements 7, 8, and 9 of Fig. 1), [that] provides a primary source of stability and rigidity to the cell.” *Id.* at 7–8. Petitioner explains that any support terminal plates 4a and 5b provide would be cursory and minimal when compared with the central winding component. *Id.* at 8.

We are persuaded by Petitioner’s argument and supporting evidence. Kobayashi describes a button cell, or other small battery, with a central, integrated winding axis core to spiral wind the positive and negative electrodes fixed to the winding axis core. Ex. 1006 ¶¶ 9, 14–17. Patent

Owner provides annotated Figure 8, reproduced below, to illustrate Kobayashi's electrode assembly.



Annotated Figure 8 shows positive electrode terminal 4 (right, red), including positive electrode terminal plate 4a, terminal connection part 4b, and slit 4c, and positive electrode 1 (orange) inserted into slit 4c. *Id.* ¶¶ 28, 47. Also shown is negative electrode terminal 5 (left, red), including negative electrode terminal plate 5a, terminal connection part 5b, and slit 5c, and negative electrode 2 (yellow) inserted into slit 5c. *Id.* Winding member 6 comprises winding axis core 7—which includes notch part 7a and 7b to receive terminal connection part 4b and 5b respectively—and insulating plates 8 and 9, each having a corresponding notch part 8b and 9b to communicate with notch parts 7a and 7b. *Id.* ¶¶ 30, 47. Insulating plates 8 and 9 include circular groove parts 8a and 9a to “accommodate” positive terminal plate 4a and negative terminal plate 5a, respectively. *Id.*

Kobayashi explains that after positive 1 electrode is inserted into slit 4c, “the terminal connection part 4b of the positive electrode terminal 4 was inserted into notch part 7b of the winding axis core 7, and the positive electrode terminal plate 4a was disposed in the notch part 9a of the insulation plate.” *Id.* ¶ 31. Kobayashi describes the same treatment for negative electrode 2. *Id.* Kobayashi explains “[a]s a result of having inserted the terminal connection parts 4b and 5b into the notch parts 7a and 7b of the winding axis core, the shape of the winding axis core 7 becomes cylindrical. *Id.* Notably, Kobayashi does not describe any degree of rigidity required for any component, much less electrode terminal plates 4a and 5a. *See generally id.* Similarly, Kobayashi does not describe electrode terminal plates as providing any structural support for winding. *Id.* Instead, Kobayashi describes the function of terminal plates 4a and 5a as providing contact with electrode case 13 or 11. *Id.* ¶¶ 33–34. In discussing positive electrode 4, Kobayashi states that “the electrode group was inserted into this positive electrode case 13, so that the positive electrode terminal plate 4a thereof was in contact with the inner surface of the positive electrode case 13.” *Id.* ¶ 34; *see also id.* ¶ 33 (discussing the negative electrode group). Indeed, Kobayashi indicates that it is winding axis core 7 (and insulation plates 8 and 9) that provides structure to wind the electrode groups into a spiral form—not electrode terminal plates 4a and 5a. *Id.* ¶¶ 9, 15, 20, claim 1. Mr. Gardner’s testimony is consistent with this understanding. In particular, he testifies that “structural[] integrity is provided by a ‘winding axis core 7’ located at the center of the electrode assembly. . . . [and] [t]he conductor plates do not provide any specific rigidity to the structure.” Ex. 1041 ¶ 88. We note Patent Owner’s argument

that mechanical forces place tension on the electrode assembly during winding and require rigid metal conducting plates for stabilization (PO Resp 29–30), but neither Patent Owner nor Dr. Peckerar direct our attention to any portion of Kobayashi that describes this purported criticality to electrode terminal plates 4a and 5a. *See generally* PO Resp.; Ex. 2043 ¶ 333.

(2) *whether the proffered motivation to modify Kobayashi is meritless*

Patent Owner further asserts that the motivation to modify Kobayashi offered by Mr. Gardner and Petitioner, i.e., “reducing the ratio of inactive to active components within the cell, which improves energy density,” is without merit. PO Resp. 31. Patent Owner argues that the “overall ratio of inactive to active components within Kobayashi’s cell is at most only slightly improved.” *Id.* at 32. Patent Owner also argues that “[o]nly a very small portion of the plate is exposed” and “[a] [person of ordinary skill in the art] would have understood that the opposing grooves 8a, 9a in the upper and lower insulation plates are not suitable to receive metal foil conductors” because “[t]he metal foils would be entirely embedded in the grooves, preventing the foils from making any connection whatsoever” with the housing. *Id.* And, according to Patent Owner, “a [person of ordinary skill in the art] would have understood that a rigid metal plate would be much easier to attach reliably to the connecting rods” because welding to metal plates, as opposed to metal foils, is easier. *Id.* at 33.

We disagree. As we explained above, Petitioner and Mr. Gardner explain, among other things, that a person of ordinary skill in the art would be motivated to use foils in the Kobayashi electrode design as opposed to terminal electrode plates “in order to increase overall volume in the cell that

is available for active components.” Ex. 1003 ¶¶ 250, 323; Pet. 31–32. Doing so “allows for increased size of the electrode layers within the electrode assembly which, beyond increasing the energy storage capacity of the cell, also decrease[s] the electrical resistance within the electrode layers.” Ex. 1003 ¶ 323. As Mr. Gardner testifies, reducing the thickness of the terminal electrode plates also reduces the ratio of inactive to active components thereby increasing energy density within the cell—which “is a well-known goal in the art.” *Id.* Dr. Peckerar acknowledges that the available overall volume would increase, though he qualifies it as only “very slightly improved.” Ex. 2043 ¶ 337; *see also* PO Resp. 32 (same). Mr. Gardner also testifies that a person of ordinary skill in the art would understand that use of foil, in addition to increasing the volume within the cell, would reduce the weight of the output conductors thereby “reducing the overall weight . . . of the resultant button cell.” Ex. 1003 ¶¶ 248–249, 322. Mr. Gardner’s testimony that weight is also a concern is supported by the teachings of Kaun. *See, e.g.* Ex. 1006 ¶ 18 (“Current collectors used in these cell arrangements add significant weight, and thus reduced specific cell energy and power outputs.”); *see also* PO Resp. 48; Ex. 2043 ¶ 327 (acknowledging that current collectors add significant weight). On balance, the preponderance of the evidence supports Petitioner’s contention that there is benefit—regardless of degree—to the function of the electrode by maximizing internal space for active components as well as benefits in power output by reducing the overall weight of the button cell.

We also disagree with Patent Owner’s position that Kobayashi’s “insulation plates are not suitable to receive metal foil conductors” because the “metal foils would be entirely embedded in the grooves, preventing the

foils from making any connection.” PO Resp. 32; Sur-reply 7. Petitioner, through the testimony of Mr. Gardner, explains that a person of ordinary skill in the art would understand that the terminal electrode plate could be “comprised of various materials” and that “a number of shapes which would fit between the electrode assembly and the housing of Kobayashi, with a motivation to choose a relatively light weight material so as to prevent the bulk of the resulting button cell.” Ex. 1003 ¶ 322. Mr. Gardner further testifies that a person of ordinary skill in the art would know how to adjust the groove depth such that the metal foil would contact the housing. Ex. 1033, 183:19–21; Ex. 1041 ¶¶ 53, 70; Pet. Reply 11. Patent Owner does not disagree that such a modification is within the skill level of the ordinarily skilled artisan. *See generally* PO Resp.; Sur-reply. Furthermore, we disagree with Patent Owner’s argument that it would be difficult to attach a flexible metal foil to the terminal connection part 4b and 5b. PO Resp. 33; Sur-reply 11. As Petitioner points out, Kobayashi “already discloses the use of metal foils within the electrode assembly” which are connected to terminal connection part 4b. Pet. Reply 6, 9; Ex. 1006 ¶¶ 21, 29. Furthermore, though there *may* be “difficulties” presented in welding a foil to the terminal connection part, “[t]he fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another.” *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000). One of ordinary skill in the art would have considered both the advantages and disadvantages and balanced the relative tradeoffs in making the proposed combination. *Id.*

(3) *does a reasonable expectation of success exist in  
Petitioner's proffered modification of Kobayashi*

Patent Owner further argues that a person of ordinary skill in the art would not have had a reasonable expectation of success because substantial redesign would need to occur. PO Resp. 35; Sur-reply 9–10. Specifically, Patent Owner alleges that “[b]ecause Kobayashi’s winding core assembly relies on the metal plates as an integral part of a positive locking system” use of metal foils would require a redesign of the winding posts as “they no longer would be registered and held securely in place by the metal plates.” PO Resp. 35. According to Patent Owner, it is likely that “a [person of ordinary skill in the art] would have been required to abandon integrating the Kobayashi winding into its winding axis core, which is the primary objective of the Kobayashi reference.” *Id.*

Petitioner asserts that “metal foils would serve just as well as the terminal plates, if not better, to operate the button cell of Kobayashi.” Pet. Reply 12. Petitioner asserts that Dr. Peckerar’s testimony that metal foils lack sufficient rigidity is speculative. *Id.* at 9. Indeed, according to Petitioner, Kobayashi does not “necessitate a rigid connection system, but the insulating member provides a primary source of stability and rigidity.” *Id.* Relying on the testimony of Mr. Gardner, Petitioner argues that “a [person of ordinary skill in the art] would understand that the metal foils would maintain electrical contact without impairment to manufacturability and service life of the battery.” *Id.*

In weighing the evidence before us, we disagree with Patent Owner that Petitioner failed to show a reasonable expectation of success and that substantial redesign would need to occur. As we explained above (*supra* Section II.D.2.b.1), Kobayashi does not describe electrode terminal plates 4a

and 5a as a critical part of the locking assembly. And, contrary to Patent Owner's allegations, Kobayashi does not describe the "winding posts"<sup>8</sup> as "registered and held securely in place by the [electrode terminal] plates." PO Resp. 35. Notably, neither Patent Owner nor Dr. Peckerar cite to any portion of Kobayashi to support these assertions. *See Id.* at 35–36; Ex. 2043 ¶¶ 351–352. Rather, Kobayashi merely states that the electrode terminal plates are "electrically connected" to the terminal connection part. Ex. 1006 ¶ 28. Kobayashi does indicate, however, that terminal connection parts 4b and 5b are secured to winding axis core 7. In particular, Kobayashi describes that winding member 6 contains a "winding axis core 7, and insulation plates 8 and 9 . . . integrated with the upper and lower end of the winding axis core" where winding axis core 7 includes "a notch part 7b into which the terminal connection part 4b of the positive electrode terminal 4 is fitted." *Id.* ¶ 30.

### 3. *Summary of Claim 1*

For the foregoing reasons, we are persuaded by Petitioner's arguments and evidence demonstrating that a person of ordinary skill in the art would have had reason to combine the teachings of Kobayashi and the knowledge of the skilled artisan, and would have had a reasonable expectation of successfully doing so to arrive at the subject matter recited in claim 1. As noted above, we also agree with Petitioner's arguments and evidence that Kobayashi in combination with the knowledge of the person of ordinary skill in the art teaches or suggests all of the limitations recited in claim 1.

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<sup>8</sup> It is unclear what component Patent Owner refers to as Kobayashi does not use the term "winding post." *See generally* Ex. 1006. We assume Patent Owner refers to terminal connection parts 4b and 5b.

4. *Remaining Claims (Claims 2–8)*

Petitioner contends that the combination of Kobayashi and the knowledge of the person of ordinary skill in the art suggests the additional limitations of claims 2–8 and renders the claims obvious. Pet. 40–48. Patent Owner does not present any arguments specific to challenged claims 2–8, but instead appears to rely on the arguments and reasons it raises above with respect to claim 1. PO Resp. 36. Therefore, Patent Owner has forfeited any arguments based on these uncontested claims. *Cf. NuVasive*, 842 F.3d at 1381 (explaining that patent owner waives an argument presented in the preliminary response if it fails to renew that argument in the patent owner response during the instituted trial).

We have reviewed the evidence of record, including the testimony of Mr. Gardner and the analysis and evidence Petitioner presents above with respect to claim 1, we are persuaded Petitioner shows sufficiently that the combination of Kobayashi and the general knowledge of the ordinarily skilled artisan suggests the limitations of claims 2–8, and provides sufficient reasoning with rational underpinning for combining the references’ teachings as claimed. *See* Pet. 40–48.

5. *Objective Indicia of Nonobviousness*

The fourth Graham factor instructs that we must consider—apart from what the prior art itself would have suggested—whether objective evidence of nonobviousness (i.e., secondary considerations) may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness). Objective evidence of

nonobviousness may include evidence of commercial success, licensing, copying, praise by others, long felt but unresolved need, and failure or skepticism of others. *Graham*, 383 U.S. at 17–18. But, secondary considerations are only a part of the “totality of the evidence”; its mere existence does not control the conclusion of obviousness. See *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed. Cir. 1997). Objective evidence of nonobviousness “may often be the most probative and cogent evidence in the record” and “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012).

Objective evidence of nonobviousness “is only relevant to the obviousness inquiry ‘if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].’” *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (2006)). A “nexus” is a legally and factually sufficient connection between the objective evidence and the claimed invention such that the objective evidence should be considered in the determination of obviousness. *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019); *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). A presumption of nexus arises where “the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229

F.3d 1120, 1130 (Fed. Cir. 2000)); *see also* *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013) (explaining that a “presumption of a nexus” exists where a product is “coextensive” with a patent claim). If, however, the patented invention is only a component of the commercial embodiment, the patentee is not entitled to a presumption of nexus. *Fox Factory*, 944 F.3d at 1374. In addition, “[a] patent claim is not coextensive with a product that includes a ‘critical’ unclaimed feature that is claimed by a different patent and that materially impacts the product’s functionality.” *Id.* at 1375. But, “[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations”; rather, “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is ‘the direct result of the unique characteristics of the claimed invention.’” *Id.* at 1374 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996)). Patent Owner bears the burden of establishing that a nexus exists between the evidence of secondary considerations and the patented invention. *Id.* at 1373.

*a) nexus*

Patent Owner argues that substantial evidence of nonobviousness exists in the form of unexpected results, commercial success enabling the development of new consumer products, industry praise, and copying. *See* PO Resp. 52–61. Patent Owner contends there is a clear nexus between these secondary considerations and the claimed invention. *Id.* In particular, Patent Owner contends that its CoinPower® button cell batteries are covered by at least claim 1 of the ’913 patent. *Id.* at 52 (citing Ex. 2043 ¶¶ 609–614). Patent Owner further attributes the improved performance of the CoinPower® button cell to its claimed combination of elements which

“allows increased electrode material to be placed inside the housing.” *Id.* at 52–53. Specifically, Patent Owner alleges

[t]he claimed invention includes a jelly roll configuration that facilitates optimal use of limited space in the housing because it is perpendicular to flat top and bottom portions of the housing. The jelly roll is protected by an insulating layer to avoid short circuits, particularly during swelling and shrinking of the jelly roll during charging and discharging. In addition, a flat foil output conductor that connects one of the jelly roll electrodes to the housing consumes no space because it rests between the spiral winding and the housing, thereby making volume available for electrode material. This structure also provides greater stability of the button cell, representing a significant breakthrough in button cell design.

*Id.* at 53 (citing Ex. 2045 ¶ 16; Ex. 2043 ¶ 624); *see also id.* (identifying the combination of the jelly roll electrode, the insulating means, and the flat output conductor as responsible for “vastly increased energy density” and “improved cycling”). Patent Owner alleges that “CoinPower® products are *substantially* coextensive with the patented features.” *Id.* (emphasis added) (citing Ex. 2045 ¶¶ 37, 46, 49; Ex. 2046 ¶¶ 15, 54; Ex. 2043 ¶ 610).

Thus, Patent Owner identifies three claimed features—i.e., the jelly-roll configuration, the insulating layer, and the flat foil output conductor—as responsible for the improved performance of the VARTA CoinPower® button cell batteries. *Id.* However, Patent Owner’s declarants testify further and explain that it is the combination of the three identified features in addition to sealing the cell without crimping and welding the foil conductor from outside the housing that are responsible for improved performance. In particular, Mr. Miehlisch, employed in VARTA’s marketing and sales department, testifies that the new cell design, which “provided

unprecedented increases in performance, including in energy density, charge capacity, and cycling stability,”

consisted of a “jelly roll electrode coil packed tightly into an uncrimped, button-like housing. The electrode coil was protected against short-circuiting by [an] insulating means, and was connected to the cell terminals by a flexible flat foil conductors resting flat between the electrode top and housing, and welded to the housing components from the outside. These features are all found in the claims of the VARTA patents here under review.

Ex. 2045 ¶¶ 15–16. And, Dr. Lindner, one of the named inventors of the ’913 patent, testifies that the

complex issues we faced were how to safely pack the required amount of electrode material into the very small “button”-sized housing and protect it against short circuits; how to connect the “jelly roll” electrode to the terminals in such a confined space without itself consuming much volume, and how to seal the top and bottom of the cell housing, all while accommodating the expansion and contraction of the electrode winding and the resulting mechanical forces.

Ex. 2046 ¶ 33. According to Dr. Linder, the jelly-roll configuration with an insulator, flexible foil output conductors, sealing the cell without crimping, and welding the foil conductors from outside the housing each contributed to the improved battery performance. *Id.* ¶¶ 34–43. Thus, it is the combination of five elements—not the three claimed in the ’913 patent—that are purportedly responsible for the “vastly increased performance characteristics” of the CoinPower® products. *Id.* ¶ 43; *see also id.* ¶ 45 (noting that “*various aspects* of our invention are covered by 10 issued patents, including the four United States patents here under review” (emphasis added)); Tr. 85:8–10 (explaining that welding, for example, is “also part of the success”). Like the patent owner in *Fox Factory*, “[i]n light

of the patentee’s own assertions about the significance of the unclaimed features, no reasonable fact finder could conclude that these features are insignificant.” *Fox Factory*, 944 F.3d 1375. As a result, the patent claims are not coextensive with the CoinPower® products because those products include “‘critical’ unclaimed feature[s] that [are] claimed by a different patent and materially impacts the product’s functionality.” *Id.*

Therefore, for purposes of our analysis, we do not apply a presumption of nexus. Below, however, we consider the parties’ arguments and evidence regarding any purported unexpected results, industry praise, commercial success, and copying in light of any alleged nexus.

*b) unexpected results*

Patent Owner contends that “[t]he invention is a novel design for the button cell that resulted in a leap forward in performance over conventional cells.” PO Resp. 54 (citing Ex. 2045 ¶ 16). Patent Owner explains that “[u]nlike conventional batteries, Patent Owner sought to produce a button cell that could be used in a wearable device that may be located in the ear shell” and that “[b]atteries that were suitable for such consumer devices with required performance . . . did not exist.” *Id.* at 54–55 (citing Ex. 2045 ¶ 30). Patent Owner explains that conventional teachings favored a “fixed core structure,” such as Kobayashi, and that “[c]ontrary to this conventional belief . . . the flexibility of the combination of elements of the [’913 patented] invention allows the electrode assembly to ‘breathe’ . . . while providing excellent stability over its lifetime, represent[ed] a striking advancement in the field.” *Id.* at 55 (citing Ex. 2046 ¶ 34).

Here, Patent Owner provides some evidence and supporting testimony that suggests that the combination of elements in the CoinPower® products

resulted in a surprisingly stable connection and improved capability. Mr. Miehlisch testified that funding requests by the inventors “initially met with a great deal of reluctance” (Ex. 2045 ¶ 26) but that the “patented new cell produced energy densities, charge capacities and cycling stability that represented a performance leap forward, particularly a cell of such small size” (*id.* ¶ 36). According to Mr. Miehlisch, “[i]n all [his] years in this technology, [he] had never seen a performance leap of this magnitude – about 30% over then existing button cells.” *Id.* Mr. Miehlisch, however, ties its unexpected results to a combination *five* features, that allow for use of a maximum amount of internal space, and not to the specific *three* features of the ’913 patent. *Id.* ¶¶ 31–35 (identifying the jelly-roll configuration, the insulating means, the flexible foil output conductors, sealing the cell without crimping, and welding the foil conductors from outside the housing). As a result, we accord only moderate weight to Patent Owner’s evidence of unexpected results in the absence of a more substantial nexus to the claims.

*c) commercial success*

Patent Owner contends that its CoinPower® products have been very successful. PO Resp. 55. Patent Owner explains that the “technology claimed in the ’913 patent was a breakthrough in button cell design and [that its] commercial embodiment has been adopted as the gold standard for use in many devices including true wireless stereo earbuds.” *Id.* at 55–56 (citing Ex. 2045 ¶¶ 18–19). According to Patent Owner, the CoinPower® products “have enjoyed widespread acceptance and explosive sales growth” and that “sales of the patented button cells have more than doubled each year in the past six years, reaching almost 140 million units in 2020” which “represents just over 60% of global market share in 2020.” *Id.* at 56 (citing Ex. 2045

¶¶ 54–57). Mr. Miehllich testifies that the “sales [are] due solely to the performance characteristics of the patented CoinPower button cell, which is brought about by the unique utilization of a ‘jelly roll’-electrode with its supporting structures” and not to any “marketing or advertising efforts.” Ex. 2045 ¶¶ 58–59.

While we agree, in view of the evidence and supporting testimony, that the CoinPower<sup>®</sup> products are commercially successful and have resulted in significant sales, Patent Owner does little, if anything, to tie that commercial success to the claimed features of the ’913 patent. First, the testimony of Mr. Miehllich clearly attributes VARTA’s sales to the overall combination of features in the CoinPower<sup>®</sup> products, including two features not claimed by the ’913 patent. In particular, Mr. Miehllich testifies that

[t]he performance enabling our sales to the interested device manufacturers were the direct result of the combination of a “jelly roll” oriented electrode essentially filling a housing, insulating means protecting the electrode and flexible foil conductors resting flat between the electrode and housing. The non-beaded-over housing contributed additional volume to be occupied by electrode, further enhancing performance, and the welding of the conductor foils to the cell terminals by weld spots passing from the outside through the housing was our preferred method of secure attachment as it readily facilitated manufacture of the cell on a large scale.

Ex. 2045 ¶ 46. Accordingly, we accord only moderate weight to Patent Owner’s evidence of commercial success in the absence of a more substantial nexus to the claims.

*d) industry praise*

Patent Owner contends that it “has received several industry awards for its CoinPower product covered by the claims of the ’913 patent.” PO Resp. 59. “Among the recognition are the 2011 Top Innovator award from

TOP100, the 2012 Product of the Year award from *Elektronik* Publication, the Innovation Award 2015 from the *Selezione di Elettronica* publication, and the Deutsche Innovationspreis 2020, all citing the CoinPower cells.” *Id.* (citing Ex. 2045 ¶¶ 62–66).

Having considered the record evidence, we find that some evidence of industry praise. For example, Mr. Miehlich testifies that in earning the above-referenced awards, the CoinPower® button cell was “cited.” Ex. 2045 ¶¶ 63–66. However, without more, it is difficult to assess the role the claimed features of the ’913 patent played in VARTA receiving its recognition. On balance, we accord little weight to Patent Owner’s evidence of industry praise as significant industry praise tied to the claimed features has not been shown.

*e) long felt need*

Patent Owner argues that “[t]he ’913 patent is considered a breakthrough in battery technology because it provided, for the first time, a solution to the problem of limited energy density available for small devices, such as those placed into a human ear.” PO Resp. 60 (citing Ex. 2045 ¶ 30). Patent Owner alleges that prior art “button cells could not supply the required energy density or cycling stability” for true wireless stereo (“TWS”) headphones. *Id.* (citing Ex. 2045 ¶¶ 40, 54–55). But, “[t]he availability of Patent Owner’s high performance cells quickly led to the development of not only of TWS earphones, but a variety of other new-generation devices, including fitness trackers, medical patches, smart keys, and the like.” *Id.*

Petitioner asserts that “VARTA fails to show that any novel claim elements of the ’913 Patent solved any unmet need.” Pet. Reply 24.

Petitioner argues that both Patent Owner and its declarants fail to identify any need in the art or introduce evidence that the combination of claim elements met that supposed need. *Id.*

In order to show a long-felt but unmet need for the claimed invention, the objective evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). “Evidence of long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would not have persisted had the solution been obvious.” *WBIP LLC v. Kohler Co.*, 829 F.3d 1317, 1332 (Fed. Cir. 2016). Here, the record evidence shows some evidence of long felt need. For example, Mr. Miehlich and Dr. Linder testified that “miniaturized batteries with sufficient capacity did not exist.” Sur-reply 25 (citing Ex. 2045 ¶ 30; Ex. 2046, ¶ 20; Ex. 1036, 25:11–26:9, 44:16–45:16). However, that testimony does not elaborate on the specific unmet yet unresolved need. Further, Patent Owner, attributes its ability to provide a solution to the problem of limited energy density for small devices to a combination *five* features, that allow for use of a maximum amount of internal space, and not to the specific *three* features of the ’913 patent. Ex. 205 ¶¶ 14–16, 18, 54 (attributing the success generally to the combination of five features). As a result, we accord little weight to Patent Owner’s evidence of long felt need as significant need tied to the claimed features has not been shown.

*f) copying*

Patent Owner asserts that “[a]s small consumer electronics devices have become more popular, others began manufacturing high performance button cells that copy the features claimed in the ’913 patent.” PO Resp. 61

(citing Ex. 2045 ¶¶ 67–69). “Patent Owner believes that as many as three to five manufacturers of button cells, including sizeable companies such as interested party Mic-Power, now employ the electrode configuration and supporting structures exactly as set forth at least in claim 1 of the ’913 patent to manufacture button cells.” *Id.* (citing Ex. 2045 ¶ 68; Ex. 2043 ¶¶ 626–630). Patent Owner asserts that the fact these companies adopted Patent Owner’s button cell design is “a powerful indicator of the validity of the ’913 patent.” *Id.*

Petitioner asserts that just because a competing product may fall within the scope of the claims does not result in copying. Pet. Reply. By way of example, Petitioner directs our attention to an IEC standard that purports to dictate certain physical and electrical specifications for standard-compliant batteries. *Id.* (citing Ex. 1038; Ex. 1037, 60:9–61:21).

“Copying requires duplication of features of the patentee’s work based on access to that work, lest all infringement be mistakenly treated as copying.” *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1347–48 (Fed. Cir. 2013). Evidence of copying may take the form of “internal documents, direct evidence such as photos or patented features, or disassembly of products, or access and similarity to a patented product.” *Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). Here, the testimony of Mr. Miehlich and Dr. Peckerar provide some evidence of copying. For example, Mr. Miehlich testifies that “VARTA believes” that there may be as many as 5 manufacturers that have adopted the design set forth in “the VARTA patents here under review.” In addition, Dr. Peckerar testifies that the “VARTA CoinPower® button cells had been commercially available long before the EVE and Mic-Power button cells

appeared in the marketplace” and that the “similarities are so pervasive that the EVE and Mic-Power batteries were constructed to be copies of the VARTA CoinPower® button cells.” Ex. 2043 ¶ 625. Dr. Peckerar compares the features of the Mic-Power M1254S2 and EVE ICR 1454 cells with the claim limitations of the ’913 patent and concludes that each limitation of claims 1, 4, and 6 is present. *Id.* ¶¶ 643–647. However, while the evidence of record suggests Petitioner and others *could* have accessed Patent Owner’s work, there is no evidence to suggest that access and copying, in fact, occurred. As such, we assign little weight to Patent Owner’s evidence of copying.

6. *Conclusion as to Obviousness*

Having considered each of the *Graham* factors, we determine that the first two *Graham* factors—the scope and content of the prior art and differences between the prior art and the challenged claims—significantly outweigh the marginal evidence of unexpected results, commercial success, industry praise, long felt need, and copying. Accordingly, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 1–8 would have been obvious over Kobayashi and the knowledge of the person of ordinary skill in the art.

E. *Remaining Grounds*

Having determined that Petitioner establishes by a preponderance of the evidence that the combination of Kobayashi with the knowledge of the person of ordinary skill in the art renders the subject matter of claims 1–8 unpatentable, we need not address Petitioner’s additional grounds challenging claims 1–8. *See SAS*, 138 S. Ct. at 1359 (holding a petitioner “is entitled to a final written decision addressing all of the claims it has

challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (“We agree that the Board need not address [alternative grounds] that are not necessary to the resolution of the proceeding.”).

#### IV. CONTINGENT MOTION TO AMEND

Patent Owner filed a Revised Contingent Motion to Amend original claims 1–8 and replace them with proposed substitute claims 9–16. MTA 3. We have determined that original claims 1–8 of the ’913 patent have been shown to be unpatentable by a preponderance of the evidence; therefore, we proceed to address Patent Owner’s Revised Contingent Motion to Amend.

Before considering the patentability of any proposed substitute claims, we first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. As part of this showing, Patent Owner bears the burden of persuasion to show, by a preponderance of the evidence, that: (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure. 37 C.F.R. § 42.121(d)(1); *Lectrosonics, Inc. v. Zaxcom, Inc.*, Case IPR 2018-01129 (PTAB Feb. 25, 2019) (Paper 15) (precedential).

Although Patent Owner must demonstrate that the statutory and regulatory requirements for a motion to amend are met, Petitioner “bears the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable.” 37 C.F.R. § 42.121(d)(2);

*Lectrosonics*, Paper 15 at 4 (citing *Aqua Prods. Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017); *Bosch Auto. Serv. Sols. LLC v. Iancu*, 878 F.3d 1027 (Fed. Cir. 2017)).

Patent Owner proposes substantive amendments to independent claims 1, 4, and 6 by way of proposed substitute claims 9, 12, and 14 to distinguish over the cited art. MTA 3, 7–10; *see also id.* at Appendix A (illustrating amendments to proposed claim language). The remaining proposed substitute dependent claims are amended to reflect proper dependency and other non-distinguishing language. *Id.* at 9; *see also id.* at Appendix A. The parties focus their discussion on the newly proposed limitations in the independent claims that purportedly distinguish over the prior art. .

*A. Requirements Under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121*

Patent Owner asserts that its Motion to Amend proposed a reasonable number of substitute claims and is not broadening. MTA 6–16. Patent Owner proposes a single substitute claim for each cancelled claim (i.e., one-for-one), and therefore, meets the requirement for a reasonable number of proposed substitute claims. *See* 37 C.F.R. § 42.121(a)(3); *see also Lectrosonics*, Paper 15 at 4 (“There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.”). Patent Owner also proposes narrowing limitations in proposed substitute claims in direct response to the grounds of unpatentability involved in this trial. MTA 5–6. Petitioner does not dispute Patent Owner’s contentions. *See generally* MTA Opp. We determine that Patent Owner has met the above-identified statutory and regulatory requirements for a motion to amend.

We next consider whether Patent Owner has shown the proposed substitute claims are supported by the original disclosure. Patent Owner argues that “each limitation of the substitute claims is disclosed in the specification and/or figures of U.S. Patent Application No. 13/146,669, as filed July 28, 2011, and for which a Section 371(c) filing date was given on September 7, 2011.” MTA 10.<sup>9</sup> Patent Owner identifies corresponding support for each limitation in chart format. *Id.* at 10–16.

Petitioner asserts that “[t]here is not sufficient written description for at least claims 9[g], 12[g], and 14[g],” i.e., the proposed substitute independent claim limitations requiring “the housing cup and the housing top [being] held together by a force-fitting connection.” MTA Opp. 3, 7. Petitioner acknowledges that the “specification discloses . . . that a force-fit connection is formed, [but] is fails to guide a person of ordinary skill regarding the nature of this connection or how the connection was it was part of the alleged invention.” *Id.* at 3. For example, Petitioner questions “is the force provided by a radial pressure between the housing components? Friction which exists between the housing and the gasket?” *Id.* Petitioner further argues that “Patent Owner relies on disclosures which recite that ‘the connection holds components together ‘essentially only by static-friction force’” and that “Dr. Peckerar relies upon a *new* construction of ‘friction’

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<sup>9</sup> The ’913 patent issued from U.S. Patent Application No. 15/283,568 which is a continuation of U.S. Patent Application No. 14/827,387 which is a divisional of U.S. Patent Application No. 13/146,669 (Ex. 2032, “the ’669 application”). MTA 10; Ex. 1001, code (60). Patent Owner cites to the “Clean Copy” of the substitute Specification in the Preliminary Amendment filed with the original application. *See* MTA 11–14 (citing Exhibit 2032 starting at page 57).

between the housing components.” MTA Sur-reply 1–2. Petitioner asserts that Patent Owner should have advanced a construction of the term. *Id.*

On this record, we agree with Patent Owner that a “force-fitting connection” is adequately supported. In particular, the original disclosure (Ex. 2032) explains as follows:

[I]t is also possible to manufacture button cells in which the cell cup and the cell top are held together in the axial direction exclusively by a force-fitting connection, and which do not have a beaded-over cup edge. [Ex. 2032 ¶ 6].

[T]here is preferably an exclusively force-fitting connection between the housing half-parts. [*id.* ¶ 41].

In the case of button cells produced using a method such as this, there is preferably an exclusively force-fitting connection between the housing components comprising the cell cup, the cell top and the seal. This ensures that the components are therefore held together in a preferred manner, *essentially only by static-friction force*. [*id.* ¶ 45 (emphasis added)].

The ’669 application continues to explain how the exclusive force-fitting connection is achieved. According to the disclosure,

Button cells without any beading over are particularly preferably produced using a cell cup which is conical at least in one subarea of its casing, such that at least its internal diameter increases in the direction of the cut edge. This makes it considerably easier to insert the cell top into the cell cup. *The dimensions of the cell cup and cell top are preferably matched to one another such that relatively large opposing forces preferably do not occur until the top has been inserted virtually completely into the cup*. [*id.* ¶ 46 (emphasis added)].

When a cell top with a cylindrical casing area is being inserted into a cell cup which is conical at least in one subarea of its casing, as has been described above, a gap which is open at the top is generally created between the cell cup and the cell top.

This gap is generally closed again by the pressure on the casing area of the cell cup. Thus, the pressure on the casing area of the cell cup may be chosen such that the conical part of the casing area of the cell cup is pushed inward until the inside of the cell cup and the outside of the cell top are essentially at the same distance from one another in the overlapping area. The resultant button cell has casing areas which are aligned parallel to one another, in particular in the overlapping area. [*id.* ¶ 48].

*When a suitable pressure is applied to the casing area of the cell cup, this results in an interference fit, as a consequence of which the button cell that has been produced has highly excellent sealing characteristics. Not least, the use of film seals makes it possible to dispense with the edge of the cell cup being beaded over without this on the other hand resulting in a need to accept disadvantages in other important characteristics. [*id.* ¶ 51 (emphasis added)].*

Dr. Peckerar's un rebutted testimony that "the '669 Application describes button cells in which the casing area of the cell cup is, during manufacture, pressed against the casing area of the cell top with the result that the button cell has a 'force-fitting connection' between the housing components comprising the cell cup, the cell top, and the seal," is consistent with the disclosure in the '669 Application. Ex. 2050 ¶ 36 (citing Ex. 2032 ¶¶ 50–52); *see also* Ex. 1042, 391:17–21 (stating a force-fitting connection as one that "form[s] a friction fit to the -- between the can top and the can cup"); *id.* at 408:1–9 (describing a "friction" connection); *id.* at 409:3–11 (explaining that "these force- fitting connections work is they -- they increase the force you can call it the critical force necessary to prise the can apart, by increasing friction and perhaps even forming a pressure weld between the can top and the can cup through the intermediary of the -- of the gasket material").

We also determine that that Patent Owner has shown sufficient written description support for the other limitations of claims 9–16. *See* MTA 10–16. Accordingly, we determine that the ’669 application sets forth sufficient written description support for the proposed substitute claims, including “the force-fitting connection.”

Having determined that the contingent Motion to Amend meets the requirements of 35 U.S.C. § 316 (d) and 37 C.F.R. § 42.121, we analyze whether proposed substitute claims 9–14 are unpatentable by a preponderance of the evidence based on the entirety of the record. For the reasons discussed below, we determine that Petitioner has not shown by a preponderance of the evidence that proposed claims 9–14 are unpatentable over the combination of Kannou and Kaun with either of Kwon or Kawamura. For completeness, we also address whether the additional combinations identified by Patent Owner—i.e., (1) Kobayashi and the knowledge of the ordinarily skilled artisan and (2) Kaun, Kobayashi, and the knowledge of the ordinarily skilled artisan—suggest the subject matter of proposed substitute claims 9–16.<sup>10</sup>

*B. Challenges to the Proposed Substitute Claims under § 103*

Patent Owner and Petitioner address the patentability of proposed substitute claims on the following grounds:

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<sup>10</sup> Though Petitioner bears the burden of persuasion, “the Board may . . . exercise its discretion to grant or deny a motion to amend . . . for reasons supported by readily identifiable and persuasive evidence of record.” 37 C.F.R. § 42.121(d). We, therefore, have reviewed the prior art combinations raised by Patent Owner—even if not asserted by Petitioner—to determine whether they present “readily identifiable and persuasive evidence” of unpatentability.

| Substitute Claims | 35 U.S.C. § | References/Basis                                                             |
|-------------------|-------------|------------------------------------------------------------------------------|
| 9-16              | 103         | Kobayashi and the knowledge of the person of ordinary skill in the art       |
| 9-16              | 103         | Kaun, Kobayashi and the knowledge of the person of ordinary skill in the art |
| 9-16              | 103         | Kannou, Kaun, and Kwon or Kawamura                                           |

*C. Patentability of the Proposed Substitute Claims*

As a replacement for independent claim 1, Patent Owner proposes claim 9. MTA 3. Proposed substitute independent claim 9 is reproduced below with annotations showing amendments to original claim 1:

1. 9. A button cell comprising:

a housing cup including a flat bottom area and a cup casing extending along an axial direction and a housing top including a flat top area and a top casing extending along the axial direction, the housing cup and the housing top separated from one another by an electrically insulating seal and which form a button cell housing with a flat bottom area and a the flat top area parallel to it the flat bottom area, and

an a rechargeable lithium-ion electrode-separator assembly disposed within the button cell housing comprising at least one positive electrode and at least one negative electrode in the form of flat layers and connected to one another by at least one flat separator,

wherein the electrode layers are aligned essentially at right angles to the flat bottom area and the flat top area, and wherein the rechargeable lithium-ion electrode-separator assembly is a spiral winding having upper and lower end faces defining side surfaces of the spiral winding facing in an the axial direction relative to the flat bottom top area and the flat top bottom area,

one of the electrodes said at least one positive electrode connects to the flat bottom area or the flat top area via an a first

metal foil output conductor and one of said at least one negative electrode connects to the other of the flat bottom area and the flat top area via a second metal foil output conductor, each of the first metal foil output conductor and the second metal foil output conductor comprising a foil a flat portion extending in a radial direction perpendicular to the axial direction and resting flat between an end face one of the upper or lower end faces of the spiral winding and the flat top area or the flat bottom area, respectively, and to which it the respective flat portion is connected via a weld, and

at least one first insulating means preventing direct mechanical and electrical contact between the lower end faces face of the spiral winding and the flat bottom area and at least one second insulating means preventing direct mechanical and electrical contact between the upper end face and the flat top areas area,

wherein the cup casing partially overlaps the top casing in an overlapping area, the top casing is disposed radially inward of the cup casing in the overlapping area, and the housing cup and the housing top are held together by a force-fitting connection, and

wherein the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part.

*Id.* at Appendix A, A-4–A-5. Relevant to the patentability over the prior art, proposed substitute independent claims 9, 12, and 14 each add the following new features: (1) a housing cup including a flat bottom area and a cup casing extending along an axial direction and a housing top including a flat top area and a top casing extending along the axial direction; (2) a cup casing that partially overlaps the top casing in an overlapping area, the top casing is disposed radially inward of the cup casing in the overlapping area, and the housing cup and the housing top are held together by a force-fitting connection; and (3) wherein the cup casing includes a first part proximal to

the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part. *Id.* at 1–2; *see also id.* at Appendix A. Each proposed substitute claim 9–16 includes the three identified new features, either through express recitation or by virtue of dependence.

*1. Challenges based on Kannou, Kaun, and either Kwon or Kawamura*

The parties address whether the combined disclosures of Kannou and Kaun with either of Kwon or Kawamura render proposed substitute claims 9–16 obvious. MTA 23–24; MTA Opp. 7–24; MTA Reply 3–11; MTA Sur-reply 2–11. Petitioner directs us to portions of Kaun and Kannou that purportedly disclose each of the limitations in the challenged claims. MTA Opp. 7–24.

*a) Prior art*

*(1) Kaun (Ex. 1005)*

Kaun is a U.S. Patent Application titled “Housing for Electrochemical Devices,” and published October 20, 2005. Ex. 1005, codes (54), (43). Kaun relates to improved housings for electrochemical devices, including battery cells, and describes a rolled-ribbon electrochemical device (button-type cell) that includes a housing comprising a first (upper housing) cup, a second (lower housing) cup, a gasket, and a spiral wound electrode assembly contained within the housing. *Id.* at code (57), ¶¶ 1, 24, 55–59, 69, 78, 80, 84, 109, Figs. 2, 7A, 11.

Figures 7A–7D of Kaun, reproduced below, illustrate an exemplary embodiment of a button-type cell housing according to Kaun’s disclosure.

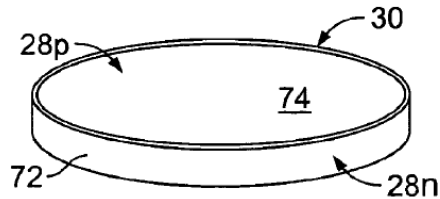


**FIG. 7A**

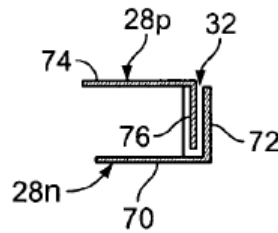


**FIG. 7B**

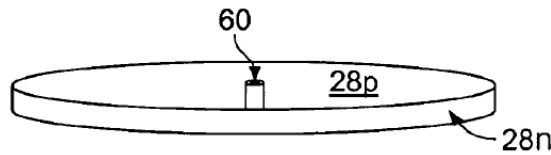


**FIG. 7C**

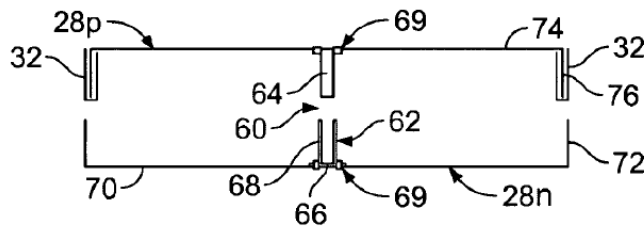


**FIG. 7D**

Figure 7A “depicts the housing for the electrochemical device”; Figure 7B depicts a cross-sectional view of the peripheral seal area of the housing; Figure 7C depicts the outer pan of the housing; and Figure 7D depicts a cross-sectional view of the housing, including a “U” shaped polymeric gasket, threaded stem, and plastic tube fastener. *Id.* ¶ 69.

Figures 7A and 7B of Kaun show housing 28 that includes upper housing cup 28p and lower housing cup 28n, joined together, and electrically isolated from each other with gasket 32, which forms a gas-tight seal. *Id.* ¶¶ 69, 84, 109. As shown in Figures 7B and 7D, Kaun discloses that housing cup 28p and housing cup 28n each comprises an essentially flat surface (plates 70, 74) surrounded by a wall that extends from the flat

surface (walls 72, 76) and fit together, one within the other, to create an enclosure for containing the spiral wound electrode assembly. *Id.* ¶¶ 84, 109, 110, 112, Figs. 7A. Kaun also discloses additional exemplary embodiments in which the housing further comprises a fastener that aligns the upper and lower housing cups during assembly and resists detachment by holding the upper and lower housing cups together. *Id.* ¶¶ 86, 87, Figs. 7C, 7D.

Figure 2 of Kaun, reproduced below, illustrates an exemplary embodiment of a spiral wound electrode assembly according to Kaun's disclosure.

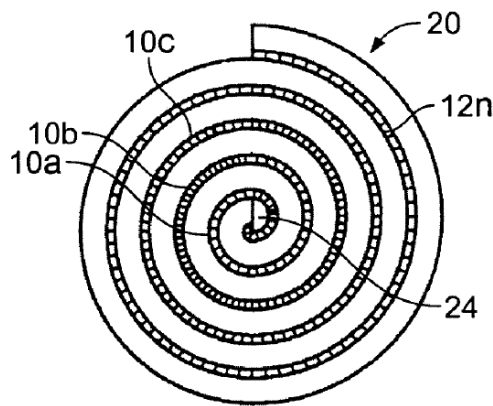


**FIG. 2**

Figure 2 of Kaun, above, shows electrode assembly 22 coiled upon itself about center core 24 to produce successive layers 10a, 10b, and 10c. *Id.* ¶¶ 78, 100. Kaun discloses the electrode assembly comprises alternately arranged, generally parallel, positive and negative electrodes and a separator layer configured in a tight serpentine manner and physically interposed between the electrodes. *Id.* ¶¶ 57–59, 78, Fig. 2.

Figure 11 of Kaun, reproduced below, illustrates a cross-section of an exemplary embodiment of a button-type cell with the spiral wound electrode assembly arranged within the housing according to Kaun's disclosure.

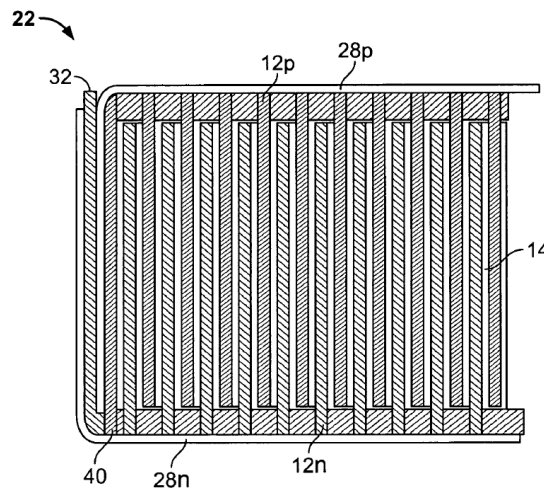


FIG. 11

Figure 11 of Kaun, above, shows a button-type cell with electrode assembly 22 arranged within the housing including upper housing cup 28p and lower housing cup 28n, with gasket 32 arranged therebetween, positive and negative electrodes 12p and 12n, and separator layer 14. *Id.* ¶¶ 73, 97, 115.

Figure 11 of Kaun further shows upper housing cup 28p inserted into lower housing cup 28n such that the casing areas of the upper and lower housing cups overlap and the edge of lower housing cup 28n is not beaded over the edge of upper housing cup 28p. Kaun also describes the spiral wound electrode assembly arranged within the housing such that the electrode interfaces are primarily perpendicular to the upper and lower housing cups 28p and 28n. *Id.* ¶¶ 78, 85.

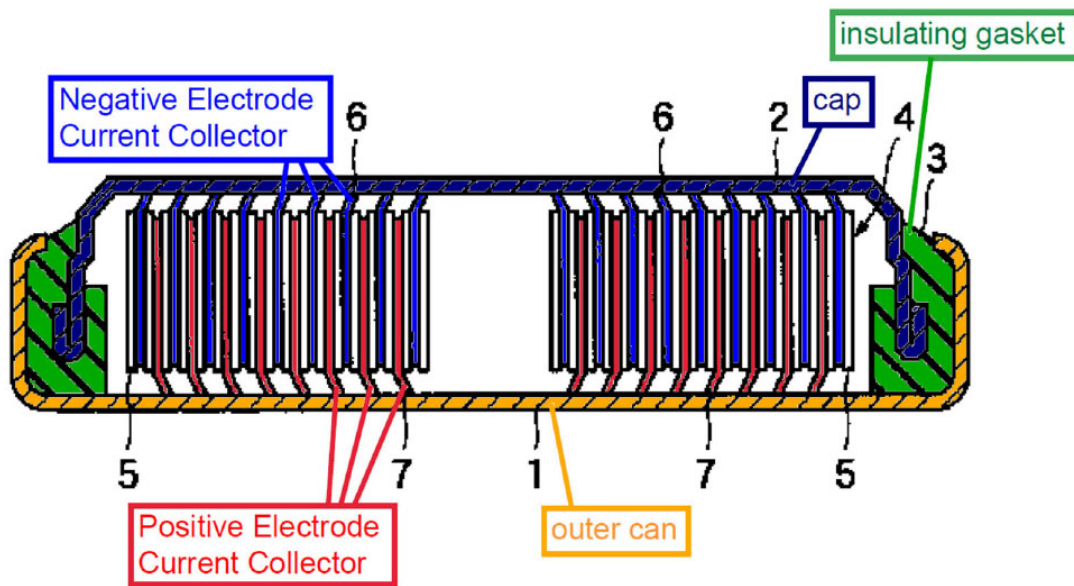
(2) *Kannou (Ex. 1039)*<sup>11</sup>

Kannou discloses “a flat-type non-aqueous secondary battery with improved discharge capacity.” Ex. 1005, code (57). Kannou notes that in order to maximize the space used in a battery, it was known to make the height in the direction of the central axis of the roll smaller than the size in the direction perpendicular to the central axis. *Id.* ¶ 5. In one particular embodiment of such a battery, however, a “high discharge capacity cannot be obtained because the electrical connection is made by contact between” a tab and the container. *Id.* ¶ 6. To resolve this problem, Kannou discloses a battery wherein the end portions of the positive and negative electrode current collector protrude to directly contact the inner surface of the positive electrode and negative electrode container, respectively. *Id.* ¶¶ 8, 14, 15. According to Kannou, such a configuration allows for a battery with a significantly enhanced discharge capacity. *Id.* ¶ 43.

Patent Owner provides annotated Figure 1 of Kannou (Sur-reply 15) which is reproduced below.

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<sup>11</sup> Kannou et al., JP 2003031266 A, published Jan. 31, 2003 (Ex. 1039, the certified English translation of “Kannou”).

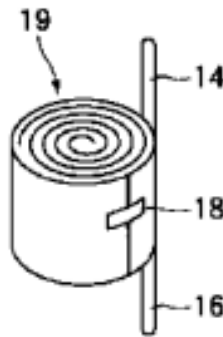


**Kannou FIG. 1 (Annotated)**

As shown in Figure 1, electrode group 4 is stored in a sealed container formed by crimping cylindrical positive electrode container 1 (yellow) to cylindrical negative electrode container 2 (dark blue), with an insulating gasket 3 (green) disposed between the two parts around the edge of the sealed container. Ex. 1039 ¶ 39. Electrode group 4 is composed of a spirally wound laminated member having a positive electrode and positive electrode current collector (both red) and a negative electrode and negative electrode current collector (both light blue), with a separator 5 (white) disposed between these layers. *Id.* ¶¶ 8, 10, 39. As shown in Figure 1, negative electrode current collector 6 protrudes from the roll surface and is bent to the inner circumference to contact the inner surface of negative electrode container 2. *Id.* Likewise, positive electrode current collector 7 protrudes from the second roll surface and is bent to the inner circumference to contact the inner surface of positive electrode container 1. *Id.*

Figure 7, reproduced below, is a schematic diagram of the electrode group of Comparative Example 1. *Id.* ¶ 55.

[FIG. 7]



As shown in Figure 7, the electrode group 4 and separator 5 are rolled into a spiral shape and “the roll end part of the resulting rolled body” is secured with adhesive tape 18 “to obtain an electrode group 19 having separators [that] protrude from both roll surfaces.” *Id.* ¶ 58. This rolled body is then placed within a housing similar to that shown above in Figure 1. *Id.* ¶ 59.

Kannou notes that when the length of the electrode group in the direction perpendicular to the roll axis is made longer than the length in the roll axis direction, “the electrode group is easily deformed into a telescoping roll shape by handling or the like during manufacturing, resulting in roll shifting and disintegration.” *Id.* ¶ 41. In Kannou’s inventive battery, however, “the electrodes and separator near the center of the roll surface can be restrained from protruding outward by the bent part, thereby reducing roll shifting and disintegration of the electrode group during manufacturing.” *Id.*

*b) Analysis of Claim 9*

Patent Owner does not challenge many of Petitioner’s allegations regarding the teachings of Kannou or Kaun. *See generally* MTA Reply.

Instead, Patent Owner focuses its argument on Petitioner's purported failure to show that (1) Kannou describes a button cell where "the housing cup and the housing top are held together by a force-fitting connection," (2) either Kaun or Kannou suggest a housing "wherein the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part," or (3) one of ordinary skill in the art would have had reason to modify Kannou with Kaun to achieve either the "force-fitting connection" or the "cup casing" as claimed. MTA 23–24; MTA Reply 5–10. Petitioner relies exclusively on Kaun to describe "the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part." MTA Opp. 18–19. Because we agree with Patent Owner that Petitioner has failed to show that Kaun teaches or suggests a "cup casing includ[ing] a first part proximal to the flat bottom area [where] the first part of the cup casing [is] disposed radially inward with respect to the second part," we limit our discussion below to addressing this argument.

Petitioner alleges that Kaun discloses the limitation "wherein the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part." *Id.* at 18. Petitioner provides annotated Figure 11 of Kaun, illustrating a cross-sectional view of an exemplary button cell, to detail its contentions. Annotated Figure 11 is reproduced below.

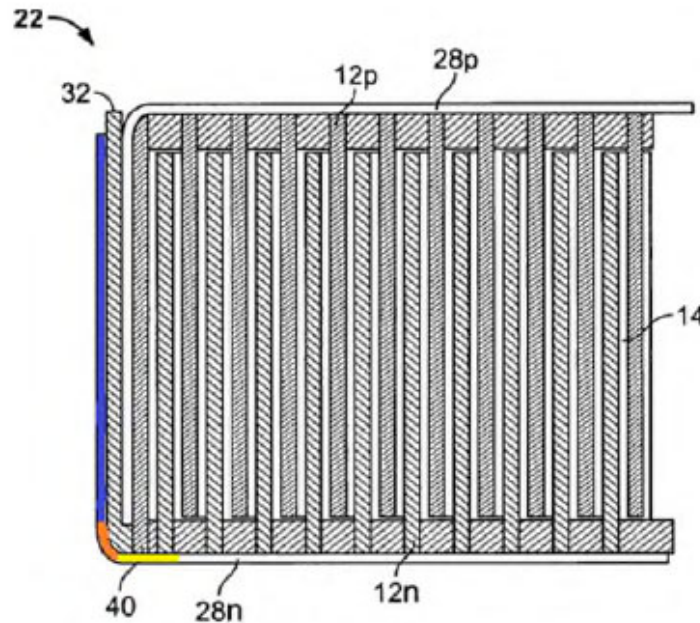


**FIG. 11**

Annotated Figure 11 of Kaun, shows a button-type cell with electrode assembly 22 arranged within the housing including upper housing cup 28p and lower housing cup 28n, with gasket 32 arranged therebetween, positive and negative electrodes 12p and 12n, and separator layer 14. *Id.* ¶¶ 73, 97, 115. “[A]nnotated Figure 11 of Kaun . . . includes a first part (in orange) proximal to the flat bottom area (in yellow) and a second part (in blue) disposed in the overlapping area.” *Id.* Petitioner alleges that “the orange portion of the housing of Kaun (which connects the vertical portion of the cell housing to the flat bottom portion) is located ‘radially inward’ with respect to the blue portion” and is “necessarily located proximate to the flat bottom portion (in yellow) as the first part links the flat bottom portion to the sidewall of the cell housing in blue.” *Id.* at 18–19.

Patent Owner disagrees and explains that “[t]he Kaun housing cup 28n has a casing (wall 72) that is uniformly cylindrical from the edge area joining the casing to the flat bottom area (plate 70), and thus does not

include ‘the first part’ recited in claim element 9[h].’” MTA 23 (citing Ex. 1005, Fig. 7D; Ex. 2050 ¶¶ 47–50, 55, 57–60). Patent Owner further argues that the area Petitioner identifies in orange is not the “first part” of the casing but rather the “edge area” between the casing and the flat bottom portion. MTA Reply 5–6 (citing Ex. 2060 ¶¶ 17–18). Patent Owner explains that the ’913 patent defines “the casing areas as ‘aligned essentially at right angles to the bottom and top areas’ where “the ‘edge areas’ . . . ‘form the transition between the casing areas and the bottom areas.’” *Id.* at 6 (citing Ex. 1001, 7:50–67). Therefore, Patent Owner explains that the “edge areas are ‘bounded on the one hand by essentially flat bottom and top areas, and on the other hand by the essentially cylindrical casing areas,’” and therefore, cannot be a first part proximal to part of the casing proximal to the flat bottom area and disposed radially inward with respect to the second part of the casing which overlaps with the top casing. *Id.* (citing Ex. 1001, 7:67–8:4; Ex. 2060).

Petitioner argues that Patent Owner “inappropriately relies upon reading the specification into the claims” because the proposed substitute claims do not recite an “edge area.” MTA Sur-reply 7.

We disagree with Petitioner that Patent Owner is improperly attempting to read limitations into the claims. Instead, Patent Owner relies on the disclosure of the ’913 patent to explain how a person of ordinary skill in the art would understand the proposed substitute claim language requiring a “cup casing include[ing] a first part proximal to the flat bottom area.”

Proposed substitute claim 9 requires “a housing cup including a flat bottom area and a cup casing extending along an axial direction . . . wherein the cup casing includes a first part proximal to the flat bottom area” where

“the first part of the cup casing is disposed radially inward with respect to the second part [of the casing cup].” MTA Appendix A, A-10–A-11 (proposed substitute claim 9). Thus, proposed substitute claim 9 explains that the cup casing extends in an axial direction from the bottom area and that the first and second parts are part of the casing itself. *Id.* The ’913 patent<sup>12</sup> further describes that:

Button cells such as these which are not beaded over generally make use of conventional cell cups and tops which each have a bottom area and a top area, a casing area, *and edge area* which is arranged between the bottom and top areas and the casing area, and a cut edge. . . . The casing areas of the cell cup and cell top in the finished button cell are aligned essentially at right angles to the bottom and top areas . . . . *The edge areas . . . of the cell cup and cell top form the transition between the casing areas and the top and bottom areas.* They are preferably therefore bounded on the one hand by essentially flat bottom and top areas, and on the other hand by the essentially cylindrical casing areas, which are arranged at right angles to them. By way of example, the *edge areas* may be in the form of a sharp edge, or else *may be rounded*.

Ex. 1001, 7:50–8:5 (emphasis added). Thus, the ’913 patent makes clear that the cup casing does *not* include the rounded edge area forming the transition between the cup casing and the flat bottom area of the cell cup. The ’913 patent explains that this first part of the cup casing which is disposed radially inward is necessary, in part, to achieve improved sealing characteristics for the completed button cell. For example, the ’913 patent states:

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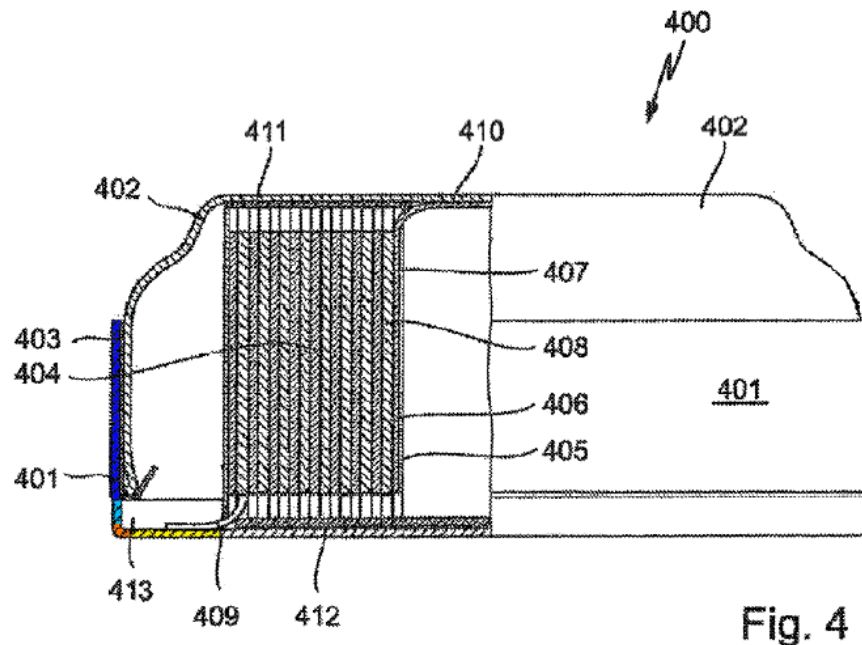
<sup>12</sup> Patent Owner provides citations to the ’913 patent Specification (Ex. 1001). *See generally* MTA Reply. For consistency, we do the same but observe that the original disclosure, i.e., the ’699 application (Ex. 2032), contains the same description.

After the cell top has been inserted into the cell cup, a part of the casing area of the cell cup can be drawn radially inward. In particular, this relates to that part of the casing area which does not overlap the casing area of the cell top.

It has been found that this process of drawing in radially makes it possible to achieve considerably better sealing characteristics. Drawing in the cup casing results in a radial pressure being exerted on the edge section which rests on the inner wall of the housing cup and on the seal which is arranged between the housing top and the housing cup, with the seal in consequence being compressed in this area.

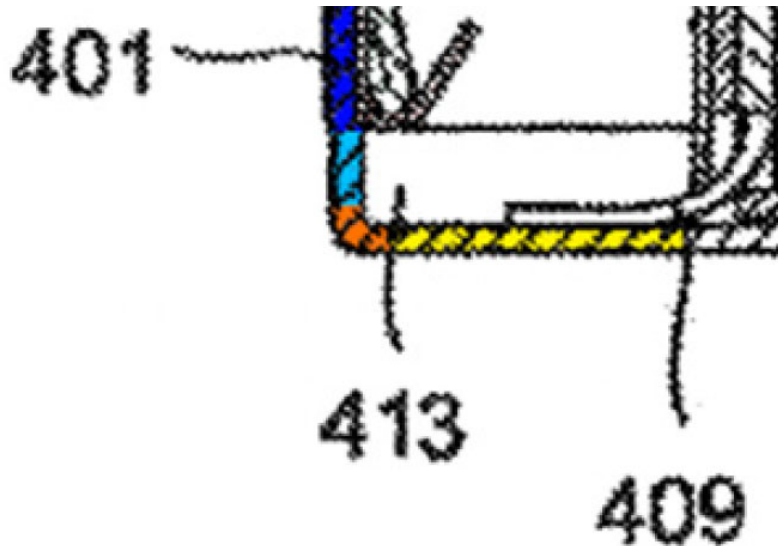
The drawing-in process can be carried out at the same time as the already mentioned exertion of pressure on the casing area of the cell cup, although the drawing-in process is preferably carried out in a subsequent, separate step.

*Id.* at 9:66–10:9. Dr. Peckerar provides annotated Figure 4 of the '913 patent, shown below:



Ex. 2060 ¶ 21. Annotated Figure 4 shows the cup casing in blue—with the first part in light blue and the second overlapping part in dark blue, the edge

area denoted in orange, and the flat bottom area depicted in yellow. *Id.* An enlarged view of Annotated Figure 4, reproduced below, shows the disposition of the light-blue first part radially inward of the dark-blue overlapping second part:



Dr. Peckerar testifies that unlike the '913 patent, "[t]he edge or transition area (orange) has a bend radius allowing it to transition between the casing and the bottom. A [person of ordinary skill in the art] would have understood the rounded edge areas (orange) of the Kaun housing to be artifacts of the manufacturing process by which the cup was produced, and not the radially inward 'first part' of the casing claimed in the substitute claims." *Id.* ¶ 23. We credit Dr. Peckerar's un rebutted testimony. Because we determine that Petitioner failed to show that Kaun includes "a first part" of the casing as claimed, we find that Petitioner has not established, by a preponderance of the evidence, that the combination of Kannou and Kaun with either of Kwon or Kawamura, would have rendered proposed substitute claim 9 unpatentable as obvious.

*c) Remaining Claims*

The remaining proposed substitute claims, i.e., claims 10–16, each also require the additional feature of “wherein the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part,” by virtue of independent recitation (claims 12 and 14) or dependence from independent claims (claims 11, 13, and 15–16). Petitioner relies on the same arguments and evidentiary support we determined did not establish, by a preponderance of the evidence, with respect to claim 9 above. MTA Opp. 19–24.

In view of the foregoing, we find Petitioner has failed to establish, by a preponderance of the evidence, that the combination of Kannou and Kaun with either of Kwon or Kawamura renders proposed substitute claims 10–16 obvious.

*2. Challenges based on Kaun, Kobayashi and the Knowledge of the Person of Ordinary Skill in the Art*

Patent Owner addresses whether the combined disclosures of Kaun and Kobayashi, and the knowledge of a person of ordinary skill in the art, render proposed substitute claims 9–16 obvious. MTA 21–23; MTA Opp. 7–24.

Petitioner does not address this combination of references. Petitioner does not address whether Kaun, Kobayashi, and the knowledge of the person of ordinary skill in the art renders the proposed substitute claims obvious. *See generally* MTA Opp. For this reason, Petitioner has not carried its burden of proving that the claims are unpatentable over this combination. In addition, because we agree with Patent Owner above that Petitioner failed to show that Kaun disclosed or suggested a “cup casing includ[ing] a first part

proximal to the flat bottom area [where] the first part of the cup casing [is] disposed radially inward with respect to the second part,” this combination does not provide “readily identifiable and persuasive evidence” of unpatentability. 37 C.F.R. § 42.121(d).

The remaining proposed substitute claims, i.e., claims 10–16, each require the additional feature of “wherein the cup casing includes a first part proximal to the flat bottom area and a second part disposed in the overlapping area, the first part of the cup casing being disposed radially inward with respect to the second part,” by virtue of independent recitation (claims 12 and 14) or dependence from independent claims (claims 11, 13, and 15–16).

In view of the foregoing, we find Petitioner has failed to establish, by a preponderance of the evidence, that the combination of Kaun, Kobayashi, and the knowledge of a person of ordinary skill in the art rendered proposed substitute claims 9–16 obvious.

3. *Challenges Based on Kobayashi and the Knowledge of the Person of Ordinary Skill in the Art*

Patent Owner asserts that Kobayashi, at a minimum, does not disclose “the housing cup and the housing top are held together by a force-fitting connection.” MTA 20–21. Rather, Patent Owner contends that “Kobayashi discloses a housing closed by swaging such that an end of a first metal part 13 is bent inward and curled over a top edge of a second metal part 11. *Id.* at 20.

Petitioner does not address whether Kobayashi and the general knowledge of those of ordinary skill in the art render the proposed substitute claims obvious. *See generally* MTA Opp. Petitioner does not address whether Kobayashi and the knowledge of the person of ordinary skill in the

art renders the proposed substitute claims obvious. *See generally* MTA Opp. For this reason, Petitioner has not carried its burden of proving that the claims are unpatentable over this combination. In addition, for the reasons expressed by Patent Owner, and summarized below, this combination does not provide “readily identifiable and persuasive evidence” of unpatentability. 37 C.F.R. § 42.121(d).

We are persuaded by Patent Owner’s argument. As Patent Owner asserts, Kobayashi describes that “[a]fter fitting the positive electrode case 13 to the negative electrode case 11, it was turned upside down, and the positive electrode case 13 was *sealed by implementing swaging* to prepare a small button cell rechargeable battery.” Ex. 1006 ¶ 35. Accordingly, the record evidence does not show a “housing cup and the housing top are held together by a force-fitting connection,” as required by the claims. Because each proposed substitute claim requires a “force-fitting connection,” the preponderance of the evidence fails to show that Kobayashi in view of the knowledge of the skilled artisan would have rendered proposed substitute claims 9–16 unpatentable.

## V. CONCLUSION<sup>13</sup>

For the foregoing reasons, we conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that claims 1–8 of the ’913 patent are unpatentable as follows:

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<sup>13</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent

| <b>Claims</b>              | <b>35<br/>U.S.C.<br/>. §</b> | <b>Reference(s)/Basis<sup>14</sup></b> | <b>Claim(s)<br/>Shown<br/>Unpatentable</b> | <b>Claim(s) Not<br/>Shown<br/>Unpatentable</b> |
|----------------------------|------------------------------|----------------------------------------|--------------------------------------------|------------------------------------------------|
| 1–8                        | 103                          | Kobayashi                              | 1–8                                        |                                                |
| 1–8                        | 103                          | Kaun, Kobayashi                        |                                            |                                                |
| <b>Overall<br/>Outcome</b> |                              |                                        | 1–8                                        |                                                |

We further conclude that Patent Owner has satisfied its burdens on a motion to amend, and Petitioner has *not* demonstrated by a preponderance of the evidence that proposed substitute claims 9–16 are unpatentable. Thus, we grant the Revised Contingent Motion to Amend as follows:

| <b>Motion to Amend Outcome</b>             | <b>Claim(s)</b> |
|--------------------------------------------|-----------------|
| Original Claims Cancelled by Amendment     |                 |
| Substitute Claims Proposed in Amendment    | 9–16            |
| Substitute Claims: Motion to Amend Granted | 9–16            |
| Substitute Claims: Motion to Amend Denied  |                 |
| Substitute Claims: Not Reached             |                 |

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Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

<sup>14</sup> In view of our determination that claims 1–8 are rendered obvious in view of Kobayashi in view of the general knowledge of those of ordinary skill in the art, we do not reach ground for which the last two columns of this table are blank (i.e., “Kaun, Kobayashi”). *See* Section II.E.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–8 of the '913 patent are unpatentable; and

FURTHER ORDERED that Patent Owner's Motion to Exclude is *dismissed in part and denied in part*; and

FURTHER ORDERED that Patent Owner's Motion to Amend is *granted*; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2020-01214  
Patent 9,799,913 B2

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