

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EVE ENERGY CO., LTD.,
Petitioner,

v.

VARTA MICROBATTERY GMBH,
Patent Owner.

IPR2022-01474
Patent 11,024,905 B2

Before CHRISTOPHER L. CRUMBLEY, JO-ANNE M. KOKOSKI, and
CHRISTOPHER M. KAISER, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Eve Energy Co., Ltd. (“Petitioner”) filed a Corrected Petition to institute an *inter partes* review of claims 1–24 (the “challenged claims”) of U.S. Patent No. 11,024,905 B2 (“the ’905 patent,” Ex. 1001). Paper 4 (“Pet.”). VARTA Microbattery GmbH (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). With Board authorization, Petitioner filed a Reply to the Preliminary Response (“Prelim. Reply,” Paper 11) and Patent Owner filed a Sur-reply to Petitioner’s Reply (“Prelim. Sur-reply,” Paper 12).

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4 (2021). For the reasons discussed below, we deny the Petition and do not institute an *inter partes* review.

A. *Real Parties in Interest*

Each party identifies itself as the real party in interest. Pet. 1; Paper 13, 2.

B. *Related Matters*

The parties identify *VARTA Microbattery GmbH v. Eve Energy Co., Ltd.*, 2:21-cv-00399 (E.D. Tex. 2021) as a related matter. Pet. 2; Paper 13, 4. The ’905 patent is also the subject of IPR2022-01476, filed by Petitioner. Pet. 2; Paper 13, 5. The parties further identify several other *inter partes* reviews directed to patents related to the ’905 patent. Pet. 2–3; Paper 13, 4–5.

C. The '905 Patent

The '905 patent relates to “button cells having a housing consisting of two metal housings halves” that contain “a wound electrode separator assembly.” Ex. 1001, 1:21–23. The '905 patent teaches that the two housing halves (the “housing cup” and the “housing top”) are separated by an electrically insulating seal to form “a housing having a plane bottom region and a plane top region parallel thereto.” *Id.* at 3:18–23. Arranged inside the housing is at least one positive electrode and at least one negative electrode, “each in the form of flat electrode layers” that are “preferably connected to one another by at least one flat separator.” *Id.* at 3:34–38. This electrode assembly is provided in the form of a winding that is “arranged such that its end sides face in the direction of the plane bottom region and the plane top region of the housing.” *Id.* at 3:43–47.

The '905 patent explains that the “button cell always also comprises metal conductors which electrically connect the at least one positive electrode and/or the at least one negative electrode respectively to one of the housing halves.” Ex. 1001, 3:55–58. The conductor connected to the positive electrode preferably consists of aluminum, and the conductor connected to the at least one negative electrode preferably consists of nickel or copper. *Id.* at 3:58–62. “On the electrode side, the conductors are preferably connected to current collectors,” which “are generally metal foils or meshes conventionally coated on both sides with active electrode material.” *Id.* at 3:63–66. “These current collectors preferably consist of aluminum on the side of the positive electrode, and preferably nickel or copper on the side of the negative electrode.” *Id.* at 3:66–4:2.

The '905 patent explains that, particularly in lithium ion button cells, the electrodes are subject to volume changes during the charging-

discharging cycle that may result in contact problems between the conductors and the housing halves. Ex. 1001, 4:34–37. The '905 patent teaches that welding the conductors to the respective housing halves alleviates these problems, and the conductors are preferably welded onto the inner side of the housing of the plane bottom region or the plane top region, respectively. *Id.* at 4:40–42.

D. Challenged Claims

Petitioner challenges claims 1–24 of the '905 patent. Pet. 1. Claim 1, the only independent challenged claim, is illustrative of the claimed subject matter, and is reproduced below.

1. A button cell comprising:
 - a housing, the housing including:
 - a metal cell cup, the metal cell cup having a cell cup plane region connected to a cell cup lateral surface region, and
 - a metal cell top, the metal cell top having a cell top plane region, the cell top plane region extending substantially parallel to the cell cup plane region;
 - an electrode winding disposed within the housing, the electrode winding having a first end side, a second end side, and an outer side, the first end side and the second end side extending substantially parallel to cell cup plane region and the cell top plane region, the outer side extending substantially perpendicular to the cell cup plane region and the cell top plane region, the electrode winding being formed from a multi-layer assembly that is wound in a spiral shape about an axis, the multi-layer assembly including:
 - a positive electrode formed from a first current collector coated with a first electrode material,
 - a negative electrode formed from a second current collector coated with a second electrode material, and

a separator disposed between the positive electrode and the negative electrode; and

an insulator,

wherein the first current collector includes a first end section bent so as to extend out of the electrode winding, at least a first portion of the first end section forming an uncoated first flat layer adjacent the first end side of the electrode winding,

wherein the second current collector includes a second end section bent so as to extend out of the electrode winding, at least a first portion of the second end section forming an uncoated second flat layer adjacent the second end side of the electrode winding,

wherein the first current collector, including the first end section thereof, is a first metallic foil or mesh and the second current collector, including the second end section thereof, is a second metallic foil or mesh,

wherein the first flat layer is welded to a first of the cell cup plane region or the cell top plane region,

wherein the second flat layer is welded to a second of the cell cup plane region or the cell top plane region, and

wherein the insulator is positioned (i) between the first flat layer and the first end side of the electrode winding or (ii) between the second flat layer and the second end side of the electrode winding.

Ex. 1001, 9:11–60.

E. Asserted Grounds

Petitioner asserts that claims 1–24 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 4–6, 9–11, 13–15, 18, 23, 24	103 ¹	Brown, ² Higuchi, ³ Fujita ⁴
3, 8	103	Brown, Higuchi, Fujita
12	103	Brown, Higuchi, Fujita, Kubota ⁵
7, 16, 19, 20	103	Brown, Higuchi, Fujita
17	103	Brown, Higuchi, Fujita, Kaun ⁶
21, 22	103	Brown, Higuchi, Fujita, Kubota

Pet. 5–6.⁷ Petitioner relies on the Declaration of Marc Juzkow (Ex. 1002) in support of its contentions.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner contends that a person having ordinary skill in the art (“POSITA”) would have had “a Bachelor’s level college degree in Mechanical, Electrical, Materials or Chemical Engineering, or Science, including Chemistry or Physics or a related field and three to four years of

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), revised 35 U.S.C. §§ 102 and 103 effective March 16, 2013. Petitioner argues, and Patent Owner does not contest, that the pre-AIA statutory provisions apply to this case. *See* Pet. 5–6. Neither party indicates the result would change based on which version of the statute the Board applies for purposes of deciding whether to institute review. Pet. 2–3.

² Brown, US 3,748,182, issued July 24, 1973 (Ex. 1005).

³ Higuchi, Chinese Patent App. Pub. CN101286572 A, published October 15, 2008 (Ex. 1006, with English translation).

⁴ Fujita, Japanese Unexamined Patent App. Pub. H4-162351, published June 5, 1992 (Ex. 1007, with English translation).

⁵ Kubota, US 5,654,114, issued August 5, 1997 (Ex. 1010).

⁶ Kaun, US 2007/0160901 A1, published July 12, 2007 (Ex. 1008).

⁷ Petitioner explains that it “separately presents grounds that rely upon the same prior art references as other grounds because each ground entails different modifications to the primary reference.” Pet. 5 n.1.

training and experience in the design of electrochemical cells and batteries.”

Pet. 6. Petitioner further contends that “[a]dditional work or research experience can substitute for a lesser or different education, and vice-versa.”

Id. Patent Owner states that the Preliminary Response “establishes that Petitioner’s arguments fail under its proffered definition of” a person of ordinary skill in the art. Prelim. Resp. 13. Patent Owner does not propose a different level of skill in the art at this stage of the proceeding. *See id.* (“Patent Owner reserves the right to dispute Petitioner’s definition of a [person of ordinary skill in the art] if an IPR is instituted.”).

To the extent necessary, and for purposes of this Decision, we accept the uncontested assessment offered by Petitioner.

B. Claim Construction

We construe each 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) (2019). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

Petitioner requests that “all claim terms be accorded their plain and ordinary meaning, as understood by a POSITA consistent with the specification and file history of the ’905 patent.” Pet. 9. Patent Owner asserts that “Patent Owner’s arguments for denial do not hinge on the outcome of an actual controversy about any claim construction.” Prelim.

Resp. 13 (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

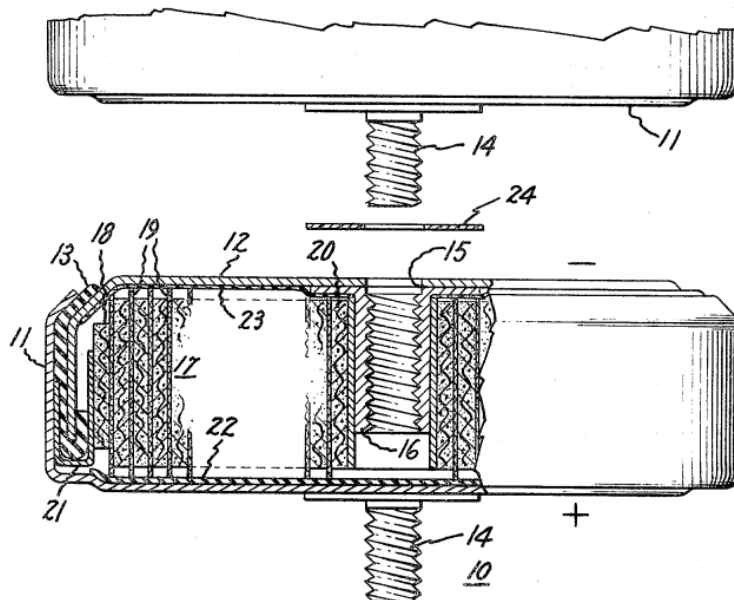
We determine that no claim term requires express construction for purposes of this Decision.

C. Ground 1: Asserted Obviousness over Brown, Higuchi, and Fujita

Petitioner contends that claims 1, 2, 4–6, 9–11, 13–15, 18, 23, and 24 would have been obvious over the combined teachings of Brown, Higuchi, and Fujita. Pet. 17–62.

1. Overview of Brown

Brown is directed to cell casings and sealed batteries, including button cell batteries. Ex. 1005. 1:21–23. Brown provides a Figure, reproduced below, that shows the structure of the described battery.



The Figure depicts a sectional view of a sealed button cell battery described in Brown. *Id.* at 1:64–66. Cell 10 includes positive components cathode 18, case 11, and threaded metal stud 14, and negative components anode 20, cover 12, and threaded socket 16. *Id.* at 2:2–21. Electrically insulating

gasket 13 insulates case 11 and cover 12 from each other. *Id.* at 2:2–5. Spiral wound assembly 17 of cathode 18, separator 19, and anode 20, is positioned within case 11 and cover 12. *Id.* at 2:13–15. Metallic conducting strip 21 connects cathode 18 and case 11. *Id.* at 2:15–16.

2. *Overview of Higuchi*

Higuchi is a Chinese Patent Application entitled “Coin-shaped Non-Aqueous Electrolyte Secondary Battery.” Ex. 1006, code (54).⁸ Higuchi describes a coin-shaped rechargeable battery having a strip-shaped anode, strip-shaped cathode, and strip-shaped separator that are wound together to form a cylindrical wound body. *Id.* at 25,⁹ Fig. 5B.

3. *Overview of Fujita*

Fujita is a Japanese Unexamined Patent Application entitled, “Method for Manufacturing Round Cylindrical Battery,” and “relates to a method for manufacturing a round cylindrical battery.” Ex. 1007, code (54), 10.¹⁰ Fujita describes a manufacturing method “wherein the lead is welded well to the bottom inner surface of the exterior case.” *Id.* at 10. Fujita teaches that,

after an electrode group wherein a positive electrode and a negative electrode, with a separator interposed therebetween, has been coiled into a coil shape, is placed in an exterior case can, a lead that leads out from either electrode of the electrode group is arranged so as to contact the bottom inner surface of the exterior case can, and the lead and bottom inner surface of the exterior case can are welded together, wherein the welding together of the lead and the bottom inner surface of the exterior case can is

⁸ Petitioner provides a certified English translation of Higuchi. Ex. 1006, 1. All citations to Higuchi are to the certified English translation.

⁹ We refer to the page numbers added by Petitioner in the lower-left corner of the page.

¹⁰ Petitioner provides a certified English translation of Fujita. Ex. 1007, 1–2. All citations to Fujita are to the certified English translation. We refer to the page numbers added by Petitioner in the lower-left corner of the page.

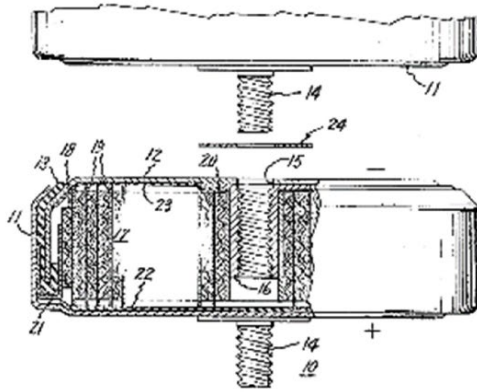
carried out through applying a laser beam or an electron beam to the bottom outer surface of the exterior can case.

Id. at 11.

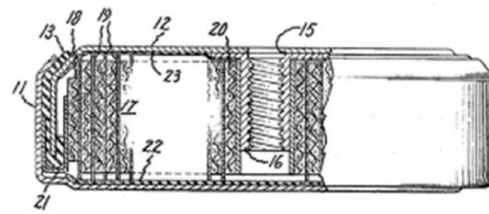
4. *Analysis*

Petitioner contends that the combined disclosures of Brown, Higuchi, and Fujita teach all of the limitations of independent claim 1, and that a person of ordinary skill in the art would have been motivated to combine the teachings of the references in a manner that would result in the claimed button cell. Pet. 17–44. Petitioner begins its analysis with Brown’s cell, which Petitioner contends includes a housing with a metal cell cup and a metal cell top (*id.* at 35–36), a spiral wound assembly (*id.* at 37), and an insulator (*id.* at 39). Petitioner then contends that a POSITA would have been motivated to modify Brown’s cell by: (1) removing Brown’s stacking mechanism, (2) constructing Brown’s spiral wound assembly 17 with Higuchi’s electrode layers, (3) modifying metallic conducting strip 21 to bend towards the center of the winding, and (4) replacing Brown’s hollow member 16 with Higuchi’s lead 12, and Brown’s metallic conducting strip 21 with Higuchi’s lead 11. Pet. 17 (citing Ex. 1002 ¶ 47). We focus our analysis on Petitioner’s contention that a POSITA would have been motivated to modify Brown’s cell by removing Brown’s stacking mechanism, because it is dispositive for purposes of this Decision.

Petitioner contends that a POSITA would have been motivated to remove member 14 and washer 24 (which Petitioner calls Brown’s “stacking mechanism”) from Brown’s cell as illustrated below:



Ex. 1005 at Fig.1



Ex. 1002 at ¶ 48.

Brown's Figure, depicting a sectional view of Brown's cell, is reproduced on the left, and Brown's Figure, modified by removing member 14 and washer 24 as proposed by Petitioner, is illustrated on the right. Pet. 18 (citing Ex. 1002 ¶ 48). Petitioner contends that, "[w]here a plurality of cells is not needed, a POSITA would have been motivated to remove the stacking feature to simplify the manufacturing process and to produce a battery with a smooth cup surface, thereby reducing the overall space occupied by the battery." *Id.* (citing Ex. 1002 ¶ 50). Petitioner contends that stacking is not Brown's sole focus, because "Brown pertains to 'both a single and multi-cell battery.'" *Id.* (citing Ex. 1005, 1:17–18). Therefore, according to Petitioner, removing member 14 and washer 24 from Brown's cell "would not change the principle of operation of the battery disclosed by Brown, nor would it eliminate the advantages of Brown's electrode configuration." *Id.* at 18–19 (citing Ex. 1002 ¶ 51).

Patent Owner argues that removing the stacking mechanism from Brown's cell would eviscerate the fundamental purpose of Brown's invention. Prelim. Resp. 36–38. Patent Owner argues that Brown's primary objective is "to provide a means for connecting and accurately stacking primary cells to produce a multi-cell battery, . . . which is achieved by

providing an aperture 15 in the housing top to allow the threaded stud [14] to engage the hollow member 16 for connecting multiple cells together.” *Id.* at 37 (citing Ex. 1005, 1:47–51, Figure). Patent Owner asserts that “Brown does not disclose an embodiment of his cell which omits the stacking structure,” and teaches only that the aperture is sealed when a single cell is used. *Id.* (citing Ex. 1005, 2:25–26).

We are not persuaded, on this record, that Petitioner adequately establishes that a POSITA would have been motivated to modify Brown in the manner proposed. Brown teaches that its battery casing with the stacking mechanism is used in both single and multi-cell batteries:

A cell casing for a primary dry cell battery of the button type is disclosed which includes a case with a first elongated electrically conductive member affixed centrally to its exterior surface, and a cover with a second elongated electrically conductive hollow member affixed centrally to its interior surface in communication with an aperture. Both a single and a multi-cell battery are described *which include the above battery casing*.

Ex. 1005, 1:11–18 (emphasis added). Consistent with this teaching, Brown’s Example I describes a cell casing “formed generally in accordance” with the casing depicted in Brown’s Figure that includes a stacking mechanism, in particular a screw (member 14) welded to the outside center of case 11. *Id.* at 2:58–81. In Example II, Brown teaches using the “cell casing of Example I,” which includes the stacking mechanism, in a single-cell battery. *Id.* at 3:1–18. Brown explicitly states that the aperture in the cover is sealed when the cell is used in a single cell battery, but provides for no other modifications to the casing. *Id.* at 3:13–16 (“The aperture was then sealed by means of a short #2-56 round-head machine screw and a 10-mil thick polytetrafluoroethylene polymer gasket.”). In Example III, Brown

similarly teaches a battery with fifteen stacked cell casings wherein, after each casing member of each cell was threaded into the hollow member of the cover of the adjacent, the aperture on the last cover was “sealed with a threaded screw as in Example II.” *Id.* at 3:19–29. These teachings demonstrate that Brown contemplated using the casing *with the stacking mechanism* in a single cell battery, and accounted for that by sealing the aperture in the cover.

In light of these disclosures in Brown, neither Petitioner nor Mr. Juzkow sufficiently explains why a POSITA would overlook Brown’s teaching that the casing includes the stacking mechanism regardless of the number of cells in the battery, in order to simplify the manufacturing process and produce a battery with a smooth cup surface that would reduce the space occupied by the battery when only a single cell is used. Pet. 18 (citing Ex. 1002 ¶ 50); *see* Ex. 1005, 1:11–18, 3:1–18. Notably, Mr. Juzkow’s testimony in this regard merely repeats the conclusory and unsupported assertions in the Petition, without citing to additional evidence or providing any reasoning to support his statement. Mr. Juzkow’s testimony thus adds little to Petitioner’s conclusory assertions regarding a POSITA’s motivation to modify Brown, and is entitled to little weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (precedential).

For these reasons, we are not persuaded that Petitioner makes a sufficient showing that a POSITA would have been motivated to modify Brown as proposed. Accordingly, we conclude that Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that independent claim 1, and claims 2, 4–6, 9–11, 13–15, 18, 23, and 24 that depend, directly or indirectly, therefrom, would have been obvious over the combined teachings of Brown, Higuchi, and Fujita.

D. Remaining Grounds

Petitioner contends that: (1) claims 3 and 8 would have been obvious over the combined teachings of Brown, Higuchi, and Fujita (Pet. 62–66); (2) claim 12 would have been obvious over the combined teachings of Brown, Higuchi, Fujita, and Kubota (*id.* at 66–68); (3) claims 7, 16, 19, and 20, would have been obvious over the combined teachings of Brown, Higuchi, and Fujita (*id.* at 69–78); (4) claim 17 would have been obvious over the combined teachings of Brown, Higuchi, Fujita, and Kaun (*id.* at 78–82); and (5) claims 21 and 22 would have been obvious over the combined teachings of Brown, Higuchi, Fujita, and Kubota (*id.* at 82–85). Petitioner’s contentions rely on Petitioner’s arguments with respect to the combination of Brown, Higuchi, and Fujita set forth with respect to Ground 1. *Id.* at 63, 66, 69, 78, 82. Petitioner’s arguments with respect to these grounds do not remedy the deficiencies identified with respect to claim 1. *See id.* at 63–64, 66–72, 78–80, 82–83. Accordingly, Petitioner does not demonstrate a reasonable likelihood of showing that dependent claims 3, 7, 8, 12, 16, 17, and 19–22 would have been obvious as proposed by Petitioner.

III. CONCLUSION

Based on the arguments in the Petition and the Preliminary Response, and the evidence of record, we determine that Petitioner does not establish a reasonable likelihood that it would prevail on its challenge that claims 1–24 of the ’905 patent are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* and no trial is instituted.

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