Filed: January 13, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHARKNINJA OPERATING LLC,
SHARKNINJA MANAGEMENT LLC, AND
SHARKNINJA SALES COMPANY,
Petitioners,

v.

IROBOT CORPORATION,
Patent Owner.

Case No. IPR2021-00544
U.S. Patent No. 9,884,423

PETITIONERS' NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141, 142 and 319, and 37 C.F.R. §§ 90.2 and 90.3, Petitioners SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company ("Petitioners") hereby provide notice that they appeal to the United States Court of Appeals for the Federal Circuit from the Final Written Decision entered November 14, 2022, (Paper 71)[1], and from all underlying orders, decisions, rulings, and opinions regarding U.S. Patent No. 9,884,423 ("the '423 patent") set forth in *Inter Partes* Review IPR2021-00544.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), the issues on appeal include, but are not limited to:

- The Board's determination that claim 9 of the '423 patent was not shown to be unpatentable; and
- All other issues decided adversely to Petitioners in any order, decision, ruling or opinion underlying or supporting the Final Written Decision.

A copy of the public version of the decision being appealed (Paper 74) is attached to this Notice.

Pursuant to 35 U.S.C. § 142 and 37 C.F.R. § 90.2(a), this Notice is being filed with the Director of the United States Patent and Trademark Office, and a copy of this Notice is being concurrently filed with the Patent Trial and Appeal Board. In

[1] A public version of the Final Written Decision was entered November 16, 2022, (Paper 74).

addition, a copy of this Notice and the required docketing fees are being filed with the Clerk's Office for the United States Court of Appeals for the Federal Circuit via CM/ECF.

Dated: January 13, 2023

Respectfully submitted,

/Erika H. Arner/
Erika H. Arner, Reg. No. 57,540

Attorney for Petitioners

CERTIFICATE OF SERVICE

I hereby certify that on January 13, 2023, a copy of the foregoing **Petitioners' Notice of Appeal** was filed and served electronically through the Board's P-TACTS system, and a copy was also filed by hand with the Director of the United States Patent and Trademark Office, at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel, 10B20
Madison Building East
600 Dulany Street
Alexandria, VA 22314

I also hereby certify that on January 13, 2023, a copy of the foregoing **Petitioners' Notice of Appeal** and the filing fee, were filed with the Clerk's Office of the United States Court of Appeals for the Federal Circuit, via CM/ECF.

I also hereby certify that on January 13, 2023, a true and correct copy of the foregoing **Petitioners' Notice of Appeal** was served via email on counsel of record for the Patent Owner at the following:

W. Karl Renner
IPR50184-0013IP1@fr.com

Jeremy J. Monaldo
Kim Leung
PTABInbound@fr.com

Peter Evangelatos
peter.evangelatos@kirkland.com

Sean M. McEldowney
sean.mceldowney@kirkland.com

Steven Dirks
sdirks@kirkland.com

Tera J. Stone
tera.stone@kirkland.com

Patent Owner has consented to service by electronic mail.

Dated: January 13, 2023

By: /Lisa C. Hines/
Lisa C. Hines
Senior Litigation Legal Assistant
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP

Trials@uspto.gov
571-272-7822

Paper 73
Date: November 16, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHARKNINJA OPERATING LLC,
SHARKNINJA MANAGEMENT LLC,
and SHARKNINJA SALES COMPANY,
Petitioner,

v.

IROBOT CORPORATION,
Patent Owner.

IPR2021-00544
Patent 9,884,423 B2

Before BARRY L. GROSSMAN, TERRENCE W. McMILLIN, and JASON W. MELVIN, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Granting Motions for Protective Order and to Seal
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company ("Petitioner") filed a Petition to institute an *inter partes* review of claims 1–4, 6–10, 12–15, 18–23, 25, and 26 (the "challenged claims") of U.S. Patent 9,884,423 B2 (Ex. 1001, the "'423 patent") pursuant to 35 U.S.C. § 311 *et seq*. Paper 1 ("Petition" or "Pet."). A Decision Granting Institution of *Inter Partes* Review was entered on November 17, 2021. Paper 13 ("Dec."). iRobot Corporation ("Patent Owner") filed a Response. Paper 25 ("Response" or "Resp."). Petitioner filed a Reply. Paper 46 ("Reply"). Patent Owner filed a Sur-reply. Paper 51 ("Sur-reply"). Oral argument was heard on August 24, 2022, 2021, and a transcript was entered into the record. Paper 62 ("Transcript").[1]

We have jurisdiction to conduct this *inter partes* review 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 herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–4, 6–8, 10, 12–15, 18–23, 25, and 26 of the '423 patent are unpatentable and has not shown claim 9 of the '423 patent is unpatentable.

[1] The parties filed confidential unredacted and public redacted versions of certain papers (e.g., Response, Reply, Sur-reply). A number of exhibits were also filed as confidential. As discussed below (*see* Section IV. *infra*), we grant the Motion to Enter Protective Order (Paper 23) and the Motions to Seal (Papers 22, 45, 52, 60, 65, 67, 68). As a result, certain parts of the record are confidential and non-public (e.g., Transcript) and public and non-public versions of this Final Written Decision will be entered.

B. Related Matters

The parties identify the following related proceedings: *In the Matter of Certain Robotic Floor Cleaning Devices and Components Thereof*, Inv. No. 337-TA-1252[2] (US International Trade Commission); and *iRobot Corp. v. SharkNinja Operating LLC*, Case No. 1:21-cv-10155 (Mass.). Pet. 80; Paper 4, 2.

C. The '423 Patent

The '423 patent is titled "Autonomous Robot Auto-Docking and Energy Management Systems and Methods." Ex. 1001, code (54). The patent relates "to auto-docking and energy management systems for autonomous robots." *Id.* at 1:35–37. The patent describes "a need for a robot and base station that can ensure proper mating regardless of location of the base station. Moreover, a system that can prevent inadvertent dislocation of the base station by eliminating collisions between the station and robot is desirable." *Id.* at 2:30–34.

The '423 patent describes "an autonomous system including a base station, that includes charging terminals for contacting external terminals of [a] robotic device, and a first signal emitter and a second signal emitter," where in some embodiments, "the first signal emitter transmit[s] a base station avoidance signal and the second signal emitter transmit[s] a base station homing signal." *Id.* at 3:35–42. The patent also discloses "a robotic device for performing a predetermined task, the robotic device having at least one energy storage unit with an external terminal for contacting the charging terminal, and at least one signal detector." *Id.* at 3:47–51.

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[2] Petitioner refers to this as 337-TA-3530, but the ITC website indicates 3530 is the docket number, not the investigation number. *See* https://pubapps2.usitc.gov/337external/3979.

Robotic device 40 "uses a variety of behavioral modes to vacuum effectively a working area," where a "microprocessor is operative to execute a prioritized arbitration scheme to identify and implement one or more dominant behavioral modes for any given scenario, based upon inputs from the sensor system," and "also operative to coordinate avoidance, homing, and docking maneuvers with the base station 10." *Id.* at 8:35–43.

Figure 5, annotated by Petitioner (Pet. 3) and reproduced below, shows an isometric view of a base station and robotic device.

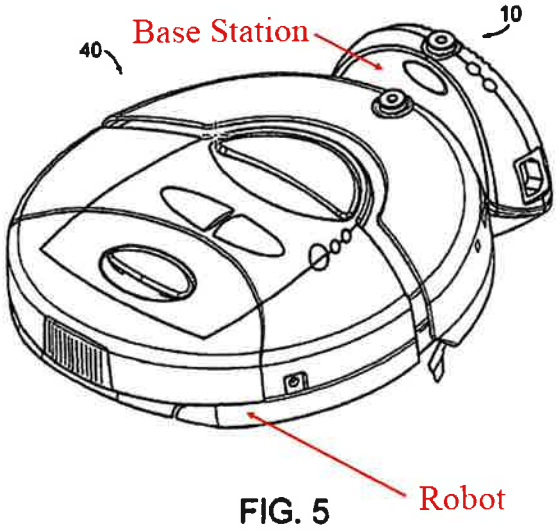

FIG. 5

Figure 5 depicts robotic device 40 completely docked with base station 10. *Id.* at 15:29–30.

The '423 patent issued on February 6, 2018, from an application filed April 19, 2017, and claims the benefit through a series of applications to an application filed on January 21, 2004. *Id.* at codes (22), (45), (60), 1:5–31.

D. Challenged Claims

Petitioner challenges claims 1–4, 6–10, 12–15, 18–23, 25, and 26 of the '423 patent. Pet. 1. Claim 1 is reproduced below.

> 1. A method of docking a robotic cleaning device with a base station that includes a plurality of signal emitters including a

right signal emitter and a left signal emitter, the method comprising:

directing the robotic cleaning device about a room at a first velocity;

detecting, by a sensor mounted on the robotic cleaning device, a right signal transmitted by the right signal emitter of the base station and a left signal transmitted by the left signal emitter of the base station;

controlling forward movement of the robotic cleaning device toward the base station at a second velocity less than the first velocity while orienting the robotic cleaning device in relation to the right signal and the left signal;

detecting contact with charging terminals on the base station;

stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station; and

charging a battery of the robotic cleaning device.

Ex. 1001, 19:32–52.

E. The Asserted Grounds

Petitioner challenges claims 1–4, 6–10, 12–15, 18–23, 25, and 26 of the '423 patent based on the grounds set forth in the table below.

Claim(s) Challenged	35 U.S.C. §	References
1–4, 6–10, 12	103[3]	Jeon[4], Everett[5]
1–4, 6–10, 12	103	Jeon, Everett, Abramson[6]

[3] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102 and 103 effective March 16, 2013. Because the challenged patent claims priority to applications filed before March 16, 2013, we refer to the pre-AIA versions of §§ 102 and 103.

[4] US 2004/0178767 A1, published Sept. 16, 2004 (Ex. 1003).

[5] H. R. Everett, "Sensors for Mobile Robots: Theory and Application," ISBN 1-56881-048-2, 1995 (Ex. 1004).

[6] US 2005/0010330 A1, published Jan. 13, 2005 (Ex. 1006).

Claim(s) Challenged	35 U.S.C. §	References
9	103	Jeon, Everett, Jones[7]
9	103	Jeon, Everett, Abramson, Jones
13–15, 18–23, 25, 26	103	Kim[8], Everett

II. ANALYSIS

A. Legal Principles

A patent claim is unpatentable as obvious 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 the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *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).

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics,*

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[7] Joseph L. Jones, et al., "Mobile Robots: Inspiration to Implementation," ISBN 1-56881-097-0, 1998 (Ex. 1007).

[8] US 5,440,216, issued Aug. 8, 1995 (Ex. 1009).

Inc., 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

With regard to the level of ordinary skill in the art, Petitioner contends, "[a] skilled artisan would have had at least a four-year degree in mechanical or electrical engineering, or a closely related field and at least one year's experience in the design and implementation of robotics and embedded systems. Additional education could substitute for professional experience and vice-versa." Pet. 3–4 (citing Ex. 1012 ¶¶ 45–47). Patent Owner does not address the level of ordinary skill in the art. *See generally* Resp.

Petitioner's undisputed contention is consistent with the technology described in the Specification and the cited prior art. In considering the arguments and evidence, we adopt and apply Petitioner's proposed level of skill in the art.

C. Claim Construction

Claim construction in this proceeding is governed by 37 C.F.R. § 42.100(b), which provides:

> In an *inter partes* review proceeding, a claim of a patent, or a claim proposed in a motion to amend under §42.121, shall be construed 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.

Under the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc), claim terms are given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *See Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1365–66 (Fed. Cir. 2012). "There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as this own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification of during prosecution." *Id.* at 1365. There is a "heavy presumption," however, that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

We are guided by the principle that we only construe claim terms if, and to the extent that, it is necessary for the purpose of the proceeding. *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)).

The Petition states, "no terms need construction because the claims encompass the prior-art mappings under any construction consistent with *Phillips*." Pet. 4. Patent Owner does not address claim construction. *See generally* Resp. To the extent that we need to interpret claim language, we address that language below in the context of the prior art. We give the

claim terms their ordinary and customary meanings, without express construction.

D. Discussion of Prior Art Status of Jeon and Abramson

Patent Owner contends that Jeon and Abramson do not qualify as prior art to claims 1, 3, 4, 6–8, and 12 of the '423 patent because the claimed invention was conceived before the filing dates of Jeon (June 23, 2003 (Ex. 1003, code (22))) and Abramson (July 11, 2003 (Ex. 1006, code (22))) followed by reasonable diligence to reduction to practice. Resp. 1–15. Petitioner contends that Jeon and Abramson are prior art under 35 U.S.C. § 102(e).[9] Pet. 8, 11. Petitioner contends that the evidence presented does not support that the inventions claimed in claims 1, 3, 4, 6–8, and 12 of the '423 patent were conceived by the inventors prior to the filing dates of Jeon and Abramson. Reply 1–9. Specifically, Petitioner argues that Patent Owner "does not provide evidence of . . . earlier conception of detecting the charging contacts of the base station or stopping forward motion upon detecting those contacts."[10] *Id.* at 1. Thus, as a threshold issue, to determine whether Jeon and Abramson are prior art under § 102(e), we first determine whether Patent Owner's evidence establishes a conception of the inventions in the challenged claims prior to June 23, 2003, the filing date of Jeon and

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[9] In pertinent part, pre-AIA 35 U.S.C. § 102(e) provides, "[a] person shall be entitled to a patent unless . . . the invention was described in . . . an application for patent, published under section 122(b), by another filed in the United States before the invention of the applicant for patent."

[10] Independent claim 1 recites, "detecting contact with charging terminals on the base station" (designated as element [1d] by the parties (Pet. 20; Resp. 12)) and "stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station" (designated as element [1e] by the parties (Pet. 23; Resp. 12)). Ex. 1001, 19:47–51. Claims 3, 4, 6–8, and 12 depend from claim 1.

the date argued by Patent Owner. *See, e.g.*, Resp. 3 ("[t]he invention was conceived prior to June 23, 2003").

For the reasons below, we determine that Petitioner has shown that Jeon and Abramson are § 102(e) prior art.

1. Applicable Law

A patentee can establish prior invention by showing "an earlier conception followed by a diligent reduction to practice."[11] *Purdue Pharma L.P. v. Boehringer Ingelheim GMBH*, 237 F.3d 1359, 1365 (Fed. Cir. 2001). Patent Owner has the burden of proving that the challenged claims are entitled to a priority date earlier than the filing dates of Jeon and Abramson. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1375–76 (Fed. Cir. 2016) ("[I]n the context of establishing conception and reduction to practice for the purposes of establishing a priority date, . . . a patent challenger has the burden of producing evidence to support a conclusion of unpatentability under § 102 or § 103, but *a patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference*.") (emphasis added) (citing *Dynamic Drinkware,* 800 F.3d at 1379.

Conception is "the formation, in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice." *Kolcraft Enterprises, Inc. v. Graco*

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[11] The parties dispute whether the alleged prior invention was diligently reduced to practice. *See* Resp. 15–27 (Patent Owner contending reasonably diligent reduction to practice); Reply 9–13 (Petitioner arguing Patent Owner does not demonstrate reasonable diligence in reducing to practice the alleged prior invention). However, we do not reach this issue as we determine that the preponderance of the evidence does not show conception of the claimed invention prior to the filing dates of Jeon and Abramson.

Children's Products, Inc., 927 F.3d 1320, 1324 (Fed. Cir. 2019) (citing *REG Synthetic Fuels, LLC v. Neste Oil Oyj*, 841 F.3d 954, 962 (Fed. Cir. 2016) (emphasis omitted) (quoting *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985))). A conception must encompass all limitations of the claimed invention, and "is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation." *Singh v. Brake*, 222 F.3d 1362, 1367 (Fed. Cir. 2000) (quoting *Burroughs Wellcome Co. v. Barr Lab., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994)).

Inventor testimony of conception must be corroborated by other, *independent* information. *Apator Miitors ApS v. Kamstrup A/S*, 887 F.3d 1293, 1295 (Fed. Cir. 2018) ("It is well established, however, that when a party seeks to prove conception through an inventor's testimony the party must proffer evidence, 'in addition to [the inventor's] own statements *and documents*,' corroborating the inventor's testimony." (quoting *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1577 (Fed. Cir. 1996) (emphasis added, alteration in original))). The requirement of *independent* knowledge remains key to the corroboration inquiry. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1170 (Fed. Cir. 2006). "One consequence of the independence requirement is that testimony of one co-inventor cannot be used to help corroborate the testimony of another." *Id.* at 1171 (citing *Lacks Indus. v. McKechnie Vehicle Components USA, Inc.*, 322 F.3d 1335, 1350 (Fed. Cir. 2003) (holding that the Special Master rightly refused to accept cross-corroboration of oral testimony as being adequate)). Also, an inventor's unwitnessed laboratory notebooks, emails, and drawings, without other independent evidence, cannot corroborate an inventor's testimony. *Kolcraft*, 927 F.3d at 1325–26 (photos and sketches in Exhibits A–H of inventor

Declaration, which were undated and lacked any showing of authorship, "failed to independently corroborate inventor testimony of prior conception."); *Apator Miitor*, 887 F.3d at 1297 ("an unwitnessed laboratory notebook, alone, cannot corroborate an inventor's testimony of conception. . . . Mr. Drachmann's unwitnessed emails and drawings, alone, cannot corroborate his testimony of conception.") (citing *Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 998-99 (Fed. Cir. 2009) (laboratory notebook that "was unwitnessed and was not corroborated by any other evidence" could not corroborate inventor testimony of conception)); *Brown v. Barbacid*, 276 F.3d 1327, 1335 (Fed. Cir. 2002) ("The Board did not err in holding that an inventor's own unwitnessed documentation does not corroborate an inventor's testimony about inventive facts.").[12] Notwithstanding this clear guidance, the law also recognizes that a notebook entry or other writing that has not been promptly witnessed does not necessarily disqualify it in serving as corroboration of conception under a rule of reason analysis. *See Apator Miitor*, 887 F.3d at 1297 (summarizing cases that permitted unwitnessed notebook entries and other writings to aid in corroborating witness testimony alongside other, more persuasive, evidence).

The requirement for corroboration of testimonial evidence is based on a need to ensure credibility of inventor testimony. As explained in

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[12] The Court in *Brown* also noted the distinction between testimonial evidence and documentary evidence. *Brown*, 276 F.3d at 1335 ("Brown's *physical evidence*, such as Dr. Reiss' notebooks and autoradiographs, *do not require corroboration to demonstrate the content of the physical evidence* itself, namely that FT assay experiments took place on September 20 and 25, 1989. *Conversely, however, the physical evidence in this case may not single-handedly corroborate Dr. Reiss' testimony.*") (emphases added).

Mahurkar, corroboration of "conception through the oral testimony of an inventor . . . arose out of a concern that inventors testifying in patent infringement cases would be tempted to remember facts favorable to their case by the lure of protecting their patent or defeating another's patent." *Mahurkar*, 79 F.3d at 1577 (citation omitted). The Court also recognized that "[w]hile perhaps prophylactic in application given the unique abilities of trial court judges and juries to assess credibility, the rule provides a bright line for both district courts and the PTO to follow in addressing the difficult issues related to invention dates." *Id.*

The clear guidance of the need for independent testimony and documents to corroborate inventor testimony has been tempered by a "rule of reason" analysis. A rule of reason analysis requires "an evaluation of all pertinent evidence . . . so that a sound determination of the credibility of the inventor's story may be reached." *NFC Tech., LLC v. Matal*, 871 F.3d 1367, 1372 (Fed. Cir. 2017) (citing *Singh*, 317 F.3d at 1341 (quoting *Price*, 988 F.2d at 1195)). Controlling case law does not require that evidence have a source independent of the inventors on every aspect of conception and reduction to practice; "such a standard is the antithesis of the rule of reason." *E.I. du Pont De Nemours & Co. v. Unifrax I LLC*, 921 F.3d 1060, 1077 (Fed. Cir. 2019) (quoting *Knorr v. Pearson,* 671 F.2d 1368, 1374 (CCPA 1982)). The law requires only that the corroborative evidence, including circumstantial evidence, support the credibility of the inventors' story. *Id.* (citing *NFC Tech.*, 871 F.3d at 1372).

As succinctly stated by Judge Rich, the "rule of reason" ensures that "[i]n the final analysis, each corroboration case must be decided on its own facts with a view to deciding whether the evidence as a whole is persuasive." *Berges v. Gottstein*, 618 F.2d 771, 776 (CCPA 1980).

Against this background, we review the evidence of conception on which Patent Owner relies.

2. Analysis of Evidence of Conception

For evidence of conception of the disputed elements of claim 1 ("detecting contact with charging terminals on the base station" (element [1d]) and "stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station" (element [1e]) (Ex. 1001, 19:47–51)), Patent Owner cites declaration testimony of two inventors of the '423 patent (*see id.* at code (72)), Clara Vu (Ex. 2063, ¶¶ 27, 41–42) and Daniel M. Ozick (Ex. 2064, ¶¶ 27, 41–42). Resp. 12. The cited paragraphs of the Vu Declaration state:

27. [redacted]

* * *

[redacted]

Ex. 2063, ¶¶ 27, 41–42. This testimony does not state that Ms. Vu or any of the inventors of the '423 patent conceived of detecting the charging contacts of the base station or stopping forward motion of the robot upon detecting those contacts. In this testimony, there is no specific reference to charging terminals of the base station, detecting contact with the charging terminals, or stopping forward movement of the robot in response to detecting contact with the charging terminals.

The cited paragraphs of the Ozick Declaration state:

27. [redacted]

[13] In deposition testimony in the ITC case referenced above (*see* Section I.B.), Ms. Vu testified [redacted], 5:16–17, 131:1–13.

[redacted]

* * *

[redacted]

[14] In deposition testimony in this proceeding, Mr. Ozick testified [redacted] Ex. 1048, 78:15–80:22.

[15] In deposition testimony in the ITC case referenced above (*see* Section I.B.), Mr. Ozick testified [redacted] Ex. 1053, 4:20, 66:19–68:16.

[redacted]

Ex. 2064, ¶¶ 27, 41–42 (boldface added). This testimony by Mr. Ozick is identical in all respects to the testimony by Ms. Vu except for the highlighted two sentences. The sentence in paragraph 27 of the Ozick Declaration that states, [redacted] *See* Resp. 12; Ex. 2063 ¶¶ 27, 41–42; Ex. 2064 ¶¶ 27, 41–42; *see also* Sur-reply 4 ("the inventors' conception of elements [1d] and [1e] before June 23, 2003 is corroborated by numerous pieces of evidence, including [redacted]

16 [redacted]

is no explicit reference to the charging contacts (or charging terminals) of the base station, detecting the charging contacts (or charging terminals) of the base station, or stopping the forward movement of the robot device in response to detecting contact with the charging contacts (or charging terminals) of the base station in Exhibit 2013.

The only pertinent portion of Exhibit 2016 is shown below.

Ex. 2016, 1. [redacted] But, here again, there is no specific reference to the charging terminals of the base station and [redacted] And, there is no reference in Exhibit 2016 to stopping the robot in response to detecting contact with the charging terminals of the base station or otherwise. [redacted]

In the Specification of the '423 patent, there are alternative methods disclosed for determining that the robot has docked. The Specification of the '423 patent states:

> Various methods are contemplated for ensuring that the robot 40 correctly docks with base station 10. For example, the

> robot 40 can continue to move toward the base station 10 (within the yellow zone 66) until the bumper 48 is depressed, signaling the robot 40 that it has contacted the base station 10. Another embodiment overlaps the homing signals 62, 64 such that the yellow zone 66 terminates at a point calibrated such that the robot 40 will contact the charging contacts 16 upon reaching the termination point. Other embodiments simply stop the robot 40 when its electrical contacts touch the electrical contacts 16 on the base station 10.

Ex. 1001, 15:13–24. Thus, the '423 patent discloses determining that the robot has docked by bumper depression and overlap of the homing signals as well as by detecting contact with the electrical contacts on the base station. And, in its Sur-reply [redacted] we do not find corroboration that the inventors conceived of "detecting contact

Thus, of the evidence cited in this section of the Response as "Evidence of Conception" of these elements, the only possible evidence of conception of "detecting contact with charging terminals on the base station" (element [1d]) and "stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station (element [1e]) as recited in claim 1 of the '423 patent [redacted] do not specifically show conception of detecting contact with the charging terminals or stopping movement of the robot in response to detecting contact with the charging terminals. Moreover, this purported evidence of prior conception fails because it is not corroborated by independent evidence of conception of the relevant elements of the claimed invention.[18]

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with charging terminals on the base station" or "stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station" prior to that date.

[18] In addition to the evidence cited by Patent Owner in the section of the Response relating to conception (*see* Resp. 12), Patent Owner contends that the Declaration of Scott Miller (Ex. 2067), a former employee, "corroborates the testimony of the inventor's conception" (*see* Resp. 3). Patent Owner does not expound on or explain this contention. Nonetheless, we considered the testimony of Mr. Miller in Exhibit 2067. Exhibit 2067 does not corroborate that the inventors conceived of detecting contact with the charging terminals or stopping movement of the robot in response to detecting contact with the charging terminals prior to June 23, 2003.

For the above reasons, and applying the rule of reason analysis, we find that Patent Owner fails to establish conception of the inventions of independent claim 1 and dependent claims 3, 4, 6–8, and 12 of the '423 patent on the basis that the claimed inventions were conceived before the filing dates of Jeon and Abramson. Based on the arguments and evidence related to this issue, we find that Jeon and Abramson qualify as § 102(e) prior art to the challenged claims.

E. Summary of Cited Art

1. Jeon (Ex. 1003)

Jeon is titled, "Automatic Charging System and Method of Robot Cleaner." Ex. 1003, code (54). In Jeon, a "power supply unit 400 includes a charging unit 403 for charging the battery 301 of the robot cleaner; and first and second infrared ray generators 401 and 402 positioned at left and right sides of a charge terminal of the charging unit 403." *Id.* ¶ 45. Jeon discloses a "robot cleaner 500" that performs a cleaning operation in a specific region. *Id.* ¶ 54. Infrared ray receiving units 304 and 305 are mounted on rotating plate 306 mounted to the body of Jeon's robot cleaner. *Id.* ¶¶ 50, 58, Fig. 3.

In Jeon, a "remaining battery capacity detecting unit 302 of the robot cleaner checks a remaining capacity of the battery 301 installed in the robot cleaner." *Id.* ¶ 55. If remaining battery capacity is below a reference value, microcomputer 303 of Jeon's robot causes plate 306 to rotate, allowing infrared ray receiving units 304 and 305 to detect infrared rays emitted by infrared ray generators 401 and 402. *Id.* ¶¶ 58–59. Microcomputer 303 moves the robot cleaner to the charging unit 403, along a center between the detected directions of the infrared rays, where "the robot cleaner is connected to the charge terminal of the charging unit 403 and performs a battery charging operation." *Id.* ¶¶ 66, 69–71.

Jeon is U.S. Patent Application Publication 2004/0178767 A1, published on September 16, 2004, and based on an application filed on June 23, 2003. Ex. 1003, codes (10), (22), (43). Jeon qualifies as prior art under 35 U.S.C. § 102(e).

2. Everett (Ex. 1004)

Everett is an excerpt from "a textbook on sensors for autonomous mobile robots, including cleaning robots." Pet. 11. Everett discloses a mobile robot capable of detecting a near-infra-red homing beacon emitted by a base station and using that beacon to travel towards the base station. Ex. 1004, 449–451.[19] "Once the battery monitor circuit on the robot detects a low-battery condition," a scheduler "activates the homing beacon on the recharging station." *Id.* at 450. Everett's mobile robot moves towards the charging station and "reduces speed as a function of standoff distance based on sonar range measurements." *Id.* at 451. Everett discloses detecting electrical contact between the battery on its robot and the charging station using a low-current source that continuously energizes the station's contacts and measuring a drop in a sense voltage. *Id.* at 450.

The textbook from which Everett was excerpted was published in 1995 and cataloged and publicly available from the University of Wisconsin-Madison Libraries as of June 6, 1999. Ex. 1005, 2, 5. Patent Owner does not challenge the prior art status of Everett. Everett qualifies as prior art under 35 U.S.C. § 102(b).

[19] Everett has two sets of page numbers. We refer to the page numbers in the bottom left corner of each page (e.g., "Page 449 of 543"). "Page 449 of 543" corresponds to original page 434 (*see* upper left corner) of Everett.

3. Abramson (Ex. 1006)

Abramson is titled, "Autonomous Machine for Docking with a Docking Station and Method for Docking." Ex. 1006, code (54). Abramson "is directed to autonomous machines, such as robots, these robots typically designed to perform tasks such as vacuum cleaning, lawnmowing, floor weeping and maintenance" and, particularly, "to methods and systems for docking these autonomous machines in docking stations." *Id.* ¶ 1. Abramson discloses performing a "seek for the docking beam 120," during which the robot "operat[es] in accordance with a random scan pattern" until "docking beam 122" is detected by a sensor on the robot. *Id.* ¶¶ 43, 47. Abramson discloses "confirming that the at least one signal for the docking station has been located," "moving the robot towards the docking station," and "ceasing robot movement once the robot has docked in the docking station and a docking contact between the robot and the docking station is established." *Id.* ¶ 10.

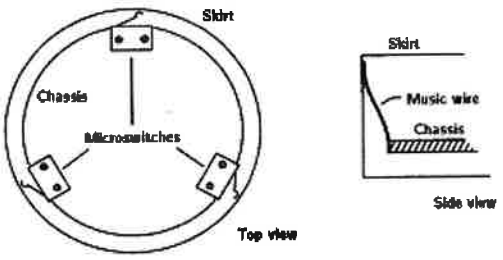
Abramson is U.S. Patent Application Publication 2005/0010330 A1, published on January 13, 2005, and based on an application filed on July 11, 2003. Ex. 1006, codes (10), (22), (43). Abramson qualifies as prior art under 35 U.S.C. § 102(e).

4. Jones (Ex. 1007)

Jones is a textbook about the "design and construction of mobile robots." Ex. 1007, 8.[20] Jones discloses building systems, including a microprocessor and software to manage a large number of sensors. *Id.* at 2–3. Jones discloses that "[f]orce sensors can be used to determine when the

[20] Our citations to Jones use the branded page numbers at the bottom of the exhibit, which totals 242 pages.

robot is in contact with another object and where that object is in relation to the robot" and that "[s]uch information allows the robot to maneuver away from collisions." *Id.* at 80. An excerpt from Jones's Figure 5.21 is reproduced below.



Id. Figure 5.21 depicts one approach to implementing a full-coverage, force-detecting bumper on a cylindrical robot, using three microswitches on the robot's perimeter to contact a movable skirt around the robot. *Id.*

Jones was published in 1999 and cataloged and publicly available from the University of Wisconsin-Madison Libraries as of June 8, 2000. Ex. 1008, 2, 5. Patent Owner does not challenge the prior art status of Jones. Jones qualifies as prior art under 35 U.S.C. § 102(b).

5. Kim (Ex. 1009)

Kim is titled, "Robot Cleaner." Ex. 1009, code (54). Kim relates to "a self-moving robot cleaner which is capable of moving to an automatic charging means to charge its battery when a charging voltage of the battery is decreased to below a predetermined level during a cleaning operation and then returning to the interrupted cleaning position to again carry out the cleaning operation." *Id.* at 1:7–13. Figure 10 of Kim is shown below.

FIG. 10

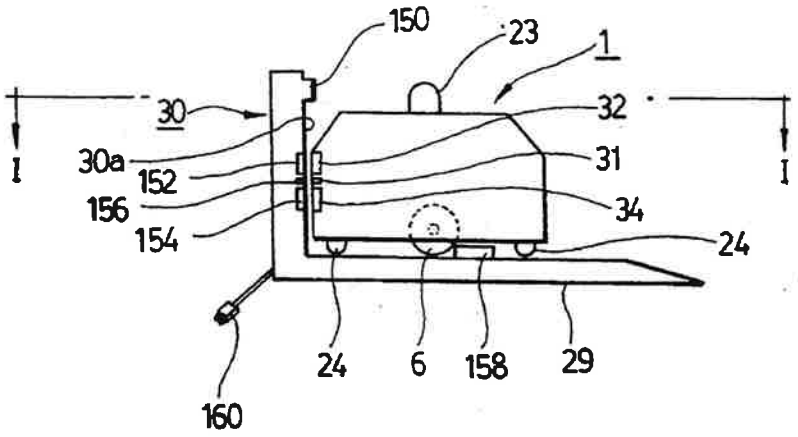


Figure 10 of Kim depicts, "the robot cleaner which has been moved to the automatic charging means." *Id.* at 7:67–68.

Kim's robot initially moves about and uses sensors to "memorize[] a structure and a size of the room." *Id.* at 10:4–9. Figure 13 of Kim is reproduced below.

FIG. 13

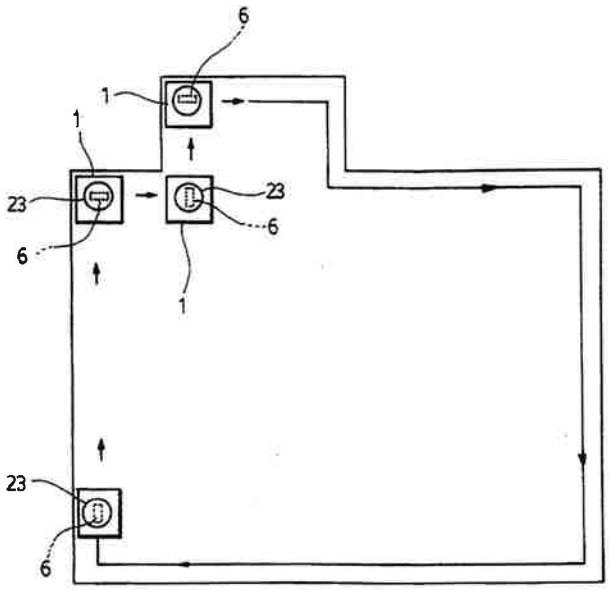


Figure 13 depicts this initial operation of the robot cleaner. *Id.* at 9:55–56. After mapping the room, Kim's robot compares data regarding the room's size and structure to stored data to determine a path for cleaning the room. *Id.* at 10:3–14, 11:62–65. Kim's robot uses mirrors and sensors to ensure that it turns and moves precisely. *Id.* at 13:14–38. Figure 14 of Kim is reproduced below.

FIG. 14

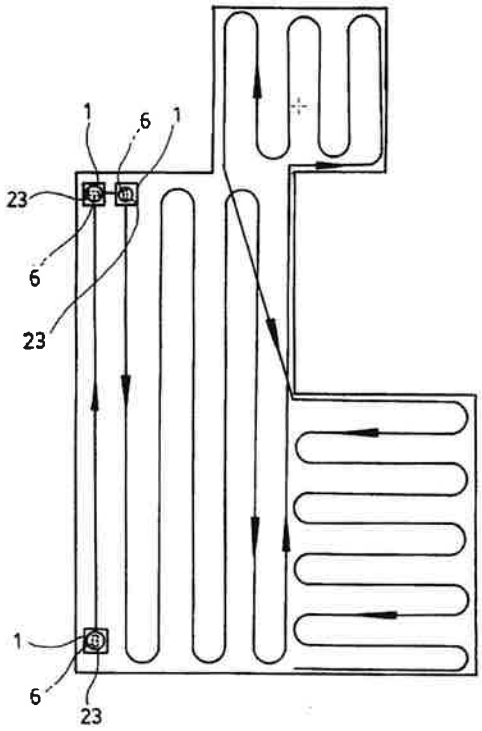


Figure 14 depicts a path along which the robot performs cleaning operations. *Id.* at 12:12-15.

Kim is U.S. Patent No. 5,440,216, issued on August 8, 1995. Ex. 1009, codes (11), (45). Patent Owner does not challenge the prior art status of Kim. Kim qualifies as prior art under 35 U.S.C. § 102(b).

F. Asserted Objective Evidence of Nonobviousness

Patent Owner argues that "extensive evidence establishing objective indicia of non-obviousness supports patentability." Resp. 48–49. In response, Petitioner argues that Patent Owner's secondary considerations arguments and evidence do not establish nonobviousness. Reply 20–25. As explained below, Patent Owner has not shown any commercial product is within the scope of the challenged claims. Patent Owner also has not established that the evidence it submits relates to the inventions claimed in the '423 patent. Without such proof, we consider this evidence, but adjudge it is entitled to little or no weight in determining whether the challenged claims are non-obvious.

For objective indicia of nonobviousness to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention. *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). "[T]here is no nexus unless the evidence presented is 'reasonably commensurate with the scope of the claims.'" *Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). A patentee is entitled to a presumption of nexus "when 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))). "[T]he purpose of the coextensiveness requirement is to ensure that nexus is only presumed when the product tied to the evidence of secondary considerations '*is* the invention disclosed and claimed.'" *Id.* at 1374 (quoting *Demaco Corp. v. F. Von Langsdorff*

Licensing Ltd., 851 F.2d 1387, 1392 (Fed. Cir. 1988)). "[T]he degree of correspondence between a product and the patent claim falls along a spectrum. At one end of the spectrum lies perfect or near perfect correspondence. At the other end lies no or very little correspondence." *Id.* "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.

Patent Owner does not provide an analysis demonstrating that its evidence or products are coextensive (or nearly coextensive) with the challenged claims. Patent Owner presents a chart purporting to show that its "Roomba Vacuuming Robot 900 Series" products are within the scope of claims 13 and 21 of the '423 patent.[21] *See* Resp. 51–55. The evidence relied upon in this chart is an "iRobot® Roomba® Vacuuming Robot 900 Series Owner's Guide" (Ex. 2068 ("Roomba Guide")) and "CES 2017 | iRobot Roomba 980 WiFi Robot Demonstration | 900 Series Robotic

[21] Patent Owner also contends that its Roomba products embody claim 1, but this contention is not supported. Patent Owner's Response states that the "Roomba robotic cleaning devices embody claim 1, as demonstrated in Section II [of the Response]." Resp. 50. Section II of the Response is headed, "Jeon and Abramson are not prior art to claims 1, 3, 4, 6-8, and 12 of the '423 patent." *Id.* at 1 (capitalization in heading omitted). Section II is the section of the Response in which Patent Owner presents its case as to conception and reduction to practice in an effort to establish that Jeon and Abramson are not prior art. *Id.* at 1–27. Although sometimes referring to the "Roomba 2, released in **July 2004"** (*id.* at 2), Patent Owner relies on a constructive reduction to practice of the invention based on a filing of a patent application on January 21, 2004 (*id.* at 27). Patent Owner does not argue or present a showing that the Roomba 2 or any product it sold embodies claim 1 of the '423 patent. The evidence and arguments in Section II of the Response will not support a finding that all (or even any) of Patent Owner's Roomba products embody claim 1 of the '423 patent.

Vacuum | Smart Review" (Ex. 2105 ("Roomba video")). There are several problems with this evidence. First, Patent Owner provides no evidence (or argument) that the products to which these exhibits relate are representative of its products or when these products were sold. Exhibit 2068, the Roomba Guide bears a copyright date of 2017 but is otherwise undated. Ex. 2068, 13. Patent Owner does not provide any argument as to when the products to which Exhibit 2068 relate were sold. Exhibit 2105, the Roomba video, is labelled as being from a trade show (CES) in 2017 and the narrator states that the product that is demonstrated (Roomba 980) was launched in September, 2015. But for what period of time this product was sold (or how many),[22] Patent Owner does not say.[23]

Second, these exhibits do not show that the products embody any claim of the '423 patent and are coextensive with any claim of the '423 patent. For example, independent claims 13 and claim 21 recite: "control forward movement of the cleaning robot toward the base charging station at a second velocity less than the first velocity . . . in response to detecting a need to charge the energy storage unit." Ex. 1001, 20:47–51, 22:1–4. In an attempt to show

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[22] The narrator of the video describes the Roomba 980 as its top-of-the-line product and as selling for $899 and compares it to the other product shown in the video (but not demonstrated or well-described), the Roomba 960 which the narrator said "starts at $699." Ex. 2105. Patent Owner provides no showing that the Roomba 960 embodies any claim of the '423 patent or the period of time in which the Roomba 960 was sold or the relative sales volume of the Roomba 980 versus the Roomba 960 or any other of Patent Owner's products.

[23] Patent Owner's Exhibit 2069 (with a copyright date of 2022 (Ex. 2069, 3)) includes a consumer comment indicating that Patent Owner has abandoned the "980" and that, due to a firmware update from Patent Owner, the device does not return to the home base to recharge. Ex. 2069, 3.

Exhibit 2068 embodies these claim elements, the Response states, "Roomba Guide describes 'If its battery gets low before finishing a cleaning cycle, Roomba returns to the Home Base to recharge.'" Resp. 54 (citing Ex. 2068, 6).[24] In this passage in Exhibit 2068, there is no reference to "a second velocity less than the first velocity." Patent Owner does not direct our attention to any description of "a second velocity less than the first velocity" in Exhibit 2068 and we can find none.

Patent Owner contends that Exhibit 2105 shows the robot slows downs as it approaches the base station. Resp. 54. The Response states the "Roomba video shows the Roomba being autonomously controlled to move forward toward the Home Base and to slow down as it approaches the home base." *Id.* However, in the video, the robot returns to the home base in response to a command sent using a cell phone app and not "in response to detecting a need to charge the energy storage unit" as recited in claims 13 and 21. Patent Owner fails to establish that any of its products embody any of the claims of the '423 patent.

Third, Patent Owner does not argue or show that Exhibit 2068 or Exhibit 2105 highlight or emphasize the elements set forth in the claims of the '423 patent. Exhibit 2068, the Roomba Guide, does not highlight or

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[24] For these elements, Patent Owner also cites Exhibit 2069, a "Roomba webpage" and states the "Roomba webpage describes 'The robot automatically returns to the Home Base® charging station to recharge at the end of a cleaning cycle or when the battery is running low.'" Resp. 54 (citing Ex. 2069, 2). In Exhibit 2069, there is no reference to "a second velocity less than the first velocity." In addition, Exhibit 2069 includes a consumer comment that indicates that, due to a firmware update from Patent Owner, the robot does not automatically return to the charging station to recharge at the end of a cleaning cycle or when the battery is running low. Ex. 2069, 3.

emphasize the subject matter of the claims. In Exhibit 2105, the Roomba video, many features of the products are discussed but none of the highlighted or emphasized features relate to the subject matter of the claims. To the contrary and even if the products discussed in these exhibits embodied the claims and were coextensive with them, both of these exhibits show that Patent Owner did not consider the elements of the claims to be important or attractive features of these products.

Fourth, Patent Owner's website identifies the '423 patent as one of ninety issued U.S. utility and design patents relating to its "Roomba® 900 Series Robot and Robot System" with "Other patents pending." Ex. 1041, 1. Patent Owner does not discuss how this large number of other patents relates to the functionality of these products. We, therefore, find that a presumption of nexus is inappropriate.

However, "[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations." *Fox Factory*, 944 F.3d at 1375. "To the contrary, 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 1373–74 (quoting *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)). "Where the offered secondary consideration actually results from something other than what is both claimed and *novel* in the claim, there is no nexus to the merits of the claimed invention," meaning that "there must be a nexus to some aspect of the claim not already in the prior art." *In re Kao*, 639 F.3d 1057, 1068–69 (Fed. Cir. 2011) (emphasis in original). On the other hand, there is no requirement that "objective evidence must be tied exclusively to claim elements that are not disclosed in a particular prior art reference in order for that evidence to carry substantial

weight." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331 (Fed. Cir. 2016). A patent owner may show, for example, "that it is the claimed combination as a whole that serves as a nexus for the objective evidence; proof of nexus is not limited to only when objective evidence is tied to the supposedly 'new' feature(s)." *Id.* Ultimately, the fact finder must weigh the secondary-considerations evidence presented in the context of whether the claimed invention as a whole would have been obvious to a skilled artisan. *Id.* at 1331–32. As shown above, in this case, Patent Owner's arguments and evidence do not show a nexus to either the unique characteristics of the invention or the claimed combination as a whole. *See* Resp. 50–55.

Patent Owner contends that "Roomba, which embodies at least claims 1, 13, and 21, was a commercial success." Resp. 55. But, Patent Owner uses "Roomba" to designate a number of products over a long period of time (about 2002 until today) (*see id.* at 55– 58 (arguments and exhibits cited in section of Response discussing commercial success)) and, as shown above, Patent Owner has failed to establish any of these products, much less all of these products, embody claims 1, 13, and 21. As discussed above, Patent Owner has failed to establish a nexus between the invention claimed in the '423 patent and any of its products.[25] To be clear, we do not find that Patent Owner's Roomba products were not commercially successful. We do find

[25] "If commercial success is due to an element in the prior art, no nexus exists." *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011). "[I]f the feature that creates the commercial success was known in the prior art, the success is not pertinent." *Ormco Corp. v. AlignTechnology, Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006). "[T]he asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art." *J.T. Easton & Co., Inc. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997).

that Patent Owner has failed to show that any commercial success is objective evidence of the nonobviousness of the claimed invention due to a lack of nexus. There is insufficient evidence to show that the invention of the challenged claims of the '423 patent has been a commercial success.

Patent Owner also argues that "Roomba was recognized, praised, and copied by others." Resp. 58. But, here again, the evidence is of broad scope relating to Roomba and not shown to be related to the claimed invention due to a lack of nexus. In addition, Patent Owner links the arguments and evidence in this section of the Response to "auto charge and resume functionality" which is not recited in independent claims 1, 13, and 21 for which Patent Owner contends there is a nexus between its secondary considerations evidence and the claimed invention. *See id.* at 58–62 (repeatedly referring to "auto charge and resume functionality"). In response to these arguments, Petitioner argues:

> [Patent Owner] equates its claimed invention to "auto-recharge and resume functions." POR, 49–62. [Patent Owner] cannot dispute, however, that auto-recharge and resume is only recited in dependent claim 23; claim 1 recites no such functionality and claims 13 and 21 recite only auto-charging, not resuming. And [Patent Owner] cannot dispute that auto-charge and resume functionality was taught in the prior art, POR, 27–42. EX1055, 2, 32-44 (invalidating claims of US 9,550,294, reciting auto-recharge and resume functionality). [Patent Owner] also did not dispute that during original prosecution. Indeed, after the Examiner found [Patent Owner]'s claims reciting auto-recharge and/or resume functions obvious or anticipated by prior art, [Patent Owner] amended them to include the "controlling forward movement" and reduced velocity limitations and argued that those new features distinguished the claims from the prior art. EX1002, 89–90, 69-72.
>
> [Patent Owner] fails to establish a nexus between its secondary considerations evidence and what it contended was

> novel, namely the claimed "controlling forward movement" and reduced velocity limitations. None of [Patent Owner]'s evidence mentions the Roomba's control of forward movement while docking, much less any reduced velocity. POR, 48–62. Because [Patent Owner] links its purported evidence of recognition, praise, and copying to other features of the Roomba, i.e., auto-charge and resume functionality known in the prior art, its argument should not be accorded any weight. *See, e.g.*, *South Alabama Medical Science Foundation v. Gnosis S.P.A.*, 808 F.3d 823, 827, (Fed. Cir. 2015) ("substantial evidence supports the Board's finding that the praise was particularly directed to the use of L-5-MTHF, an element already known in the prior art.").

Reply 22 –23. We agree with Petitioner that the alleged recognition, praise, and copying is directed to features not recited in claims 1, 13, and 21. Patent Owner has failed to establish any recognition, praise, or copying of the inventions recited in claims 1, 13, and 21 of the '423 patent. There is insufficient evidence to show that this purported objective evidence of the nonobviousness relates to the challenged claims of the '423 patent.

In summary, we find that the evidence proffered by Patent Owner in an effort to establish that there is objective evidence of the nonobviousness of the invention claimed in the '423 patent is weak and has not been shown to relate to the specific inventions recited in the challenged claims. However, we have considered all the proffered evidence of objective indicia of nonobviousness relied upon by Patent Owner in our determination as to obviousness.

G. *Asserted Obviousness of Claims 1–4, 6–10, and 12 in View of Jeon and Everett or Jeon, Everett, and Abramson*[26]

1. *Discussion of Claim 1*

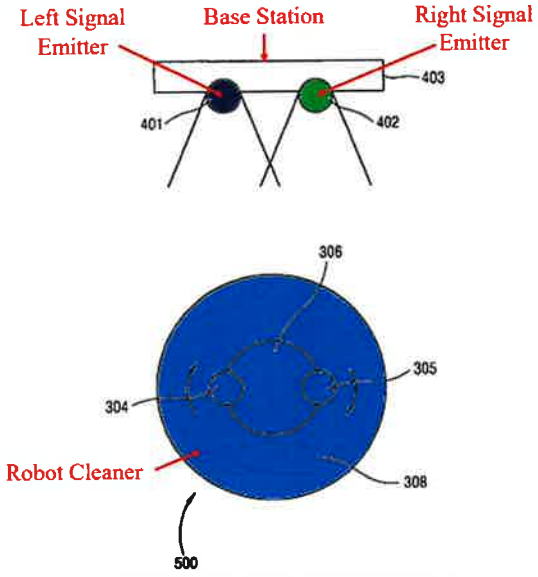
We begin our discussion of the challenge to the claims of the '423 patent with a consideration of Petitioner's allegation that claim 1 would have been obvious in view of the combinations of Jeon and Everett and of Jeon, Everett, and Abramson. *See* Pet. 5, 12–26.

> *A method of docking a robotic cleaning device with a base station that includes a plurality of signal emitters including a right signal emitter and a left signal emitter, the method comprising:*

Petitioner does not take a position as to whether the preamble of claim 1 is limiting. Pet. 12 ("If the preamble is limiting, [ ]Jeon/Everett discloses it.") (citing Ex. 1012 ¶¶ 62–64). Petitioner relies on Jeon in support of its contentions relating to the preamble of claim 1. *Id.* at 12–13. The Petition contains an annotated Figure 3 of Jeon, reproduced below.

[26] In the Petition, Petitioner presented its arguments and evidence relating to the Jeon-Everett combination and the Jeon-Everett-Abramson combination together. *See* Pet. 8–46. In order to follow the presentation in the Petition, we consider the showing as to these combinations together.

FIG. 3



Id. at 13. Annotated Figure 3 depicts, "infrared sensors of the automatic charging system of a robot cleaner." Ex. 1003 ¶ 37. The Petition states:

> [ ]Jeon discloses "an automatic charging system and method of a robot cleaner." [ ]Jeon, ¶ [0002]. [ ]Jeon discloses "a power supply unit 400" (base station) including "a charging unit 403 for charging the battery 301 of the robot cleaner; and first and second infrared ray generators 401 and 402 positioned at left and right sides of a charge terminal of the charging unit 403" and outputting signals to guide robot 500 to charging unit 403. *Id.*, ¶¶ [0044]-[0045], Fig. 3. [ ]Jeon's "infrared ray generators 401 and 402" correspond to the claimed left or right signal emitters, respectively. Likhachev, ¶ 64.

Pet. 12–13. Petitioner's contentions relating to the preamble of claim 1 are supported by Jeon.

Patent Owner does not take a position as to whether the preamble of claim 1 is limiting or dispute Petitioner's showing that the cited art teaches the elements of the preamble of claim 1. *See generally* Resp.

Because Petitioner has shown sufficiently that the recitations in the preamble are satisfied by the cited art, we need not determine whether the

preamble is limiting. *See Vivid Techs.*, 200 F.3d at 803. We find that, even if the preamble is limiting, Petitioner has shown that the cited art teaches all the elements of the preamble of claim 1.

directing the robotic cleaning device about a room at a first velocity;

Petitioner relies on Jeon as teaching all the elements of this limitation. Pet. 14 (citing Ex. 1012 ¶¶ 65–67). Petitioner cites the following passages in Jeon: "the robot cleaner includes . . . a microcomputer for moving the robot cleaner" and "robot cleaner 500 performs a cleaning operation according to a user's command in a specific region." *Id.* (citing Ex. 1003 ¶¶ 46, 54). Petitioner contends:

> Because [ ]Jeon's robot performs cleaning in a specific region (room), and includes a microcomputer to control its movements, [ ]Jeon directs its robot about a room. Likhachev, ¶ 65.
>
> The term "first velocity" only appears in the '423 patent claims, but the specification does not describe this term. '423 patent, claims 1, 13, 21. Thus, any velocity used by [ ]Jeon's robot during cleaning corresponds to the first velocity. Likhachev, ¶ 66-67.

Id. The cited passages in Jeon support these contentions.

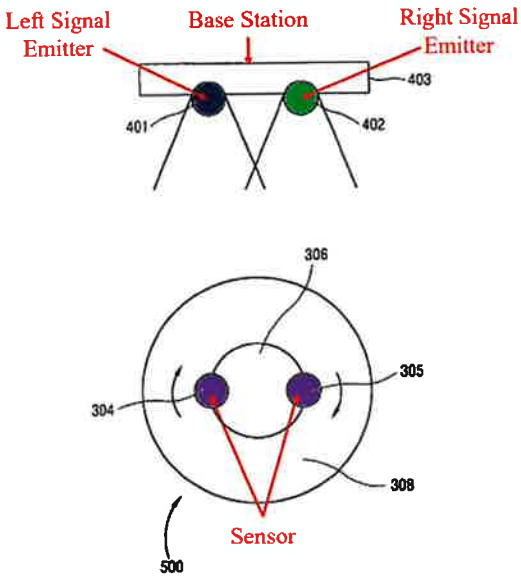
Patent Owner does not dispute that Jeon teaches this limitation. *See generally* Resp.

We find that the cited art teaches this limitation.

detecting, by a sensor mounted on the robotic cleaning device, a right signal transmitted by the right signal emitter of the base station and a left signal transmitted by the left signal emitter of the base station;

Petitioner relies on Jeon as teaching all the elements of this limitation. Pet. 14–16 (citing Ex. 1012 ¶¶ 68–69). In support, the Petition includes an annotated Figure 3, reproduced below.

FIG. 3



Id. at 15. This annotated Figure 3 depicts, "robot cleaner 500, base station component 403, left and right signal emitters 401 and 402, and sensor(s) 304, 305." *Id.* The Petition states:

> [ ]Jeon's robot has "a rotating plate 306 mounted at a main body." [ ]Jeon, ¶ [0046]. In charge mode, [ ]Jeon's microcomputer 303 causes rotation of the rotating plate 306. [ ]Jeon, ¶ [0058]. [ ]Jeon's "first and second infrared ray receiving units 304 and 305 mounted at the rotating plate 306 are rotated accordingly." *Id.* [ ]Jeon explains that "first and second infrared ray receiving units 304 and 305 of the robot cleaner receive first and second infrared signals respectively outputted from the first and second infrared ray generators 401 and 402." *Id.*, ¶ [0059], [0065]. [ ]Jeon discloses that plate 306 may have only one sensor. *Id.*, ¶ [0060]. Receiving units 304 and 305 or the one sensor on plate 306 correspond to the claimed sensor. Likhachev, ¶ 68.

Id. at 14–15. Jeon supports Petitioner's showing as to this limitation.

Patent Owner does not dispute that Jeon teaches this limitation. *See generally* Resp.

We find that Jeon teaches this limitation.

controlling forward movement of the robotic cleaning device toward the base station at a second velocity less than the first velocity while orienting the robotic cleaning device in relation to the right signal and the left signal;

Petitioner relies on Jeon as teaching elements of this limitation. Pet. 16–19 (citing Ex. 1012 ¶¶ 70–83). With regard to "controlling forward movement of the robotic cleaning device toward the base station . . . while orienting the robotic cleaning device in relation to the right signal and the left signal," Jeon teaches:

> [T]he microcomputer 303 of the robot cleaner detects a direction of the charging unit 403 on the basis of the first and second infrared signals received from the first and second infrared ray generators 401 and 402, and moves the robot cleaner in the detected direction. That is, the robot cleaner is moved in the direction that the first and second infrared ray signals are generated. . . .
>
> [T]he microcomputer 303 moves the robot cleaner 500 along the center between the detected direction in which the first infrared signal is generated and the detected direction in which the second infrared signal is generated.
>
> As the robot cleaner 500 keeps moving to the direction that the first and second infrared signals are generated, it eventually reaches the charging unit 403.

Ex. 1003 ¶¶ 64, 66, 67.

Petitioner acknowledges that Jeon "does not explicitly state a velocity of its robot as it moves toward the charging unit," but contends "a skilled artisan would have found it obvious that [ ]Jeon's robot would approach the charging unit at a second velocity lower than its cleaning velocity (first velocity)." Pet. 17 (citing Ex. 1003 ¶¶ 72–78). Petitioner supports this obviousness contention with two arguments. *Id.* at 17–19. Petitioner argues:

> [A] skilled artisan would understand that because [ ]Jeon's robot approaches and docks with the charging unit for charging its battery, the robot must come to a stop at the charging unit. [Ex. 1003] ¶ 72. Moreover, to ensure [ ]Jeon's robot stops, its microcomputer must reduce the robot's velocity from its initial cleaning velocity (first velocity) until the velocity becomes zero. *Id.*
>
> A skilled artisan would recognize that a robot traveling at a higher velocity would require a longer stopping distance. *Id.*, ¶ 73. To timely stop the robot and prevent it from colliding with the charging station, a skilled artisan would have been motivated to reduce the robot's velocity towards the charging unit. *Id.*, ¶ 74.

Id. The second of Petitioner's arguments is:

> [T]o charge the robot's battery, electrical connections on [ ]Jeon's robot must align with and engage terminals on [ ]Jeon's charging unit (base station). Likhachev, ¶ 75. As Dr. Likhachev explains, "it takes time for a robot to turn and if the robot is traveling forward too fast, there may be insufficient time to turn the robot," for example, to align it with charging terminals on the base station. *Id.* A robot traveling at a lower speed can follow an intended path more accurately, making it easier to turn, maneuver, and align the robot's electrical contacts with those of the charging unit. *Id.*, ¶ 76. A skilled artisan would recognize that it is essential to dock the robot accurately and accurate placement is easier and more likely achieved at lower speeds. *Id.* . . .
>
> A skilled artisan would understand that maneuvering near a base station may require making sharp turns, at small radii of curvature, which would be easier at low speeds. *Id.*, ¶ 77. Reducing the speed of a robot when maneuvering in tight spaces was well known. . . Likhachev, ¶ 77. Accordingly, it would have been obvious to a skilled artisan that [ ]Jeon's robot cleaner would move towards the base station at a second, slower velocity than the first velocity to achieve known, predictable results (avoiding collision with and/or increased maneuverability for accurate alignment with the base station). *Id.*

Id. at. 17–19.

Petitioner additionally cites Everett as "disclos[ing] a mobile robot capable of detecting a near infra-red homing beacon emitted by a base station and traveling towards it to recharge its battery" and as "teach[ing] that it was well known for a robot to travel to its docking station at a second velocity lower than a first velocity while using a homing beacon to adjust its heading." *Id.* at 19 (citing Ex. 1004, 449–451; Ex. 1012 ¶¶ 80–81). Everett states, "[t]he robot relies on [an] optical tracking system to control heading while closing on the charger and reduces speed as a function of stand-off distance based on sonar range measurements." Ex. 1004, 451.

With regard to combining the relevant teachings of Jeon and Everett relating to this limitation, the Petition states:

> It would have been obvious to combine this well-known, reduced base station approach velocity with [ ]Jeon . . . Doing so is nothing more than substituting a known feature (e.g., Everett's reduced base station approach velocity) in an existing system ([ ]Jeon's robot cleaner) according to known methods (e.g., function of stand-off distance) to achieve a predictable result (avoiding collision with and/or increased maneuverability for accurate alignment with the base station). *Id.*; *KSR*, 550 U.S. at 416-418.
>
> Selecting a reduced base station approach velocity is a known, obvious, trivial selection from a limited number of options (increasing, decreasing, or maintaining velocity). Likhachev, ¶ 82. Given the benefits of reducing the velocity (e.g., avoiding collision and/or increased maneuverability), to the extent not already understood from [ ]Jeon and the knowledge of a skilled artisan, a skilled artisan would have found it obvious to try reducing the base station approach velocity of [ ]Jeon's robot cleaner as taught by Everett. *Id.*; *KSR*, 550 U.S. at 421.

Pet. 19–20. We find that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon and Everett.

Patent Owner argues that this limitation "requires both 'forward movement' and 'orienting . . . in relation to the right and the left signals,' which are two different requirements" and "there is no disclosure that Jeon's robot cleaner does more than just move forward towards the base station, much less that the robot ***re***-orients or changes its direction in relation to the signals." Resp. 36 (emphasis added). This argument is not supported by the language of the claim as this limitation requires "orienting" not ***re***-orienting and Jeon teaches "orienting . . . in relation to the right and the left signals" as recited in claim 1.[27] Petitioner cites paragraphs 64, 66 and 67 of Jeon (quoted above) in support of its contention that Jeon teaches these elements. *See* Pet. 16. Paragraph 64 of Jeon states:

> [T]he microcomputer 303 of the robot cleaner detects a direction of the charging unit 403 on the basis of the first and second infrared signals received from the first and second infrared ray generators 401 and 402, and moves the robot cleaner in the detected direction. That is, the robot cleaner is moved in the direction that the first and second infrared ray signals are generated.

Ex. 1003 ¶ 64. We have considered the passages cited by both parties in Jeon and find Jeon teaches "forward movement" and "orienting . . . in relation to the right and the left signals." Indeed, Patent Owner acknowledges that "Jeon discloses that after the infrared ray receiving units detect the infrared ray signals, the robot cleaner moves in their direction

[27] Patent Owner does not argue that "orienting . . . in relation to the right and the left signals" should be construed in a way that would support this argument. *See* Resp. 36–37.

toward the charging unit and '***keeps moving to the direction*** that the first and second infrared signals are generated' until it 'eventually reaches the charging unit.'" Resp. 36 (citing Ex. 1003 ¶¶ 65–67). And, in response to this argument, Petitioner contends "[a] POSITA[28] would understand that by moving the robot forward from its initial travel direction to the center direction between the right and left signals, [ ]Jeon's microcomputer controls the robot's forward movement while orienting it relative to those signals, as claimed." Reply 13 (citing Pet. 16; Ex. 1012 ¶¶ 70–71). We agree with Petitioner.

We find that, based on the preponderance of the evidence, Petitioner has shown that the cited art teaches this limitation.

detecting contact with charging terminals on the base station;

Petitioner cites Jeon as teaching this limitation. Pet. 14–16 (citing Ex. 1012 ¶¶ 68–69). Petitioner cites this passage from Jeon: "as the power terminal of the robot cleaner and the charge terminal of the charging unit 403 are connected to each other, the remaining battery capacity detecting unit 302 outputs a docking complete signal to the microcomputer 303." *Id.* at 21 (citing Ex. 1003 ¶ 72). Petitioner contends that, "[a] skilled artisan would understand that [ ]Jeon's robot detects contact with charging terminals on the base station based on transmission of the docking complete signal." *Id.* (citing Ex. 1003 ¶¶ 84–86). Jeon supports Petitioner's showing for this limitation.

Petitioner also cites Everett as teaching this limitation. Pet. 21–22 (citing Ex. 1012 ¶¶ 88–92). The Petition states, "Everett provides a solution

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[28] POSITA is an acronym commonly used in patent proceedings to refer to a person of ordinary skill in the art.

for confirming the robot's contacts are connected to the charging terminal['s contacts] by detecting a change in the sense voltage." *Id.* at 22 (citing Ex. 1012 ¶ 89). Everett states that, "[t]his 'sense' voltage (about 20 volts DC) allows the robot to know when a valid electrical connection has been established with the recharger." Ex. 1004, 450. Everett supports Petitioner's contentions.

With regard to combining the relevant teachings of Jeon and Everett as related to this limitation, the Petition states:

> A skilled artisan would recognize that if charging current cannot flow to [ ]Jeon's battery to charge it, the very purpose for which [ ]Jeon's robot returns to the base station would be defeated. Likhachev, ¶ 90. A skilled artisan would, therefore, have been motivated to combine Everett's method of confirming connection between the contacts of [ ]Jeon's robot and the base station charging terminals to ensure the robot's battery can receive charging current. *Id.* Implementing a method of detecting contact with the charging terminals on [ ]Jeon's robot in view of Everett would have improved the robot's ability to ensure its battery can be charged by the charging unit. *Id.* Doing so would have simply combined a known feature (Everett's sense-voltage monitoring) in [ ]Jeon's robot to achieve a predictable result (ensuring charging current can flow from the charging unit to the robot battery). *Id.*; *KSR*, 550 U.S. at 416-418.
>
> A skilled artisan would have been able to make this modification and reasonably expect success. Likhachev, ¶ 91. Everett teaches a sense voltage drop indicates connection of the robot's battery as a load across the base station charging terminals. Everett, 435. [ ]Jeon's charging unit already includes charging terminals for engaging contacts on [ ]Jeon's robot. [ ]Jeon, ¶¶ [0071]-[0074]. A skilled artisan would therefore have reasonably expected that implementing Everett's sense voltage measurement on [ ]Jeon's robot would allow it to confirm contact between its power terminal and the base station charge terminals. Likhachev, ¶¶ 91-92.

Pet. 22–23. We find that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon and Everett.

Patent Owner does not dispute that the cited art teaches this limitation. *See generally* Resp.

We find that the cited art teaches this limitation and Petitioner has provided a sufficient rationale to combine the references' teachings.

> *stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station; and*

Petitioner acknowledges that Jeon does not teach this limitation but argues a skilled artisan would have been motivated to implement it. Pet. 23–24. The Petition states:

> [ ]Jeon/Everett discloses this (Ground 1A). Likhachev, ¶ 94. [ ]Jeon discloses an ultrasonic signal generator that generates a stop signal when the robot is adjacent to the charging station. *See* Section VII.E.5; [ ]Jeon, ¶¶ [0046], [0068], [0069]. A skilled artisan would, however, understand that stopping [ ]Jeon's robot near the charging station would not guarantee electrical connection of the robot's battery with the charging station. Likhachev, ¶ 94. [ ]Jeon itself recognizes this possibility. [ ]Jeon, ¶¶ [0071], [0073] (disclosing docking error signal); Section VII.E.5; Likhachev, ¶ 94. A skilled artisan would, therefore, have been motivated to implement a better way of ensuring the power terminal of [ ]Jeon's robot always connects to the charging station connector when the robot returns to the charging station. Id. A skilled artisan would recognize that a simple way to do so would be to stop forward movement of [ ]Jeon's robot upon detecting that the robot's battery is electrically connected to the charging terminal connector. *Id.* Indeed, such techniques were well known. Abramson, ¶¶ [0066], [0074]. Moreover, doing so would have produced predictable results (ensuring that the power terminal of [ ]Jeon's robot is connected to the charging terminals of the charging unit). Likhachev, ¶ 94; *KSR*, 550 U.S. at 416-418.

Id. We do not find this argument persuasive.[29] Petitioner suggests that stopping forward movement of the robot upon detecting electrical contact with the charging terminal connectors was "better," "simple," and "well known," but provides only a very thin explanation.[30] *See id.* at 23–24. We find these arguments to be poorly supported and largely conclusory.[31]

Patent Owner contends that "Jeon fails to disclose that the robot cleaner 'stops forward movement' in response to 'detecting contact with the charging terminals' of its dock." Resp. 37. Instead, Patent Owner argues "Jeon discloses that movement ceases when the robot cleaner is close to the charging unit, but not when any connection to a charging terminal of the charging unit has been made." *Id.* We agree with Patent Owner and find that Jeon does not teach or suggest this limitation.

Petitioner, however, also relies on a combination with Abramson for "disclos[ing] stopping forward movement in response to detecting contact

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[29] Petitioner cites to paragraph 94 of the Likhachev Declaration in support of this argument. Pet. 23–24 (citing Ex. 1012 ¶ 94). We have considered this testimony, but it is substantially the same as the argument in the Petition with the addition of "in my opinion." *See* Ex. 1012 ¶ 94. We find this testimony to be conclusory with inadequate supporting evidence. This testimony is entitled to little or no weight. 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

[30] Petitioner cites, without explanation, only two paragraphs in Abramson in support of its statement that "such techniques were well known." Pet. 23 (citing Ex. 1006 ¶¶ 66, 74).

[31] "To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil*, 829 F.3d at 1380.

with the charging terminals on the base station." Pet. 24 (citing Ex. 1012 ¶¶ 95–97). Petitioner refers to the detailed description of Figure 12, reproduced below, of Abramson. *Id.*

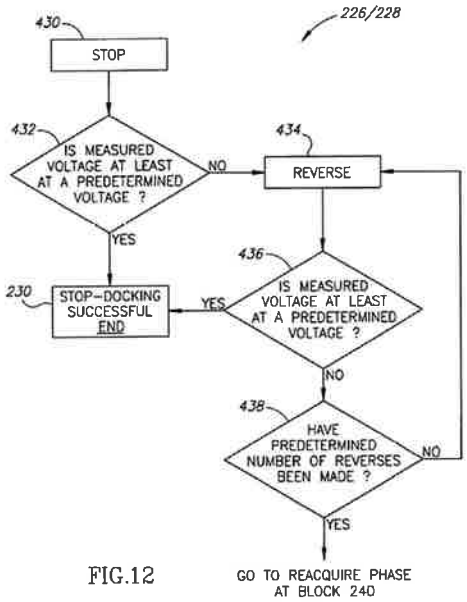

FIG.12

Figure 12 is "a flow diagram detailing the end game or final docking phase" of an autonomous robot. Ex. 1006 ¶ 22. The detailed description of Figure 12 provides:

> [O]nce a contact, between docking contacts 110 of the docking station 100 and docking contacts 68 of the apparatus 20, is detected by the control system 40 (through voltage sensors 69 in the power system 52) of the apparatus 20 (at block 224, and equivalent blocks 404 and 410), the apparatus 20 stops, at block 430. This stop is for a period of approximately 2 seconds . . . With the stop or rest period expired, the voltage on the docking contacts 68 of the apparatus 20 is measured, at block 432.
>
> If a rise in the voltage is present, such as a rise in voltage to at least a predetermined voltage level, for example, approximately 20 volts, as sensed by the voltage sensors 69 electrically coupled to the docking contacts 68 (as detailed above), a docking contact (between the docking contacts 68 of the apparatus 20 and the docking contacts 110 of the docking station 100) is present, and the process moves to block 230 ["STOP—DOCKING SUCCESSFUL END"]. With an

> established docking contact (for example, at or above the predetermined level, here, 20 or more volts), the process is complete, as the apparatus 20 is charging.

Id. ¶¶ 74–75. Based on these teachings, we find that Abramson teaches this element.

Patent Owner argues that Abramson fails to teach this limitation, because as part of an "alignment phase," Abramson teaches performing "***a short reverse movement***, typically moving about 6 cm." Resp. 40 (citing Ex. 1006, ¶¶ 68–69, Figure 10). We have considered Patent Owner's argument and find it unavailing. Patent Owner is correct to the extent that Abramson includes various procedures including the "alignment phase" (see Ex. 1006 ¶¶ 67–69) and a "wiggle sequence" (*id.* ¶¶ 70–71 (with reverse movements of "approximately 1 cm or less"))[32] for ensuring that the robot docks properly in order that it may recharge. However, the small reverse movements described in these passages do not detract from the teachings in Abramson that the movement of the robot is generally forward movement towards the docking station. *See id.* at Figs. 7, 9, 11, 13. The process relied on by Petitioner is the "end game or final docking phase" described in Abramson, in which it is determined that the docking process is considered complete, and all movement of the robot is stopped in response to detecting contact with the charging terminals on the base station. *See id.* ¶¶ 22, 73–77, Figure 12 (reproduced above).[33]

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[32] Claims 43 and 52 of Abramson recite, "wherein moving the robot ***toward*** the docking station includes: the robot performing at least one wiggle movement ***toward*** the docking station." Ex. 1006, claims 43, 52 (emphasis added); *see also id.* at claims 13, 31.

[33] We recognize that the "end game or final docking phase" described in Abramson can also include a short reverse movement of about 1 cm. *See*

With regard to combining the relevant teachings of Jeon, Everett, and Abramson, the Petition states:

> A skilled artisan would have been motivated to combine Abramson's teaching of stopping forward movement of the robot upon detecting contact with [ ]Jeon. Likhachev, ¶ 98. Doing so would help prevent collision of [ ]Jeon's robot with the base station, and confirm the robot's battery is electrically connected to [ ]Jeon's charging unit, ensuring uninterrupted flow of charging current to the robot's battery. *Id.* The combination of Abramson's teaching with [ ]Jeon would be nothing more than substitution of one element (stopping based on an ultrasonic sensor) with another (stopping in response to detecting electrical contact) to produce a predictable result (ensuring charge current can flow to the robot battery). *Id.*; *KSR,* 550 U.S. at 416-418. Because [ ]Jeon/Everett discloses detecting contact of [ ]Jeon's robot with the base station, a skilled artisan would have been able to implement Abramson's teaching of stopping forward movement upon detecting such contact without undue burden or dramatic alteration to the design and purpose of [ ]Jeon's robot. Likhachev, ¶ 99.

Pet. 24–25. We find that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon, Everett, and Abramson.

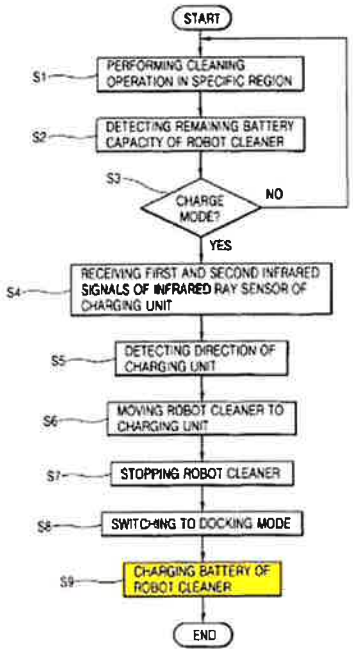
We find that Petitioner has not established that the Jeon-Everett combination teaches or suggests this limitation. However, we find that the Jeon-Everett-Abramson combination teaches this limitation and that a motivation to combine the relevant teachings existed.

charging a battery of the robotic cleaning device.

Petitioner relies on Jeon as teaching all the elements of this limitation. Pet. 25–26 (citing Ex. 1012 ¶¶ 101–102). In support, the Petition includes an annotated Figure 4, reproduced below.

Ex. 1006 ¶ 76 ("This reverse movement, at block 434 [of Figure 12], is, for example, a short movement, of approximately 1 cm.").

FIG. 4



Id. at 26. Annotated Figure 4 depicts, "a flow chart of an automatic charging method of a robot cleaner." Ex. 1003 ¶ 38. Petitioner also cites this sentence in Jeon: "[t]he docking mode in this connection is a mode for connecting the power terminal of the robot cleaner and the charge terminal of the charging unit 402 in order to charge the battery 301 of the robot cleaner." Pet. 25 (citing Ex. 1003 ¶ 70). We find that Jeon teaches charging a battery of a robotic cleaning device.

Patent Owner does not dispute that Jeon teaches this limitation. *See generally* Resp.

We find that the cited art teaches this limitation.

Summary as to Claim 1

Considering all the arguments and evidence relating to claim 1, including objective evidence of nonobviousness, we conclude that a preponderance of the evidence establishes that claim 1 of the '423 patent would have been obvious in view of the combined teachings of Jeon,

Everett, and Abramson, but Petitioner has not shown that claim 1 would have been obvious in view of the combined teachings of Jeon and Everett.

2. Claims 2–4, 6–8, 10, and 12

Petitioner also contends that claims 2–4, 6–10, and 12 which depend from claim 1 would have been obvious in view of the Jeon-Everett combination and in view of the Jeon-Everett-Abramson combination. *See* Pet. 5, 26–46. In support of these contentions, Petitioner provides a detailed showing that each of the elements of the additional limitations recited in these dependent claims is taught by the cited art. *See id.* at 26–46. Except for claim 9, which Patent Owner discusses separately (*see* Resp. 27–35), Patent Owner does not separately argue these claims (*see id.* at 35–42). We consider dependent claim 9 separately below. *See* Section II.H. *infra*. For the remainder of these claims, the undisputed showing in the Petition as to the additional limitations recited in these claims supports findings that all the elements of these claims are taught or suggested by the cited art and that a skilled artisan would have been motivated to combine them in the manner recited in these claims. We, therefore, accept and adopt Petitioner's showing as to claims 2–4, 6–8, 10, and 12.

With regard to claims 2–4, 6–8, 10, and 12, we conclude that Petitioner has failed to establish that these claims would have been obvious in view of Jeon and Everett for the reasons discussed above with regard to independent claim 1 from which these claims depend. *See* Section II.G.1. *supra* (Petitioner failed to establish that all the limitations of claim 1 were taught or suggested by the combination of Jeon and Everett); *see also* Resp. 50 ("And because claims 2-4, 6-10, and 12 depend from claim 1, they necessarily include all limitations of claim 1."). With regard to claims 2–4, 6–8, 10, and 12 and the Jeon-Everett-Abramson combination, we conclude

that these claims are unpatentable as obvious.

H. Asserted Obviousness of Claim 9

Petitioner contends that dependent claim 9 of the '423 patent would have been obvious in view of the following four combination of references: (1) Jeon-Everett; (2) Jeon-Everett-Abramson; (3) Jeon-Everett-Jones; and (4) Jeon-Everett-Abramson-Jones. *See* Pet. 5. Patent Owner argues that all of Petitioner's challenges to claim 9 fail. *See* Resp. 27–35. For the reasons discussed below, we conclude that claim 9 is not unpatentable as obvious.

Claim 9 depends from claim 1 and recites:

> *9. The method of claim 1, further comprising avoiding, by the robotic cleaning device, the right signal and the left signal while an energy level of the battery of the robotic cleaning device remains above a predetermined energy level.*

Ex. 1001, 20:20–24.

With regard to the asserted combinations of references that do not include Abramson (Jeon-Everett and Jeon-Everett-Jones), we conclude that claim 9 has not been shown unpatentable, because the combination of Jeon-Everett does not teach or suggest all the limitations of claim 1 from which claim 9 depends for the reasons discussed above with regard to claim 1. *See* Section II.G.1. *supra.*

With regard to the Jeon-Everett-Abramson combination (and the Jeon-Everett combination), Petitioner argues that because Jeon's infrared receiving units do not attempt to detect the infrared signals from the base station, the robot is "avoiding" the signals as recited in claim 9. *See* Pet. 42–43. Petitioner argues, "[a] skilled artisan would recognize that [infrared ray] receiving units [of the robotic cleaning device] ***do not attempt to detect (i.e. avoid)*** infrared signals transmitted by [ ]Jeon's base station when [ ]Jeon's

robot is not in charge mode." *Id.* at 42 (citing Ex. 1012 ¶¶ 143–144) (emphasis added). In response, Patent Owner argues that "[c]onsistent with the description in the '423 patent specification, the plain meaning of 'avoid' is to 'keep away from.'" Resp. 28. Although neither party proposed that we should explicitly construe "avoiding" or any other part of the additional limitation in claim 9, we conclude that the plain and ordinary meaning of "avoiding" in the context of the Specification of the '423 patent requires more than not attempting to detect the signals. In the Specification of the '423 patent, when "avoidance" is discussed, it refers to the robot moving away from the base station or altering its course to avoid the base station. *See* Ex. 1001, 2:55–57, 3:65–4:1, 6:17–22, 11:62–12:21. The description of "avoidance" in the Specification comports with the ordinary and customary meaning. We find that the Jeon-Everett-Abramson combination (and the Jeon-Everett combination) does not teach or suggest the limitation recited in dependent claim 9.

With regard to the Jeon-Everett-Abramson-Jones combination, Petitioner relies on the disclosure of an "Avoid" behavior in Jones. *See* Pet. 47–49. However, this "Avoid" behavior is based on detecting reflections of IR signals from the robot off of obstacles and not right and left signals from emitters on the base station. Ex. 1007, 169. The Petition states:

> Jones discloses that "using [the robot's] infrared (IR) detector, its robot's 'Avoid' behavior determines if any obstacles are in the robot's path." *Id.*, 314. Avoid "check[s] to see if the IR detectors have sensed a reflection from the obstacle." *Id.*, 316. If so, Avoid "arbitrarily decides to turn left" or right and "computes a motion command only during the time the IR sensors detect a reflection." *Id.*

Pet. 47 (alterations in original). Petitioner argues that implementing Jones' teachings regarding its "Avoid" behavior into the method disclosed in Jeon would achieve a predictable result and would "conserve energy, save time, and avoid accidental collisions with the base station." *Id.* at 48–49. In response, Patent Owner argues, "nothing in Jones suggests triggering an avoid behavior in response to an infrared ray emitted from any obstacle, much less a charging base station" and "Petitioner cites no disclosure in Jones or any prior art reference that describes a robot detecting and avoiding an infrared signal emitted by a charging base station." Resp. 31. We agree with Patent Owner. We find that Jones does not teach or suggest this limitation. And, we find Petitioner's argument for incorporating Jones' "Avoid" behavior into Jeon to be too general and conclusory and the combination would still not include all the elements recited in claim 9, such as, avoiding signals emitted from the base station.

We, therefore, conclude that claim 9 has not been shown to be unpatentable.

I. Asserted Obviousness of Claims 13–15, 18–23, 25, and 26 in View of Kim and Everett

Petitioner contends that claims 13–15, 18–23, 25, and 26 would have been obvious in view of a combination of the teachings of Kim and Everett. Pet. 5, 49–80. Patent Owner argues that "a POSITA would not have been motivated to combine Kim and Everett to control movement of the 'cleaning robot' toward the base station 'at a second velocity less than the first velocity,'" but does not otherwise dispute Petitioner's showing as to these claims. *See* Resp. 42 (capitalization in quoted heading omitted). As motivation to combine is the only disputed issue as to the challenge to these claims, we take up that issue first.

In the Kim-Everett combination, Petitioner relies on Kim for teaching all the elements of the challenged claims, except for the "second velocity" as recited in claims 13, 20, 21, 25, and 26. *See* Pet. 49–80. For disclosing the "second velocity" as recited, Petitioner relies on Everett. *See id.* at 63, 76.[34] With regard to combining the relevant teachings of Kim and Everett, Petitioner first generally argues that a skilled artisan would have found it obvious to do so because of their similarities. *Id.* at 52. The Petition states, "[e]ach discloses a mobile robot that detects signals from its base station, and autonomously returns to, docks with, and recharges its battery." *Id.* With specific regard to combining the teachings of Everett as related to the "second velocity" as recited, the Petition states, "[a] skilled artisan would have been motivated to reduce base station approach velocity as taught by Everett in [ ]Kim's robot to achieve a predictable, desired result (avoiding collision and/or increased robot maneuverability for accurate alignment with the base station)." *Id.* at 63.

Patent Owner argues that Kim and Everett have significant differences in size, weight, configuration, and operation. *See* Resp. 42–47. Petitioner

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[34] In its limitation-by-limitation mapping of the cited art for the Kim–Everett combination to claims 13–15, 18–23, 25, and 26 (Resp. 53–80), Petitioner specifically relies on, and cites to, Everett only with regard to claims that explicitly recite a "second velocity" (*see id.* at 63 (discussing claim 13), 76 (discussing claim 20)) and only with regard to limitations that explicitly recite a "second velocity" (*see id.*). For the remaining claims and limitations that explicitly recite a "second velocity," Petitioner relies on its showing as to claims 13 and 20. *See id.* at 77 (relying on the showing for claim 13 for claim 21), 78 (relying on its showing for claim 20 for claim 26), 79 (relying on its showing for claim 13 for claim 25). Thus, Petitioner contends that Kim alone teaches the majority of the limitations of claims 13–15, 18–23, 25, and 26 and Petitioner relies on Everett only for its teachings as to a "second velocity."

counters that Patent Owner's evidence of differences, particularly with regard to size and weight, is not supported, speculative, and incorrect. *See* Reply 18. Petitioner points out that Kim "is silent on the size/weight of its robot." *Id.* And, Petitioner argues, "[r]egardless of size or weight, a POSITA would have found it obvious to reduce the approach velocity of [ ]Kim's robot in view of Everett," because "[a] POSITA would have recognized that reducing velocity would reduce the momentum of [ ]Kim's robot, making it easier to stop the robot upon alignment with the magnets and charging contacts on [ ]Kim's base station." *Id.* at 19. Petitioner's reasoning is sound. Moreover, as Petitioner points out, Patent Owner's argument is a legally insufficient bodily incorporation argument. *Id.* at 18 (citing *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016)).

Patent Owner also argues that "Petitioner fails to show that there would have been any motivation to modify Kim as Kim already provides a mechanism for avoiding collision and accurately aligning the charging prong of the robot with the base statin: a magnet." Resp. 47 (citing Ex. 1009, 8:63–9:6, Figs. 11a, 11b). Petitioner counters that "[a]lthough [ ]Kim provides magnets for alignment, a POSITA would understand that these magnets would not prevent misalignment of a robot, traveling at a higher velocity, with its charging station." Reply 20 (citing Ex. 1012 ¶ 73). We find that the system disclosed in Kim would benefit from the robot approaching the base station to recharge at a lesser velocity than its cleaning velocity. We find that, as contended by Petitioner, a skilled artisan would have been motivated to combine Kim and Everett to control movement of the "cleaning robot" toward the base station "at a second velocity less than

the first velocity" as recited in claims 13, 20, 21, 25, and 26 of the '423 patent.[35]

Having considered the arguments of the parties relating to motivation to combine Kim and Everett and weighed the cited evidence, including objective evidence of nonobviousness, we find that a skilled artisan would have been motivated to combine the teachings of Everett relating to "a second velocity less than a first velocity" as recited in claims 13–15, 18–23, 25, and 26 with the relevant teachings of Kim. A preponderance of the evidence on this issue supports this finding and favors Petitioner's position on this issue.

The Petition provides a detailed limitation-by-limitation mapping of claims 13–15, 18–23, 25, and 26 to explicit teachings in Kim and Everett. *See* Pet. 80. The Petition provides a well-supported showing that each of the limitations of claims 13–15, 18–23, 25, and 26 is taught in the Kim-Everett combination. *See id.* This showing is not disputed by Patent Owner. We,

[35] We also find a skilled artisan would recognize the advantages of reducing the velocity of a moving device as it approaches a stationary structure to facilitate accurate alignment of the moving device with the stationary structure and to avoid or soften collisions between the two. *See KSR*, 550 U.S. 418 ("As our precedents make clear, however, the 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."). In this regard, the Petition states, "[a]lthough [ ]Kim does not explicitly disclose the speed at which its robot travels toward charging means 30, a skilled artisan would have found it obvious that [ ]Kim's robot would approach the charging means as a second velocity lower that the robot's cleaning velocity (the first velocity). Pet. 63 (citing Ex. 1012 ¶ 84); *see also id.* at 17–19 (asserting obviousness of a "second velocity" in the context of Jeon and claim 1).

having reviewed the entire record, accept and adopt Petitioner's showing as to claims 13–15, 18–23, 25, and 26. In reliance on this evidence and the motivation to combine evidence relating to the Kim-Everett combination, we conclude that claims 13–15, 18–23, 25, and 26 would have been obvious in view of Kim and Everett.

III. CONCLUSION[36]

For these reasons, we conclude that Petitioner has met its burden of showing, by a preponderance of evidence, that claims 1–4, 6–8, 10, 12–15, 18–23, 25, and 26 of the '423 patent are unpatentable. Claims 1–4, 6–10, and 12 would have been obvious in view of Jeon, Everett, and Abramson. Claims 13–15, 18–23, 25, and 26 would have been obvious in view of Kim and Everett.

We conclude that Petitioner has not met its burden of showing that claim 9 of the '423 patent is unpatentable. Petitioner has not established that the cited art teaches or suggests all the limitations of claim 9.

IV. MOTIONS FOR PROTECTIVE ORDER AND TO SEAL

Patent Owner's Motion to Enter Protective Order is pending. Paper 23. Patent Owner seeks entry of a Protective Order in the form agreed upon by the parties and submitted as Exhibit 2099. *Id.* at 2. The proposed "Protective Order is based on the Default Protective Order provided in

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[36] 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 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).

Appendix B of the Trial Practice Guide . . . with modifications agreed upon by the parties." *Id.*; (*see also* Consolidated Trial Practice Guide[37] at 107–122 (App. B, Protective Order Guidelines and Default Protective Order)). Patent Owner "also file[d], as Exhibit 2100, a redlined version of the Protective Order highlighting the differences between the Default Protective Order and the modified Protective Order." *Id.* The agreed-to modifications to the Board's Default Protective Order delete provisions providing access to information designated confidential to the parties, in-house counsel, and other employees of a party. *See* Exhibit 2100, 2–3. As the agreed-to modifications do not diminish the access of the Board or the public to information, we deem them acceptable and enter a Protective Order in the form of Exhibit 2099.

There are seven motions to seal pending, Papers 22, 45, 52, 60, 65, 67, 68.[38] Paper 22, filed by Patent Owner, relates to the Response and Exhibits 2010–2030, 2033–2058, and 2063–2067. In this motion to seal, Patent Owner argues good cause exists for sealing the redacted portions of the Response and these exhibits in order to protect "confidential engineering or design information that is unknown to the public and/or . . . designated as confidential under the protective order governing the ITC Investigation." *See* Paper 22, 2. Patent Owner contends:

> The public would have full access to the nature of the information and the conclusions reached using the information as part of [Patent Owner]'s expert testimony and Patent

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[37] *Available at* https://www.uspto.gov/TrialPracticeGuideConsolidated.

[38] The portions of the Response (Paper 25), Reply (Paper 46), and Sur-reply (Paper 51) requested to be sealed can be identified from the redacted version of the Response filed as Paper 24. Reply filed as Paper 47, and the Sur-reply filed as Paper 53.

> Owner's Response, which remains unsealed, but redacted where appropriate. Such access should adequately fulfill the needs of the public to maintain a complete and understandable file history, while still protecting confidential and proprietary information.

Id. Papers 52, 65, and 68 (all filed by Patent Owner) relate to additional filings by Patent Owner and contain similar contentions relating to why good cause for sealing the filings exists. Based on the representations in these motions to seal, Patent Owner has shown good cause for sealing and we grant its motions to seal (Papers 22, 52, 65, 68).

Paper 45, filed by Petitioner, relates to the Petitioner's Reply and Exhibits 1043, 1044, 1047–1053, and 1056. Petitioner argues good cause exists for sealing, because:

> Petitioner's Reply and the exhibits sought to be sealed contain non-public details of Petitioner's and Patent Owner's businesses, including internal information on research and development, sales, marketing, and customer relations. Good cause exists to seal and keep this information confidential because it could impact Petitioner's and Patent Owner's market position if made public.

Paper 45, 4. Papers 60 and 67 (both filed by Petitioner) relate to additional filings by Petitioner and contain similar contentions relating to why good cause for sealing the filings exists. Based on the representations in these motions to seal, Petitioner has shown good cause for sealing and we grant its motions to seal (Papers 45, 60, 67).

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, based on a preponderance of the evidence, claims 1–4, 6–8, 10, 12–15, 18–23, 25, and 26 of U.S. Patent 9,884,423 B2 have been shown to be unpatentable;

FURTHER ORDERED that claim 9 of U.S. Patent 9,884,423 B2 has not been shown to be unpatentable;

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

FURTHER ORDERED that a protective order in the form of Exhibit 2099 is entered; the motions to seal (Papers 22, 45, 52, 60, 65, 67, 68) are granted; and the portions of the record requested to be sealed are sealed until further order.

In summary:

Claims	**35 U.S.C. §**	**Reference(s)/Basis**	**Claims Shown Unpatentable**	**Claims Not shown Unpatentable**
1–4, 6–10, 12	103	Jeon, Everett		1–4, 6–10, 12
1–4, 6–10, 12	103	Jeon, Everett, Abramson	1–4, 6–8, 10, 12	9
9	103	Jeon, Everett, Jones		9
9	103	Jeon, Everett, Abramson, Jones		9
13–15, 18–23, 25, 26	103	Kim, Everett	13–15, 18–23, 25, 26	
Overall Outcome			1–4, 6–8, 10, 12–15, 18–23, 25, 26	9

FOR PETITIONER:

FOR PATENT OWNER: