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Paper 13
Date: November 17, 2021

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 TERRENCE W. McMILLIN, AMANDA F. WIEKER, and JASON W. MELVIN, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

DECISION
Granting Petitioner's Request on Rehearing
37 C.F.R. § 42.71(d)
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company ("Petitioner")[1] 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."). iRobot Corporation ("Patent Owner")[2] filed a Preliminary Response. Paper 6 ("Preliminary Response" or "Prelim. Resp."). The Preliminary Response addressed only the issue of discretion under 35 U.S.C. § 314(a). After considering the Petition, the Preliminary Response, and the evidence of record, we exercised our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review. Paper 7 ("Decision Denying Institution" or "DDI").

Petitioner filed a timely Request for Rehearing of Institution Decision. Paper 8 ("Request for Rehearing" or "Request"). As authorized by the Board, Patent Owner filed a Response to Petitioner's Request for Rehearing of Institution Decision in which Patent Owner opposes the Request for Rehearing. Paper 11 ("Response").

In its Request for Rehearing, Petitioner argues, "the [Board] panel should rehear and institute this proceeding." Request 1. We have considered the arguments set forth in the Request for Rehearing and the Response. Petitioner has persuaded us that our Decision Denying Institution should be changed. Accordingly, for the reasons stated below, we grant the

[1] Petitioner identifies SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company as the real parties-in-interest. Pet. 80.
[2] Patent Owner identifies iRobot Corporation as the real party-in-interest. Paper 4, 2.

Request for Rehearing and we determine that the information presented in the Petition shows that "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). Thus, we institute an *inter partes* review as to all of the challenged claims of the '423 patent on the grounds of unpatentability presented in the Petition.

A. Related Proceedings

The parties identify the following related proceedings:

In the Matter of Certain Robotic Floor Cleaning Devices and Components Thereof, Inv. No. 337-TA-1252[3] (US International Trade Commission) (the "ITC investigation"); and

iRobot Corp. v. SharkNinja Operating LLC, Case No. 1:21-cv-10155 (Mass.) (the "District Court litigation"). Pet. 80; Paper 4, 2.

B. 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.

[3] 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.

The '423 patent describes "an autonomous system including a base station, that includes charging terminals for contacting external terminals of 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.

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 and reproduced below, shows an isometric view of a base station and robotic device.

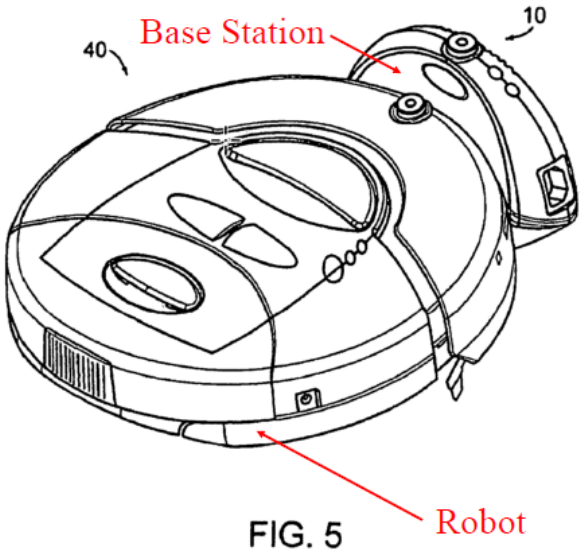


FIG. 5

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

C. 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.

D. 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[4]	Jeon[5], Everett[6]
1–4, 6–10, 12	103	Jeon, Everett, Abramson[7]
9	103	Jeon, Everett, Jones[8]
9	103	Jeon, Everett, Abramson, Jones
13–15, 18–23, 25, 26	103	Kim[9], Everett

Petitioner supports its showing of unpatentability of the challenged claims with the Declaration of Maxim Likhachev, Ph.D. (Ex. 1012, "Likhachev Decl."). Patent Owner has not submitted a declaration or other testimonial evidence of an expert. *See generally* Prelim. Resp. As such, the testimony of Dr. Likhachev is unrebutted by any contrary testimony.

[4] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. Because the challenged patent claims priority to applications filed before March 16, 2013, we refer to the pre-AIA version of § 103. Our opinions on the present record would not change if the AIA versions of § 103 were to apply.

[5] US 2004/0178767 A1, published Sept. 16, 2004 (Ex. 1003). Petitioner contends that this reference is prior art under 35 U.S.C. § 102(e). Pet. 8.

[6] H. R. Everett, "Sensors for Mobile Robots: Theory and Application," ISBN 1-56881-048-2, 1995 (Ex. 1004). Petitioner contends that this reference is prior art under 35 U.S.C. § 102(b). Pet. 10.

[7] US 2005/0010330 A1, published Jan. 13, 2005 (Ex. 1006). Petitioner contends that this reference is prior art under 35 U.S.C. § 102(e). Pet. 11.

[8] Joseph L. Jones, et al., "Mobile Robots: Inspiration to Implementation," ISBN 1-56881-097-0, 1998 (Ex. 1007). Petitioner contends that this reference is prior art under 35 U.S.C. § 102(b). Pet. 46.

[9] US 5,440,216, issued Aug. 8, 1995 (Ex. 1009). Petitioner contends that this reference is prior art under 35 U.S.C. § 102(b). Pet. 49.

II. ANALYSIS

A. Request for Rehearing[10]

1. Standard of Review for Request for Rehearing

A request for rehearing must identify specifically all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, or a reply. 37 C.F.R. § 42.71(d). Petitioner, as the party challenging the Decision Denying Institution, has the burden of showing that the Decision Denying Institution should be modified. *Id*. When rehearing a decision on a petition, the Board reviews the decision for an abuse of discretion. *Id*. § 42.71(c). "An abuse of discretion occurs if the decision (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact findings; or (4) involves a record that contains no evidence on which the Board could rationally base its decision." *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 442 (Fed. Cir. 2015). Patent Owner argues that "Petitioner identifies no such abuse of discretion, misapprehension, or overlooked issues of fact or law in the Board's decision denying institution of *inter partes* review." Response 1.

2. Petitioner's Argument That the Board Misapprehended the Application of Fintiv Factor 2

Fintiv[11] factor 2 is "proximity of the court's trial date to the Board's projected statutory deadline for a final written decision." *Fintiv,* IPR2020-

[10] Familiarity with the Decision Denying Institution (Paper 7) is assumed. We do not repeat information found in the Decision Denying Institution except as necessary to our decision here.
[11] *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*").

00019, Paper 11, 6. When considering *Fintiv* factor 2 in the Decision Denying Institution, in light of the parallel ITC investigation, we determined that "this factor weighs in favor of exercising our discretion to deny institution." DDI 9. Petitioner argues the Board "misapprehended the application of *Fintiv* Factor 2 by basing its analysis on the ITC initial determination date rather than the ITC target date." Request 1. Specifically, Petitioner contends, "[b]y mistakenly treating the initial determination date of April 29[, 2022,] as the 'final determination,' D.I. 9, and overlooking the ITC's target date of August 29[, 2022], Ex. 2004 at 5, the D.I. misapprehended Factor 2 and incorrectly weighed the *Fintiv* factors. D.I. 8-9." *Id.* at 3.

In its Response to the Request for Rehearing, Patent Owner argues that the Board's analysis of *Fintiv* factor 2 was correct and consistent with *Fintiv* because it compared the deadline for the Board's final written decision with the trial date set in the ITC investigation. Response 1 ("The Board's approach is consistent with the explicit language of *Fintiv* . . . requiring a comparison between the Board's 'projected statutory deadline' and the '***trial date***' in the parallel proceeding."). Patent Owner contends, "even if considering the ITC's target date as well as its trial date is appropriate in some instances, the Board did not abuse its discretion in following *Fintiv*'s instruction to compare its projected statutory deadline to the '***ITC trial date***.'" *Id.* at 2 (citing *Fintiv* at 8–9). And, Patent Owner observes that now, "even if post-trial proceedings at the ITC are also considered, the ITC's August 29, 2022 target date would still be 'earlier than the projected statutory deadline'" and thus, based on the current circumstances, *Fintiv* factor 2 favors denying institution. *Id.* at 2–3.

The mistake Petitioner refers to is that the Decision Denying Institution stated, "[t]he evidentiary hearing in the ITC investigation is scheduled to begin January 5, 2022, and ***the final determination is due April 29, 2022***." DDI 9 (citing Ex. 2004, 5; emphasis added). Petitioner is correct that the statement did not correctly state the target date for the ITC's final determination. According to the Adopted Procedural Schedule for the ITC Investigation, the "Final ID" is due April 29, 2022, and the "Target Date" is August 29, 2022. Ex. 2004, 5. We agree that the ITC's target date for final determination is more appropriate for evaluating *Fintiv* factor 2, consistent with the Board's prior decisions. *See* Request 2–3 (identifying numerous proceedings).

Applying the August 29, 2022, date, we conclude that *Fintiv* factor 2 is neutral in this proceeding, because of the close proximity between the ITC's target final determination and our expected final written decision based on the mailing date of this Decision.

3. Petitioner's Argument That Its Updated Stipulation Makes Rehearing and Institution of Trial Appropriate

Petitioner argues, "[r]ehearing and institution would also be appropriate under *Sotera*[12] and *Sand Revolution*,[13] allowing the Board to consider Petitioners' update to its initial stipulation that was made before the ITC case had even begun." Request 1. Petitioner contends that, "[b]y stipulating to accept full IPR estoppel upon institution, Petitioners remove any 'concerns of duplicative efforts between the [ITC and] district court and

[12] *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A).
[13] *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 (PTAB June 16, 2020) (informative).

the Board, as well as concerns of potentially conflicting litigation.'" *Id.* at 6 (quoting *Sotera*, IPR2020-01019, Paper 12, 19) (second alteration in original).

Because Petitioner's broader stipulation accepting full estoppel was not filed until after the Decision Denying Institution was issued, Patent Owner argues that it is improper for Petitioner to supplement its Petition or present new arguments or evidence in a request for rehearing. Response 3. And, Patent Owner argues, "the Board cannot overlook or misapprehend information not presented to it before its decision." *Id.* Patent Owner contends that *Sotera* and *Sand Revolution* "involved unique circumstances absent here" and "do not stand for a general rule that Petitioners are free to delay filing broad stipulations until after the Board has denied institution." *Id.* at 3–4.

Finitv factor 4 is "overlap between issues raised in the petition and in the parallel proceeding." *Fintiv*, IPR2020-000019, Paper 11, 6. In the Decision Denying Institution, the Board considered the stipulation identified in the Petition (Pet. 4–5) that "if this IPR is instituted, [Petitioner] will not pursue the grounds presented in this Petition in the ITC or district court." DDI 11–12. With specific regard to the stipulation in the Petition, the Decision Denying Institution said:

> Petitioner's stipulation "mitigates to some degree the concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions." *See Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 11–12 (PTAB June 16, 2020) (informative). We note, however, that a broader stipulation than that provided by Petitioner "might better address concerns regarding duplicative efforts and potentially

> conflicting decisions in a much more substantial way." *Id.* at 12 n.5.

Id. at 12. After considering the Petitioner's stipulation in light of the informative decision in *Sand Revolution* and the other evidence of record at the time, the Board determined "[t]here is overlap between issues raised in the Petition and the ITC investigation" (*id.* at 11) and *Fintiv* factor 4 "weighs marginally in favor of not exercising discretion to deny institution" (*id.* at 12).

As noted above, after the Decision Denying Institution was entered, Petitioner broadened its stipulation to match the stipulation that the Board's informative decision in *Sand Revolution* suggested "might better address concerns regarding duplicative efforts and potentially conflicting decisions in a much more substantial way." *Sand Revolution*, IPR2019-01393, Paper 24, 12 n.5. Specifically, Petitioner's counsel stated in an email to Patent Owner's counsel that, "if the IPR petition is instituted they will not assert grounds that were raised or reasonably could have been raised in the IPR against the '423 patent in the parallel ITC and district court proceedings." Ex. 1024. We grant rehearing based on Petitioner's persuasive showing of error in our determination with respect to the ITC's final determination date, and we acknowledge Petitioner's broad stipulation consistent with that asserted in related IPR2021-00545.

Based on Petitioner's broadened stipulation, there will not be duplication of substantive arguments between this proceeding and the ITC investigation (or the District Court litigation). Petitioner's stipulation (regardless of its timing) promotes efficiency by eliminating duplication between proceedings, and thus promotes one of the Board's primary

interests in determining whether to discretionarily deny institution. *See Fintiv*, IPR2020-000019, Paper 11, 5–6. Petitioner's stipulation "mitigates any concerns of duplicative efforts" between this proceeding and others, along with "concerns of potentially conflicting decisions." *Sotera Wireless*, IPR2020-01019, Paper 12, 15. Having considered Petitioner's broadened stipulation, we determine that *Fintiv* factor 4 weighs strongly in favor of not exercising our discretion to deny institution.

4. Holistic Assessment of Fintiv Factors and Conclusion

Fintiv provides that we take "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Fintiv*, IPR2020-000019, Paper 11, 6. We determine that our mistake with regard to the final determination date of the ITC proceeding justifies rehearing and reconsideration of our decision denying institution. And, based on both the correct date and Petitioner's broadened stipulation, we determine that it is not appropriate to exercise our discretion to deny institution based on the parallel proceedings involving the '423 patent. We, therefore, consider the merits of the Petition.

B. Legal Standards

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 non-obviousness. *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")). Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

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 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).

We are also 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, e.g.*, *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed '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* Prelim. Resp. In this Decision, we give the claim terms their ordinary and customary meanings, without express construction.

D. 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 (Likhachev Decl.) ¶¶ 45–47). Patent Owner does not address the level of ordinary skill in the art. *See generally* Prelim. Resp.

Petitioner's undisputed proposal is consistent with the technology described in the Specification and the cited prior art. In order to determine whether Petitioner has demonstrated a reasonable likelihood of showing the

unpatentability of at least one of the challenged claims, we adopt Petitioner's proposed level of skill in the art.

E. Obviousness Analysis

We determine that Petitioner has shown a reasonable likelihood of establishing the obviousness of claim 1 in view of Jeon, Everett, and Abramson and, on that basis, institute *inter partes* review of all the challenged claims. *See* 37 C.F.R. § 42.108(a) ("When instituting *inter partes* review, the Board will authorize the review to proceed on all the challenged claims."). We begin our analysis with summaries of Jeon, Everett, and Abramson and then consider the arguments and evidence presented by Petitioner relating to claim 1.

1. Jeon

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.

2. Everett

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.[14] "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.

3. Abramson

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.

[14] 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.

Abramson discloses performing a "seek for the docking beam 120," during which the robot "operate[s] 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.

4. Claim 1

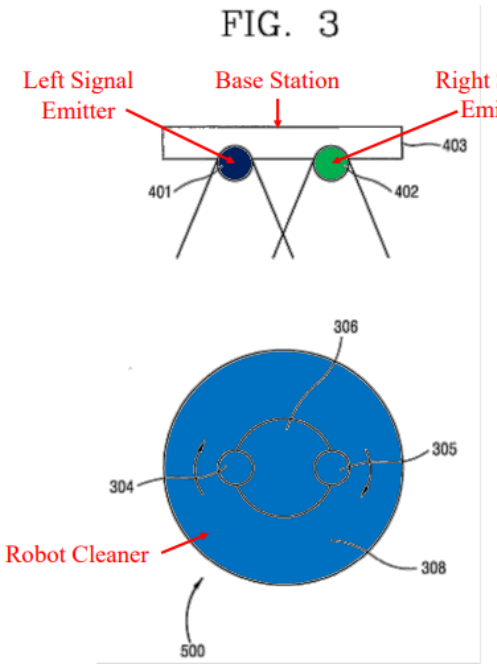
Petitioner presents a detailed analysis of the obviousness of claim 1 supported by citations to Jeon, Everett, and Abramson and the Declaration of Maxim Likhachev, Ph.D. (Ex. 1012 ("Likhachev Decl.")).[15] *See* Pet. 12–26. Our element-by-element consideration of whether Petitioner has shown a reasonable likelihood of establishing the obviousness of claim 1 in view of Jeon, Everett, and Abramson is provided below.

> *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 (Likhachev Decl.) ¶¶ 62–64). Petitioner relies on Jeon

[15] Patent Owner's Preliminary Response and other filings are limited to arguing that institution should be denied under 35 U.S.C. § 314(a). As such, at this stage, we do not have any arguments or evidence submitted by Patent Owner to consider as to the obviousness of claim 1 (or any other challenged claim).

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.



Id. at 13. 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.

Our preliminary, non-binding, determination[16] is that the preamble of claim 1 is not limiting because a complete invention is recited in the body of claim 1 and the preamble only states the purpose or intended use of the invention. *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997) ("[W]here a patentee . . . uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation."). However, on the current record, we also determine that, for purposes of institution, Petitioner has shown sufficiently 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 (Likhachev Decl.) ¶¶ 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

[16] Even where we do not explicitly indicate that our determinations at this stage are preliminary and non-binding, any determination, finding, or conclusion set forth within this document is preliminary and non-binding. At this stage, we have not heard from Patent Owner with regard to any issue other than discretionary denial and wish to have the record developed before making any non-preliminary and binding determination other than whether to institute trial.

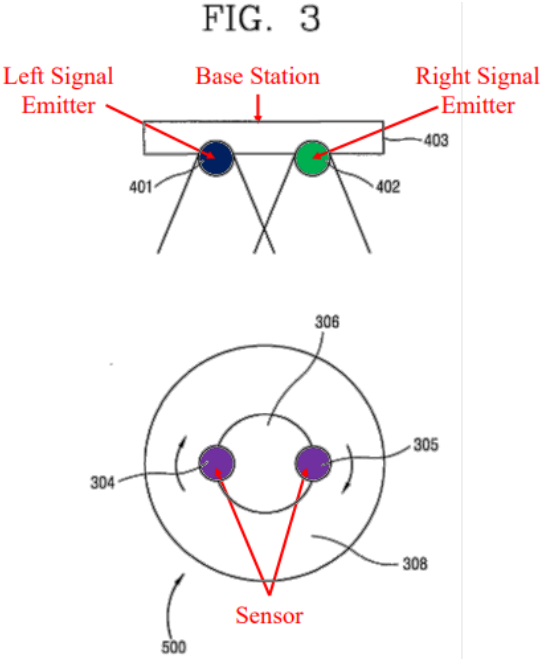
> robot during cleaning corresponds to the first velocity. Likhachev, ¶ 66-67.

Id. The cited passages in Jeon support these contentions.

We determine that, for purposes of institution, Petitioner has shown sufficiently 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 (Likhachev Decl.) ¶¶ 68–69). In support, the Petition includes an annotated Figure 3, reproduced below.



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.

We determine that, for purposes of institution, Petitioner has shown sufficiently that the cited art 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 (Likhachev Decl.) ¶¶ 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. On this record, we determine that Jeon teaches these elements of this limitation.

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. At least at this stage, we find Petitioner's arguments and evidence that 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) sufficient to support institution of trial.

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 that "teaches 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 (Likhachev Decl.) ¶¶ 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. Everett supports Petitioner's contention that the cited art teaches this limitation.

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. At least at this stage of the proceedings, we determine that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon and Everett.

We determine that, for purposes of institution, Petitioner has shown sufficiently 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 (Likhachev Decl.) ¶¶ 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, "[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 (Likhachev Decl.) ¶¶ 88–92). The Petition states, "Everett provides a solution 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 (Likhachev Decl.) ¶ 89). Everett states, "[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. At least at this stage of the proceedings, we determine that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon and Everett.

We determine that, for purposes of institution, Petitioner has shown sufficiently that the cited art teaches this limitation.

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

Petitioner relies on Abramson for "disclos[ing] stopping forward movement in response to detecting contact 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.*

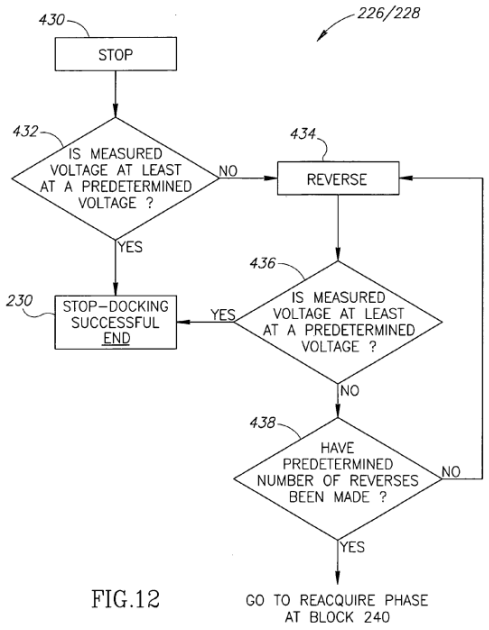


FIG.12

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. On this record, we determine that Abramson teaches this limitation.

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.

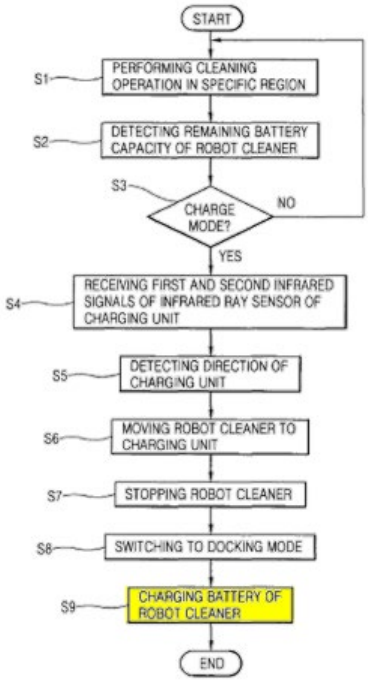
Pet. 23–25. At least at this stage of the proceeding, we determine that Petitioner provides sufficient rationale for combining the relied upon teachings of Jeon, Everett, and Abramson.

We determine that, for purposes of institution, Petitioner has shown sufficiently that the cited art teaches this limitation.

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 (Likhachev Decl.) ¶¶ 101–102). In support, the Petition includes an annotated Figure 4, reproduced below.

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). On this record, we determine that Jeon teaches charging a battery of a robotic cleaning device.

We determine that, for purposes of institution, Petitioner has shown sufficiently that the cited art teaches this limitation.

Summary as to Claim 1

Petitioner has shown a reasonable likelihood of showing that claim 1 of the '423 patent would have been obvious in view of the combined teachings of Jeon, Everett, and Abramson.

5. Claims 2–4, 6–10, 12–15, 18–23, 25, and 26

Petitioner also contends that claims 2–4, 6–10, 12–15, 18–23, 25, and 26 would have been obvious in view of a combination of the asserted references. *See* Pet. 26–80. As noted previously, Patent Owner does not address the merits of any portion of the Petitioner's obviousness showing. *See generally* Prelim. Resp. Thus, at this stage, Petitioner's obviousness showing as to claims 2–4, 6–10, 12–15, 18–23, 25, and 26 is undisputed.

We have determined that there is a reasonable likelihood that the Petitioner will prevail with respect to at least one of the claims challenged in the Petition pursuant to 35 U.S.C. § 314 and that *inter partes* review should be instituted. Accordingly, we institute as to all the challenged claims and all the challenges raised in the Petition. *SAS Institute Inc. v. Iancu*, 138 S.Ct. 1348, 1358 (2018); 37 C.F.R. §42.108 (a) ("When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.").

III. CONCLUSION

Petitioner has persuaded us that rehearing is appropriate and we grant the Request for Rehearing. After reconsidering our discretionary denial of the Petition, we determine that discretionary denial is inappropriate. And, we determine that Petitioner has demonstrated a reasonable likelihood of showing at least one of the claims challenged in the Petition would have been obvious.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Request for Rehearing is granted;

FURTHER ORDERED that an *inter partes* review is instituted on all challenged claims under all challenged grounds; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the ’423 patent is hereby instituted commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

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