

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.

IPR2020-00735
Patent 10,045,676 B2

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

MELVIN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting institution of *inter partes* review of claims 1, 2, 4–10, and 12–18 (“the challenged claims”) of U.S. Patent No. 10,045,676 B2 (Ex. 1001, “the ’676 patent”). iRobot Corporation (“Patent Owner”) filed a Preliminary Response. Paper 6. After our email authorization, Petitioner filed a Preliminary Reply (Paper 7) and Patent Owner filed a Preliminary Sur-Reply (Paper 9). We instituted review. Paper 11 (“Institution Decision” or “Inst.”).

Patent Owner filed a Response. Paper 20 (“PO Resp.”). Petitioner filed a Reply. Paper 22 (“Pet. Reply”). Patent Owner filed a Sur-Reply. Paper 26 (“PO Sur-Reply”). We held a hearing on July 12, 2021, and a transcript appears in the record. Paper 35 (“Tr.”).

This is a final written decision as to the patentability of the challenged claims. For the reasons discussed below, we determine Petitioner has shown by a preponderance of the evidence that claims 1, 2, 4–10, 12, and 14–18 are unpatentable, and has not shown by a preponderance of the evidence that claim 13 is unpatentable.

A. RELATED MATTERS

The parties identify the following matters related to the ’676 patent: *SharkNinja Operating LLC v. iRobot Corporation*, Civil Action No. 1:19-cv-01935 (D. Del.) (filed Oct. 11, 2019); *iRobot Corporation v. SharkNinja Operating LLC, et al.*, Civil Action No. 1:19-cv-12125 (D. Mass.) (filed Oct. 15, 2019); and *SharkNinja Operating LLC v. iRobot Corporation*, Civil Action No. 1:19-cv-12236 (D. Mass.) (filed Oct. 30, 2019). Pet. 80; Paper 4, 2.

B. THE '676 PATENT

The '676 patent is titled “Remote Control Scheduler and Method for Autonomous Robotic Device.” Ex. 1001, code (54). It relates to methods for scheduling operation of a robotic device “such that it will carry out a defined task at the desired time without the need for further external control.” *Id.* at code (57). The robotic device may be a cleaning robot. *Id.* at 1:29–30, 4:47–49.

The specification describes that a user may interact using a remote communication device, to input scheduling information, control directly a function of the robotic device, or receive information from the robotic device. *Id.* at 2:40–47. Such information may include an error report, power level report or status report. *Id.* at 3:64–4:3, 8:40–46. The '676 patent describes that a remote communication device may take a variety of forms, including one shaped to fit a user’s hand like a remote control, a PC or laptop computer, or a mobile phone or personal digital assistant (PDA). *Id.* at 9:44–55.

C. CHALLENGED CLAIMS

Challenged claim 1 is reproduced below:

1. A method of cleaning a room using a robotic cleaning device, the method comprising:
 - autonomously navigating the robotic cleaning device having a battery about a floor surface of the room;
 - transmitting a power level report from the robotic cleaning device to a mobile device;
 - automatically returning the robotic cleaning device to a docking station based on a power level of the robotic cleaning device;
 - transmitting a mission status report from the robotic cleaning device to the mobile device; and

transmitting from the robotic cleaning device an error report indicative of an error of at least one of a filter or a brush of the robotic cleaning device.

Ex. 1001, 12:48–61. All other challenged claims 2, 4–10, and 12–18 depend from claim 1.

D. PRIOR ART AND ASSERTED GROUNDS

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1, 4–8, 13, 14, 16–18	103	Toshiba ¹ , Ruffner ²
2, 9, 10	103	Toshiba, Ruffner, Abramson ³
15	103	Toshiba, Ruffner, Murray ⁴
12	103	Toshiba, Ruffner, Otsu ⁵

Pet. i–iii, 3–4. Petitioner also relies on the Declaration of Dr. Alonzo Kelly. Ex. 1004.

¹ Japanese Patent Application Publication No. 2002-85305, published March 26, 2002 (Ex. 1007 (English translation); Ex. 1006 (original)).

² U.S. Patent Application Publication No. 2002/0049521, published April 25, 2002 (Ex. 1009).

³ U.S. Patent Application Publication No. 2003/0120389, published June 26, 2003 (Ex. 1010).

⁴ U.S. Patent Application Publication No. 2002/0152576, published Oct. 24, 2002 (Ex. 1011).

⁵ Japanese Patent Application Publication No. 2003-62776, published Mar. 5, 2003 (Ex. 1013 (English translation); Ex. 1012 (original)).

II. ANALYSIS

A. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner proposes that a person of ordinary skill “would have had at least a four-year degree in electrical engineering, mechanical engineering, or a closely related field and have at least one year of experience in the design and implementation of robotics and embedded systems.” Pet. 7 (citing Ex. 1004 ¶¶ 46–47). Patent Owner does not dispute this definition of a person of ordinary skill. *See generally* PO Resp. We adopt Petitioner’s proposed level of ordinary skill as it appears to be consistent with the level of skill reflected by the specification and in the asserted prior art references.

B. CLAIM CONSTRUCTION

For an *inter partes* review petition filed after November 13, 2018, we construe claim terms “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).” 37 C.F.R. § 42.100(b) (2019). Petitioner submits that no term requires express construction. Pet. 8. Patent Owner asserts that no “formal claim constructions” are required, “[e]xcept to the extent implicated by argument” in its papers. PO Resp. 5. We address relevant claim-construction disputes in context below. Beyond the noted disputes, none of the claim terms requires express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

C. OBVIOUSNESS OVER TOSHIBA AND RUFFNER

For its ground directed at claim 1, Petitioner relies on a combination of Toshiba and Ruffner. Pet. 8–42. Patent Owner challenges aspects of Petitioner’s showing. PO Resp. 6–37.

Toshiba discloses an “autonomous traveling robot cleaner” and a “home server” for controlling the robot. Ex. 1007, code (57). Toshiba’s robot propels itself with drive wheels, each driven by a motor. *Id.* ¶¶ 16, 18, Fig. 3. It includes a vacuum with a powered brush to clean the floor surface. *Id.* Toshiba further describes its control through onboard processing and through wireless connection to the home server. *Id.* ¶¶ 17, 20, 28–37, Figs. 1, 4–10. It discloses that the home server can display the status of the robot’s battery charge. *Id.* ¶ 66, Fig. 17. Further, the robot transmits position information to the home server during cleaning, and reports cleaning completion time to the home server. *Id.* ¶¶ 50–51. Toshiba provides that a mobile phone may be used to select a room and cleaning mode through the home server. *Id.* ¶ 39.

Ruffner discloses a “multifunctional, mobile appliance capable of performing a variety of tasks” including “floor vacuuming.” Ex. 1009, code (57). It states that “[t]he battery-powered device can recharge itself and a wireless link enables the appliance to communicate with its user and a user support network via the World Wide Web.” *Id.* Ruffner discloses communicating between the device and a user “via numerous communication utilities, including voice mail, faxes, email, and web pages.” *Id.* ¶ 57. Ruffner’s communication functionality includes sending a user status reports that include problem reports. *Id.* ¶¶ 117, 178. Errors detected by Ruffner’s device include detecting being “tangled up in a power cord.” *Id.* ¶ 79. Ruffner discloses that “the mobile unit 1 will sense when its battery 86 energy is low and return to dock” to be recharged. *Id.* ¶ 113.

1. Claim 1

For claim 1, Petitioner argues that skilled artisans would have had reason to “modify Toshiba such that its mobile phone 13 operates to control and receive information from robot cleaner 8—including the status reports regarding power levels (e.g., state of battery charge)—using the Internet.” Pet. 31. Such a change, submits Petitioner, would have been a simple substitution of a mobile phone for Toshiba’s notebook for receiving power-level reports, or alternatively would have permitted a user to adjust power settings with the mobile device. *Id.* at 31–32. Petitioner argues that skilled artisans would have had reason to also modify Toshiba’s robot to use Ruffner’s ability to automatically return to a dock for charging. *Id.* at 35. That change, reasons Petitioner, would have helped achieve Toshiba’s goal of fully unattended cleaning, and would have implemented Ruffner’s known techniques to improve Toshiba’s device by increasing its autonomy. *Id.* Finally, Petitioner argues that skilled artisans would have had reason to configure Toshiba’s device to use Ruffner’s detection of a brush error (e.g., being tangled) and problem reports “so that the user can replace or repair the brush.” *Id.* at 41. Petitioner additionally argues that the change would simply enhance Toshiba’s existing information display to use Ruffner’s enhanced error reporting “so that the condition about a brush can also be provided to the user.” *Id.* at 42.

a. *“transmitting an error report indicative of an error of . . . a brush”*

Patent Owner challenges whether Ruffner discloses an error report indicative of an error of a brush. PO Resp. 6–32. Principally, Patent Owner argues that Ruffner detects errors only with the general assembly that contains a brush, the “work module.” *Id.* at 7–8. In Patent Owner’s view,

generically detecting “vacuum work module 18 tangled up in a power cord” (Ex. 1009 ¶ 79) “suffices to diagnose a mobility issue with the robot, but would not suffice for purposes such as component-level diagnostics, or to inform a user of detailed information about the status of consumable parts as described in the ’676 patent” (PO Resp. 8).

As an initial matter, Patent Owner relies on the specification’s description of features without adequately supporting that the claim language requires those features. Petitioner points out that the claimed error report must be merely “indicative of an error of . . . a brush of the robotic cleaning device.” Pet. Reply 5. We agree with Petitioner that the claims do not require “the specific capability of detecting a brush error” as Patent Owner asserts (PO Resp. 8). Pet. Reply 5–6. While it seems logical that a device would detect an error condition before sending an error report, the claim language does not require that. Instead, it requires transmitting an error report indicative of an error, regardless of whether a certain condition, i.e., a brush error, is detected to trigger the error report. Ex. 1001, 12:59–61. Additionally, as Petitioner points out, the transmitted error report need be only “indicative of” a brush error, rather than detailing the nature of the brush error. Pet. Reply 5–6. By using “indicative of,” claim 1 allows for some latitude between a brush error and the contents of the error report. *See Mentor Graphics Corp. v. EVE-USA, Inc.*, 851 F.3d 1275, 1282 (Fed. Cir. 2017) (holding plain meaning encompassed a signal “indicative of” source code reading on a system where the signal allowed a skilled artisan to find the relevant source code, without identifying it directly). Thus, the claim language does not itself require detecting or reporting a specific brush error.

The specification does not provide instruction or limitation on how the device detects errors for reporting or how it reports those errors. It describes

that the invention may include “transmitting information from the robotic device to the communication device” and that the information “can include, but is not limited to, an error report” Ex. 1001, 3:64–4:3; *accord id.* at 10:49–51 (“[I]nformation such as, but not limited to, status reports and error reports can be communicated back to the communication device 102 from the robotic devices.”). It describes further that information may include “receiving power level or dirt compartment level status reports, error reports, information on when filters, sensors or brushes need to be cleaned, ‘dirt alerts’ when a dirty area of floor is detected, or mission status reports (e.g. mission completed/abandoned/battery depleted, etc.).” *Id.* at 8:40–46. We do not agree with Patent Owner that the claim requires “component-level diagnostics” or “inform[ing] a user of detailed information about the status of consumable parts.” PO Resp. 8 (citing Ex. 2013 ¶ 41 n.2; Ex. 1001, 3:38–46, 3:66–4:3). First of all, those characterizations of the specification’s disclosures are not adequately supported. Further, even if Patent Owner accurately characterized the scope of what the specification describes for reports, the claim language does not support narrowing the claim scope to require Patent Owner’s characterizations. Although the specification describes that the invention might communicate when “brushes need to be cleaned,” we find insufficient support to limit the claimed “error of . . . a brush” to that condition.

We conclude that Ruffner discloses sending an error report indicative of an error of a brush, and therefore satisfies the claim language. Patent Owner agrees that Ruffner’s work module includes a “beater bar,” which refers to a brush. *Cf.* PO Resp. 13 (“[T]he vacuum work module 18 consists of much more than just the ‘beater bar’ (brush) itself.”). Although Patent Owner argues that Ruffner does not describe a sensor specifically indicating

a condition of the beater bar (PO Resp. 18), Ruffner describes that its device integrates feedback from multiple sensors and may therefore “distinguish between such events as a wheel 19 slipping in a mud trough, a mobile unit 1 flipped on its back, or a vacuum work module 18 tangled up in a power cord.” Ex. 1009 ¶ 79. Thus, Patent Owner’s argument that the “work-module rotation switch is not tied to the beater bar specifically” (PO Resp. 22–23) is not persuasive because Ruffner does not rely on a single sensor or switch to detect error conditions. Rather, it describes that, by integrating feedback from multiple sensors, particular conditions may be detected. Ex. 1009 ¶ 79. In light of Ruffner’s disclosures, including that a “vacuum work module 18 tangled up in a power cord” (*id.* ¶ 79) is detected as a condition separate from the work module rotating due to an impact (*id.* ¶ 78), we agree with Petitioner that an error reporting a tangled work module indicates an error of a brush (Pet. 40–41; Reply 5–7).

Patent Owner additionally attempts to distinguish Ruffner based on its “overarching concerns with navigation and mobility issues rather than low-level component errors.” PO Resp. 25. But regardless of whether Ruffner’s intent with reporting that its “vacuum work module 18 [is] tangled up in a power cord” (Ex. 1009 ¶ 79) is to indicate a mobility problem, such a report is “indicative of an error of . . . a brush of the robotic cleaning device” (Ex. 1001, 12:59–61), as discussed above. *See* Pet. Reply 7.

Ruffner further describes sending messages to a user including status reports. Ex. 1009 ¶ 33. Patent Owner argues that because Ruffner cannot detect a brush error, it cannot transmit the claimed report indicative of an error of a brush error. PO Resp. 28–29. Although Patent Owner agrees that Ruffner discloses sending alerts to users about various problems, Patent Owner submits that those problems all relate to the status of the device as a

whole, not to individual components. *Id.* at 29–30. That argument has the same flawed foundation as Patent Owner’s argument, discussed above, that Ruffner does not disclose detecting component-level problems. We do not agree, because Ruffner specifically discusses an error when its work module is “tangled up in a power cord.” Ex. 1009 ¶ 79. That error is sufficiently specific to satisfy the claim language, and Ruffner’s disclosure of sending “status reports” (*id.* ¶ 33) further encompasses notifying users of error conditions.

b. Reason to combine Toshiba and Ruffner as claimed

Patent Owner disputes whether skilled artisans would have had sufficient reason to combine Ruffner’s teachings with Toshiba’s device as asserted by Petitioner. PO Resp. 32–37. According to Patent Owner, “substantial differences between the configurations of Toshiba’s robot cleaner 8 and Ruffner’s mobile unit 1” undermine Petitioner’s reasoning. *Id.* at 33. Patent Owner asserts that detecting its vacuum work module becoming tangled with a power cord requires combining input from multiple sensors in Ruffner, “but not all of these sensors would be available in a combination that starts with Toshiba’s robot.” *Id.* at 34–35.

We do not agree with Patent Owner. As Petitioner points out, Toshiba’s device includes the ability to report errors to the user. Pet. 40–42 (citing Ex. 1007 ¶ 67); Pet. Reply 10–11. The combination Petitioner asserts takes Ruffner’s teachings and applies them to Toshiba’s device in a way to enable the tangle-indicating functionality. A skilled artisan would understand from Ruffner’s teachings that a combination of sensors is required to indicate a tangled work module—as discussed above, Ruffner expressly discusses that arrangement. Ex. 1009 ¶ 79. And Petitioner asserted

a combination in which a skilled artisan “upgrade[s] Toshiba’s robot cleaner, allowing it to use sensors to detect the brush’s condition, use software to analyze the sensor feedback, and send an error report about the brush to a user through a proper communication channel.” Pet. 42; *accord* Pet. Reply 11; Ex. 1004 ¶¶ 116–119. Thus, we do not agree that the combined device would be unable to implement the desired functionality.

Patent Owner criticizes Petitioner’s reliance on additional references to show that skilled artisans would have expected success with the asserted combination. PO Resp. 35–37. In this ground, Petitioner does not rely on those references—Toyoda⁶ and Murray⁷—to show an element of the claim but instead to support Dr. Kelly’s opinion that the prior art showed other instances taking similar approaches and therefore that skilled artisans would have expected success with the asserted combination. Pet. 41; Ex. 1004 ¶ 121. While Patent Owner distinguishes those prior approaches as inapposite to Ruffner’s error when tangled with a power cord, we do not agree. In particular, Toyoda describes measuring motor current to detect a worn brush (Ex. 1016 ¶ 46) and therefore supports that the asserted combination would not have been beyond the ordinary skill in the art at the time.

We conclude that Petitioner has adequately justified that skilled artisans would have had reason to combine Ruffner’s teaching with Toshiba’s device in way that would fall within claim 1’s scope.

⁶ Japanese Patent App. Pub. No. 2000-342496 (Ex. 1016).

⁷ *See supra* at 4 n.4.

c. Summary

Patent Owner does not otherwise contest Petitioner’s assertions against claim 1. *See* PO Resp. 6–37. Accordingly, Patent Owner has waived any such challenge. *See* Paper 12, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”); *In re NuVasive, Inc.*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016); Consolidated Trial Practice Guide 52 (Nov. 2019). Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that claim 1 would have been obvious over Toshiba and Ruffner.

2. Claim 13

Claim 13 depends from claim 1 and further recites “generating a schedule based on a pattern of one or more user-initiated cleaning operations, and wherein autonomously navigating the robotic cleaning device about the floor surface comprises initiating a cleaning operation in accordance with the schedule.” Ex. 1001, 13:43–48.

Petitioner asserts that both Toshiba and Ruffner disclose “generating a schedule based on a pattern of one or more user-initiated cleaning operations” and Toshiba discloses the “automatically navigating” limitation. Pet. 52–57. Petitioner’s assertion relies on allowing a user to enter a schedule as a sequence of steps. *Id.* at 52–54.

Patent Owner argues that, as a matter of claim construction, the “generating” limitation requires the schedule be generated from actual cleaning operations conducted by the robot, not just a sequence of operations entered by the user. PO Resp. 50–56. Patent Owner points to the specification’s description that the robot can learn a cleaning schedule based on user-initiated operations. *Id.* at 51 (citing Ex. 1001, 6:42–52 (“These

learning programs can, for example, allow a mobile robotic device 26 to . . . adapt its scheduling based on prior patterns of user behavior.”)). In Patent Owner’s view, the claim language reflects that description. *Id.* Petitioner, on the other hand, argues that “claim 13 does not recite ‘learning,’ ‘adapting,’ or ‘prior patterns of user behavior.’” Pet. Reply 12. Petitioner points to instances “in which a schedule is generated without using a learning program.” *Id.* at 13–14.

We agree with Patent Owner. Although Petitioner identifies instances in the specification where a user defines a schedule, and Petitioner argues “[t]here is no suggestion in the specification that these embodiments are disavowed,” we do not agree that indicates we should necessarily construe the claim language to include all embodiments. Rather, with “generating,” claim 13 requires something beyond merely accepting input from the user. We agree that the claim is limited to the device producing a schedule based on prior cleaning operations initiated by a user. We do not view the plain language of claim 13 as consistent with a user entering a schedule into the device. Petitioner does not contend that the prior art discloses claim 13’s limitations under Patent Owner’s view of the claim. *See* Pet. Reply 12–15.

Accordingly, Petitioner has not proven that claim 13 would have been obvious over Toshiba and Ruffner.

3. Additional Claims

For claims 4–8, 14, and 16–18, Patent Owner does not contest Petitioner’s assertions, other than as discussed above for claim 1. *See generally* PO Resp. Accordingly, Patent Owner has waived any such challenge. *See* Paper 12, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”); *NuVasive, Inc.*, 842

F.3d at 1380–81; Consolidated Trial Practice Guide 52 (Nov. 2019). Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that each of claims 4–8, 14, and 16–18 would have been obvious over Toshiba and Ruffner. Pet. 43–52, 57–62.

D. OBVIOUSNESS OVER TOSHIBA, RUFFNER, AND ABRAMSON

1. Claim 2

Claim 2 depends from claim 1 and recites “receiving, from the mobile device at the robotic cleaning device, information about a cleaning power setting; and cleaning at a cleaning power between a minimum setting and a maximum setting based on the received information about the cleaning power setting.” Ex. 1001, 12:63–67. The parties dispute whether the prior art teaches “cleaning at a cleaning power between a minimum setting and a maximum setting.” For that aspect, Petitioner relies on Abramson. Pet. 66–71.

Abramson discloses an autonomous robotic vacuum cleaner. Ex. 1010, code (57). It discloses that a remote controller can provide to the robot “various commands, such as ON/OFF, various travel modes, various cleaning modes and patterns, strengths of cleaning, speed of the apparatus, etc.” *Id.* ¶ 123. It also discloses that the possible cleaning modes include “spot clean,” which “involves small precise movements concentrated around a small area for cleaning this small area” and “may involve high power suction.” *Id.* ¶ 124. Abramson also discloses that the speed of its rotating brushes may be changed using the remote control. *Id.* ¶ 79 (“Speed of the rotating members 166a, 166b (i.e., brushes) can be changed . . . and signaled to the control system For example, the rotating members 166a, 166b or

brush speed may be approximately 3000 RPM on carpet, and about 500 RPM on hard floors.”).

Petitioner submits that skilled artisans would have had reason “to add a cleaning power setting to the commands transmitted from Toshiba’s robot cleaner 8 to a mobile device, so that a user can remotely select a power setting.” Pet. 69. Petitioner asserts doing so would merely use Abramson’s known technique to improve Toshiba’s device. *Id.*

Patent Owner argues that Abramson teaches only two power levels (as brush speeds) and therefore lacks a power level “between a minimum setting and a maximum setting.” PO Resp. 37–41. In Patent Owner’s view, Abramson’s reference to “various cleaning modes” is not sufficient, in particular because it does not disclose more than a minimum and maximum. *Id.* at 41. Moreover, argues Patent Owner, because Abramson distinguishes between “various cleaning modes” and “strengths of cleaning,” it suggests that cleaning modes are not power settings. *Id.*

We agree with Petitioner that Abramson discloses or suggests cleaning at a power between the minimum and maximum. When Abramson discusses brush speed, it gives two speeds as examples (Ex. 1010 ¶ 79) but that does not limit Abramson’s approach to just those two particular speeds. Reply 17–18. Further, Abramson discloses varying more than just the brush speed—it also discloses varying cleaning power, cleaning mode, and the robot’s speed. Ex. 1010 ¶ 123; Pet. Reply 16. Thus, varying those parameters would result in power levels between the minimum and maximum.

Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that claim 2 would have been obvious over Toshiba, Ruffner, and Abramson.

2. Claim 9

Claim 9 depends from claim 1 and further recites “receiving information indicative of a user-selected cleaning power for the robotic cleaning device, wherein autonomously navigating the robotic cleaning device comprises initiating a cleaning operation at a cleaning power that is based on the received user selected cleaning power.” Ex. 1001, 13:24–30. Petitioner relies on Abramson, based on the same disclosures identified above for claim 2 (for the “receiving information” aspect), and based on Abramson’s disclosure that its robot autonomously performs “vacuum cleaning or vacuuming, and other surface cleaning operations” using a power that depends on user-entered information. Pet. 72–73 (quoting Ex. 1010 ¶ 50).

Patent Owner challenges Petitioner’s contentions, arguing that Petitioner addresses setting cleaning power during cleaning, which Patent Owner distinguishes from initiating a cleaning operation. PO Resp. 42. Petitioner responds that the claim language does not require a “new” cleaning operation and that changing power level during a cleaning operation satisfies the claim language. Pet. Reply 19–20. Petitioner also argues that, because Abramson’s robot engages in multiple cleaning operations, using a different power when transitioning between cleaning operations is “initiating a cleaning operation” as claimed. *Id.* at 19. We agree with Petitioner. Abramson describes a robot that performs multiple cleaning operations, and changing a setting to select among “various cleaning modes” or “strengths of cleaning” would initiate a cleaning operation at that setting. Ex. 1010 ¶¶ 123, 126.

Patent Owner argues that a user in Abramson “never actually selects a cleaning power, as required by Claim 9.” PO Resp. 44. We do not agree that

the claim requires expressly selecting a power level, as it recites “information indicative of a user-selected cleaning power.” Because the received information need only indicate a cleaning power, the claim language reads on selecting a parameter that affects cleaning power, as disclosed by Abramson.

Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that claim 9 would have been obvious over Toshiba, Ruffner, and Abramson.

3. Claim 10

Claim 10 depends from claim 1 and further recites “receiving, from the mobile device at the robotic cleaning device, a command to perform a cleaning operation at a user-selected cleaning power.” Ex. 1001, 13:31–34. For the additional limitation, Petitioner relies on Abramson’s disclosures discussed above for claims 2 and 9. Pet. 73–74. Other than as discussed for claim 1 above, Patent Owner does not challenge Petitioner’s contentions for claim 10. *See generally* PO Resp. Accordingly, Patent Owner has waived any such challenge. *See* Paper 12, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”); *NuVasive, Inc.*, 842 F.3d at 1380–81; Consolidated Trial Practice Guide 52 (Nov. 2019).

Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that claim 10 would have been obvious over Toshiba, Ruffner, and Abramson.

E. OBVIOUSNESS OVER TOSHIBA, RUFFNER, AND OTSU

Claim 15 depends from claim 1 and further recites “wherein the error report is indicative of an error of the filter of the robotic cleaning device.”

Ex. 1001, 13:54–56. Petitioner relies on Murray for this additional limitation. Pet. 74–76. Other than as discussed for claim 1 above, Patent Owner does not challenge Petitioner’s contentions for claim 10. *See generally* PO Resp. Accordingly, Patent Owner has waived any such challenge. *See* Paper 12, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”); *NuVasive, Inc.*, 842 F.3d at 1380–81; Consolidated Trial Practice Guide 52 (Nov. 2019).

Having considered all of the parties’ contentions and evidence, we are persuaded that Petitioner has proven that claim 15 would have been obvious over Toshiba, Ruffner, and Murray.

F. OBVIOUSNESS OVER TOSHIBA, RUFFNER, AND OTSU

1. Claim 12

Claim 12 depends from claim 1 and further recites “authenticating a communication link between the robotic cleaning device and the mobile device before transmitting the power level report and before transmitting the mission status report.” Ex. 1001, 13:38–42. For claim 12’s additional limitation, Petitioner relies on Otsu. Pet. 76–80. Patent Owner disputes whether a combination including Otsu would teach “authenticating a communication link between the robotic cleaning device and the mobile device.” PO Resp. 45–50.

Otsu discloses a robotic toy dog that may be controlled using a mobile phone. Ex. 1013, code (57). The phone may communicate directly with the robot, using Bluetooth, when in close proximity. *Id.* ¶ 12. Otherwise, it communicates through a wireless base station. *Id.* Otsu states that, “[w]hen a robo-dog 1 is accessed from a cell phone 25 (step (‘S’ below) 301), a wireless base station controller judges whether the cell phone 25 has access

rights to the robo-dog 1 specified by the telephone number (S302).” *Id.* ¶ 14.

“If it judges that there are access rights, manipulation from the cell phone side is possible” *Id.* Petitioner submits that Toshiba’s robot might “reside in the communication range of multiple devices” and thus would benefit from using Otsu’s method “to ensure that the cleaning robot communicate with the correct mobile device.” Pet. 78. Petitioner suggests that the combination would yield predictable results because, “[s]imilar to checking the telephone number in Otsu, the robot cleaner in Toshiba and Ruffner may check the serial number or media access control address of the mobile device to verify its identify.” *Id.* at 79.

Patent Owner argues first that Otsu does not support Petitioner’s contention that the combined system could authenticate based on “the serial number or media access control address of the mobile device to verify its identify.” Pet. 79; PO Resp. 48. Because Otsu discloses authentication only using a telephone number, Patent Owner views it as lacking support for Petitioner’s contention. PO Resp. 48 (citing Ex. 1013 ¶ 14). We view Petitioner’s contention as accounting for basic differences in technology that would have been well within the ordinary skill in the art. Claim 12 does not require any particular authentication approach, and Petitioner’s statement that the combined system could use a serial number or media access control address recognizes how a skilled artisan might have implemented the combination. We do not fault Petitioner for providing that additional detail. *Cf. In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007) (“[W]e do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art.”).

Patent Owner argues also that Petitioner asserts a combination in which the robotic cleaner itself authenticates its link with a mobile device,

whereas Otsu discloses that the base station authenticates a link.

PO Resp. 49. Patent Owner implies that the claim requires the robot to authenticate the link, but we do not agree. The claim language does not restrict what device may authenticate the link. Nor does it state that the link must directly connect the robot and mobile device. And the specification, when discussing links for controlling a robot, explains that the invention encompasses a variety of approaches, including communication through a stationary device local to the robot. *See* Ex. 1001, 10:35–60. The Petition relies on Toshiba’s robot using “home server 6,” similarly to Otsu’s wireless base station. Pet. 78 (“The Toshiba home server 6 may function similarly to Otsu’s wireless base station, to facilitate information exchange between Toshiba’s robot cleaner 8 and mobile phone 13.” (citing Ex. 1007 ¶¶ 11, 13, 39)). Thus, we do not agree that Petitioner asserts a combination in which the robot itself performs the authentication.

Patent Owner argues that, in Otsu, no link to the robot exists until after the cell phone has been authenticated. PO Sur-Reply 24 (“Otsu . . . teaches that the cell phone 25 first accesses the wireless base station, and the wireless base station only connects the cell phone 25 to the robot if the cell phone’s access rights are verified.”). Otsu’s description, however, is consistent with the language of claim 12, in that the claim requires authenticating the link with a mobile device before transmitting reports, similar to Otsu’s description of authenticating the cell phone before accepting “manipulations from the cell phone side.” Ex. 1013 ¶ 14. And Otsu’s description suggests that its wireless base station is linked to the robot at all times, as once authenticating a cell phone, “manipulation from the cell phone side is possible” without establishing a further connection. *Id.*

Having considered all of the parties' contentions and evidence, we are persuaded that Petitioner has proven that claim 12 would have been obvious over Toshiba, Ruffner, and Otsu.

III. CONCLUSION⁸

For the reasons discussed, we conclude:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 4–8, 13, 14, 16–18	103	Toshiba, Ruffner	1, 4–8, 14, 16–18	13
2, 9, 10	103	Toshiba, Ruffner, Abramson	2, 9, 10	
15	103	Toshiba Ruffner, Murray	15	
12	103	Toshiba, Ruffner, Otsu	12	
Overall Outcome			1, 2, 4–10, 12, 14–18	13

IV. ORDER

ORDERED that Petitioner has proven that claims 1, 2, 4–10, 12, 14–18 of the '676 patent are unpatentable;

⁸ 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).

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FURTHER ORDERED that Petitioner has not proven that claim 13 of the '676 patent is unpatentable; and

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

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