

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.

PGR2021-00079
Patent 10,990,110 B2

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

MELVIN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 328(a)

I. INTRODUCTION

SharkNinja Operating LLC, SharkNinja Management LLC, and SharkNinja Sales Company (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting institution of post-grant review of claims 1–14 of U.S. Patent No. 10,990,110 B2 (Ex. 1001, “the ’110 patent”). iRobot Corporation (“Patent Owner”) filed a Preliminary Response (Paper 6) and we instituted review (Paper 7, “Institution Decision” or “Inst.”).

Patent Owner filed a Response (Paper 9, “PO Resp.”) and Petitioner filed a Reply (Paper 11, “Pet. Reply”). We held a hearing on August 24, 2022, and a transcript appears in the record. Paper 18 (“Tr.”).¹

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 1–14 are unpatentable.

A. THE ’110 PATENT

The ’110 patent is titled “Celestial Navigation System for an Autonomous Vehicle.” Ex. 1001, code (54). It addresses “the demand for robotic devices that can navigate around a complex environment or working space with little or no assistance from a human operator.” *Id.* at 1:28–:30. The ’110 patent uses “vacuuming as a demonstrative task of the depicted robotic cleaning device 12.” *Id.* at 4:16–:18. In one aspect, the specification describes projecting infrared signals onto a room’s ceiling or walls and refers to regions where the signals contact a surface as “points.” *Id.* at 4:27–:43. Alternatively, it explains, “visible points can be used in place of infrared points” and may be detected using a camera. *Id.* at 5:11–:15. Then, the

¹ Patent Owner did not present argument at the hearing.

device's microprocessor can calculate bearings from the robot to the signals and, ultimately, "determine the location of the autonomous vehicle 12 within the working area 14." *Id.* at 5:15–:21.

The '110 patent further describes how an autonomous vehicle may take advantage of location information. For example, a "coded signal may serve as a unique marker for a different working space," which may cause the autonomous vehicle to "alter its cleaning function." *Id.* at 12:50–:54. "Thus, if room A is carpeted but room B is uncarpeted, the autonomous vehicle can adjust its cleaning as it moves from room A to room B." *Id.* at 12:54–:56. The '110 patent also describes aspects of a status screen that can display a floor plan and how much of a scheduled cleaning has been completed. *Id.* at 18:56–:58.

The parties agree that the embodiment of Figure 22 is relevant to the issues raised in the Petition. *See* Pet. 20–21; PO Resp. 5–6, 12–13, 16–17, 21. Figure 22 is reproduced below:

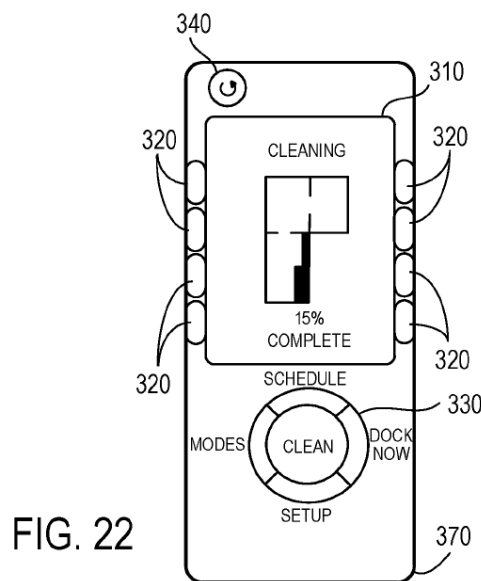


Figure 22 illustrates a status screen, shown on remote control 370, which “can have a variety of formats for informing the user how much of a scheduled cleaning has been completed.” Ex. 1001, 18:55–:58. The parties agree that Figure 22 is the best representation of the “floor plan,” claimed in independent claims 1 and 8, found in the ’110 patent. *See* Pet. 20–21; PO Resp. 16–17, 21.

B. CHALLENGED CLAIMS

The Petition challenges claims 1–14 (the “challenged claims”). Pet. 1. Challenged claims 1 and 8 are independent, illustrative of the claimed subject matter, and reproduced below:

1. An autonomous robotic cleaning device comprising:
 - a robot body;
 - a drive supporting the robot body above a floor surface within a room and configured to maneuver the robot body across the floor surface;
 - a cleaning apparatus to clean the floor surface; and
 - one or more processors configured to:
 - navigate the autonomous robotic cleaning device based on a map, the map indicating areas with carpeting and indicating areas that do not have carpeting,
 - sense a location of the autonomous robotic cleaning device relative to the areas with carpeting and the areas that do not have carpeting; and
 - adjust a cleaning behavior of the autonomous robotic cleaning device based on the sensed location relative to the areas with carpeting and the areas that do not have carpeting; and
 - transmit data to cause a user display device to display a floor plan that comprises a plurality of rooms, the plurality of rooms comprising the room, and the

displayed floor plan comprising an identification of the areas with carpeting and the areas that do not have carpeting and an indication of doors separating the plurality of rooms.

Id. at 19:8–:32.

8. [A] method comprising:

navigating an autonomous robotic cleaning device based on a map, the map indicating areas with carpeting and indicating areas that do not have carpeting;

sensing a location of the autonomous robotic cleaning device relative to the areas with carpeting and the areas that do not have carpeting;

adjusting a cleaning behavior of the autonomous robotic cleaning device based on the sensed location relative to the areas with carpeting and the areas that do not have carpeting; and

transmitting data to cause a user display device to display a floor plan that includes a plurality of rooms, the displayed floor plan including an identification of the areas with carpeting and the areas that do not have carpeting and an indication of doors separating the plurality of rooms.

Id. at 20:10–:26. Challenged claims 2–7 depend from claim 1, and challenged claims 9–14 depend from claim 8. *Id.* at 19:33–20:61.

C. ASSERTED GROUND OF UNPATENTABILITY

Petitioner asserts that claims 1–14 of the '110 patent are unpatentable under the written-description requirement of 35 U.S.C. § 112(a).² Pet. 1.

² The America Invents Act included revisions to, *inter alia*, 35 U.S.C. §§ 102, 103, and 112 effective on March 16, 2013. In the Institution Decision, we determined the '110 patent is eligible for post-grant review, so the AIA versions of those sections apply. Inst. 6–7.

Petitioner relies on the specification of the '110 patent and the Declaration of Dr. Noah Cowan (Ex. 1003).

II. ANALYSIS

A. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner proposes that a person of ordinary skill “would have at least a bachelor’s degree in mechanical engineering or electrical engineering or a closely related field and at least one year of experience in the design and implementation of robotics and embedded systems.” Pet. 11 (citing Ex. 1003 ¶ 18). Patent Owner does not dispute this definition. *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.

B. CLAIM CONSTRUCTION

For a post-grant 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. § 42.200(b) (2019). Thus, claim terms generally are construed in accordance with their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art, and the prosecution history pertaining to the patent at issue. *Id.* The ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent,” and “as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc).

Petitioner submits that no term requires express construction. Pet. 11–12. Petitioner contends that the claims are unpatentable under any

construction of the claim language because they lack specification support for a display that identifies different floor types in a floor plan. Pet. 20, 27. In the Institution Decision, we agreed “with Patent Owner that nothing in the claim language requires identification of a specific floor type beyond whether an area has carpeting,” but concluded that “the claim language requires that a floor plan displayed on a user display must allow users to distinguish between areas with carpeting and areas that do not have carpeting.” Inst. 11.

Patent Owner argues that “the plain language of the claims, the specification, and the file history, all support a broader interpretation that only requires identification of particular ‘areas’ in the floor plan.” PO Resp. 7. In Patent Owner’s view, the claims do not require identification of areas in a way that allows users to distinguish carpeted from noncarpeted areas. *Id.*

Patent Owner focuses on the term “areas.” PO Resp. 7–8. Claims 1 and 8 recite navigation based on a “map indicating areas with carpeting and indicating areas that do not have carpeting” and a user device displaying a floor plan with “identification of the areas with carpeting and the areas that do not have carpeting.” Patent Owner argues those clauses “clarify which ‘areas’ must be identified in the displayed floor plan.” PO Resp. 7. Patent Owner notes that it is “undisputed that the claims do not require real-time detection of the floor type,” and that the autonomous vehicle modifies cleaning behavior by sensing its location relative to defined areas with or without carpeting. PO Resp. 12. Thus, in Patent Owner’s view, the display limitation is concerned with area boundaries, not the type of floor covering

within areas. *Id.* (“[T]he carpeting characteristics are mere descriptions of which ‘areas’ require identification.”).

We do not agree. The two types of areas encompass all possible areas, so they cannot clarify which areas must be identified. All areas in a map must be identified, regardless of the claim-construction dispute. By dividing areas into two types based on whether or not each area has carpeting, the claim language indicates that whether or not an area has carpeting is significant.

As explained in the Institution Decision, that the claim language requires the floor plan include “identification” of the areas is significant. Giving that term its ordinary and customary meaning, identification means “an act of identifying,” where “identifying” is “to establish the identity of.” *Identify & Identification*, WEBSTER’S NINTH NEW COLLEGIATE DICTIONARY 597 (1985) (Ex. 3001); *accord Identification*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/identification> (last visited Oct. 19, 2021) (“to ascertain the identity of . . . something that is unfamiliar or unknown”) (Ex. 3002); *Identify*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/identifying> (last visited Oct. 19, 2021) (Ex. 3003). The claims recite identification of two groups—“the areas with carpeting and the areas that do not have carpeting.” Ascertaining the identity of those areas relates to the presence of carpeting in a given area.

The claim language establishes two distinct (and mutually exclusive) types of areas: “areas with carpeting” and “areas that do not have carpeting.” Ex. 1001, 19:17–18, 20:12–13. Those areas, as defined, provide the antecedent basis for the later claim language requiring the areas be

“identifi[ed]” in the displayed floor plan (“an identification of the areas with carpeting and the areas that do not have carpeting”). We conclude that identifying—ascertaining the identity of—two distinct types of areas requires an indication to distinguish one type of area from the other. That conclusion flows from the claim language that establishes two types of areas and then refers back to those types when requiring a floor plan that includes identification of them. Indeed, the claim as a whole depends on a distinction between the two types of areas. After establishing that the map used for navigation indicates the two types of areas, the claim requires that the robot sense its location relative to the areas and adjust its cleaning behavior based on that location. *Id.* at 19:16–:25, 20:11–:19. Patent Owner’s proposed construction—that “identification of the areas with carpeting and the areas that do not have carpeting” does not require distinguishing between the two types of areas—would contravene the claim’s consistent approach to the areas.³

Patent Owner argues that “meaningful weight can still be attributed to the term ‘identification’ by identifying the ‘areas’ themselves, with no further need to identify whether the area is carpeted or not carpeted.” PO Resp. 8. We do not agree, in light of the claim language discussed above that makes carpeting the identifying feature of a particular area. Patent

³ Patent Owner’s approach would also seemingly allow for the floor plan to identify the “areas” collectively, but without distinguishing between area floor types, the area boundaries have no meaning. Because the areas include the entire map (a given area necessarily falls in one of the two defined area types, i.e., it either includes carpet or it does not include carpet), that approach would render the “identification” limitation meaningless.

Owner contends that a requirement to identify areas such that one could distinguish carpeted from noncarpeted areas “could be properly recited in a dependent claim.” *Id.* Although true, that does not persuade us that the independent claims lack the limitation. As discussed above, the claim language already requires the displayed floor plan allow users to distinguish between areas with carpeting and areas without carpeting.

Patent Owner contends that, during prosecution, the claim language referred generally to “indicated” or “marked” areas when sensing location or adjusting cleaning behavior. PO Resp. 8–12. After the Examiner indicated the claims were allowable, the applicant amended to the current language, using the full antecedent definitions for the two types of areas when sensing location or adjusting cleaning behavior. *Id.* at 10–11 (citing Ex. 1002, 10, 15, 17). According to Patent Owner, because the post-allowance amendments “were limited to matters of form,” they confirm that the full descriptions of the two types of areas is equivalent to the indicated or marked areas as a whole. *Id.* at 11. Even accepting that premise, however, it does not change that the claim requires distinguishing between the two types of areas. Indeed, adjusting cleaning behavior would have no meaning within the context of the claim language if it is not based on which of the two defined area types the robot is in. Moreover, the “indicated” and “marked” areas recited in the original claim language both refer to the already-defined two area types; that antecedent basis brings with it the distinction between the two area types. Thus, we do not agree that the prosecution history supports Patent Owner’s proposed construction.

Patent Owner additionally relies on the specification to support its view of the claim (PO Resp. 12–13), but that is a circular approach. The

claim language does not allow for Patent Owner’s construction and using the specification to justify that construction would circumvent the proper written-description-support analysis. *See Koninklijke Philips Elecs. N.V. v. Cardiac Sci. Operating Co.*, 590 F.3d 1326, 1336 (Fed. Cir. 2010) (en banc) (noting that written-description support requires analysis under the correct claim construction). Thus, we do not agree that the specification counsels in favor of Patent Owner’s construction.

Based on the foregoing, we conclude that the claim language “the displayed floor plan comprising an identification of the areas with carpeting and the areas that do not have carpeting” requires that a floor plan displayed on a user display must allow users to distinguish between areas with carpeting and areas that do not have carpeting. Such a floor plan need not enable distinguishing between floor types with any greater precision.

C. LACK OF WRITTEN DESCRIPTION

To satisfy the written-description requirement under 35 U.S.C. § 112(a), the specification must “reasonably convey[] to those skilled in the art that the inventor had possession” of the claimed invention as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). An adequate description does not require any particular form of disclosure or that the specification recite the claimed invention *in haec verba*, but must do more than render the claimed invention obvious. *Id.* at 1352. Further, analyzing written-description support requires properly construing the claims. *See Koninklijke Philips*, 590 F.3d at 1336.

Petitioner challenges claims 1–14 under § 112(a), contending that the ’110 patent does not provide written-description support for the limitation “the displayed floor plan comprising an identification of the areas with

carpeting and the areas that do not have carpeting” recited by each independent claim. Pet. 15–16 (emphasis omitted). Patent Owner contends that Petitioner improperly reads the limitation to require identifying floor types, and that, when “properly construed, the ’110 patent provides ample written description support for the display limitation.” PO Resp. 16–18. Because we do not adopt Patent Owner’s proposed construction, we do not address whether the specification adequately supports the claim under that construction.

Patent Owner further contends that the Petition fails to show a lack of written description “even under the Board’s construction.” PO Resp. 18–21. Patent Owner relies on our conclusion that the claimed “floor plan need not enable distinguishing between floor types with any greater precision” than “allow[ing] users to distinguish between areas with carpeting and areas that do not have carpeting.” *Id.* (citing Inst. 11–12).

Patent Owner submits that Figure 22 discloses a floor plan that depicts a plurality of rooms and the boundaries between rooms. *Id.* at 21. According to Patent Owner, Figure 22’s floor plan “would plainly allow users to distinguish between areas with or without carpeting” because users would be familiar with the room arrangement or the floor plan would draw a user’s attention such that the user could determine whether the room is carpeted. *Id.* at 22. In this regard, Patent Owner relies on Petitioner’s position in IPR2020-00735 regarding “an error report indicative of an error of . . . a brush of the robotic cleaning device” that, to be “indicative of” a condition,

information need not directly identify that condition.⁴ PO Resp. 20 (citing Ex. 2002, 6–8).

We do not agree that Petitioner’s position on the error report at issue in IPR2020-00735 conflicts with its position here regarding a “floor plan comprising an identification of the areas with carpeting and the areas that do not have carpeting.” Foremost, the claim language is different—information “indicative of” a condition is not the same as information that is an “identification of” a condition. Patent Owner has not established that we should view those two phrases as interchangeable. *See* PO Resp. 22 (using “identifying” and “indicating” as interchangeable without explanation). Given the different claim terms and specification at issue, we conclude that Petitioner has not taken inconsistent positions. Accordingly, we do not construe the claim term at issue here with the same scope as the claim term discussed in IPR2020-00735. *See SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1290–91 (Fed. Cir. 2005) (refusing to apply judicial estoppel where the party’s prior argument was not clearly inconsistent with its current position).

Under the construction adopted above, we conclude the specification lacks written-description support for a “displayed floor plan comprising an identification of the areas with carpeting and the areas that do not have carpeting.” As discussed, our construction requires that the floor plan itself allow users to distinguish between areas with carpeting and areas that do not have carpeting. Neither Figure 22 nor any textual description supports that capability, and Patent Owner does not argue otherwise. *See* PO Resp. 18–23.

⁴ The Final Written Decision in IPR2020-00735 agreed with Petitioner’s position on the “indicative” error report. IPR2020-00735, Paper 36, 8–9.

III. CONCLUSION⁵

For the reasons discussed, we conclude:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–14	112(a)	Lack of Written Description	1–14	
Overall Outcome			1–14	

IV. ORDER

Accordingly, it is

ORDERED that, Petitioner has proven that claims 1–14 of the
'110 patent are 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.

⁵ 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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