

# United States Court of Appeals for the Federal Circuit

---

GOOGLE LLC, ECOBEE, INC.,  
*Appellants*

v.

ECOFACITOR, INC.,  
*Appellee*

---

2022-1750, 2022-1767

---

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-01504, IPR2021-00792.

---

Decided: February 7, 2024

---

MATTHEW A. SMITH, Smith Baluch LLP, Washington, DC, argued for all appellants. Appellant Google LLC also represented by ELIZABETH LAUGHTON.

TIMOTHY J. CARROLL, Venable LLP, Chicago, IL, for appellant ecobee, Inc. Also represented by JUSTIN J. OLIVER, Washington, DC; LAURA A. WYTSMA, Los Angeles, CA.

JONATHAN LINK, Russ August & Kabat, Washington, DC, argued for appellee. Also represented by REZA MIRZAIE, Los Angeles, CA.

---

Before REYNA, TARANTO, and STARK, *Circuit Judges*.

REYNA, *Circuit Judge*.

Appellants Google LLC and ecobee, Inc. (collectively, “Google”) appeal from a Final Written Decision of the United States Patent and Trademark Office’s Patent Trial and Appeal Board, which found the challenged claims of U.S. Patent No. 8,498,753 not unpatentable. Google challenges the Board’s determination on the basis that the Board made an erroneous claim construction of a limitation in Claim 1. Google also argues that the Board’s Final Written Decision violates the Administrative Procedure Act because Google had no notice or an opportunity to address the Board’s construction. We reverse the Board’s claim construction, vacate the Board’s Final Written Decision, and remand.

#### BACKGROUND

##### U.S. Patent No. 8,498,753

EcoFactor, Inc. (“EcoFactor”) is the assignee of U.S. Patent No. 8,498,753 (the “’753 patent”), which is entitled “System, Method and Apparatus for Just-In-Time Conditioning Using a Thermostat” and which relates generally to climate control systems, such as heating and cooling systems (“HVAC” systems). The ’753 patent discloses a thermostat that takes into consideration factors like outside weather conditions and the “thermal characteristics of individual homes in order to improve the ability to dynamically achieve the best possible balance between comfort and energy savings.” ’753 patent, 2:1–6. The claimed objective of the ’753 patent is to reduce the cycling time of the climate control system, HVAC, when a user seeks a specific indoor temperature at a certain time. *See, e.g., id.* at 9:9–10.

Claim 1 is representative and recites the following:<sup>1</sup>

1. [1a] A method for reducing the cycling time of a climate control system, said method comprising:

[1b] accessing stored data comprising a plurality of historic internal temperature readings taken within a structure and a plurality of measurements relating to a plurality of historic external temperatures outside said structure during at least one selected time period;

[1c] determining one or more thermal performance values of said structure

[1d] by correlating at least one of the plurality of historic internal temperatures with at least one of the plurality of historic external temperatures that both occur at a first time during the at least one selected time period, and by correlating at least one of the plurality of historic internal temperatures with at least one of the plurality of historic external temperatures that both occur at a second time during the at least one selected time period,

[1e] wherein said one or more thermal performance values indicate a rate of change of temperature in said structure in response to changes in outside temperatures;

[1f] storing said one or more thermal performance values of said structure;

[1g] retrieving a target time at which said structure is desired to reach a target temperature;

---

<sup>1</sup> The limitation numbering [1a]–[1m] follows the numbering used by the parties both before the Board and on appeal.

[1h] acquiring at least a first internal temperature inside said structure at a third time prior to said target time;

[1i] acquiring at least a first external temperature relating to a temperature outside said structure at the third time prior to said target time;

[1j] obtaining at least one forecasted temperature forecasted to occur outside the structure at the target time;

[1k] retrieving at least said one or more thermal performance values of said structure that indicate said rate of change of temperature in said structure in response to changes in outside temperatures;

[1l] retrieving at least one performance characteristic of said climate control system;

[1m] determining a first time prior to said target time at which said climate control system should turn on to reach the target temperature by the target time based at least in part on [i] said one or more thermal performance values of said structure, [ii] said performance characteristic of said climate control system, [iii] said first internal temperature, [iv] said first external temperature, and [v] the forecasted temperature;

...

*Id.* at 9:9–54. Pertinent to this appeal is the [1m] limitation and inputs [i]–[v] recited in that limitation.

#### Proceeding Before the Board

Google filed a petition to institute an *inter partes* review (“IPR”) of claims 1–20 of the ’753 patent. J.A. 2. Google asserted a single ground: that the combination of U.S. Patent No. 5,197,666 (“Wedekind”) in view of U.S. Patent No. 6,216,956 (“Ehlers”) renders claims 1–20 obvious.

J.A. 2, 11. The Patent Trial and Appeal Board (“Board”) later instituted the IPR. J.A. 2.

Following institution, the parties disputed whether Wedekind disclosed the portion of claim limitation [1m] that reads “determining a first time prior to said target time . . . *based at least in part on* . . . [iii] said first internal temperature.” J.A. 18–21, 24–27 (emphasis added). Google argued that Wedekind calculated a “first time prior to said target time” based on thermal performance values (input [i]) which are themselves calculated from internal temperature values (input [iii]). *See* J.A. 433–35; *see also* J.A. 439–40. Thus, according to Google, Wedekind’s “first time prior to said target” was “*based at least in part on* . . . [iii] said first internal temperature.” *See* J.A. 433–35; *see also* J.A. 439–40 (emphasis added). EcoFactor disagreed, contending that each input in the [1m] limitation was distinct and could not be intertwined as Google argued or else it would render certain claim limitations meaningless. *See* J.A. 1263, 1265. Neither party explicitly argued for claim construction to resolve the issue.

On March 3, 2022, the Board issued its Final Written Decision in two joined IPRs, Nos. IPR2020-01504 and IPR2021-00792. The Board concluded that Google had not shown by a preponderance of the evidence that the challenged claims of the ’753 patent were unpatentable. J.A. 1, 30. In coming to its decision, the Board determined that claim construction was unnecessary, and then concluded, based on the claim language, that the inputs [i]–[v] of the [1m] limitation were separate and distinct components that required distinctly different input data. *See* J.A. 25–26. The Board found that Google’s theory of obviousness did “not use each of the five distinct inputs,” but rather double counted an input such that it uses “one or more thermal performance values of said structure’ to satisfy both inputs [i] and [iii].” J.A. 26. For this reason, the Board found that Google’s obviousness theory, reliant on

Wedekind, failed to show that the prior art taught the disputed limitation. J.A. 27.

Google timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### STANDARD OF REVIEW

We review the issue of claim construction of a patent claim de novo with any underlying fact findings reviewed for substantial evidence. *Dionex Softron GmbH v. Agilent Techs., Inc.*, 56 F.4th 1353, 1358 (Fed. Cir. 2023). We also review de novo the Board’s compliance with the Administrative Procedure Act (“APA”). *In re NuVasive, Inc.*, 841 F.3d 966, 970 (Fed. Cir. 2016).

#### DISCUSSION

Google argues that the Board, despite stating otherwise, construed the [1m] limitation of Claim 1. According to Google, the Board’s implicit claim construction is wrong and requires reversal. EcoFactor contends that the Board made no claim construction and that its findings are supported by substantial evidence. We first address whether the Board construed Claim 1 of the ’753 patent.

##### I. The Board Construed the [1m] Limitation

###### A.

It is a bedrock principle of patent law that claims of a patent define the scope of a patented invention and the patentee’s right to exclude. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 321 (2015); *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). Claims are “the life of the patent,” defining the limits of the patent’s scope. 2 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* §505, at 111 (1890). That scope, the Supreme Court explained, “must be known for the protection of the patentee, the encouragement of the inventive genius of others, and the assurance that the

subject of the patent will be dedicated ultimately to the public.” *Gen. Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938); *see also Motion Picture Pats. Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 510 (1917).

It is also well understood that “[c]laim construction serves to define the scope of the patented invention and the patentee’s right to exclude.” *HTC Corp. v. Cellular Comms. Equip., LLC*, 877 F.3d 1361, 1367 (Fed. Cir. 2017); *see O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008). “Claim construction is the judicial statement of what is and is not covered by the technical terms and other words of the claims.” *Netword, LLC v. Centraal Corp.*, 242 F.3d 1347, 1352 (Fed. Cir. 2001) (internal quotation marks omitted).

Less clear, at times, is whether a court or other tribunal has construed a claim *or* whether it has simply compared the claim to prior art or an allegedly infringing technology. While the line between these two inquiries can be fine, the answer could be critical given the different standard of review applicable to each issue on appeal. *Dionex*, 56 F.4th at 1358 (reviewing claim construction determination based on intrinsic evidence *de novo*); *Fleming v. Cirrus Design Corp.*, 28 F.4th 1214, 1221–22 (Fed. Cir. 2022) (reviewing question of whether asserted prior art discloses claim limitation for substantial evidence); *Amgen Inc. v. Hospira, Inc.*, 944 F.3d 1327, 1335 (Fed. Cir. 2019) (noting that infringement presents a question of fact reviewed for substantial evidence when tried to a jury).

To determine whether a court, or the Board, has construed a claim, it is helpful to look to the outcome of the tribunal’s analysis. *See HTC Corp.*, 877 F.3d at 1367 (determining that a claim construction occurred where the Board’s findings established the scope of the patented subject matter). If the outcome of the analysis of the claim term establishes the scope (e.g., boundaries) and meaning of *the patented subject matter*, the court (or the Board) has

mostly likely construed the claim. *See Netword*, 242 F.3d at 1352; *see also Trading Techs. Int'l, Inc. v. Open E Cry, LLC*, 728 F.3d 1309, 1319 (Fed. Cir. 2013). Claim construction may be undertaken prior to or in tandem with the tribunal's review of the allegedly infringing technology or prior art. The point in the proceeding at which the analysis occurs is not dispositive.<sup>2</sup>

## B.

In view of the foregoing backdrop, we turn back to the Board's assessment of the '753 patent's [1m] limitation on appeal. We conclude that the Board construed Claim 1.

The Board stated that “[b]ecause no express construction is needed for our decision, we do not construe any of the claim limitations.” J.A. 15. The Board later concluded, however, that the [1m] limitation “recites five distinct inputs upon which the time is based at least in part” and thus it “requires that each of those inputs be a distinct component of the calculation of the ‘first time prior to said target time.’” J.A. 25. In support of this conclusion, the Board cited several Federal Circuit cases for the proposition that

---

<sup>2</sup> The Board performs both claim construction and factfinding application of the claims, as do trial judges in non-jury cases. However, there are times when different decisionmakers have responsibility for claim construction and factfinding application of the construction. For example, a trial judge construes a claim and gives that construction to a jury for application to facts. In this instance, the jury's application does not establish a claim construction, nor does a post-verdict opinion's substantial evidence review of the application for reasonableness, taking the furnished construction as a given. *See Avid Tech., Inc. v. Harmonic, Inc.*, 812 F.3d 1040, 1048–49 (Fed. Cir. 2016); *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1320–21 (Fed. Cir. 2003).



“[w]here a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention.” J.A. 25–26 (cleaned up) (first quoting *Becton Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010); and then citing *Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404–05 (Fed. Cir. 1996)). On this basis, the Board determined that “[t]here is nothing in the asserted claims to suggest that one piece of data can be used to satisfy multiple inputs.” J.A. 26 (citing *CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co.*, 224 F.3d 1308, 1317 (Fed. Cir. 2000)). The Board then rejected Google’s theory of unpatentability because it did “not use each of the five distinct inputs” and instead “effectively ignore[d] a claim limitation by double counting.” J.A. 26 (“Petitioner uses the ‘one or more thermal performance values of said structure’ to satisfy both inputs [i] and [iii].”).

As an initial matter, the Board’s statement that it was not engaging in claim construction is not dispositive as to whether claim construction occurred. We have found implicit claim constructions even when the Board does not recognize that it is construing a claim. For example, in *HTC*, we held that “[d]espite no express construction of [a claim term] below, [the] Board[’s] findings establish[ed] the scope of the patented subject matter.” *HTC Corp.*, 877 F.3d at 1367. Those “findings,” we concluded, amounted to claim construction. *See id.*

We agree with Google that the Board’s assessment of the [1m] limitation amounts to claim construction. Here, the outcome of the Board’s assessment established the scope of the [1m] limitation. The [1m] limitation lists five enumerated inputs on which the timing for the system to activate is “based at least in part on.” ’753 patent, 9:9–10:3. However, there is nothing on the face of the claim to discern the scope and boundaries of those inputs, e.g., whether one input may be calculated based on another input, and whether they must be distinct or may be entwined. *Id.* To

determine, as the Board did, that no input can be based in part on another input and that each input must be distinct, is to establish a limit to the scope of the [1m] claim limitation. Thus, the Board’s assessment resulted in a construction of the claim. *See Netword*, 242 F.3d at 1350 (concluding that the Board effectuated claim construction where its determination “establish[ed] the scope and boundaries of the subject matter that is patented”); *see also HTC Corp.*, 877 F.3d at 1367. The limiting impact of the Board’s determination is evidenced by the Board’s rejection of Google’s argument that a prior art reference’s measurement could satisfy both the input for [i] and the input for [iii]. *See* J.A. 26. Had the Board instead interpreted the inputs of [1m] as non-distinct, its basis for rejecting Google’s argument would evaporate.

The cases relied on by the Board support our determination that the Board engaged in claim construction. Each of the cases the Board cited relates to interpreting claims in the claim construction context. *See Becton*, 616 F.3d at 1254; *Engel*, 96 F.3d at 1404–05; *CAE*, 224 F.3d at 1317. And the Board relied on these cases to determine the scope and meaning of the claims, a claim construction inquiry.

We conclude that the Board’s assessment qualified as claim construction.

## II. The Board’s Claim Construction is Erroneous

We next turn to the Board’s claim construction. Google argues that the Board’s claim construction is erroneous for two reasons: (1) the Board’s claim construction violated the APA; and (2) the limitations imposed by the Board related to the [1m] inputs are not supported by the intrinsic record or case law. Appellant Br. 44–57.

### A.

The Board’s claim construction did not violate the APA. “[T]he Board may adopt a claim construction of a disputed term that neither party proposes without running afoul of

the APA.” *Qualcomm Inc. v. Intel Corp.*, 6 F.4th 1256, 1262–63 (Fed. Cir. 2021) (collecting cases). The Board, however, cannot, without notice and opportunity for the parties to respond, change theories midstream by adopting a claim construction in its final written decision that neither party requested nor anticipated. *SAS Inst., Inc. v. ComplementSoft, LLC*, 825 F.3d 1341, 1351 (Fed. Cir. 2016), *rev’d on other grounds, SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348 (2018); *see Qualcomm*, 6 F.4th at 1263.

The record establishes that the parties disputed the meaning and scope of the [1m] limitation during the IPR proceeding under the same framework now on appeal.<sup>3</sup> Starting with its petition, Google argued that the prior art disclosed inputs [i], [iii], and [iv] because the reference used inputs [iii] and [iv] to determine input [i]. J.A. 438–39. EcoFactor argued that Google’s use of the same value for two inputs contravened the plain language of the claim, which required distinctly different measurements. *See* J.A. 1263, 1265. Google responded in its Reply that there “is no negative limitation that would prevent” using inputs [iii] and [iv] to calculate input [i]. *See* J.A. 1456. In its Sur-Reply, EcoFactor opposed Google’s argument that the value in the prior art, a historical temperature measurement, could be used to satisfy the two inputs. *See* J.A. 1922. According to EcoFactor, this would render parts of the claim limitation meaningless. *Id.* While an explicit

---

<sup>3</sup> For this same reason, we reject EcoFactor’s argument that Google forfeited its claim construction argument on appeal. *Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1290 (Fed. Cir. 2015) (finding no waiver when a party’s “argument on [an] issue ha[d] been sufficiently consistent” at trial and at the appellate level); *see also In re Google Tech. Holdings LLC*, 980 F.3d 858, 862 (Fed. Cir. 2020) (“[This] court mainly uses the term ‘waiver’ when applying the doctrine of ‘forfeiture.’”).

claim construction was not proposed by either party, both parties recognized that the core issue related to the scope and boundaries of the five inputs enumerated in [1m] and, thus, were afforded both notice and opportunity to address this issue. We hold, therefore, that because Google “had notice of the contested claim construction issues and an opportunity to be heard,” the Board’s claim construction of Claim 1 did not violate the APA. *Hamilton Beach Brands, Inc. v. f’real Foods, LLC*, 908 F.3d 1328, 1339 (Fed Cir. 2018).

### B.

We turn now to whether the Board’s claim construction of the [1m] limitation was erroneous. The claim construction dispute before us is decided solely on intrinsic evidence.<sup>4</sup> The Board determined that the five inputs<sup>5</sup> in the

---

<sup>4</sup> “We are generally hesitant to construe patent claims in the first instance on appeal.” *MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1380 (Fed. Cir. 2019). “Our hesitancy is intended to avoid conflating de novo review with an independent analysis.” *Id.*; see also *Wavetronix LLC v. EIS Elec. Integrated Sys.*, 573 F.3d 1343, 1355 (Fed. Cir. 2009). However, in this case, we are effectively reviewing the Board’s claim construction of the [1m] limitation. In any event, the parties agree that this claim construction dispute can be decided purely on the intrinsic record. Notably, at oral argument, EcoFactor’s counsel conceded that if we conclude that the Board erred and that Google’s reading of the claim is correct, reversal on that construction is appropriate. See Oral Arg. 31:20–31:32; see also *id.* at 31:33–32:12.

<sup>5</sup> The five inputs include: [i] “said one or more thermal performance values of said structure,” [ii] “said performance characteristic of said climate control system,” [iii] “said first internal temperature,” [iv] “said first external

[1m] limitation are “distinct component[s]” that “must be used distinctly from the other listed input[s],” primarily relying on *Becton*, 616 F.3d at 1253–54 and *Engel*, 96 F.3d at 1404 for its conclusion. J.A. 25–27. For the reasons discussed below, we conclude that the Board erroneously construed the [1m] limitation, which is not limited to inputs that are entirely separate and distinct.

“When construing claim terms, we first look to, and primarily rely on, the intrinsic evidence, including the claims themselves, the specification, and the prosecution history of the patent, which is usually dispositive.” *Sunovion Pharms., Inc. v. Teva Pharms. USA, Inc.*, 731 F.3d 1271, 1276 (Fed. Cir. 2013). Here, the claim language supports a broader reading of the [1m] limitation, which must allow for any of the five claimed inputs to potentially be used to calculate another claimed input. The claim language broadly recites that “a first time” is determined “*based at least in part on*” each of the five inputs. ’753 patent, 9:47–61 (emphasis added). This language places no constraint on the manner in which the inputs are used. A patentee “is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning unless the patentee explicitly redefines the term or disavows its scope.” *Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1367 (Fed. Cir. 2012). There is no such redefinition or disavowal here.

Additionally, the specification supports a broader construction of the [1m] limitation than the Board’s construction. The specification contains no restrictive language and does not explicitly require that the claim inputs be separate. To the contrary, the specification contemplates an embodiment in which one claimed input is calculated based on at least one other claimed input. *See* ’753 patent, 5:47–

---

temperature,” and [v] “the forecasted temperature.” ’753 patent, 9:50–54.

49. “We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.” *Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008). In this instance, the Board’s claim construction excluding such an embodiment is incorrect.

In construing the [1m] limitation, the Board relied on *Becton*, 616 F.3d at 1253–54, and *Engel*, 96 F.3d at 1404. These cases, however, do not mandate the Board’s narrow construction of the [1m] limitation. These cases do not create a *per se* rule that separately listed claim elements are distinct components, regardless of the intrinsic record. Indeed, in *Becton*, we looked to the specification to confirm that the claim element “spring means” was separate from a hinged arm element. 616 F.3d at 1254. Rather, we have explained that there is a “presumption” that separately listed claim limitations may indicate separate and distinct physical structure, but that presumption may always be rebutted in the context of a particular patent. *See, e.g., Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231–32 (Fed. Cir. 2011). Here, the claim language and specification rebut any presumption that the five inputs listed in the [1m] limitation are distinct components that must be used distinctly from other listed inputs.

In construing the [1m] limitation, the Board also relied on *CAE*, 224 F.3d at 1317, to support what appears to be a claim differentiation determination that “nothing in the asserted claims [] suggest[s] that one piece of data can be used to satisfy multiple inputs.” J.A. 26. But the doctrine of claim differentiation only creates a rebuttable presumption that each claim in a patent has a different scope; it is a guide, not a rigid rule of claim construction. *See Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1380–81 (Fed. Cir. 2006). Here, the claim language and the specification rebut such a presumption.

In sum, both the claim language and the specification support a broader construction than the Board accorded

the [1m] limitation. The proper construction of the term must allow for any of the five claimed inputs to potentially be used to calculate another claimed input. We agree, then, with Google's proposed construction, which simply "require[s] that each of the five inputs be used at some point during the determination of the first time prior to said target time." Appellant Br. 52 (emphasis and quotation marks omitted). Based on the foregoing, we vacate the Board's Final Written Decision and remand with instructions that the Board apply this construction on remand.

#### CONCLUSION

We conclude that the Board construed the [1m] limitation in Claim 1 and that its construction is erroneous. We therefore reverse the Board's construction, vacate the Board's Final Written Decision, and remand for further proceedings under the correct construction of the [1m] limitation.

#### **VACATED AND REMANDED**

#### COSTS

No costs.