

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

**A. O. SMITH CORPORATION, AOS HOLDING
COMPANY,**
Plaintiffs-Appellees

v.

BRADFORD WHITE CORPORATION,
Defendant-Appellant

2021-2222

Appeal from the United States District Court for the
District of Delaware in No. 1:18-cv-00412-LPS, Judge
Leonard P. Stark.

Decided: August 3, 2022

S. EDWARD SARSKAS, Michael Best & Friedrich LLP,
Milwaukee, WI, argued for plaintiffs-appellees. Also rep-
resented by KENNETH M. ALBRIDGE, III, Madison, WI; KYLE
GLENDON HEPNER, Washington, DC.

JAMES R. BARNEY, Finnegan, Henderson, Farabow,
Garrett & Dunner, LLP, Washington, DC, argued for de-
fendant-appellant. Also represented by RYAN VALENTINE
MCDONNELL.

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

Opinion for the court filed by *Circuit Judge* TARANTO.

Concurring opinion filed by *Circuit Judge* DYK.

TARANTO, *Circuit Judge*.

AOS Holding Company, which is wholly owned and controlled by A. O. Smith Corporation, owns U.S. Patent No. 8,375,897, titled “Gas Water Heater.” The two companies (collectively, A.O. Smith), the only persons permitted to practice or profit from the invention embodied in the patent, brought the present action against Bradford White Corporation in the U.S. District Court for the District of Delaware, alleging infringement of the patent’s claim 1 (the patent’s sole claim), which identifies a “method of interfacing a natural convection vent construction with a water heater.” ’897 patent, col. 6, lines 9–10. The district court held that Bradford White infringed claim 1 and that the claim was not invalid. Bradford White appeals both determinations. We affirm.

I

The short specification of the ’897 patent describes the operation of a hot-water heater system, using a burner containing a blower, a flue tube running through a water tank, and exhaust components. A burner burns a “fuel/air mixture,” and the resulting “products of combustion” are forced, by the burner’s blower, into a “flue tube **65** under positive pressure.” ’897 patent, col. 3, lines 15–18. The flue tube (which may have bends in it to increase surface area) extends through the tank and functions as a heat exchanger to heat the surrounding water. *Id.*, col. 4, lines 54–60; *see* fig. 2. At the outlet of the flue, the products enter an exhaust plenum, where their pressure drops to “near or below atmospheric pressure, and the products of combustion are therefore able to rise out of the plenum **70** and into

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the draft hood **75** substantially entirely under the influence of natural convection.” *Id.*, col. 4, lines 5–9. In the draft hood, the products mix with ambient air. *Id.*, col. 4, lines 9–11. The invention may also have a baffle in the flue tube “to reduce the velocity and pressure of the products of combustion as they approach the outlet end.” *Id.*, col. 3, lines 54–57.

The plenum and baffle, the specification says, “may be said to uncouple the flow of the products of combustion from the power burner”—“[i]n other words, the products of combustion enter the plenum **70** under the influence of the power burner **60**, but exhaust from the plenum **70** without the influence of the power burner **60**.” *Id.*, col. 4, lines 12–17. The specification immediately adds: “Thus, the present water heater **10** can be retrofitted into a Category I venting system despite the fact that the water heater **10** utilizes a power burner **60**.” *Id.*, col. 4, lines 17–19. That language refers to the standard industry classification of venting systems, embodied in the National Fuel Gas Code, which explains that a Category I vented appliance is one with nonpositive vent static pressure and a vent gas temperature that avoids excessive condensate production. J.A. 242; J.A. 28.¹

Claim 1 reads:

1. A method of interfacing a natural convection vent construction with a water heater, the method comprising:

¹ The Code describes Categories I through IV as the four possible combinations of (a) vent static pressure that is either nonpositive or positive (relative to atmospheric pressure) and (b) vent gas temperature that either avoids or may cause excessive condensation. See J.A. 28–29; J.A. 242.

providing a water heater having a burner, a blower, and a flue;

creating products of combustion with the burner;

forcing the products of combustion into the flue under positive pressure with the blower;

interposing an exhaust plenum between the flue and the natural convection vent construction;

dropping the pressure of the products of combustion to near atmospheric pressure within the plenum; and

permitting the products of combustion to rise out of the plenum and into the natural convection vent construction substantially entirely under the influence of natural convection;

wherein the natural convection vent construction includes a draft hood, the method further comprising mixing ambient air with the products of combustion as the products of combustion flow into the draft hood.

'897 patent, col. 6, lines 9–27.

A.O. Smith sued Bradford White for infringement in March 2018. It alleged that Bradford White was directly and indirectly infringing claim 1 through sales and other activities involving several Bradford White models of water heaters. J.A. 154, 160. Bradford White counterclaimed for invalidity and non-infringement.

The parties first sought an early claim-construction hearing addressing the phrase “substantially entirely under the influence of natural convection” in the permitting limitation. Bradford White argued that the phrase was indefinite—thus invalidating the claim—because a relevant artisan would not understand the degree of influence that the power burner and other factors exert on the products

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as they enter the vent. The court disagreed with Bradford White's contention and instead adopted A.O. Smith's proposed construction: "[a]t a pressure near or below atmospheric pressure and without the influence of the power burner, such that a Category I venting system can be used." J.A. 118. The court determined that the claim, read in light of the specification, particularly the specification's reference to Category I venting, provides sufficient instruction to a relevant artisan. J.A. 119–20. Subsequently, the parties sought a construction of the term "natural convection" within the same claim phrase. The court construed "natural convection" to mean "fluid motion compatible with use of a Category I venting system," consistent with its earlier construction of the entire claim phrase. J.A. 110–11.

The district court then held a bench trial on infringement and on invalidity for anticipation or obviousness (as well as on damages issues, including willfulness, not before us). The court found that Bradford White directly and indirectly infringed claim 1. The infringement dispute turned on whether Bradford White (and its customers) performed, using specified Bradford White water heaters, the limitation regarding "permitting the products of combustion to rise out of the plenum . . . substantially entirely under the influence of natural convection" (the "permitting" limitation). J.A. 68–69. The court found that Bradford White (and its customers) performed the permitting limitation, relying on evidence, including expert testimony, that "the negative static pressure of the products of combustion leaving the plenum" and the accused products' "Category I certification" demonstrated that the products of combustion in the accused products rise out of the plenum and into the vent "at a pressure near or below atmospheric pressure and without the influence of the power burner, such that a Category I venting system can be used." *See* J.A. 42, 68–73.

The court also rejected Bradford White's invalidity challenges, including the contention that claim 1 is invalid

for anticipation by a prior-art patent to Tam (U.S. Patent No. 5,228,413). J.A. 94–97. Only the Tam-based anticipation argument is before us, as to which it suffices for us to focus on whether Tam teaches the “dropping” limitation of the ’897 patent’s claim 1—requiring “dropping the pressure of the products of combustion to near atmospheric pressure within the plenum.” The district court held that the dropping limitation requires that the products of combustion be at a positive pressure before they enter the plenum, so that the claim does not encompass a situation in which the products are already negative in pressure when they enter the plenum and drop to a more negative (but still “near atmospheric”) pressure. J.A. 62–64. Under that construction, the district court found that Tam does not disclose the dropping limitation (or render a modification to perform that limitation obvious, an issue not raised on appeal here). J.A. 95–99.

Bradford White timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

II

Claim construction is ultimately a question of law, decided de novo on review, as are the intrinsic-evidence aspects of a claim-construction analysis. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331–32 (2015). Subsidiary factual determinations based on extrinsic evidence are reviewed for clear error. *Id.*

A

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For infringement, the only dispute involves the permitting limitation. Bradford White challenges an aspect of the district court’s construction of that limitation, namely, the construction of “natural convection” as meaning “fluid motion compatible with use of a Category I venting system.” J.A. 110; Bradford White’s Br. at 25; *id.* at 2 (statement of first issue); *id.* at 22 (summary of argument). Bradford

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White argues that this construction improperly departs from the ordinary meaning of the claim term “natural convection” shown in a dictionary definition, without the assertedly required redefinition or disavowal of that dictionary meaning. *Id.* at 25–26. We reject this contention.

The premise of Bradford White’s argument is that the phrase “natural convection” is to be read in isolation to determine its ordinary meaning, with a dictionary definition of the phrase in isolation to be given controlling force unless overcome by a clear enough redefinition or disavowal. That premise is incorrect. “[T]he context of the surrounding words of the claim . . . must be considered in determining the ordinary and customary meaning of those terms.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) (quoting with approval *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003)). Moreover, “the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.* at 1313; *see id.* at 1315–16 (stressing central importance of specification). Here, these principles justify the district court’s construction of “natural convection” in the challenged respect.

The claim phrase at issue, “natural convection,” is part of the requirement of permitting the combustion products to rise out of the plenum into the vent structure “substantially entirely under the influence of natural convection.” The phrase as a whole was construed to mean “[a]t a pressure near or below atmospheric pressure and without the influence of the power burner, such that a Category I venting system can be used.” J.A. 118. Bradford White does not challenge the portion of that construction requiring pressure near or below atmospheric pressure; nor does it challenge the “influence” portion of the construction or the district court’s elaboration of that portion to preclude the

burner from being a “significant influence” on the rising process at issue, J.A. 120; *see also* J.A. 111, which must occur “substantially entirely” under the influence of natural convection, J.A. 119. This surrounding claim language, as construed in unchallenged respects, provides essential context for understanding the “natural convection” term as used in the integrated set of terms linking pressure and the degree of influence of the burner on the rising process. Indeed, Bradford White recognizes that the issue is not the construction of the phrase “natural convection” by itself but also the “such that a Category I venting system can be used” construction of the permitting limitation as a whole—which Bradford White has to challenge as well for its challenge to the construction of “natural convection” to matter. *See* Bradford White’s Br. at 33 n.3. As the district court explained, this claim-language context invites clarification from the specification, without the need for what would amount to redefinition or disclaimer of a meaning already plain from the claim itself. *See* J.A. 109–10 (looking to specification for “a baseline” for the “substantially entirely” requirement and “for determining whether pressure has been dropped [to] near atmospheric pressure”).

The specification in this case provides that clarification, and it compellingly supports the district court’s reading of “natural convection” in context. The specification discloses the relationship of natural convection and atmospheric venting. *See, e.g.*, ’897 patent, col. 4, lines 5–11. More pointedly, the specification is explicit that “the present water heater [] can be retrofitted into a Category I venting system despite the fact that the water heater [] utilizes a power burner.” *Id.*, col. 4, lines 17–19; *see also id.*, col. 5, lines 26–29 (explaining that the invention can replace “an existing atmospheric water heater”). A.O. Smith did not need to repeat itself to make the point clear in this short and to-the-point specification: A requirement of the claimed invention was compatibility with the installed base of Category I venting systems into which the water

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heater operating according to the invented method could be “retrofitted.”²

For the foregoing reasons, we affirm the district court’s inclusion of its requirement concerning Category I compatibility in its claim construction.

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In Bradford White’s brief, the statement of the issue and the argument headings regarding the permitting limitation are limited to disputing the inclusion of the Category I requirement in the claim construction, as discussed above, and asserting that such inclusion, if error, was harmful, requiring a new trial. *See* Bradford White’s Br. at v–vi (headings); *id.* at 2 (statement of issues); *id.* at 25–33 (arguing that the claim construction of the permitting limitation is incorrect); *id.* at 33–39 (arguing that correcting the claim-construction error requires a new trial); *see also id.* at 22 (summary of argument). Bradford White does not present a separate argument to this court that the evidence cannot support the finding that it practices (or induces practice of) the permitting limitation even if we conclude that the Category I construction is correct, as we do.

² The district court adopted its claim construction before trial, but trial evidence later supported what the specification itself indicates about the relationship between Category I compatibility and the claim. For example, A.O. Smith’s expert explained that Category I venting standards, which require a nonpositive vent pressure, J.A. 242, are equivalent to exhaustion by natural convection and atmospheric venting, *see* J.A. 706–07; J.A. 714–15; J.A. 747, and a Bradford White witness testified that “atmospheric vent[ing]” is synonymous with Category I venting, J.A. 780–81.

In its harmful-error argument, however, Bradford White contends that certain language in the district court’s findings and conclusions on the permitting limitation suggests a view—which Bradford White asserts is legal error, given the ’897 specification—that the “velocity or flow” of combustion products (in contrast to pressure) is simply immaterial under the ’897 patent. Bradford White’s Br. at 36–38. We need not and do not decide whether Bradford White has adequately raised a legal argument along these lines, or whether it is correct in such an argument, for consideration independently of its challenge to the Category I venting claim construction, which we have rejected. Even if we so assume, we see no basis to set aside the court’s determination that the permitting limitation was met here. We read the district court’s opinion as relying independently on an evidentiary finding that reasonably assigned little if any probative weight to the evidence regarding velocity presented in this case and instead found that the evidence based on pressure, together with the meaning of the Category I certification of the accused products, proves satisfaction of the permitting limitation.

The district court held that both “the negative static pressure of the products of combustion leaving the plenum” in the accused products, and the products’ “Category I certification,” persuasively prove satisfaction of the permitting step. J.A. 42. The court determined that, consistent with industry standards and Category I requirements, “analyzing pressure ‘is a definitive way’ of determining whether the products of combustion are substantially entirely under the influence of natural convection.” J.A. 22–23. It also credited A.O. Smith’s expert testimony that pressure measurements in the accused products indicated that the products of combustion dropped within the plenum to a pressure that would allow them to rise into the vent substantially entirely under the influence of natural convection. J.A. 41. And it explained that “[t]he negative pressure at the plenum exit means that there is no longer any

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significant power burner influence on the products of combustion at that point.” J.A. 68–69. In addition to considering pressure measurements, the court found that Bradford White’s relevant products have been certified as Category I compliant. J.A. 69. And it found that, if the power burner exerted significant influence in the plenum of the accused products, there would be “spilling, leakage, and an inability to obtain Category I compliance.” *Id.*

The district court also gave evidentiary reasons, with sufficient record support, for not crediting the velocity measurements introduced by Bradford White. The district court credited testimony from A.O. Smith’s expert that, in the view of a relevant artisan, “velocity cannot be used to judge the influence of the blower,” J.A. 72, because velocity can “be a product of both natural convection and anything else,” J.A. 38 (quoting J.A. 868), rather than an indication of blower influence specifically. The district court also rejected Bradford White’s velocity measurements because its expert, who did not qualify as a relevant artisan at the priority date, *see* J.A. 26, 70, did not measure velocity in the products’ “steady-state, intended operation,” J.A. 73.

We have been shown no clear error in the foregoing findings, for which the district court pointed to clear supporting evidence. More generally, we have been shown no clear error in the overall finding that the Category-I-compliant accused products permit venting by natural convection without a significant influence of the burner, thus meeting the permitting limitation. For these reasons, we affirm the district court’s determination that Bradford White directly and indirectly infringes claim 1.

B

For invalidity, the only dispute is over anticipation by Tam. The dispositive issue is whether Tam teaches the dropping limitation of the ’897 patent’s claim 1. The district court held that it does not, relying on its construction of the dropping limitation—“dropping the pressure of the

products of combustion to near atmospheric pressure within the plenum”—as requiring the pressure of the combustion products to be positive before entering the plenum. J.A. 63, 96. Bradford White challenges that claim construction. Bradford White’s Br. at 39. We reject this challenge.

We agree with the district court that a “drop[] . . . to near atmospheric pressure within the plenum” is most reasonably read to mean a drop from outside to inside the range defined by “near atmospheric pressure.” *See* J.A. 63–64. That is the ordinary-language meaning, which does not naturally encompass a situation where the pressure before the combustion products enter the plenum is already below atmospheric, *i.e.*, negative (in the “near atmospheric” range), and the pressure then drops to still further below atmospheric pressure (but still in the “near atmospheric” range) when the products are in the plenum. Expert testimony explaining how a relevant artisan would interpret the claim phrase, credited by the district court, made the same point. J.A. 63–64; J.A. 959–60. This construction is also consistent with the specification. The patent explains that the products of combustion are forced into the flue “under positive pressure,” ’897 patent, col. 3, lines 15–18, and as they exit the flue, they “enter the plenum **70** under the influence of the power burner **60**, but exhaust from the plenum **70** without the influence of the power burner **60**,” *id.*, col. 4, lines 14–17. This central description of the overall operation of the invention suggests that the products are at positive pressure (outside the “near atmospheric” range) before entering the flue due to burner influence, and drop to negative pressure (in the “near atmospheric” range) only in the plenum, so that the process satisfying the permitting limitation may occur. *See* J.A. 31; J.A. 866; J.A. 966.

Bradford White contends that the district court’s adopted construction reads out the “creep and spill” embodiment from the scope of claim 1. But we agree with the district court that the claim language at issue here is clear enough that the proper construction would not be altered

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even if one embodiment set forth in the specification were not covered. *See* J.A. 64 (citing *TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008) (claims often do not encompass all embodiments)). Moreover, Bradford White has not shown that a relevant artisan would have understood that, in the identified embodiment, the pressure of the combustion products before they enter the plenum would actually be negative. Bradford White relies on certain testimony from its expert, but, as already noted, the district court determined that the expert did not qualify as a relevant artisan at the priority date, a finding unchallenged on appeal. And the testimony was only that, in the embodiment at issue, the products would have “very little” energy and pressure and would be “near” atmospheric pressure at the flue exit, J.A. 1316–17, testimony not tied to the claim construction of “near atmospheric pressure,” J.A. 109–10, a construction that is not challenged on appeal. This testimony does not justify departing from the claim construction of the dropping limitation adopted by the district court and used to reject anticipation by Tam.

There is no dispute in this appeal that, if the district court’s construction of the dropping limitation is correct, Tam does not anticipate the challenged claim. We thus affirm the court’s judgment of no invalidity.

III

For the foregoing reasons, we affirm the court’s final judgment.

The parties shall bear their own costs.

AFFIRMED

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
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Appeal from the United States District Court for the
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Leonard P. Stark.

DYK, *Circuit Judge*, concurring.

I join section II.B of the majority’s opinion finding no
invalidity of the dropping limitation. With respect to the
permitting limitation, I agree with the result reached by
the majority to affirm the district court’s infringement find-
ing but by a different path.

The district court’s original construction of the permit-
ting limitation came inbi response to defendant Bradford
White Corporation’s (“Bradford”) indefiniteness challenge.
The construction appeared to make Category I compliance

a necessary, but not sufficient, condition of the permitting limitation. J.A. 118 (“At a pressure near or below atmospheric pressure and without the influence of the power burner, such that a Category I venting system *can be used*.”) (emphasis added). The same is true for the district court’s subsequent construction of the permitting limitation before trial. J.A. 110 (“[F]luid motion *compatible with* use of a Category I venting system.”) (emphasis added).

After trial, the district court appeared to hold for the first time that satisfying the Category I compliance standard itself established infringement of the permitting limitation. It found that “if the products of combustion were still under the influence of the power burner . . . the Accused Products could not be certified as Category I compliant and, consequently, a Category I venting system could not be used,” J.A. 42 (internal quotations omitted), ultimately concluding that “[t]he evidence demonstrate[d] that . . . there [was, at the time of venting] no longer . . . any remaining significant influence from the power burner on the products of combustion; natural convection has taken over such that Category I compliance can be achieved,” J.A. 69. *See also* J.A. 70 (“The patent is about enabling Category I venting. . .”).

Unlike the majority, which approves of the post-trial Category I construction, this seems to me to be an incorrect claim construction. The claim language on its face requires that the influence of the blower be substantially entirely eliminated so that the products of combustion rise out of the plenum “substantially entirely under the influence of natural convection.” ’897 patent, col. 6, ll. 22–23. That the permitting limitation as a matter of claim construction cannot be satisfied simply by the gasses being at a negative pressure is shown by the fact that the claim includes an additional and separate limitation (the “dropping” limitation) requiring negative pressure. *See id.*, col. 6, ll. 18–19.

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The specification is not to the contrary. Its sole reference to Category I venting merely states that the water heater *is able to* achieve Category I compliance because it “can be retrofitted into a Category I venting system,” *id.*, col. 4, ll. 17–18, not that Category I compliance is sufficient for the products of combustion to rise out of the plenum without the influence of the power burner.

Nonetheless, as the majority points out, the district court did not rely solely on claim construction as to Category I compliance to establish infringement. Its conclusion that the power burner’s influence had been sufficiently eliminated was also based on a factual finding that evidence of negative pressure showed a lack of influence from the power burner. The district court credited expert testimony that “analyzing pressure is a definitive way of determining whether the products of combustion are substantially entirely under the influence of natural convection,” J.A. 23 (internal citations and quotations omitted), and tests revealing “positive static pressure of the products of combustion entering the plenum” and “negative static pressure of the products of combustion leaving the plenum [],” J.A. 41. According to the district court, the measured negative pressure showed that “there [was] no longer any significant power burner influence . . . at that point.” J.A. 68–69 (internal citations omitted).

This factual determination seems to me open to question since the patent itself appears to assume that negative pressure does not preclude influence of the power burner. But as the majority points out, Bradford does not challenge this fact finding on appeal. Under these circumstances, the district court’s factual finding is sufficient to affirm the judgment of infringement with respect to the permitting limitation.