

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

**ETHANOL BOOSTING SYSTEMS, LLC,
MASSACHUSETTS INSTITUTE OF TECHNOLOGY,**
Appellants

v.

FORD MOTOR COMPANY,
Appellee

**JOHN A. SQUIRES, UNDER SECRETARY OF
COMMERCE FOR INTELLECTUAL PROPERTY
AND DIRECTOR OF THE UNITED STATES
PATENT AND TRADEMARK OFFICE,**
Intervenor

2024-1381, 2024-1382, 2024-1383

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2021-
00339, IPR2021-00340, IPR2021-00341.

Decided: December 23, 2025

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argued for appellants. Also represented by MATTHEW
ROBERT BERRY, ANDRES HEALY.

2 ETHANOL BOOSTING SYSTEMS, LLC v. FORD MOTOR COMPANY

ANDREW JAMES LIGOTTI, Alston & Bird LLP, New York, NY, argued for appellee. Also represented by ERIN BEATON, KIRK T. BRADLEY, MICHAEL S. CONNOR, CHRISTOPHER TIMOTHY LAWN DOUGLAS, Charlotte, NC.

MICHAEL S. FORMAN, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for intervenor. Also represented by PETER J. AYERS, ROBERT J. MCMANUS.

Before CHEN, CLEVINGER, and HUGHES, *Circuit Judges*.

CHEN, *Circuit Judge*.

Massachusetts Institute of Technology and Ethanol Boosting Systems, LLC (collectively, EBS) appeal from final written decisions in three *inter partes* reviews by the Patent Trial and Appeal Board (Board), the first holding claims 1, 2, 5–15, 18, 20–21, 23, 25, 27–29, and 31 of U.S. Patent No. 10,619,580 unpatentable as obvious under 35 U.S.C. § 103, the second holding claims 1, 4, 6–15, 18, 20–29, 31, and 33 of U.S. Patent No. 10,791,760 unpatentable as obvious, and the third holding claims 1, 3–5, 11–17, 19, and 21 of U.S. Patent No. 9,708,965 unpatentable as obvious. *See Ford Motor Co. v. Ethanol Boosting Sys.*, No. IPR2021-00339, 2023 WL 8039802 (P.T.A.B. Nov. 20, 2023) (*'580 Decision*); *Ford Motor Co. v. Ethanol Boosting Sys.*, No. IPR2021-00340, 2023 WL 8040878 (P.T.A.B. Nov. 20, 2023) (*'760 Decision*); *Ford Motor Co. v. Ethanol Boosting Sys.*, No. IPR2021-00341, 2023 WL 8041916 (P.T.A.B. Nov. 20, 2023) (*'965 Decision*). We *affirm* all three Board decisions.

BACKGROUND

I

Massachusetts Institute of Technology owns U.S. Patent Nos. 10,619,580 (*'580 patent*), 10,781,760 (*'760*

patent), and 9,708,965 ('965 patent). It exclusively licensed all three to EBS.

The '580 patent, representative of the three challenged patents, proposes an optimized fuel management system for internal combustion engines. *See* '580 patent at Abstract. Standard internal combustion engines suffer from “engine knock.” This phenomenon occurs when the fuel/air mixture in the engine cylinder unintentionally detonates, which reduces efficiency and damages the engine. The '580 patent, seeking to mitigate engine knock, proposes a fuel management system which injects an “anti-knock agent” directly into the engine cylinder. *See id.* at col. 1 ll. 31–34. Doing so, according to the patent, causes “evaporative cooling” in the cylinder, which drops the cylinder temperature further from the mixture’s ignition point. *See id.* at col. 2 l. 64–col. 3 l. 1.

The claimed fuel management system contains two injection mechanisms: (1) direct injection and (2) port injection. *See id.* at claim 1. In the former, a valve sprays the fuel directly into the cylinder, whereas in the latter, a valve sprays the fuel into a passageway adjacent to the cylinder, which then mixes with air before it is introduced into the cylinder. At lower values of engine torque, only the port injector operates.¹ But for higher values of torque, both injection mechanisms kick in, and in this regime, as the torque increases, the direct injector supplies an increasingly greater percentage of the fuel (as compared to the port injector). *Id.* Finally, the claimed fuel management

¹ The '580 and '760 patents both focus on *torque* ranges when selecting which injection mechanisms operate. *See* '580 patent at claim 1; '760 patent at claim 1. The '965 patent instead focuses on *manifold pressure* ranges when deciding which injection mechanisms operate. *See* '965 patent at claim 1. This difference does not impact the appeal.

4 ETHANOL BOOSTING SYSTEMS, LLC v. FORD MOTOR COMPANY

system also includes a “three-way catalyst” for reducing emissions.

Claim 1, representative for appeal, recites:

1. A fuel management system for a spark ignition engine, comprising:

a first fueling system that uses direct injection;

a second fueling system that uses port fuel injection; and

a three-way catalyst configured to reduce emissions from the spark ignition engine,

wherein the fuel management system is configured to provide fueling in a first torque range, the first torque range being a first range of torque values at which both the first fueling system and the second fueling system are operable throughout the first range of torque values,

wherein the fuel management system is further configured such that a fraction of fueling provided by the first fueling system is higher at a highest value of torque in the first torque range than in a lowest value of torque in the first torque range,

wherein the fuel management system is further configured to provide fueling in a second torque range, the second torque range being a second range of torque values at which the second fueling system is operable throughout the second range of torque values and the first fueling system is not operable throughout the second range of torque values,

wherein the fuel management system is further configured such that when the system provides fueling at a torque value that exceeds the second range of torque values, the spark ignition engine is operated in the first torque range, and

wherein the spark ignition engine is configured to operate at a stoichiometric air/fuel ratio in at least part of the first torque range and in at least part of the second torque range.

'580 patent at claim 1.

II

Our court has seen these patents before, albeit in an appeal from a district court. *See Ethanol Boosting Sys., LLC v. Ford Motor Co.*, No. 21-1949, 2022 WL 2798395 (Fed. Cir. July 18, 2022) (*EBS I*).

In October 2020, EBS filed suit against Ford for infringing these three challenged patents. J.A. 9038–87. As EBS and Ford do here, EBS and Ford there disputed the meaning of terms recited in the limitations involving the direct injection mechanism, e.g., “directly inject[ed] *fuel*” in claim 1 of the '965 patent, and “*fueling* system that uses direct injection” in claim 1 of the '580 and '760 patents. *See* J.A. 10095–96 (emphases added). The parties collectively refer to these disputed terms as the “DI Fuel terms,” and we do too. *See* Appellant Br. 9; Appellee Br. 5.

In the district court litigation, EBS opted for the plain and ordinary meaning, and proposed no constraints on the term (in contrast to its narrower view of the claim in the current patentability challenge). Ford thought differently. It understood the DI Fuel terms to require a fuel that (1) is different from the fuel used in the port injection system and (2) contains an anti-knock agent other than gasoline.

Ford's proposed construction included these two constraints.

Ford, while awaiting the district court's decision on the claim construction, petitioned for *inter partes* review (IPR) of all three patents on December 24, 2020. *See* J.A. 316–414, 13454–539, 26982–7066. In Ford's petitions, it proposed construing the DI Fuel terms under their plain and ordinary meaning, just as EBS advocated for in the district court litigation. *See* J.A. 329 (“Petitioner adopts Patent Owner's construction and does not limit the type of P[ort] I[n]jection] or D[irect] I[n]jection] fuel used.”).

On March 25, 2021, before the Board ruled on whether to institute IPRs on Ford's petitions,² the district court issued its claim construction decision adopting Ford's construction requiring (1) different fuel for direct injection and port injection and (2) an anti-knock agent other than gasoline. *See* J.A. 11982–87. It then granted judgment of non-infringement in light of a stipulation by the parties. EBS timely appealed, leading to our *EBS I* decision.

A few months after the district court's claim construction order, on July 2, 2021, the Board denied institution on all three IPR petitions. *See* J.A. 512. The Board primarily did so because it construed the DI Fuel terms to require a fuel different from the fuel used in the port injector, just as the district court reasoned. *See* J.A. 525–26 (“[T]hat is, we

² While the Director has historically delegated institution decisions to the Board, *see* 37 C.F.R. § 42.4; *Ethicon Endo-Surgery, Inc. v. Covidien LP*, 812 F.3d 1023, 1028 (Fed. Cir. 2016), the Director recently announced that he will reclaim authority over those determinations. *See* John A. Squires, Open Letter from America's Innovation Agency and Memorandum (Oct. 17, 2025), https://www.uspto.gov/sites/default/files/documents/open-letter-and-memo_20251017.pdf (last visited Nov. 20, 2025).

determine that the fuel terms do not encompass single fuel systems.”). Under that construction, Ford’s prior-art challenge fell short. *Id.* at 529.

Ford petitioned for rehearing on August 2, 2021, explaining that EBS had appealed the district court’s construction and urging the Board to reconsider its institution denial once our court issued a decision on EBS’s appeal. *See* J.A. 540–41. The Board granted Ford’s rehearing request on November 21, 2022, just a few months after we issued our *EBS I* decision, concluding that Ford showed a reasonable likelihood of EBS’s claims being found unpatentable in light of our intervening claim construction in *EBS I*. *See* J.A. 581–95; *EBS I*, 2022 WL 2798395.

III

Importantly, for purposes of the current appeal, EBS in the prior *EBS I* appeal only took issue with the first portion of the district court’s claim construction of the DI Fuel terms, i.e., requiring that the directly injected fuel is different from the fuel used for port injection. *See* J.A. 13263 at 14 n.2 (explaining, in its opening brief for *EBS I*, that EBS appeals only one portion of the district court’s claim construction). Ford likewise understood EBS to not appeal the second portion of the district court’s claim construction, i.e., that gasoline cannot serve as the anti-knock agent. *See* J.A. 13337.

We vacated the district court’s non-infringement order because we disagreed with the appealed portion of the district court’s construction of “fuel.” *See EBS I*, 2022 WL 2798395, at *3. Nothing in the claims, we explained, required the directly injected fuel to differ from the port injected fuel. *Id.* at *2. And the specification expressly disclosed a 100% ethanol, i.e., ethanol-only, embodiment; the district court’s requirement of differing fuels would exclude this disclosed embodiment from the scope of the claims. *See id.* (citing ’580 patent col. 3 ll. 34–38). We therefore rejected the district court’s construction, which

excluded a single fuel embodiment from the claims, and remanded back to the district court. We, however, never addressed the portion of the district court's construction that required the DI Fuel terms to require an anti-knock agent that was not gasoline.

IV

That bring us to the Board's IPR decision below. The Board, in relevant part, first grappled with the claim construction of "fuel." *See '580 Decision*, 2023 WL 8039802, at *4. EBS contended that the DI Fuel terms cannot rely on gasoline as the anti-knock agent because, in its view, our *EBS I* decision made that construction "controlling law." J.A. 729. The Board disagreed that this latter portion of the district court's original construction of the DI Fuel terms was "controlling" for the IPR proceeding, given that neither party to the district court litigation appealed that portion of the construction. *'580 Decision*, 2023 WL 8039802, at *4. Because neither party offered any argument to support a particular construction of the DI Fuel terms, aside from EBS's rejected "controlling law" assertion, the Board opted for the plain and ordinary meaning. *Id.*

The Board next found a motivation to combine the various asserted prior art references for each ground raised. *See id.* at *6–9 (ground 1), *24–27 (ground 2). It found that the proposed prior-art combinations disclosed the disputed claim limitations.

EBS appeals. And in so doing, it offers three general arguments. First, EBS contends the Board lacked the authority to "stay" its rehearing decision on institution for fifteen months to await our decision in *EBS I*, and therefore, asks us to dismiss the proceeding altogether because the grant of institution followed from the alleged *ultra vires* agency action. *See* Appellant Br. 3. Second, EBS raises several arguments for why the Board erred by construing DI Fuel terms to encompass a gasoline-only anti-knock

agent. *See id.* at 19–20. Third, and finally, EBS challenges the Board’s factual findings on (1) motivation to combine and (2) whether the prior art teaches various limitations. *See id.* at 40.

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

STANDARD OF REVIEW

“We decide legal issues de novo, including whether a statute precludes judicial review and whether challenged agency action is ‘not in accordance with the law or without observance of procedure required by law.’” *IGT v. Zynga Inc.*, 144 F.4th 1357, 1365 (Fed. Cir. 2025) (quoting 5 U.S.C. § 706).

We review the Board’s legal determinations de novo, but its fact findings for substantial evidence. *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769 (Fed. Cir. 2018). We thus review claim construction de novo, but review subsidiary fact findings for substantial evidence. *Id.* Similarly, we review the Board’s ultimate conclusion of obviousness de novo, but review its underlying findings of fact for substantial evidence. *Best Med. Int’l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022).

DISCUSSION

I

We begin with EBS’s allegation that the Board erred in issuing its reconsideration of institution decision. EBS frames it this way: because the Board had no authority to “stay” its decision on Ford’s rehearing petition (which was pending for over a year), and because the Board granted institution only after issuing the “stay,” we must instruct the Board to dismiss the proceedings. *See* Appellant Br. 31. EBS effectively asks us to de-institute the IPRs.

That argument, however, conflicts with 35 U.S.C. § 314(d)’s reviewability bar for IPR institution determinations and precedent interpreting that provision.

Section 314(d) bars us from reviewing the Director’s decision to institute an inter partes review. *See* 35 U.S.C. § 314(d) (“The determination by the Director whether to institute an inter partes review under this section shall be final and nonappealable.”); *Thryv, Inc v. Click-To-Call Techs., LP*, 590 U.S. 45, 52–53 (2020); *IGT*, 144 F.4th at 1365; *ESIP Series 2, LLC v. Puzhen Life USA, LLC*, 958 F.3d 1378, 1386 (Fed. Cir. 2020). EBS’s challenge, if accepted, would require us to uproot the finality of the Board’s reconsideration decision, and we have already held that an attack on a Board’s reconsideration decision looks no different than an attack on its institution decision. *See Medtronic, Inc. v. Robert Bosch Healthcare Sys., Inc.*, 839 F.3d 1382, 1384 (Fed. Cir. 2016) (“It is difficult to conceive of a case more ‘closely related’ to a decision to institute proceedings than a reconsideration of that very decision.”). Section 314(d)’s bar on reviewability thus applies, and bars EBS’s challenge to the Board’s reconsideration of institution.

EBS instead characterizes its challenge as an attack on the Board’s purportedly *ultra vires* “stay”—which consequently tainted its institution decision—rather than on the institution decision itself. We find that unpersuasive.

EBS has not established that the Board truly issued a “stay” at all; our precedent has not previously labeled the time taken by an agency to issue a reconsideration decision as a “stay,” and we see no reason to do so here. *See, e.g., CyWee Grp. Ltd. v. Google LLC*, 59 F.4th 1263, 1267 (Fed. Cir. 2023). The Board simply waited to rule on the rehearing decision until our court settled the claim construction, which arose from a district court appeal. At that point in time, no deadlines existed to “stay” in the first place: EBS points to no statute requiring the Board to rule on a petition for reconsideration within a specified time, nor are we

aware of any.³ And so, despite EBS’s belief that it formally challenges the “stay” rather than the reconsideration decision, we cannot see its argument as anything but a challenge to the propriety of the institution.

Precedent confirms this view. That a party formally attacks an agency action other than the institution determination does not automatically remove its challenge from the ambit of § 314(d)’s bar on judicial review. The patentee in *Thryv* framed its attack as one against the final written decision, as opposed to the determination to institute the IPR proceeding. 590 U.S. at 60. The Supreme Court disagreed, observing that the patentee’s “contention remain[ed], *essentially*, that the agency should have refused to institute inter partes review.” *Id.* (emphasis added). “As explained, § 314(d) makes that contention unreviewable.” *Id.* At base, the patent owner in *Thryv* challenged the propriety of institution. *Cf.* *IGT*, 144 F.4th at 1367 (“[L]abeling a challenge as an appeal from the final written decision’ does not make the appeal reviewable where the challenge *still attempts* to overturn the institution decision.” (cleaned up) (emphasis added) (quoting *Thryv*, 590 U.S. at 60)). Pointing to a different agency action (here, the alleged stay) does not automatically alter the analysis; § 314(d) applies when a party attempts to dislodge institution.

³ EBS’s reliance on *Ethicon, Inc. v. Quigg*, 849 F.2d 1422 (Fed. Cir. 1988), is unavailing. There, we held that the USPTO could not stay an already-initiated reexamination proceeding due to the specific statutory requirement that reexamination proceedings “will be conducted with special dispatch.” *Id.* at 1426–27 (quoting 35 U.S.C. § 305). Here, the IPR had not yet been instituted, and no similar “special dispatch” statutory command exists for the timing of a reconsideration of an institution decision.

So too here. EBS expressly challenges the propriety of institution itself by asking us to de-institute the IPRs. *See* Appellant Br. 31 (“[T]he resulting final written decisions must be vacated and the matter remanded with instructions to dismiss.”). That looks no different from alleging “that the agency should have refused to institute inter partes review.” *Thryv*, 590 U.S. at 60. Section 314(d) thus bars review of EBS’s challenge.

EBS reads our § 314(d) precedent as barring judicial review only when a party alleges a violation of a statutory prerequisite for institution, leaving all other possible aspects of an institution decision still open to judicial review. *See, e.g., Thryv*, 590 U.S. at 48 (holding unreviewable a challenge to application of § 315(b)’s one-year deadline for filing a petition after complaint had been served); *cf. ESIP Series 2*, 958 F.3d at 1385–86 (finding a challenge to § 312(a)(3)’s particularity requirement unreviewable). But our precedent looked to the role of the purportedly violated prerequisite (e.g., § 315(b) or § 312(a)(3)) in order to better understand the precise target of the appellant’s challenge: if the challenge focused on a statute which has force only in the institution context, i.e., a prerequisite for institution, then the appellant’s challenge *necessarily* targeted the institution decision. Here, EBS likewise seeks to undo the IPR institution, alleging that the Board’s conduct as to the reconsideration decision went beyond what the statute permits.

The Supreme Court, however, has identified only possible narrow exceptions to § 314(d): “appeals that implicate constitutional questions, that depend on other less closely related statutes, or [] present other questions of interpretation that reach, in terms of scope and impact, well beyond” § 314. *Cuozzo Speed Techs. v. Com. for Intell. Prop.*, 579 U.S. 261, 275 (2016); *In re Motorola Sols., Inc.*, 159 F.4th 30, 36 (Fed. Cir. 2025) (“We have noted possible exceptions for colorable constitutional claims, . . . and certain statutory challenges.” (internal citation omitted));

Apple Inc. v. Vidal, 63 F.4th 1, 12 n.5 (Fed. Cir. 2023), *cert. denied sub nom.*, *Intel Corp. v. Vidal*, 144 S. Ct. 548, 217 L. Ed. 2d 292 (2024) (similar). For example, if the agency were to cancel a patent claim for indefiniteness under § 112—an action beyond its statutory authority—that would constitute a “shenanigan” that may be properly reviewable under § 319 and the Administrative Procedure Act. *Cuozzo*, 579 U.S. at 275.

EBS believes the Board engaged in “shenanigans” by purportedly acting *ultra vires* by delaying its institution reconsideration decision. See Appellant Br. 39–40. Yet allegations of acting in excess of statutory jurisdiction “closely tied to the application and interpretation of statutes related to the Patent Office’s decision to initiate” IPR, without more, do not overcome § 314(d)’s bar. *Cuozzo*, 579 U.S. at 275. In *SIPCO, LLC v. Emerson Electric Co.*, for example, we reviewed an appeal from a Covered Business Method (CBM) review. 980 F.3d 865, 869 (Fed. Cir. 2020). And there, the patent owner contended that its patent did not qualify as a CBM-eligible patent in the first place, and so, “the Board exceeded its authority in conducting a CBM review.” *Id.*

We found that contention unreviewable. In so holding, we explained how “*Thryv* held that the ‘No Appeal’ provision barred judicial review of the threshold decision to institute inter partes review despite the argument that the Board exceeded its statutory authority in doing so.” *Id.* (citing *Thryv*, 590 U.S. at 66 (Gorsuch, J., dissenting)). We thus refused to treat an allegation of exceeding statutory jurisdiction directly bearing on statutes related to the Patent Office’s decision to initiate IPR, without more, as a “shenanigan” exempt from § 314(d)’s bar on reviewability. EBS’s argument looks no different. It merely asserts the Board’s issuance of a “stay” exceeded its statutory

authority in the context of the Board’s reconsideration of an institution decision.⁴

The Board here, moreover, had “sound reasons” for awaiting our *EBS I* decision: our decision would address the very claim term that the Board hinged its initial denial of institution upon. *See IGT*, 144 F.4th at 1360–61 (declining to find a shenanigan when the Board had “sound reasons” for its action). Section 314(d) thus bars EBS’s challenge.⁵

II

EBS next alleges error in the Board’s claim construction of “fuel.” First, it contends the Board had no choice but to adopt the non-appealed portion of the district court’s construction. Second, even if not formally bound by that construction, it faults the Board for not adequately addressing that construction and failing to undertake a substantive analysis of its own. Third, and finally, EBS challenges the Board’s construction on the merits. We find none of these challenges persuasive.

A

The district court initially construed the DI Fuel terms to require a fuel that (1) is different from the port injected fuel, and (2) contains an anti-knock agent other than gasoline. J.A. 11982. EBS, as noted earlier, appealed only the first portion of the construction, *see* J.A. 13263 n.3, and we vacated on that basis. *See EBS I*, 2022 WL 2798395. Importantly, we had no occasion to address the latter portion

⁴ Separately, EBS points to no statute commanding the manner of how and when the agency must decide reconsideration requests.

⁵ Although a constitutional challenge may be reviewable, EBS did not sufficiently raise any due process or other constitutional argument in its opening brief.

of the construction, i.e., whether the anti-knock agent necessarily had to be something other than gasoline. *See id.* at *2.

Nevertheless, EBS treats the non-appealed portion of the claim construction as “controlling law,” not only on the district court proceeding, but also on the Board’s separate IPR proceedings too. *See* Appellant Br. 23. Specifically, EBS contends that our mandate rule, combined with our waiver doctrine, rendered the claim construction “precluded from further adjudication” by the Board. *Id.* But EBS offers no authority suggesting that we apply these doctrines across *different* litigations and proceedings, particularly for a non-appealed district court construction. Indeed, we have suggested the opposite: our law-of-the-case doctrine—which relates very closely to the mandate rule—does not apply across different cases. *See Musacchio v. United States*, 577 U.S. 237, 244–45 (2016) (“The law-of-the-case doctrine generally provides that ‘when a court decides upon a rule of law, that decision should continue to govern the same issues in subsequent stages in the *same case*.’” (emphasis added) (citation omitted)); *Hyatt v. Stewart*, 148 F.4th 1376, 1382 (Fed. Cir. 2025) (same); *TecSec, Inc. v. Int’l Bus. Machs. Corp.*, 731 F.3d 1336, 1344 (Fed. Cir. 2013) (“[L]aw of the case doctrine is a ‘corollary to the mandate rule’” (citation omitted)); *see also Bay v. Anadarko E&P Onshore LLC*, 73 F.4th 1207, 1217 (10th Cir. 2023) (“The mandate rule follows from the law of the case doctrine.” (citation omitted)); *Callahan v. Cnty. of Suffolk*, 96 F.4th 362, 367 n.6 (2d Cir. 2024) (“The mandate rule is a branch of the law of the case doctrine.”). EBS gets no help by invoking our mandate and waiver rules in an attempt to bind the Board to a non-appealed district court construction.

EBS briefly alludes to judicial estoppel too. But other than reciting the phrase “judicial estoppel,” it hardly offers any argument on appeal, let alone one that walks through the relevant factors. EBS fails to explain any prejudice to

itself or any unfair advantage to Ford—a consideration often important in our judicial estoppel jurisprudence. *See Columbia Sportswear N. Am., Inc. v. Seirus Innovative Accessories, Inc.*, 80 F.4th 1363, 1375 (Fed. Cir. 2023) (“Factors that typically inform whether to apply the doctrine include: . . . (3) whether the party would ‘derive an unfair advantage or impose an unfair detriment’ on the opposing party if not estopped.” (quoting *New Hampshire v. Maine*, 532 U.S. 742, 750–51 (2001))). And it never raised such an argument below. *See* J.A. 729 (arguing only that the post-remand construction became “controlling law”). EBS has forfeited this argument. *See United States v. Great Am. Ins. Co. of New York*, 738 F.3d 1320, 1328 (Fed. Cir. 2013) (“It is well established that arguments that are not appropriately developed in a party’s briefing may be deemed waived.”); *Knox v. Dep’t of Just.*, 125 F.4th 1059, 1067 (Fed. Cir. 2025). While we may consider forfeited arguments under “exceptional circumstances,” *Wash World Inc. v. Belanger Inc.*, 131 F.4th 1360, 1369 (Fed. Cir. 2025), EBS did not even attempt to show any exceptional circumstances are presented here.

B

EBS next faults the Board for failing to engage in any meaningful claim construction analysis for the DI Fuel terms (such as examining the claims themselves as well as the specification), and relatedly, for failing to adequately explain why it substantively reached a different outcome than the non-appealed portion of the district court’s construction (which excluded gasoline as a permissible anti-knock agent). *See* Appellant Br. 20–22. These failures, EBS contends, ran afoul of 37 C.F.R. § 42.100, which states that “[a]ny prior claim construction determination concerning a term of the claim in a civil action . . . that is timely made of record in the *inter partes* review proceeding will be considered.” 37 C.F.R. § 42.100. In this instance, we find no reversible error.

“We review questions of compliance with the Board’s procedures for an abuse of discretion.” *ClearOne, Inc. v. Shure Acquisition Holdings, Inc.*, 35 F.4th 1345, 1351 (Fed. Cir. 2022). We typically do not fault the Board for failing to answer for unraised issues. *See Apple Inc. v. Gesture Tech. Partners, LLC*, 127 F.4th 364, 370 n.2 (Fed. Cir. 2025). That same principle controls here.

EBS never asked the Board to construe the DI Fuel terms; if anything, it asked the Board to *expressly forego* any construction of its own and to instead adopt the non-appealed portion of the district court’s construction as a matter of “controlling law.” J.A. 729; *see id.* at 729–30. Here, where neither party asked the Board to undertake a claim construction analysis of the DI Fuel terms nor explained why the district court’s construction as to the anti-knock agent was correct on the merits, we find no reversible error. The Board did not abuse its discretion by not evaluating a claim construction argument that neither party raised. To the extent EBS is now asserting that 37 C.F.R. § 42.100(b) requires the Board to engage with a district court’s construction even when the parties’ briefing to the Board does not, EBS made no such argument before the Board, nor did it identify the language in the regulation that gives rise to this alleged requirement.

For this reason, *Power Integrations, Inc. v. Lee*, 797 F.3d 1318 (2015) differs from the present case. There, we did not impose a blanket rule requiring the Board to always evaluate the merits of any prior claim constructions—indeed, we made it expressly clear that we refused to do so. *See id.* at 1327 (“We do not hold that the board must in all cases assess a previous judicial interpretation of a disputed claim term.”). Instead, our holding in *Power Integrations* was limited to the circumstances presented. *See id.* at 1326 (“We conclude, moreover, that under the circumstances presented here, the board erred in failing to address the district court’s previous interpretation . . .”). And importantly, the patent owner in *Power Integrations*

expressly teed up a claim construction dispute before the Board. *See id.* at 1322. EBS did not. *See* J.A. 729–30.

C

EBS next argues that the Board’s construction of the DI Fuel terms is incorrect as a substantive matter. In its view, some portions of the specification disavow gasoline as the anti-knock agent.

For one, EBS has forfeited this issue because it failed to ask the Board to engage in any claim construction.

But, in any event, we disagree with EBS on the merits. Nothing in the claims suggests that the DI Fuel terms disavow gasoline as the anti-knock agent. *See* ’580 patent at claim 1. Indeed, the specification counsels *against* adopting EBS’s constraint on the anti-knock agent because it teaches a gasoline-only embodiment. *See* ’580 patent col. 12 ll. 26–40; *id.* at col. 12 ll. 26–27 (“When the ethanol has been exhausted, the engine can operate in a ‘lower performance gasoline only’ mode”); *see also* J.A. 9056 (EBS alleging, in its complaint, that “[t]he shared specification of the ’965, ’580, and ’760 [p]atents recites embodiments in which the same fuel is port injected and direct injected into a spark-ignition gasoline engine” and “also discloses embodiments in which that fuel is gasoline alone”). EBS’s position would read out this embodiment from the claim scope. And “[w]e normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification”—we only do so amidst clear disclaimer or disavowal. *Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008). EBS offers no persuasive evidence of disclaimer; at best, it points to a few lines suggesting that anti-knock agents other than gasoline function better. *See* Appellant Br. 26. That falls short of showing disclaimer. *See IQRIS Techs. LLC v. Point Blank Enters., Inc.*, 130 F.4th 998, 1004 (Fed. Cir. 2025).

Moreover, as EBS previously explained to this court in *EBS I*, other disclosures in these same patents contemplate gasoline as a permissible anti-knock agent. J.A. 13258 (EBS previously arguing that “[t]he patents define this knock-suppressing ‘anti-knock agent’ as ‘a fuel’ and do not place a limit on the types of fuels that can be used.”); *id.* (“[T]he patents teach that *any* fuel has a knock-suppressive effect.” (citing ’580 patent col. 1 ll. 33, 58–59)); *id.* at 13287 (“Table 3 [is] a measure of ‘the properties of proposed fuel antiknock/alternative fuels’ and the fuels it lists range from gasoline to methanol and ethanol.” (quoting ’580 patent col. 14 ll. 50–51)). We agree with EBS’s (previous) understanding of the DI Fuel terms in light of these teachings in the specification.

III

Ford’s petition relied on three proposed combinations of references—two of which are relevant to this appeal: (1) Schray⁶ in view of Miura⁷ (ground 1) and (2) Rubbert⁸ in view of Yuushiro⁹ and Bosch (ground 2).¹⁰ *See* J.A. 333, 359. EBS challenges several Board findings made for each combination. As explained below, substantial evidence supports the Board’s findings.

A

We first provide an overview of the relevant prior art. Schray proposes an internal combustion engine to reduce engine knocking. It teaches directly injecting the fuel twice during each cycle, with the first occurring in the induction

⁶ U.S. Patent No. 6,505,603.

⁷ Japanese Patent Application Pub’n No. JP2003013785.

⁸ German Patent Application No. DE19853799.

⁹ Japanese Patent Application Publ’n No. JPH10252512.

¹⁰ Bosch Auto. Handbook (3d ed.).

phase and the second occurring in the compression phase. J.A. 12–13. Miura also focuses on suppressing engine knock and teaches using a port injector. *See* J.A. 4069 ¶¶ 12–15; J.A. 4066. Ford’s first proposed combination (ground 1) substituted Schray’s first direct injection with Miura’s port injection. *See* J.A. 334 (“Thus, Miura confirms what the POSITA would have understood, that a first direct injection or early direct injection is functionally similar to port fuel injection and that the two were interchangeable.”).

Rubbert, one of the three references in ground 2 of Ford’s petition, teaches a method for creating fuel mixtures in an internal combustion engine. *See* J.A. 4062 col. 1. It also teaches drawing a greater percentage of the fuel from the direct injector at greater loads. *See id.* at col. 2. Yuu-shiro proposes an engine that contains both a port injector as well as a direct injector, *see* J.A. 4040–41 ¶ 12, and teaches a particular control scheme, i.e., fuel map, for determining which of those two injectors operate (as a function of torque), *see id.* at 4049 FIG. 3. Bosch is a general-purpose automotive handbook. *See* J.A. 4403–98.

B

EBS contends the Board’s finding of a motivation to combine Schray with Miura lacks substantial evidence. Ford, according to EBS, alleged that a skilled artisan would combine Schray with Miura because both references teach operating “homogenously” (i.e., where the fuel and air are thoroughly mixed), but Ford’s ultimate combination—which relied on Schray’s second (later) direct injector—operates non-homogenously. *See* Appellant Br. 43–45. EBS, in other words, posits that Ford’s rationale for combining the references doesn’t track the ultimate combination it relied upon.

EBS misreads Ford’s petition and the Board’s findings. Ford did not rely on the homogeneity between Schray and Miura as the motivation for a skilled artisan to use Miura’s

port injector alongside Schray's second injector in the proposed combination. Ford merely discussed homogeneity as one basis to explain why a skilled artisan would have a reasonable expectation of success of achieving the claimed invention *once* the skilled artisan combined the references.¹¹ See J.A. 335.

As to a skilled artisan's motivation to combine references, Ford instead explained that a skilled artisan would swap Schray's first injector with Miura's port injector because Miura's port injector would "provide the engine of Schray with additional benefits related to mixing and stable combustion at low loads." J.A. 334. The Board agreed with Ford's argument, *see* J.A. 18, and EBS does not challenge that argument on appeal. See Appellant Reply Br. 23 (indicating that "whether Schray would benefit from the use of Miura's port injection" is a different issue from what EBS contended in its principal brief). Separately, the Board adopted Ford's rationale that Schray and Miura teach different approaches for knock suppression, and therefore, a skilled artisan would seek to combine the two approaches. See *Decision*, 2023 WL 8039802, *6, *8; *see also Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023) ("There is a motivation to combine when a known technique 'has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way'" (quoting *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007))). EBS does not challenge that finding. See *generally* Appellant Br. 41–45. Moreover, the Board also

¹¹ Ford also posited that a skilled artisan would have a reasonable expectation of success achieving the claimed invention because Miura not only taught an engine with port injection and direct injection, but also an engine with two direct injections, like Schray. See J.A. 335. EBS did not oppose that finding. See J.A. 734–37.

adopted Ford’s rationale that a skilled artisan would seek to integrate Miura’s “open loop control strategy into Schray,” and yet again, EBS does not challenge that rationale on appeal either. *See Decision*, 2023 WL 8039802, *6, *8; *see generally* Appellant Br. 41–45. The Board’s findings here have substantial evidence.

C

EBS next challenges three of the Board’s findings made as to particular claim limitations under ground 1 (Schray in view of Miura). *See* Appellant Br. 45–54. Specifically, EBS faults the Board for relying on a theory of unpatentability (for each limitation) not raised by the petition. We disagree.

“We review the Board’s judgments concerning what arguments are fairly presented in a petition and other pleadings for abuse of discretion.” *Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1376 (Fed. Cir. 2023).

EBS believes the Board first strayed from Ford’s petition when it found that Ford’s proposed combination “*rendered [] obvious*” the three-way-catalyst limitation.¹² *See* J.A. 25 (emphasis added). According to EBS, the petition only alleged that Schray *taught* the three-way catalyst, which raises an anticipation-like theory of disclosure. *See* Appellant Br. 46. But just as Ford proposed in its petition, the Board reasoned that a skilled artisan would understand Schray to teach a three-way catalyst. *Compare* J.A. 338 (“Schray teaches a three-way catalyst in the form of a catalytic converter 46 . . .”), *with* J.A. 25 (“We credit Dr. Clark’s testimony that ‘[a] person of ordinary skill in the art would have understood that [Schray’s] catalytic converter 46 constitutes a three-way catalyst’”

¹² The full limitation recites “a three-way catalyst configured to reduce emissions from the spark ignition engine.” ’580 patent at claim 1.

(alterations in original)). And for that reason, the Board concluded that the *proposed combination* as a whole rendered the claim limitation obvious. We thus disagree with EBS’s characterization of the Board’s decision.

EBS’s deviation-from-the-petition arguments as to the other limitations fall short for the same reason; they too narrowly fixate on particular verbiage the Board used without considering the thrust of the Board’s fact-finding and analysis. *See* Appellant Br. 50 (“The Board repeated the same error for ‘limitation [1.E]’”); *id.* at 51 (“The Board similarly erred by finding that ‘limitation [1.C]’ of the ’965 patent was disclosed by the ‘combined teachings’”).

We reject all of EBS’s challenges as to ground 1.¹³

D

Finally, we consider EBS’s challenges against ground 2 (Rubbert in view of Yuushiro and Bosch).

EBS faults the Board for failing to adequately explain why a skilled artisan would have a motivation to combine Rubbert, Yuushiro, and Bosch. *See* Appellant Br. 56. But Ford provided sufficiently detailed explanations for why a skilled artisan would combine the references. *See, e.g.,* J.A.

¹³ EBS also suggests that a potential typographical error in the Board’s final written decision evinces a genuine misunderstanding (of a claim limitation) by the Board. *See* Appellant Br. 54–55. But context makes clear the Board made a harmless typographical error, and EBS offers no reason for *why* the Board might possibly have intended to mean what it actually wrote. For this reason, EBS’s reliance on *Corephotonics, Ltd. v. Apple Inc.* falls short. *See* 84 F.4th 990, 1013 (Fed. Cir. 2023) (finding an error was not harmless when the Board could genuinely have intended to mean two things).

362 (explaining, among other things, that implementing Yuushiro’s fuel map scheme within Rubbert’s method would enable “the knock limit to be fully utilized”). And the Board expressly adopted Ford’s rationales. *See Decision*, 2023 WL 8039802, at *27. Under the circumstances here, where the Board also provided a full explanation for why it rejected EBS’s multiple counter-arguments, the Board’s reasoning is readily discernible, and therefore, it satisfied its obligation to adequately explain its motivation finding. *See id.*

EBS also raises several arguments concerning the Board’s rejection of its rebuttal arguments. It first contends the Board, when denying institution in a prior proceeding, purportedly made a fact-finding that directly contradicts a finding it made here (in the course of rejecting one of EBS’s rebuttals). *See* Appellant Br. 56–59. Specifically, EBS believes the prior Board already settled that a skilled artisan would not have been motivated to modify Rubbert’s engine (so as to operate stoichiometrically, rather than leanly). *Id.* But even a cursory read of the prior denial of institution makes clear that the Petitioner there simply failed to meet its burden for showing that a skilled artisan would modify a prior art reference; the prior Board did not authoritatively declare that a skilled artisan would not modify Rubbert. *See* J.A. 12405 (“We determine that Petitioner fails to supply adequate and persuasive reasoning with rational underpinning why a person of ordinary skill in the art would have modified Rubbert’s carefully crafted system . . .”). In these IPRs, Ford came armed with several reasons for why a skilled artisan would modify Rubbert (including Yuushiro’s fuel map, which was not relied upon in the prior proceeding). And here, on this record, the Board found that Ford satisfied its burden. As the Board correctly pointed out, its prior decision did not have the benefit of considering Yuushiro and other expert testimony. *See Decision*, 2023 WL 8039802, *27.

ETHANOL BOOSTING SYSTEMS, LLC v. FORD MOTOR COMPANY 25

CONCLUSION

We have considered the parties' remaining arguments, but find them unpersuasive. We therefore affirm.

AFFIRMED