

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

ROVALMA, S.A.,
Appellant

v.

BOHLER-EDELSTAHL GMBH & CO. KG,
Appellee

2016-2233

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2015-00150.

Decided: May 11, 2017

MARC WADE VANDER TUIG, Senniger Powers LLP, St. Louis, MO, argued for appellant. Also represented by ROBERT M. EVANS, JR., JOHN R. SCHROEDER.

MAXWELL JAMES PETERSEN, Lewis Brisbois Bisgaard & Smith, LLP, Chicago, IL, argued for appellee. Also represented by THOMAS A. DOUGHERTY, Denver, CO.

Before WALLACH, TARANTO, and STOLL, *Circuit Judges*.
TARANTO, *Circuit Judge*.

Rovalma, S.A. owns U.S. Patent No. 8,557,056, which describes and claims methods for making steels with certain desired thermal conductivities. In October 2014, Böhler-Edelstahl GmbH & Co. KG (Böhler) petitioned the Patent Trial and Appeal Board for an inter partes review of claims 1–4 of the '056 patent. The Board instituted a review based on Böhler's construction of the claims at issue. In its final written decision, however, the Board rejected Böhler's construction and adopted Rovalma's construction instead. Böhler had not submitted arguments or evidence for unpatentability based on Rovalma's construction. Nevertheless, the Board determined that Rovalma's own submissions demonstrated that the claims, construed as Rovalma urged, would have been obvious to a relevant skilled artisan over the same prior art that Böhler invoked.

Rovalma appeals. It argues both that substantial evidence does not support the Board's determination and that the Board committed prejudicial procedural errors in relying on Rovalma's own submissions when determining that the claims would have been obvious under Rovalma's construction. We conclude that the Board did not set forth its reasoning in sufficient detail for us to determine what inferences it drew from Rovalma's submissions. We therefore cannot determine whether the Board's decision was substantively supported and procedurally proper. We vacate the Board's decision and remand for further proceedings.

I

The '056 patent addresses hot-work steels. It is undisputed that hot-work steels are used at high temperatures and that the ability to conduct and thereby remove heat—thermal conductivity—is important for such steels. According to the patent, hot-work steels disclosed in the prior art had thermal conductivities of approximately 16–37 W/mK (Watts per meter-Kelvin), which were inade-

quate for certain applications. '056 patent, col. 1, lines 50–52; col. 4, lines 11–14. The patent claims processes for “setting” the thermal conductivity of a hot-work steel at room temperature to more than 42 W/mK (higher in the dependent claims). *Id.*, col. 21, line 59 through col. 22, line 64. The '056 patent discloses an allegedly inventive process that, to achieve such higher thermal conductivities, focuses on carbides (metal-carbon compounds) in the steel’s matrix, or lattice, structure. *Id.*, col. 4, lines 35–63.

The summary of the invention states that “an internal structure of the steel is metallurgically created in a defined manner such that the carbidic constituents thereof have a defined electron and phonon density and/or the crystal structure thereof has a mean free length of the path for the phonon and electron flow that is determined by specifically created lattice defects.” *Id.*, col. 4, lines 37–43. Alternatively, the internal structure may have “in its carbidic constituents an increased electron and phonon density and/or which has as a result of a low defect content in the crystal structure of the carbides and of the metallic matrix surrounding them an increased mean free length of the path for the phonon and electron flow.” *Id.*, col. 4, lines 54–58.

The patent includes four claims. Claim 1 recites:

1. A process for setting a thermal conductivity of a hot-work steel, which comprises the steps of:

providing a hot-work steel, including carbidic constituents and, by weight, 2–10% Mo+W+V [molybdenum + tungsten + vanadium];

metallurgically creating an internal structure of the steel in a defined manner such that carbidic constituents thereof have at least one of a defined electron and phonon density and a crystal structure thereof having a mean free length of a path for a phonon and electron flow

being determined by specifically created lattice defects;

selecting:

a) a surface fraction and thermal conductivity of the carbidic constituents and a particular surface fraction and thermal conductivity of a matrix material containing the carbidic constituents; or

b) a volume fraction and thermal conductivity of the carbidic constituents and thermal conductivity of the matrix material containing the carbidic constituents; and

setting the thermal conductivity of the steel at room temperature to more than 42 W/mK.

Id., col. 21, line 59 through col. 22, line 14.

Claims 2 and 3, which depend on claim 1, require setting the thermal conductivities of the steel to more than 48 and 55 W/mK respectively. '056 patent, col. 22, lines 15–20. Claim 4, an independent claim, is similar to claim 1, but contains some different language in the “creating” step, including a reference to a “metallic matrix” surrounding the carbides. *Id.*, col. 22, lines 21–64.

In October 2014, Böhler petitioned for inter partes review of all four claims of the '056 patent under 35 U.S.C. §§ 311–312. In its Petition, Böhler argued that the claims should be construed to cover the specific chemical compositions described in the specification, whether or not created according to the process steps—“providing,” “creating,” “selecting,” and “setting”—recited in the claims. *See* Petition for Inter Partes Review 4–20, *Böhler-Edelstahl GmbH & Co. KG v. Rovalma, S.A.*, No. IPR2015-00150 (P.T.A.B. Oct. 24, 2014), Paper No. 1 (Petition). Böhler argued that the claims, so construed,

would have been obvious over various prior-art references that disclosed those compositions, including European Patent No. EP 0,787,813 (EP '813). Petition 20–59. Böhler did not address whether the asserted prior-art references disclosed the “providing,” “creating,” “selecting,” and “setting” steps of the '056 patent’s claims. *See id.* Nor did Böhler address whether those steps would have been obvious to one of ordinary skill in the art. *See id.*

In April 2015, the Board, acting as the delegate of the Patent and Trademark Office’s Director, 37 C.F.R. § 42.4(a), instituted a review of the challenged claims under 35 U.S.C. § 314. *See* Institution Decision, *Böhler-Edelstahl GmbH & Co. KG v. Rovalma, S.A.*, No. IPR2015-00150, 2015 WL 1871000 (P.T.A.B. Apr. 22, 2015). In its decision to institute, the Board adopted Böhler’s proposed claim construction. *Id.* at *3–8. Applying that construction, the Board concluded that Böhler had established a reasonable likelihood of prevailing on its assertion that the challenged claims would have been obvious over the asserted prior-art references. *Id.* at *8–9.

After the review was instituted, Rovalma, in its Patent Owner’s Response, argued against the claim construction that the Board had relied on in instituting the review. Patent Owner Response 19–51, *Böhler-Edelstahl*, No. IPR2015-00150 (P.T.A.B. Aug. 14, 2015), Paper No. 25. Rovalma argued that the claims should be construed to require performance of the processes recited in the claims, not simply to cover the compositions described in the specification. As background for its proposed claim construction—according to Rovalma’s statement at oral argument in this court, to counteract an enablement-based objection to its proposed construction—Rovalma submitted additional evidence and argument regarding thermoprocessing.

Rovalma argued that a person of ordinary skill in the art at the time of the invention, given the specification, would have been able to predict the formation of certain carbides based on particular heat treatments. *Id.* at 4. Rovalma also argued that a person of ordinary skill would have been able to use software tools, such as ThermoCalc, to carry out the needed calculations. *Id.* at 4–5. In addition, Rovalma argued, based on H. Bayati & R. Elliott, *Influence of Matrix Structure on Physical Properties of an Alloyed Ductile Cast Iron*, 15 *Materials Sci. & Tech.* 265 (1999), that the thermal conductivity of a steel depends on lattice defects and impurities. Patent Owner Response 7. The passage of Bayati and Elliott cited by Rovalma states that matrix structure and thermal processing also affect thermal conductivity. *See, e.g.*, Bayati & Elliot, *supra*, at 265 (“Matrix structure is shown to play a significant role in determining the thermal conductivity of the ductile iron.”); *id.* (“Heat transport also depends on lattice defects, microstructure, impurities, and the processing of the metal or alloy.”).

In its Petitioner’s Reply, Böhler repeated its contention that the claims should be construed to cover chemical compositions, not processes. Petitioner’s Reply 5–21, *Böhler-Edelstahl*, No. IPR2015-00150 (P.T.A.B. Nov. 11, 2015), Paper No. 30. It did not argue, in the alternative, that the claims would have been obvious under Rovalma’s proposed claim construction. Nor did it address Rovalma’s thermoprocessing submissions, except to argue that Rovalma’s extrinsic evidence was irrelevant to the proper construction of the claims. *See id.* at 7–8.

At the oral argument, the Board extensively questioned Rovalma’s counsel about the effect of its thermoprocessing submissions on the patentability of the claims under the claim construction urged by Rovalma. *See* Record of Oral Hearing 53–87, 94–95, *Böhler-Edelstahl*, No. IPR2015–00150 (P.T.A.B. Mar. 30, 2016), Paper No. 41. In particular, the Board asked Rovalma to discuss the

notion that it would have been obvious to create steel with the claimed thermal conductivities in light of the prior-art references advanced by Böhler because: (a) those references disclosed the chemical compositions described in the '056 patent specification; and (b) Rovalma's submissions showed that a person of ordinary skill in the art would have known how to optimize those compositions to achieve the desired properties, including thermal conductivity. *See, e.g., id.* at 67 (“But see, in [Bayati and Elliott] I believe the abstract is telling us the matrix structure is shown to play a significant role in determining thermal conductivity of ductile iron. Why wouldn't one of ordinary skill in the art, given the Böhler reference and [Bayati and Elliott], understand that the matrix structure[] is important for thermal conductivity and you would want to optimize it for a given composition?”).

In April 2016, the Board found the challenged claims unpatentable. The Board rejected Böhler's claim construction, and adopted Rovalma's. Final Written Decision 8–17, *Böhler-Edelstahl*, No. IPR2015-00150 (P.T.A.B. Apr. 20, 2016). Applying Rovalma's construction, the Board then determined that the claims would have been obvious over “the asserted prior art as read in light of the knowledge of the ordinarily skilled artisan.” Final Written Decision 22; *see id.* at 20–22. The Board relied on Rovalma's own submissions for key findings about what a relevant skilled artisan would have taken from the Böhler-asserted prior art.

Specifically, the Board rejected Rovalma's argument that the asserted prior-art references did not disclose setting the thermal conductivity of a steel by selecting a surface or volume fraction of carbides or by manipulating the steel's microstructure in a defined manner. *See id.* Instead, the Board found that a person of ordinary skill “would have recognized that thermal processing conditions affect internal structure and, thus, thermal properties of steel.” *Id.* at 21. The Board also found that a

person of ordinary skill would have been motivated to increase the thermal conductivity of steel and would have had a reasonable expectation of success in doing so. *Id.* at 22. The Board further found that a person of ordinary skill would have “inherently completed the ‘selecting’ steps set forth in the challenged claims.” *Id.* To support each of those findings, the Board relied on Rovalma’s thermal-processing submissions and Rovalma’s statements at the oral argument. *See id.* at 20–22.

Rovalma appeals the Board’s decision. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

II

We review the Board’s decisions under the Administrative Procedure Act (APA). Taking “due account . . . of the rule of prejudicial error,” we must “hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law,” “without observance of procedure required by law,” or “unsupported by substantial evidence.” 5 U.S.C. § 706. In applying those standards, “we will uphold a decision of less than ideal clarity if the agency’s path may reasonably be discerned,” but “we may not supply a reasoned basis for the agency’s action that the agency itself has not given.” *Bowman Transp., Inc. v. Ark.-Best Freight Sys., Inc.*, 419 U.S. 281, 285–86 (1974); *SEC v. Chenery Corp.*, 332 U.S. 194, 196–97 (1947). Thus, the Board must, as to issues made material by the governing law, set forth a sufficiently detailed explanation of its determinations both to enable meaningful judicial review and to prevent judicial intrusion on agency authority. *See SEC v. Chenery Corp.* 318 U.S. 80, 88, 94 (1943); *Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 991–93 (Fed. Cir. 2017); *In re NuVasive, Inc.*, 842 F.3d 1376, 1382–83 (Fed. Cir. 2016).

In challenging the Board’s decision in this case, Rovalma argues both evidentiary insufficiency and procedural inadequacy. We address those arguments in turn. We conclude that a remand is advisable in both respects, for related reasons.

A

Rovalma challenges the Board’s implicit factual findings that a person of ordinary skill (1) would have appreciated that the claimed thermal conductivities could be achieved by practicing the claimed process steps, (2) would have been motivated to increase the thermal conductivities of the steels disclosed in the prior art to achieve the claimed thermal conductivities, and (3) would have had a reasonable expectation of success in achieving the claimed thermal conductivities. We conclude that the Board did not sufficiently explain the basis for its obviousness determinations to permit us to resolve the substantial-evidence issues raised by Rovalma.

The Supreme Court has recognized the importance of clarity with respect to obviousness determinations. For example, in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), the Court explained that determining whether a person of ordinary skill would have been motivated to combine known elements to arrive at the patented invention often requires a factfinder to compare the “interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art.” *Id.* at 418. “To facilitate review,” the Court added, “this analysis should be made explicit.” *Id.* We have repeatedly insisted on such explanations in reviewing the adequacy of the Board’s analysis—both as a matter of obviousness law and as a matter of administrative law. We have noted that the amount of explanation needed varies from case to case, depending on the complexity of the matter

and the issues raised in the record. *See Personal Web Technologies*, 848 F.3d at 991–94; *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364–67 (Fed. Cir. 2015); *In re Lee*, 277 F.3d 1338, 1342–46 (Fed. Cir. 2002).

In this case, the Board did not adequately explain the basis for the findings that Rovalma challenges. The Board found that EP '813 and the other asserted prior-art references expressly disclosed steel compositions “including carbidic constituents and, by weight, 2–10% Mo+W+V,” as required by the “providing” steps in claims 1 and 4 of Rovalma’s patent. Final Written Decision 22. But the Board did not sufficiently lay out the basis for its implicit findings regarding the remaining process limitations. With respect to those limitations, the Board found that a person of ordinary skill “would have at least inherently completed the ‘selecting’ steps” and apparently determined that the other steps would have been obvious in view of Rovalma’s submissions. *Id.* But it did not explain the evidentiary basis for those determinations, and Böhler did not provide any explanation regarding the process claim elements that the Board could adopt as its own.

Nor did the Board adequately explain why a person of ordinary skill in the art would have been motivated to increase the thermal conductivities of the steels disclosed in the prior art. Stating that EP '813 and other asserted prior-art references disclosed “the desirability of steels having high thermal conductivity,” the Board found that a person of ordinary skill “would have had reason to increase the thermal conductivity of these compositions.” *Id.* But the Board did not cite any evidence, either in the asserted prior-art references or elsewhere in the record, with sufficient specificity for us to determine whether a person of ordinary skill in the art would have been so motivated. As Rovalma points out, it does not necessarily follow from prior-art disclosures of the general desirability of high thermal conductivities that a person of ordi-

nary skill would have been motivated to increase thermal conductivity beyond levels previously achieved.

Adequate explanation is also lacking for why a person of ordinary skill in the art would have reasonably expected success in achieving the claimed thermal conductivities. The Board found that Rovalma's submissions disclosed that a person of ordinary skill would have understood "heat transfer through metallic matrices and entrained metal carbides" and "the ability to model the effects of thermal processing on steel alloy microstructure," and from that finding the Board inferred that a person of ordinary skill "would have had a reasonable expectation of success in arriving at the claimed invention." *Id.* Again, however, the Board did not cite any evidence to support the inference that a person of ordinary skill would have reasonably expected to achieve the specific thermal conductivities recited in the claims.

Without more explanation than we have, we are not prepared to reach a bottom-line judgment on Rovalma's substantial-evidence challenge. The Board has not provided a sufficiently focused identification of the relevant evidence or explanation of its inferences for us to confidently review its decision and avoid usurping its fact-finding authority. *See Consolidated Edison Co. of N.Y. v. NLRB*, 305 U.S. 197, 229 (1938) ("Substantial evidence . . . means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion."). Accordingly, as we have concluded in similar circumstances, these deficiencies call for a vacatur and remand for further explanation from the Board. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1044 (Fed. Cir. 2017); *In re Van Os*, 844 F.3d 1359, 1360–62 (Fed. Cir. 2017); *Personal Web Technologies*, 848 F.3d at 991–94; *Ariosa Diagnostics*, 805 F.3d at 1364–67. We next address Rovalma's procedural challenge.

B

Rovalma makes essentially two arguments in favor of its contention that the Board committed prejudicial procedural error. One argument is that the inter partes review statute prohibited the Board, after adopting Rovalma’s own claim construction, from relying on Rovalma’s own submissions in determining that the claims, so construed, would have been obvious over the Böhler-asserted prior art. The other argument is that Rovalma was denied adequate notice of and an adequate opportunity to address the possibility that the Board would rely on Rovalma’s submissions, as it ultimately did.

1

We reject Rovalma’s argument that the Board “exceeded its statutory authority.” Appellant’s Br. 24 (capitalization in heading omitted). To support that argument, Rovalma relies entirely on *In re Magnum Oil Tools International, Ltd.*, 829 F.3d 1364 (Fed. Cir. 2016). That decision, however, does not preclude the Board from relying on a patent owner’s own submissions in determining unpatentability in the way the Board did here, as long as the patent owner had adequate notice and an adequate opportunity to be heard—procedural requirements that we address in the next subsection of this opinion.

The court in *Magnum Oil* focused principally on the question of whether the Board had violated 35 U.S.C. § 316(e) by improperly relying on a burden-shifting framework that required the patent owner, not the petitioner, to prove the unpatentability of claims on which review was instituted. We held that the Board had engaged repeatedly in such impermissible burden shifting. *Magnum Oil*, 829 F.3d at 1375–79. We then explained that the evidence in the record did not permit the findings of fact needed to establish unpatentability, noting that on the crucial points the petitioner’s evidence consisted of no

more than legally insufficient “conclusory statements.” *Id.* at 1380.

In the final paragraph of the opinion, we addressed the Director’s broad contention that the Board was free to make an argument for the petitioner simply because the argument “could have been included in a properly-drafted petition.” *Id.* at 1377, 1380 (quoting Intervenor’s Br. 34, *Magnum Oil*, 829 F.3d 1364, ECF No. 41). We rejected “the PTO’s position that the Board is free to adopt arguments on behalf of petitioners that could have been, but were not, raised by the petitioner during an IPR” and explained that “the Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to respond.” *Id.* at 1381 (citing *SAS Inst., Inc. v. ComplementSoft, LLC*, 825 F.3d 1341, 1351 (Fed. Cir. 2016)).

Magnum Oil, we conclude, is best understood as supporting Rovalma’s contention only with respect to the requirement of notice and opportunity to be heard, and no further. Here, the Board resolved an active dispute over claim construction in favor of the patent owner and, using the patent owner’s construction, relied on the patent owner’s own submissions to determine how a skilled artisan would have read the very prior-art references on which the petitioner’s obviousness challenge was based.¹ That was not the situation in *Magnum Oil*. And our

¹ Rovalma does not dispute that a skilled artisan’s background knowledge is relevant to the reading of the prior art on which the obviousness challenge is based and that it is permissible, and sometimes even necessary, to establish such background knowledge by pointing to other prior art. See, e.g., *Van Os*, 844 F.3d at 1361; *K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365–66 (Fed. Cir. 2014); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013).

statement that the Board must rely on “arguments that were advanced by a party,” 829 F.3d at 1381, does not, by its terms, preclude the Board from relying on arguments made by a party and doing its job, as adjudicator, of drawing its own inferences and conclusions from those arguments, even when the result is use of the party’s submissions against it—subject, of course, to the provision of adequate notice and opportunity to be heard.

We do not see any reason that *Magnum Oil* should be read more broadly to establish a statutory rule prohibiting the Board from ever relying on a patent owner’s own submissions in determining unpatentability, even as evidence of the knowledge a relevant skilled artisan would bring to reading the prior art asserted by the petitioner. *Magnum Oil* was addressing only the Director’s broad assertion that the Board could raise *any* argument that *could* have been included in a petition. Rejecting that broad assertion does not imply precluding reliance on a patent owner’s own submissions (part of the record created by the parties) essentially as admissions, if adequate notice and opportunity to be heard are provided. And Rovalma has identified nothing in the statute that forbids the Board to follow the principle, which is well established in other adjudicatory settings, that a tribunal may use a party’s own submissions against it, even if the opposing party bears the burden of persuasion. *See, e.g., Advanced Magnetic Closures, Inc. v. Rome Fastener Corp.*, 607 F.3d 817, 832 (Fed. Cir. 2010) (“To the extent that the district court relied on Mr. Riceman’s testimony to explain Mr. Bauer’s motives for listing himself as the ’773 patent inventor, . . . we find this error harmless because [the patent owner’s] own evidence . . . provided a sufficient basis on which to infer that Mr. Bauer intended to deceive the PTO.”); *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 1065 (Fed. Cir. 1998) (“[T]he district court did not place the burden of proving validity on [the patent owner]; [the patent owner’s] own evidence was clear and

convincing that the patent is invalid.”); *Mroz v. Dravo Corp.*, 429 F.2d 1156, 1163 (3d Cir. 1970) (“It is true that the burden of proof is on the defendant to prove contributory negligence. But . . . contributory negligence may . . . be established by the plaintiff’s evidence alone.”).

SAS Institute, on which we relied in *Magnum Oil* for the statement invoked by Rovalma, also supports a narrower reading of *Magnum Oil* than Rovalma urges. In *SAS Institute*, we affirmed the Board’s construction of certain claim language, but remanded for application of that construction. 825 F.3d at 1348–53. As we explained, remand was necessary because the Board had newly adopted that construction in its final written decision—even though the parties did not dispute the meaning of the construed claim language—without giving the petitioner an opportunity to argue that the claims would have been unpatentable under that (correct) construction. *Id.* at 1350–53. The provision of a remand in *SAS Institute* cuts against Rovalma’s position regarding *Magnum Oil* and the statute. If the statute prohibited the Board from ever determining that a claim was unpatentable under a construction that the petitioner had not addressed in its submissions, remand would have been inappropriate in *SAS Institute*.

For those reasons, we conclude that Rovalma has not shown a statutory bar, independent of whether it had adequate notice and opportunity to be heard, to the Board’s reliance on Rovalma’s submissions in determining what a skilled artisan would have found obvious based on Böhler’s prior-art references. We must therefore turn to Rovalma’s argument that it lacked adequate notice and opportunity to be heard. Before we do so, however, we emphasize two ways in which our conclusion in this subsection is limited.

First, we have addressed Rovalma’s statutory argument only in the context of the circumstances of this case.

We have not explored other questions about what authority the statute might permit the Board to exercise to raise issues or arguments or to produce evidence *sua sponte* in an inter partes review, if it gave adequate notice and an adequate opportunity to be heard, as district courts may sometimes do in their cases. *See, e.g., Day v. McDonough*, 547 U.S. 198, 205–11 (2006) (discussing a district court’s authority to raise certain affirmative defenses not raised by party); *Monolithic Power Sys., Inc. v. O2 Micro Int’l Ltd.*, 558 F.3d 1341, 1346–48 (Fed. Cir. 2009) (discussing a district court’s authority to call and to question witnesses and to appoint its own expert under Fed. R. Evid. 614 and 706 and to rely on the resulting evidence).

Second, we have addressed and rejected only Rovalma’s contention about *statutory* authority. We have not decided what regulatory or other non-statutory constraints, either on the Board or on the parties, such as those which govern waiver or forfeiture, might apply to the Board’s determination of unpatentability under Rovalma’s claim construction. We note that, in this case, unlike in *SAS Institute*, the petitioner had clear notice that the Board might adopt the claim construction ultimately adopted—that construction was argued in the Patent Owner’s Response—yet it did not present a case for unpatentability under that construction when it had the opportunity, in its Reply. Whether Böhler committed a forfeiture, and whether Rovalma has preserved a forfeiture contention, are among the non-statutory matters open for the Board to consider in the remand we order.

2

Under the APA, the Board must comply with certain procedural requirements in conducting an inter partes review. Notably, the Board must timely inform a patent owner of “the matters of fact and law asserted,” give the patent owner an “opportunity” for the “submission and consideration of facts” and “arguments,” and permit the

patent owner “to submit rebuttal evidence, and to conduct such cross-examination as may be required for a full and true disclosure of the facts.” 5 U.S.C. §§ 554(b)(3), (c), 556(d); *see, e.g., SAS Inst.*, 825 F.3d at 1351; *Dell Inc. v. Accelaron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015). In applying those provisions, we have explained that the Board “‘may not change theories in midstream without giving respondents reasonable notice of the change’ and ‘the opportunity to present argument under the new theory.’” *Belden*, 805 F.3d at 1080 (quoting *Rodale Press, Inc. v. FTC*, 407 F.2d 1252, 1256–57 (D.C. Cir. 1968)). The Board’s procedural obligations are not satisfied merely because a particular fact might be found somewhere amidst the evidence submitted by the parties, without attention being called to it so as to provide adequate notice and an adequate opportunity to be heard. *NuVasive*, 841 F.3d at 971.

In this case, because we cannot sufficiently determine how the Board reached the conclusion that the challenged claims would have been obvious, we also cannot conclusively determine whether the Board’s actions complied with the APA’s procedural requirements. As discussed above, the Board’s decision indicates that the Board found that a person of ordinary skill would have appreciated that the claimed thermal conductivities could be achieved by practicing the claimed process steps, but does not adequately explain the basis for that finding. Because the asserted prior-art references concededly did not disclose those steps in as many words, the Board relied on Rovalma’s submissions to determine that skilled artisans would have found the process steps obvious.

To the extent that the Board did rely on Rovalma’s submissions, and drew reasonably disputable inferences from those submissions, Rovalma was entitled to adequate notice of and opportunity to address those inferences. But Böhler never described what inferences were

to be made, as it essentially disregarded the process steps throughout the Board proceeding. And although the Board discussed the process steps extensively at the oral argument, that was too late in the absence of an additional adequate opportunity to be heard. *See Dell*, 818 F.3d at 1301.

Because we cannot sufficiently determine which inferences the Board drew from Rovalma's submissions, we will not decide whether the Board violated Rovalma's procedural rights. To make that decision, we would need to be able to determine what evidence the Board relied on to support its implicit factual findings, how the Board interpreted that evidence, and what inferences the Board drew from it. The Board's opinion does not sufficiently permit such determinations. As with the substantial-evidence challenge, a remand is warranted on Rovalma's procedural challenge. *See Personal Web Technologies*, 848 F.3d at 991–94; *NuVasive*, 842 F.3d at 1381–85; *Ariosa Diagnostics*, 805 F.3d at 1364–67.

CONCLUSION

For the foregoing reasons, we vacate the Board's decision and remand for further proceedings.

No costs.

VACATED AND REMANDED