

Nos. 16-1824, -1825

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

HITACHI METALS, LTD.,

Appellant,

v.

ALLIANCE OF RARE-EARTH PERMANENT MAGNET INDUSTRY,

Appellee.

Appeals from the United States Patent and Trademark Office,
case nos. IPR2014-01265, -01266

REPLY BRIEF FOR APPELLANT HITACHI METALS, LTD.

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INTRODUCTION

When a patent claims the combination of previously known elements, the question of obviousness is a fact-intensive inquiry into whether a person of ordinary skill would have recognized the benefits of the claimed combination and would have reasonably expected to realize those benefits by combining elements in the manner claimed. Yet the Board held and the Alliance argues that obviousness may be based on the mere fact that the claims cover the combination of known elements that are used for their intended purposes. That is not the law, and this Court should reverse.

The Board also erred by dismissing Hitachi Metals' overwhelming evidence that a skilled artisan would have expected the combinations to be failures. The Board erroneously concluded that Hitachi Metals' evidence was not relevant to the obviousness determination but instead went only to whether the combination would have made "commercial sense." Yet the Board paradoxically (and incorrectly) held that the claims were obvious because combining the references supposedly would have been commercially advantageous. And that was despite the Alliance's complete failure to offer evidence on this point.

The Alliance's attempted defense of the Board's obviousness determinations only confirms the Board's errors. Lacking evidence in the record to support the Board's finding of commercial advantages, the Alliance repeatedly points to

evidence purportedly supporting findings that the Board never actually made. But factual findings that the Board never made cannot support affirmance.

Likewise, on two distinct claim-construction issues, the Alliance barely offers any response. With respect to “rapid cooling method” in the ’385 patent, the Alliance does not dispute that the construction the Board adopted is different from the term’s ordinary meaning. Contrary to the Alliance’s argument, nowhere does the patent redefine “rapid cooling method.” And with respect to claim 4 of the ’765 patent, the Alliance offers little defense of a construction that is at odds with the claim language. Claim 4 requires that the alloy be finely pulverized in a high-speed flow of gas comprising oxygen, yet the Alliance suggests that the limitation is satisfied even if the alloy is finely pulverized and then a high-speed flow of gas comprising oxygen is introduced only afterward. The Board’s constructions were unreasonably broad and should be set aside. Moreover, because the Alliance never disputes that the claims are not invalid under Hitachi Metals’ proposed constructions, the Board’s invalidity holdings should be reversed outright.

ARGUMENT

I. THE BOARD'S CONCLUSIONS OF UNPATENTABILITY WITH RESPECT TO THE '385 PATENT SHOULD BE REVERSED

A. The Obviousness Determinations Should Be Reversed

1. *The obviousness determinations based on Hasegawa and Yamamoto and on Ohashi and Yamamoto were premised on legal errors and lack evidentiary support*

The Board erroneously ruled claims 1, 5, and 6 of the '385 patent unpatentable based on the combinations of *Hasegawa* and *Yamamoto* as well as *Ohashi* and *Yamamoto*.

a. The Alliance cannot defend the Board's errors

The Board gave two bases for concluding that a skilled artisan would have “arrive[d] at what is claimed.” Appx14. Both were legally erroneous because neither included an evidence-based rationale for why an artisan would have made the combinations. Indeed, the Alliance has no real defense of the Board's errors.

First, the Board stated that “the claims represent the combination of prior art elements according to known methods to yield a predictable result,” which it believed was “itself a sufficient reason.” Appx14 (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416-17 (2007)); *see also* Appx18-19. But as Hitachi Metals explained, that has never been enough. HM Br. 30-31. Proving obviousness requires evidence that “the hypothetical skilled artisan would recognize the potential benefits and pursue the variation.” *Belden, Inc. v. Berk-Tek LLC*, 805

F.3d 1064, 1075 (Fed. Cir. 2015). As this Court recently reiterated, “the PTAB must articulate a *reason why* a PHOSITA would combine the prior art references.” *In re NuVasive, Inc.*, --- F.3d ---, 2016 WL 7118526, at *4 (Fed. Cir. Dec. 7, 2016). The Board’s obviousness ruling should be set aside when the Board fails to address “the benefits that could have been obtained by combining the prior art references.” *Id.* at *5-6. Thus, the Board’s mere conclusion that the claims represent the combination of known elements to yield a predictable result is legally insufficient. *See Veritas Techs. LLC v. Veeam Software Corp.*, 835 F.3d 1406, 1414-15 (Fed. Cir. 2016) (noting the long-line of precedent holding that “novel and nonobvious inventions often are only a combination of known individual features”).

The Alliance never actually responds to this point. Instead, the Alliance argues that substantial evidence supports the Board’s conclusion, without addressing that conclusion’s legal sufficiency. The Alliance argues that substantial evidence shows (1) “that every step recited in Claim 1 was known in the art and, as claimed, was used for its known purpose,” Alliance Br. 33, 42; (2) “that ‘a person of ordinary skill in the art would have known how to combine’” *Yamamoto’s* alloy-production method with the alloy-processing methods of *Hasegawa* or *Ohashi*, *id.* at 34 (quoting Appx12), 43; and (3) “that ‘a person of ordinary skill would have recognized the results of [this] combination to be predictable,’” *id.* at 35 (quoting Appx13; alteration by Alliance), 43.

But none of those beside-the-point arguments addresses the salient point: that merely showing that the claims represent the combination of known elements to yield a predictable result does not prove obviousness. It is therefore uncontested that the Board's first stated basis for its obviousness ruling is legally insufficient.

Second, the Board went on to articulate a particular benefit that it believed would have led a person of ordinary skill to pursue the combination: “design incentives, such as the provision of a ‘lower cost, more productive [process] better suited for higher volume manufacturing.’” Appx14-15 (quoting Alliance reply brief at Appx375; alteration in Board opinion). But the Alliance does not defend that finding either.

Indeed, the Alliance's use of ellipses in its quotation of the Board's conclusion highlights its decision not to defend the Board. The Board stated:

[C]onsideration of design incentives, *such as the provision of a “lower cost, more productive [process] better suited for higher volume manufacturing”* would have led one of ordinary skill to pursue the predictable combination of elements.

Appx14-15 (citation omitted; emphasis added; second alteration in Board opinion).

The italicized language is the *only* purported benefit the Board identified for the combination. Yet, in quoting the Board, the Alliance replaced the Board's only alleged benefit with ellipses:

[S]ubstantial evidence supports the Board's finding that “consideration of design incentives . . . would have led

one of ordinary skill to pursue the predictable combination of elements.”

Alliance Br. 35, 44 (quoting Appx14, Appx19; ellipses by Alliance).

The Alliance’s use of ellipses is telling. Nowhere in the response brief does the Alliance ever defend the Board’s stated rationale of providing a “lower cost, more productive process better suited for higher volume manufacturing.” The Alliance never disputes Hitachi Metals’ argument that the finding lacks substantial-evidence support. It never points to any supporting evidence.

To be sure, the Alliance tries to replace the Board’s benefit with different benefits that the Board never found. Alliance Br. 35-36 (citing purported benefits of *Yamamoto*). But that is not a defense of the Board’s actual decision, nor does it voice any disagreement with Hitachi Metals’ assertion that the Board erred in its stated reasoning. In any event, the Alliance’s substituted rationale cannot support affirmance, for the reasons given below. *See infra* Section I.A.1.c.

In short, as the Alliance’s arguments confirm, the Board’s errors require reversal.

b. The Board erred in rejecting evidence that a skilled artisan would have expected the combinations to be failures

Because the Alliance never addresses either of the above errors, the errors identified in Hitachi Metals’ opening brief are now undisputed, and this Court can reverse the Board’s obviousness determinations for that reason alone. Regardless,

the Board legally erred in refusing to consider Hitachi Metals' evidence that a person of ordinary skill would not have expected to realize the alleged benefits of the proposed combinations.

The Board articulated a single benefit that supposedly would have motivated the combinations: commercial advantages. Appx14, 19. Hitachi Metals produced overwhelming evidence that a skilled artisan would not reasonably have expected the combinations to result in that benefit. HM Br. 26-30, 34-36. That evidence demonstrated that replacing *Hasegawa's* or *Ohashi's* alloy-producing method with *Yamamoto's* would result in an alloy with a drastically different microstructure. Appx969-971 (¶¶89-91), Appx1437, Appx1481. Alloys with different microstructures pulverize differently during the pulverization steps of *Hasegawa* and *Ohashi*. Appx949 (¶41), Appx1305-1306, Appx1437, Appx1443. But *Hasegawa's* and *Ohashi's* magnet-production processes involve carefully calibrated particle filtering that is premised on the specific alloy-preparation and -pulverization methods disclosed in those references. Appx688 (Abstract), Appx689-691 (¶¶4, 6, 8, 12), Appx698 (col.3:43-45, col.4:53-64), Appx969-971 (¶¶89-91), Appx973-975 (¶¶98-100). Applying *Hasegawa's* and *Ohashi's* particle filtering to alloys produced according to *Yamamoto* would require discarding large amounts of pulverized powder, which would reduce the yield and quality of rare-earth magnets while driving up production costs. Appx971 (¶¶92-93), Appx973-

976 (¶¶98-102). The discarded powder also is extremely dangerous, as it can spontaneously combust and cause large explosions. Appx85 (col.10:36-42), Appx653, Appx2688, Appx2743.

The Board refused to consider Hitachi Metals' evidence, stating that it goes only to whether the proposed combination would have made "commercial sense." Appx13. But as discussed in Hitachi Metals' principal brief (at 32-36), it was legally erroneous for the Board simultaneously to identify commercial advantages as the combinations' alleged benefit and to dismiss Hitachi Metals' evidence that those commercial advantages are illusory.

For example, in *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, this Court reversed after the Board dismissed evidence that a skilled artisan would not have expected a proposed combination to achieve the stated goals. 738 F.3d 1337, 1345-46 (Fed. Cir. 2013). The alleged motivation for combining references was producing chromosomal DNA without killing the cells, but the patent owner's evidence showed the combination would have killed the cells. *Id.* Although the claims did not require living cells, the challenger's alleged motivation for combining references did. *Id.* Hence it was legal error for the Board to dismiss the patent owner's evidence rebutting the alleged motivation. *Id.* at 1346.

This Court recently reached a similar conclusion in *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359 (Fed. Cir. 2016). There, the patent owner presented evidence that the proposed combination of elements from different prior-art methods would have been inefficient and unreliable. *Id.* at 1367-69. This Court explained that such evidence was relevant—even though the claims did not require a specific level of efficiency or reliability—because the “sole argument” for a motivation to combine was achieving efficiency. *Id.* at 1368.

Here, the alleged motivation was “design incentives, such as the provision of a ‘lower cost, more productive [process] better suited for higher volume manufacturing.’” Appx14-15. Hitachi Metals’ evidence directly rebutted that stated motivation. The Board erred in dismissing it.

The Alliance tries to distinguish *Focarino*, arguing that “neither Hasegawa nor Yamamoto indicates that their combination would necessarily result in a diminished yield.” Alliance Br. 41; *see id.* at 46 (same for *Ohashi* and *Yamamoto*). That does not distinguish this case from *Focarino*. In *Focarino*, as here, the evidence that the combination would have killed the cells came from sources other than the purportedly obviating references. 738 F.3d at 1345-46. The same was true in *Intelligent*. 821 F.3d at 1368. In any event, motivation-to-combine evidence need not come from the references involved in the combination. *DyStar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1365-66 (Fed. Cir. 2006).

The Alliance doubles down on the Board's flawed reasoning by arguing that Hitachi Metals' evidence regarding the combinations is "divorced entirely from the '385 patent's claims and specification" and that there is no "indication in the '385 patent that the inventors sought to solve—or even recognized—a problem relating to manufacturing yield for rapidly cooled alloys." Alliance Br. 39. This Court already rejected that exact reasoning in *Focarino* and *Intelligent*. Those cases hold that evidence that the ordinarily skilled artisan would not have expected certain benefits from a combination is relevant when those benefits are the proffered reason for making the combination, regardless of whether the claims require producing such benefits. *Intelligent*, 821 F.3d at 1368; *Focarino*, 738 F.3d at 1345-46. Accordingly, what matters here is that Hitachi Metals' evidence directly rebuts the sole motivation cited by the Board—commercial advantages. It was error for the Board to reject that evidence as irrelevant to the obviousness analysis.

The Alliance also suggests that the Board did not refuse to consider Hitachi Metals' evidence but rather weighed all the evidence (including Hitachi Metals') and concluded that the claims are nevertheless obvious. Alliance Br. 39-40. But that is contrary to the Board's express rationale: that Hitachi Metals' "commercial sense" evidence "does not control the obviousness determination" because "the claims do not recite a minimum required yield." Appx13-14. Nowhere did the Board state that Hitachi Metals' evidence was unpersuasive or outweighed by other

evidence. And as explained, the Board legally erred because whether the combinations would have made commercial sense *does* control when commercial sense is the stated reason to combine. *Focarino*, 738 F.3d at 1346; *Intelligent*, 821 F.3d at 1368.

c. The Alliance’s remaining arguments cannot absolve the Board’s errors

Unable to defend the Board’s rationale, the Alliance largely focuses on the existence of evidence to support findings that the Board never actually made. But the Board’s decision cannot be affirmed based on factual findings the Board did not make. *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1340 (Fed. Cir. 2016); *In re Lee*, 277 F.3d 1338, 1345 (Fed. Cir. 2002); *see SEC v. Chenery Corp.*, 318 U.S. 80, 87-88 (1943). Nor would the Alliance’s arguments support such findings had they been made.

First, the Alliance repeatedly argues there would have been a motivation to combine because the Board made a “finding that Yamamoto’s rapid cooling method would have resulted in an alloy that is more uniform, contains less α -Fe, exhibits superior pulverizability and sinterability, and imparts better magnetic properties.” Alliance Br. 37; *see id.* at 30, 35-36, 41-42, 44. But the Alliance does not cite anywhere in the Board’s final decision where the Board purportedly made such a finding. It did not. The Alliance made this argument before the Board, but the Board did not adopt it. Appx13-15, Appx18-19, Appx661-663 (¶¶ 59, 63-64).

At most, the Board found that alloys produced using *Yamamoto*'s rapid-cooling method had a more uniform composition but that any resulting "sufficient improvement has not yet been seen." Appx10.

In any event, the Alliance's factual argument goes only to the purported benefits of *Yamamoto*'s disclosures standing alone, not to whether one of ordinary skill would have expected those benefits from combining *Yamamoto* with *Hasegawa* or *Ohashi*. To prove obviousness, the Alliance needed to show that the benefits "could have been obtained by combining the prior art references." *NuVasive*, 2016 WL 7118526, at *5-6. The Alliance did not so do.

Nor could it have: the different properties of a *Yamamoto*-style alloy are precisely the reason that a skilled artisan would *not* have combined *Yamamoto*'s rapid-cooling method with *Hasegawa* or *Ohashi*. HM Br. 28-30; *supra* pp. 7-8. *Yamamoto*'s cooling method produces a narrow and uniform distribution of particles, Appx715 (col.3:49-57, col.4:25-29), Appx716 (col.5:46-58), which leads to throwing out large portions of the alloy powder when combining that approach with *Hasegawa* or *Ohashi*, HM Br. 28-29, 34-36. That results in an inefficient and costly process that is more dangerous and less productive than the individual methods of *Hasegawa*, *Ohashi*, or *Yamamoto* standing alone. HM Br. 29-30.

Second, the Alliance observes that the Board "noted in its Decision to Institute review of the '385 patent, '[w]hile tradeoffs may be required in balancing

the benefits of rapidly cooled alloys with ingot cast alloys, such tradeoffs do not necessarily prevent the proposed combination.” Alliance Br. 36-37 (quoting Appx238; alteration by Alliance). That the Board “noted” this in its institution decision is not a basis for affirmance. The Board’s statement was simply a preliminary assessment by the agency, not its final reasoning. *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016).

Third, the Alliance argues that “the Board properly discounted Hitachi Metals’ evidence regarding diminished yield” because “Hitachi Metals relies on articles published well after the time of the invention.” Alliance Br. 38. Contrary to the Alliance’s assertion, this was not the Board’s reasoning. The Alliance points to nowhere in the Board’s decision adopting that rationale. Moreover, articles published after the date of invention often are relevant to the perspective of a person of ordinary skill at the time of the invention. *Plant Genetic Sys., N.V. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1344 (Fed. Cir. 2003) (“‘This court has approved use of later publications as evidence of the state of art existing on the filing date of an application.’” (quoting *In re Hogan*, 559 F.2d 595, 605 (C.C.P.A. 1977))); *see also Gould v. Quigg*, 822 F.2d 1074, 1078 (Fed. Cir. 1987); *Thomas & Betts Corp. v. Litton Sys., Inc.*, 720 F.2d 1572, 1580-81 (Fed. Cir. 1983). That is how Hitachi Metals used the evidence here, as confirmed by Hitachi Metals’ other

evidence, including Hitachi Metals' and the Alliance's experts, as well as other art published before the invention date. *See* HM Br. 27-29 (citing experts at Appx949 (¶41), Appx969-971 (¶¶89-91), Appx971 (¶¶92-93) and Appx1305-1306, and *Hasegawa* at App688, Appx689-691 (¶¶4, 6-8, 12)). Indeed, the Alliance implicitly concedes that printed publications may be used in this manner: the Alliance itself relies on an article that was published after the invention date as establishing a skilled artisan's knowledge at the time of the invention. Alliance Br. 37-38 (citing Appx1485-1486).

Fourth, the Alliance belatedly attempts to attack Hitachi Metals' expert's conclusion that combining the disclosures of *Hasegawa* and *Yamamoto* would require discarding more than half of the material. Alliance Br. 38. The Alliance had every opportunity before the Board to produce contrary evidence or seek to present its own expert evidence in reply. But the Alliance never produced any evidence contrary to Hitachi Metals' expert's conclusions on this issue, despite bearing the ultimate burden of persuasion. The Alliance's newly crafted attorney argument—which is wrong in any event—cannot overcome its failure to produce evidence.

Finally, the Alliance incorrectly argues that “a person of ordinary skill would have known how to mitigate a reduction in yield and magnet quality when using a strip cast alloy.” Alliance Br. 37-38. Again, the Board never made such a

finding. In any event, the Alliance's evidence shows at most that persons of ordinary skill knew how to adjust milling parameters for pulverizing an alloy. But the problems from the combinations are not due to milling and could not be (and were not) solved by simply turning a dial on a jet mill to obtain a different particle-size distribution. Rather, the problems are the result of the combined effects of multiple steps in the alloy-production and -processing chain. HM Br. 26-30, 34-36; *supra* pp. 7-8. The Alliance points to no evidence, nor offers any explanation, for how simply adjusting some milling parameters would somehow overcome those problems.

Accordingly, the Board's conclusion that claims 1, 5, and 6 are obvious over *Hasegawa* and *Yamamoto* and over *Ohashi* and *Yamamoto* should be reversed.

2. *The obviousness determinations based on He and Yamamoto also should be reversed*

The Board also erred in concluding that claims 5 and 6 would have been obvious in light of *He* and *Yamamoto*.

As discussed in Hitachi Metals' principal brief, the Board *rejected* the Alliance's asserted motivation for replacing *He*'s super-rapid cooling method with *Yamamoto*'s slower cooling method, concluding that the Alliance's articulated rationale "lacks evidentiary rational underpinning." Appx25. Nevertheless, the Board held that the claims would have been obvious based on the alternative

rationale that the claims were “the combination of prior art elements according to known methods to yield a predictable result.” Appx25.

As Hitachi Metals explained, the Board’s boilerplate conclusion was unsupported by any *evidence*. HM Br. 38-39. Nor did the Board articulate any *reason* why a person of ordinary skill would have selected these specific elements from these specific prior art references and combined them in the specific manner claimed. HM Br. 37-38. The Board’s conclusion therefore must be reversed. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1337 (Fed. Cir. 2016) (obviousness conclusion requires a reason why ordinary artisan “would have plucked one reference out of the sea of prior art” and combined with another).

The Alliance barely responds at all, and the half-page response it does offer is manifestly insufficient. The Alliance argues summarily that the claimed elements were individually known and used for their known purposes and that an ordinary artisan would have known how to combine the disclosures and would have expected the results to be predictable. Alliance Br. 48-49. But as Hitachi Metals explained—and the Alliance does not expressly contest—that has never been enough to establish obviousness. *Belden*, 805 F.3d at 1075; *see* HM Br. 37-38; *supra* pp. 3-4.

A party hoping to establish obviousness must “proffer evidence indicating *why* a person having ordinary skill in the art would combine the references to

arrive at the claimed invention.” *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1366-67 (Fed. Cir. 2012) (emphasis added); see *NuVasive*, 2016 WL 7118526, at *4-6. Even in *KSR*, where the Supreme Court clarified that the test for obviousness remains flexible, the Court repeatedly emphasized the need to identify “design incentives,” “market forces,” or some benefit that a skilled artisan would have recognized and sought to obtain by combining elements to arrive at the claimed invention. 550 U.S. at 417.¹ Moreover, *KSR* made clear that the analysis of a reason to combine prior art elements “should be made explicit.” *Id.* at 418. “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Yet the Alliance never points to any finding by the Board of a reason to combine the elements from *He* and *Yamamoto* to arrive at the claimed invention, and it never offers a legal basis for upholding the Board’s decision in the absence of such a finding.

¹ See also *KSR*, 550 U.S. at 418 (“demands known to the design community,” “an apparent reason to combine”); *id.* at 419 (“market demand”); *id.* at 420 (“known problem,” “any need or problem known in the field”); *id.* at 421 (“design need or market pressure”); *id.* at 422 (holding claim obvious because evidence showed that skilled artisan “could have” made combination and “would have seen the benefits”).

Even if it were enough to show that the results of the proposed combination would have been predictable (it is not), there is no evidence supporting the Board's conclusion that combining *He* and *Yamamoto* would have yielded predictable results. The Alliance baldly asserts there is substantial evidence supporting such a finding, but the Alliance never explains what the evidence was or how it supports the Board's conclusion. Alliance Br. 49. Without explanation, the Alliance cites passages from *Yamamoto*, but none of those passages discusses the results of combining steps from *He* and *Yamamoto*. Appx715 (col.3:49-col.4:6, col.4:39-59). The Alliance also cites a statement by its expert opining that the cooling method of *Yamamoto* was well-known, but it never explains how that statement might be relevant. The Alliance's perfunctory citations, without more, are not enough even to preserve its argument. *CardSoft, LLC. v. VeriFone, Inc.*, 807 F.3d 1346, 1353 (Fed. Cir. 2015); *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006). Much less are they sufficient to affirm the Board's conclusion.

B. The Board Based Its Anticipation Holding For Claim 1 On An Unreasonably Broad Construction Of "Rapid Cooling Method"

The Board likewise erred in concluding that *He* anticipated claim 1. The Alliance expressly agrees with Hitachi Metals that the question of anticipation turns entirely on the construction of "rapid cooling method." Alliance Br. 46 ("In this appeal, the issue of whether *He* discloses a rapid cooling method is entirely a matter of claim construction."); *see* HM Br. 39, 45-46. Thus, if this Court reverses

the Board's construction, *He* cannot anticipate. The construction is unreasonably broad and should be reversed.

Most of the issues with respect to claim construction are undisputed. Hitachi Metals explained that “rapid cooling” “had a well understood meaning in the context of preparing alloys for sintered rare-earth magnets.” HM Br. 40. The Alliance does not contest that. *See* Alliance Br. 47-48. Hitachi Metals explained that the ordinary meaning of “rapid cooling method” excluded super-rapid cooling methods, wherein an alloy is cooled at rates on the order of 10^5 degrees per second or faster. HM Br. 43-44. The Alliance does not contest that either. *See* Alliance Br. 47-48. Nor does the Alliance dispute that *He* discloses only ingot casting—which is a traditional, non-rapid cooling method—and melt-spinning—which is a super-rapid cooling method. HM Br. 45-46; *see* Alliance Br. 47-48. It is therefore common ground between the parties that the ordinary meaning of “rapid cooling method” to a person of ordinary skill at the time of the invention would not have included either of *He*'s disclosures.

Based on the above undisputed propositions, the Board should have given “rapid cooling method” its ordinary meaning in the art—a method that cools faster than ingot casting (on the order of a few degrees per second or slower), but not so fast that it exceeds rapid cooling and enters the domain of super-rapid cooling (on the order of 10^5 degrees per second or faster).

The Alliance's sole contrary argument in this Court is that "rapid cooling method" should not be given its ordinary meaning because the '385 patent's specification supposedly redefined the term by "provid[ing] a 'clear definition' of the term." Alliance Br. 47. But that is wrong. "To act as its own lexicographer, a patentee must 'clearly set forth a definition of the disputed claim term' other than its plain and ordinary meaning." *Thorner v. Sony Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citation omitted). The Court applies an "exacting" standard that looks to whether the patentee "clearly express[ed] an intent to redefine the term." *Id.* at 1365-66 (quotation marks and citation omitted).

There is no evidence in the '385 patent of a clearly expressed intent to redefine "rapid cooling method." The Alliance points to two pieces of intrinsic evidence, but neither comes close to satisfying the redefinition standard.

First, the Alliance points to the passage from the specification on which the Board relied. Alliance Br. 47 (citing Appx70 (col.1:38-45)); Appx7-8. The full passage reads:

The material alloy can be produced by methods largely classified into two types. The first type is an ingot casting method where a molten alloy is poured into a mold and cooled comparatively slowly. The second type is a rapid cooling method, *typified by* a strip casting method and a centrifugal casting method, where a molten material alloy is put into contact with a single chill roll, twin chill rolls, a rotary chill disk, a rotary cylindrical chill mold, *or the like*, to be rapidly cooled thereby

producing a solidified alloy thinner than an ingot cast alloy.

Appx70 (col.1:36-45) (emphases added). Far from redefining the term, that statement simply provides examples of known “rapid cooling method[s]” under that term’s ordinary meaning. Indeed, the passage’s use of “typified by” and “or the like” confirms that the discussion is exemplary, not a redefinition.

Moreover, the very next sentence goes on to state: “In the rapid cooling method, the molten alloy is cooled at a rate in the range between $10^{2^{\circ}}$ C./sec and $10^{4^{\circ}}$ C./sec.” Appx70 (col.1:46-47). That sentence is consistent with the ordinary meaning of the term and inconsistent with the Alliance and the Board’s redefined meaning, which stretched “rapid cooling method” to include methods that cool at rates in excess of 10^6 degrees per second. HM Br. 42-43.

Second, the Alliance simply states, without explanation, that the Board’s construction “is consistent with the limitations of dependent Claims 5 and 6.” Alliance Br. 47. That bare sentence, without more, is not enough to preserve an argument in this Court. *CardSoft*, 807 F.3d at 1353; *SmithKline Beecham*, 439 F.3d at 1320.

To the extent that the Alliance is adverting to a claim-differentiation argument, it is wrong. “[T]he doctrine of claim differentiation can not broaden claims beyond their correct scope, determined in light of the specification and prosecution history and any relevant extrinsic evidence.” *MarcTec, LLC v.*

Johnson & Johnson, 664 F.3d 907, 918 (Fed. Cir. 2012) (citation omitted). Moreover, the principle of claim differentiation is consistent with giving “rapid cooling method” its ordinary meaning because that meaning is already broader than the dependent claims’ limitations. Claim 5 limits claim 1 to “cooling a molten material alloy at a cooling rate in a range between $10^{2^{\circ}}$ C./sec and $10^{4^{\circ}}$ C./sec.” Appx76 (col.14:1-4). And claim 6 adds that “the molten material alloy is cooled by a strip casting method.” Appx76 (col.14:5-6). But the ordinary meaning of “rapid cooling method” is broader: cooling a molten alloy at a rate faster than ingot casting (on the order of a few degrees per second and slower), but not so fast that it enters the domain of super-rapid cooling (on the order of 10^5 degrees per second and faster). A claim-differentiation argument thus does not support broadening “rapid cooling method” even further, beyond its ordinary meaning.

II. THE ALLIANCE FAILED TO PROVE THAT THE CHALLENGED ’765 PATENT CLAIMS ARE UNPATENTABLE

A. The Alliance Failed To Prove That Combining *Ohashi* And *Hasegawa* Was Within The Skill Of An Ordinary Artisan

A single error requires reversal of all of the Board’s unpatentability determinations for the ’765 patent: the Board failed to require evidence that *Hasegawa*’s hydrogen-pulverization method and *Ohashi*’s magnet-production process could be combined by a person of skill in the art to work for their intended purposes. Instead of requiring evidence, the Board accepted bare attorney

assertions and conclusory statements. HM Br. 49. The Alliance’s response brief simply parrots that non-evidence. Alliance Br. 50-53.

The Alliance does not dispute (Alliance Br. 50-53)—and the parties thus agree—that the evidence before the Board established the following:

- *Ohashi* discloses a carefully calibrated process, arrived at “after extensive investigations,” that identifies a specific size threshold for filtering particles. Appx698 (col.3:43-45, col.4:53-64); *see* HM Br. 51-52.
- *Ohashi*’s extensive investigation and carefully calibrated process involved only mechanical pulverization techniques, despite being developed at a time when hydrogen pulverization was known and in use. Appx698 (col.4:37-52), Appx2876 (hydrogen pulverization known six years before *Ohashi*’s filing), Appx2459 (contemporaneous art showing use of hydrogen pulverization in industrial-scale process); *see* HM Br. 48, 51-52.
- Altering *Ohashi* to use hydrogen pulverization would completely alter *Ohashi*’s operating principle. It would require starting with a different alloy with a different microstructure. And it would produce a pulverized powder with different properties. The effects of these changes were never studied in *Ohashi*. Appx2715 (¶¶38-40), Appx2739 (¶¶90-91), Appx2877-2879; *see* HM Br. 50-51.

Despite these undisputed facts, the Board found that a skilled artisan could have readily combined *Ohashi* and *Hasegawa* to achieve a “predictable result.” Appx40. As Hitachi Metals explained, however, the Board’s conclusion was erroneous because there was no evidence to support it. The Alliance never offered any evidence that the combination would have a predictable result. And the Board pointed to none. HM Br. 48.

In response, the Alliance cites only a single fact supposedly supporting the Board's conclusion: that hydrogen pulverization was generally known by the time of the invention. Alliance Br. 52 (citing Appx689 (¶2), Appx795 (ll.19-23), Appx1304 (ll.9-17)). But establishing that an element was generally known, or even well known, has never been enough to establish that a skilled artisan could have combined it with another known element. *E.g., Crocs, Inc. v. Int'l Trade Comm'n*, 598 F.3d 1294, 1308-09 (Fed. Cir. 2010). If that were enough, then obviousness would be established every time a party shows that all claim elements are disclosed in various pieces of prior art.

As discussed above, even though it was not its burden to do so, Hitachi Metals submitted evidence that the combination could not readily be done. And even though it was the Alliance's burden, the Alliance completely failed to submit evidence that a skilled artisan would have been able to overcome the challenges posed by altering the method in *Ohashi* to incorporate *Hasegawa's* hydrogen-pulverization step. In its brief in this Court, the Alliance still points to no such evidence.

Because the Alliance has failed to buttress any support for the Board's cancellation of the claims of the '765 patent, this Court should reverse.

B. The Board's Erroneous Construction Of Claim 4 Independently Requires Reversal As To That Claim

The Board's cancellation of claim 4 also should be reversed because (1) it was based on a construction that it adopted in its final written decision without having given Hitachi Metals notice or an opportunity to respond and (2) that new construction was unreasonably broad. The Alliance has no meaningful response to Hitachi Metals' contentions as to either of these errors. Additionally, the Alliance does not dispute that, if this Court agrees and adopts Hitachi Metals' construction of claim 4, the Court should reverse because the prior art does not disclose the claimed element. HM Br. 62; *see CardSoft*, 807 F.3d at 1352-53 (in appeal from district court, reversing outright under new construction after appellee failed to respond to argument for reversal).

First, the Board erred by adopting a new construction as to which Hitachi Metals had no notice or any opportunity to respond. *See* HM Br. 54-57. The Alliance argues that the Board's construction responded to arguments first raised by Hitachi Metals. Alliance Br. 54 (citing Appx2055-2058). But that is not true. Indeed, the portions of Hitachi Metals' briefing that the Alliance cites confirm this. They show that Hitachi Metals understood that the Board would apply the ordinary meaning of claim 4 and that the parties' arguments would be based on that ordinary meaning. Appx2055-2058. The Board departed from that understanding in response to the Alliance's new arguments, which were raised for the first time in

its petitioner's reply, Appx2108-2109, after Hitachi Metals no longer had the right to submit new arguments or evidence, *see* 37 C.F.R. §§ 42.23, 42.107, 42.120(a).

Even if the Board's construction were in response to Hitachi Metals' argument, that still does not show that the Board abided by the procedural requirements of the Administrative Procedure Act. The APA requires the Board to “‘timely inform[]’ the patent owner of ‘the matters of fact and law asserted,’” to “‘provide ‘all interested parties opportunity for the submission and consideration of facts [and] arguments,’” and to “allow ‘a party . . . to submit rebuttal evidence.’” *Dell Inc. v. Acceleron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016) (quoting 5 U.S.C. §§ 554, 556; alterations in *Dell*); *see also In re NuVasive, Inc.*, 841 F.3d 966, 970-72 (Fed. Cir. 2016). None of those requirements is satisfied where the Board adopts a new construction in response to an argument that is based on a claim's ordinary meaning but does not provide notice of the new construction or an opportunity to respond. That is especially true when the Board then faults the party for not applying the newly adopted construction—which occurred here. Appx51-52.

The Alliance is also wrong that oral argument or the availability to request a discretionary surreply is enough. *Contra* Alliance Br. 54. Oral argument is not an opportunity to present rebuttal evidence or new arguments. *Dell*, 818 F.3d at 1301 (citing Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,768 (Aug. 14,

2012)). And an opportunity to request discretionary relief is insufficient to protect a party's *entitlement* to notice and a fair opportunity to respond. *See NuVasive*, 841 F.3d at 971-73 (the Board denies such requests even when made).

Second, the Board's belated construction is wrong. Claim 1 requires "a second pulverization step of finely pulverizing the material alloy, wherein . . . said second pulverization step comprises a step of removing at least part of fine powder" based on powder particle size. Appx87 (col.13:21-34). Both parties agree that this "second pulverization step" is an umbrella step that incorporates two sub-steps: (a) a finely pulverizing sub-step (also known as milling)² and (b) a particle-classifying-and-removing sub-step that removes part of the finely pulverized powder. HM Br. 57; Alliance Br. 53. Dependent claims 3 and 4 limit the way the alloy is "finely pulverized." Appx87 (col.13:40-41). Specifically, "the alloy is finely pulverized in a high-speed flow of gas . . . compris[ing] oxygen." Appx87 (col.13:40-44).

According to the Alliance, the dependent claims' reference to the "second pulverization step" means that a high-speed flow of gas comprising oxygen need only be present during either of the two sub-steps within the second step. The

² "Milling" refers to the process of finely pulverizing coarse powder, often done using a jet mill to accelerate particles in a high-speed flow of gas so that they collide and break up into a fine powder. Appx2383-2384 (¶52), Appx2717 (¶43).

Alliance thus argues that claim 4 is satisfied if oxygen is present during only sub-step (b)—i.e., the classifying-and-removing sub-step.

But that argument cannot be reconciled with the claim language. Claims 3 and 4 do not say that the high-speed flow of gas comprising oxygen must be present at any time during the “second pulverization step.” Nor do they reference the classifying-and-removing sub-step (i.e., sub-step (b)). Instead, they specifically require that the powder be “finely pulverized” in a high-speed flow of gas comprising oxygen, expressly referring to the finely pulverizing sub-step (i.e., sub-step (a)). Appx87 (col.13:40-44).

Indeed, as Hitachi Metals explained (HM Br. 59), the claim language states that the classifying-and-removing sub-step is performed *after* the powder has already been finely pulverized into a “fine powder.” Appx87 (col.13:31, 40-44). Thus, claim 3’s reference to when the alloy is “finely pulverized” necessarily refers to the milling sub-step (sub-step (a)), the step in which the alloy is finely pulverized *before* the classifying-and-removing sub-step. The Alliance has no response to this. *Cf. Straight Path IP Grp. v. Sipnet EU SRO*, 806 F.3d 1356, 1361 (Fed. Cir. 2015) (absent redefinition or disavowal, proper construction is one that stays true to claim language).

Contrary to the Alliance’s arguments, the specification supports Hitachi Metals’ construction. As the Alliance observes (Alliance Br. 54), the specification,

like the claims, refers to a second pulverization step that involves two sub-steps: (a) finely pulverizing or milling the powder and (b) removing and classifying the resulting fine powder. Appx81-82 (col.2:66-3:7), Appx82 (col.4:56-62), Appx85 (col.10:46-50). But whenever the specification refers to a high-speed flow of gas containing oxygen, it discusses only sub-step (a), the sub-step of finely pulverizing (or milling). Appx82 (col.3:27-28), Appx83 (col.5:23-28), Appx84 (col.7:10-17, col.8:16-21), Appx85 (col.9:12-20, col.10:50-53). The specification therefore confirms Hitachi Metals' plain reading of the claim language.

Because the Board unreasonably construed claim 4 not to require that an alloy be finely pulverized in a high-speed flow of gas comprising oxygen, and because there is no dispute before this Court that the prior art does not disclose that limitation, this Court should reverse.

C. The Alliance Failed To Prove That Claims 11 And 12 Would Have Been Obvious In View Of *Ohashi, Hasegawa, And Yamamoto*

It is undisputed that the Board held claims 11 and 12 of the '765 patent unpatentable based on the same art disclosing essentially the same claim elements discussed in Section I.A., and that the Board pointed to the same "design incentives" of allegedly lower cost and better productivity as motivating the combination. *See Alliance Br. 55-56.*

The Board's finding of a motivation to combine is just as unsupported and flawed for these claims as it is for the claims of the '385 patent. Hitachi Metals'

evidence showed that a skilled artisan would not have been motivated to combine elements from these references because such an artisan would have expected the resulting process to be drastically more expensive and less productive. HM Br. 64 (citing Appx2745-2748 (¶¶106-13)). The Board pointed to zero contrary evidence, and the Board's reasoning for dismissing Hitachi Metals' evidence was rejected by this Court in *Focarino* and *Intelligent*. See *supra* pp. 8-10.

In response the Alliance offers a bare assertion of “substantial evidence support[,]” adding three record citations that discuss only *Yamamoto* but say nothing about the expected cost-effectiveness or productivity of the proposed combination. Alliance Br. 56 (citing Appx716 (col.5:46-58) (paragraphs from *Yamamoto* discussing benefits of alloy ingots standing alone); Appx2408 (¶92) (statement by Alliance expert regarding same); Appx1274 (ll.10-20) (statement by Alliance expert about cost-savings and productivity of *Yamamoto* alone, but without addressing whether those savings and increased productivity would be realized when combined with *Hasegawa* and *Ohashi*).

Because there is no evidence that a person of skill in the art would have pursued the combination, the Court should reverse.

CONCLUSION

For the foregoing reasons and those in Hitachi Metals' principal brief, the Board's decision should be reversed, or, at a minimum, vacated and remanded.

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Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH RULE 32(a)

This brief complies with the type-volume limitation of Rule 32(a) of the Federal Rules of Appellate Procedure because it contains 6,875 words.

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