

United States Court of Appeals for the Federal Circuit

POLARIS INDUSTRIES, INC.,
Appellant

v.

ARCTIC CAT, INC.,
Cross-Appellant

2016-1807, 2016-2280

Appeals from the United States Patent and Trade-
mark Office, Patent Trial and Appeal Board in Nos.
IPR2014-01427, IPR2014-01428.

Decided: February 9, 2018

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Before LOURIE, O'MALLEY, and HUGHES, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

Polaris Industries, Inc. (“Polaris”) owns U.S. Patent No. 8,596,405 (“the ’405 patent”), which is directed to all-terrain vehicles (“ATVs”) having at least two seats arranged side-by-side. Polaris’s competitor, Arctic Cat, Inc. (“Arctic Cat”), filed two petitions for *inter partes* review, challenging the patentability of all thirty-eight claims of the ’405 patent as obvious under 35 U.S.C. § 103 based on different combinations of prior art references. The Patent Trial and Appeal Board (“Board”) found, in two *inter partes* review proceedings, that the claims are unpatentable over one combination of references, but not the other. *See Arctic Cat, Inc. v. Polaris Indus., Inc.*, No. IPR2014-01427, 2016 WL 498434 (P.T.A.B. Feb. 4, 2016) (*1427 Decision*); *Arctic Cat, Inc. v. Polaris Indus., Inc.*, No. IPR2014-01428, 2016 WL 498539 (P.T.A.B. Feb. 4, 2016) (*1428 Decision*). The parties cross-appealed.

For the reasons below, we affirm in part, vacate in part, and remand for further proceedings in the *1427 Decision*. We affirm the Board’s determination that the challenged claims were not proven unpatentable in the *1428 Decision*.

I. BACKGROUND

A. The ’405 Patent

The ’405 patent, titled “Side-by-Side ATV,” issued on December 3, 2013, and was assigned to Polaris. According to the specification, the invention of the ’405 patent “relates to [ATVs] having at least a pair of laterally spaced apart seating surfaces.” ’405 patent, col. 1, ll. 10–12. At several points, the ’405 patent expresses a desire that the ATV have a low center of gravity. The specification, for example, explains that in one “illustrative embodiment,” shown in Figure 2, “the ratio of the wheelbase to the seat height, or distance A to distance B, is about 6.55 to 1.” *Id.* col. 4, ll. 19–21. The specification goes on to

state that “the present invention contemplates ATVs having a ratio of wheelbase to seat height greater than about 6.0 to 1,” which “facilitates a relatively low vehicle center of gravity and further provides improved ergonomics, handling, and space utilization.” *Id.* col. 4, ll. 23–28. The specification also provides that, in another embodiment, “various relatively heavy components” such as the battery and fuel tank “are positioned vertically proximate the frame 15 to lower the vehicle’s center of gravity, thereby improving balance and stability.” *Id.* col. 5, ll. 23–35

Each of the thirty-eight claims recites components housed within the ATVs, and specifies the spatial relationship between these components. For example, independent claim 1, at issue on appeal, recites an ATV including:

- [a] a frame, comprising a front frame portion, a mid frame portion and a rear frame portion;
- [b] a front suspension supported by the front frame portion;
- [c] at least two front wheels coupled to the front suspension;
- [d] a front axle assembly supported by the front frame portion and drivingly coupled to the front wheels;
- [e] a seating area supported by the mid frame portion, comprising side by side seats;
- [f] an engine supported by the rear frame portion, the engine positioned rearwardly of the seating area;
- [g] a transmission coupled to and extending rearwardly of the engine;

[h] a rear suspension supported by the rear frame portion;

[i] at least two rear wheels coupled to the rear suspension;

[j] a rear axle assembly supported by the rear frame portion and drivingly coupled to the rear wheels;

[k] a front drive shaft extending between the transmission and the front axle assembly for coupling the transmission to the front wheels;

[l] and a rear drive shaft extending between the transmission and the rear axle assembly for coupling the transmission to the rear wheels.

Id. col. 11, ll. 2–25.

The claims that depend from claim 1—*i.e.*, claims 2–33 and 35—either specify the spatial relationship between the various components or recite additional components, such as “side-by-side bucket seats having a seat back and seat bottom.” *Id.* col. 11, ll. 26–28 (claim 2). Also at issue on appeal are dependent claims 15–19, which include limitations regarding the placement of a “protective panel,” fuel tank, battery, and front driveshaft. *Id.* col. 11, l. 61–col. 12, l. 6. These five claims all depend from claim 5, which recites “[t]he all-terrain vehicle of claim 1, wherein the rear frame portion comprises a lower rear frame portion and an upper rear frame portion.” *Id.* col. 11, ll. 35–37.

The only other independent claim, claim 34, differs from claim 1 in two relevant ways. First, while claim 1 requires that the front and rear drive shafts “extend[] between” the transmission and the front and rear axle assemblies, respectively, claim 34 requires that these drive shafts “extend[] forward of the transmission” and “rearward of the transmission,” respectively. *Compare id.*

col. 11, ll. 20–26, *with id.* col. 13, ll. 6–11. Second, while claim 1 requires that the transmission “extend[] rearwardly of the engine,” claim 34 requires that the transmission be located “completely rearward of the seating area.” *Compare id.* col. 11, ll. 14–15, *with id.* col. 12, ll. 66–67.

B. The Prior Art

Three prior art references—U.S. Patent Nos. 7,658,258 (“Denney”), 5,327,989 (“Furuhashi”), and 3,709,314 (“Hickey”)—are relevant to these appeals. These references are described below.

1. Denney

Denney is directed to “an all terrain, four-wheeled vehicle frame for carrying at least two passengers in a side-by-side riding configuration, comprising a rigid, tubular frame body.” *Denney*, at Abstract. The invention of Denney “provides for a forward passenger compartment having structural support members for carrying a pair of seats for the side-by-side passengers” and “a rearward engine compartment configured for receiving an engine, power train, and transmission for driving wheels of the vehicle.” *Id.* The invention in Denney “includes a vertical, load-bearing truss member extending generally along a longitudinal, central axis of the vehicle within the passenger compartment, the truss member forming a load-bearing structural member between the pair of seats.” *Id.*

Denney’s specification describes the state of the art at the time of the invention disclosed therein, and the tradeoffs between certain known vehicle designs. The specification explains that ATVs “typically have a short wheelbase which gives the ATV *increased maneuverability and transportability* over their counterpart recreational vehicles such as sandrails or a dune buggies [sic].” *Id.* col. 1, ll. 17–20 (emphasis added). But, “[h]istorically,

ATVs with a shorter wheelbase require that the ATV occupancy area be raised to accommodate the decreased amount of space between the wheels. By raising the occupancy area, the *center of gravity of the ATV is also raised.*” *Id.* col. 1, ll. 22–26 (emphasis added). “The result of a higher center of gravity is a *decrease in vehicle stability* and subsequent *increased risk of rollovers.*” *Id.* col. 1, ll. 26–28 (emphasis added).

On the other hand, recreational vehicles such as dune buggies “with wider wheelbases are able to accommodate vehicle occupants lower in the vehicle plane and hence have a *lower center of gravity.*” *Id.* col. 1, ll. 30–32 (emphasis added). But “the wider wheelbase *decreases* the vehicles [sic] *maneuverability* as well as the ability to transport the recreational vehicle in the back of a standard pick up truck bed.” *Id.* col. 1, ll. 34–36 (emphasis added). Denney therefore explains that “[i]t would be advantageous to combine the attractive features of the lower center of gravity vehicles with the attractive features of the shorter wheelbase . . . vehicles such that the resultant ATV has the increased maneuverability and transportability of a smaller ATV and the lower center of gravity and resultant enhanced stability of the vehicles with the wider wheelbases.” *Id.* col. 1, ll. 37–43.

The invention described in Denney purports to achieve this desired combination, but purportedly does so in a *two-wheel drive* system. *See id.* col. 4, ll. 29–35 (describing the power train giving the rear wheels additional movement through the driving axle). It is undisputed that Denney lacks features claimed in the ’405 patent that relate to front-wheel drive. *See* Cross-Appellant Br. 17. It is also undisputed that Denney does not disclose the additional limitations recited in claims 16–19 of the ’405 patent. *See id.* at 23–25.

2. Furuhashi

Furuhashi, by contrast, is directed to a “four-wheeled buggy” that can accommodate a single rider. *Furuhashi*, at Abstract; *id.* col. 1, ll. 6–9. Furuhashi’s specification explains that, in one embodiment, “a seat S is arranged in front of the engine room 11 and a fuel tank 120 is located within an area defined under a cushion 81 of the seat S.” *Id.* col. 12, ll. 23–26. Moreover, “[a] battery 16” is “arranged at the right side of the engine 12 in such a way that the battery 16 is supported on the right main frame 1” *Id.* col. 5, ll. 39–42. The specification goes on to explain that, “[u]nder a seatback 80 a fixed plate 123 is provided to cover a clearance 122 positioned behind the rider’s waist and is formed thereon with air ventilating slots 124.” *Id.* col. 12, ll. 31–34. In addition, Figure 19 depicts a “space 121” running below the fixed plate 123, the “lower part” of which “is provided for passing therethrough a front wheel driving apparatus such as a front propeller shaft 18 and the like as referred to in FIGS. 2 and 5.” *Id.* col. 12, ll. 26–31; *id.* Fig. 19.

3. Hickey

Hickey is directed to “provid[ing] a wheeled high speed, cross-country, rough terrain vehicle suitable for use as a reconnaissance vehicle for use with highly mobile armored forces or for use as a family recreational vehicle.” *Hickey*, col. 1, ll. 11–15. The specification explains that “presently known vehicles are not capable of operating with modern armored forces at sufficiently high speed and safety in rough terrain conditions,” and declares that:

[t]he vehicle of the present invention achieves this higher mobility through a novel drive train that takes power from the transmission and divides it between a front differential and a rear limited slip differential by means of an interaxle differential that incorporates a limited slip features [sic] in both forward or reverse.

Id. col. 1, ll. 15–25.

C. The Board’s Final Written Decisions

After being sued for infringing claims of the ’405 patent in district court, Arctic Cat filed two petitions for *inter partes* review, challenging the patentability of claims 1–38 as obvious in view of combinations of certain prior art references, including Denney, Furuhashi, and Hickey. In one petition, Arctic Cat argued that all relevant claims were obvious in view of the combination of Denney and Furuhashi. *See 1427 Decision*, 2016 WL 498434, at *2.¹ In the other petition, it contended that all thirty-eight claims were obvious in view of Hickey and at least one other reference. *See 1428 Decision*, 2016 WL 498539, at *2. The U.S. Patent and Trademark Office instituted review on these grounds, and the Board issued two Final Written Decisions on February 4, 2016. *See 1427 Decision*, 2016 WL 498434, at *1; *1428 Decision*, 2016 WL 498539, at *1. These decisions, and relevant arguments raised by the parties as part of these IPRs, are discussed below.

1. The 1427 IPR

In the 1427 IPR, the Board considered whether the relevant claims were obvious over the combination of Denney and Furuhashi. With respect to claim 1, Arctic

¹ Arctic Cat argued that all claims except dependent claims 14 and 35 would have been obvious over the combination of Denney and Furuhashi, and that these two claims would have been obvious over the combination of Denney, Furuhashi, and a third prior art reference. *1427 Decision*, 2016 WL 498434, at *2. In the proceedings below, Polaris did not “set forth any assertions concerning the separate patentability of any of dependent claims 14 and 35.” *Id.* Polaris does not argue that dependent claims 14 and 35 are separately patentable on appeal.

Cat argued that Denney discloses every limitation recited in that claim, with the exception of limitations relating to four-wheel drive and the limitation “a transmission coupled to and extending rearwardly from the engine.” *1427 Decision*, 2016 WL 498434, at *5. Arctic Cat relied on Furuhashi for these limitations, and provided “three separate rationales for combining Denney and Furuhashi to arrive at the subject matter of independent claim 1.” *Id.* (citing paragraphs 77–82 of Arctic Cat’s opening expert declaration). Arctic Cat further argued and submitted evidence that a person of skill in the art would have been motivated to position the protective panel, front driveshaft fuel tank, battery, and driveshaft disclosed in Furuhashi within the vehicle disclosed in Denney in the manner recited in claims 15–19.

The Board determined that all thirty-eight claims had been proven unpatentable as obvious in view of Denney and Furuhashi, and in so ruling, rejected Polaris’s myriad arguments to the contrary. First, it disagreed with Polaris that skilled artisans would not have been motivated to modify Denney into a four-wheel drive vehicle because Denney discloses a desire for a low center of gravity, and therefore “teach[es] away” from including anything under the seating area, such as the front drive shaft and fuel tank of Furuhashi. *Id.* at *6. The Board reasoned that, although Denney “discloses a desire for a low center of gravity,” this desire is simply one of several “subjective preferences” that is “a tool of limited value in evaluating obviousness” due to its “infinite[] variab[ility]” that could be overcome by other known preferences, such as adding four-wheel drive to a two-wheel drive vehicle. *Id.* at *6, *8.

The Board likewise rejected Polaris’s assertion that the combination of Denney and Furuhashi does not disclose or suggest the additional limitations recited in dependent claims 15–19, relying in part on its discussion of “subjective preferences” articulated in its analysis of

the obviousness of claim 1. *Id.* at *14–15. Finally, with respect to claim 34 and its dependents, the Board, among other things, rejected Polaris’s evidence of secondary considerations of nonobviousness. *Id.* at *16–17. In particular, the Board was not persuaded that Polaris showed that its “RZR vehicles are covered by claims 34 and 36–38 of the ’405 patent,” and found the supporting testimony from Polaris’s expert, Dr. John Moskwa, to be “conclusory” and “devoid of any analysis as to how the RZR vehicles are covered by” these claims. *Id.* at *16.

2. The 1428 IPR

In the 1428 IPR, the Board examined whether the claims of the ’405 patent would have been obvious over combinations that rely on Hickey as the primary reference. The Board began its analysis by construing terms recited in the limitations “a front drive shaft extending between the transmission and the front axle assembly” and “a rear drive shaft extending between the transmission and the rear axle assembly.” *1428 Decision*, 2016 WL 498539, at *3–6. The Board construed the term “drive shaft” to mean “a shaft structure that transmits torque, and excludes other hardware, such as universal joints, couplers, bearings, and interaxle differentials.” *Id.* at *4. It construed the phrase “extending between” as requiring “that a given drive shaft, and only that given drive shaft, must account for the entire distance between the transmission and the respective axle assembly.” *Id.* at *6.

The Board found that Hickey’s “shaft 22 is connected to transmission 14 . . . via at least interaxle differential 20 and universal joint 26.” *Id.* at *7. The Board therefore concluded “that Hickey does not disclose or suggest ‘a front drive shaft extending between the transmission and the front axle assembly,’ as recited in independent claim 1,” and determined that Arctic Cat had not shown, by a preponderance of the evidence, that the claims of the ’405

patent were obvious over combinations including Hickey. *Id.*

Polaris appeals the *1427 Decision*, while Arctic Cat conditionally cross-appeals the *1428 Decision*. We have jurisdiction over the appeals under 28 U.S.C. § 1295(a)(4)(A) (2012).

II. STANDARD OF REVIEW

Obviousness is a question of law based on underlying factual findings, including the scope and content of prior art references and the existence of a reason to combine those references. *See In re Hyon*, 679 F.3d 1363, 1365–66 (Fed. Cir. 2012) (explaining that motivation to combine is an underlying factual issue that is reviewed for substantial evidence); *In re NuVasive, Inc.*, 842 F.3d 1376, 1381–82 (Fed. Cir. 2016) (providing that the “ultimate determination of obviousness is a question of law” that is based on underlying factual findings, including those set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)). We uphold the Board’s factual findings unless they are not supported by substantial evidence, while we review the Board’s legal conclusions de novo. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). A finding is supported by substantial evidence if a reasonable mind might accept the evidence to support the finding. *In re Jolley*, 308 F.3d 1317, 1320 (Fed. Cir. 2002).

III. DISCUSSION

Polaris attacks the *1427 Decision* on three grounds. First, it argues that the Board’s analysis of the purported obviousness of claims 15–19 cannot withstand scrutiny, either because it is predicated on an improper claim construction or was too cursory. Second, it submits that the Board relied on impermissible hindsight in combining features of Denney and Furuhashi to arrive at certain of the claimed inventions, failing to articulate a valid motivation to combine these references and applying a “sub-

jective preferences” analysis that finds no basis in this court’s precedents. Finally, it contends that the Board erred in rejecting the undisputed evidence that Polaris introduced regarding the commercial success of its RZR vehicles that purportedly embody claims 34 and 36–38.

Arctic Cat, in its conditional cross-appeal, argues that the Board erred in construing the phrase “extending between” to exclude the possibility of intervening structures along the length of a given driveshaft. It therefore asks this court to vacate the Board’s construction, confirm that the “extending between” limitation permits the interposition of certain elements in the path of the drive shaft, and remand for further proceedings.

A. The 1427 IPR

We address Polaris’s challenges in the order they are raised in its opening brief.

1. Claims 15–19

a. Claim 15

Claim 15 recites the ATV of claim 5, further comprising “a *protective panel* positioned between the pair of laterally spaced-apart seating surfaces and the engine.” ’405 patent, col. 11, ll. 61–63 (emphasis added). Polaris submits that the Board adopted an impermissibly broad construction of the term “protective panel,” which caused it to erroneously find that Denney’s “mounting plate 45” satisfies this limitation. According to Polaris, Denney’s mounting plate is positioned behind the driver’s side seat only, whereas the claims require that the “protective panel” be positioned behind *both* seats.

Arctic Cat contends that Polaris’s claim construction argument is both waived and wrong on the merits. We agree with Arctic Cat that Polaris’s proposed construction is overly restrictive, and therefore reject Polaris’s argu-

ment that the Board erred in finding that Denney's mounting plate satisfies the protective panel limitation.

In *inter partes* review proceedings, the Board gives claim terms their broadest reasonable interpretation in light of the claim language and the specification. See *Cuozzo Speed Techs., LLC v. Lee*, — U.S. —, 136 S. Ct. 2131, 2142–46 (2016). Claim 15 specifies that the protective panel must be “positioned between” the “pair of laterally spaced-apart seating surfaces” and the engine. ’405 patent, col. 11, ll. 61–63. The specification, moreover, explains that, in one embodiment, the “output shaft 138 extends under protective panel 134,” which “is positioned behind upper and lower seating surfaces 18*a*, 18*b* and 20*a*, 20*b* and protects passengers in ATV 10 from moving parts of modular engine assembly 34, as well as, assists in shielding from noise.” *Id.* col. 7, ll. 41–46.

Nothing in the claims or the specification commands that the protective panel have any particular positioning relative to one or both seats. Instead, the intrinsic evidence requires that a portion of the panel must exist in the space between the seating surfaces and the engine and must serve some protective function.

Denney's mounting plate meets both of these requirements. Denney discloses a “mounting plate 45 [that] may be positioned between the engine and the main support truss 40” that “may be utilized to separate engine compartment 25 from the passenger compartment 15 and provide additional support for placement of the passenger seats.” *Denney*, col. 3, ll. 27–32. Figure 1 of Denney, reproduced below, depicts the mounting plate 45 positioned laterally between the spaces that house the seating surfaces and the engine:

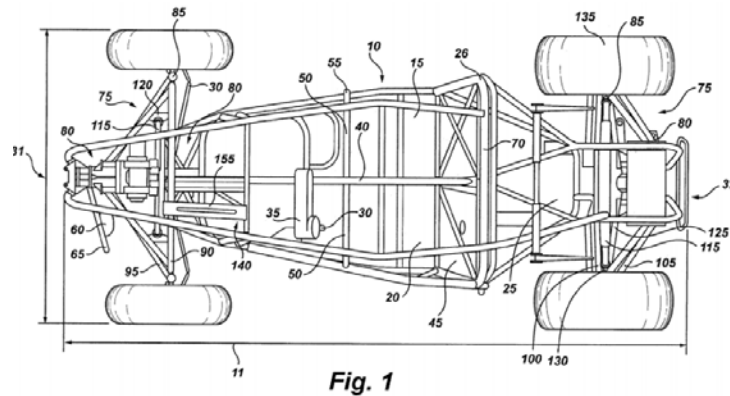


Fig. 1

Id. at Fig. 1. Although Polaris contends that no portion of mounting plate 45 depicted in Figure 1 is positioned between any portion of the passenger-side seat and the engine compartment, we do not read this illustration so restrictively.² Even if Polaris is correct that Figure 1 shows a mounting plate that does not extend across the entire passenger compartment, Denney’s specification is broader than the embodiment illustrated in that figure. In particular, the specification states that the mounting plate may be used to separate the engine “from the *passenger compartment*,” which houses both seats, and may “provide additional support for placement of the *passenger seats*.” *Id.* col. 3, ll. 27–32 (emphases added). These disclosures suggest that the mounting plate can run behind *both* seats, which would fall within the broadest reasonable interpretation of the term “protective panel.” This is consistent with the Board’s finding that Denney’s mounting plate “is disposed between engine compartment 25 and passenger compartment 15,” which, “[b]y virtue of its placement and existence alone . . . would provide *some*

² It is not clear from the drawing where mounting plate 45 begins and ends.

protection” to those in the passenger compartment. 1427 *Decision*, 2016 WL 498434, at *14. It is also consistent with the testimony of Arctic Cat’s expert, which the Board credited, *see id.*, that a person of ordinary skill would have recognized that Denney “teaches a protective panel positioned between the seating surfaces and the engine, as claimed in claim 15,” J.A. 1026 ¶ 120.

In short, we see no error in the Board’s finding that Denney’s mounting plate satisfies the protective panel limitation. We therefore affirm the Board’s determination that claim 15 would have been obvious.

b. Claim 16

Claim 16 recites the ATV of claim 15, “wherein the front driveshaft extends under the protective panel.” ’405 patent, col. 11, ll. 64–65. Polaris contends that the Board’s conclusion that claim 16 was obvious is based on the unsupported finding that a skilled artisan would have known to include Furuhashi’s front driveshaft “underneath the ATV of Denney” to obtain the known benefits of four-wheel drive. According to Polaris, the only evidence on the issue of adding a driveshaft “underneath the ATV of Denney” came from its expert, who unequivocally stated that one skilled in the art would not have adopted such a design because “[t]his location would expose the driveshaft to damage and decrease the vehicle’s clearance.” J.A. 3636. Arctic Cat responds by arguing, among other things, that it introduced sufficient evidence to demonstrate the obviousness of claim 16’s below-panel-positioning limitation, including by describing the benefits that such a modification would confer, particularly regarding safety.

Substantial evidence supports the Board’s determinations that one of ordinary skill in the art would have been motivated to place the front driveshaft of Furuhashi underneath the mounting plate of Denney and would have known how to accomplish this modification. As part

of its analysis concerning the obviousness of claim 1, the Board expressly credited the testimony of Arctic Cat's expert that "the structure of Denney discloses adequate space to place a front drive shaft with minimal other modifications," and relied on Arctic Cat's evidence to find that "Denney's existing structure could support a front drive shaft alongside or in place of support truss 40, which would not raise the center of gravity of Denney's ATV." *1427 Decision*, 2016 WL 498434, at *10 (citing paragraphs 16–18 of Arctic Cat's expert's declaration and certain other exhibits).

Figures 1 and 3 of Denney illustrate that support truss 40 runs "under" mounting plate 45, and therefore running a front driveshaft alongside or in place of this truss would result in running the driveshaft underneath the protective panel, satisfying the additional limitation of claim 16. Denney, Figs. 1, 3. Although the Board's reasoning could have been more thorough, we do not "find fault in the Board's arguably limited treatment of [Polaris's] arguments" concerning the positioning of the driveshaft, where the Board's treatment "was at least commensurate with" Polaris's presentation of this issue. *Novartis AG v. Torrent Pharm. Ltd.*, 853 F.3d 1316, 1327–28 (Fed. Cir. 2017) (concluding that the Board did not err in failing to consider the patent owner's argument concerning a lack of motivation to combine references where the patent owner "did not direct the Board to the expert declarations it now highlights on appeal" or "to any record evidence at all" and did not "meaningfully advance [its] suggested negatives or develop[] them in such a fashion as to necessarily overcome the numerous advantages" found to result from the combination). Accordingly, we affirm the Board's determination that claim 16 would have been obvious.

c. Claims 17–19

Claims 17–19 depend from claim 16 and include the following additional limitations: (1) “a *fuel tank*, the spaced-apart seating surfaces including a driver seating surface and a passenger seating surface, the fuel tank being positioned below one of the seating surfaces,” (claim 17); (2) “a *battery* positioned below the other of the seating surfaces,” (claim 18); and (3) a front driveshaft “extend[ing] laterally between the fuel tank and the battery,” (claim 19). ’405 patent, col. 11, l. 66–col. 12, l. 6 (emphasis added). The Board determined that all three claims were obvious, rejecting each of Polaris’s arguments and citing Arctic Cat’s expert’s testimony. *1427 Decision*, 2016 WL 498434, at *15.

Polaris contends that the Board’s analysis with respect to these claims suffers from multiple legal errors, all of which stem from the premise that “[v]ehicle design is essentially a packaging exercise,” in which the “components are standard, but where they are placed is creative.” Appellant Br. 36. First, it argues that the Board improperly relied on hindsight in determining that these claims were obvious. It next submits that the Board mistakenly concluded that, because Polaris introduced undisputed evidence that these components could be configured in multiple ways, Polaris admitted that these claims would have been obvious. Third, Polaris contends that the Board improperly rejected its evidence that Denney teaches away from introducing these modifications. Finally, Polaris argues that the Board failed to explain its rationale for determining that claims 18 and 19 would have been obvious.

We conclude that the Board’s analysis of these claims was inadequate. We begin with claim 17. Although it is true that the Board credited the testimony of Arctic Cat’s expert that skilled artisans would have been motivated to include a fuel tank below one of the surfaces to improve

the distribution of weight across the vehicle, *see 1427 Decision*, 2016 WL 498434, at *15, this finding does not, standing alone, support a determination of obviousness. This is because the Board (1) failed to consider Polaris’s uncontested evidence that skilled artisans would *not* have been motivated to place a fuel tank under Denney’s seats; and (2) applied a legal analysis that not only finds no support in our caselaw, but also runs contrary to the concept of teaching away.

Regarding the first point, Polaris introduced undisputed evidence below that placing a fuel tank underneath one of Denney’s seats would have required significantly raising the occupancy area. *See* J.A. 3667–68 (citing *Denney*, col. 1, ll. 25–28). According to Polaris, such a modification would have been contrary to Denney’s teaching that, “[b]y raising the occupancy area, the center of gravity of the ATV is also raised,” which results in “a decrease in vehicle stability and subsequent increased risk of rollovers.” *See Denney*, col. 1, ll. 25–28.³ The question, then, is whether the Board properly considered this undisputed evidence and other evidence introduced by the parties in evaluating whether persons of skill in the art would have been motivated to modify Denney to meet the limitations of claims 17–19.

The remainder of the Board’s analysis demonstrates that it did not. The Board failed to analyze whether

³ Although Polaris made a similar “teaching away” argument with respect to claim 1, Arctic Cat introduced evidence that a person of skill in the art could have modified Denney to meet the additional limitations of claim 1 without raising the center of gravity of the vehicle. The Board credited Arctic Cat’s evidence, and Polaris does not challenge this finding on appeal. Thus, the obviousness inquiry with respect to claim 17 is materially distinct from that concerning claim 1.

Denney “teaches away” from claims 17–19 by determining whether “a person of ordinary skill, upon reading [Denney], would be discouraged from following the path set out in [Denney], or would be led in a direction divergent from the path that was taken by the applicant.” *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). This was error.

The Board’s evaluation of Polaris’s teaching away argument was, in the Board’s own words, “the same as that set forth above with respect to why similar assertions set forth for independent claim 1 were unpersuasive” *1427 Decision*, 2016 WL 498434, at *15. As part of this earlier analysis, the Board rejected Polaris’s supposed “conflat[ion] [of] known modifications having known benefits with subjective preferences,” and held “that an obviousness analysis should focus on whether a modification is known to implement and has known benefits[.]” *Id.* at *6. The Board then stated that “one of ordinary skill has the ability to weigh the various benefits and disadvantages based on subjective preferences in an analysis *largely unrelated to obviousness*.” *Id.* (emphasis added).

We have never articulated a framework for analyzing whether claims would have been obvious that includes the phrase “subjective preference” or that permits a tribunal to wholly disregard the significance of prior art teachings based on such a characterization. Nevertheless, the Board applied its “subjective preferences” analysis to reject Polaris’s argument that Denney’s stated desire for a low center of gravity “teaches away” from making modifications that would raise the ATV’s center of gravity, without conducting a proper teaching away analysis. *See generally id.* at *6–11.

There are three specific problems with the “subjective preference” analysis espoused and applied by the Board. First, by completely disregarding certain teachings as ill-defined “subjective preferences,” the Board’s approach

invited the “distortion caused by hindsight bias” into the fold. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). We have observed that “the prejudice of hindsight bias” often overlooks that the “genius of invention is often a combination of known elements which in hindsight seems preordained.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 711 F.3d 1348, 1368 (Fed. Cir. 2013) (quoting *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351 (Fed. Cir. 2001)). We have also recognized that, “[w]hen the art in question is relatively simple, as is the case here, the opportunity to judge by hindsight is particularly tempting.” *McGinley*, 262 F.3d at 1351 (citations omitted).

Second, the Board focused on what a skilled artisan would have been *able* to do, rather than what a skilled artisan would have been *motivated* to do at the time of the invention. See *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (concluding that a party’s expert “succumbed to hindsight bias in her obviousness analysis” where such analysis “primarily consisted of conclusory references to her belief that one of ordinary skill in the art *could* combine these references, not that they *would* have been motivated to do so”).

Third, the Board’s analysis encourages the fact-finder to outright discard evidence relevant both to “teaching away” and to whether skilled artisans would have been motivated to combine references. “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (quoting *Ricoh Co., Ltd. v. Quanta Comput. Inc.*, 550 F.3d 1325, 1332 (Fed. Cir. 2008)). Moreover, a reference “must [be] considered for all it taught, disclosures that diverged and taught away from the invention at hand as well as disclo-

tures that pointed towards and taught the invention at hand.” *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 296 (Fed. Cir. 1985) (citation omitted). A reference does not teach away “if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.” *DePuy*, 567 F.3d at 1327 (quoting *In re Fulton*, 391 F.3d at 1201). But even if a reference is not found to teach away, its statements regarding preferences are relevant to a finding regarding whether a skilled artisan would be motivated to combine that reference with another reference. *See Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1051 n.15 (Fed. Cir. 2016) (en banc) (noting that, even if a reference “does not teach away, its statements regarding users preferring other forms of switches are relevant to a finding regarding whether a skilled artisan would be motivated to combine the slider toggle in” that reference with the invention of a second reference).

In this case, it is undisputed that adding a fuel tank under one of the seats of Denney’s ATV would significantly raise its occupancy area, thereby raising the center of gravity and rendering the vehicle less stable, which would run contrary to one of Denney’s stated purposes. *See Denney*, col. 1, ll. 25–28, 38–44; J.A. 3667–68. The Board’s treatment of this evidence was deficient, and we therefore vacate its determination that claim 17 would have been obvious.⁴ Because claims 18 and 19 depend

⁴ The Board compounded this error by transforming Polaris’s argument that “[t]here are many other potential locations for a gas tank in an ATV” into an admission that it would have been obvious to place a fuel tank underneath one of the two seats in Denney. *1427 Decision*, 2016 WL 498434, at *15. The Board failed to consider that “[m]erely stating that a particular placement of an

from claim 17, we vacate the Board’s obviousness determination with respect to those claims as well.⁵

On remand, the Board must analyze whether Denney “teaches away” from claims 17–19 under the framework that our caselaw *has* articulated. The Board must determine whether Denney merely expresses a general preference for maintaining very low seats or whether Denney’s teachings “criticize, discredit, or otherwise discourage” significantly raising the occupancy area of Denney’s ATV to add a fuel tank under one of the seats. *DePuy*,

element is a design choice does not make it obvious.” *Cutsforth, Inc. v. MotivePower, Inc.*, 636 F. App’x 575, 578 (Fed. Cir. 2016). Instead, the Board must explain why a person of ordinary skill in the art “would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 1359 (Fed. Cir. 1998) (“[T]he Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.”).

⁵ The Board’s analysis with respect to claims 18 and 19 failed to credit *any* evidence submitted by Arctic Cat regarding a motivation or ability to modify Denney’s ATV to satisfy the additional limitations of these claims using Furuhashi’s battery and front driveshaft. This is particularly problematic given that Furuhashi discloses a *single-seat* ATV. “The PTAB’s own explanation must suffice for us to see that the agency has done its job and must be capable of being ‘reasonably . . . discerned’ from a relatively concise PTAB discussion.” *In re Nuvasive*, 842 F.3d at 1383 (quoting *In re Huston*, 308 F.3d 1267, 1281 (Fed. Cir. 2002)). “[I]t is not adequate to summarize and reject arguments without explaining why the PTAB accepts the prevailing argument.” *Id.* (citation omitted).

567 F.3d at 1327. Even if the Board determines that Denney does not teach away because it merely expresses a general preference, the statements in Denney are still relevant to determining whether a skilled artisan would be motivated to combine Denney and Furuhashi. *See Apple*, 839 F.3d at 1051 n.15.

2. Claim 1

Polaris argues that the Board erred in its analysis of whether claim 1 would have been obvious because it improperly found a motivation to combine the dune buggy disclosed in Denney with the ATV disclosed in Furuhashi. Appellant Br. 47–49. According to Polaris, the Board’s analysis does not address why a person of skill in the art “looking to get the benefits of four-wheel drive would start with a dune buggy reference like Denney as the primary reference in the first place.” *Id.* at 48. Polaris submits that the evidence demonstrates that a person of skill in the art “does not simply convert a rear-wheel-drive vehicle to a four-wheel-drive vehicle without having to do a complete vehicle redesign, which would motivate such a person to *not* modify Denney as Arctic contends.” *Id.* at 49.

We find Polaris’s argument that there is no evidence why one of skill in the art looking to create a four-wheel drive ATV would be motivated to start with Denney’s dune buggy unavailing. First, as the Board found, Denney refers to its invention as an “all terrain vehicle[]” with “a pair of seats for the side-by-side passengers.” *1427 Decision*, 2016 WL 498434, at *6; *see Denney*, col. 1, ll. 14–15 (“The present invention relates generally to all terrain vehicles.”). Polaris also does not challenge the Board’s conclusion that the inventions described in Denney and in the ’405 patent are directed to solving problems associated with side-by-side ATVs, and are therefore analogous art under the test set forth in *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). *See 1427 Decision*, 2016 WL

498434, at *6 (“[W]e find that the ’405 patent and Denney are both directed to solving problems associated with side-by-side ATVs, which meets either prong of the analogous art test.”). Nor does Polaris challenge the Board’s findings that four-wheel drive was a well-known feature with known benefits, including increased traction and better acceleration in off-road conditions, and that a person skilled in the art could add four-wheel drive to Denney without raising the center of gravity of Denney’s vehicle. *See* Appellant Br. 26, 48.

Based on these fact-findings, we conclude that the Board articulated a valid motivation to combine the inventions of Denney and Furuhashi. *See WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1337 (Fed. Cir. 2016) (“Whether a skilled artisan would be motivated to make a combination includes whether he would select particular references in order to combine their elements. This is part of the fact question . . .”). We therefore affirm the Board’s determination that claim 1 would have been obvious.⁶ We likewise affirm the Board’s obviousness

⁶ Polaris claims that the Board improperly invoked the “subjective preferences” analysis we rejected above to ignore Denney’s teaching away from the inventions of claims 1, 25, and 34, and contends that the Board’s reference to this analysis warrants vacatur of the Board’s conclusions on each of these claims, just as it does with respect to claims 17–19. Polaris wholly fails to explain, however, how the Board relied on this test in concluding that claim 1 and its dependents were obvious. Importantly, Polaris fails to explain how any reference to “subjective preferences” in connection with claim 1 impacted the factual findings which we find support the Board’s obviousness conclusion with respect to that claim. We, thus, conclude that any reference to “subjective preferences” in

determination regarding claims 2–14, 20–33, and 35, as Polaris does not raise any separate patentability arguments as to these dependent claims.

3. Claims 34 and 36–38

Polaris next challenges the Board’s analysis of claims 34 and 36–38. Polaris argues that the Board improperly failed to weigh its evidence of commercial success in assessing whether claims 34 and 36–38 would have been obvious. Specifically, Polaris contends that the Board was wrong to reject its evidence of commercial success on the ground that Polaris failed to prove that its successful RZR vehicles are actually covered by or practice those particular claims of the ’405 patent.

According to Polaris, its expert performed a proper and complete analysis of the evidence of commercial success by reviewing the patent and claims, inspecting the RZR vehicles, studying literature relating to these vehicles, and comparing the vehicles to the claims. Polaris further points out that neither Arctic Cat nor its experts disputed these conclusions. On these grounds, Polaris submits that the Board’s rejection of Polaris’s expert’s testimony runs afoul of our recent decision in *PPC Broadband, Inc. v. Corning Optical Communications RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016). We agree.

Polaris also submits that, because it presented evidence showing its covered RZR vehicles were a commercial success, having generated over \$1.5 billion in sales since 2007, it was entitled to a presumption of commercial success. Polaris claims that it should have been entitled to such a presumption because it introduced evidence that the RZR vehicles became the market leader within two years after launch. Appellant Br. 58 (citing J.A. 3862

the Board’s analysis of claim 1, though error, was harmless.

¶ 56). Relatedly, Polaris argues that it is entitled to a presumption of a nexus between that commercial success and the claims of the '405 patent, citing to *WBIP, LLC v. Kohler Co.* for the proposition that “[t]here is a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘is the invention disclosed and claimed in the patent.’” 829 F.3d at 1329 (quoting *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997)). Again, we agree.

“The objective indicia of non-obviousness play an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis.” *Id.* at 1328. Indeed, we have held that such evidence “may often be the most probative and cogent evidence in the record.” *Id.* (quoting *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983)). “A determination of whether a patent claim is invalid as obvious under § 103 requires consideration of all four *Graham* factors, and it is error to reach a conclusion of obviousness until all those factors are considered.” *Id.* (citing *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1075 (Fed. Cir. 2012)).

Evidence of commercial success is one such objective indicator of non-obviousness. We have held that a patentee “cannot demonstrate commercial success, for purposes of countering the challenge of obviousness, unless it can show that the commercial success of the product results from the claimed invention.” *J.T. Eaton*, 106 F.3d at 1571. Put another way, “objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.” *Asyst Techs., Inc. v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008) (quoting *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983)). We presume that such a nexus applies for objective indicia when the patentee shows that the asserted objective evidence is tied to a specific product and that

product “embodies the claimed features, and is coextensive with them.” *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000). Conversely, “[w]hen the thing that is commercially successful is not coextensive with the patented invention—for example, if the patented invention is only a component of a commercially successful machine or process—the patentee must show prima facie a legally sufficient relationship between that which is patented and that which is sold.” *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

A patent challenger may rebut the presumption of nexus by presenting evidence “to show that the commercial success was due to extraneous factors other than the patented invention,” *id.* at 1393, such as “additional unclaimed features and external factors, such as improvements in marketing,” *WBIP*, 829 F.3d at 1329. “However, a patent challenger cannot successfully rebut the presumption with argument alone—it must present evidence.” *WBIP*, 829 F.3d at 1329 (citing *Brown & Williamson Tobacco*, 229 F.3d at 1130; *Demaco*, 851 F.2d at 1393).

Relying on these principles, we considered how the Board should treat undisputed evidence from a patentee that its product is the invention disclosed in the challenged claims in *PPC Broadband*, writing:

When the patentee has presented undisputed evidence that its product is the invention disclosed in the challenged claims, it is error for the Board to find to the contrary without further explanation. There was no such explanation here. The Board in its opinions did not explain why the SignalTight connectors fail to embody the claimed features, or what claimed features in particular are missing from the SignalTight connectors. Nor does Corning justify this finding on appeal. Sub-

stantial evidence does not support the Board's finding on this point.

815 F.3d 734, 745–47 (footnote omitted).

Here, the Board “decline[d] to accord . . . substantive weight” to the patentee’s undisputed evidence that its product is the invention disclosed in certain claims because it characterized the patentee’s evidence as “conclusory.” *1427 Decision*, 2016 WL 498434, at *16. On these facts, we conclude that the Board erred in failing to credit Polaris’s undisputed evidence that its RZR vehicles embody and are coextensive with claims 34 and 36–38 of the ’405 patent.

Polaris’s expert, Dr. Moskwa, submitted a declaration in which he testified that he had reviewed the ’405 patent and all claims recited therein, reviewed the RZR vehicles “and literature (*e.g.*, parts catalogs and parts drawings) associated therewith,” and construed the claim terms recited in the claims as one of ordinary skill in the art would understand them. J.A. 3593 ¶¶ 58–60. He further testified that he compared the RZR vehicles to the claims and determined, “based on [his] inspection, analysis, and study,” that a list of eight RZR vehicles embody each element recited in claims 34 and 36–38 of the ’405 patent. J.A. 3594 ¶ 61. Arctic Cat presented no contrary evidence.

The Board found Dr. Moskwa’s averments to be “conclusory statements,” and, thus, rejected Polaris’s evidence of commercial success in its entirety. Our case law does not require a patentee and its expert to go further than Polaris did here, however, to demonstrate that its commercial products are the inventions disclosed in the challenged claims, where the proffered evidence is not rebutted and the technology is relatively simple. Claims 34 and 36–38 broadly cover the *entire* vehicle, rather than “only a component of a commercially successful machine.” *Demaco*, 851 F.2d at 1392. Moreover, the Board did not

point to any limitation it found missing in the RZR vehicles. On these undisputed facts, we hold that the Board erred in failing to find that Polaris's eight RZR vehicles are the inventions disclosed in claims 34 and 36–38.⁷

Because the evidence submitted by Polaris demonstrates these vehicles are “the invention disclosed and claimed in the patent,” we presume that any commercial success of these products is due to the patented invention. *J.T. Eaton*, 106 F.3d at 1571. On remand, the Board must assess the import of this evidence after presuming that a nexus between the claims and the commercial success of the RZR vehicles exists, unless and until that presumption is adequately rebutted.

4. Conclusion Regarding the 1427 IPR

We have considered the remainder of the parties' arguments related to the 1427 IPR, and find them unpersuasive. We therefore affirm the Board's determination in the *1427 Decision* that claims 1–16, 20–33, and 35 are unpatentable as obvious. We vacate the Board's obviousness determination as to claims 17–19, 34, and 36–38 and remand for further proceedings.

B. The 1428 IPR

Finally, because we vacate the Board's obviousness determination with respect to certain claims in the 1427

⁷ We reject the implication that either a “limitation-by-limitation analysis” or “documentary evidence” is required for *PPC Broadband* to apply, finding no support for such a principle in our precedent. Compare Cross-Appellant Br. 65 (arguing that *PPC Broadband* requires limitation-by-limitation analysis or documentary evidence), with Appellant Br. 34 (arguing that *PPC Broadband* does not so require).

IPR, we consider the merits of Arctic Cat's conditional cross appeal from the *1428 Decision*.

Arctic Cat argues that the Board erred in its construction of the phrase “extending between” in claim 1's limitation “a front drive shaft extending between the transmission and the front axle assembly.” The Board construed this phrase as requiring that a front drive shaft, and only that drive shaft, “account for the entire distance between the transmission and the [front] axle assembly.” *1428 Decision*, 2016 WL 498539, at *6.

Arctic Cat submits that, in typical use, and certainly in its broadest reasonable use, the phrase “extending between” does not exclude the possibility of intervening structures. In so arguing, Arctic Cat analogizes that Pennsylvania Avenue extends between Georgetown and the southeast border of Washington, DC, even though “the U.S. Capitol is interposed between.” Cross-Appellant Br. 79. It submits that the Board's decision to “cherry-pick” dictionary definitions of the phrase “extending between” is improper, and further argues that other definitions tend to show that the broadest reasonable meaning of “extend” demonstrates that this limitation is not as narrow as the Board held. *Id.* at 80–82. Arctic Cat also contends that the Board erred by improperly elevating dictionary definitions over the clear guidance of the specification.

We disagree, and conclude that the phrase “extending between,” read in light of the claims, specification, and extrinsic evidence of record, requires that the front driveshaft account for the entire distance between the transmission and the front axle assembly, rather than some portion of that distance. A derivation of the phrase “extend between” appears four times in the specification. In each instance, the specification and associated figures illustrate that the component that “extends between” two other components spans the entire distance, as opposed to

a portion of the entire distance, between those other components. See '405 patent, col. 4, ll. 13–15 (“[W]heelbase A, which extends between the center of front axle 36 and the center of rear axle 38, is equal to about 77 inches (195.6 centimeters).”); *id.* col. 4, ll. 30–33 (“[W]idth C, which is defined as the overall width of ATV 10, extends between the outermost lateral points of ATV 10.”); *id.* col. 8, ll. 2–4 (“Front brackets 162 and rear brackets 160 extend between lower tubes 180 and down tubes 105.”); *id.* col. 8, ll. 51–53 (“Upper ends of dampeners 217 are pivotally coupled to bracket 223 extending between rear tubes 207.”). Arctic Cat points to no instance where the '405 patent specification uses “extending between” to refer to a structure that is merely located between two other structures. We have considered Arctic Cat’s other arguments, and find them unpersuasive.

Because we agree with the Board’s construction of the phrase “extending between,” and because Arctic Cat does not submit that we should reverse or vacate the Board’s decision under that construction, we affirm the Board’s determination that Arctic Cat has not demonstrated, by a preponderance of the evidence, that claims 1–38 of the '405 patent are unpatentable as obvious. We do not address the remainder of Arctic Cat’s cross-appeal.

IV. CONCLUSION

For the foregoing reasons, we affirm the Board’s determination in the *1427 Decision* that claims 1–16, 20–33, and 35 of the '405 patent are unpatentable as obvious. We vacate the Board’s obviousness determination as to claims 17–19, 34, and 36–38 and remand for further proceedings. We affirm the Board’s determination in the *1428 Decision* that Arctic Cat failed to meet its burden of demonstrating that the claims of the '405 patent are unpatentable.

**AFFIRMED IN PART, VACATED IN PART, AND
REMANDED**

COSTS

No costs.