

APPENDIX

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

FOX FACTORY, INC.,
Appellant

v.

SRAM, LLC,
Appellee

2018-2024, 2018-2025

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2017-
00118, IPR2017-00472.

Decided: December 18, 2019

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Before PROST, *Chief Judge*, WALLACH and HUGHES,
Circuit Judges.

PROST, *Chief Judge*.

Appellant FOX Factory, Inc. (“FOX”) appeals the decisions of the Patent Trial and Appeal Board (“Board”) in two inter partes reviews (“IPRs”) of claims 1–6 and 13–19 (“the challenged claims”) of U.S. Patent No. 9,182,027 (“the ’027 patent”). The Board found that the prior art references asserted by FOX disclose all the limitations of the ’027 patent’s independent claims and that a skilled artisan would have been motivated to combine the asserted prior art. The Board nevertheless concluded, based on its analysis of secondary considerations, that FOX had not shown that the challenged claims would have been obvious. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (2012). For the reasons below, we vacate and remand for further proceedings.

I

A

Bicycle chainrings are the toothed disks to which the bicycle crankarms are attached, collectively forming the crankset. Pedaling the crankarms rotates the chainring, which engages with and rotates the chain. Chains can be susceptible to disengaging from the chainring. This problem is especially prevalent with geared bicycles, which can experience severe changes in chain tension and energy motion of the chain, particularly when riding over rough terrain. Bicycles have employed extraneous structures, such as chain guides, to improve chain retention.

SRAM, LLC (“SRAM”) owns the ’027 patent, which generally covers an improved chainring structure that better maintains the chain, obviating the need for extraneous structures. For instance, the ’027 patent discloses a chainring with alternating narrow and wide tooth tips, which allegedly improves chain retention because the narrow and

wide teeth better fit inside the inner and outer chain links, respectively. In addition, the '027 patent discloses teeth offset from the center of the chainring, which also purportedly improves chain retention by providing "better guiding of the chain to one side of the chainring." Appellee's Br. 8 (quoting '027 patent col. 6 ll. 8–13).

The independent claims of the '027 patent—claims 1, 7, 13, and 20—recite a chainring with alternating narrow and wide tooth tips and teeth offset from the center of the chainring. Claims 7–12 and 20–26 generally cover tooth tips offset toward the body of the bicycle ("inboard offsets"), and claims 1–6 and 13–19 require teeth offset away from the body of the bicycle ("outboard offsets"). Claim 1 is representative of the "outboard offset" independent claims:

1. A bicycle chainring for engagement with a drivetrain, comprising:

a plurality of teeth formed about a periphery of the chainring, the plurality of teeth including a first group of teeth and a second group of teeth, each of the first group of teeth wider than each of the second group of teeth and at least some of the second group of teeth arranged alternately and adjacently between the first group of teeth, wherein each of the plurality of teeth includes a tooth tip;

wherein a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side; and

wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward the outboard side of the chainring.

'027 patent claim 1. Claim 7 is representative of the "inboard offset" independent claims:

7. A bicycle chainring for engagement with a drive chain, comprising:

a plurality of teeth formed about a periphery of the chainring, the plurality of teeth including a first group of teeth and a second group of teeth, each of the first group of teeth wider than each of the second group of teeth and at least some of the second group of teeth arranged alternately and adjacently between the first group of teeth, wherein each of the plurality of teeth includes a tooth tip;

wherein a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side; and

wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward the inboard side of the chainring.

Id. at claim 7.

The '027 patent specification discloses additional chainring features that are not recited by the independent claims. Like the features claimed, each of the disclosed but non-claimed features contribute to improving chain retention. For example, the specification discloses forwardly protruding tip portions that “function[] to engage a chain link earlier than a chain lacking the tip portion and provide[] better guiding of the chain.” '027 patent col. 5 ll. 47–51; *see also id.* at fig.5. The specification also discloses a “hook feature 78 . . . that may be formed on the rear flank 70 of each” tooth and “may cooperate with the tip portion 76 to provide better guiding of the chain.” *Id.* at col. 5 ll. 52–55; *see also id.* at fig.5. The specification further discloses “inner link-receiving recesses.” *Id.* at col. 5 ll. 26–44; *see also id.* at figs.5, 7. Furthermore, the '027 patent explains that the narrow and wide teeth preferably fill at

least 80% of the axial distance of the corresponding space in the chain link (“>80% gap filling”). *Id.* at col. 4 ll. 19–41.

SRAM also owns U.S. Patent 9,291,250 (“the ’250 patent”), which is a continuation of the ’027 patent and includes claims reciting a chainring with alternating narrow and wide teeth and wide teeth with >80% gap filling. ’250 patent claim 1; *see also* J.A. 5270, 5282. In separate IPR proceedings, SRAM stated that this “combination of features” claimed in the ’250 patent, “amongst several others disclosed in the ’250 patent, leads to a chainring that will retain a chain in even the worst conditions.” J.A. 5282–83. SRAM also explained that the >80% gap filling feature “allows the inventive chainring to better retain the chain under many conditions and amounts to the ‘heart’ of the challenged ’250 patent claims combined with the narrow and wide tooth configuration.” J.A. 5284. SRAM further described the >80% gap filling limitation as “critical.” J.A. 5289.

SRAM sells thirteen different versions of its “X-Sync” chainrings. It is undisputed that twelve of the thirteen versions embody the inboard offset claims and the thirteenth version embodies the outboard offset claims.

B

FOX filed two petitions collectively requesting inter partes review of claims 1–26 of the ’027 patent. One petition requested inter partes review of the outboard offset claims, and the other requested review of the inboard offset claims. Here, we discuss the Board’s findings in IPR 2017-00472, which relate to the outboard offset claims. We note, however, that the Board made similar findings in IPR 2017-00118 with respect to the inboard offset claims, including with respect to secondary considerations. *See FOX Factory, Inc. v. SRAM, LLC*, IPR2017-00118, 2018 WL 1633537, at *3–18 (P.T.A.B. Apr. 2, 2018).

The Board found that Japanese Utility Model No. S56-42489 (“JP-Shimano”) and U.S. Patent No. 5,285,701 (“Parachinni”) together disclose every limitation of the outboard offset independent claims and that a skilled artisan would have been motivated to combine the references. *FOX Factory, Inc. v. SRAM, LLC*, IPR2017-00472, 2018 WL 1889561, at *3–7 (P.T.A.B. Apr. 18, 2018) (J.A. 1–70) (“*Board Decision 472*”). The Board determined that JP-Shimano discloses the claimed narrow and wide teeth, and Parachinni discloses the claimed outboard offset. *Id.* at *3–5. The Board also found that a skilled artisan would have been motivated to combine the references because the skilled artisan would have recognized that the combination of the two features would improve chain retention better than either feature alone. *Id.* at *5–7.

Nevertheless, the Board determined, based on its analysis of secondary considerations, that FOX had not shown that the challenged claims would have been obvious. *Id.* at *21. SRAM submitted secondary considerations evidence pertaining to its X-Sync products. The Board determined that SRAM was entitled to a presumption of nexus between the challenged outboard offset claims and secondary considerations evidence pertaining to SRAM’s X-Sync products, subject to two limitations. *Id.* at *7–10.

First, the Board stated that evidence of secondary considerations “specifically directed” to either an inboard or outboard offset X-Sync product is only entitled to a presumption of nexus with the claims reciting the same type of offset. *Id.* Second, the Board explained that the presumption of nexus only applies when a product is “coextensive” with a patent claim. *Id.* at *7. The Board interpreted the coextensiveness requirement to mean only that the claims must broadly cover the product that is the subject of the secondary considerations evidence. *Id.* at *9–10. Through that lens, the Board explained that SRAM’s secondary considerations evidence pertaining to a specific X-Sync product or component (chainring, crankset, or

drivetrain) is only coextensive with the claims broadly covering that particular component. *Id.* at *10–11. For instance, in the Board’s view, SRAM’s independent claims, which cover a *chainring*, are only coextensive with sales or industry praise of X-Sync *chainrings*, not sales or industry praise of X-Sync cranksets or drivetrains. *Id.* at *11.

FOX argued that SRAM’s products are not coextensive with the challenged claims because the products include numerous unclaimed features. *Id.* at *9. The Board rejected this argument, reasoning that “[u]nclaimed features do not prevent the presumption of nexus, but they may be the basis for rebutting the presumption.” *Id.*

FOX also argued that, under this court’s decision in *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1289 (Fed. Cir. 2010), *vacated on other grounds*, 374 F. App’x 35 (2010), SRAM’s products are not coextensive with the independent claims because the X-Sync products also embody the claims of additional patents that cover a different invention than the claims of the ’027 patent. *Board Decision 472*, at *9. The Board also rejected this argument. The Board reasoned that, under *Therasense*, presuming nexus is only inappropriate if the products also embody one or more claims of a prior art patent. *Id.* However, the Board observed that FOX relied only on continuations of the ’027 patent.

Weighing the evidence, the Board determined that FOX could not rebut the nexus presumption, and due to SRAM’s “extremely strong overall showing of objective indicia of non-obviousness,” FOX had not shown by a preponderance of the evidence that the challenged claims would have been obvious. *Id.* at *21. FOX appealed the Board’s obviousness determinations.

II

“We review the PTAB’s factual findings for substantial evidence and its legal conclusions de novo.” *Redline*

Detection, LLC v. Star Envirotech, Inc., 811 F.3d 435, 449 (Fed. Cir. 2015) (citation omitted). “Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence,” meaning that “[i]t is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *In re NuVasive, Inc.*, 842 F.3d 1376, 1379–80 (Fed. Cir. 2016) (internal quotation marks and citations omitted). “If two inconsistent conclusions may reasonably be drawn from the evidence in record, the PTAB’s decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence.” *Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1356 (Fed. Cir. 2018) (internal quotation marks, brackets, and citation omitted). Obviousness is a legal question based on underlying fact findings. *In re DBC*, 545 F.3d 1373, 1377 (Fed. Cir. 2008).

A

On appeal, FOX contends that the Board applied the wrong standard for determining whether SRAM was entitled to a presumption of nexus between the challenged claims and SRAM’s evidence of secondary considerations. We agree.

1

A patent claim is invalid “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103 (2012).¹ Obviousness

¹ Congress amended § 103 when it enacted the Leahy-Smith America Invents Act (“AIA”). Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287 (2011). Because the ’027

“is a question of law based on underlying findings of fact.” *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Those underlying findings of fact include: (1) “the scope and content of the prior art,” (2) “differences between the prior art and the claims at issue,” (3) “the level of ordinary skill in the pertinent art,” and (4) the presence of evidence of secondary considerations, such “as commercial success, long felt but unsolved needs, failure of others,” and unexpected results. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966); see *United States v. Adams*, 383 U.S. 39, 50–52 (1966). In assessing the prior art, the PTAB also “consider[s] whether a [skilled artisan] would have been motivated to combine the prior art to achieve the claimed invention and whether there would have been a reasonable expectation of success in doing so.” *In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333 (Fed. Cir. 2016) (internal quotation marks, brackets, and citation omitted).

In order to accord substantial weight to secondary considerations in an obviousness analysis, “the evidence of secondary considerations must have a ‘nexus’ to the claims, i.e., there must be ‘a legally and factually sufficient connection’ between the evidence and the patented invention.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). “The patentee bears the burden of showing that a nexus exists.” *WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). “To determine whether the patentee has met that burden, we consider the correspondence between the objective evidence and the claim scope.” *Henny Penny*, 938 F.3d at 1332.

As first recognized in *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, a patentee is entitled to a rebuttable

patent has an effective filing date after March 16, 2013, the AIA applies. See *id.* § 3(n)(1), 125 Stat. at 293.

presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product “is the invention disclosed and claimed.” 851 F.2d at 1392 (emphasis added). That is, presuming nexus is appropriate “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.’” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *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 is not entitled to a presumption of nexus. *Demaco*, 851 F.2d at 1392.

We have reaffirmed the importance of the “coextensiveness” requirement in subsequent opinions. See, e.g., *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1319 (Fed. Cir. 2015) (“If a product both embodies the claimed features and is coextensive with the claims at issue, a nexus is presumed. In other words, a nexus exists if the commercial success of a product is limited to the features of the claimed invention.” (citation and quotation marks omitted)); *Therasense*, 593 F.3d at 1299.² Whether a product is coextensive with the patented invention, and therefore whether a presumption of nexus is appropriate in a given case, is a question of fact.

² Although the panel opinion in *Therasense* was vacated by an order granting appellants’ petition for rehearing en banc on the issue of inequitable conduct, 374 F. App’x 35, the portions of *Therasense* addressing obviousness—which are the portions we rely on in this case—were reinstated. 649 F.3d 1276, 1276 (Fed. Cir. 2011) (en banc).

A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations. *See In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996). To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the “direct result of the unique characteristics of the claimed invention.” *Id.*

2

The parties dispute whether the X-Sync chainrings are coextensive with the independent claims.³ In finding that the independent claims would not have been obvious, the Board did not address the dependent claims in its obviousness analysis. *Board Decision 472*, at *20. Accordingly, we only address the Board’s application of the presumption of nexus to the independent claims. Because no reasonable fact finder could find otherwise, we conclude that SRAM’s X-Sync chainrings are not coextensive with the independent claims.

The independent claims cover a chainring that includes wide and narrow teeth and either inboard or outboard offset teeth. It is undisputed that the X-Sync chainrings include unclaimed features. *See generally* Appellant’s Br.; Appellee’s Br. 24–25. For example, SRAM does not dispute that its X-Sync chainrings embody the independent claim

³ Because neither party disputes the Board’s finding that the X-Sync cranksets and drivetrains are not coextensive with the independent claims, the only issue before us is whether the X-Sync chainrings are coextensive with the independent claims. *See* Appellee’s Br. 24. In any event, because the X-Sync cranksets and drivetrains each include an X-Sync chainring, our conclusions as to whether nexus can be presumed between the independent claims and the X-Sync chainrings also extend to the X-Sync cranksets and drivetrains.

of a different patent—the '250 patent—which, as explained previously, covers a chainring with both wide and narrow teeth and wide teeth with >80% gap filling. *See* J.A. 5282–85 (Preliminary Patent Owner Response). As discussed in more detail below, because the independent claims of the '027 patent do not recite this >80% gap filling feature, the independent claims are not coextensive with the X-Sync chainrings.

To be sure, we have never held that the existence of one or more unclaimed features, standing alone, means nexus may not be presumed. Indeed, there is rarely a *perfect correspondence* between the claimed invention and the product. As we explained, the purpose of the coextensiveness requirement is to ensure that nexus is only presumed when the product tied to the evidence of secondary considerations “is the invention disclosed and claimed.” *Demaco*, 851 F.2d at 1392 (emphasis added). Thus, if the unclaimed features amount to nothing more than additional insignificant features, presuming nexus may nevertheless be appropriate.

Put differently, the degree of correspondence between a product and a patent claim falls along a spectrum. At one end of the spectrum lies perfect or near perfect correspondence. At the other end lies no or very little correspondence, such as where “the patented invention is only a component of a commercially successful machine or process.” *Id.* Although we do not require the patentee to prove perfect correspondence to meet the coextensiveness requirement, what we do require is that the patentee demonstrate that the product is essentially the claimed invention. *See id.* While coextensiveness is an issue of fact that should ordinarily be decided by the fact finder in the first instance, no reasonable fact finder could conclude, under the proper standard, that the X-Sync chainrings are coextensive with the patent claims.

It is undisputed that the X-Sync chainrings include unclaimed features that the patentee describes as “critical” to

the product's ability to "better retain the chain under many conditions" and that go to the "heart" of another one of SRMA's patents. See J.A. 5284, 5289. In light of the patentee's own assertions about the significance of the unclaimed features, no reasonable fact finder could conclude that these features are insignificant. As an initial matter, the fact that SRAM obtained the '250 patent covering the combination of wide and narrow teeth and >80% gap filling leads us to conclude that this combination of features amounts to more than an insignificant feature not claimed by the '027 patent. See *Therasense*, 593 F.3d at 1299 (finding that the patentee was not entitled to a presumption of nexus because the product embodied at least two patented inventions, and the burden thus remained on the patentee to show that the product's success was due to the invention claimed in the patent asserted in the case). Moreover, in a separate IPR proceeding pertaining to the '250 patent, SRAM touted this "combination of features" as, "amongst several others disclosed in the '250 patent," one that "leads to a chainring that will retain a chain in even the worst conditions." J.A. 5282–83. SRAM further described this gap filling feature as "critical" and one that "allows the inventive chainring to better retain the chain under many conditions and amounts to the 'heart' of the challenged '250 patent claims combined with the narrow and wide tooth configuration." J.A. 5284, 5289. A patent claim is not co-extensive with a product that includes a "critical" unclaimed feature that is claimed by a different patent and that materially impacts the product's functionality by "lead[ing] to a chainring that will retain a chain in even the worst conditions." See J.A. 5282–84, 5289.

In short, because the independent claims do not include the >80% gap filling feature, we cannot say that the X-Sync chainrings *are* the invention claimed by the independent claims. Accordingly, the Board erred in presuming nexus between the independent claims of the '027 patent and

secondary considerations evidence pertaining to SRAM's X-Sync chainrings.

The lack of coextensiveness between the independent claims of the '027 patent and SRAM's X-Sync chainrings appears to extend far beyond the gap filling feature to additional unclaimed features. More specifically, FOX contends, and SRAM does not contest, that the X-Sync chainrings further include the following unclaimed features: (1) forwardly protruding tooth tips, Appellant's Br. 22-26; *see also* '027 patent col. 5 ll. 45-51, fig.5; (2) hook features on the teeth, Appellant's Br. 22-26; *see also* '027 patent col. 5 ll. 52-55, fig.5; and (3) mud-clearing recesses, Appellant's Br. 22-26. As to the first, the '027 patent specification explains that forwardly protruding tooth tips "function[] to engage a chain link earlier than a chain lacking the tip portion and provide[] better guiding of the chain." '027 patent col. 5 ll. 45-51; *see also id.* at fig.5. As to the second, the '027 patent specification explains that such hook features "cooperate with the [forwardly protruding tips] 76 to provide better guiding of the chain." *Id.* at col. 5 ll. 52-55; *see also id.* at fig.5. As to the third, SRAM's marketing materials explain that these recesses "get rid of mud so the chain remains in place no matter what conditions you're up against." J.A. 5316.⁴ In sum, the '027 patent and SRAM's marketing materials confirm that the forwardly protruding tooth tips, hook features, and mud clearing recesses each materially impacts the functioning

⁴ FOX further contends that these recesses appear to be the same as the inner link-receiving recesses discussed in the '027 patent. It is unclear on this record whether FOX's contention is correct. If these features are different, SRAM's chain links further appear to include inner link-receiving recesses. Appellant's Br. 22-26; *see also* J.A. 219 ('027 patent col. 5, ll. 26-44). *Compare* J.A. 5344 *with* J.A. 211-12 ('027 patent figs.5, 7).

of a chainring. For each of these features that the Board confirms is included in the X-Sync chainrings, nexus can only be presumed between the X-Sync chainrings and a patent claim if the claim includes limitations relating to these features.

SRAM's counterarguments are unpersuasive. First, SRAM argues that the existence of unclaimed features in a commercial product is irrelevant to the question of whether nexus can be presumed between that product and a patent claim.⁵ Rather, according to both SRAM and the Board, unclaimed features are only relevant on rebuttal,⁶ and the coextensiveness requirement is met if the patent claim

⁵ For this position, both the Board and SRAM rely on our decision in *PPC Broadband, Inc. v. Corning Optical Communications RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016).

⁶ In addition to challenging whether the Board erred by presuming nexus in this case, FOX also contends that the Board imposed too high a burden on FOX to rebut the presumption of nexus by requiring FOX to show that the claimed invention had absolutely no relevance to SRAM's evidence of secondary considerations. Appellant's Br. 51–53; see, e.g., *Board Decision 472*, at *14 (“Petitioner fails to direct us to where the industry praise is directed only to the inboard-offset feature.”); *id.* at *15 (“Moreover, none of the articles that include the references to the ‘tall,’ ‘hooked,’ and ‘asymmetric’ teeth purport to attribute all of the benefits of the X-Sync chainring to those attributes.”); *id.* (“As for the fact that some of the articles only mention wide narrow teeth, we do not agree with Petitioner that this establishes that the praise was only directed to the features found in the prior art.”). Because we determine that the Board erroneously presumed nexus, we do not reach this issue.

broadly covers the product that is the subject of the evidence of secondary considerations. *See, e.g.*, Appellee's Br. 50–56. As previously explained, we agree with both the Board and SRAM that the mere existence of one or more unclaimed features does not necessarily mean presuming nexus is inappropriate. In this case, however, because there are one or more features not claimed by the '027 patent that materially impact the functionality of the X-Sync products, including the >80% gap filling feature claimed in the '250 patent, nexus may not be presumed.

On a broader note, if we were to agree with the positions taken by both SRAM and the Board—i.e., that the co-extensiveness requirement is met so long as the patent claim broadly covers the product that is the subject of the secondary considerations evidence, irrespective of the nature of any unclaimed features—then the coextensiveness requirement would rest entirely on minor variations in claim drafting. For instance, suppose a patent includes some claims specifically covering novel “brake pads” and others directed to an “automobile” in which the body of the claim recites little more than the novel brake pads. It is beyond dispute that the “brake pad” claims would not be entitled to a nexus presumption with any secondary considerations evidence tied to commercially sold automobiles containing those brake pads (e.g., commercial success or praise of the automobiles). In SRAM and the Board's view, the “automobile” claims would be entitled to a nexus presumption with such secondary considerations evidence. They reach this view even though the automobiles sold contain hundreds if not thousands of different components beyond just the novel aspect of the claimed brake pads, and even though only minor variations in patent claim language (i.e., whether the word “automobile” is included in the claims) differentiate the “brake pad” claims and the “automobile” claims. Resting the coextensiveness inquiry on nothing more than minor variations in patent claim

language would turn the inquiry into one of form over substance.

We reject SRAM's attempt to reduce the coextensiveness requirement to an inquiry into whether the patent claims broadly cover the product that is the subject of the evidence of secondary considerations. Such an interpretation is inconsistent with *Demaco's* requirement that nexus can only be presumed where the evidence of secondary considerations is tied to a specific product that "*is the invention disclosed and claimed.*" *Demaco*, 851 F.2d at 1392 (emphasis added). Nor is such an interpretation consistent with *Demaco's* explanation that nexus cannot be presumed where, for example, "the patented invention is only a component of a commercially successful machine or process." *Id.* We are bound by *Demaco* and decline to depart from it.

Second, SRAM also argues that because the '250 patent is a continuation of the '027 patent, failing to presume nexus in this case "would result in the absurd situation that multiple continuations on a patent would prohibit a presumption of nexus." Appellee's Br. 50. SRAM continues that "[t]his Court has recognized time and again that related patents can share a presumption of nexus." *Id.* at 53. Where a product embodies claims from two patents, a presumption of nexus can be appropriate only if the claims of both patents generally cover the same invention. In each of the cases SRAM cites for the proposition that the claims of multiple patents can share a presumption of nexus with the same product, the claims of each of the patents covered essentially the same invention. *See, e.g., WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1324–25 (Fed. Cir. 2016) (presuming nexus between a product and the asserted claims of two related patents where the patents covered essentially the same invention, and the court identified a single claim as representative of both patents); *PPC Broadband*, 815 F.3d at 737–39 (presuming nexus between a product and the asserted claims of three patents where the asserted claims of all three patents recited the same essential

features); *Gator Tail, LLC v. Mud Buddy LLC*, 618 F. App'x 992, 995, 999–1000 (Fed. Cir. 2015) (presuming nexus between a product and all of the asserted claims where “the [related] patents essentially claim the same invention”); *Media Techs. Licensing, LLC v. Upper Deck Co.*, 596 F.3d 1334, 1336–39 (Fed. Cir. 2010) (unclear as to whether nexus was presumed, and in any event the related patents were drawn to the same invention).⁷ Conversely, here, the independent claims of the '250 patent and '027 patent do not cover the same invention. In particular, these patents cover different combinations of chainring features.

In addition, although the fact that SRAM separately sought patent protection for the combination of wide and narrow teeth with this >80% gap filling feature is alone probative of whether this combination of features adds up to more than an insignificant additional feature, *see Therasense*, 593 F.3d at 1299, a presumption of nexus might well be inappropriate in this case even if SRAM never sought such patent protection. In particular, the X-Sync products are not coextensive with the independent claims of the '027 patent because the products include a “critical” unclaimed feature not covered by the independent claims of the '027 patent that materially impacts the product's functionality by “lead[ing] to a chainring that will retain a chain in even the worst conditions.” *See* J.A. 5282–84, 5289. This is true regardless of whether SRAM included these unclaimed features in other patents.

⁷ The additional cases on which SRAM relies do not address the presumption of nexus at all. *See Acorda Therapeutics, Inc. v. Roxane Labs., Inc.*, 903 F.3d 1310 (Fed. Cir. 2018); *Merck Sharp & Dohme Corp. v. Hospira, Inc.*, 874 F.3d 724, 730–31 (Fed. Cir. 2017); *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1354–55 (Fed. Cir. 2012); *Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1368 (Fed. Cir. 2011).

We note that the Board's determinations in these IPR proceedings on the '027 patent and the IPR proceedings on the '250 patent highlight one reason why nexus may not be presumed under these circumstances. Between these two proceedings, the Board presumed nexus between the independent claims of both patents and the secondary considerations evidence submitted by SRAM, *see* J.A. 6458–62, even though (a) SRAM relies on essentially the same evidence of secondary considerations in both proceedings; J.A. 5455–76, 6363–88; *see also* J.A. 5282–84, 5289; and (b) the '027 and '250 patent claims cover different inventions. The same evidence of secondary considerations cannot be presumed to be attributable to two different combinations of features. *See Therasense*, 593 F.3d at 1299. In such situations, the patentee retains the burden of proving the degree to which evidence of secondary considerations tied to a product is attributable to a particular claimed invention. *See, e.g., WMS Gaming*, 184 F.3d at 1359.

4

Because the Board erroneously presumed nexus between the evidence of secondary considerations and the independent claims, we vacate the Board's obviousness determination and remand for further proceedings. On remand, SRAM will have the opportunity to prove nexus between the challenged independent claims and the evidence of secondary considerations. More specifically, SRAM will bear the burden of proving that the evidence of secondary considerations is attributable to the claimed *combination* of wide and narrow teeth with inboard or outboard offset teeth, as opposed to, for example, prior art features in isolation or unclaimed features. *See, e.g., Ethicon Endo-Surgery, Inc. v. Covidien LP*, 812 F.3d 1023, 1034 (Fed. Cir. 2016) (for patent claims covering a combination of prior art features, to establish nexus, patentee must show that the evidence of secondary considerations is attributable to "the *combination* of the two prior art features . . . that is the purportedly inventive aspect of the [challenged] patent" as

opposed to unclaimed features or either prior art feature in isolation).

B

Separate from the issue of nexus, in its response to FOX's statement of the case, SRAM briefly contends that we can enter judgment in favor of SRAM on an alternative ground: that substantial evidence does not support the Board's conclusions that a skilled artisan would have been motivated to combine the asserted prior art to arrive at the independent claims. Appellee's Br. 20–23. Notably, SRAM does not mention this argument in its summary of the argument or argument sections of the brief. *See generally* Appellant's Br. We have previously declined to address arguments that appear in the statement of facts but not the summary of the argument or argument sections of the brief. *See Kao Corp. v. Unilever U.S., Inc.*, 441 F.3d 963, 973 n.4 (Fed. Cir. 2006) (declining to consider appellee's argument that only “appear[ed] in the appellee's brief's sections ‘Statement of the Facts’ and ‘Standard of Review,’” but not the “statement of issues presented, nor the summary of argument, nor the argument section” of the brief); *see also SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1319 (Fed. Cir. 2006) (“Our law is well established that arguments not raised in the opening brief are waived.”); *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 800 (Fed. Cir. 1990) (holding we have discretion to consider arguments that are not properly raised in the opening brief).

Even if this argument is properly preserved, it is meritless. Substantial evidence—including the declarations submitted by FOX's expert—supports the Board's conclusion that a skilled artisan would have been motivated to combine the asserted prior art because the skilled artisan would have recognized that the combination of prior art features would better address chain drop than either feature in isolation. *See, e.g.*, J.A. 4492–4513, 5219–27, 5762–

89, 6099–6106. Therefore, we affirm the Board’s determination that a skilled artisan would have been motivated to combine the asserted prior art.

III

FOX also raises a SAS-based remand request. In one of the underlying inter partes review proceedings, IPR 2017-00118, the Board instituted review of only two of the eight grounds of unpatentability raised by FOX. Three weeks after the Board’s final written decision, the Supreme Court issued its decision in *SAS Institute v. Iancu*, 138 S. Ct. 1348 (2018). Shortly after this appeal was docketed, and before any briefs were filed, FOX moved to terminate the appeal as to IPR2017-00118 on the ground that the Board failed to follow the requirements set forth in SAS by failing to institute review of all eight grounds FOX raised. Motion of Appellant FOX Factory, Inc., for Remand of Appeal No. 2018-2024 (IPR2017-00118) in View of Intervening Authority at 1–2 (Sept. 28, 2018), ECF No. 22 (“Motion”). Although we chose not to terminate the appeal as to IPR No. 2017-00118, we now remand to the Board to consider the non-instituted grounds.

SRAM contends that FOX waived its right to a remand (and to terminate the appeal) pursuant to SAS because FOX failed to raise its SAS objection before the Board. Appellee SRAM, LLC’s Opposition to Appellant’s Motion to Remand at 2 (Oct. 2, 2018), ECF No. 24. This argument, however, is unavailing because SAS issued after the Board’s final written decision, and we have not required filing a request for reconsideration to preserve a SAS-based remand. See *BioDelivery Scis. Int’l, Inc. v. Aquestive Therapeutics, Inc.*, 898 F.3d 1205, 1208 (Fed. Cir. 2018) (“We also declined to find that a party waived its right to seek SAS-based relief due to failure to argue against partial institution before the PTAB.”).

SRAM also argues that FOX waived its right to a remand because FOX failed to explicitly raise its SAS

objection in its Notice of Appeal. We have found that a patent challenger can properly preserve an *SAS* objection by requesting remand in its opening brief. *See Google LLC v. Ji-Soo Lee*, 759 F. App'x 998, 1002 n.2 (Fed. Cir. 2019). Here, FOX did more than that: it filed a motion to remand even before its opening brief was due. *See Motion*. Accordingly, we conclude that FOX did not waive its right to a remand.

IV

We vacate the Board's obviousness determinations in IPR 2017-00118 and IPR 2017-00472 and remand for it to reevaluate the import of the evidence of secondary considerations with the burden of proving nexus placed on the correct party. We also remand IPR 2017-00118 for the Board to consider the non-instituted grounds.

VACATED AND REMANDED

COSTS

The parties shall bear their own costs.

Appendix B

NOTE: This order is nonprecedential.

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

FOX FACTORY, INC.,
Appellant

v.

SRAM, LLC,
Appellee

2018-2024, 2018-2025

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2017-
00118, IPR2017-00472.

ON PETITION FOR REHEARING EN BANC

Before PROST, *Chief Judge*, NEWMAN, LOURIE, DYK,
MOORE, O'MALLEY, REYNA, WALLACH, TARANTO, CHEN,
HUGHES, and STOLL, *Circuit Judges*.

PER CURIAM.

ORDER

Appellee SRAM, LLC filed a petition for rehearing en banc. A response to the petition was invited by the court and filed by Appellant Fox Factory, Inc. The petition was

first referred as a petition for rehearing to the panel that heard the appeal, and thereafter the petition for rehearing en banc was referred to the circuit judges who are in regular active service.

Upon consideration thereof,

IT IS ORDERED THAT:

The petition for panel rehearing is denied.

The petition for rehearing en banc is denied.

The mandate of the court will issue on March 20, 2020.

FOR THE COURT

March 13, 2020

Date

/s/ Peter R. Marksteiner

Peter R. Marksteiner
Clerk of Court

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FOX FACTORY, INC.,
Petitioner,

v.

SRAM, LLC,
Patent Owner.

Case IPR2017-00118
Patent 9,182,027 B2

Before MICHAEL W. KIM, FRANCES L. IPPOLITO, and
KEVIN W. CHERRY, *Administrative Patent Judges*.

CHERRY, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine Petitioner *has not proven* by a preponderance of the evidence that claims 7–12 and 20–26 of the '027 patent are unpatentable. *See* 35 U.S.C. § 316(e).

I. BACKGROUND

A. RELATED PROCEEDINGS

Patent Owner has asserted infringement of the '027 patent in *SRAM, LLC v. Race Face Performance Products*, Case No. 1:15-cv-11362-JHL (N.D. Ill.). Paper 4, 3; Pet. 92.

The '027 patent is one of a number of related, issued patents and pending applications. *See* Paper 4, 1. The '027 patent is also at issue in the following post-grant proceedings: (1) *FOX Factory, Inc. v. SRAM, LLC*, Case IPR2016-01876 and (2) *FOX Factory, Inc. v. SRAM, LLC*, Case IPR2017-00472. Paper 7, 2. The '027 patent is currently undergoing *ex parte* reexamination proceedings under Reexamination Control No. 90/013,715, which was initiated on June 2, 2016. *Id.* We stayed this reexamination on April 3, 2017. *See* Paper 7.

B. THE '027 PATENT

The '027 patent relates generally to chainrings, and more particularly to a solitary chainring for use with a conventional chain in a bicycle drivetrain system that includes a bicycle crank. Ex. 1001, 1:5–7. Bicycles and other chain-driven vehicles typically employ one or more chainrings and set of rear hub-mounted sprockets connected by a chain. *Id.* at 1:8–10. According to the '027 patent, the management of chain and chainring engagement in bicycles is important, and various mechanisms are used to maintain the chain on the chainring and the sprockets, including chain

guards, chain tensioners, chain catchers, and derailleur configurations, among others. *Id.* at 1:10–13. The '027 patent explains that managing the connection between the chain and the chainring is particularly difficult in geared bicycles, which can experience severe changes in chain tension and energy motion of the chain, especially when riding over rough terrain. *Id.* at 1:14–20. Specifically, the '027 patent asserts that it is directed to a solution for the problem of chain management, especially for a bicycle that can successfully and reliably be ridden over challenging and rough terrain. *Id.* at 1:27–29.

Figure 3 of the '027 patent illustrates a drive chain and chainring, and is reproduced below:

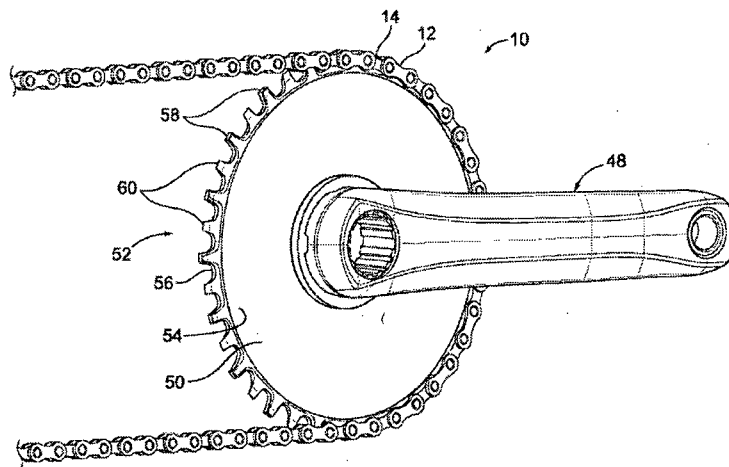


FIG. 3

Figure 3, reproduced above, is an isometric view of a combined drive chain and chainring, according to the purported invention engaged by a drivetrain. *Id.* at 2:21–22. Figure 3 shows chainring 50 and conventional chain 10. *Id.* at 3:44–45. Crank or crank arm 48 attaches to chainring 50. *Id.* at 3:47–49. Force applied to crank arm 48 (typically, in a downward direction) causes rotation of chainring 50 in like a like direction (clockwise). *Id.* at 3:55–57.

The rotation of chainring 50 causes chain 10 to be drawn over and advanced about chainring 50. *Id.* at 3:57–59.

As is illustrated in Figure 3, chainring 50 includes a plurality of teeth, including first group of teeth 58 and second group of teeth 60. *Id.* at 3:60–67. Drive chain 10 includes outer chain links 12 and inner chain links 14. *Id.* at 2:63–65. First group of teeth 58 is configured to be received by, and fitted into, the outer link spaces of drive chain 10, and second group of teeth 60 is configured to be received by, and fitted into, the inner link spaces. *Id.* at 3:66–4:3. Each tooth can have an optional tip portion that protrudes forwardly from a line drawn where rollers in the chain contact the tooth. *Id.* at 5:33–48. The '027 patent explains that this protruding tip portion “functions to engage a chain link earlier than a chain lacking the tip portion and provides better guiding of the chain.” *Id.* at 5:48–51.

C. ILLUSTRATIVE CLAIM

Claims 7 and 20, both apparatus claims, are the only independent claims of the '027 patent challenged in the Petition. Claims 8–12 each depend from claim 7. Claim 21–26 each depend from claim 20. Claim 7 is illustrative of the subject matter in this proceeding and is reproduced below.

7. A bicycle chainring for engagement with a drive chain, comprising:

a plurality of teeth formed about a periphery of the chainring,

the plurality of teeth including a first group of teeth and a second group of teeth,

each of the first group of teeth wider than each of the second group of teeth and at least some of

the second group of teeth arranged alternately and adjacently between the first group of teeth, wherein each of the plurality of teeth includes a tooth tip;

wherein a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side; and

wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward the inboard side of the chainring.

Id. at 7:32–46.

D. INSTITUTED GROUNDS OF UNPATENTABILITY

We instituted an *inter partes* review of the '027 patent on the following grounds of unpatentability asserted in the Petition. Inst. Dec. 27.

Claims	Basis	References
7, 8, 11, 12, 20–22, 25, and 26	§ 103(a) ¹	US 6,273,836 B1 to Thompson (“Thompson”) (Ex. 1019) and JP S56-442489 to Shimano (“JP-Shimano”) (Ex. 1006) ²
9, 10, 23, and 24	§ 103(a)	Thompson, JP-Shimano, and US 3,375,022 to Hattan (“Hattan”) (Ex. 1004)

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29 (2011), revised 35 U.S.C. §§ 102–103, effective March 16, 2013. Because the '027 patent has an effective filing date before March 16, 2013, we refer to the pre-AIA versions of §§ 102 and 103

² Exhibit 1006 includes both the published Japanese Patent Application (pages 1–10) and an English translation (pages 11–18). We will refer exclusively to the English translation.

II. ANALYSIS

A. CLAIM CONSTRUCTION

We interpret claims in an unexpired patent using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[].” 37 C.F.R. § 42.100(b). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). “Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016).

Only those terms which are in controversy need be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

We determine that no terms require express construction for purposes of this Final Written Decision.

B. LEVEL OF SKILL IN THE ART

Petitioner asserts that a person of ordinary skill in the art, at the time of the effective filing date of the ’027 patent, “would have a skill level of at least a bachelor’s degree in mechanical engineering and/or at least three to five years’ experience in the development and design of chain drive systems and components thereof.” Pet. 1 n.1 (citing Ex. 1023 ¶ 16). Patent Owner contends that a person of ordinary skill would have a bachelor’s degree in mechanical engineering and at least one year of design experience with chainrings or related technologies. PO Resp. 12 n.3 (citing Ex. 2074 ¶ 25). Any difference between these two definitions is insignificant to this analysis.

On this record, however, we find Patent Owner’s definition of a person of ordinary skill in the art to be more persuasive given the well-developed, relatively simple nature of the art, and apply it for our analysis.

C. SCOPE AND CONTENT OF THE PRIOR ART

The instituted ground alleges that claims 7, 8, 11, 12, 20–22, 25, and 26 of the ’027 patent are unpatentable as obvious over Thompson and JP-Shimano, and claims 9, 10, 23, and 24 are unpatentable as obvious over the combination of Thompson, JP-Shimano, and Hattan. Pet. 15–57; Inst. Dec. 13–25.

1. *Thompson (Ex. 1019)*

Thompson, titled “Chain Sprocket with Axial Stiffeners,” describes a “chain sprocket,” i.e., chainring, with stiffening fins “formed integrally with” the chainring’s spokes. Ex. 1019, at [54], Abstract. An exemplary embodiment of Thompson’s chain sprocket is shown in Figure 3, which is reproduced below.

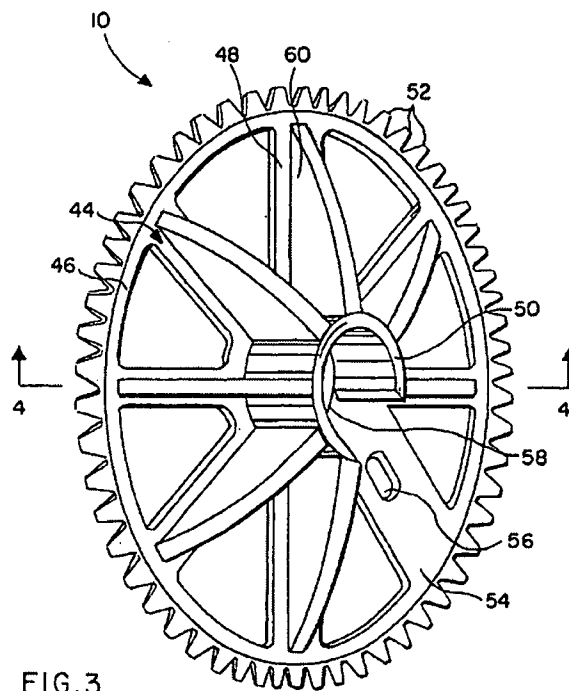


Figure 3 shows a perspective view of Thompson's chain sprocket. *Id.* at 2:16–17. Thompson explains that chain sprocket 10 typically comprises disc-like base 44 having outer rim 46 and spokes 48 extending radially from hub 50 to outer rim 46. *Id.* at 3:1–4. Chain-accepting teeth 52 are formed along the outer periphery of outer rim 46. *Id.* at 3:4–5. Stiffening fins 60 are formed integrally with at least some of spokes 48. Figure 4 of Thompson, which is reproduced below, illustrates the depth of the chainring.

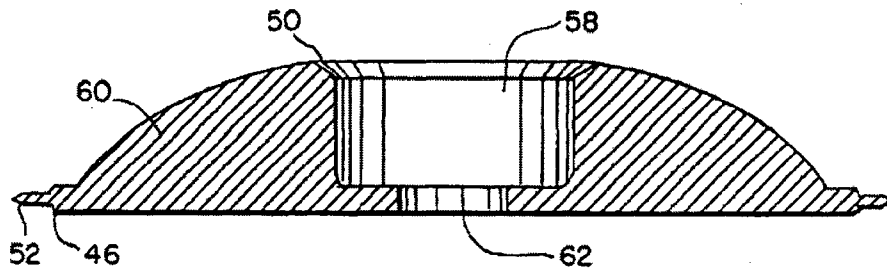


FIG. 4

Figure 4 of shows a cross-sectional view taken along line 4—4 of Figure 3. *Id.* at 2:18–19. Figure 4 shows that stiffening fins 60 have a much greater axial dimension than teeth 52 or outer rim 46 of base 44. *Id.* at 3:36–40.

2. Hattan (Ex. 1004)

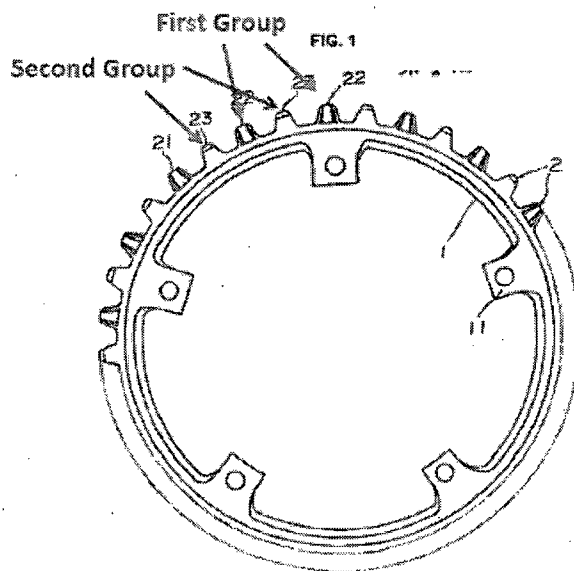
Hattan, titled “Drives for Bicycles,” relates to an improved pedal actuated drive for bicycles. Ex. 1004, 1:20–21. Hattan explains that a “major object” of its invention is to “provide improved and simplified means for preventing the chain from jumping off of the forward oblong sprocket wheel under any operating conditions.” *Id.* at 1:64–67. Hattan describes preferred tooth dimensions for use with a $\frac{3}{32}$ inch chain. *Id.* at 7:52–66. In particular, Hattan discloses that, for “a standard $\frac{3}{32}$ of an inch chain,” which corresponds to the spacing between the inner links of the chain (Ex. 1023 ¶ 81), it is “preferred” that the axial thickness of the sprocket teeth

“be between about .070 inch and .090 inch, desirably about .080 inch.”

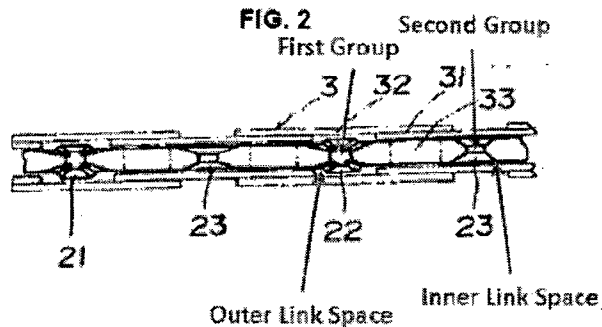
Ex. 1004, 7:52–66. Based on Hattan’s description of its preferred thicknesses, the filled axial distance defined by the inner link spaces (i.e., “axial fill”) for an inner link space of $3/32$ (0.09375) inches would be between 74.6% (dividing 0.070 by 0.09375) and 96% (dividing 0.090 by 0.09375). Ex. 1023 ¶ 81.

3. JP-Shimano (Ex. 1006)

JP-Shimano is a Japanese Utility Model Application, titled “Chain Gear for a Bicycle,” and describes a chain gear for a bicycle designed to reduce chain drop. Ex. 1006, 15:49–60, 15:78–86. JP-Shimano discloses a chainring for a bicycle with alternating wide and narrow teeth. *Id.* at 15:55–60, 15:78–86, 15:108–115, Figs 1–2. JP-Shimano describes a chainring having “a plurality of teeth provided circumferentially on an outer periphery of the gear main body.” *Id.* at 15:64–67. Figure 1 of JP-Shimano, as annotated by the Petitioner, is reproduced below.



Pet. 61. Figure 1, as annotated by Petitioner, shows an embodiment of the chainring of JP-Shimano. *Id.* at 16:134–135. Figure 1 shows alternating wide and narrow teeth (teeth 22 and 23 respectively (labeled first group and second group by Petitioner)). *Id.* at 16:99–106. Figure 2 of JP-Shimano, as annotated by the Petitioner, is reproduced below.



Pet. 62. Figure 2, as annotated by Petitioner, shows teeth 22 and 23 engaging the bicycle chain. *Id.* JP-Shimano notes that wider teeth 22 may be wider than or equal to the space between inner link plates 31, and the thickness of wider teeth 22 is greater than narrower teeth 23, such that wider teeth 22 engage the chain between outer chain link plates 32.

Id. at 16:99–115. JP-Shimano summarizes its device as:

The present device focuses on the fact that spaces between the outer link plates in the chain become wider than the spaces between the inner link plates, and . . . is configured to eliminate dropping of the chain from between the outer link plates, and also to enhance durability. The present device accomplishes this by setting one specific tooth as a standard, from among the plurality of teeth provided circumferentially on the outer periphery of the gear main body, and by forming the thickness of the even-numbered teeth smaller than the spaces between the outer link plates of the chain, but greater than other teeth that engage between the inner link plates, so that the teeth with the greater thickness engage between the outer link plates.

Ex. 1006, 15:78–86.

D. DIFFERENCES BETWEEN THE PRIOR ART AND THE CLAIMED INVENTION

1. *Claims 7, 8, 11, 12, 20–22, 25, and 26*

With respect to independent claim 7, Petitioner contends that Thompson discloses: (1) “a bicycle chainring for engagement with a drive train, comprising,” Pet. 24 (citing Ex. 1019, 1:48–67, 2:38–67, 3:1–17; Ex. 1023 ¶ 37); (2) “a plurality of teeth formed about a periphery of the chainring,” *id.* at 25–26 (citing Ex. 1019, 1:48–67, 2:38–67, 3:1–17, Fig. 4; Ex. 1023 ¶ 39); (3) wherein “each of the plurality of teeth includes a tooth tip,” *id.* at 29–30 (citing Ex. 1019, 1:48–67, 2:38–67, 3:1–17; Ex. 1023 ¶¶ 43, 44); and (4) “where a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side,” *id.* at 30–32 (citing Ex. 1019, Fig. 4; Ex. 1023 ¶¶ 45–47). Petitioner also submits that JP-Shimano accounts for (1) “the plurality of teeth including a first group of teeth and a second group of teeth,” *id.* at 26–27 (citing Ex. 1006, 15:55–60, 15:78–86, 16:99–117, Figs. 1, 2; Ex. 1023 ¶ 40); (2) “each of the first group of teeth is wider than each of the second group of teeth,” *id.* at 27–28 (citing Ex. 1006, 15:81–86, 16:99–117, Figs. 1, 2; Ex. 1023 ¶ 41); and (3) “at least some of the second group of teeth arranged alternately and adjacently between the first group of teeth,” *id.* at 28–29 (citing Ex. 1006, 16:99–117, Figs. 1–2; Ex. 1023 ¶ 42). Petitioner further relies on the combined teachings of Thompson, as modified in view of JP-Shimano, to account for “wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward

the inboard side of the chainring.”³ Pet. 32–34 (citing Ex. 1019, Abstract, 1:48–67, 2:38–67, 3:1–17; Ex. 1023 ¶¶ 48, 49).

Petitioner also further asserts that Thompson and JP-Shimano account for the limitations of claims 8, 11, 12, 20–22, 25, and 26. Pet. 34–45.

2. *Motivation to Combine*

To support its argument that a person of ordinary skill would have combined the teachings of Thompson and JP-Shimano, Petitioner argues that a person of ordinary skill in the art “would have known that it is critical to the operation of a bicycle for a bicycle chain to remain engaged with the bicycle chainring.” Pet. 22 (citing Ex. 1023 ¶ 34). Petitioner asserts that “*Thompson* and *JP-Shimano* each teach this motivation for their respective apparatuses: preventing the chain from detaching from the chainring.” *Id.* Petitioner contends that it would have been obvious to a person of ordinary skill in the art to improve chain retention by combining known methods of doing so, such as employing both the offset-teeth chainring of Thompson and the alternating narrow and wide teeth of JP-Shimano, in order to “improve chain engagement and retention to the maximum extent possible, particularly for a solitary front chainring such as in *Thompson*” Pet. 22–23 (citing Ex. 1023 ¶ 35). Petitioner notes that “*Thompson* explains that its disclosed sprocket (i.e., chainring) is axially reinforced to prevent deformation of the sprocket, such as flexing or bending, which ‘can cause chain disengagement from the sprocket.’” *Id.* at 22 (citing Ex. 1019, 1:32–33). Petitioner also submits that “JP-Shimano recognizes that the ‘large gap’

³ Patent Owner correctly notes that we erroneously stated in our Institution Decision (*see* Inst. Dec. 17) that Petitioner was relying on only Thompson for this element. PO Resp. 47–48 n.5.

between narrow chainring teeth and the outer link plates can cause the chain to drop if a chain line is displaced, and solves this problem with its alternating narrow-wide tooth chainring that ‘is configured to eliminate dropping of the chain from between the outer link plates, and also to enhance durability.’” *Id.* (quoting Ex. 1006, 15–16, ll. 73–86, 122–130). Petitioner asserts that “[s]uch a combination would provide the chain retention benefits offered by both devices, and would not require modifying the structure of the *Thompson* chainring beyond merely configuring its inboard-offset teeth to alternate between narrow and wide profiles.” *Id.* at 23 (citing Ex. 1023 ¶ 36). Petitioner contends that such a modification would merely be the combination of familiar elements according to known methods to do no more than yield predictable results. *Id.* at 23 (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007)).

Patent Owner argues that there is no rationale to modify Thompson in view of JP-Shimano for two reasons. PO Resp. 46–53. First, Patent Owner argues that Petitioner’s rationale is improper, because “Thompson already has structure for solving the problem addressed by *JP-Shimano* (i.e., chain drop associated with a deflected chain) and there is no suggestion that Thompson has any need to control the chain path further.” *Id.* at 47–48. Second, Patent Owner contends that the combination of Thompson and JP-Shimano would have been too complex and expensive. *Id.* at 52–53.

Petitioner’s rationale for combining Thompson and JP-Shimano is based on an assumption that chain retention techniques of Thompson and JP-Shimano are additive, and would “improve chain retention to the maximum extent possible.” Pet. 22–23; *see also* Tr. 8:6–9; Ex. 2074 ¶ 48. The Petition and Dr. Neptune’s opening Declaration, however, contains no facts

or explanation to support this underlying assumption. Ex. 2074 ¶ 50. Dr. Sturges testifies that a person of ordinary skill in the art would have understood that JP-Shimano would not have improved chain retention and engagement in Thompson, because both are directed to solving the same kind of problems that result in chain drop—namely, chain line displacement. Ex. 2074 ¶¶ 45-47. Thus, Patent Owner contends that there would have been no net benefit to combining the two references, and hence, no rationale to combine Thompson and JP-Shimano. PO Resp. 47–52.

Petitioner responds by arguing that Thompson does not completely prevent chain drop, even in circumstances due to chain-line displacement, and identifies various situations that Dr. Neptune contends where Thompson would not have solved chain drop. Pet. Reply 3; Ex. 1050 ¶¶ 10–12. Petitioner argues that JP-Shimano would have helped prevent chain drop caused by chain line displacement in situations when the chain approaches the chairing from the rear gears at an angle. Ex. 1050 ¶¶ 12–14; Ex. 1006, 15:73–75. Petitioner also asserts that JP-Shimano is not limited to solving only chain drop caused by chain line displacement, but also solves chain drop caused by worn or broken teeth. Pet. Reply 4. Petitioner now further contends that a person of ordinary skill would have been motivated to combine Thompson and JP-Shimano to improve durability, which in turn would reduce chain drop. *Id.* at 4 (citing Ex. 1050 ¶¶ 15, 16).

We find that Petitioner has shown a sufficient rationale to combine the teachings of the references. Petitioner has offered evidence that Thompson would have been improved by adding the wide-narrow teeth of JP-Shimano in certain situations when the chain approaches the chairing from the rear gears at an angle. Ex. 1050 ¶¶ 12–14; Ex. 1006, 15:73–75. We find this

evidence persuasive and give it significant weight. We do note that we also give some weight to Patent Owner's evidence that Thompson and JP-Shimano do largely overlap in their solutions, and that the benefits of the combination would be limited. Ex. 2074 ¶¶ 45–50. We find that even though Patent Owner's arguments do not amount to a teaching away, they do slightly weaken the factual basis of Petitioner's combination. *See Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (“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.”).

As for Petitioner's new contention that a person of ordinary skill would have combined Thompson and JP-Shimano to improve the durability of teeth in Thompson, we do not find this reason to be as persuasive or entitled to as much weight as Petitioner's evidence that JP-Shimano would have improved Thompson in situations where the chain approached at an angle discussed above. We decline to give much weight to the durability theory, because we find that it is a new theory raised for the first time on reply. Ex. 2129, 96:16–97:5 (Dr. Neptune admitting the theory was not in his original testimony). A reply is not the place to raise an almost entirely new motivation to combine. *See* 37 C.F.R. § 42.23(b).

Patent Owner's second argument is that the combination of Thompson and JP-Shimano would not have been obvious due to the additional complexity and cost that each modification would require. PO Resp. 52 (citing Ex. 2074 ¶ 53). Patent Owner submits that Thompson's chainring, by itself, has many drawbacks, and that combining Thompson with JP-Shimano would amplify those drawbacks, outweighing any material gain.

Id. at 52–53 (citing Ex. 2074 ¶¶ 54, 55). Specifically, Patent Owner argues that the machining required to make JP-Shimano’s thick and thin teeth would have increased the costs of Thompson’s already expensive chainring. *Id.* at 53. Second, Patent Owner argues that the additional material would have added excessive weight to the chainring. *Id.* Petitioner argues that combination need not have yielded the most preferred or desirable combination to support a rationale to combine. Pet. Reply 5. In addition, Petitioner offers testimony that the combination would have added only minimal weight or complexity to Thompson’s chainring. *Id.* Moreover, Petitioner argues that, if weight were a concern, there were many known options to minimize the added weight. *Id.* at 6.

We are not persuaded that the added cost or weight of modifying Thompson in view of JP-Shimano would have obviated the rationale to modify Thompson in view of JP-Shimano. As the Federal Circuit has explained, “just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012). Moreover, Petitioner offered credible evidence that there would be options to minimize the additional weight. Ex. 1050 ¶ 20. Having said that, we do assign some, but not dispositive, countervailing weight to Patent Owner’s proffered disadvantages of cost and weight. *See Polaris*, 882 F.3d at 1069.

Given Patent Owner’s evidence of limited benefit and the cost problems identified above, we decrease the weight of Petitioner’s evidence of a rationale to combine the teachings slightly. But overall, we find that Petitioner has shown an adequate rationale to modify Thompson in view of JP-Shimano.

E. OBJECTIVE INDICIA OF NON-OBVIOUSNESS

Notwithstanding what the teachings of the prior art would have suggested to one skilled in the art, objective evidence of non-obviousness (so called “secondary considerations”) may lead to a conclusion that the challenged claims would not have been obvious. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). Objective evidence of non-obviousness “may often be the most probative and cogent evidence in the record” and “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). Patent Owner puts forth evidence of commercial success, licensing, copying, praise by others, long-felt, unresolved need, and failure by others. We agree with Patent Owner that its proffered evidence, with respect to the objective indicia of non-obviousness, weigh significantly in favor non-obviousness, as explained below.

1. Nexus

To be relevant, evidence of non-obviousness must be commensurate in scope with the claimed invention. *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Thus, to be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining non-obviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). There is a “presumption of a nexus” when a product is “coextensive” with a patent

claim. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013). The Federal Circuit has held that “if the marketed product embodies the claimed features, and is coextensive with them, then a nexus is presumed and the burden shifts to the party asserting obviousness to present evidence to rebut the presumed nexus.” *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000).

Patent Owner presents evidence that each of the twelve families of X-Sync chainrings are covered by the challenged claims. *See* PO Resp. 18 n.4. In particular, Patent Owner presents the testimony of its expert, supported by detailed claim charts, and the testimony of Mr. Ritzler and Mr. Wesling, that “each element of the challenged claims is practiced by each of these twelve (12) different versions of X-Sync chainrings.” *See* Ex. 2074 ¶ 63; *see also id.* ¶ 64 (testimony of Dr. Sturges that all other sized chainrings in each family of the tested versions practice all the challenged claims); Ex. 2078–2089 (claim charts for all the challenged claims); Ex. 2076 ¶ 11 (explaining the families of products Patent Owner sells); Ex. 2073 ¶ 10 (explaining the families of products Patent Owner sells). As such, Patent Owner argues that it is entitled to a presumption of a nexus.

Petitioner does not dispute that the X-Sync chainrings are covered by the challenged claims; rather, Petitioner disputes whether the X-Sync chainring is coextensive with the claims. *See* Tr. 61:17–20 (“Your Honor, we don’t dispute that it’s covered by the patent, we dispute whether it’s coextensive.”). Petitioner argues that Patent Owner failed to demonstrate that the products are coextensive, because the X-Sync chainring includes unclaimed features, and “the majority of [Patent Owner’s] X-Sync chainrings are marketed and sold as mere *components* of cranksets and

drivetrain groupsets.” Pet. Reply 17–18. As an initial matter, Petitioner argues that “[t]he X-Sync chainring is not coextensive with the claimed invention because the X-Sync chainring includes ‘hundreds of features’ . . . not claimed in the ’027 patent, many of which are instead claimed by other SRAM patents.” *Id.* at 18. This argument misrepresents the law on two points. First, Petitioner is incorrect that the existence of unclaimed features in the commercial product prevents a Patent Owner from being able to claim a presumption of a nexus. Instead, the law provides that a Patent Owner is entitled to a presumption of a nexus if it shows that “the asserted objective evidence is tied to a specific product and that product ‘is the invention disclosed and claimed in the patent.’” *WBIP*, 829 F.3d at 1329. The Federal Circuit has explained that “[t]his is true even when the product has additional unclaimed features.” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016).

Unclaimed features do not prevent the presumption of a nexus, but they may be the basis for rebutting the presumption. *Id.* To do so, a person challenging patent validity must show that the commercial success, or other objective evidence of non-obviousness, was due to “extraneous factors” including “additional unclaimed features.” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018). Merely pointing out unclaimed features in the X-Sync chainring is not enough. *Id.* (“However, a patent challenger cannot successfully rebut the presumption with argument alone—it must present evidence.”).

Second, Petitioner is incorrect that the existence of other patents necessarily obviates the presumption of a nexus. In this regard, Petitioner relies on a *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1289,

1299 (Fed. Cir. 2010), for the proposition that “a product that embodies more than one patent is not coextensive with any of them.” Pet. Reply 20. Petitioner has only identified two patents, both in the same family of continuations as the ’027 patent.⁴ *Id.* (identifying U.S. Patent Nos. 9,291,250 and 9,493,211, both of which are continuations of the ’027 patent). We do not agree that *Therasense* stands for so broad a proposition that the existence of continuations in the same patent family obviates a presumption of a nexus. Indeed, *Therasense* involves the far more conventional situation that a nexus may not exist when the merits of the claimed invention were “readily available in the prior art.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). In *Therasense*, the court found that the product was covered by both the claims of a prior art patent (U.S. Patent 4,545,382) and the asserted patent (U.S. Patent 5,820,551). *See Therasense*, 593 F.3d at 1299. The patents related to the ’027 patent have not been shown to be prior art to the ’027 patent, and so they do not fall into this situation. We decline to extend the language in *Therasense* so far from the conventional situation of prior art patents that it was contemplating, to include patents that have not been shown to be prior art to the claimed invention.

Having reviewed Patent Owner’s evidence, we agree with Patent Owner that it has shown that it is entitled to a presumption of a nexus between the evidence secondary considerations tied to the X-Sync chainring

⁴ Petitioner contends that there are “possibly” other patents that cover Patent Owner’s commercial product (Pet. Reply 22), but does not identify them. Petitioner’s allegations of other patents are too insubstantial to be entitled to any weight.

and the invention recited in the challenged claims. In particular, we find that Patent Owner has shown that the various X-Sync chainrings are covered by the challenged claims and are coextensive with them. *See* Ex. 2074 ¶¶ 63, 64 (testimony of Dr. Sturges that the products practice the claims); Ex. 2078–2089 (claim charts); Ex. 2076 ¶ 11 (explaining the families of products Patent Owner sells); Ex. 2073 ¶ 10 (explaining the families of products Patent Owner sells). Here, the claims are directed to chainrings, as well as cranksets and drivetrains that include chainrings. Thus, there is a presumption of a nexus between the evidence of secondary considerations tied to the X-Sync chainring, as well as to cranksets and drivetrains that include the X-Sync chainring, and the challenged claims that recite those bicycle components. *See Polaris Indus.*, 882 F.3d at 1073 (“[The challenged claims] broadly cover the *entire* vehicle, rather than ‘only a component of a commercially successful machine.’ . . . 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 [the claims].” (citation omitted)).

Petitioner tries to rebut this presumption of a nexus by attempting to shift the burden of proof to Patent Owner to prove the objective indicia is tied to certain claimed features rather than unclaimed features present in the commercial embodiments. Pet. Reply 24–25. We agree with Patent Owner that this argument improperly attempts to shift the burden to Patent Owner. Sur-Reply 8–9. Here, because Patent Owner has shown that it is entitled to a presumption of a nexus between the X-Sync chainring and the challenged claims, the burden is on Petitioner to rebut that nexus. *Demaco*, 851 F.2d at 1392.

With respect to the improved chain retention of the X-Sync chainring, Petitioner argues that there are numerous unclaimed features, many of which are touted in advertising materials, but Petitioner asserts that none of the claimed features are touted. Pet. Reply 31–32. Petitioner argues that “[i]n light of the unclaimed features touted by [Patent Owner] and the press, and in the absence of any touting/recognition for the claimed combination,” Patent Owner cannot establish a nexus between the claimed invention and the objective indicia. *Id.* at 32 (citing *Ethicon Endo Surgery, Inc. v. Covidien LP*, 812 F.3d 1023, 1035 (Fed. Cir. 2016)). Although Petitioner points to some evidence touting other features, *see id.* at 31 (citing Exs. 1038, 1054, 1055), 40–41 (citing Exs. 2005, 2008, 2027), we find that this evidence is insufficient to overcome the presumption of a nexus that Patent Owner has established. Moreover, much of the evidence is clearly broader than Petitioner acknowledges. In addition to pointing out unclaimed features, there is also praise pointing generally to the “unique tooth profile,” Ex. 2006, “tooth profile,” Ex. 2008, Patent Owner’s “adaptation of the narrow-wide chainring tooth profile,” Ex. 2019, and the “cleverly profiled chainring,” Ex. 2023.

We find that the evidence shows that, in addition to touting specific features, the praise is also broadly directed to the X-Sync chainring’s entire implementation of the narrow/wide tooth concept, including the claimed features. Weighing the evidence together, we find that Petitioner has failed to carry its burden of rebutting the presumption of a nexus. At best, Petitioner has offered conjecture that these unclaimed features could play a role in improved chain retention, but we find that this is insufficient to rebut the presumption of a nexus. *See Polaris*, 882 F.3d at 1072 (explaining that

to rebut presumption of nexus the patent challenger must “present[] evidence to show that the [objective evidence] was due to extraneous factors other than the claimed invention”).⁵

Petitioner also argues Patent Owner sells X-Sync chainrings in at least three different ways—(1) individual chainrings; (2) cranksets including the X-Sync chainring along with two crank arms and an axle; and (3) nine different 1X⁶ drivetrain groupsets that include a number of components including the X-Sync chainring. Pet. Reply 21–22. Petitioner asserts that the majority of sales data provided by Patent Owner is for cranksets, not individual chainrings. *Id.* at 22–24. Petitioner contends that Patent Owner has not shown that the claimed chainring is coextensive with the commercially sold cranksets and drivetrains, and, thus, concludes that there is no presumption of a nexus. *Id.* at 24. We agree with Petitioner that, to the extent that the sales of the X-Sync chainring were sales of cranksets and drivetrains, they are not coextensive with some of the claims. However, as Patent Owner correctly points out, these commercial products are coextensive with claims 11 and 25, which recite a bicycle crankset including a chainring, or claims 12 and 26, which recite a bicycle drivetrain including

⁵ This case is distinguishable from *Ethicon Endo* where the evidence demonstrated that the success was “primarily attributable to a single feature present in the prior art, varying staple size, rather than the combination of prior art features.” 812 F.3d at 1034. We find that no such evidence attributing the success or improved chain retention primarily to one or more features found in the prior art is present here.

⁶ “1X” is a term used to identify mountain bike drivetrains that use a single-chainring. See Ex. 1046 ¶¶ 8–14 (explaining mountain bike drivetrain market). For example, 1X11 would be a drivetrain with a front single chainring and a back 11 speed gear cassette. *Id.*

a chainring. Sur-Reply 7. Thus, while we agree with Petitioner that, to the extent that Patent Owner presents sales information for cranksets or drivetrain groupsets alone, that sales information is not coextensive with claims 7–10 and 20–24, which are directed only to chainrings, the same is not true for claims 11, 12, 25, and 26. *Demaco*, 851 F.2d at 1392 (“When 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.”).

As we discuss below, the same conclusion applies to evidence that only praises Patent Owner’s drivetrains, and does not focus on, or mention, the benefits of the X-Sync chainring. That broader evidence would also not have a nexus to claims 7–10 and 20–24. *Demaco*, 851 F.2d at 1392. However, as we stated above, Patent Owner’s expert has shown that cranksets incorporating the X-Sync chainring include the features recited in claims 11 and 25, and drivetrains incorporating an X-Sync chainring are covered by claims 12 and 26. *See, e.g.*, Ex. 2078, 3–4 (claims 11 and 12 for SRAM’s 004.000 X-Sync chainring), 8–9 (claims 25 and 26 for same chainring). Because those claims are coextensive with cranksets and drivetrains, respectively, we find that those claims are still entitled to a presumption of a nexus for evidence of secondary considerations tied to cranksets and drivetrains that include the X-Sync chainring, respectively.

Finally, Petitioner argues that Patent Owner’s wide-range rear cassettes are what drove the demand for and success of Patent Owner’s drivetrains, not the X-Sync chainring. Pet. Reply 27–32. There is no

dispute that the improved gearing of Patent Owner's rear cassette enabled more riders to use single chainring drivetrains. *Id.* at 28–29 (citing Ex. 1046 ¶¶ 8–13; Ex. 1045-A, 48:24–49:17; Ex. 1061, 2). However, Patent Owner has presented extensive testimony that, whatever the advantages of the rear cassette, it was the development of the X-Sync chainring that made it possible. Sur-Reply 10. As Mr. Ritzler explained at his deposition:

Q. ... To what do you attribute the success of X-SYNC chainring sales?

A. I attribute the success of chainring sales directly to their ability to hold the chain on without a chain guide or chain management system. Before X-SYNC bicycles featured additional devices to control chain management. They featured guides and guards and rollers. All these things were complex. All of them added elements of friction or lower performance, and when we designed X-SYNC, we designed the guiding and guarding into the chainring, which prevents the chain from falling off and makes the one-by drivetrain possible. When you look at the initial success of X-SYNC chainrings, we were blown away, we were surprised, we were – I'd say critical of the potential ourselves internally, and then we started to experience a performance externally through test driving, through validation with athletes, through the media feedback. We were amazed with the potential that that product technology had to offer. Since we released product it's obviously appealed to a wide number of both our customers as well as competitors as it's been copied many, many times over.

* * *

Q. Do you attribute the success of the X-SYNC chainrings to the sales of assets or rear derailleurs associated with those chainrings?

A. I think that the success of the chainrings is largely independent of the success of the cassettes and the other components. We sell X-SYNC chainrings above and beyond or one-by drivetrains for mountain. You see one-by drivetrains made by many consumers

at home featuring chainrings that copy our design. I think it all comes down to the fact that the chainring offers up the possibility, the real estate and the potential to make a one-by drivetrain that does not lose its chain.

Ex. 1045-A, 103:3–104:21; *see also* Ex. 1045-A, 104:22–106:12 (providing further explanation). We have reviewed Mr. Ritzler’s testimony and find it well-reasoned, and supported by extensive evidence of praise that the X-Sync chainring has received. Thus, we give it substantial weight.

Petitioner’s evidence to the contrary is not persuasive. For example, Petitioner cites Exhibit 1037 for its statement that the rear cassette is the “heart” of Patent Owner’s XX1 drivetrain system (which includes an X-Sync chainring). Pet. Reply 29. However, this same article specifically mentions the X-Sync chainring and its “carefully engineered tooth profiles on the chainring that ensure the chain will engage the sprocket and remain secure at the wide input and output angles inherent to single-ring drivetrains as the system is shifted across the cassette.” Ex. 1037, 1. Instead of undermining Mr. Ritzler’s testimony, we find Petitioner’s article consistent with Mr. Ritzler’s statement on the importance of the X-Sync chainring to enabling the use of a 1X drivetrain. The same is true of Exhibit 2009, which is cited by Petitioner for its praise of the rear cassette, but also includes extensive praise of the X-Sync chainring, and mentions that it reduces friction in the system, which is consistent with Mr. Ritzler’s testimony. Ex. 2009, 2. Exhibit 2015, which is also cited by Petitioner for this point, praises the X-Sync chainring, and notes that one of the challenges of moving to a single ring setup is that you “[l]ose that front derailleur and you start losing the chain more often,” and that this is why “just about everyone who runs a single ring also runs some sort of guide.” Ex. 2015, 3. Exhibit 2015

concludes by noting that Patent Owner was also introducing “a special chainring that retains chains all by its lonesome” with “some oddly-shaped teeth on that chainring,” and that “being able to run a single-ring setup without the added friction and weight of a chain guide . . . it’d be a significant improvement.” *Id.* Thus, again, we find this evidence consistent with and corroborative of Mr. Ritzler’s testimony. Moreover, given the corroboration of Mr. Ritzler’s testimony and his detailed explanation, we give it more weight than the testimony of Petitioner’s witness, Mr. Marriott, to the contrary.

Petitioner attempts to rebut Mr. Ritzler’s testimony by contending that Patent Owner’s “Type 2 rear derailleur with Roller Bearing Clutch technology (known as ‘X-Horizon’ and included in the XX1 groupset) already minimized chain disengagement.” Pet. Reply 28 (citing Ex. 1044, 75:12–77:9). However, the fact that the rear derailleur might help the system perform better does not outweigh the extensive evidence that the X-Sync chainring is an essential part of chain retention in Patent Owner’s 1X drivetrain systems. Indeed, the evidence suggests that clutch derailleurs and larger cassettes had existed for many years, Ex. 1044, 76:6–17, Ex. 1045-A, 104:22–106:12, but, as Petitioner’s evidence notes, 1X drivetrain systems were not readily available before Patent Owner’s introduction of the XX1 drivetrain incorporating the X-Sync chainring, Ex. 1037, 1 (“In fact, the question most riders will ask after riding [Patent Owner’s] XX1 [drivetrain] will be, ‘Why has it taken so long for the industry to figure this out?’”). The importance of the X-Sync chainring is also not inconsistent with Patent Owner’s efforts to market and sell the chainring as part of a drivetrain system, which merely may suggest an effort to maximize profits. Indeed, it

may be rational given Patent Owner's presented evidence that competitors were not copying its derailleur, but instead they are copying its chainring. *See* Ex. 1045-A, 114:7–115:15; Ex. 2074 ¶¶ 75–79; Ex. 2076 ¶¶ 40–49; Ex. 2077.

Petitioner also argues that the X-Sync chainring did not entirely eliminate the need for a chainguide, as evidenced by Patent Owner's own statements and advertisements in Exhibit 2007 and Exhibit 1062. Pet. Reply 29–30. But the '027 patent only seeks to provide a bicycle that “can successfully and reliably be ridden over rough and challenging terrain,” Ex. 1001, 1:28–31, not to eliminate chain drop for all riders under all circumstances. Petitioner's evidence is not inconsistent with this objective and solution. Exhibit 2007 merely leaves it to the rider to determine whether they are comfortable without a chainguide. Ex. 2007, 2. Exhibit 1062 is a profile of a professional mountain bike racer whose bike is pictured with a chainguide. Ex. 1062, 1. Exhibit 1062 provides no explanation about the chain guide. *See id.* This evidence is entirely consistent with other evidence that aggressive riders may still require additional chain management, even with the X-Sync chainring. Ex. 2019, 3; Ex. 1045-A, 117:2–11.

Thus, considering the evidence in the record as a whole, we find that Petitioner has not rebutted Patent Owner's presumption of a nexus with respect to evidence of secondary considerations tied to the X-Sync chainring for all of the challenged claims, and to evidence of secondary considerations tied to a crankset or drivetrain groupset including for the X-Sync chainring for claims 11, 12, 25, and 26.

2. *Commercial Success*

Patent Owner has presented extensive evidence that its X-Sync chainrings have achieved significant sales volumes, have achieved large sales growth, have grown to a majority of their chainring sales, and have allowed them to grow from a small share to a significant share of the single chainring market. PO Resp. 17–25.

Petitioner argues that Patent Owner’s data fails to show commercial success, because it only shows that the X-Sync chainring sales “cannibalized” its other multi-chainring sales. Pet. Reply 32. Petitioner asserts that Patent Owner’s sales of X-Sync chainrings have not increased its market share of the mountain bike chainring market, but instead its market share has been falling since 2013. *Id.* at 34. Petitioner contends that “[i]n the absence of growth in [Patent Owner]’s mountain bike chainring market since the introduction of the X-Sync, [Patent Owner]’s purported evidence of commercial success does not require a holding that the claimed invention is nonobvious.” *Id.*

We have reviewed Patent Owner’s evidence of sales and market share, and find that it demonstrates substantial commercial success within the single chainring market. Ex. 2076 ¶¶ 16–29. In particular, we find the large growth in market share and sales volume, and resulting large market share in the single chainring market, to be indicative of commercial success. *Id.* ¶¶ 20–29. We find this evidence compelling and entitled to substantial weight. We do not agree with Petitioner’s argument that Patent Owner’s growth in the single-chainring market was primarily due to cannibalization of its multi-chainring market share, and that Patent Owner’s lack of achieved growth in the overall chainring market (single- and multi-) indicates that

there was no commercial success. As Patent Owner notes, cannibalization does not preclude commercial success. *See Medtronic, Inc. v. Daig Corp.*, 789 F.2d 903, 907 (Fed. Cir. 1986). Moreover, Patent Owner presented evidence that it has achieved this large market share, in the single-chainring market, while charging between two and eight times the prices of its competitors in the single chainring market. Ex. 2076 ¶ 13 (stating that Patent Owner’s X-Sync chainrings are sold for more than \$90, which is at least twice as expensive as the Race Face chainrings, and in some cases eight times more expensive). Patent Owner also noted that this large market share does not include the sales of its competitors who are licensees. *Id.* ¶¶ 26–29; *see also* Tr. 16:12–15 (agreeing that Patent Owner’s drivetrain as a whole was a commercial success). Thus, we find that Patent Owner has presented substantial evidence of commercial success.

As we noted above, Petitioner points to evidence that the sales information presented is primarily directed to sales of X-Sync chainrings as parts of cranksets and drivetrain groupsets. *See* Pet. Reply 21–24. We found above that, for data related to cranksets and groupsets, Patent Owner has only established a nexus for claims 11, 12, 25, and 26. Thus, we find that a strong demonstration of a nexus that exists between claims 11, 12, 25, and 26 and this commercial success information. Accordingly, we find that commercial success weighs significantly in favor of non-obviousness of claims 11, 12, 25, and 26.

3. *Industry Praise and Skepticism*

a. *Industry Praise*

Praise from industry participants, especially competitors, is probative as to obviousness because such participants “are not likely to praise an

obvious advance over the known art. Thus, if there is evidence of industry praise of the claimed invention in the record, it weighs in favor of the non-obviousness of the claimed invention.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc).

Patent Owner presents extensive evidence of industry praise and awards that its X-Sync chainring products have received. PO Resp. 26–37; Sur-Reply 5–6; Exs. 2076 ¶¶ 52–67; 2074 ¶¶ 67, 68; 2006, 2–3 (praising teeth design as “mechanical duct tape”); 2007, 4 (noting lack of chain drop and suggesting that bike can be trail ridden without a chain guide); 2008, 2 (noting lack of chain retention issues, discussing tooth shape); 2009, 2 (praising chainring); 2010, 1 (noting lack of chain drop); 2011, 1 (praising chainring); 2012, 2 (praising teeth design), 4 (noting chain retention); 2013, 2 (noting chain retention of X-Sync chainring); 2014, 5 (praising X-Sync chainring as “unique” and noting it removes the need for a chain guide); 2015, 3 (praising X-Sync chainring for potentially removing the need for a chain guide); 2016, 1 (noting X-Sync narrow and wide teeth the “was in part the catalyst” for the change to 1X transmissions); 2017, 4 (praising X-Sync chainring and noting “complicated design” of narrow-wide teeth); 2019, 3–4 (“Innovation of the Year Award” for “SRAM X-Sync Narrow-Wide Chainring”); 2023 (noting no need for a chain guide).

Petitioner argues that none of the articles cited mentions the “offset” feature or the combination of the narrow wide teeth and offset features. Pet. Reply 40. Instead, Petitioner argues that the praise is focused either on the 1X mountain bike drive train alone, or even when it mentions the X-Sync chainring, it does so only in the context of the entire drive train. *Id.* Petitioner also argues that the articles praise unclaimed features such as the

“tall,” “hooked,” and “asymmetric” teeth. *Id.* at 41. Finally, Petitioner asserts that some of the articles only praise the narrow/wide teeth, which are found in the prior art. *Id.*

We disagree with Petitioner that Patent Owner has failed to establish a nexus between the praise and the claimed inventions. Instead, as we discussed in detail above, we find that Patent Owner has established a strong presumption of a nexus between the claims and the evidence of secondary considerations tied to the X-Sync chainring. *See supra* II.E.1. As we discussed above, Patent Owner has shown that the X-Sync chainring embodies the claimed invention and is coextensive with it. Therefore, Patent Owner is entitled to a presumption of a nexus between the challenged claims and the X-Sync chainring. To the extent that the articles praise the entire drivetrain, we found above, in our discussion of commercial success, that claims 12 and 26 recite a drivetrain and are, thus, coextensive with the drivetrain and entitled to a presumption of a nexus regardless. Furthermore, as we explained above, Patent Owner has established that the X-Sync chainring technology is an essential part of what enabled it to develop the entire drivetrain, which outweighs the evidence that Petitioner presents to rebut the nexus, namely, that the evidence of objective indicia of non-obviousness is tied to the rear cassette.

In any event, we find that Patent Owner has presented ample evidence of praise that is tied directly to the X-Sync chainring. *See* Exs. 2006, 2–3 (praising teeth design as “mechanical duct tape”); 2007, 4 (noting lack of chain drop and suggesting that bike can be trail ridden without a chain guide); 2008, 2 (noting lack of chain retention issues, discussing tooth shape); 2009, 2 (praising chainring); 2010, 1 (noting lack of chain drop);

“adaptation of the narrow-wide chainring tooth profile,” as embodied in the X-Sync, that was “the missing piece in the single-chainring drivetrain puzzle.” Ex. 2019, 3. Thus, even this article indicates that it is not merely the narrow-wide profile, but Patent Owner’s implementation of it in the X-Sync chainring—which we have found embodies and is coextensive with the claims—that resulted in the innovation. *Id.* Thus, we are not persuaded by Petitioner’s arguments that there is no nexus between the praise and the challenged claims. We find this evidence suggestive of non-obviousness and entitled to significant weight in our analysis.

b. Skepticism

Evidence of industry skepticism weighs in favor of non-obviousness. *See United States v. Adams*, 383 U.S. 39, 52 (1966). “If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors non-obviousness.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1335 (Fed. Cir. 2016).

Patent Owner presents evidence of skepticism from various magazine articles reviewing the X-Sync chainring. PO Resp. 25–32. Petitioner’s argument against this evidence is the same considered with respect to industry praise—i.e., that there is no nexus. Pet. Reply 40–41. As we explained above, Patent Owner is entitled to a presumption of a nexus between the evidence of secondary considerations tied to the X-Sync chainring and the claims, and Petitioner has failed to rebut that presumption. We have reviewed the evidence of skepticism presented by Patent Owner, and find that Patent Owner has made a significant showing of skepticism within the industry towards the effectiveness of the X-Sync chainring

regarding chain retention. Exs. 2008, 2011, 2012, 2014, 2015. For instance, one article noted that “[m]ore than a few editors on site were concerned about the lack of a chain guide on our test bikes” and that “one editor insisted that SRAM had embedded high-power magnets into the CNC-machined aluminum chainring (alas, there were none).” Ex. 2008. As summarized on pages 27 to 31 of the Patent Owner Response, this was not the only statement of skepticism by industry participants. *See* PO Resp. 27–31. We find this substantial amount of evidence suggestive of non-obviousness and entitled to significant weight in our analysis. *See WBIP*, 829 F.3d at 1335.

4. *Long-Felt Need*

“Evidence of a long felt but unsolved need that is met by the claimed invention is further evidence of non-obviousness.” *Millennium Pharms., Inc. v. Sandoz Inc.*, 862 F.3d 1356, 1369 (Fed. Cir. 2017). “Evidence of long-felt need is particularly probative of obviousness when it demonstrates both that a demand existed for the patented invention, and that others tried but failed to satisfy that demand.” *Id.*

Patent Owner argues that the problem of maintaining a chain on a chainring has existed for more than 100 years. PO Resp. 43 (citing Exs. 2048–2062; Ex. 2074 ¶¶ 15, 80, 81). Patent Owner contends that prior art attempts to solve the problem failed to address several issues. *Id.* Patent Owner argues that prior art solutions had issues with increasing one or all of complexity, weight, and drivetrain friction. *Id.* Patent Owner asserts that “[t]hese prior art devices have existed for more than 100 years, but have failed to improve chain retention without the known problems of increased complexity, weight, and/or drivetrain friction.” *Id.* at 44. Patent

Ex. 2076 ¶ 50; Ex. 2073 ¶ 12. Indeed, Petitioner’s expert, Dr. Neptune, conceded that there was a long-felt need for “a multi-gear bicycle that could be reliably ridden over rough terrain without the aid of a chain retention device external to the chainring.” Ex. 2129, 78:12–17. Although Petitioner’s witness, Mr. Marriott, testified that there was no long-felt need regarding chain drop, because chain guides kept the chain on the chainring, Ex. 1075, 69:24–70:3, he did not address the narrower problem that Patent Owner articulated, and Dr. Neptune admitted. As for Petitioner’s other contention—based on other testimony by Mr. Marriott (*see* Ex. 1046 ¶ 16)—that there was no market for 1X chainrings, and hence no long-felt need, we find this belied by Dr. Neptune’s concession, and Mr. Ritzler’s testimony, that it was not that such systems were not wanted, but that they were not feasible, in part, due to the problems of increased complexity, weight, and/or drivetrain friction that were discussed above. *See* Ex. 1045-A, 103:2–104:21. As we discussed above, we find Mr. Ritzler’s testimony persuasive and give it substantial weight. Thus, we do not find Mr. Marriott’s testimony persuasive about long-felt need.

We also find that Patent Owner has demonstrated that the X-Sync chainring met this long-felt need. In particular, Dr. Sturges testified that the X-Sync chainring met this need. Ex. 2074 ¶¶ 80–86. We find this testimony reasoned and persuasive, and give it substantial weight. Moreover, this testimony is supported by and consistent with the effusive praise and awards discussed above with regard to industry praise that further supports this finding. *See, e.g.*, Exs. 2006, 2008, 2015, 2019. Moreover, the mere fact that there may be certain conditions when chainguards are still used, *see, e.g.*, Ex. 1075, 80:23–81:10, does not mean that the X-Sync chainring did

re Cree, Inc., 818 F.3d 694, 703 (Fed. Cir. 2016) (quoting *In re Antor Media Corp.*, 689 F.3d 1282, 1294 (Fed. Cir. 2012)).

Patent Owner argues that it offers “an open license program where any competitor may license the X-Sync technology for a reasonable royalty.” PO Resp. 38. Patent Owner asserts that “[w]ith this program, [Patent Owner] has already licensed the ’027 patent, as well as the X-Sync technology to at least eight different companies, some of whom are major market players.” *Id.* Specifically, Patent Owner contends that it has entered into a number of licenses with major bicycle manufacturers and bicycle component providers. *Id.* at 38–39 (citing Exs. 2091–2106; Ex. 2076 ¶¶ 32–37; Ex. 2074 ¶¶ 72–74).

Petitioner responds that five of the eight licenses (Exs. 2092–2100) provided by Patent Owner do not refer to the ’027 patent. Pet. Reply 33. Instead, Petitioner notes that “they are licenses to [Patent Owner’s] German Utility Model (DE 20 2012 012 533 U1, “Kettenring”) and corresponding patents/patent applications with claims differing from those of the ’027 [patent] claims.” *Id.* Petitioner argues that “the German claims do not recite the ‘offset’ feature, which is one of the alleged ‘principal features’ of the ’027 patent.” *Id.* Petitioner argues that because these licenses are not to the ’027 patent and “do not cover the invention claimed in the ’027 patent, [Patent Owner] does not (and cannot) show nexus between these licenses and the claimed invention.” *Id.* Petitioner also asserts that two other licenses (Exs. 2102 and 2104) “prove nothing about the value of the ’027 [patent] claims” because they cover numerous other continuations and international patents/applications. *Id.* at 34. Finally, Petitioner notes that the

final license (Ex. 2106) is irrelevant because it was entered into to settle a lawsuit. *Id.*

We determine that these licenses are entitled to some weight in our obviousness analysis. However, we agree, in part, with Petitioner that some of the licenses have limited probative value. For instance, we agree with Petitioner that the license with Wolf Tooth (Ex. 2106) is entitled to less weight because it was entered into to settle a lawsuit. There is no evidence suggesting that it was the merit of the '027 patent, as opposed to the desire to save litigation costs, that drove the license. *See EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907–08 (Fed. Cir. 1985) (explaining that it is often “cheaper to take licenses than to defend infringement suits, or for other reasons unrelated to the unobviousness of the licensed subject matter.”). As for the remaining licenses, while we agree with Petitioner that the fact that the licenses cover a number of patents affects the weight they should receive, we do not agree that the fact that the licenses cover more than just the '027 patent means that they are entitled to no weight. In particular, we note that the licenses with both Saris Cycling Group (Ex. 2102) and White Industries (Ex. 2104) both explicitly mention the '027 patent, and were not entered into to settle litigation. Ex. 2076 ¶ 37. Thus, we find that they are entitled to some weight.

Finally, as for the remaining licenses—Chromag Bikes (Ex. 2092), Accell Group N.V. (a.k.a Winora-Staiger) (Ex. 2094), KCNC International (Ex. 2096), Quality Bicycle Products, Inc. (Ex. 2098), Cannondale Bicycle (Ex. 2100), Petitioner is correct that they do not list the '027 patent, but cover “the invention(s) described in German Utility Model DE 2012 012 533

U1 – ‘Kettenring’⁷ and any patent applications corresponding to the above-described Utility Model that are issued, filed, or to be filed in any and all foreign countries and the know-how associated with the inventions defined by the patent.” *See, e.g.*, Ex. 2092, 1. Patent Owner has offered evidence that the disclosure of “Kettenring” is commensurate in scope with the ’027 patent. Ex. 2074 ¶ 73. Moreover, there is no dispute that the ’027 patent is an application “corresponding to [Kettenring]” and is within the scope of these licenses. *Id.*; Ex. 2076 ¶ 11; Ex. 2073 ¶ 10. Petitioner is correct that these licenses, which cover a number of applications and patents throughout the world, and entered into before the ’027 patent issued, have limited probative value into the non-obviousness of the claims of the ’027 patent. We disagree, however, with Petitioner that these licenses have no probative value. We find that these licenses do have some value in showing that the inventions covered by ’027 patent have had some acceptance in the industry, and thus, these licenses are entitled some weight.

In sum, we conclude that Patent Owner’s evidence of licensing is entitled to some, but not significant, weight.

6. Copying

“Copying may indeed be another form of flattering praise for inventive features.” *Crocs, Inc. v. Int’l Trade Comm’n*, 598 F.3d 1294, 1311 (Fed. Cir. 2010). Copying “requires evidence of efforts to replicate a specific product.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010). “This may be demonstrated either through internal documents; direct evidence such as disassembling a patented prototype, photographing

⁷ As Patent Owner explains, “Kettenring” is the German word for chainring. Ex. 2076 ¶ 36.

its features, and using the photograph as a blueprint to build a virtually identical replica; or access to, and substantial similarity to, the patented product (as opposed to the patent).” *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (internal citations omitted). “We note, however, that a showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations.” *Ecolchem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000); *see also In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995) (“[M]ore than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the obviousness issue.” (quoting *Cable Elec. Prods. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985))).

Patent Owner argues that it is “aware of at least seventeen (17) different companies who have copied its patented technology, copying the features of the Challenged Claims.” PO Resp. 40 (citing Ex. 2076 ¶¶ 40, 41, 46; Ex. 2074 ¶ 75–77; Exs. 2031–2047). Patent Owner submits that the “Race Face chainrings incorporate the patented features of the ’027 [patent] claims and further details of the X-Sync chainrings, and Race Face had sufficient access to the X-Sync chainrings.” *Id.* (citing Ex. 2076 ¶¶ 47, 48).

Petitioner responds that “Race Face’s chainring differs substantially from [Patent Owner’s] X-Sync chainring (the original X-Sync and X-Sync Eagle).” Pet. Reply 34. Petitioner offers photographs purporting to show that Race Face’s chainring does not include the “protruding tip portion,” the “hooked rear flank,” or the “asymmetric teeth” of Patent Owner’s chainring. *Id.* at 35–36. Petitioner also argues that “Race Face did not copy the claimed ‘offset’ feature . . . , and thus there was *no copying of the claimed*

combination.” *Id.* at 37. Petitioner also asserts that Patent Owner “failed to show replication of its X-Sync chainring by other competitors.” *Id.* at 38–39.

Patent Owner has put forward some evidence of copying. Patent Owner bases its allegations of copying on allegations of access to, and substantial similarity to, the patented product (as opposed to the patent). *See* PO Resp. 37. Patent Owner has put forward unrebutted evidence of access, which Petitioner does not appear to dispute. Ex. 2076 ¶¶ 47–49. Petitioner does dispute, however, the “substantial similarity” of the Race Face chainring and Patent Owner’s X-Sync chainring. Pet. Reply 35–37. With respect to “substantial similarity,” Patent Owner has provided testimony from Dr. Sturges that the Race Face Narrow Wide chainring infringes the challenged claims of the ’027 patent, and an identification of various features common to the products. Ex. 2074 ¶ 77. Patent Owner also offers the testimony of Mr. Ritzler that there are similarities between Patent Owner’s and Race Face’s products. Ex. 2076 ¶¶ 39–49. The only evidence Petitioner offers in response are some photographs of two of Patent Owner’s chainrings and a Race Face chainring, and the testimony of Mr. Marriott that he “thinks” Race Face did not copy. Exs. 1036, 1070, 1073; Ex. 1075, 47:8–16. The photographs purport to illustrate features that are different between the various products, but Petitioner provides no testimony to support a finding that these differences are significant. Moreover, although it is apparent from the photographs and the labels that there are some differences between the products, the photographs that Petitioner offers are of low quality and it is difficult to ascertain the significance of those differences. As for Mr. Marriott’s testimony, the testimony of what he “thinks” is merely

speculation, and while he asserts that there are “dozens” of differences, he fails to identify any of them with specificity. Ex. 1075, 47:8–16. As a result, we give Petitioner’s evidence little to no weight. In comparison, although Dr. Sturges’s testimony does not go into great detail, we find it sufficient to establish that some copying by Race Face has taken place.

As for Petitioner’s argument that the Race Face products lack the claimed “offset,” Pet. Reply 37–38, Petitioner’s evidence supporting this contention is photographs of Patent Owner’s and Race Face’s products, with labels added to them purporting to show the lack of the claimed offset, in that there is an alleged admission by Mr. Ritzler that an “offset” is the spatial difference between the inboard/outboard side of the wide teeth and the inboard/outboard edge of the chainring. *Id.* at 37 n. 5 (citing Ex. 1045-A, 129:17–132:9). However, we reviewed Mr. Ritzler’s testimony and find that the cited testimony of Mr. Ritzler does not support Petitioner’s contention that what they have labeled on page 38 of the Reply is necessarily what is claimed. Mr. Ritzler identifies that as an “offset,” but does not admit that is what the claim means. Ex. 1045-A, 129:17–132:9. In contrast, Patent Owner has provided the testimony of Dr. Sturges that the Race Face chainrings do include the claimed offset. We find this testimony persuasive. Ex. 2074 ¶¶ 75–77. Thus, Petitioner has not shown that the Race Face products lack the claimed offset.

As for the other competitors that Patent Owner contends copied its product, we find this evidence entitled to some weight. Petitioner argues that there is no nexus between this copying and the claimed invention, because Patent Owner position “[o]n the whole” is that any chainring with narrow and wide teeth is a copy, but that feature is found in JP-Shimano.

Pet. Reply 38. However, Petitioner provides no evidence to support this contention. Dr. Sturges testified that the Race Face chainring is representative of these other products, and has identified a number of features that he opines are copied from the SRAM X-Sync product, in addition to the narrow/wide teeth. Ex. 2074 ¶¶ 76, 77. Petitioner offers no evidence to rebut this testimony. Thus, we do not find Petitioner's contention that the other products merely copy the features found in JP-Shimano to be persuasive. As we noted above, the evidence that Patent Owner offers is not very detailed, so we find that Patent Owner's evidence of the 17 other copying products to be entitled to some weight, but not significant weight.

In sum, we determine that Patent Owner has shown some copying of its X-Sync chainring product, which is covered by the '027 patent. We find this evidence of copying overall is entitled to some weight in our analysis.

F. REMAINING CLAIMS

Petitioner asserts that claims 9, 10, 23, and 24 would have been obvious over the combination of Thompson, JP-Shimano, and Hattan. Pet. 45–57. Claims 9 and 10 depend from claim 7 and claims 23, and 24 depend from claim 20. Ex. 1001, 8:51–60, 10:4–22. Petitioner does not rely on Hattan for any of the elements in claims 7 or 20, and instead relies on its analysis of the ground of Thompson and JP-Shimano for those elements. Because we find below that Petitioner has failed to prove that claims 7 and 20 would have been obvious, and Petitioner relies on same reasoning to account for those claim limitations in its contentions regarding claims 9, 10, 23, and 24, there is no need to reach Patent Owner's separate arguments, and we do not address them in this Decision.

G. FINAL CONCLUSION OF OBVIOUSNESS

As we explained above, we find that Petitioner has shown there would have been a rationale to combine the references. *See supra* at II.D.2. But we also find that Patent Owner has made an extremely strong overall showing of objective indicia of non-obviousness, which includes very strong showings on industry praise, skepticism, and long felt need, a strong showing on commercial success for claims 11, 12, 25, and 26, and weak showings on licensing and copying. “The objective indicia of non-obviousness play an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis.” *WBIP*, 829 F.3d at 1328. Indeed, the Federal Circuit has 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)). We find this to be such a case where the objective evidence is the most probative evidence in the record. Petitioner’s rationale to combine rests mainly on the testimony of its expert, but the copious objective evidence demonstrates the significance and importance of Patent Owner’s invention. Weighing all four *Graham* factors, we find that Petitioner has not shown by a preponderance of the evidence that claims 7, 8, 11, 12, 20–22, 25, and 26 would have been obvious over the combination of Thompson and JP-Shimano and claims 9, 10, 23, and 24 would have been obvious over the combination of Thompson, JP-Shimano, and Hattan.

We note that this is not a case as in *Intercontinental Great Brands LLC v. Kellogg North America Co.*, 869 F.3d 1336, 1342–47 (Fed. Cir. 2017), where the strong case of obviousness outweighs the objective indicia

of non-obviousness. On the contrary, we find that the case of obviousness here is easily outweighed by the objective evidence of non-obviousness.

III. MOTIONS TO EXCLUDE

A. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude SRAM Exhibit 2002 ¶¶ 50–54, 58–63, 66 (ll. 1–2), 67, and 68; Exhibit 2074 ¶¶ 61, 65–72, 74–79, 80 (ll. 1–2), 83 (ll. 7–9), 84 and 85; Exhibit 2004 ¶ 17; Exhibit 2076 ¶¶ 8, 19–29, 41–50; Exhibits 2005–2047; Exhibit 2073, ¶ 12; and Exhibits 2109 and 2110. Pet. Mot. Exclude 1.

1. *Testimony of Dr. Sturges*

a. *Commercial Success, Long-Felt Need, Failure of Others, & Licensing*

Petitioner seeks to exclude Paragraphs 50–52, 59, 60, 64, 67, and 68 of the First Sturges Declaration and Paragraphs 61, 65, 66, 72, 74, 80, and 83–85 of the Second Sturges Declaration under Federal Rules of Evidence 403, 602, and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 2–4; Pet. Mot. Reply 1–2. Petitioner argues that Dr. Sturges has no experience in the relevant market, and is not qualified to give expert opinions regarding commercial success, long-felt need, failure by others, and licensing. Pet. Mot. Exclude 2. Petitioner further asserts that Dr. Sturges lacks the requisite personal knowledge to give such testimony. *Id.* at 3.

With respect to Paragraphs 50–52, 59, and 60 of the First Sturges Declaration and Paragraphs 61, 65, 66, 72, and 74 of the Second Sturges Declaration, we did not rely on this testimony in reaching our decision. So, we dismiss this portion of the motion as moot.

As for Paragraphs 64, 67, and 68 of the First Sturges Declaration and Paragraphs 80 and 83–85 of the Second Sturges Declaration, we agree with Patent Owner that this testimony is admissible. To begin with, we note that the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude. As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, Petitioner is prejudiced by this testimony. Thus, Petitioner’s Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges has sufficient expertise and has provided sufficient analysis to offer opinions regarding long-felt need. *See* Ex. 2074 ¶¶ 80, 83–85. Long-felt need is viewed from the perspective of a person of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). In this case, we did not find that the level of ordinary skill in the art required special knowledge of marketing in the bicycle industry, as Petitioner suggests. *See supra* Section II.B. Dr. Sturges testified he has reviewed the art and cited to the evidence he relied upon, including a number of references involving the problem of chain drop. *See* Ex. 2074 ¶¶ 80, 83–85. As for Rule 602, it is well-established that “an expert’s opinion need not be based on personal knowledge.” *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 592 (1993). As we explained, Dr. Sturges testified about the references he reviewed, and explains why he concludes that there a person of ordinary skill in the art would have understood that there was a long-felt need in the art at the time of the invention. Thus, we deny Petitioner’s Motion to Exclude Paragraphs 64, 67,

and 68 of the First Sturges Declaration and Paragraphs 80 and 83–85 of the Second Sturges Declaration.

b. Copying

Petitioner seeks to exclude Paragraphs 61–63 of the First Sturges Declaration and Paragraphs 75–79 of the Second Sturges Declaration under Federal Rules of Evidence 403 and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 4–5; Pet. Mot. Reply 3–4. Petitioner contends that Dr. Sturges fails to perform a “product-to-product comparison required to demonstrate the alleged copying” and focuses on the similarities and ignores “the many differences between the two products.” Pet. Mot. Exclude 4–5. Petitioner further argues that Dr. Sturges’s testimony is conclusory, that Dr. Sturges provides no factual support for his opinion, and offers no explanation of why or how the particular chainring he relied on is representative. Pet. Mot. Reply 3–4. Patent Owner responds that Dr. Sturges explained the evidence he relied upon, and properly relied on the Race Face chainring as representative of the “copycat chainrings.” PO Opp. 7.

We agree with Patent Owner that Dr. Sturges’s testimony is admissible. To begin with, as we noted above, the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude. As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, how Petitioner is prejudiced by admitting this testimony. Thus, Petitioner’s Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges provides sufficient

analysis to support his opinions regarding copying. *See* Ex. 2074 ¶¶ 75–79. Dr. Sturges cited to the evidence he relied upon, including Patent Owner’s infringement contentions from the underlying district court litigation and Mr. Ritzler’s testimony. Petitioner’s arguments go more to the weight that Dr. Sturges’s testimony should be given, not its admissibility. Thus, we deny Petitioner’s Motion to Exclude Paragraphs 61–63 of the First Sturges Declaration and Paragraphs 75–79 of the Second Sturges Declaration.

c. Professional Approval and Praise

Petitioner seeks to exclude Paragraphs 53, 54, and 58 of the First Sturges Declaration and Paragraphs 67–71 of the Second Sturges Declaration under Federal Rules of Evidence 403 and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 5–6; Pet. Mot. Reply 2–3. Petitioner contends that Dr. Sturges fails to cite any specific text in the various magazine articles he relies upon, and does not provide any specific analysis why the praise is driven by the features of the challenged claims. Pet. Mot. Exclude 5. Petitioner also argues that “[t]o the extent Dr. Sturges relies on the magazine articles to demonstrate the alleged benefits of the X-Sync (*see, e.g.*, Ex. 2074, ¶¶ 67, 68), such testimony should be excluded as hearsay under [Federal Rule of Evidence] 802.” *Id.* at 6. Patent Owner argues that Dr. Sturges did provide a detailed analysis by demonstrating that the X-Sync chainrings are covered by the patents and provides citations to the evidence he relied upon. Pat. Opp. 8. Patent Owner further argues that Dr. Sturges is permitted to rely on hearsay in forming his opinions. *Id.*

To begin with, as we noted above, the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude.

As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, how Petitioner is prejudiced by admitting this testimony. Thus, Petitioner's Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges provides sufficient analysis to support his opinions that the X-Sync chainring has received praise and there is a nexus between the X-Sync chainring and the '027 patent. *See* Ex. 2074 ¶¶ 63, 64 (explaining how the X-Sync chainring is covered by the patent), ¶¶ 68–71 (citing to Ex. 2076 (testimony of Mr. Ritzler); Exs. 2005–2030). Finally, we agree with Patent Owner that Petitioner's hearsay objection is without merit. *See* Fed. R. Evid. 703 (explaining experts may rely on hearsay in forming their opinions). Thus, Petitioner's Motion to Exclude Paragraphs 53, 54, and 58 of the First Sturges Declaration and Paragraphs 67–71 of the Second Sturges Declaration is *denied*.

2. Testimony of Mr. Ritzler

a. Commercial Success

Petitioner seeks to exclude Paragraphs 8 and 19–29 of the Declaration of Ron Ritzler (“Ritzler Declaration”), an employee of Patent Owner, regarding commercial success. Pet. Mot. Exclude 6–10. Petitioner argues that Mr. Ritzler's testimony is vague and conclusory and “provides no details of his methodologies or application to whatever underlying data he may have considered.” *Id.* at 7–8. Petitioner argues that because it has not been shown that “Mr. Ritzler's market share calculations are based on reliable principles or methodologies, or that Mr. Ritzler reliably applied his chosen methodologies,” Paragraphs 8 and 19–29 of the Ritzler Declaration

should be excluded. *Id.* at 8; Pet. Mot. Reply 4. Patent Owner responds that Mr. Ritzler provided sufficient evidence of his methodologies and experience. PO Opp. 10.

We agree with Patent Owner that Mr. Ritzler has provided sufficient explanation of his methodologies and principles that he applied in providing his testimony regarding commercial success. Ex. 2076 ¶¶ 16–17, 28; Ex. 2121 ¶¶ 1–9. Mr. Ritzler explained the sources of the data and the way he reached the conclusions stated in his testimony. We find this testimony persuasive and give it substantial weight. *Id.* Accordingly, we deny Petitioner’s Motion to Exclude Paragraphs 8 and 19–29 of the Ritzler Declaration.

b. Copying and Long-felt Need

Petitioner seeks to exclude Mr. Ritzler’s testimony regarding copying and long-felt need (Ex. 2004 ¶ 17; Ex. 2076 ¶¶ 41–50) as “speculative and unsupported” under Federal Rules of Evidence 702 and 602. Pet. Mot. Exclude 10–11; Pet. Mot. Reply 5. Patent Owner contends that Mr. Ritzler is qualified to offer his testimony on copying and long-felt need, and that he is permitted to testify about his personal observations. PO Opp. 11.

We agree with Patent Owner that Mr. Ritzler’s testimony regarding copying and long-felt need is admissible. Mr. Ritzler has extensive experience in the industry and with bicycles generally. *See* Ex. 2076 ¶¶ 3, 4. With respect to copying, his testimony is clear that he is testifying based on his personal knowledge as Patent Owner’s vice president of product development. *See* Ex. 2076 ¶¶ 41–49. As for long-felt need, Mr. Ritzler explains the basis for his opinion that there was a long-felt need in the industry. We determine that Petitioner’s arguments go to the weight we

should give Mr. Ritzler's testimony, not its admissibility. Thus, Petitioner's Motion to Exclude Paragraph 17 of Exhibit 2004 and Paragraphs 41–50 of Exhibit 2076 is denied.

3. *Exhibits 2005–2030*

Exhibits 2005–2030 are various articles that Patent Owner contends are evidence of industry praise of the products that embody the '027 patent. *See* Exs. 2005–2030. Petitioner moves to exclude Exhibits 2005–2030 under Federal Rules of Evidence 401, 403, and 802, as irrelevant, unduly prejudicial, and hearsay, respectively. Pet. Mot. Exclude 11–12. Patent Owner responds that Petitioner ignores its nexus showing and that its briefs point to specific passages that discuss the industry's recognition of the claimed features. Pat. Opp. 12. Patent Owner also argues that the articles are offered for a non-hearsay purpose and are, therefore, admissible. *Id.* at 13.

We agree with Patent Owner that Petitioner has failed to show these exhibits should be excluded as irrelevant. Evidence is relevant if it has *any tendency* to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining the action. Fed. R. Evid. 401 (emphasis added). It is well-established that “[l]audatory statements by third parties regarding an invention are relevant to the question of obviousness.” *Asetek Danmark A/S v. CMI USA, Inc.*, NO. 13-cv-00457-JST, 2014 WL 12644295, at *1 (N.D. Cal. Nov. 19, 2014) (collecting cases). Petitioner's arguments about nexus go more to the weight this evidence should be given, rather than its admissibility.

As for Petitioner's arguments that the evidence should be excluded under Federal Rule of Evidence 403, Petitioner has offered no concrete

assertions of prejudice, so we deny this request on that basis alone. Further, we do not discern any prejudice to Petitioner, under Federal Rule of Evidence 403, in allowing this exhibit into evidence. In a non-jury trial, such as before the Board, the risk that a decision by the trier of fact will be unfairly affected by the admission of improper evidence is far less than in a jury trial. *See E.E.O.C. v. Farmer Bros. Co.*, 31 F.3d 891, 898 (9th Cir. 1994). As the factfinder, we are able to consider this evidence, in light of the parties' arguments, and give it the appropriate weight. *See* 22 CHARLES ALAN WRIGHT & KENNETH W. GRAHAM, JR., FEDERAL PRACTICE AND PROCEDURE § 5213 (1978 & Supp 1999) ("Since the judge must hear the evidence in ruling on the motion to exclude the evidence under Rule 403, exclusion of the evidence on grounds of prejudice in a non-jury trial is described as a 'useless procedure.'"); *see also Schultz v. Butcher*, 24 F.3d 626, 632 (4th Cir. 1994)(finding court should not exclude evidence under Rule 403 in non-jury trial on grounds of unfair prejudice); *Gulf States Utilities Co. v. Ecodyne Corp.*, 635 F.2d 517, 519 (5th Cir. 1981) (finding unfair prejudice portion of Rule 403 "has no logical application to [non-jury] trials").

As for Petitioner's hearsay objection, it is without merit because the articles are not offered for the truth of the matters asserted in them, but to show that the statements were made. Because the existence of the statements themselves is relevant, "courts have properly found that articles showing the receipt of 'awards and accolades' are admissible over a hearsay objection." *Asetek Danmark A/S*, 2014 WL 12644295, at *2 (collecting cases).

Thus, we deny Petitioner's Motion to Exclude Exhibits 2005–2031.

4. Exhibits 2031–2047

Exhibits 2031–2047 are company product descriptions or store webpages showing pictures of various competing products that Patent Owner contends are copies of its product. *See* Exs. 2031–2047. Petitioner moves to exclude Exhibits 2031–2047 under Federal Rule of Evidence 401 as irrelevant. Pet. Mot. Exclude 12–13. Petitioner argues that Patent Owner “failed to show that each of the chainrings in these exhibits includes every feature of the allegedly copied X-Sync chainrings, beyond a bare and unsupported assertion by Dr. Sturges.” *Id.* Petitioner contends that the only other evidence cited also has no supporting explanation, so “[a]s a result, beyond bare assertions, [Patent Owner] presents no evidence that the chainrings in Exhibits 2031–2047 are copies of the X-Sync chainring. . . .” *Id.* at 13. Patent Owner argues that the exhibits are relevant because copying was extensively discussed by Dr. Sturges and Mr. Ritzler. PO Opp. 13.

We agree with Patent Owner that Exhibits 2031–2047 are relevant and admissible. Evidence is relevant if it has *any tendency* to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining the action. Fed. R. Evid. 401 (emphasis added). Given Dr. Sturges’s testimony that these chainrings are copies of Patent Owner’s products, this is sufficient to establish that these exhibits are relevant under the low standard of Rule 401. *See United States v. Whittington*, 455 F.3d 736, 739 (6th Cir. 2006) (“[T]he district court correctly noted that the relevance threshold is very low under Rule 401.”) (internal quotation marks omitted). Petitioner’s arguments go more to the weight this evidence should be given, rather than its admissibility. Thus, we deny Petitioner’s Motion to Exclude Exhibits 2031–2047.

6. *Exhibits 2109 and 2110*

Exhibits 2109 and 2110 are videos showing the operation SRAM X-Sync chainrings. Petitioner moves to exclude them under Federal Rules of Evidence 401–403, 702, 901, and 37 C.F.R. §§ 42.63 and 42.65. Pet. Mot. Exclude 13. We did not rely on Exhibits 2109 or 2110, so we dismiss this portion of Petitioner’s Motion to Exclude as moot.

B. PATENT OWNER’S MOTION TO EXCLUDE

Patent Owner moves to exclude Exhibits 1036–1037, 1039–1042, 1047–1048, 1057–1058, 1061, 1069–1070, and 1073, as well as ¶¶ 9–11 and 13–16 of Exhibit 1046 and ¶ 26 of Exhibit 1068. PO Mot. Exclude 17. Petitioner withdraws Exhibits 1042 and 1057, but otherwise opposes Patent Owner’s Motion. Pet. Opp. 1. We consider Patent Owner’s Motion below.

1. *Exhibit 1036*

Patent Owner seeks to exclude Exhibit 1036 under Federal Rule of Evidence 901 as not authenticated. PO Mot. Exclude 4. Patent Owner contends that “[n]o witness has authenticated the collection of photographs set forth in Exhibit 1036 or the statements contained therein purporting to tie the photographs to a specific member of a SRAM X-Sync chainring family.” *Id.* Patent Owner submits that “[t]o the extent this exhibit was used at Mr. Wesling’s deposition, he was unable to authenticate the photographs because of their poor quality and because he did not take the photographs in question.” *Id.* Petitioner responds that Mr. Wesling did authenticate the exhibits in his deposition. Pet. Opp. 4 (citing Ex. 1044, 12:22–13:11, 15:19–20:5, 23:4–24:10). Furthermore, Petitioner submits that the photographs in Exhibit 1035 are identical to those contained in Exhibit 1073, and authenticated in Exhibits 1069 and 1070. *Id.* at 4–5. In its Reply, Patent

Owner argues that Mr. Wesling did not authenticate the exhibits. PO Mot. Reply 2.

Documents are authenticated by evidence “sufficient to support a finding that the item is what the proponent claims it is.” Fed. R. Evid. 901(a). Authenticity is, therefore, not an especially high hurdle for a party to overcome. *See United States v. Patterson*, 277 F.3d 709, 713 (4th Cir. 2002); *see also United States v. Ceballos*, 789 F.3d 607, 617–18 (5th Cir. 2015) (noting “low” burden for authentication); *United States v. Isiwele*, 635 F.3d 196, 200 (5th Cir. 2011) (noting flaws in authentication go to weight not admissibility).

We have reviewed Mr. Wesling’s testimony. Although he was vague in his testimony regarding the photographs, we find his review of the actual chainrings and confirmation that the photographs resembled the actual chainrings to be more than sufficient to meet the low bar for authentication. Ex. 1044, 12:22–13:11, 15:19–20:5, 23:4–24:10. Patent Owner’s arguments go to the weight that should be given the evidence, not its admissibility.

2. *Exhibits 1037, 1039, 1047, 1048, 1058, and 1061*⁸

Exhibits 1037, 1039, 1047, 1048, 1058, and 1061 are printouts and videos from various non-governmental websites. Patent Owner moves to exclude these exhibits for lack of authentication under Federal Rule of Evidence 902. PO Mot. Exclude 5–6. Patent Owner also argues that these exhibits should be excluded as hearsay. *Id.* at 6. Petitioner argues that these web printouts are properly authenticated by the testimony of Ms. Arpita Bhattacharyya and the cross examination testimony of Mr. Ritzler. Pet.

⁸ Exhibit 1057 has been withdrawn. Pet. Opp. 1.

Opp. 5–6 (citing Ex. 1068 ¶¶ 3, 5, 9, 10, 16, 19; Ex. 1045-A, 59:12–21; Ex. 2076 ¶¶ 53, 56, 57). As for the hearsay objection, Petitioner asserts that Exhibits 1037 and 1058 include “Opposing Party Statements,” which are admissible under Rule 801(d)(2), and Petitioner contends that all of these exhibits are not relied upon for the truth of the matter asserted. *Id.* at 6–7. However, Petitioner submits that, to the extent it does rely on the truth of the matter asserted in the articles, they should be admitted under Federal Rule of Evidence 806, because they “undermine and are inconsistent with secondary considerations positions taken by [Patent Owner’s] witnesses and in its pleadings based upon articles from the same or similar magazines/sources.” *Id.* at 8. Petitioner also seeks to have them admitted under the residual hearsay exception of Federal Rule of Evidence 807, because the sources for these exhibits have been shown to be reliable. *Id.* at 9.

With respect to Exhibit 1039, Petitioner did not cite or rely on this exhibit in any of its papers, so we dismiss this portion of Patent Owner’s Motion to Exclude as moot. As for the remaining documents, although we considered them, we did not rely on them in reaching our decision. Thus, we dismiss this portion of the Motion as moot.

3. *Exhibits 1040 and 1041*⁹

Exhibits 1040 and 1041 are email chains between employees of Patent Owner and persons from other companies. *See* Exs. 1040, 1041. Patent Owner moves to exclude these exhibits as not authenticated, under Federal Rule of Evidence 901, as hearsay, under Federal Rule of Evidence 802, and as irrelevant, under Federal Rule of Evidence 402. PO Mot. Exclude 6–8.

⁹ Exhibit 1042 has been withdrawn. Pet. Opp. 1.

With respect to authentication, Petitioner argues that Mr. Ritzler authenticated these exhibits at his deposition, and that Ms. Bhattacharyya also authenticated these exhibits in her Declaration. Pet. Opp. 10. As for the hearsay objection, Petitioner argues that the statements are opposing party statements exempt from the hearsay rule under Federal Rule of Evidence 801(d)(2). *Id.* at 9. Petitioner argues that the exhibits are relevant to its nexus arguments. *Id.* at 9–10.

We have no reason to rely on these exhibits. Petitioner relies on these exhibits to show that Patent Owner has a policy of selling only complete drivetrain Eagle groupsets. Pet. Opp. 9. However, Mr. Ritzler, Patent Owner’s witness, confirmed at his deposition that Patent Owner’s policy is to require OEM customers to purchase complete drivetrain Eagle groupsets. Ex. 1045-A, 88:12–17. These exhibits are merely cumulative of Mr. Ritzler’s testimony. Thus, we dismiss this portion of Patent Owner’s Motion as moot. Patent Owner’s arguments about relevance go more to the weight that should be accorded the evidence, not its admissibility.

4. *Paragraphs 9–11 and 13–16 of Exhibit 1046*

Exhibit 1046 is the Declaration of Adam Marriott. *See* Ex. 1046. Mr. Marriott is a senior product manager at RFE Holding (Canada) Corp., which is the parent company of Petitioner. *Id.* ¶ 1. Paragraphs 9–11 and 13–16 offer Mr. Marriott’s opinions on whether he believes that the success of Patent Owner’s product is a result of the rear cassette, and not the chainring. *See id.* ¶¶ 9–11, 13–16. Patent Owner seeks to exclude these opinions for lack of personal knowledge under Federal Rule of Evidence 602, and also seeks to exclude certain other paragraphs under Federal Rules of Evidence 401, 402, 403, 701, 702, 801, 802, and 805. PO Mot. Exclude

8–10; PO Mot. Reply 4–5. Petitioner responds that Mr. Marriott made these statements based on his extensive experience in the field of mountain bikes, and his opinions should be admitted. Pet. Opp. 10–13.

We agree with Petitioner that Mr. Marriott has sufficient experience in the bicycle industry to offer these opinions on state of the industry and Patent Owner’s products. Patent Owner’s arguments go more to the weight we should give this testimony rather than its admissibility. Therefore, we deny Patent Owner’s Motion to Exclude Paragraphs 9–11 and 13–16 of Exhibit 1046 (Marriott Declaration).

5. *Paragraph 26 of Exhibit 1068*

Exhibit 1068 is the Declaration of Arpita Bhattacharyya, who is one of Petitioner’s attorneys in this proceeding. In Paragraph 26, Ms. Bhattacharyya testifies that she reviewed Exhibits 2005–2030 “in detail,” and that none of the articles in those exhibits mentioned certain claimed features. Ex. 1068 ¶ 26. Patent Owner argues that this testimony should be excluded because it is improper expert testimony. PO Mot. Exclude 11. Petitioner argues that this is merely fact testimony. Pet. Opp. 13–14.

Because we can review the articles “in detail” ourselves, there is no need for us to rely on this testimony. Accordingly, we dismiss this portion of Patent Owner’s Motion as *moot*.

6. *Exhibits 1069, 1070, and 1073*

Exhibit 1069 is the Declaration of Christopher B. McKinley (“McKinley Declaration”), one of Petitioner’s attorneys, and, in addition to certain testimony of Mr. McKinley authenticating certain pictures submitted, it also contains tables of pictures purporting to compare various features of

the Race Face chainring, SRAM X-Sync chainring, and the SRAM Eagle chainring. Ex. 1069. The table includes labeling that points out certain features of the various chainrings. *Id.* at 3–4. Exhibit 1073 consists solely of a table of pictures of various SRAM chainrings, labeled by part number, with close-up pictures of the teeth of the chainring with similar labels as the McKinley Declaration. *See* Ex. 1073, 1–6. Exhibit 1070 is the Declaration of Daniel F. Klodowski (“Klodowski Declaration”), one of Petitioner’s attorneys. Ex. 1070. The Klodowski Declaration purports to authenticate the pictures of Exhibit 1073, and asserts that they are representative of the twelve families of X-Sync chainrings. *Id.* ¶¶ 3, 4.

Patent Owner seeks to exclude this evidence as irrelevant under Federal Rules of Evidence 401 and 402. PO Mot. Exclude 11–12. Petitioner argues that the McKinley and Klodowski Declarations serve to authenticate the pictures of the various chainrings. Pet. Opp. 14–15. Petitioner also asserts that Exhibit 1069 is relevant to copying, because it shows ‘that Race Face’s chainring differs substantially from [Patent Owner]’s chainrings, i.e., that Race Face’s chainring does not include the ‘protruding tip portion,’ the ‘hooked rear flank,’ or the ‘asymmetric teeth’ of SRAM’s chainrings.” *Id.* at 15. As for Exhibit 1073, Petitioner argues that its relevant to its argument that Patent Owner is not entitled to a presumption of a nexus, because Petitioner contends that it “demonstrates that X-Sync chainrings are not coextensive with the claimed invention.” *Id.* Petitioner further argues that there has been no demonstration of prejudice. *Id.*

We agree with Petitioner that these exhibits cross the low bar of relevance. We agree that they are relevant to the issues of copying and nexus. Thus, we deny Patent Owner’s Motion to Exclude Exhibits 1069,

1070, and 1073. However, as we explain above, though admissible, these pictures, without any other substantive analysis or explanation for the labels or their significance, are entitled to very little weight.

IV. CONCLUSION

For the reasons given, based on the arguments and evidence of record, Petitioner has not met its burden to prove by a preponderance of the evidence that claims 7, 8, 11, 12, 20–22, 25, and 26 of the '027 patent are unpatentable under 35 U.S.C. § 103(a) over Thompson and JP-Shimano or that claims 9, 10, 23, and 24 are unpatentable under 35 U.S.C. § 103(a) over Thompson, JP-Shimano, and Hattan. *See* 35 U.S.C. § 316(e). We deny-in-part and dismiss-as-moot-in-part Petitioner's and Patent Owner's Motions to Exclude.

IV. ORDER

Accordingly, it is:

ORDERED that claims 7–12 and 20–26 of the '027 patent have *not been proven unpatentable*;

Petitioner's Motion to Exclude is *denied-in-part* and *dismissed-as-moot-in-part*;

Patent Owner's Motion to Exclude is *denied-in-part* and *dismissed-as-moot-in-part*; and

FURTHER ORDERED that, because this is a Final Written Decision, any party to the proceeding seeking judicial review of this Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FOX FACTORY, INC.,
Petitioner,

v.

SRAM, LLC,
Patent Owner.

Case IPR2017-00472
Patent 9,182,027 B2

Before MICHAEL W. KIM, FRANCES L. IPPOLITO, and
KEVIN W. CHERRY, *Administrative Patent Judges*.

CHERRY, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Fox Factory, Inc. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–6 and 13–19 of U.S. Patent No. 9,182,027 B2 (Ex. 1001, “the ’027 patent”). Paper 1 (“Petition” or “Pet.”). Pursuant to 35 U.S.C. § 314(a), we determined the Petition showed a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claims 1–6 and 13–19, and instituted an *inter partes* review of these claims on certain asserted grounds of unpatentability. Paper 10 (“Inst. Dec.”). Patent Owner SRAM, LLC (“SRAM” or “Patent Owner”) filed a Patent Owner Response. Paper 17 (“PO Resp.”). Petitioner filed a Reply to Patent Owner’s Response. Paper 37 (“Pet. Reply”). Pursuant to our authorization, Patent Owner also filed a Sur-Reply. Paper 43 (“Sur-Reply”).

Patent Owner filed Observations on Cross Examination. Paper 46 (“Obs.”). Petitioner filed a Response to Patent Owner’s Observations on Cross Examination. Paper 53 (“Response Obs.”). We have considered fully both the Observations and Response to Observations in reaching this Final Written Decision.

Petitioner also filed a Motion to Exclude certain evidence. Paper 50 (“Pet. Mot. Exclude”). Patent Owner filed an Opposition to Petitioner’s Motion to Exclude. Paper 56 (“PO Opp.”). Petitioner filed a Reply in support of its Motion to Exclude. Paper 58 (“Pet. Mot. Reply”). Patent Owner also filed a Motion to Exclude certain evidence. Paper 51 (“PO Mot. Exclude”). Petitioner filed an Opposition to Patent Owner’s Motion to Exclude. Paper 55 (“Pet. Opp.”). Patent Owner filed a Reply in support of its Motion to Exclude. Paper 57 (“PO Mot. Reply”). An oral hearing was held on January 12, 2018. Paper 63 (“Tr.”).

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine Petitioner *has not proven* by a preponderance of the evidence that claims 1–6 and 13–19 of the '027 patent are unpatentable. *See* 35 U.S.C. § 316(e).

I. BACKGROUND

A. RELATED PROCEEDINGS

Patent Owner has asserted infringement of the '027 patent in *SRAM, LLC v. Race Face Performance Products*, Case No. 1:15-cv-11362-JHL (N.D. Ill.). Paper 3, 2; Pet. 89.

The '027 patent is one of a number of related, issued patents and pending applications. *See* Paper 3, 2–3. The '027 patent is also at issue in the following post-grant proceedings: (1) *FOX Factory, Inc. v. SRAM, LLC*, Case IPR2016-01876 and (2) *FOX Factory, Inc. v. SRAM, LLC*, Case IPR2017-00118. Paper 3, 2. The '027 patent is currently undergoing *ex parte* reexamination proceedings under Reexamination Control No. 90/013,715, which was initiated on June 2, 2016. *Id.* We stayed this reexamination on April 3, 2017. *See* Paper 7.

B. THE '027 PATENT

The '027 patent relates generally to chainrings, and more particularly to a solitary chainring for use with a conventional chain in a bicycle drivetrain system that includes a bicycle crank. Ex. 1001, 1:5–7. Bicycles and other chain-driven vehicles typically employ one or more chainrings and set of rear hub-mounted sprockets connected by a chain. *Id.* at 1:8–10. According to the '027 patent, the management of chain and chainring engagement in bicycles is important, and various mechanisms are used to maintain the chain on the chainring and the sprockets, including chain

guards, chain tensioners, chain catchers, and derailleur configurations, among others. *Id.* at 1:10–13. The '027 patent explains that managing the connection between the chain and the chainring is particularly difficult in geared bicycles, which can experience severe changes in chain tension and energy motion of the chain, especially when riding over rough terrain. *Id.* at 1:14–20. Specifically, the '027 patent asserts that it is directed to a solution for the problem of chain management, especially for a bicycle that can successfully and reliably be ridden over challenging and rough terrain. *Id.* at 1:27–29.

Figure 3 of the '027 patent illustrates a drive chain and chainring, and is reproduced below:

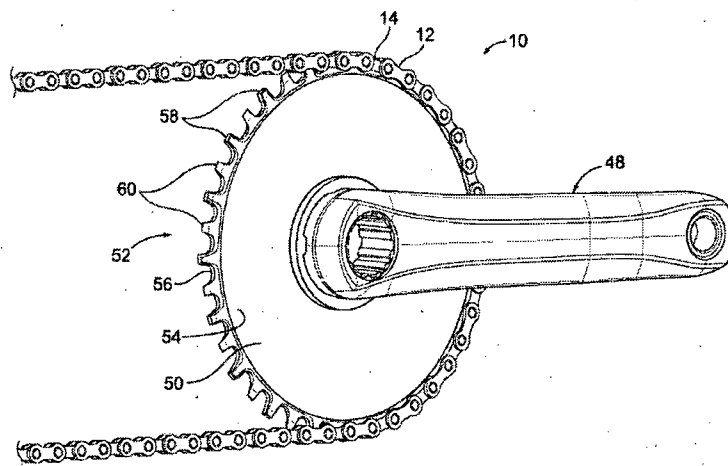


FIG. 3

Figure 3, reproduced above, is an isometric view of a combined drive chain and chainring, according to the purported invention engaged by a drivetrain. *Id.* at 2:21–22. Figure 3 shows chainring 50 and conventional chain 10. *Id.* at 3:44–45. Crank or crank arm 48 attaches to chainring 50. *Id.* at 3:47–49. Force applied to crank arm 48 (typically, in a downward direction) causes rotation of chainring 50 in like a like direction (clockwise). *Id.* at 3:55–57.

The rotation of chainring 50 causes chain 10 to be drawn over and advanced about chainring 50. *Id.* at 3:57–59.

As is illustrated in Figure 3, chainring 50 includes a plurality of teeth, including first group of teeth 58 and second group of teeth 60. *Id.* at 3:60–67. Drive chain 10 includes outer chain links 12 and inner chain links 14. *Id.* at 2:63–65. First group of teeth 58 is configured to be received by, and fitted into, the outer link spaces of drive chain 10, and second group of teeth 60 is configured to be received by, and fitted into, the inner link spaces. *Id.* at 3:66–4:3. Each tooth can have an optional tip portion that protrudes forwardly from a line drawn where rollers in the chain contact the tooth. *Id.* at 5:33–48. The '027 patent explains that this protruding tip portion “functions to engage a chain link earlier than a chain lacking the tip portion and provides better guiding of the chain.” *Id.* at 5:48–51.

C. ILLUSTRATIVE CLAIM

Claims 1 and 13, both apparatus claims, are the only independent claims of the '027 patent challenged in the Petition. Claims 2–6 each depend from claim 1. Claim 14–19 each depend from claim 13. Claim 1 is illustrative of the subject matter in this proceeding and is reproduced below.

1. A bicycle chainring for engagement with a drive chain, comprising:
a plurality of teeth formed about a periphery of the chainring,
the plurality of teeth including a first group of teeth and a second group of teeth,
each of the first group of teeth wider than each of the second group of teeth and at least some of the second group of teeth

arranged alternately and adjacently between the first group of teeth,

wherein each of the plurality of teeth includes a tooth tip;

wherein a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side; and

wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward the outboard side of the chainring.

Id. at 6:49–63.

D. INSTITUTED GROUNDS OF UNPATENTABILITY

We instituted an *inter partes* review of the '027 patent on the following grounds of unpatentability asserted in the Petition. Inst. Dec. 28.

Claims	Basis	References
1, 2, 5, 6, 13–15, 18, and 19	§ 103(a) ¹	US 5,285,701 to Parachinni (“Parachinni”) (Ex. 1027) and JP S56-42489 to Shimano (“JP-Shimano”) (Ex. 1006) ²
3, 4, 16, and 17	§ 103(a)	Parachinni, JP-Shimano, and US 3,375,022 to Hattan (“Hattan”) (Ex. 1004)
1, 2, 5, 6, 13–15, 18, and 19	§ 103(a)	Parachinni, JP-Shimano, and US 4,576,587 to Nagano (“Nagano”) (Ex. 1010)
3, 4, 16, and 17	§ 103(a)	Parachinni, JP-Shimano, Nagano, and Hattan

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29 (2011), revised 35 U.S.C. §§ 102–103, effective March 16, 2013. Because the '027 patent has an effective filing date before March 16, 2013, we refer to the pre-AIA versions of §§ 102 and 103

² Exhibit 1006 includes both the published Japanese Patent Application (pages 1–10) and an English translation (pages 11–18). We will refer exclusively to the English translation.

II. ANALYSIS

A. CLAIM CONSTRUCTION

We interpret claims in an unexpired patent using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[].” 37 C.F.R. § 42.100(b). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). “Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016).

Only those terms which are in controversy need be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

We determine that no terms require express construction for the purposes of this Final Written Decision.

B. LEVEL OF SKILL IN THE ART

Petitioner asserts that a person of ordinary skill in the art, at the time of the effective filing date of the ’027 patent, would have a skill level of “at least a bachelor’s degree in mechanical engineering and/or at least three to five years’ experience in the development and design of chain drive systems and components thereof.” Pet. 1 n.1 (citing Ex. 1026 ¶ 16). Patent Owner contends that a person of ordinary skill would have a bachelor’s degree in mechanical engineering and at least one year of design experience with chainrings or related technologies. PO Resp. 13 n.3 (citing Ex. 2074 ¶ 25). We find that any difference between these two definitions is insignificant to

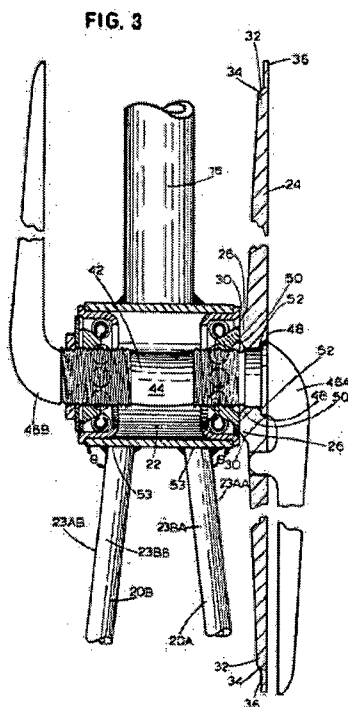
this analysis. On this record, however, we find Patent Owner’s definition of a person of ordinary skill in the art to be more persuasive given the well-developed, relatively simple nature of the art, and apply it for our analysis.

C. SCOPE AND CONTENT OF THE PRIOR ART

The instituted grounds allege that claims 1, 2, 5, 6, 13–15, 18, and 19 of the ’027 patent are unpatentable as obvious over the combinations of Parachinni and JP-Shimano and/or Parachinni, JP-Shimano, and Nagano; and claims 3, 4, 16, and 17 are unpatentable as obvious over the combinations of Parachinni, JP-Shimano, and Hattan and/or Parachinni, JP-Shimano, Nagano and Hattan. Pet. 16–89; Inst. Dec. 11–28.

1. *Parachinni (Ex. 1027)*

Parachinni, titled “Gearing Mechanism for High Speed Bicycles,” describes a bicycle with a single front “enlarged crank sprocket” (i.e., front chainring). Ex. 1027, at [54], Abstract. The large diameter front chainring provides a relatively high gear ratio for the bicycle, thereby increasing the bicycle’s potential speed. *Id.* at 1:10–18, 1:56–58. An exemplary embodiment of Parachinni’s chain sprocket is shown in a version of Figure 3 of Parachinni annotated by the Petitioner to highlight the chain sprocket, which is reproduced below.



Pet. 17.

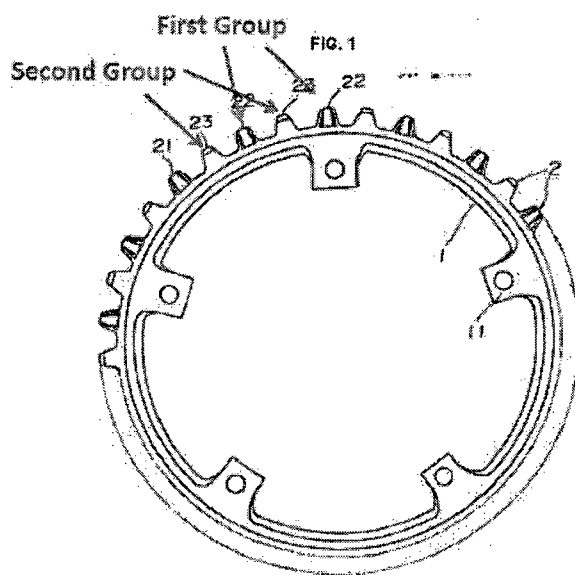
Figure 3, as annotated by Petitioner, shows a fragmented cross sectional view of Parachinni's device. Pet. 17. Petitioner has highlighted the crank sprocket in yellow. *Id.* Parachinni's crank sprocket includes extender portion 26, which extends the crank sprocket outwardly away from crank hub 22. Ex. 1027, 2:32–54. Crank sprocket 26 also includes integral stabilizer portion 32, which strengthens and stabilizes crank sprocket 26. *Id.* at 2:58–3:5. Both extender portion 26 and stabilizer portion 32 are integral and continuous parts of the “one piece” crank sprocket. *Id.* at 2:53–54, 2:58–59, 3:12–16. Parachinni's crank sprocket includes teeth 36 for engaging bicycle chain 38. *Id.* at 3:22–36.

2. *Hattan (Ex. 1004)*

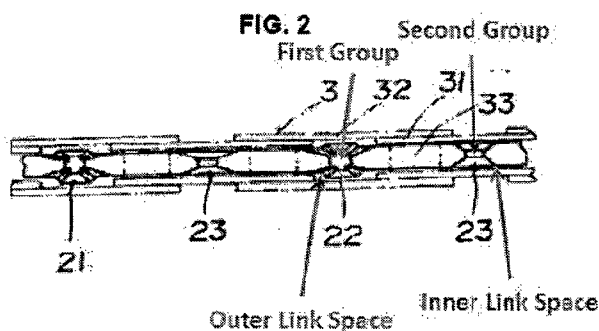
Hattan, titled “Drives for Bicycles,” relates to an improved pedal actuated drive for bicycles. Ex. 1004, 1:20–21. Hattan explains that a “major object” of its invention is to “provide improved and simplified means for preventing the chain from jumping off of the forward oblong sprocket wheel under any operating conditions.” *Id.* at 1:64–67. Hattan describes preferred tooth dimensions for use with a $\frac{3}{32}$ inch chain. *Id.* at 7:52–66. In particular, Hattan discloses that, for “a standard $\frac{3}{32}$ of an inch chain,” which corresponds to the spacing between the inner links of the chain (Ex. 1026 ¶ 84), it is “preferred” that the axial thickness of the sprocket teeth “be between about .070 inch and .090 inch, desirably about .080 inch.” Ex. 1004, 7:52–66. Based on Hattan’s description of its preferred thicknesses, the filled axial distance defined by the inner link spaces (i.e., “axial fill”) for an inner link space of $\frac{3}{32}$ (0.09375) inches would be between 74.6% (dividing 0.070 by 0.09375) and 96% (dividing 0.090 by 0.09375). Ex. 1026 ¶ 84.

3. *JP-Shimano (Ex. 1006)*

JP-Shimano is a Japanese Utility Model Application, titled “Chain Gear for a Bicycle,” and describes a chain gear for a bicycle designed to reduce chain drop. Ex. 1006, 15:49–60, 15:78–86. JP-Shimano discloses a chainring for a bicycle with alternating wide and narrow teeth. *Id.* at 15:55–60, 15:78–86, 15:108–115, Figs 1–2. JP-Shimano describes a chainring having “a plurality of teeth provided circumferentially on an outer periphery of the gear main body.” *Id.* at 15:64–67. Figure 1 of JP-Shimano, as annotated by the Petitioner, is reproduced below.



Pet. 61. Figure 1, as annotated by Petitioner, shows an embodiment of the chainring of JP-Shimano. *Id.* at 16:134–135. Figure 1 shows alternating wide and narrow teeth (teeth 22 and 23 respectively (labeled first group and second group by Petitioner)). *Id.* at 16:99–106. Figure 2 of JP-Shimano, as annotated by the Petitioner, is reproduced below.



Pet. 62. Figure 2, as annotated by Petitioner, shows teeth 22 and 23 engaging the bicycle chain. *Id.* JP-Shimano notes that wider teeth 22 may be wider than or equal to the space between inner link plates 31, and the thickness of wider teeth 22 is greater than narrower teeth 23, such that wider teeth 22 engage the chain between outer chain link plates 32. *Id.* at 16:99–115. JP-Shimano summarizes its device as:

The present device focuses on the fact that spaces between the outer link plates in the chain become wider than the spaces between the inner link plates, and . . . is configured to eliminate dropping of the chain from between the outer link plates, and also to enhance durability. The present device accomplishes this by setting one specific tooth as a standard, from among the plurality of teeth provided circumferentially on the outer periphery of the gear main body, and by forming the thickness of the even-numbered teeth smaller than the spaces between the outer link plates of the chain, but greater than other teeth that engage between the inner link plates, so that the teeth with the greater thickness engage between the outer link plates.

Ex. 1006, 15:78–86.

4. Nagano (Ex. 1010)

Nagano, titled “Front Chain Gear for a Bicycle,” relates to a chain gear for a bicycle and, more particularly, to a bicycle chain gear with a plurality of asymmetrical teeth about its periphery. Ex. 1010, 1:5–12, 3:4–9. Nagano explains that its teeth are chamfered in a direction extending along the thickness of gear body 1. *Id.* at 3:4–9. This is illustrated in Figure 2 of Nagano, which is reproduced below.

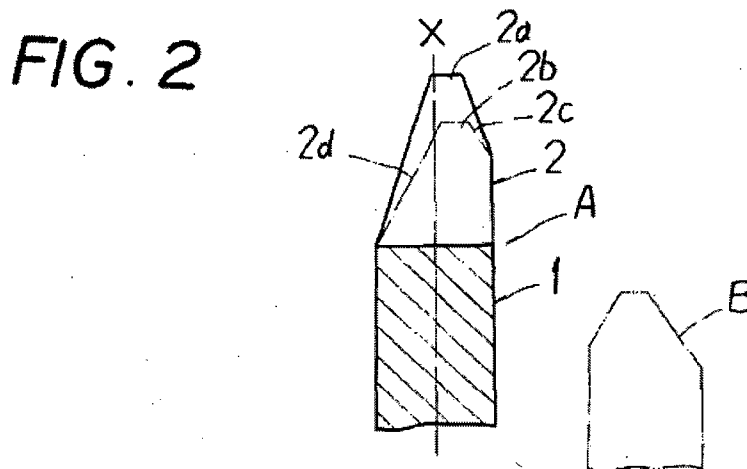


Figure 2 of Nagano is a partially enlarged sectional view of a tooth tip of the chain gear of Nagano. *Id.* at 2:60–61. Chamfered teeth 2 vary in length

between 2a and 2b and are chamfered to a lesser extent at one side 2c than on another side 2d, thereby making the teeth asymmetrical, i.e., the inboard and outboard sides of the teeth are not mirror images of each other. *Id.* at 3:27–39, 3:6–4:3.

D. DIFFERENCES BETWEEN THE PRIOR ART AND THE CLAIMED INVENTION

1. *Claims 1, 2, 5, 6, 13–15, 18, and 19*

With respect to independent claim 1, Petitioner contends that Parachinni discloses: (1) “[a] bicycle chainring for engagement with a drive chain,” Pet. 25 (citing Ex. 1027, 1:56–2:11, 3:22–36; Ex. 1026 ¶ 37); (2) “a plurality of teeth formed about a periphery of the chainring,” *id.* at 25–27 (citing Ex. 1027, 3:22–36, 2:38–67, Figs. 1–4; Ex. 1026 ¶¶ 38–40); (3) “each of the plurality of teeth includes a tooth tip,” *id.* at 30–31 (citing Ex. 1027, 3:22–36, Fig. 3; Ex. 1026 ¶ 44); and (4) “wherein a plane bisects the chainring into an outboard side and an inboard side opposite the outboard side,” *id.* at 31–34 (citing Ex. 1027, Fig. 4; Ex. 1026 ¶¶ 45–48). Petitioner submits that JP-Shimano accounts for (1) “the plurality of teeth including a first group of teeth and a second group of teeth,” *id.* at 27–28 (citing Ex. 1006, 15:55–60, 15:78–86, 16:99–117, Figs. 1, 2; Ex. 1026 ¶ 41); (2) “each of the first group of teeth being wider than each of the second group of teeth,” *id.* at 28–29 (citing Ex. 1006, 15:81–86, 16:99–117, Figs. 1, 2; Ex. 1026 ¶ 42); and (3) “at least some of the second group of teeth arranged alternately and adjacently between the first group of teeth,” *id.* at 29–30 (citing Ex. 1006, 16:99–117, Figs. 1–2; Ex. 1026 ¶ 43).

Petitioner further relies on the teachings of Parachinni, as modified in view of JP-Shimano, to account for “wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is

offset from the plane in a direction toward the outboard side of the chainring.”³ Pet. 34–35 (citing Ex. 1027, 1:56–2:11, 3:12–36, Figs. 3–4; Ex. 1026 ¶¶ 49, 50).

With respect to its contentions regarding Parachinni, JP-Shimano, and Nagano, Petitioner relies on its analysis for the ground Parachinni and JP-Shimano discussed above, and further contends that Nagano also provides additional disclosure of certain limitations. *See* Pet. 63–78. For example with respect to claim 1, Petitioner contends that Nagano provides additional disclosure of (1) “a plurality of teeth formed about a periphery of the chainring,” *id.* at 70 (citing Ex. 1010, Fig. 2; Ex. 1026 ¶¶ 117, 118); (2) “wherein each of the plurality of teeth includes a tooth tip,” *id.* at 70–71 (citing Ex. 1010, Fig. 2; Ex. 1026 ¶¶ 119, 120); and (3) “wherein at least the majority of the tooth tip of at least one of each of the first and second groups of teeth is offset from the plane in a direction toward the outboard side of the chainring,” *id.* at 71–73 (citing Ex. 1010, 3:34–39, Fig. 2; Ex. 1026 ¶¶ 121–125).

Petitioner further asserts that Parachinni and JP-Shimano and/or Parachinni, JP-Shimano, and Nagano account for the limitations of claims 2, 5, 6, 13–15, 18, and 19. Pet. 35–50, 73–78.

2. Motivation to Combine

To support its argument that a person of ordinary skill would have combined the teachings of Parachinni and JP-Shimano, Petitioner argues that a person of ordinary skill in the art “would have known that it is critical to

³ Patent Owner correctly notes that we erroneously stated in our Institution Decision (*see* Inst. Dec. 15) that Petitioner was relying on only Parachinni for this element. PO Resp. 46 n.5.

the operation of a bicycle for the bicycle chain to remain engaged with the bicycle chainring.” Pet. 22 (citing Ex. 1026 ¶ 34). Petitioner asserts that “*Parachinni* and *JP-Shimano* each teach this motivation for their respective apparatuses: preventing the chain from detaching from the chainring.” *Id.* at 22–23. Petitioner contends that it would have been obvious to a person of ordinary skill in the art to improve chain retention by combining known methods of doing so, such as employing both the offset-teeth chainring of *Parachinni* and the alternating narrow and wide teeth of *JP-Shimano*, in order to “improve chain retention to the maximum extent possible, particularly for a solitary front chainring such as in *Parachinni*” Pet. 23 (citing Ex. 1026 ¶ 35). Petitioner notes that “*Parachinni* recognizes that chain derailment is a problem faced by a large-diameter chainring.” *Id.* at 23 (citing Ex. 1027, 1:40–50, 4:19–29). Petitioner also submits that:

JP-Shimano recognizes that the “large gap” between narrow chainring teeth and the outer link plates can cause the chain to drop if a chain line is displaced, and solves this problem with its alternating narrow-wide tooth chainring that “is configured to eliminate dropping of the chain from between the outer link plates, and also to enhance durability.”

Id. (quoting Ex. 1006, 15–16, ll. 73–86, 122–130). Petitioner asserts that “[s]uch a combination would provide the chain retention benefits offered by both devices, and would not require modifying the structure of the *Parachinni* chainring beyond merely configuring its outboard-offset teeth to alternate between narrow and wide profiles.” *Id.* at 24 (citing Ex. 1026 ¶ 36). Petitioner contends that such a modification would merely be the combination of familiar elements according to known methods that do no more than yield predictable results. *Id.* (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007)).

Patent Owner argues that there is no rationale to modify Parachinni in view of JP-Shimano. PO Resp. 45–51. Patent Owner contends that Petitioner’s rationale is improper, because “*Parachinni* already has structure for solving the specific chain drop problem addressed by *JP-Shimano* (i.e., chain drop associated with a deflected chain) and there is no suggestion that *Parachinni* has any need to control the chain path further.” *Id.* at 46. Patent Owner further contends that Parachinni teaches away from any combination with an additional chain retention method, because “*Parachinni* states that its chainring is to be used without a front derailleur or chain guide, because at least ‘[t]he location of the plane of rotation of [Parachinni’s chainring] helps prevent chain sprocket chain derailment ***without the aid of a front derailleur chain guide.***” PO Resp. 47 (quoting Ex. 1027, 4:36–39).

Petitioner’s rationale for combining Parachinni and JP-Shimano is based on an assumption that chain retention techniques of Parachinni and JP-Shimano are additive, and would “improve chain retention to the maximum extent possible.” Pet. 23; *see also* Tr. 8:6–9; Ex. 2074 ¶¶ 53–55.

Dr. Sturges testifies that a person of ordinary skill in the art would have understood that JP-Shimano would not have improved chain retention and engagement in Parachinni, because both are directed to solving the same kind of problems that result in chain drop—namely, chain line displacement. Ex. 2074 ¶¶ 50–57. Thus, Patent Owner contends that there would have been no net benefit to combining the two references, and hence, no rationale to combine Parachinni and JP-Shimano. PO Resp. 49–50.

Petitioner responds by arguing that Parachinni does not completely prevent chain drop, even in circumstances due to chain-line displacement, and identifies various situations that Dr. Neptune contends where Parachinni

would not have solved chain drop. Pet. Reply 3; Ex. 1051 ¶¶ 10–13.

Petitioner argues that JP-Shimano would have helped prevent chain drop caused by chain line displacement in situations when the chain approaches the chainring from the rear gears at an angle. Ex. 1051 ¶¶ 10–13; Ex. 1006, 15:73–75. Petitioner also asserts that JP-Shimano is not limited to solving only chain drop caused by chain line displacement, but also solves chain drop caused by worn or broken teeth. Pet. Reply 4–5. Petitioner now further contends that a person of ordinary skill would have been motivated to combine Parachinni and JP-Shimano to improve durability, which in turn would reduce chain drop. *Id.* (citing Ex. 1051 ¶ 17).

We find that Petitioner has shown a sufficient rationale to combine the teachings of the references. Petitioner has offered evidence that Parachinni would have been improved by adding the wide-narrow teeth of JP-Shimano in certain situations when the chain approaches the chainring from the rear gears at an angle. Ex. 1051 ¶¶ 10–13; Ex. 1006, 15:73–75. We find this evidence persuasive and give it significant weight.

We do not agree with Patent Owner that Parachinni teaches away from the combination. A reference teaches away from a claimed invention if it “criticize[s], discredit[s], or otherwise discourage[s]” modifying the reference to arrive at the claimed invention. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). There is nothing in Parachinni’s statement that its invention “helps prevent chain sprocket derailment without the aid of a front derailleur chain guide” that suggests that the alleged invention could not be used with a front derailleur chain guide let alone other methods to reduce chain drop. At best, the statement appears to recognize a potential benefit of

the alleged invention, not an admonition forbidding its use with other techniques. *See* Ex. 1051 ¶ 13.

We do give some weight to Patent Owner’s evidence that Parachinni and JP-Shimano do largely overlap in their solutions, and that the benefits of the combination would be less than the sum of its parts. Ex. 2074 ¶¶ 50–51. We do find that even though Patent Owner’s arguments do not amount to a teaching away, they do slightly weaken the factual basis of Petitioner’s combination. *See Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (“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.”).

As for Petitioner’s new contention that a person of ordinary skill would have combined Parachinni and JP-Shimano to improve the durability of teeth in Parachinni, we do not find this reason to be as persuasive or entitled to as much weight as Petitioner’s evidence that JP-Shimano would have improved Parachinni in situations where the chain approached at an angle discussed above. We decline to give any weight to the durability theory, because we find that it is a new theory raised for the first time on reply. Ex. 2129, 96:16–97:5 (Dr. Neptune admitting the theory was not in his original testimony). A reply is not the place to raise an almost entirely new motivation to combine. *See* 37 C.F.R. § 42.23(b).

Given Patent Owner’s evidence of the limited benefit, we decrease the weight of Petitioner’s evidence of a rationale to combine the teachings slightly. But overall, we find that Petitioner has shown an adequate rationale to modify Parachinni in view of JP-Shimano.

E. OBJECTIVE INDICIA OF NON-OBVIOUSNESS

Notwithstanding what the teachings of the prior art would have suggested to one skilled in the art, objective evidence of non-obviousness (so called “secondary considerations”) may lead to a conclusion that the challenged claims would not have been obvious. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). Objective evidence of non-obviousness “may often be the most probative and cogent evidence in the record” and “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). Patent Owner puts forth evidence of commercial success, licensing, copying, praise by others, long-felt, unresolved need, and failure by others. We agree with Patent Owner that its proffered evidence, with respect to the objective indicia of non-obviousness, weigh significantly in favor non-obviousness, as explained below.

1. Nexus

To be relevant, evidence of non-obviousness must be commensurate in scope with the claimed invention. *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Thus, to be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining non-obviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). There is a “presumption of a nexus” when a product is “coextensive” with a patent

claim. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1372 (Fed. Cir. 2013). The Federal Circuit has held that “if the marketed product embodies the claimed features, and is coextensive with them, then a nexus is presumed and the burden shifts to the party asserting obviousness to present evidence to rebut the presumed nexus.” *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000).

Patent Owner presents evidence that one of the thirteen families of X-Sync chainrings are covered by the challenged claims, and the remaining twelve families are covered by the remaining claims of the '027 patent. *See* PO Resp. 18 n.4. In particular, Patent Owner presents the testimony of its expert, supported by detailed claim charts, and the testimony of Mr. Ron Ritzler and Mr. Kevin Wesling, that “each element of the claims of the '027 patent is practiced by each of these thirteen (13) different versions of X-Sync chainrings.” *See* Ex. 2074 ¶ 61; *see also id.* ¶ 62 (testimony of Dr. Sturges that all other sized chainrings in each family of the tested versions practice all the challenged claims); Ex. 2078–2089 (claim charts for claims 7–12 and 20–26); Ex. 2119 (claim chart for claims 1–6 and 13–19) Ex. 2076 ¶ 11 (explaining the families of products Patent Owner sells); Ex. 2118 ¶ 10 (explaining the families of products Patent Owner sells). As such, Patent Owner argues that it is entitled to a presumption of a nexus.

Petitioner does not dispute Patent Owner’s mapping of the various claims of the '027 patent X-Sync chainrings are covered by the challenged claims. *See* Tr. 61:17–20 (“Your Honor, we don’t dispute that it’s covered by the patent, we dispute whether it’s coextensive.”). Petitioner raises several arguments, including that most of the families of the X-Sync

chainring are not covered by the challenged claims, and Patent Owner's evidence is not coextensive with the claimed invention.

Petitioner asserts that twelve of the thirteen families are not covered by claims 1–6 and 13–19, and relate to inboard-offset tooth chainrings, not at issue in this proceeding, so no nexus can exist between the claims 1–6 and 13–19 for those products. Pet. Reply 12–13. Petitioner argues that Patent Owner attempts to “paper over that deficiency by pointing to the same inboard-offset secondary considerations evidence it presented in IPR2016-01876 and IPR2017-00118.” *Id.* at 13. Petitioner argues that Patent Owner

separately claimed inboard- and outboard-offset chainrings, and [Patent Owner] has the burden to present evidence of secondary considerations related to its outboard-offset chainrings *and* to prove nexus between the evidence and the challenged claims. [Patent Owner] has not even attempted to meet those burdens, and that should be the end of the inquiry.

Id.

We disagree with Petitioner that the same evidence necessarily cannot support the patentability of both the inboard-offset and outboard-offset claims of the '027 patent. Patent Owner has presented evidence, the Declaration of Kevin Wesling, that although the bicycling industry has shown a preference for inboard offset chainrings, that the “asymmetric offsets work the same, regardless of which side the asymmetric offsets are on, the only difference being to which side the chain will be guided.” Ex. 2118 ¶ 16. Mr. Wesling further testifies that “[t]he preference [for inboard-offset chainrings] is a function of the current construction of bicycles and their drivetrains.” *Id.* Petitioner does not point us to any contrary evidence. Based on this testimony from Mr. Wesling, we agree with Patent Owner that evidence related to X-Sync chainrings can be

attributed to both the inboard-offset and outboard-offset embodiments of the '027 patent. Patent Owner has shown that all thirteen families of the X-Sync chainring practice either the inboard-offset or outboard offset-claims. *See* Ex. 2074 ¶ 61; *see also id.* ¶ 62 (testimony of Dr. Sturges that all other sized chainrings in each family of the tested versions practice all the challenged claims); Ex. 2078–2089 (claim charts for claims 7–12 and 20–26); Ex. 2119 (claim chart for claims challenged in this proceeding) Ex. 2076 ¶ 11 (explaining the families of products Patent Owner sells); Ex. 2118 ¶ 10 (explaining the families of products Patent Owner sells). We find that the evidence supports a finding that the effects and attributes that the evidence directed to the X-Sync generally are praising are common to both embodiments and work in the same way. For example, we agree with Patent Owner that the evidence of industry praise, skepticism, and long-felt need is directed to all the families of the X-Sync chainring regardless of the offset direction. Thus, we find that Patent Owner has shown that the X-Sync chainring generally embodies the alleged inventions of claims 1–6 and 13–19.

However, we agree with Petitioner that to the extent that Petitioner has shown that the evidence is specifically directed to the inboard-offset products, such as, for example, product sales and copying, that information does not meet every limitation of claims 1–6 and 13–19, and, thus, is not entitled to a presumption of nexus. Stated differently, we find that Patent Owner has failed to show much, if any, nexus between claims 1–6 and 13–19 and evidence of commercial success of only the inboard-offset products or copying of only the inboard-offset products. Thus, for that evidence

directed specifically towards the inboard offset chainring, we find that such evidence is entitled to no weight.

Petitioner further argues that, even assuming the products are covered by claims 1–6 and 13–19, Patent Owner failed to demonstrate that the products are coextensive. In particular, Petitioner argues that the evidence is not coextensive with the claimed invention because the X-Sync chainring includes unclaimed features, and “the majority of [Patent Owner’s] X-Sync chainrings are marketed and sold as mere *components* of cranksets and drivetrain group sets.” Pet. Reply 17. As an initial matter, Petitioner argues that “[n]one of the X-Sync chainrings is coextensive with the claimed invention because all X-Sync chainrings include ‘hundreds of features’ . . . not claimed in the ’027 patent, many of which are instead claimed by other SRAM patents.” *Id.* at 18. This argument misrepresents the law on two points. First, Petitioner is incorrect that the existence of unclaimed features in the commercial product prevents a Patent Owner from being able to claim a presumption of a nexus. Instead, the law provides that a Patent Owner is entitled to a presumption of a nexus if it shows that “the asserted objective evidence is tied to a specific product and that product ‘is the invention disclosed and claimed in the patent.’” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016). The Federal Circuit has explained that “[t]his is true even when the product has additional unclaimed features.” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016).

Unclaimed features do not prevent the presumption of a nexus, but they may be the basis for rebutting the presumption. *Id.* To do so, a person challenging patent validity must show that the commercial success, or other

objective evidence of non-obviousness, was due to “extraneous factors” including “additional unclaimed features.” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018). Merely pointing out unclaimed features in the X-Sync chainring is not enough. *Id.* (“However, a patent challenger cannot successfully rebut the presumption with argument alone—it must present evidence.”).

Second, Petitioner is incorrect that the existence of other patents necessarily obviates the presumption of a nexus. In this regard, Petitioner relies on *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1289, 1299 (Fed. Cir. 2010), for the proposition that “a product that embodies more than one patent is not coextensive with any of them.” Pet. Reply 21. Petitioner has only identified two patents, both in the same family of continuations as the ’027 patent.⁴ *Id.* (identifying U.S. Patent Nos. 9,291,250 and 9,493,211, both of which are continuations of the ’027 patent). We do not agree that *Therasense* stands for so broad a proposition that the existence of continuations in the same patent family obviates a presumption of a nexus. Indeed, *Therasense* involves the far more conventional situation that a nexus may not exist when the merits of the claimed invention were “readily available in the prior art.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). In *Therasense*, the court found that the product was covered by both the claims of a prior art patent (U.S. Patent 4,545,382) and the asserted patent (U.S. Patent 5,820,551). *See Therasense*, 593 F.3d at 1299. The patents related to the ’027 patent have not been shown to be prior

⁴ Petitioner contends that there are other patents that cover Patent Owner’s commercial product (Pet. Reply 21), but does not identify them. Petitioner’s allegations of other patents are too insubstantial to be entitled to any weight.

art to the '027 patent, and so they do not fall into this situation. We decline to extend the language in *Therasense* so far from the conventional situation of prior art patents that it was contemplating, to include patents that have not been shown to be prior art to the claimed invention.

Having reviewed Patent Owner's evidence, we agree with Patent Owner that it has shown that it is entitled to a presumption of a nexus between the evidence secondary considerations tied to the X-Sync chainring and the invention recited in the challenged claims. In particular, we find that Patent Owner has shown that the various X-Sync chainrings are covered by the challenged claims and are coextensive with them. *See* Ex. 2074 ¶¶ 61, 62 (testimony of Dr. Sturges that the products practice the claims); Ex. 2078–2089, 2119 (claim charts); Ex. 2076 ¶ 11 (explaining the families of products Patent Owner sells); Ex. 2118 ¶ 10 (explaining the families of products Patent Owner sells). Here, the claims are directed to chainrings, as well as cranksets and drivetrains that include chainrings. Thus, there is a presumption of a nexus between the evidence of secondary considerations tied to the X-Sync chainring, as well as to cranksets and drivetrains that include the X-Sync chainring, and the challenged claims that recite those bicycle components. *See Polaris Indus.*, 882 F.3d at 1073 (“[The challenged claims] broadly cover the *entire* vehicle, rather than ‘only a component of a commercially successful machine.’ . . . 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 [the claims].” (citation omitted)).

Petitioner tries to rebut this presumption of a nexus by attempting to shift the burden of proof to Patent Owner to prove the objective indicia is

tied to certain claimed features rather than unclaimed features present in the commercial embodiments. Pet. Reply 24–25. We agree with Patent Owner that this argument improperly attempts to shift the burden to Patent Owner. Sur-Reply 8–9. Here, because Patent Owner has shown that it is entitled to a presumption of a nexus between the X-Sync chainring and the challenged claims, the burden is on Petitioner to rebut that nexus. *Demaco*, 851 F.2d at 1392.

With respect to the improved chain retention of the X-Sync chainring, Petitioner argues that there are numerous unclaimed features, many of which are touted in advertising materials, but Petitioner asserts that none of the claimed features are touted. Pet. Reply 31–32. Petitioner argues that “[i]n light of the unclaimed features touted by [Patent Owner] and the press, and in the absence of any touting/recognition for the combination,” Patent Owner cannot establish a nexus between the claimed invention and the objective indicia. *Id.* at 32 (citing *Ethicon Endo Surgery, Inc. v. Covidien LP*, 812 F.3d 1023, 1035 (Fed. Cir. 2016)). Although Petitioner points to some evidence touting other features, *see id.* at 31 (citing Exs. 1038, 1054, 1055), 40–41 (citing Exs. 2005, 2008, 2027), we find that this evidence is insufficient to overcome the presumption of a nexus that Patent Owner has established. Moreover, much of the evidence is clearly broader than Petitioner acknowledges. In addition to pointing out unclaimed features, there is also praise pointing generally to the “unique tooth profile,” Ex. 2006, “tooth profile,” Ex. 2008, Patent Owner’s “adaptation of the narrow-wide chainring tooth profile,” Ex. 2019, and the “cleverly profiled chainring,” Ex. 2023.

We find that the evidence shows that, in addition to touting specific features, the praise is also broadly directed to the X-Sync chainring's entire implementation of the narrow/wide tooth concept, including the claimed features. Weighing the evidence together, we find that Petitioner has failed to carry its burden of rebutting the presumption of a nexus. At best, Petitioner has offered conjecture that these unclaimed features could play a role in improved chain retention, but we find that this is insufficient to rebut the presumption of a nexus. *See Polaris*, 882 F.3d at 1072 (explaining that to rebut presumption of nexus the patent challenger must “present[] evidence to show that the [objective evidence] was due to extraneous factors other than the invention”).⁵

Petitioner also argues Patent Owner sells X-Sync chainrings in at least three different ways—(1) individual chainrings; (2) cranksets including the X-Sync chainring along with two crank arms and an axle; and (3) nine different 1X⁶ drivetrain group sets that include a number of components including the X-Sync chainring. Pet. Reply 22. Petitioner asserts that the majority of sales data provided by Patent Owner is for cranksets, not individual chainrings. *Id.* at 23–24. Petitioner contends that Patent Owner

⁵ This case is distinguishable from *Ethicon Endo* where the evidence demonstrated that the success was “primarily attributable to a single feature present in the prior art, varying staple size, rather than the combination of prior art features.” *Ethicon Endo*, 812 F.3d at 1034. We find that no such evidence attributing the success or improved chain retention primarily to one or more features found in the prior art is present here.

⁶ “1X” is a term used to identify mountain bike drivetrains that use a single-chainring. *See* Ex. 1046 ¶¶ 8–14 (explaining mountain bike drivetrain market). For example, 1X11 would be a drivetrain with a front single chainring and a back 11 speed gear cassette. *Id.*

has not shown that the claimed chainring is coextensive with the commercially sold cranksets and drivetrains, and, thus, concludes that there is no presumption of a nexus. *Id.* at 24. We agree with Petitioner that, to the extent that the sales of the X-Sync chainring were sales of cranksets and drivetrains, they are not coextensive with some of the claims. However, as Patent Owner correctly points out, these sales of commercial products are coextensive with claims 5 and 18, which recite a bicycle crankset including a chainring, or claims 6 and 19, which recite a bicycle drivetrain including a chainring. Sur-Reply 7. Thus, while we agree with Petitioner that, to the extent that Patent Owner presents sales information for cranksets or drivetrain group sets alone, that sales information is not coextensive with claims 1–4 and 13–17, which are directed only to chainrings, the same is not true for claims 5, 6, 18, and 19. *Demaco*, 851 F.2d at 1392 (“When 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.”).

As we discuss below, the same conclusion applies to evidence that only praises Patent Owner’s drivetrains, and does not focus on, or mention, the benefits of the X-Sync chainring. That broader evidence would also not have a nexus to claims 1–4 and 13–17. *Demaco*, 851 F.2d at 1392. However, as we stated above, Patent Owner’s expert has shown that cranksets incorporating the X-Sync chainring include the features recited in claims 5 and 18, and drivetrains incorporating an X-Sync chainring are covered by claims 6 and 19. *See, e.g.*, Ex. 2119, 4–5 (claims 5 and 6 for

SRAM's 018.011 X-Sync chainring), 8–9 (claims 18 and 19 for same chainring). Because those claims are coextensive with cranksets and drivetrains, respectively, we find that those claims are still entitled to a presumption of a nexus for evidence of secondary considerations tied to cranksets and drivetrains that include the X-Sync chainring, respectively.

Finally, Petitioner argues that Patent Owner's wide-range rear cassettes are what drove the demand for and success of Patent Owner's drivetrains, not the X-Sync chainring. Pet. Reply 26–31. There is no dispute that the improved gearing of Patent Owner's rear cassette enabled more riders to use single chainring drivetrains. *Id.* at 26–28 (citing Ex. 1046 ¶¶ 8–13; Ex. 1045-A, 48:24–49:17; Ex. 1061, 2). However, Patent Owner has presented extensive testimony that, whatever the advantages of the rear cassette, it was the development of the X-Sync chainring that made it possible. Sur-Reply 10. As Mr. Ritzler explained at his deposition:

Q. . . . To what do you attribute the success of X-SYNC chainring sales?

A. I attribute the success of chainring sales directly to their ability to hold the chain on without a chain guide or chain management system. Before X-SYNC bicycles featured additional devices to control chain management. They featured guides and guards and rollers. All these things were complex. All of them added elements of friction or lower performance, and when we designed X-SYNC, we designed the guiding and guarding into the chainring, which prevents the chain from falling off and makes the one-by drivetrain possible. When you look at the initial success of X-SYNC chainrings, we were blown away, we were surprised, we were – I'd say critical of the potential ourselves internally, and then we started to experience a performance externally through test driving, through validation with athletes, through the media feedback. We were amazed with the potential that that product technology had to offer. Since we released product it's obviously appealed to a wide number of

both our customers as well as competitors as it's been copied many, many times over.

* * *

Q. Do you attribute the success of the X-SYNC chainrings to the sales of assets or rear derailleurs associated with those chainrings?

A. I think that the success of the chainrings is largely independent of the success of the cassettes and the other components. We sell X-SYNC chainrings above and beyond or one-by drivetrains for mountain. You see one-by drivetrains made by many consumers at home featuring chainrings that copy our design. I think it all comes down to the fact that the chainring offers up the possibility, the real estate and the potential to make a one-by drivetrain that does not lose its chain.

Ex. 1045-A, 103:3–104:21; *see also* Ex. 1045-A, 104:22–106:12 (providing further explanation). We have reviewed Mr. Ritzler's testimony and find it well-reasoned, and supported by extensive evidence of praise that the X-Sync chainring has received. Thus, we give it substantial weight.

Petitioner's evidence to the contrary is not persuasive. For example, Petitioner cites Exhibit 2009, which is cited by Petitioner for its praise of the rear cassette, but also includes extensive praise of the X-Sync chainring, and mentions that it reduces friction in the system, which is consistent with Mr. Ritzler's testimony. Ex. 2009, 2. Exhibit 2015, which is also cited by Petitioner for this point, praises the X-Sync chainring, and notes that one of the challenges of moving to a single ring setup is that you "[l]ose that front derailleur and you start losing the chain more often," and that this is why "just about everyone who runs a single ring also runs some sort of guide." Ex. 2015, 3. Exhibit 2015 concludes by noting that Patent Owner was also introducing "a special chainring that retains chains all by its lonesome" with "some oddly-shaped teeth on that chainring," and that "being able to run a

single-ring setup without the added friction and weight of a chain guide . . . it'd be a significant improvement.” *Id.* Thus, again, we find this evidence consistent with, and corroborative of, Mr. Ritzler’s testimony. Moreover, given the corroboration of Mr. Ritzler’s testimony and his detailed explanation, we give it more weight than the testimony of Petitioner’s witness, Mr. Adam Marriott, to the contrary.

Petitioner attempts to rebut Mr. Ritzler’s testimony by contending that Patent Owner’s “Type 2 rear derailleur with Roller Bearing Clutch technology (known as ‘X-Horizon’ and included in the XX1 group set) already minimized chain disengagement.” Pet. Reply 29 (citing Ex. 1044, 75:12–77:9). However, the fact that the rear derailleur might help the system perform better does not outweigh the extensive evidence that the X-Sync chainring is an essential part of chain retention in Patent Owner’s 1X drivetrain systems. Indeed, the evidence suggests that clutch derailleurs and larger cassettes had existed for many years, Ex. 1044, 76:6–17, Ex. 1045-A, 104:22–106:12, but, as Petitioner’s evidence notes, 1X drivetrain systems were not readily available before Patent Owner’s introduction of the XX1 drivetrain incorporating the X-Sync chainring, Ex. 1037, 1 (“In fact, the question most riders will ask after riding [Patent Owner’s] XX1 [drivetrain] will be, ‘Why has it taken so long for the industry to figure this out?’”). The importance of the X-Sync chainring is also not inconsistent with Patent Owner’s efforts to market and sell the chainring as part of a drivetrain system, which merely may suggest an effort to maximize profits. Indeed, it may be rational given Patent Owner’s presented evidence that competitors were not copying its derailleur, but instead they are copying its chainring.

See Ex. 1045-A, 114:7–115:15; Ex. 2074 ¶¶ 73–77; Ex. 2076 ¶¶ 40–49; Ex. 2077.

Petitioner also argues that the X-Sync chainring did not entirely eliminate the need for a chain guide, as evidenced by Patent Owner’s own statements and advertisements in Exhibit 2007 and Exhibit 1062. Pet. Reply 29–30. But the ’027 patent only seeks to provide a bicycle that “can successfully and reliably be ridden over rough and challenging terrain,” Ex. 1001, 1:28–31, not to eliminate chain drop for all riders under all circumstances. Petitioner’s cited evidence is not inconsistent with this objective and solution. Exhibit 2007 merely leaves it to the rider to determine whether they are comfortable without a chain guide. Ex. 2007, 2. Exhibit 1062 is a profile of a professional mountain bike racer whose bike is pictured with a chain guide. Ex. 1062, 1. Exhibit 1062 provides no explanation about the chain guide. *See id.* This evidence is entirely consistent with other evidence that aggressive riders may still require additional chain management, even with the X-Sync chainring. Ex. 2019, 3; Ex. 1045-A, 117:2–11.

Thus, considering the evidence in the record as a whole, we find that Petitioner has not rebutted Patent Owner’s presumption of a nexus with respect to evidence of secondary considerations tied to the X-Sync chainring for all of the challenged claims, and to evidence of secondary considerations tied to a crankset or drivetrain group set including for the X-Sync chainring for claims 5, 6, 18, and 19.

2. *Commercial Success*

Patent Owner has presented extensive evidence that its X-Sync chainrings have achieved significant sales volumes, have achieved large

sales growth, have grown to a majority of their chainring sales, and have allowed them to grow from a small share to a significant share of the single chainring market. PO Resp. 17–25.

Petitioner argues that Patent Owner’s data fails to show commercial success, because it only shows that the X-Sync chainring sales “cannibalized” its other multi-chainring sales. Pet. Reply 32. Petitioner asserts that Patent Owner’s sales of X-Sync chainrings have not increased its market share of the mountain bike chainring market, but instead its market share has been falling since 2013. *Id.* at 33. Petitioner contends that “[i]n the absence of growth in [Patent Owner]’s mountain bike chainring market since the introduction of the X-Sync, [Patent Owner]’s purported evidence of commercial success for the inboard-offset chainrings does not require a holding that the challenged outboard-offset claims are nonobvious.” *Id.*

We have reviewed Patent Owner’s evidence of sales and market share, and find that it demonstrates substantial commercial success within the single chainring market for the inboard-offset chainrings. Ex. 2076 ¶¶ 16–29. In particular, we find the large growth in market share and sales volume, and resulting large market share in the single chainring market, to be indicative of commercial success. *Id.* ¶¶ 20–29. We do not agree with Petitioner’s argument that Patent Owner’s growth in the single-chainring market was primarily due to cannibalization of its multi-chainring market share, and that Patent Owner’s lack of achieved growth in the overall chainring market (single- and multi-) indicates that there was no commercial success. As Patent Owner notes, cannibalization does not preclude commercial success. *See Medtronic, Inc. v. Daig Corp.*, 789 F.2d 903, 907 (Fed. Cir. 1986). Moreover, Patent Owner presented evidence that it has

achieved this large market share, in the single-chainring market, while charging between two and eight times the prices of its competitors in the single chainring market. Ex. 2076 ¶ 13 (stating that Patent Owner's X-Sync chainrings are sold for more than \$90, which is at least twice as expensive as the Race Face chainrings, and in some cases eight times more expensive). Patent Owner also noted that this large market share does not include the sales of its competitors who are licensees. *Id.* ¶¶ 26–29; *see also* Tr. 16:12–15 (agreeing that Patent Owner's drivetrain as a whole was a commercial success).

However, two things significantly diminishes and eliminates the weight we give this evidence. As Patent Owner admitted, its sales of the outboard-offset chainrings are minimal relative to the inboard-offset products. Ex. 2076 ¶ 11; PO Resp. 19. Thus, this evidence is directed primarily at the inboard- offset products. Moreover, as we noted above, Petitioner points to evidence that the sales information presented is primarily directed to sales of X-Sync chainrings as parts of cranksets and drivetrain group sets. *See* Pet. Reply 21–24. We found above that, for data related to cranksets and group sets, Patent Owner has only established a nexus for claims 5, 6, 18, and 19.

Thus, we find that, at best, this commercial success information is only applicable to claims 5, 6, 18, and 19, and even there, the commercial success information is primarily directed to inboard-offset products only. Accordingly, we find that the commercial success of the inboard-offset X-Sync chainrings is entitled, at best, to very little to no weight in favor of non-obviousness of claims 5, 6, 18, and 19.

3. *Industry Praise and Skepticism*

a. *Industry Praise*

Praise from industry participants, especially competitors, is probative as to obviousness because such participants “are not likely to praise an obvious advance over the known art. Thus, if there is evidence of industry praise of the claimed invention in the record, it weighs in favor of the non-obviousness of the claimed invention.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc).

Patent Owner presents extensive evidence of industry praise and awards that its X-Sync chainring products have received. PO Resp. 25–36; Sur-Reply 5–6; Exs. 2076 ¶¶ 52–67; 2074 ¶¶ 65–69; 2006, 2–3 (praising teeth design as “mechanical duct tape”); 2007, 4 (noting lack of chain drop and suggesting that bike can be trail ridden without a chain guide); 2008, 2 (noting lack of chain retention issues, discussing tooth shape); 2009, 2 (praising chainring); 2010, 1 (noting lack of chain drop); 2011, 1 (praising chainring); 2012, 2 (praising teeth design), 4 (noting chain retention); 2013, 2 (noting chain retention of X-Sync chainring); 2014, 5 (praising X-Sync chainring as “unique” and noting it removes the need for a chain guide); 2015, 3 (praising X-Sync chainring for potentially removing the need for a chain guide); 2016, 1 (noting X-Sync narrow and wide teeth the “was in part the catalyst” for the change to 1X transmissions); 2017, 4 (praising X-Sync chainring and noting “complicated design” of narrow-wide teeth); 2019, 3–4 (“Innovation of the Year Award” for “SRAM X-Sync Narrow-Wide Chainring”); 2023 (noting no need for a chain guide).

Petitioner argues that none of the articles cited mentions the “offset” feature or the combination of the narrow wide teeth and offset features. Pet.

Reply 40. Instead, Petitioner argues that the praise is focused either on the 1X mountain bike drive train alone, or even when it mentions the X-Sync chainring, it does so only in the context of the entire drive train. *Id.*

Petitioner also argues that the articles praise unclaimed features such as the “tall,” “hooked,” and “asymmetric” teeth. *Id.* at 40–41. Finally, Petitioner asserts that some of the articles only praise the narrow/wide teeth, which are found in the prior art. *Id.* at 41.

We disagree with Petitioner that Patent Owner has failed to establish a nexus between the praise and the claimed inventions. Instead, as we discussed in detail above, we find that Patent Owner has established a strong presumption of a nexus between the claims and the evidence of secondary considerations tied to the X-Sync chainring. *See supra* II.E.1. As we discussed above, Patent Owner has shown that the X-Sync chainring embodies the claimed invention and is coextensive with it. Moreover, Petitioner fails to direct us to where the industry praise is directed only to the inboard-offset feature. Indeed, our review of these articles indicates that the praise is focused on the X-Sync chainring generally. Therefore, Patent Owner is entitled to a presumption of a nexus between the challenged claims and the X-Sync chainring. To the extent that the articles praise the entire drivetrain, we found above, in our discussion of commercial success that claims 6 and 19 recite a drivetrain and are, thus, coextensive with the drivetrain and entitled to a presumption of a nexus regardless. Furthermore, as we explained above, Patent Owner has established that the X-Sync chainring technology is an essential part of what enabled it to develop the entire drivetrain, which outweighs the evidence that Petitioner presents to

rebut the nexus, namely, that the evidence of objective indicia of non-obviousness is tied to the rear cassette.

In any event, we find that Patent Owner has presented ample evidence of praise that is tied directly to the X-Sync chainring. *See* Exs. 2006, 2–3 (praising teeth design as “mechanical duct tape”); 2007, 4 (noting lack of chain drop and suggesting that bike can be trail ridden without a chain guide); 2008, 2 (noting lack of chain retention issues, discussing tooth shape); 2009, 2 (praising chainring); 2010, 1 (noting lack of chain drop); 2011, 1 (praising chainring); 2012, 2 (praising teeth design), 4 (noting chain retention); 2013, 2 (noting chain retention of X-Sync chainring); 2014, 5 (praising X-Sync chainring as “unique” and noting it removes the need for a chain guide); 2015, 3 (praising X-Sync chainring for potentially removing the need for a chain guide); 2016, 1 (noting X-Sync chainring narrow and wide teeth the “was in part the catalyst” for the change to 1X transmissions); 2017, 4 (praising X-Sync chainring and noting “complicated design” of narrow-wide teeth); 2019, 3–4 (“Innovation of the Year Award” for “SRAM X-Sync Narrow-Wide Chainring”); 2023 (noting no need for a chain guide).

Indeed, as the collection of quotes from the articles cited above makes clear, the praise focuses directly on the ability of the *chainring* to improve chain retention without a chain guard. *See id.* Thus, we do not agree with Petitioner that the praise is directed to the unclaimed components of the drivetrain, and not the chainring. To the extent that some articles noted by Petitioner use words such as the “tall,” “hooked,” and “asymmetric” teeth, we find that those references, without more explanation as to their exact meaning, do not rebut the presumption of a nexus. Moreover, none of the articles that include the references to the “tall,” “hooked,” and “asymmetric”

teeth purport to attribute all of the benefits of the X-Sync chainring to those attributes. *See, e.g.*, Ex. 2008, 2. Thus, we do not agree that those references alone can carry Petitioner’s burden of rebutting the presumption of nexus that Patent Owner has met.

Finally, we further note that, as we found above, *see supra* at pp. 21–22, the general praise of the X-Sync chainring applies to both the inboard-offset and outboard-offset chainrings. Thus, we do not agree with Petitioner that this evidence is irrelevant to claims 1–6 and 13–19 because they claim outboard-offset chainrings.

As for the fact that some of the articles only mention wide narrow teeth, we do not agree with Petitioner that this establishes that the praise was only directed to the features found in the prior art. Indeed, Exhibit 2019 makes clear that it is not just wide-narrow teeth, but Patent Owner’s “adaptation of the narrow-wide chainring tooth profile,” as embodied in the X-Sync, that was “the missing piece in the single-chainring drivetrain puzzle.” Ex. 2019, 3. Thus, even this article indicates that it is not merely the narrow-wide profile, but Patent Owner’s implementation of it in the X-Sync chainring—which we have found embodies and is coextensive with the claims—that resulted in the innovation. *Id.* Thus, we are not persuaded by Petitioner’s arguments that there is no nexus between the praise and the challenged claims. We find this evidence indicative of non-obviousness and entitled to significant weight in our analysis.

b. Skepticism

Evidence of industry skepticism weighs in favor of non-obviousness. *See United States v. Adams*, 383 U.S. 39, 52 (1966). “If industry participants or skilled artisans are skeptical about whether or how a problem

could be solved or the workability of the claimed solution, it favors non-obviousness.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1335 (Fed. Cir. 2016).

Patent Owner presents evidence of skepticism from various magazine articles reviewing the X-Sync chainring. PO Resp. 25–31. Petitioner’s argument against this evidence is the same considered with respect to industry praise—i.e., that there is no nexus. Pet. Reply 40–41. As we explained above, Patent Owner is entitled to a presumption of a nexus between the evidence of secondary considerations tied to the X-Sync chainring and the claims, and Petitioner has failed to rebut that presumption. We have reviewed the evidence of skepticism presented by Patent Owner, and find that Patent Owner has made a significant showing of skepticism within the industry towards the effectiveness of the X-Sync chainring regarding chain retention. Exs. 2008, 2011, 2012, 2014, 2015. For instance, one article noted that “[m]ore than a few editors on site were concerned about the lack of a chain guide on our test bikes” and that “one editor insisted that SRAM had embedded high-power magnets into the CNC-machined aluminum chainring (alas, there were none).” Ex. 2008. As summarized on pages 27 to 31 of the Patent Owner Response, this was not the only statement of skepticism by industry participants. *See* PO Resp. 27–31. We find this substantial amount of evidence indicative of non-obviousness and entitled to significant weight in our analysis. *See WBIP*, 829 F.3d at 1335.

4. *Long-Felt Need*

“[E]xistence of a long felt but unsolved need that is met by the claimed invention is further objective evidence of non-obviousness.”

Millennium Pharms., Inc. v. Sandoz Inc., 862 F.3d 1356, 1369 (Fed. Cir. 2017). “Evidence of long-felt need is particularly probative of obviousness when it demonstrates both that a demand existed for the patented invention, and that others tried but failed to satisfy that demand.” *Id.*

Patent Owner argues that the problem of maintaining a chain on a chainring has existed for more than 100 years. PO Resp. 42 (citing Exs. 2048–2062; Ex. 2074 ¶¶ 15, 78, 79). Patent Owner contends that prior art attempts to solve the problem failed to address several issues. *Id.* Patent Owner argues that prior art solutions had issues with increasing one or all of complexity, weight, and drivetrain friction. *Id.* Patent Owner asserts that “[t]hese prior art devices have existed for more than 100 years, but have failed to improve chain retention without the known problems of increased complexity, weight, and/or drivetrain friction.” *Id.* at 43. Patent Owner contends that “[t]he claimed invention addressed the long-felt need for improved chain retention without the known problems of increased complexity, weight, and/or drivetrain friction.” *Id.*

Petitioner argues that because “the market for 1X drivetrains was insignificant before [Patent Owner’s] 2012 introduction of its wide-range rear cassette that made 1X mountain biking available to the masses,” and “in a multi-chainring system, the front derailleur (which is indispensable) minimizes chain drop irrespective of the type of chainring,” there was no persistent need that was recognized by those of ordinary skill in the art to solve the problem of chain drop without a chain guide in either a single- or multi-chainring drivetrain. Pet. Reply 39 (citations omitted). Thus, in essence, Petitioner argues that there was no long-felt need. In addition, Petitioner argues that, even if we find there was a long-felt need, there is no

nexus to the merits of the claimed invention, because Patent Owner has not “shown the alleged long-felt need was solved by the claimed combinations of [narrow/wide] teeth with inboard/outboard offset, and not by the unclaimed chain-retention features of the X-Sync or by [Patent Owner’s] Type 2 rear derailleur.” *Id.*

We find that Patent Owner has shown strong evidence that a long-felt need existed in the bicycle industry for improved chain retention that did not increase the known problems of complexity, weight, and/or drivetrain friction. As Patent Owner’s evidence indisputably shows, skilled artisans in the bicycle arts have endeavored to address the problem of chain retention for over 100 years. *See* Ex. 2074 ¶ 79 (citing Exs. 2048–2062); Ex. 2076 ¶ 50; Ex. 2118 ¶ 12. Patent Owner also presents persuasive evidence that a significant shortcoming in these prior art solutions was that they each increased complexity, weight, and/or drivetrain friction. Ex. 2074 ¶ 80; Ex. 2076 ¶ 50; Ex. 2118 ¶ 12. Indeed, Petitioner’s expert, Dr. Neptune, conceded that there was a long-felt need for “a multi-gear bicycle that could be reliably ridden over rough terrain without the aid of a chain-retaining device external to the chainring.” Ex. 2129, 78:12–17. Although Petitioner’s witness, Mr. Marriott, testified that there was no long-felt need regarding chain drop, because chain guides kept the chain on the chainring, Ex. 1075, 69:24–70:3, he did not address the narrower problem that Patent Owner articulated, and Dr. Neptune admitted. As for Petitioner’s other contention—based on other testimony by Mr. Marriott (*see* Ex. 1046 ¶ 16)—that there was no market for 1X chainrings, and hence no long-felt need, we find this belied by Dr. Neptune’s concession, and Mr. Ritzler’s testimony, that it was not that such systems were not wanted, but that they were not

feasible, in part, due to the problems of increased complexity, weight, and/or drivetrain friction that were discussed above. *See* Ex. 1045-A, 103:2–104:21. As we discussed above, we find Mr. Ritzler’s testimony persuasive and give it substantial weight. Thus, we do not find Mr. Marriott’s testimony persuasive about long-felt need.

We also find that Patent Owner has demonstrated that the X-Sync chainring met this long-felt need. In particular, Dr. Sturges testified that the X-Sync chainring met this need. Ex. 2074 ¶¶ 78–84. We find this testimony reasoned and persuasive, and give it substantial weight. Moreover, this testimony is supported by and consistent with the effusive praise and awards discussed above with regard to industry praise that further supports this finding. *See, e.g.*, Exs. 2006, 2008, 2015, 2019. Moreover, the mere fact that there may be certain conditions when chain guards are still used, *see, e.g.*, Ex. 1075, 80:23–81:10, does not mean that the X-Sync chainring did not satisfy the long-felt need articulated, *id.* at 86:9–15 (Mr. Marriott conceding that X-Sync chainrings do a “good job” of keeping the chain on the chainring).

As for Petitioner’s contention, discussed above, that there is no nexus between the evidence of secondary considerations tied to the X-Sync chainring and the claimed invention, we disagree. As we have found above, Patent Owner has shown that it is entitled to a presumption of a nexus between the evidence of secondary considerations tied to the X-Sync chainring and the challenged claims, and that presumption has not been rebutted. *See supra* Section II.E.1. We also further explained above, with regard to industry praise, that Petitioner has not rebutted this presumption. Furthermore, as we explained above relying on the testimony of Mr.

Wesling, the fact that there are both inboard-offset and outboard-offset embodiments, does not change our conclusion. *See supra* at pp. 21–22. Thus, we find that the claimed inventions of the '027 patent met the long-felt need of improved chain retention, without the known problems of increased complexity, weight, and/or drivetrain friction. We find that Patent Owner's showing of long-felt need is entitled to significant weight in our analysis.

5. *Licensing*

Courts “specifically require affirmative evidence of nexus where the evidence of commercial success presented is a license, because it is often ‘cheaper to take licenses than to defend infringement suits.’” *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004) (quoting *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 908 (Fed. Cir. 1985)). The Federal Circuit has explained that “[w]hen the specific licenses are not in the record, it is difficult for the court to determine if ‘the licensing program was successful either because of the merits of the claimed invention or because they were entered into as business decisions to avoid litigation, because of prior business relationships, or for other economic reasons.’” *In re Cree, Inc.*, 818 F.3d 694, 703 (Fed. Cir. 2016) (quoting *In re Antor Media Corp.*, 689 F.3d 1282, 1294 (Fed. Cir. 2012)).

Patent Owner argues that it offers “an open license program where any competitor may license the X-Sync technology for a reasonable royalty.” PO Resp. 37. Patent Owner asserts that “[w]ith this program, [Patent Owner] has already licensed the '027 patent, as well as the X-Sync technology to at least eight different companies, some of whom are major market players.” *Id.* Specifically, Patent Owner contends that it has entered into a number of licenses with major bicycle manufacturers and bicycle

component providers. *Id.* at 38–39 (citing Exs. 2091–2106; Ex. 2076 ¶¶ 32–37; Ex. 2074 ¶¶ 70–72).

Petitioner responds that five of the eight licenses (Exs. 2092–2100) provided by Patent Owner do not refer to the '027 patent. Pet. Reply 33. Instead, Petitioner notes that “they are licenses to [Patent Owner’s] German Utility Model (DE 20 2012 012 533 U1, ‘Kettenring’) and corresponding patents/patent applications with claims differing from those of the '027 patent.” *Id.* at 34. Petitioner argues that “the German claims do not recite any ‘offset’, which is one of the alleged ‘principal features’ of the '027 [patent] claims.” *Id.* Petitioner argues that because these licenses are not to the '027 patent and “do not cover either of the inventions claimed in the '027 patent, [Patent Owner] does not (and cannot) show nexus between these licenses and the claimed invention.” *Id.* Petitioner also asserts that two other licenses (Exs. 2102 and 2104) “prove nothing about the value of the '027 [patent] claims” because they cover numerous other continuations and international patents/applications. *Id.* Finally, Petitioner notes that the final license (Ex. 2106) is irrelevant because it was entered into to settle a lawsuit. *Id.*

We determine that these licenses are entitled to some weight in our obviousness analysis. However, we agree, in part, with Petitioner that some of the licenses have limited probative value. For instance, we agree with Petitioner that the license with Wolf Tooth (Ex. 2106) is entitled to less weight because it was entered into to settle a lawsuit. There is no evidence suggesting that it was the merit of the '027 patent, as opposed to the desire to save litigation costs, that drove the license. *See EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907–08 (Fed. Cir. 1985) (explaining that it is

often “cheaper to take licenses than to defend infringement suits, or for other reasons unrelated to the unobviousness of the licensed subject matter.”). As for the remaining licenses, while we agree with Petitioner that the fact that the licenses cover a number of patents affects the weight they should receive, we do not agree that the fact that the licenses cover more than just the '027 patent means that they are entitled to no weight. In particular, we note that the licenses with both Saris Cycling Group (Ex. 2102) and White Industries (Ex. 2104) both explicitly mention the '027 patent, and were not entered into to settle litigation. Ex. 2076 ¶ 37. Thus, we find that they are entitled to some weight.

Finally, as for the remaining licenses—Chromag Bikes (Ex. 2092), Accell Group N.V. (a.k.a Winora-Staiger) (Ex. 2094), KCNC International (Ex. 2096), Quality Bicycle Products, Inc. (Ex. 2098), Cannondale Bicycle (Ex. 2100), Petitioner is correct that they do not list the '027 patent, but cover “the invention(s) described in German Utility Model DE 2012 012 533 U1 – ‘Kettenring’⁷ and any patent applications corresponding to the above-described Utility Model that are issued, filed, or to be filed in any and all foreign countries and the know-how associated with the inventions defined by the patent.” *See, e.g.*, Ex. 2092, 1. Patent Owner has offered evidence that the disclosure of “Kettenring” is commensurate in scope with the '027 patent. Ex. 2074 ¶ 71. Moreover, there is no dispute that the '027 patent is an application “corresponding to [Kettenring]” and is within the scope of these licenses. *Id.*; Ex. 2076 ¶ 11. Petitioner is correct that these licenses, which cover a number of applications and patents throughout the world, and

⁷ As Patent Owner explains, “Kettenring” is the German word for chainring. Ex. 2076 ¶ 36.

entered into before the '027 patent issued, have limited probative value into the non-obviousness of the claims of the '027 patent. We disagree, however, with Petitioner that these licenses have no probative value. We find that these licenses do have some value in showing that the inventions covered by '027 patent have had some acceptance in the industry, and, thus, these licenses are entitled some weight.

In sum, we conclude that Patent Owner's evidence of licensing is entitled to some, but not significant, weight.

6. Copying

"Copying may indeed be another form of flattering praise for inventive features." *Crocs, Inc. v. Int'l Trade Comm'n*, 598 F.3d 1294, 1311 (Fed. Cir. 2010). "[C]opying requires evidence of efforts to replicate a specific product." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010). "This may be demonstrated either through internal documents; direct evidence such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a virtually identical replica; or access to, and substantial similarity to, the patented product (as opposed to the patent)." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (internal citations omitted). "We note, however, that a showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations." *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000); *see also In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995) ("[M]ore than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the

obviousness issue.” (quoting *Cable Elec. Prods. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985))).

Patent Owner argues that it is “aware of at least seventeen (17) different companies who have copied its patented technology, copying the features of the claims of the ’027 patent.” PO Resp. 40 (citing Ex. 2076 ¶¶ 40, 41, 46; Ex. 2074 ¶ 73–75; Exs. 2031–2047). Patent Owner submits that the “Race Face chainrings incorporate the patented features of the ’027 [patent] claims and further details of the X-Sync chainrings, and Race Face had sufficient access to the X-Sync chainrings.” *Id.* (citing Ex. 2076 ¶¶ 47, 48).

Petitioner responds that Patent Owner has failed to show replication of either the inboard-offset or outboard-offset chainrings “Race Face’s chainring differs substantially from [Patent Owner’s] X-Sync chainring (the original X-Sync and X-Sync Eagle).” Pet. Reply 35. Petitioner offers photographs purporting to show that Race Face’s chainring does not include the “protruding tip portion,” the “hooked rear flank,” or the “asymmetric teeth” of Patent Owner’s chainring. *Id.* at 36–37. Petitioner also argues that “Race Face did not copy the offset tooth tips feature . . . , and thus there was ***no copying of the claimed combination.***” *Id.* at 38. Petitioner also asserts that Patent Owner “failed to show replication of its X-Sync chainring by anyone.” *Id.* at 39. Petitioner also notes that “infringement of the inboard-offset claims, even if true, proves nothing about the patentability of the challenged outboard-offset claims.” *Id.* at 35.

Patent Owner has put forward some evidence of copying of its inboard-offset chainrings. Patent Owner bases its allegations of copying on allegations of access to, and substantial similarity to, the patented product

(as opposed to the patent). *See* PO Resp. 39–40. Patent Owner has put forward un rebutted evidence of access, which Petitioner does not appear to dispute. Ex. 2076 ¶¶ 47–49. Petitioner does dispute, however, the “substantial similarity” of the Race Face chainring and Patent Owner’s X-Sync chainring. Pet. Reply 35–37. With respect to “substantial similarity,” Patent Owner has provided testimony from Dr. Sturges that the Race Face Narrow Wide chainring infringes the challenged claims of the ’027 patent, and an identification of various features common to the products. Ex. 2074 ¶ 75. Patent Owner also offers the testimony of Mr. Ritzler that there are similarities between Patent Owner’s and Race Face’s products. Ex. 2076 ¶¶ 39–49. The only evidence Petitioner offers in response are some photographs of two of Patent Owner’s chainrings and a Race Face chainring, and the testimony of Mr. Marriott that he “thinks” Race Face did not copy. Exs. 1036, 1070, 1073; Ex. 1075, 47:8–16. The photographs purport to illustrate features that are different between the various products, but Petitioner provides no testimony to support a finding that these differences are significant. Moreover, although it is apparent from the photographs and the labels that there are some differences between the products, the photographs that Petitioner offers are of low quality, and it is difficult to ascertain the significance of those differences. As for Mr. Marriott’s testimony, we find that the testimony of what he “thinks” is merely speculation, in that while he asserts that there are “dozens” of differences, he fails to identify any of them with specificity. Ex. 1075, 47:8–16. As a result, we give Petitioner’s evidence little to no weight. In comparison, although Dr. Sturges’s testimony admittedly also does not go into great detail, our review of the evidence indicates that his testimony is more

credible, and, thus, we find his testimony sufficient to establish that some copying by Race Face has taken place.

As for Petitioner's argument that the Race Face products lack the claimed "offset," Pet. Reply 37–38, Petitioner's evidence supporting this contention is photographs of Patent Owner's and Race Face's products, with labels added to them purporting to show the lack of the claimed offset, in that there is an alleged admission by Mr. Ritzler that an "offset" is the spatial difference between the inboard/outboard side of the wide teeth and the inboard/outboard edge of the chainring. *Id.* at 37 n. 5 (citing Ex. 1045-A, 129:17–132:9). However, we reviewed Mr. Ritzler's testimony and find that the cited testimony of Mr. Ritzler does not support Petitioner's contention that what they have labeled on page 38 of the Reply is commensurate with what is claimed. While Mr. Ritzler does identify that as an "offset" generally, he does not admit that is what the claim means by "offset." Ex. 1045-A, 129:17–132:9. In contrast, Patent Owner has provided the testimony of Dr. Sturges that the Race Face chainrings do include the claimed offset. We find this testimony persuasive. Ex. 2074 ¶¶ 73–75. Thus, Petitioner has not shown that the Race Face products necessarily lack the claimed offset based on Mr. Ritzler's testimony.

As for the other competitors that Patent Owner contends copied its product, we find this evidence entitled to some weight. Petitioner argues that there is no nexus between this copying and the claimed invention, because Patent Owner position "[o]n the whole" is that any chainring with narrow and wide teeth is a copy, but that feature is found in JP-Shimano. Pet. Reply 38. However, Petitioner provides no evidence to support this contention. Dr. Sturges testified that the Race Face chainring is

representative of these other products, and has identified a number of features that he opines are copied from the SRAM X-Sync product, in addition to the narrow/wide teeth. Ex. 2074 ¶¶ 74, 75. Petitioner offers no evidence to rebut this testimony. Thus, we do not find Petitioner's contention that the other products merely copy the features found in JP-Shimano to be persuasive. As we noted above, the evidence that Patent Owner offers is not very detailed, so we find that Patent Owner's evidence of the 17 other copying products to be entitled to some weight, but not significant weight.

We do agree with Petitioner, however, that because copying evidence is limited to the inboard offset chainring, it is entitled to very limited to no weight with respect to the outboard offset claims. Pet. Reply 35. In sum, we determine that Patent Owner has shown some copying of its X-Sync chainring product, which is covered by the '027 patent. However, although this evidence shows copying of the related inboard-offset chainring, there is no evidence of copying outboard-offset chainring. Thus, we find this evidence of copying overall is entitled to very limited to no weight in our analysis.

F. REMAINING CLAIMS AND GROUNDS

With respect to the combination of Parachinni, JP-Shimano, and Nagano, Petitioner argues that it would have been further obvious to modify the combined chainring of Parachinni and JP-Shimano, discussed above, to include the asymmetric tooth shape of Nagano "as a matter of a simple design choice." Pet. 67 (citing Ex. 1026 ¶ 113). Petitioner relies on the same reasoning and rationale for combining Parachinni and JP-Shimano discussed above, and Petitioner does not contend that Nagano provides any

additional reason to modify Parachinni in view of JP-Shimano. *Id.* at 67–68. Indeed, the combination is offered only “[i]f the Board determines that [Petitioner’s] proposed constructions of ‘teeth’ and ‘offset from the plane in the direction toward the outboard side of the chainring’ are correct, then [Petitioner contends that] *Nagano* teaches teeth reading on both claim terms.” *Id.* at 68. Because we conclude above that the combination of the teachings of Parachinni and JP-Shimano would not have been obvious, we need not separately determine if it would have been further obvious to modify that combination in view of Nagano, as proposed by Petitioner in the Parachinni, JP-Shimano and Nagano ground.

Petitioner asserts that claims 3, 4, 16, and 17 would have been obvious over the combinations of Parachinni, JP-Shimano, and Hattan and/or Parachinni, JP-Shimano, Nagano, and Hattan. Pet. 50–62, 78–88. Claims 3 and 4 depend from claim 1 and claims 16 and 17 depend from claim 13. Ex. 1001, 7:1–20, 8:54–67. Petitioner does not rely on Hattan for any of the elements in claims 1 or 13, and instead relies on its analysis of the grounds of Parachinni and JP-Shimano and Parachinni, JP-Shimano, and Nagano for those elements. Because we find below that Petitioner has failed to prove that claims 1 and 13 would have been obvious, and Petitioner relies on same reasoning to account for those claim limitations in its contentions regarding claims 3, 4, 16, and 17, there is no need to reach Patent Owner’s separate arguments, and we do not address them in this Decision.

G. FINAL CONCLUSION OF NON-OBVIOUSNESS

As we explained above, we find that Petitioner has shown there would have been a rationale to combine the references. *See supra* at II.D.2. But we also find that Patent Owner has made an extremely strong overall

showing of objective indicia of non-obviousness, which includes very strong showings on industry praise, skepticism, and long felt need, and a weak showing on licensing. We find that Patent Owner's, at best, very weak showing on commercial success and copying does not weigh significantly in our analysis. "The objective indicia of non-obviousness play an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis." *WBIP*, 829 F.3d at 1328. Indeed, the Federal Circuit has 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)). We find this to be such a case where the objective evidence is the most probative evidence in the record. Petitioner's rationale to combine rests mainly on the testimony of its expert, but the copious objective evidence demonstrates the significance and importance of Patent Owner's invention. Weighing all four *Graham* factors, we find that Petitioner has not shown by a preponderance of the evidence that claims 1, 2, 5, 6, 13–15, 18, and 19 would have been obvious over the combinations of Parachinni and JP-Shimano or Parachinni, JP-Shimano, and Nagano, and claims 3, 4, 16, and 17 would have been obvious over the combinations of Parachinni, JP-Shimano, and Hattan or Parachinni, JP-Shimano, Nagano, and Hattan.

We note that this is not a case as in *Intercontinental Great Brands LLC v. Kellogg North America Co.*, 869 F.3d 1336, 1342–47 (Fed. Cir. 2017), where the strong case of obviousness outweighs the objective indicia of non-obviousness. On the contrary, we find that the case of obviousness here is easily outweighed by the objective evidence of non-obviousness.

III. MOTIONS TO EXCLUDE

A. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude SRAM Exhibit 2002 ¶¶ 51–55, 59–64, 65 (ll. 1–2), 68, and 69; Exhibit 2074 ¶¶ 61, 65–72, 74–79, 80 (ll. 1–2), 83 (ll. 7–9), 84 and 85; Exhibit 2004 ¶ 17; Exhibit 2076 ¶¶ 8, 13, 19–29, 41–50; Exhibits 2005–2047; Exhibit 2118 ¶ 12; and Exhibits 2109 and 2110. Pet. Mot. Exclude 1.

1. *Testimony of Dr. Sturges*

a. *Commercial Success, Long-Felt Need, Failure of Others, & Licensing*

Petitioner seeks to exclude Paragraphs 50–52, 59, 60, 64, 67, and 68 of the First Sturges Declaration and Paragraphs 59, 63, 64, 70, 72, 78, and 81–83 of the Second Sturges Declaration⁸ under Federal Rules of Evidence 403, 602, and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 2–4; Pet. Mot. Reply 1–2. Petitioner argues that Dr. Sturges has no experience in the relevant market, and is not qualified to give expert opinions regarding commercial success, long-felt need, failure by others, and licensing. Pet. Mot. Exclude 2. Petitioner further asserts that Dr. Sturges lacks the requisite personal knowledge to give such testimony. *Id.* at 3.

With respect to Paragraphs 50–52, 59, and 60 of the First Sturges Declaration and Paragraphs 59, 63, 64, 70, and 72 of the Second Sturges Declaration, we did not rely on this testimony in reaching our decision. So, we dismiss this portion of the motion as moot.

⁸ We agree with Patent Owner that Petitioner's citations to the Second Sturges Declaration are inconsistent with the alleged problems Petitioner identifies in its Motion to Exclude. *See* PO Opp. 6 n.1. We rely on the corrected citations identified by Patent Owner in this discussion.

As for Paragraphs 64, 67, and 68 of the First Sturges Declaration and Paragraphs 78 and 81–83 of the Second Sturges Declaration, we agree with Patent Owner that this testimony is admissible. To begin with, we note that the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude. As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, Petitioner is prejudiced by this testimony. Thus, Petitioner’s Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges has sufficient expertise and has provided sufficient analysis to offer opinions regarding long-felt need. *See* Ex. 2074 ¶¶ 78, 81–83. Long-felt need is viewed from the perspective of a person of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). In this case, we did not find that the level of ordinary skill in the art required special knowledge of marketing in the bicycle industry, as Petitioner suggests. *See supra* Section II.B. Dr. Sturges testified he has reviewed the art and cited to the evidence he relied upon, including a number of references involving the problem of chain drop. *See* Ex. 2074 ¶¶ 78, 81–83. As for Rule 602, it is well-established that an expert’s opinion need not be based on personal knowledge. *See Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 592 (1993). As we explained, Dr. Sturges testified about the references he reviewed, and explains why he concludes that there a person of ordinary skill in the art would have understood that there was a long-felt need in the art at the time of the invention. Thus, we deny Petitioner’s Motion to Exclude Paragraphs 64, 67,

and 68 of the First Sturges Declaration and Paragraphs 78 and 81–83 of the Second Sturges Declaration.

b. Copying

Petitioner seeks to exclude Paragraphs 61–63 of the First Sturges Declaration and Paragraphs 73–77 of the Second Sturges Declaration under Federal Rules of Evidence 403 and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 4–5; Pet. Mot. Reply 3–4. Petitioner contends that Dr. Sturges fails to perform a “product-to-product comparison required to demonstrate the alleged copying” and focuses on the similarities and ignores “the many differences between the two products.” Pet. Mot. Exclude 4–5. Petitioner further argues that Dr. Sturges’s testimony is conclusory, that Dr. Sturges provides no factual support for his opinion, and offers no explanation of why or how the particular chainring he relied on is representative. Pet. Mot. Reply 3–4. Patent Owner responds that Dr. Sturges explained the evidence he relied upon, and properly relied on the Race Face chainring as representative of the “copycat chainrings.” PO Opp. 7.

We agree with Patent Owner that Dr. Sturges’s testimony is admissible. To begin with, as we noted above, the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude. As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, how Petitioner is prejudiced by admitting this testimony. Thus, Petitioner’s Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges provides sufficient

analysis to support his opinions regarding copying. *See* Ex. 2074 ¶¶ 73–77. Dr. Sturges cited to the evidence he relied upon, including Patent Owner’s infringement contentions from the underlying district court litigation and Mr. Ritzler’s testimony. Petitioner’s arguments go more to the weight that Dr. Sturges’s testimony should be given, not its admissibility. Thus, we deny Petitioner’s Motion to Exclude Paragraphs 61–63 of the First Sturges Declaration and Paragraphs 73–77 of the Second Sturges Declaration.

c. Professional Approval and Praise

Petitioner seeks to exclude Paragraphs 53, 54, and 58 of the First Sturges Declaration and Paragraphs 65–69 of the Second Sturges Declaration under Federal Rules of Evidence 403 and 702, and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 5–6; Pet. Mot. Reply 2–3. Petitioner contends that Dr. Sturges fails to cite any specific text in the various magazine articles he relies upon, and does not provide any specific analysis why the praise is driven by the features of the challenged claims. Pet. Mot. Exclude 5. Petitioner also argues that “[t]o the extent Dr. Sturges relies on the magazine articles to demonstrate the alleged benefits of the X-Sync (*see, e.g.*, Ex. 2074, ¶¶ 67, 68), such testimony should be excluded as hearsay under [Federal Rule of Evidence] 802.” *Id.* at 6. Patent Owner argues that Dr. Sturges did provide a detailed analysis by demonstrating that the X-Sync chainrings are covered by the patents and provides citations to the evidence he relied upon. Pat. Opp. 8. Patent Owner further argues that Dr. Sturges is permitted to rely on hearsay in forming his opinions. *Id.*

To begin with, as we noted above, the portion of 37 C.F.R. § 42.65(a) relied on by Petitioner deals only with the weight that can be given evidence, not its admissibility. Thus, it is not a proper basis for a motion to exclude.

As for the objections based on the Federal Rules of Evidence, we do not see how, nor has Petitioner met its burden of demonstrating, that even if Federal Rule of Evidence 403 applies to a non-jury trial like these proceedings, how Petitioner is prejudiced by admitting this testimony. Thus, Petitioner's Rule 403 objection is without merit. As for the Rule 702 objection, we determine that Dr. Sturges provides sufficient analysis to support his opinions that the X-Sync chainring has received praise and there is a nexus between the X-Sync chainring and the '027 patent. *See* Ex. 2074 ¶¶ 61, 62 (explaining how the X-Sync chainring is covered by the patent), ¶¶ 65–69 (citing to Ex. 2076 (testimony of Mr. Ritzler); Exs. 2005–2030). Finally, we agree with Patent Owner that Petitioner's hearsay objection is without merit. *See* Fed. R. Evid. 703 (explaining experts may rely on hearsay in forming their opinions). Thus, Petitioner's Motion to Exclude Paragraphs 53, 54, and 58 of the First Sturges Declaration and Paragraphs 65–69 of the Second Sturges Declaration is *denied*.

2. Testimony of Mr. Ritzler

a. Commercial Success

Petitioner seeks to exclude Paragraphs 8 and 19–29 of the Declaration of Ron Ritzler (“Ritzler Declaration”), an employee of Patent Owner, regarding commercial success. Pet. Mot. Exclude 6–10. Petitioner argues that Mr. Ritzler's testimony is vague and conclusory and “provides no details of his methodologies or application to whatever underlying data he may have considered.” *Id.* at 7–8. Petitioner argues that because it has not been shown that “Mr. Ritzler's market share calculations are based on reliable principles or methodologies, or that Mr. Ritzler reliably applied his chosen methodologies,” Paragraphs 8 and 19–29 of the Ritzler Declaration

should be excluded. *Id.* at 8; Pet. Mot. Reply 4. Patent Owner responds that Mr. Ritzler provided sufficient evidence of his methodologies and experience. PO Opp. 10.

We agree with Patent Owner that Mr. Ritzler has provided sufficient explanation of his methodologies and principles that he applied in providing his testimony regarding commercial success. Ex. 2076 ¶¶ 16–17, 28; Ex. 2121 ¶¶ 1–9. Mr. Ritzler explained the sources of the data and the way he reached the conclusions stated in his testimony. We find this testimony credible and give it substantial weight. *Id.* Accordingly, we deny Petitioner’s Motion to Exclude Paragraphs 8 and 19–29 of the Ritzler Declaration.

b. Copying and Long-felt Need

Petitioner seeks to exclude Mr. Ritzler’s testimony regarding copying and long-felt need (Ex. 2004 ¶ 17; Ex. 2076 ¶¶ 41–50) as “speculative and unsupported” under Federal Rules of Evidence 702 and 602. Pet. Mot. Exclude 10–11; Pet. Mot. Reply 5. Patent Owner contends that Mr. Ritzler is qualified to offer his testimony on copying and long-felt need, and that he is permitted to testify about his personal observations. PO Opp. 11.

We agree with Patent Owner that Mr. Ritzler’s testimony regarding copying and long-felt need is admissible. Mr. Ritzler has extensive experience in the industry and with bicycles generally. *See* Ex. 2076 ¶¶ 3, 4. With respect to copying, his testimony is clear that he is testifying based on his personal knowledge as Patent Owner’s vice president of product development. *See* Ex. 2076 ¶¶ 41–49. As for long-felt need, Mr. Ritzler explains the basis for his opinion that there was a long-felt need in the industry. We determine that Petitioner’s arguments go to the weight we

should give Mr. Ritzler's testimony, not its admissibility. Thus, Petitioner's Motion to Exclude Paragraph 17 of Exhibit 2004 and Paragraphs 41–50 of Exhibit 2076 is denied.

3. *Exhibits 2005–2030*

Exhibits 2005–2030 are various articles that Patent Owner contends are evidence of industry praise of the products that embody the '027 patent. *See* Exs. 2005–2030. Petitioner moves to exclude Exhibits 2005–2030 under Federal Rules of Evidence 401, 403, and 802, as irrelevant, unduly prejudicial, and hearsay, respectively. Pet. Mot. Exclude 11–12. Patent Owner responds that Petitioner ignores its nexus showing and that its briefs point to specific passages that discuss the industry's recognition of the claimed features. Pat. Opp. 12. Patent Owner also argues that the articles are offered for a non-hearsay purpose and are, therefore, admissible. *Id.* at 13.

We agree with Patent Owner that Petitioner has failed to show these exhibits should be excluded as irrelevant. Evidence is relevant if it has *any tendency* to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining the action. Fed. R. Evid. 401 (emphasis added). It is well-established that “[l]audatory statements by third parties regarding an invention are relevant to the question of obviousness.” *Asetek Danmark A/S v. CMI USA, Inc.*, NO. 13-cv-00457-JST, 2014 WL 12644295, at *2 (N.D. Cal. Nov. 19, 2014) (collecting cases). Petitioner's arguments about nexus go more to the weight this evidence should be given, rather than its admissibility.

As for Petitioner's arguments that the evidence should be excluded under Federal Rule of Evidence 403, Petitioner has offered no concrete

assertions of prejudice, so we deny this request on that basis alone. Further, we do not discern any prejudice to Petitioner, under Federal Rule of Evidence 403, in allowing this exhibit into evidence. In a non-jury trial, such as before the Board, the risk that a decision by the trier of fact will be unfairly affected by the admission of improper evidence is far less than in a jury trial. *See E.E.O.C. v. Farmer Bros. Co.*, 31 F.3d 891, 898 (9th Cir. 1994). As the factfinder, we are able to consider this evidence, in light of the parties' arguments, and give it the appropriate weight. *See* 22 CHARLES ALAN WRIGHT & KENNETH W. GRAHAM, JR., FEDERAL PRACTICE AND PROCEDURE § 5213 (1978 & Supp. 1999) ("Since the judge must hear the evidence in ruling on the motion to exclude the evidence under Rule 403, exclusion of the evidence on grounds of prejudice in a non-jury trial is described as a 'useless procedure.'"); *see also Schultz v. Butcher*, 24 F.3d 626, 632 (4th Cir. 1994)(finding court should not exclude evidence under Rule 403 in non-jury trial on grounds of unfair prejudice); *Gulf States Utilities Co. v. Ecodyne Corp.*, 635 F.2d 517, 519 (5th Cir. 1981) (finding unfair prejudice portion of Rule 403 "has no logical application to [non-jury] trials").

As for Petitioner's hearsay objection, it is without merit because the articles are not offered for the truth of the matters asserted in them, but to show that the statements were made. Because the existence of the statements themselves is relevant, "courts have properly found that articles showing the receipt of 'awards and accolades' are admissible over a hearsay objection." *Asetek Danmark A/S*, 2014 WL 12644295, at *2 (collecting cases).

Thus, we deny Petitioner's Motion to Exclude Exhibits 2005–2031.

4. *Exhibits 2031–2047*

Exhibits 2031–2047 are company product descriptions or store webpages showing pictures of various competing products that Patent Owner contends are copies of its product. *See* Exs. 2031–2047. Petitioner moves to exclude Exhibits 2031–2047 under Federal Rule of Evidence 401 as irrelevant. Pet. Mot. Exclude 12–13. Petitioner argues that Patent Owner “failed to show that each of the chainrings in these exhibits includes every feature of the allegedly copied X-Sync chainrings, beyond a bare and unsupported assertion by Dr. Sturges.” *Id.* Petitioner contends that the only other evidence cited also has no supporting explanation, so “[a]s a result, beyond bare assertions, [Patent Owner] presents no evidence that the chainrings in Exhibits 2031–2047 are copies of the X-Sync chainring. . . .” *Id.* at 13. Patent Owner argues that the exhibits are relevant because copying was extensively discussed by Dr. Sturges and Mr. Ritzler. PO Opp. 13.

We agree with Patent Owner that Exhibits 2031–2047 are relevant and admissible. Evidence is relevant if it has *any tendency* to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining the action. *See* Fed. R. Evid. 401. Given Dr. Sturges’s testimony that these chainrings are copies of Patent Owner’s products, this is sufficient to establish that these exhibits are relevant under the low standard of Rule 401. *See United States v. Whittington*, 455 F.3d 736, 739 (6th Cir. 2006) (“[T]he district court correctly noted that the relevance threshold is very low under Rule 401.”) (internal quotation marks omitted). Petitioner’s arguments go more to the weight this evidence should be given, rather than its admissibility. Thus, we deny Petitioner’s Motion to Exclude Exhibits 2031–2047.

5. *Testimony of Mr. Wesling*

Petitioner seeks to exclude Paragraph 12 of Exhibit 2118 (“Wesling Declaration”) under Federal Rule of Evidence 702 and 37 C.F.R. § 42.65(a). Pet. Mot. Exclude 13. In that paragraph, Mr. Wesling testifies that there was a long-felt need for the X-Sync chainring, because existing products did not provide the solution that the market allegedly desired to prevent chain disengagement. Ex. 2118 ¶ 12. Petitioner argues that he provides no facts or data to support his assertion, and that this “speculative and conclusory testimony should be excluded under FRE 702 for failure to provide sufficient facts or data supporting his opinion.” Pet. Mot. Exclude 13; Pet. Mot. Reply 5. Patent Owner responds that Mr. Wesling does provide citations to various patents, and also relies on his over twenty years of personal experience in the industry in offering this testimony. PO Opp. 14. We agree with Patent Owner that Mr. Wesling’s testimony is admissible. Contrary to Petitioner’s arguments, Mr. Wesling does provide citations and has detailed his extensive experience in this field. *See* Ex. 2118 ¶¶ 2, 3, 12. This is sufficient support for the testimony. Moreover, to the extent that the reasoning provided by Mr. Wesling is insufficient or faulty, Petitioner’s arguments go more to the weight that should be given the testimony than its admissibility. *See Microfinancial, Inc. v. Premier Holidays Int’l.*, 385 F.3d 72, 81 (1st Cir. 2004) (“When the factual underpinning of an expert’s opinion is weak, it is a matter affecting the weight and credibility of the testimony—a question to be resolved by the [factfinder].”). Thus, we deny Petitioner’s request to exclude Paragraph 12 of the Wesling Declaration.

6. *Exhibits 2109 and 2110*

Exhibits 2109 and 2110 are videos showing the operation SRAM X-Sync chainrings. Petitioner moves to exclude them under Federal Rules of Evidence 401–403, 702, 901, and 37 C.F.R. §§ 42.63 and 42.65. Pet. Mot. Exclude 13. We did not rely on Exhibits 2109 or 2110, so we dismiss this portion of Petitioner’s Motion to Exclude as moot.

B. PATENT OWNER’S MOTION TO EXCLUDE

Patent Owner moves to exclude Exhibits 1036–1037, 1039–1042, 1047–1048, 1057–1058, 1061, 1069–1070, and 1073, as well as ¶¶ 9–11 and 13–16 of Exhibit 1046 and ¶ 26 of Exhibit 1068. PO Mot. Exclude 17. Petitioner withdraws Exhibits 1042 and 1057, but otherwise opposes Patent Owner’s Motion. Pet. Opp. 1. We consider Patent Owner’s Motion below.

1. *Exhibit 1036*

Patent Owner seeks to exclude Exhibit 1036 under Federal Rule of Evidence 901 as not authenticated. PO Mot. Exclude 4. Patent Owner contends that “[n]o witness has authenticated the collection of photographs set forth in Exhibit 1036 or the statements contained therein purporting to tie the photographs to a specific member of a SRAM X-Sync chainring family.” *Id.* Patent Owner submits that “[t]o the extent this exhibit was used at Mr. Wesling’s deposition, he was unable to authenticate the photographs because of their poor quality and because he did not take the photographs in question.” *Id.* Petitioner responds that Mr. Wesling did authenticate the exhibits in his deposition. Pet. Opp. 4 (citing Ex. 1044, 12:22–13:11, 15:19–20:5, 23:4–24:10). Furthermore, Petitioner submits that the photographs in Exhibit 1035 are identical to those contained in Exhibit 1073, and authenticated in Exhibits 1069 and 1070. *Id.* at 4–5. In its Reply, Patent

Owner argues that Mr. Wesling did not authenticate the exhibits. PO Mot. Reply 2.

Documents are authenticated by “evidence sufficient to support a finding that the item is what the proponent claims it is.” Fed. R. Evid. 901(a). Authenticity is, therefore, not an especially high hurdle for a party to overcome. *See United States v. Patterson*, 277 F.3d 709, 713 (4th Cir. 2002); *see also United States v. Ceballos*, 789 F.3d 607, 617–18 (5th Cir. 2015) (noting “low” burden for authentication); *United States v. Isiwale*, 635 F.3d 196, 200 (5th Cir. 2011) (noting flaws in authentication go to weight not admissibility).

We have reviewed Mr. Wesling’s testimony. Although he is vague in his testimony regarding the photographs, we find his review of the actual chainrings and confirmation that the photographs resembled the actual chainrings to be more than sufficient to meet the low bar for authentication. Ex. 1044, 12:22–13:11, 15:19–20:5, 23:4–24:10. Patent Owner’s arguments go to the weight that should be given the evidence, not its admissibility.

2. *Exhibits 1037, 1039, 1047, 1048, 1058, and 1061*⁹

Exhibits 1037, 1039, 1047, 1048, 1058, and 1061 are printouts and videos from various non-governmental websites. Patent Owner moves to exclude these exhibits for lack of authentication under Federal Rule of Evidence 902. PO Mot. Exclude 5–6. Patent Owner also argues that these exhibits should be excluded as hearsay. *Id.* at 6. Petitioner argues that these web printouts are properly authenticated by the testimony of Ms. Arpita Bhattacharyya and the cross examination testimony of Mr. Ron Ritzler. Pet.

⁹ Exhibit 1057 has been withdrawn. Pet. Opp. 1.

Opp. 5–6 (citing Ex. 1068 ¶¶ 3, 5, 9, 10, 16, 19; Ex. 1045-A, 59:12–21; Ex. 2076 ¶¶ 53, 56, 57). As for the hearsay objection, Petitioner asserts that Exhibits 1037 and 1058 include “Opposing Party Statements,” which are admissible under Rule 801(d)(2), and Petitioner contends that all of these exhibits are not relied upon for the truth of the matter asserted. *Id.* at 6–7. However, Petitioner submits that, to the extent it does rely on the truth of the matter asserted in the articles, they should be admitted under Federal Rule of Evidence 806, because they “undermine and are inconsistent with secondary considerations positions taken by [Patent Owner’s] witnesses and in its pleadings based upon articles from the same or similar magazines/sources.” *Id.* at 8. Petitioner also seeks to have them admitted under the residual hearsay exception of Federal Rule of Evidence 807, because the sources for these exhibits have been shown to be reliable. *Id.* at 9.

With respect to Exhibit 1039, Petitioner did not cite or rely on this exhibit in any of its papers, so we dismiss this portion of Patent Owner’s Motion to Exclude as moot. As for the remaining documents, although we considered them, we did not rely on them in reaching our decision. Thus, we dismiss this portion of the Motion as moot.

3. *Exhibits 1040 and 1041*¹⁰

Exhibits 1040 and 1041 are email chains between employees of Patent Owner and persons from other companies. *See* Exs. 1040, 1041. Patent Owner moves to exclude these exhibits as not authenticated, under Federal Rule of Evidence 901, as hearsay, under Federal Rule of Evidence 802, and as irrelevant, under Federal Rule of Evidence 402. PO Mot. Exclude 6–8.

¹⁰ Exhibit 1042 has been withdrawn. Pet. Opp. 1.

With respect to authentication, Petitioner argues that Mr. Ritzler authenticated these exhibits at his deposition, and that Ms. Bhattacharyya also authenticated these exhibits in her Declaration. Pet. Opp. 10. As for the hearsay objection, Petitioner argues that the statements are opposing party statements exempt from the hearsay rule under Federal Rule of Evidence 801(d)(2). *Id.* at 9. Petitioner argues that the exhibits are relevant to its nexus arguments. *Id.* at 9–10.

We have no reason to rely on these exhibits. Petitioner relies on these exhibits to show that Patent Owner has a policy of selling only complete drivetrain Eagle group sets. Pet. Opp. 9. However, Mr. Ritzler, Patent Owner's witness, confirmed at his deposition that Patent Owner's policy is to require OEM customers to purchase complete drivetrain Eagle group sets. Ex. 1045-A, 88:12–17. These exhibits are merely cumulative of Mr. Ritzler's testimony. Thus, we dismiss this portion of Patent Owner's Motion as moot. Patent Owner's arguments about relevance go more to the weight that should be accorded the evidence, not its admissibility.

4. *Paragraphs 9–11 and 13–16 of Exhibit 1046*

Exhibit 1046 is the Declaration of Adam Marriott. *See* Ex. 1046. Mr. Marriott is a senior product manager at RFE Holding (Canada) Corp., which is the parent company of Petitioner. *Id.* ¶ 1. Paragraphs 9–11 and 13–16 offer Mr. Marriott's opinions on whether he believes that the success of Patent Owner's product is a result of the rear cassette, and not the chainring. *See id.* ¶¶ 9–11, 13–16. Patent Owner seeks to exclude these opinions for lack of personal knowledge under Federal Rule of Evidence 602, and also seeks to exclude certain other paragraphs under Federal Rules of Evidence 401, 402, 403, 701, 702, 801, 802, and 805. PO Mot. Exclude

8–10; PO Mot. Reply 4–5. Petitioner responds that Mr. Marriott made these statements based on his extensive experience in the field of mountain bikes, and his opinions should be admitted. Pet. Opp. 10–13.

We agree with Petitioner that Mr. Marriott has sufficient experience in the bicycle industry to offer these opinions on state of the industry and Patent Owner’s products. Patent Owner’s arguments go more to the weight we should give this testimony rather than its admissibility. Therefore, we deny Patent Owner’s Motion to Exclude Paragraphs 9–11 and 13–16 of Exhibit 1046 (Marriott Declaration).

5. *Paragraph 26 of Exhibit 1068*

Exhibit 1068 is the Declaration of Arpita Bhattacharyya, who is one of Petitioner’s attorneys in this proceeding. In Paragraph 26, Ms. Bhattacharyya testifies that she reviewed Exhibits 2005–2030 “in detail,” and that none of the articles in those exhibits mentioned certain claimed features. Ex. 1068 ¶ 26. Patent Owner argues that this testimony should be excluded because it is improper expert testimony. PO Mot. Exclude 11. Petitioner argues that this is merely fact testimony. Pet. Opp. 13–14.

Because we can review the articles “in detail” ourselves, there is no need for us to rely on this testimony. Accordingly, we dismiss this portion of Patent Owner’s Motion as *moot*.

6. *Exhibits 1069, 1070, and 1073*

Exhibit 1069 is the Declaration of Christopher B. McKinley (“McKinley Declaration”), one of Petitioner’s attorneys, and, in addition to certain testimony of Mr. McKinley authenticating certain pictures submitted, it also contains tables of pictures purporting to compare various features of

the Race Face chainring, SRAM X-Sync chainring, and the SRAM Eagle chainring. Ex. 1069. The table includes labeling that points out certain features of the various chainrings. *Id.* at 3–4. Exhibit 1073 consists solely of a table of pictures of various SRAM chainrings, labeled by part number, with close-up pictures of the teeth of the chainring with similar labels as the McKinley Declaration. *See* Ex. 1073, 1–6. Exhibit 1070 is the Declaration of Daniel F. Klodowski (“Klodowski Declaration”), one of Petitioner’s attorneys. Ex. 1070. The Klodowski Declaration purports to authenticate the pictures of Exhibit 1073, and asserts that they are representative of the twelve families of X-Sync chainrings. *Id.* ¶¶ 3, 4.

Patent Owner seeks to exclude this evidence as irrelevant under Federal Rules of Evidence 401 and 402. PO Mot. Exclude 11–12. Petitioner argues that the McKinley and Klodowski Declarations serve to authenticate the pictures of the various chainrings. Pet. Opp. 14–15. Petitioner also asserts that Exhibit 1069 is relevant to copying, because it shows ‘that Race Face’s chainring differs substantially from [Patent Owner]’s chainrings, i.e., that Race Face’s chainring does not include the ‘protruding tip portion,’ the ‘hooked rear flank,’ or the ‘asymmetric teeth’ of SRAM’s chainrings.” *Id.* at 15. As for Exhibit 1073, Petitioner argues that it is relevant to its argument that Patent Owner is not entitled to a presumption of a nexus, because Petitioner contends that it “demonstrates that X-Sync chainrings are not coextensive with the claimed invention.” *Id.* Petitioner further argues that there has been no demonstration of prejudice. *Id.*

We agree with Petitioner that these exhibits cross the low bar of relevance. We agree that they are relevant to the issues of copying and

nexus. Thus, we deny Patent Owner's Motion to Exclude Exhibits 1069, 1070, and 1073. However, as we explain above, though admissible, these pictures, without any other substantive analysis or explanation for the labels or their significance, are entitled to very little weight.

IV. CONCLUSION

For the reasons given, based on the arguments and evidence of record, Petitioner has not met its burden to prove, by a preponderance of the evidence, that claims 1, 2, 5, 6, 13–15, 18, and 19 of the '027 patent are unpatentable under 35 U.S.C. § 103(a) over the combinations of Parachinni and JP-Shimano or Parachinni, JP-Shimano, and Nagano or that claims 3, 4, 16, and 17 are unpatentable under 35 U.S.C. § 103(a) over the combinations of Parachinni, JP-Shimano, and Hattan or Parachinni, JP-Shimano, and Hattan. *See* 35 U.S.C. § 316(e). We deny-in-part and dismiss-as-moot-in-part Petitioner's and Patent Owner's Motions to Exclude.

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–6 and 13–19 of the '027 patent have *not been proven unpatentable*;

Petitioner's Motion to Exclude is *denied-in-part* and *dismissed-as-moot-in-part*;

Patent Owner's Motion to Exclude is *denied-in-part* and *dismissed-as-moot-in-part*; and

FURTHER ORDERED that, because this is a Final Written Decision, any party to the proceeding seeking judicial review of this Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Appendix E

United States Code Annotated

Title 35. Patents (Refs & Annos)

Part II. Patentability of Inventions and Grant of Patents (Refs & Annos)

Chapter 10. Patentability of Inventions (Refs & Annos)

35 U.S.C.A. § 103

§ 103. Conditions for patentability; non-obvious subject matter

Currentness

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

CREDIT(S)

(July 19, 1952, c. 950, 66 Stat. 798; Pub.L. 98-622, Title I, § 103, Nov. 8, 1984, 98 Stat. 3384; Pub.L. 104-41, § 1, Nov. 1, 1995, 109 Stat. 351; Pub.L. 106-113, Div. B, § 1000(a)(9) [Title IV, § 4807(a)], Nov. 29, 1999, 113 Stat. 1536, 1501A-591; Pub.L. 108-453, § 2, Dec. 10, 2004, 118 Stat. 3596; Pub.L. 112-29, §§ 3(c), 20(j)(1), Sept. 16, 2011, 125 Stat. 287, 335.)

35 U.S.C.A. § 103, 35 USCA § 103

Current through P.L. 116-150.

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