

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PRINCETON CARBON WORKS INC.,
Petitioner,

v.

METRON IP LIMITED,
Patent Owner.

IPR2022-00078
Patent 9,610,800 B2

Before RICHARD H. MARSCHALL, FREDERICK C. LANEY, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. *Background and Summary*

Petitioner, Princeton Carbon Works Inc., requests that we institute an *inter partes* review to challenge the patentability of claims 1–6, 9–12, 14–19, 21, and 22 (the “challenged claims”) of U.S. Patent 9,610,800 B2 (Ex. 1001, “the ’800 patent”). Paper 1 (“Pet.”). Patent Owner, Metron IP Limited, argues that Petitioner’s request is deficient and should not be granted. Paper 6 (“Preliminary Response” or “Prelim. Resp.”). With our authorization, Petitioner filed a Reply (Paper 11, “Reply”) to Patent Owner’s Preliminary Response, and Patent Owner filed a Sur-reply (Paper 12, “Sur-reply”) to Petitioner’s Reply.

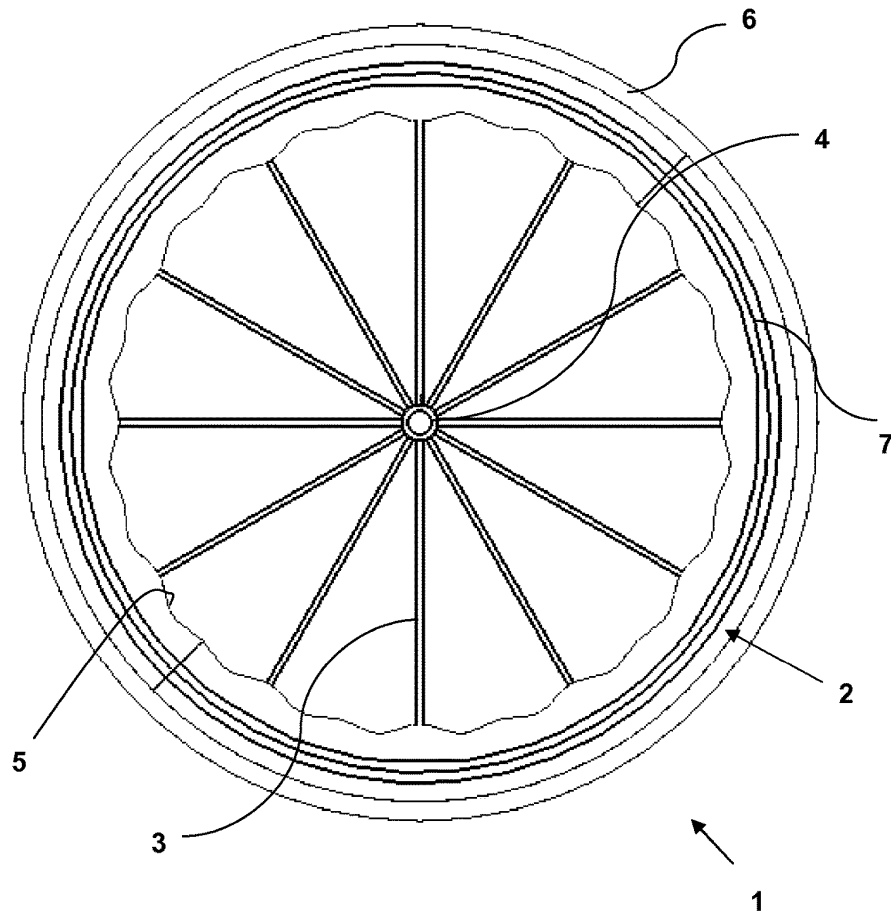
Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we deny the Petition and decline to institute an *inter partes* review.

B. *Related Matters*

The parties identify the following related district court litigation: *SRAM, LLC v. Princeton Carbon Works Inc.*, No. 21-80581-CIV-ALTMAN (S.D. Fl.). Pet. 2; Paper 4, 2. Patent Owner also identifies the following related *inter partes* review: IPR2022-00082. Paper 4, 2.

C. *The ’800 Patent*

The ’800 patent is entitled “Bicycle Wheels” relates to bicycle wheels having a rim with an undulating configuration. Ex. 1001, codes (54), (57). Embodiments of the undulating configuration of the rim can be seen in Figure 1 reproduced below.



As can be seen in Figure 1, above, a bicycle wheel 1 has an annular rim 2, elongate spokes 3 and a central hub 4. *Id.* at 7:49–51. The rim 2 has an inner surface 5 with a plurality of elevations, such as support elevations “which are located in the region of connection of each spoke” and ancillary elevations “which are located between the support elevations.” *Id.* at 8:22–27. The elevations “provide a regularly undulating inner surface of the rim.” *Id.* at 8:29–31.

D. Illustrative Claim(s)

Petitioner challenges claims 1–6, 9–12, 14–19, 21, and 22 of the ’800 patent. Claims 1 and 17 are independent and claim 1 is illustrative:

1. A wheel for use with a bicycle, the wheel comprising:
a hub for mounting the wheel to a bicycle;

a rim about which a tire is mountable; and
a plurality of spokes extending between the hub and the rim,
wherein the rim has a radially inner edge, and wherein at least
part of the radially inner edge has an undulating configuration
and a radial distance that continuously varies between adjacent
peaks and troughs of the undulating configuration, each peak of
the undulating configuration having a convex exterior profile in
a plane of the wheel.

Ex. 1001, 10:61–11:5.

E. Prior Art and Asserted Grounds

Petitioner asserts the following grounds of unpatentability (Pet. 3),
supported by the declaration of Ronald E. Hanson, Ph.D. (Ex. 1002):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–6, 9–12, 14–19, 21, 22	102 ¹	Carlson ²
1–6, 9–12, 14–19, 21, 22	103(a)	Carlson, Zibkoff ³
1–6, 9–12, 14–19, 21, 22	102	Herting ⁴
1–6, 9–12, 14–19, 21, 22	103(a)	Herting, Zibkoff

1. Carlson

Carlson is directed to a bicycle wheel, and in particular to aspects of
the wheel relating to the spokes. Ex. 1007 ¶¶ 1, 10–25. As illustrated below

¹ Because the challenged claims appear to have an effective filing date
before March 16, 2013, we apply the version of 35 U.S.C. §§ 102–103 in
effect before the adoption of the Leahy-Smith America Invents Act (“AIA”),
Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011).

² U.S. Patent Pub. 2005/0242658 A1, pub. Nov. 3, 2005 (“Carlson”) (Ex.
1007).

³ U.S. Patent Pub. 2009/0236902 A1, pub. Sept. 24, 2009 (“Zibkoff”) (Ex.
1008).

⁴ U.S. Patent 6,425,641 B1, issued July 30, 2002 (“Herting”) (Ex. 1006).

in Figure 1, Carlson shows bicycle wheel 10 with spokes 14 extending between hub 12 and rim 16. *Id.* ¶ 47.

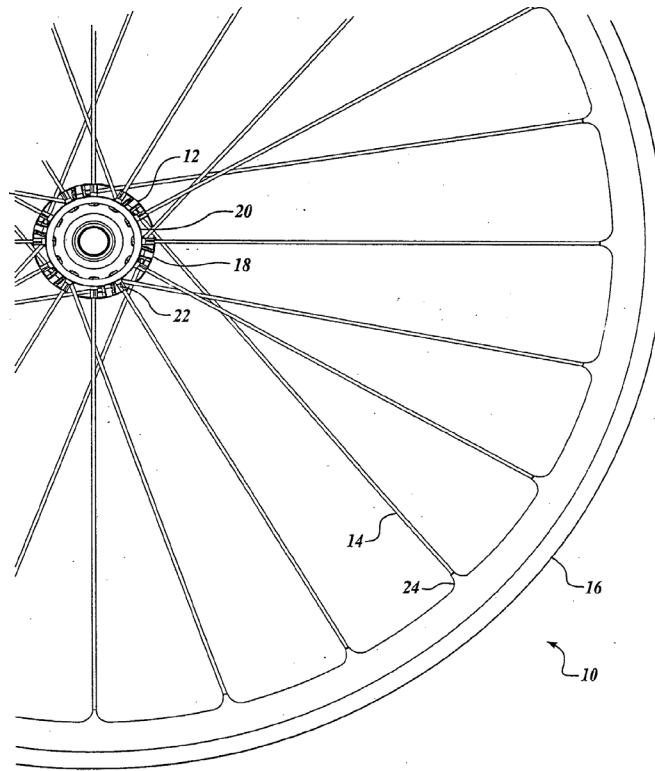


Fig. 1

The bicycle wheel of Figure 1 above, also shows spoke mounts 24 in rim 16. A detail of a spoke mount is illustrated in Figure 7 below.

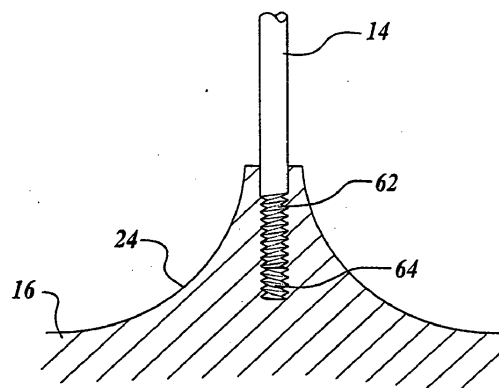


Fig. 7

In the detail view of Figure 7 above, spoke 14 is shown in threaded engagement with spoke mount 24. *Id.* ¶ 56. It can be seen that spoke mount

24 is formed with two concave sides that rise to a flat top and the spoke is mounted in the flat top. Figure 7 also illustrates one of the benefits claimed by Carlson, which is that the mounting hole in the spoke mount does not pass all the way through a wall of the rim. *See id.* at code (57), ¶ 11.

Notably, Carlson does not discuss the aerodynamics of the bicycle wheel. Carlson does discuss adding ferrule 66 at the spoke mount so that there is “a smooth aerodynamic transition” between the spoke mount and the spoke. *Id.* ¶ 59. The ferrule illustrated by Carlson effectively makes the flat top of the spoke mount rise to more of a point to provide a less abrupt transition. *See id.* at Fig. 10.

2. Herting

Herting is directed to a bicycle wheel, and in particular to aspects of the wheel relating to the spokes. Ex. 1006, 1:25–30. As illustrated below in Figure 3, Herting shows a wheel rim with flanges 34 extending around the inner circumference in a “scalloped configuration to define alternating peaks and valleys.” *Id.* at 2:59–65.

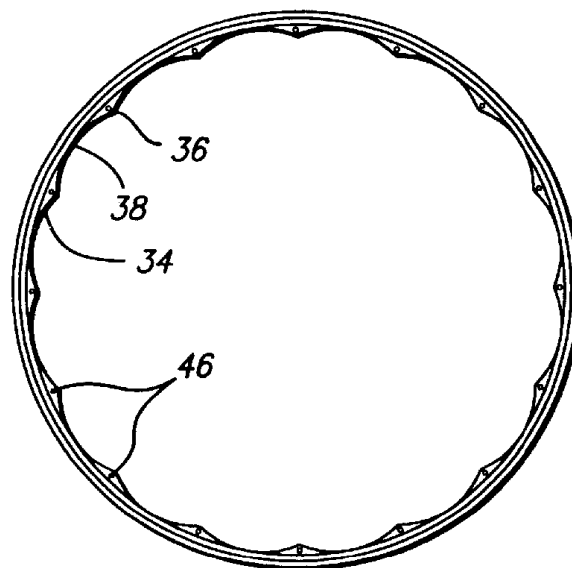


FIG. 3

The bicycle wheel rim of Figure 3 above, also shows apertures 46 in the flanges for receiving spokes.

Herting teaches that:

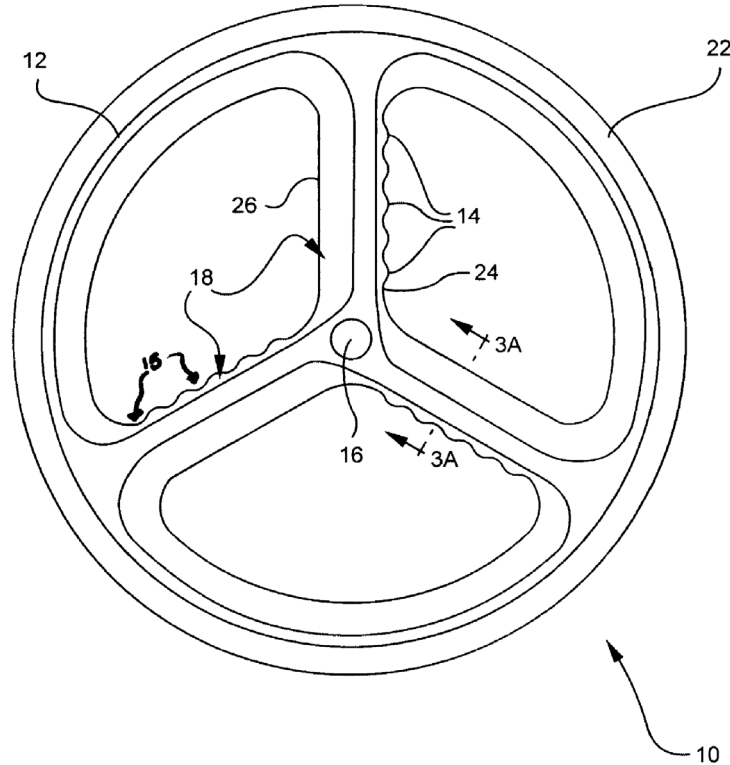
The primary objective of the invention is to provide a sturdy easy to manufacture lightweight cycle rim which is less susceptible to distortion than prior art rims particularly for tubeless inflatable tires in which spokes interconnecting the rim to a hub portion of the cycle wheel can be replaced without deflating or dismounting the tire.

Id. at 1:25–30.

It is also notable that Herting does not discuss the aerodynamics of the bicycle wheel.

3. *Zibkoff*

Zibkoff is directed “to bicycle wheels and more precisely to the spokes of aerodynamic bicycle wheels.” Ex. 1008 ¶ 3. As illustrated below in Figure 3, Zibkoff shows bicycle wheel 10 with spokes 18 extending between hub 16 and rim 12. *Id.* ¶ 45.



The bicycle wheel of Figure 1 above, also shows aerodynamic protrusions 14 and valleys 15 on leading edge 24 of spokes 18. Zibkoff also teaches that:

airflow around an aerodynamic protrusion disposed on a leading edge of a spoke of the wheel is disrupted into a plurality of airflows forming a first vortex about a first valley associated with the protrusion and a second vortex about a second valley associated with the protrusion. The plurality of airflows are joined at the trailing edge of the spoke.

Id. at code (57).

II. ANALYSIS

A. Legal Standards

Petitioner bears the burden to demonstrate unpatentability. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). At this preliminary stage, we determine whether the information presented in the Petition shows a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have

been obvious over the proposed combinations of prior art. *See* 35 U.S.C. § 314(a).

“A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover, “[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Whether a reference anticipates is assessed from the perspective of an ordinarily skilled artisan. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (“[T]he dispositive question regarding anticipation [i]s whether one skilled in the art would reasonably understand or infer from the [prior art reference’s] teaching’ that every claim element was disclosed in that single reference.”).

A claim is unpatentable as obvious under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence,

objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the Petition’s challenges.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Id.* at 13, 17. Petitioner asserts that a person of ordinary skill in the art “would have a master’s degree or PhD in mechanical or aerospace engineering or a related field, or would have equivalent work experience in the field of aerodynamics.” Pet. 8–9 (citing Ex. 1002 ¶ 21).

Patent Owner argues for a slightly different level of skill and that Petitioner’s proposed level of skill excludes the inventor of the ’800 patent:

A person of ordinary skill in the art in early 2011 would have at least (1) a bachelor’s degree in mechanical engineering or an equivalent degree in the aerodynamics or fluid dynamics fields plus one or more years of experience in the design work related to aerodynamics or fluid dynamics or bicycle component design relating to aerodynamics; (2) a Master’s or Ph.D. degree in mechanical engineering or in the fields of aerodynamics or fluid dynamics plus a strong understanding of mechanical design principles; or (3) the equivalent work experience in the fields of aerodynamics or fluid dynamics or bicycle component design relating to aerodynamics. *See* Ex. 2011, ¶35; *id.* at 132-33. . . .

Notably, Princeton’s expert Dr. Hanson’s proposed definition of the level of ordinary skill (Ex. 1002, ¶ 21) would appear to exclude Dimitrios Katsanis, the inventor of the ’800 Patent, from being considered a person of ordinary skill in the art because Mr. Katsanis only possessed a bachelor’s degree in engineering at the time of the ’800 Patent invention even though he was a bicycle wheel and component designer for years. There should be no doubt that Mr. Katsanis was at least a person of ordinary skill in the art at the time of the invention. *See* Ex. 2011, ¶¶37-38; *id.* at 133.

Prelim. Resp. 38–39.

At this stage of the proceeding, and on this record, we determine it is unnecessary to resolve any differences in the parties’ definitions of the level of ordinary skill in the art, as any distinction does not impact our Decision.

C. Claim Construction

In *inter partes* review, we construe claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2020).

Petitioner asserts that no terms require express construction at this stage, and Patent Owner does not argue otherwise. Pet. 20–21; *see generally* Prelim. Resp. We agree. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms that are in controversy, and only to the extent necessary to resolve the controversy.”) (internal quotation omitted).

D. 35 U.S.C. §§ 102, 103(a) – Carlson and Zibkoff

Petitioner argues that Carlson alone anticipates, or the combination of Carlson and Zibkoff renders obvious claims 1–6, 9–12, 14–19, 21, and 22. Pet. 37–48, 67–85. Patent Owner argues against the references. Prelim. Resp. 41–49, 56–64. Patent Owner relies on the Declaration of Dr. Laurens Howle for support. Ex. 2011. For the reasons expressed below, we determine that Petitioner has not established a reasonable likelihood of succeeding in showing that claims 1–6, 9–12, 14–19, 21, and 22 are unpatentable.

1. Analysis of Claim 1

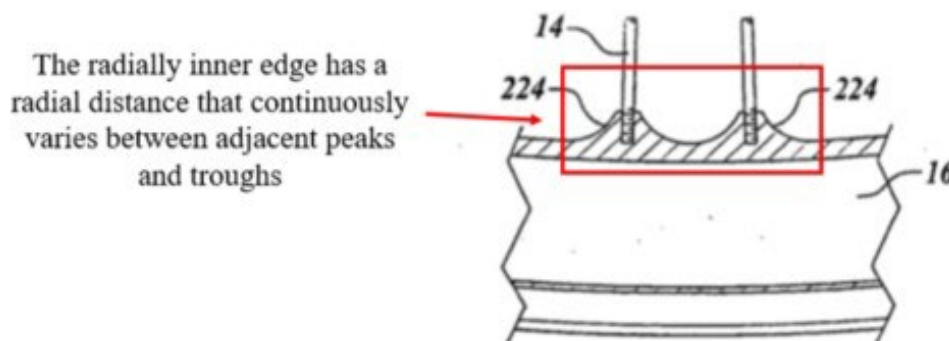
Petitioner argues that Carlson teaches or suggests all elements of claim 1 and in the alternative, the combination of Carlson and Zibkoff teaches all elements of claim 1. Pet. 37–48, 67–72. For our discussion, we focus on the requirements of claim 1 that:

- 1) at least part of the radially inner edge [of the rim] has an undulating configuration and a radial distance that continuously varies between adjacent peaks and troughs of the undulating configuration,
- 2) each peak of the undulating configuration having a convex exterior profile in a plane of the wheel.

a) Carlson Alone

Concerning Carlson alone, Petitioner argues that Carlson’s flat top of the spoke mount is part of “a radial distance that continuously varies.” Pet. 69–70. We disagree.

Petitioner points to Carlson Figure 9B as showing this claim element. Pet. 69. We reproduce one of Petitioner’s annotated versions of Figure 9B below.



Petitioner annotates Figure 9B, which shows a portion of a bicycle rim, to include a red arrow pointing to a red box which has been added around an inner portion of the rim. *Id.* at 69. Petitioner also annotates the figure to include the statement: “The radially inner edge has a radial distance

that continuously varies between the adjacent peaks and troughs.” *Id.*

Petitioner explains that the radial distance continuously varies “at least between adjacent spokes 14.” *Id.*

Petitioner fails to explain how the peaks at spokes 14, which are flat, show a radial distance that continuously varies as asserted by Petitioner in the annotated figure. Further, by failing to address the flat tops of the peaks, Petitioner fails to explain how Figure 9B shows a radial distance that continuously varies between the adjacent troughs as also required by the claim.

Next, Petitioner argues that Carlson also teaches that “each spoke mount 324 can also include a cone-shaped ferrule for a smooth aerodynamic transition.” *Id.* at 69–70 (citing Ex. 1007 ¶ 59). Petitioner argues that the “spoke mounts 324 and the ferrules 66 also provide an undulating configuration along the ridge 30 of the rim, and the radially inner edge has a radial distance that continuously varies between adjacent peaks and troughs.” *Id.* at 70.

Both Carlson’s Figure 10 and Petitioner’s drawing (Pet. 70) in the Petition of a ferrule show the ferrule having a flat top. Petitioner fails to explain how these flat tops show a radial distance that continuously varies or how Carlson teaches a radial distance that continuously varies between the adjacent troughs as also required by the claim.

We further note that Carlson teaches that the ferrules are separate pieces that are “slid on the spoke” such that after the spoke is threaded “within [the] spoke mount . . . a wide end [of the ferrule] abuts the inward end [i.e. flat top] of [the] spoke mount.” Ex. 1007 ¶ 59. Thus, Carlson does not appear to teach that the ferrules are part of the rim and Petitioner’s

reliance on the ferrules for support of Carlson teaching a rim that continuously varies is misplaced.

Similar to the above, the Petition also asserts that the flat tops of the spoke mounts and the ferrules are peaks having convex exterior profiles. Pet. 70–71. These arguments fail for essentially the same reasons discussed above with respect to a continuously varying radial distance—Petitioner fails to explain how a flat surface is convex. *See also* Prelim. Resp. 61–62. Notably, Petitioner does not argue that one of skill in the art would understand that Carlson’s spoke mounts are peaks having convex exterior profiles. Further, the cited figures do not establish sufficiently that the spoke mounts have convex exterior profiles.

Petitioner also argues that Carlson’s spoke mounts have convex exterior profiles because they have the same profile as Figure 9 of the ’800 patent. Pet. 70. Petitioner argues that a licensee of the ’800 patent offered Figure 9 “as an embodiment of the ’800 Patent claims” in the infringement contentions in the parallel district court proceeding. *Id.* (citing Ex. 1023; Ex. 1024, 1). We reproduce Figure 9 of the ’800 patent below.

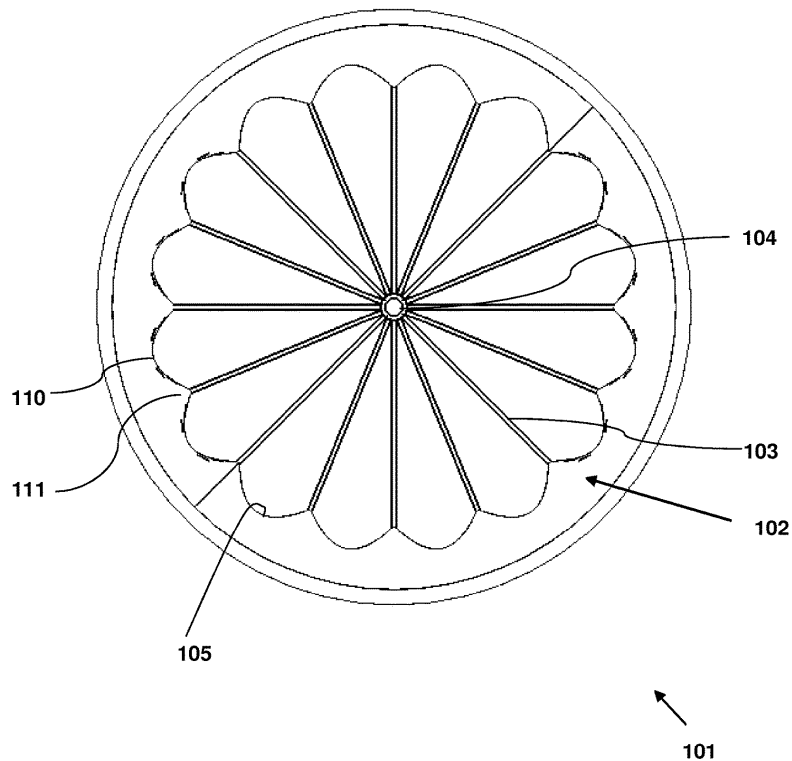


Figure 9 of the '800 patent shows a bicycle wheel with a rim having an undulating profile.

Other than referring to the figure, Petitioner does not explain why the inner rim profiles are the same. Pet. 71. We first note that the exact profile of the peaks in Figure 9 of the '800 patent is not clear. We decline to determine based on the current record whether or not one of skill in the art would consider this Figure as showing convex peaks. At the same time, it is not clear that the inner rim profiles of Figure 9 of the '800 patent and Carlson's Figure 9B are the same. In particular, it is not readily apparent that Figure 9 of the '800 patent shows the same flat tops of the peaks as taught by Carlson. Even if Figure 9 did show flat tops, the statement of a litigant in district court litigation does not bind us here. We note that other figures of the '800 patent clearly show a rim having convex peaks covered by the claim limitation. *See, e.g.*, Ex. 1001, Figs. 1, 5.

For all of these reasons, and based on the current record, we determine that the Petition fails to show a reasonable likelihood that Carlson teaches all of the features of claim 1.

b) Carlson and Zibkoff

Petitioner also argues that the combination of Carlson and Zibkoff teaches the “radial distance continuously varies” and “convex peak” limitations of claim 1. Pet. 37–48, 71–72. The Petition explains that “*Carlson*’s undulating configuration [of the rim] would be modified to incorporate the shape of *Zibkoff*’s scallop-shaped, aerodynamic protrusions [from *Zibkoff*’s spokes].” *Id.* at 37 (citing Ex. 1002 ¶ 91).⁵

As for the reasoning for the combination, Petitioner argues that “*Carlson* and *Zibkoff* both state a desire to improve the aerodynamics of bicycle wheel components and disclose structures to do so.” *Id.* at 41. However, Petitioner overstates the teachings of the references. For example, Carlson does not discuss the aerodynamics of the bicycle wheel. The only statement about aerodynamics in Carlson is that adding a ferrule can provide “a smooth aerodynamic transition” between the spoke mount and the spoke. Ex. 1007 ¶ 59.

Petitioner states that “*Zibkoff* explains that its “aerodynamic *scallop-shaped protrusion* 14 and antipodean valley 15 may be configured to *provide aerodynamic benefit* to the spoke 18.” Pet. 41 (quoting Ex. 1008 ¶ 51). Petitioner then asserts that it would have been obvious to modify Carlson’s rim in view of Zibkoff because “the trailing and leading edges of

⁵ We do not address Petitioner’s argument that Carlson’s ferrules would have been modified in view of Zibkoff’s teachings (Pet. 37–48, 71–72), for as discussed above, Carlson does not teach that the ferrules are part of the rim.

Carlson's rim are subject to the same air forces as the leading and trailing edge of *Zibkoff's* spoke.” *Id.* at 44; *see also* Ex. 1002 ¶¶ 98–100.

Petitioner's reasoning that the air forces at *Carlson's* rim are the same as those at *Zibkoff's* spoke is that air flows across the spoke and air flows across the rim, and they both have leading and trailing edges. Pet. 42–44. Petitioner supports its reasoning by citing to its expert and to the '800 patent. *Id.* at 44–46; Ex. 1002 ¶¶ 98–102. Petitioner's declarant repeats the same reasoning as Petitioner, which we determine to be conclusory.

This analysis fails to address the differences in air flow experienced at the rim versus the spoke, for example due to the fact that the rim is spaced further away from the hub or differences based on rotation or the differences based on the shape and positioning of the leading and trailing edges. *See* Prelim. Resp. 47; Ex. 2011 ¶¶ 69–70, 73.

Further, it is not clear from Petitioner's analysis which edge of a rim Petitioner is considering to be the leading edge and which edge is the trailing edge. Pet. 43–44. Petitioner's identification involves a box surrounding a section of rim including both the inner rim and the outer rim and an arrow pointing to the box. *Id.* For *Carlson*, the Petition includes two figures of Petitioner's own creation, each with a box surrounding the same section of rim, with arrows to indicate airflow and an arrow pointing to the box with the words “leading edge” or “trailing edge.” *Id.* It is not clear whether Petitioner's analysis is for one section of the rim, or two different sections. If the analysis is for one section, the analysis fails to discuss the bicycle tire which is attached to the rim and what affect that has on the air flow when compared to the leading and trailing edges of *Zibkoff's* spokes, which have no tire surrounding one of its edges. If it is for two opposing sections, the analysis fails to discuss the spokes and hub in between the two sections and

what affect they have on the air flow or why the mostly empty space would be similar to the spoke body in Zibkoff.

Though we agree that there maybe be similarities in the air forces at Carlson's rim and at Zibkoff's spoke, Petitioner's analysis is insufficient to establish that they are the same or similar enough that the purported air flow advantages of Zibkoff's spoke configuration apply to Carlson's rim.

Petitioner's analysis is further weakened by the fact that the only supporting reference that Petitioner identifies linking the aerodynamic benefits between the rim and the spoke is the '800 patent. *See* Pet. 44–46; Ex. 1002 ¶¶ 101–102; *see also* Prelim. Resp. 47–48. Thus, Petitioner's analysis suggests hindsight bias, and we decline to consider Petitioner's and their declarant's discussion of how the teachings of the '800 patent provide a motivation to combine Carlson and Zibkoff.

After arguing over the “aerodynamic benefits,” Petitioner then argues that “the '800 Patent describes its undulating configuration as providing lightweight, structural support for bicycle wheels” and that the combination of Carlson and Zibkoff would also provide this benefit. Pet. 46. This analysis, also based on the teachings of the '800 patent suggests hindsight bias. Further it is unclear how Petitioner's reliance on Zibkoff's teaching that “[t]he spoke 18 is configured to provide internal support to the wheel 10 and to support the hub 16,” applies to adding protrusions to the rim. Ex. 1008 ¶ 35 (cited at Pet. 46). Thus, Petitioner's statement that the “spoke and *aerodynamic protrusions* as providing ‘internal support’ to bicycle wheels and their hubs” overstates the teachings of Zibkoff. *See* Pet. 46 (emphasis added).

For all of these reasons, and based on the current record, we determine that the Petition fails to show a reasonable likelihood that the combination of Carlson and Zibkoff teaches all of the features of claim 1.

E. 35 U.S.C. §§ 102, 103(a) – Herting and Zibkoff

Petitioner argues that either Herting alone anticipates or the combination of Herting and Zibkoff renders obvious claims 1–6, 9–12, 14–19, 21, and 22. Pet. 27–37, 48–67. Patent Owner argues against the references. Prelim. Resp. 41–55. Patent Owner relies on the Declaration of Dr. Laurens Howle for support. Ex. 2011. For the reasons expressed below, we determine that Petitioner has not established a reasonable likelihood of succeeding in showing that claims 1–6, 9–12, 14–19, 21, and 22 are unpatentable.

1. Analysis of Claim 1

Petitioner argues that Herting teaches or suggests all elements of claim 1 and in the alternative, the combination of Herting and Zibkoff teaches all elements of claim 1. Pet. 27–37, 48–54. For our discussion, we focus on the requirements of claim 1 that:

each peak of the undulating configuration having a convex exterior profile in a plane of the wheel.

a) Herting Alone

Concerning Herting alone, Petitioner argues that Herting’s flanges are peaks having convex exterior profiles. Pet. 51. The sole reason given is the assertion that Herting’s flanges have the same profile as Figure 9 of the ’800 patent. *Id.* at 51–52. As discussed previously Petitioner argues that a licensee of the ’800 patent offered Figure 9 “as an embodiment of the ’800 Patent claims” in the infringement contentions in the parallel district court proceeding. *Id.* at 52 (citing Ex. 1023, 1; Ex. 1024, 1; Ex. 1027, 6). Notably,

Petitioner does not argue that one of skill in the art would understand that Herting's flanges are peaks having convex exterior profiles. Further, the cited figures do not establish sufficiently that the spoke mounts have convex exterior profiles.

Other than referring to the figure, Petitioner does not explain why the inner rim profiles are the same. Pet. 51–52. As we previously discussed, the exact profile of the peaks in Figure 9 of the '800 patent is not clear and other figures show the convex peaks more clearly. We decline to determine based on the current record whether or not one of skill in the art would consider this Figure as showing convex peaks. At the same time, it is not clear that the inner rim profiles of Figure 9 of the '800 patent and Herting's Figures 3 and 4 are the same.

For all of these reasons, and based on the current record, we determine that the Petition fails to show a reasonable likelihood that Herting teaches all of the features of claim 1.

b) Herting and Zibkoff

Petitioner also argues that the combination of Herting and Zibkoff teaches the “convex peak” limitation of claim 1. Pet. 27–37, 53–54. The Petition explains that “*Herting's* scallop-shaped, undulating configuration [of the rim] would be modified to incorporate the shape of *Zibkoff's* scallop-shaped, aerodynamic protrusions [from *Zibkoff's* spokes].” *Id.* at 27 (citing Ex. 1002 ¶ 70).

Petitioner provides essentially the same reasoning for this combination as discussed above with respect to Carlson and Zibkoff. The reasoning here falters for similar reasons.

Petitioner argues that “*Herting and Zibkoff* disclose bicycle wheels designed to increase aerodynamic flow and decrease drag.” *Id.* at 30; *see*

also id. at 30 (citing Ex. 1006, 3:26–46; Ex. 1008 ¶ 32), 34 (citing Ex. 1008 ¶¶ 16–17). Petitioner overstates the teachings of the references, as both focus on spoke design in regards to aerodynamics. *See* Ex. 1006, 3:26–46; Ex. 1008 ¶ 32.

For example, Petitioner states that Herting teaches a flange design, which “arrangement allows ‘for reduced aerodynamic drag.’” Pet. 30 (quoting Ex. 1006, 3:26–37). However, Herting’s only statement about aerodynamics is that “it is possible to place the wheel spokes either outside of the flanges 44, 54 or inside of the flanges 92, 94 for reduced aerodynamic drag,” not that the flange design provides “for reduced aerodynamic drag.” Ex. 1006, 3:34–37.

Petitioner states that “*Zibkoff* explains that its “aerodynamic ***scallop-shaped protrusion*** 14 and antipodean valley 15 may be configured to ***provide aerodynamic benefit*** to the spoke 18.” Pet. 31 (quoting Ex. 1008 ¶ 51). Petitioner then asserts that it would have been obvious to modify Herting’s rim in view of *Zibkoff* because “they both encounter the same resistive air forces and seek to improve aerodynamic performance.” *Id.* at 33; *see also* Ex. 1002 ¶¶ 80–82.

Petitioner’s reasoning that the air forces at Herting’s rim are the same as those at *Zibkoff*’s spoke is that air flows across the spoke and air flows across the rim, and they both have leading and trailing edges. Pet. 32–33. Petitioner supports its reasoning by citing to its expert and to the ’800 patent. *Id.*; Ex. 1002 ¶¶ 80–85. Petitioner’s declarant repeats the same reasoning as Petitioner, which we determine to be conclusory.

This analysis fails to address the differences in air flow experienced at the rim versus the spoke, for example due to the fact that the rim is spaced further away from the hub or differences based on rotation or the differences

based on the shape and positioning of the leading and trailing edges. *See* Prelim. Resp. 47; Ex. 2011 ¶¶ 69–70, 73.

Further, it is not clear from Petitioner’s analysis which edge of a rim Petitioner is considering to be the leading edge and which edge is the trailing edge. Pet. 33. Like Petitioner’s analysis of Carlton, Petitioner’s identification of the leading and trailing edges of Herting’s rim involve boxes surrounding a section of rim including both the inner rim and the outer rim and an arrow pointing to the box. *Id.* However, unlike Carlson, the Petition includes the boxes on one figure of Petitioner’s own creation, with each box on opposite sides of a rim of Herting. *Id.* Thus, it would appear that Petitioner’s analysis is for two different sections of the rim. However, it is still not clear whether the analysis applies to the inner edge or the outer edge of the rim or both. Further, for the two opposing sections of the rim, the analysis fails to discuss the spokes and hub in between the two sections and what affect they have on the air flow or why the mostly empty space would be similar to the spoke body in Zibkoff so that the air forces are the same. The analysis also fails to take into account how the presence of the tire on the rim alters the air flow over the identified edges, and how that flow differs from Zibkoff’s air flow over its spokes.

Though we agree that there may be similarities in the air forces at Herting’s rim and at Zibkoff’s spoke, Petitioner’s analysis is insufficient to establish that they are the same or similar enough that the purported air flow advantages of Zibkoff’s spoke configuration apply to Herting’s rim.

Petitioner’s analysis is further weakened by the fact that the only supporting reference that Petitioner identifies linking the aerodynamic benefits between the rim and the spoke is the ’800 patent. *See* Pet. 33–34; Ex. 1002 ¶¶ 83–85; *see also* Prelim. Resp. 47–48. Thus, Petitioner’s analysis

suggests hindsight bias, and we decline to consider Petitioner's and their declarant's discussion of how the teachings of the '800 patent provide a motivation to combine Herting and Zibkoff.

After arguing over the "aerodynamic benefits," Petitioner then argues that "the '800 Patent describes its undulating configuration as providing lightweight, structural support for bicycle wheels" and that the combination of Herting and Zibkoff would also provide this benefit. Pet. 35. This analysis, also based on the teachings of the '800 patent suggests hindsight bias. Further it is unclear how Petitioner's reliance on Zibkoff's teaching that "[t]he spoke 18 is configured to provide internal support to the wheel 10 and to support the hub 16," applies to adding protrusions to the rim. Ex. 1008 ¶ 35 (cited at Pet. 35). Thus, Petitioner's statement that the "spoke and *aerodynamic protrusions* as providing 'internal support' to bicycle wheels and their hubs" overstates the teachings of Zibkoff. See Pet. 35 (emphasis added).

For all of these reasons, and based on the current record, we determine that the Petition fails to show a reasonable likelihood that the combination of Herting and Zibkoff teaches all of the features of claim 1.

F. Claims 2–6, 9–12, 14–19, 21, and 22

Claims 1 and 17 are independent. Claims 6, 9–12, 14–16 depend from claim 1, and claims 18, 19, 21, and 22 depend from claim 17. Though claims 1 and 17 are not identical, Petitioner asserts that most of the limitations claim 17 are "satisfied for the same reasons as claim 1." Pet. 65–66, 84. As Petitioner has not shown a reasonable likelihood that the cited references teach or suggest all of the features of claim 1 and Petitioner fails to identify any differences between claim 1 and any other claim that would address the deficiencies in the analysis of claim 1 we discuss above, we

determine that Petitioner has not shown a reasonable likelihood that the cited references teach or suggest all of the features of the challenged claims.

III. CONCLUSION

For the foregoing reasons, we have determined that there is not a reasonable likelihood that the Petitioner would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, the Petition is denied, and no trial is instituted.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* and that no trial is instituted.

FOR PETITIONER:

Derek Constantine
Serge Subach
MINTZ, LEVIN, COHN, FERRIS, GLOVSKY,
POPEO, P.C.
deconstantine@mintz.com
ssubachmintz@mintz.com

FOR PATENT OWNER:

Michael Hickey
Michael Durbin
LEWIS RICE LLC
mhickey@lewisrice.com
mdurbin@lewisrice.co