

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HANGZHOU CHIC INTELLIGENT TECHNOLOGY CO., LTD.,
Petitioner,

v.

SHANE CHEN,
Patent Owner.

IPR2016-01778
Patent 8,738,278 B2

Before MEREDITH C. PETRAVICK, HYUN J. JUNG, and
GEORGE R. HOSKINS, *Administrative Patent Judges*.

PETRAVICK, *Administrative Patent Judge*.

DECISION

Denying Institution of Inter Partes Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

Hangzhou Chic Intelligent Technology Co., Ltd. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–9 of U.S. Patent No. 8,738,278 B2 (Ex. 1001, “the ’278 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 2 (“Pet.”). Shane Chen (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 7 (“Prelim. Resp.”).

Section 314(a) of Title 35 of the United States Code provides that an *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). We determine that the Petition fails to show that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. For the reasons described below, we do not institute an *inter partes* review of claims 1–9.

B. Related Proceedings

Patent Owner indicates that the ’278 patent is the subject of several proceedings in the U.S. District Courts and a proceeding at the International Trade Commission. Paper 5, 1–3. In addition, the ’278 patent is the subject of pending Reissue Application No. 15/165,654, in which Patent Owner seeks to amend claims 1, 5–7, and 9 and to add new claims. *Id.* at 2.

C. The '278 Patent

The '278 patent is titled “Two-wheel, Self-balancing Vehicle with Independently Movable Foot Placement Sections” and issued on May 27, 2014, from an application claiming priority to a provisional application filed on February 12, 2012. Ex. 1001, [45], [54], [60]. The '278 patent discloses a two-wheel, self-balancing vehicle with independently movable platform sections. *Id.* at 2:42–45. Figure 1 of the '278 patent is reproduced below.

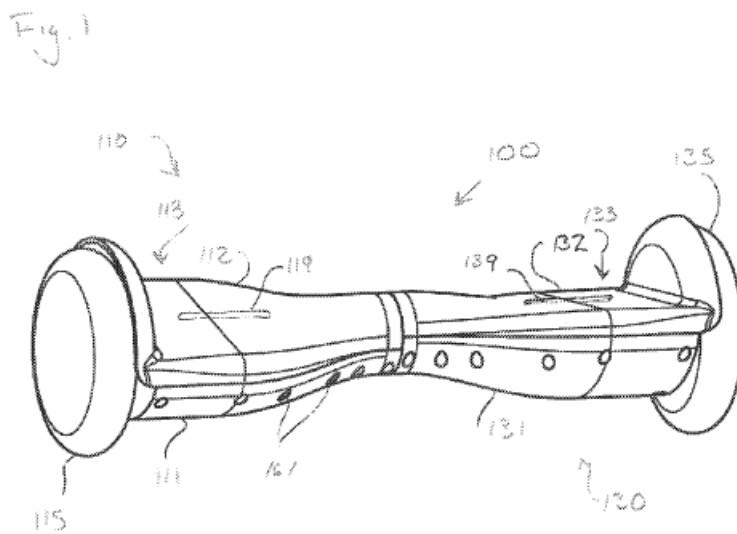


Figure 1 depicts two-wheel, self-balancing vehicle 100. *Id.* at 2:42–44. Vehicle 100 has first section 110 and second section 130. *Id.* at 2:46–47. Each section has a bottom housing member (111, 131), a top housing member (112, 132), a foot placement section (113, 133), and a wheel (115, 135). *Id.* at 2:47–51, 2:64–65. Wheels 115, 135 have an axle 116, 136 and a motorized hub assembly 117, 137. *Id.* at 2:64–65, Fig. 2.

First section 110 and second section 130 are independently movable to one another and pivot around shaft 170. *Id.* at 3:36–38. Each section has a sensor (120, 140), which independently measures the position of the respective section. *Id.* at 3:4–11. The sensed position information is used to

drive the corresponding motor and wheel, and control logic 150, 151 translates the position information to motor drive signals. *Id.* at 3:9–13. Thus, the operator independently controls the driving of each wheel. *See id.* at 2:9–18.

D. Illustrative Claim

Claim 1 is independent. Claims 2–9 depend directly or indirectly from claim 1. Claim 1, reproduced below, is illustrative of the '278 patent.

1. A two-wheel, self-balancing vehicle device, comprising:
 - a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another;
 - a first wheel associated with the first foot placement section and a second wheel associated with the second foot placement section, the first and second wheels being spaced apart and substantially parallel to one another;
 - a first position sensor and a first drive motor configured to drive the first wheel, a second position sensor and a second drive motor configured to drive the second wheel; and
 - control logic that drives the first wheel toward self-balancing the first foot placement section in response to position data from the first sensor and that drives the second wheel toward self-balancing the second foot placement section in response to position data from the second foot placement section.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Ground	Claim(s)	Prior Art
§ 102(b)	1 and 3–9	Sasaki ¹
§ 103(a)	2	Sasaki and Jiang ²
§ 103(a)	9	Sasaki and Kakinuma ³
§ 102(b)	1, 3, 4, 8, and 9	Ishii ⁴
§ 103(a)	2	Ishii and Jiang
§ 103(a)	5–7	Ishii and Imai ⁵
§ 103(a)	1–9	Kamen, ⁶ Nishikawa, ⁷ and Jiang

Petitioner proffers a Declaration of Dr. Gerald Cook (Ex. 1008) to support its unpatentability analysis. Patent Owner proffers a Declaration of W. Mark Richter (Ex. 2002) to support its arguments in the Preliminary Response.

¹ Makiko Sasaki & Naoto Yanagihara, *Steering Control of the Personal Riding-type Wheeled Mobile Platform (PMP)*, 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2005, pp. ii–lii and 3821–3826 (August 2–6, 2005) (Ex. 1002).

² U.S. Patent No. 7,367,572 B2 (issued May 6, 2008) (Ex. 1003).

³ U.S. Patent Application Publication No. 2006/0260857 A1 (published Nov. 23, 2006) (Ex. 1013).

⁴ U.S. Patent Application Publication No. 2008/0147281 A1 (published June 19, 2008) (Ex. 1004).

⁵ U.S. Design Patent No. D601,922 S (issued Oct. 13, 2009) (Ex. 1005).

⁶ U.S. Patent No. 6,367,817 B1 (issued Apr. 9, 2002) (Ex. 1006).

⁷ U.S. Patent No. 7,481,291 B2 (issued Jan. 27, 2009) (Ex. 1007).

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation approach). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as they would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner proposes a construction for the term “control logic.” See Pet. 7–8. For the purposes of this Decision, however, we determine that no explicit claim constructions are needed to resolve the issues before us. See, e.g., *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”) (quotation omitted).

B. Anticipated by Sasaki

Petitioner contends that Sasaki anticipates claims 1 and 3–9. Pet. 8–17; see also Ex. 1008 ¶¶ 39–60 (testimony of Dr. Cook substantially repeating the contentions in the Petition). In particular, Petitioner contends that Sasaki describes “a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another” (Ex. 1001, 4:61–63), as required by

independent claim 1, because Sasaki discloses that the shape of its standing plate is deformed by the changing of the rider's center of gravity. Pet. 9–12 (citing Ex. 1002, 3822). Patent Owner disagrees. Prelim. Resp. 9–14.

“A claim is anticipated 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. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Under principles of inherency, when a reference is silent about an asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991).

Sasaki is a paper titled “Steering Control of the Personal Riding-type Wheeled Mobile Platform.” Ex. 1002, 3821. Figure 2 of Sasaki is reproduced below.



Figure 2 depicts a personal riding-type wheeled mobile platform. *Id.* at 3822. The mobile platform has two independently driven wheels and a standing platform (aka standing base or standing plate). *Id.* at 3821. A rider can drive and steer the mobile platform by changing the relative position of

his or her center of gravity. *Id.* The center of gravity is determined using four strain gages attached to the corners of the standing plate. *Id.* at 3822. Sasaki states “[a]lthough the shape of the plate is deformed by the changing of the 2-dimensional position of the rider’s [center of gravity] while he/she is on the standing base, the position of the rider’s COG can be estimated using the four force sensor’s outputs” *Id.*

Based on Sasaki’s statement concerning deformation, reproduced above, Petitioner argues that “as the standing plate is flexed, the two sections thereof on which the rider places his/her two feet move with respect to each other.” Pet. 9. Petitioner argues that “[t]hus, the right foot and left foot sections of the standing plate are coupled and independently movable with respect to one another.” *Id.* at 12. As Patent Owner points out, however, Petitioner’s argument is not sufficiently supported by Sasaki. See Prelim. Resp. 13–14. Sasaki is silent as to how the standing plate deforms and Sasaki does not support, expressly, Petitioner’s contention that the deformation would cause independent movement between right and left foot sections. Petitioner does not provide any other sufficient explanation as to why the deformation would necessarily mean right foot and left foot sections of Sasaki’s standing plate are independently movable with respect to one another. Likewise, Petitioner’s declarant Dr. Cook fails to provide any sufficient explanation, as Dr. Cook’s testimony substantially repeats the arguments in the Petition. See Ex. 1008 ¶ 45. Petitioner, thus, fails to sufficiently show that Sasaki describes, either expressly or inherently, “a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another” (Ex. 1001, 4:61–63), as required by independent claim 1.

It is Petitioner's burden to establish the reasonable likelihood of unpatentability. *See* 37 C.F.R. § 42.108(c). Claims 3–9 depend directly or indirectly from claim 1. We determine that the Petition fails to show that there is a reasonable likelihood that claims 1 and 3–9 are anticipated by Sasaki.

C. Obvious Over Sasaki and Jiang and Obvious Over Sasaki and Kakinuma

Petitioner contends that claim 2 is unpatentable over Sasaki and Jiang and claim 9 is unpatentable over Sasaki and Kakinuma. Pet. 17–22. Claims 2 and 9 depend from claim 1, and Petitioner does not rely upon Jiang or Kakinuma to cure the deficiency of Sasaki discussed above (*see id.*). We determine that the Petition fails to show that there is a reasonable likelihood that claim 2 is unpatentable over Sasaki and Jiang and claim 9 is unpatentable over Sasaki and Kakinuma.

D. Anticipated by Ishii

Petitioner contends that claims 1, 3, 4, 8, and 9 are anticipated by Ishii. Pet. 22–33; *see also* Ex. 1008 ¶¶ 73–94 (testimony of Dr. Cook substantially repeating the contentions in the Petition). In particular, Petitioner contends that Ishii describes “a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another” (Ex. 1001, 4:61–63), as required by independent claim 1, because Ishii discloses step plates 4L, 4R remain horizontal when traveling on laterally inclined surfaces. Pet. 26–27 (citing Ex. 1004 ¶¶ 38, 79, 95, Figs. 4B, 4C). Patent Owner disagrees. Prelim. Resp. 20–23.

Ishii is a patent application publication titled “Travel Device” and published on June 19, 2008. Ex. 1004, [43], [54]. Figures 4A, 4B, and 4C of Ishii are reproduced below.

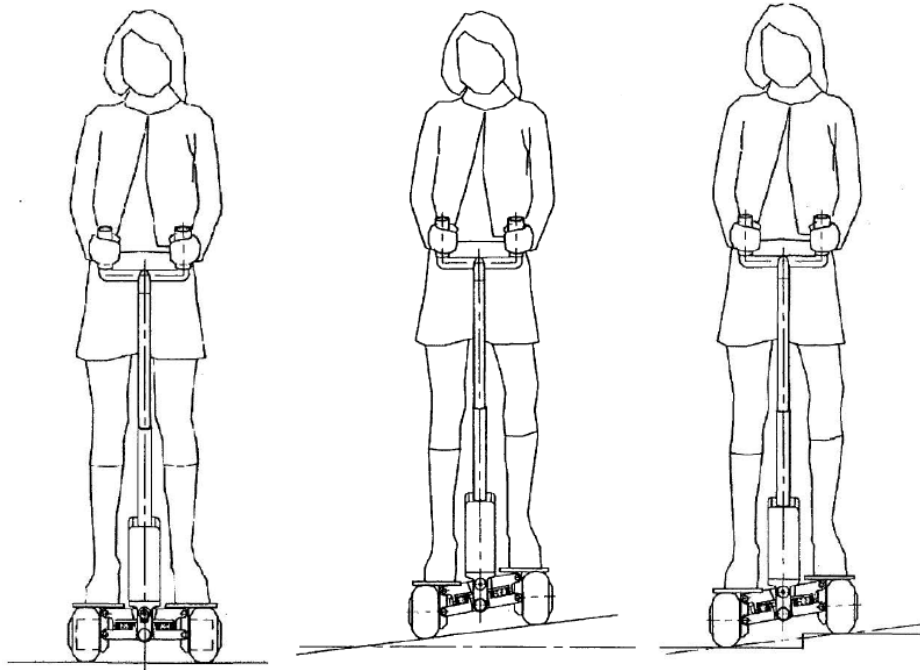


Fig. 4A

Fig. 4B

Fig. 4C

Figures 4A, 4B, and 4C depict Ishii’s co-axial two-wheel travel device on a flat road, a lateral slope, and a step, respectively. *Id.* ¶¶ 20–22, 79. The travel device has two step plates 4L, 4R on which a driver places his or her feet. *Id.* ¶ 67. Ishii states “when the lateral inclination of a road changes as shown in FIGS. 4A, 4B and 4C, the step is kept horizontal when a passenger does not intentionally apply any control force to the handle and the step, thereby permitting a passenger to travel stably.” *Id.* ¶ 95; *see also id.* ¶ 83

(“This allows a passenger to proceed straight while maintaining a stable standing posture without tilting the body to the left or right.”).

Based on Ishii’s statements concerning keeping the step plates horizontal and Figs. 4A–C, reproduced above, Petitioner argues that “one side of the vehicle can be independently raised or lowered while the other remains in place.” Pet. 27; *see also* Ex. 1008 ¶¶ 79–80. As Patent Owner points out, however, Petitioner’s argument is not sufficiently supported by Ishii. *See* Prelim. Resp. 20–23. Ishii does not expressly disclose that the steps 4L and 4R can be raised or lowered independently. Indeed, Ishii suggests the opposite. Ishii discloses that “steps 4L and 4R are coupled to each other by a link mechanism (not shown) so that they maintain the parallel relationship with each other,” that “handle 5 and the steps 4L [and] 4R are coupled to each other by a link mechanism (not shown) so that they maintain the perpendicular relationship to each other” and that “the handle 5 and the steps 4L and 4R tilt *in conjunction* with each other.” Ex. 1004 ¶¶ 67, 79 (emphasis added). Petitioner does not address these seemingly contradictory disclosures of Ishii or provide any other sufficient explanation as to how Ishii describes, either expressly or inherently, “a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another” (Ex. 1001, 4:61–63), as required by independent claim 1. Likewise, Dr. Cook fails to provide any sufficient explanation, as Dr. Cook’s testimony substantially repeats the arguments in the Petition. *See* Ex. 1008 ¶¶ 79–80.

It is Petitioner’s burden to establish the reasonable likelihood of unpatentability. *See* 37 C.F.R. § 42.108(c). Claims 3, 4, 8, and 9 depend directly or indirectly from claim 1. We determine that the Petition fails to

show that there is a reasonable likelihood that claims 1, 3, 4, 8, and 9 are anticipated by Ishii.

E. Obvious Over Ishii and Jiang and Obvious Over Ishii and Imai

Petitioner contends that claim 2 is unpatentable over Ishii and Jiang and claims 5–7 are unpatentable over Ishii and Imai. Pet. 34–45. Claims 2 and 5–7 depend directly or indirectly from claim 1, and Petitioner does not rely upon Jiang or Imai to cure the deficiency of Ishii discussed above (*see id.*). We determine that the Petition fails to show that there is a reasonable likelihood that claim 2 is unpatentable over Ishii and Jiang and claims 5–7 are unpatentable over Ishii and Imai.

F. Obvious Over Kamen, Nishikawa, and Jiang

Section 103(a) forbids issuance of a patent when “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). The ultimate determination of obviousness under § 103 is a question of law based on underlying factual findings. *In re Baxter Int’l, Inc.*, 678 F.3d 1357, 1361 (Fed. Cir. 2012) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1996)). These underlying factual considerations consist of: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of non-obviousness such as “commercial

success, long felt but unsolved needs, failure of others, etc.”⁸ *KSR*, 550 U.S. at 405 (quoting *Graham*, 383 U.S. at 17–18).

Petitioner contends that claims 1–9 are unpatentable over a combination of Kamen, Nishikawa, and Jiang. Pet. 45–63; *see also* Ex. 1008 ¶¶ 113–152 (testimony of Dr. Cook substantially repeating the contentions in the Petition). In particular, Petitioner contends “a first foot placement section and a second foot placement section that are coupled to one another and are independently movable with respect to one another” (Ex. 1001, 4:61–63), as required by independent claim 1, would have been obvious in light of Kamen and Nishikawa or alternatively in light of Kamen, Nishikawa, and Jiang. Pet. 50–55. Patent Owner disagrees. Prelim. Resp. 30–35.

First, Petitioner argues that it would have been obvious to combine the embodiment of Kamen’s balancing vehicle depicted in Figure 11 with the embodiment of Nishikawa’s vehicle depicted in Figure 10 to arrive at first and second foot placement sections that are coupled to one another and are independently movable with respect to one another. Pet. 50.

Kamen is a patent titled “Personal Mobility Vehicles and Methods” and issued on April 9, 2002. Ex. 1006, [45], [54]. Figure 11 of Kamen is reproduced below.

⁸ Patent Owner proffers arguments and evidence concerning secondary considerations. We do not need to reach Patent Owner’s arguments in this regard because, as discussed in our analysis, Petitioner has not met its burden of showing that the claims are unpatentable even without consideration of secondary considerations of non-obviousness.

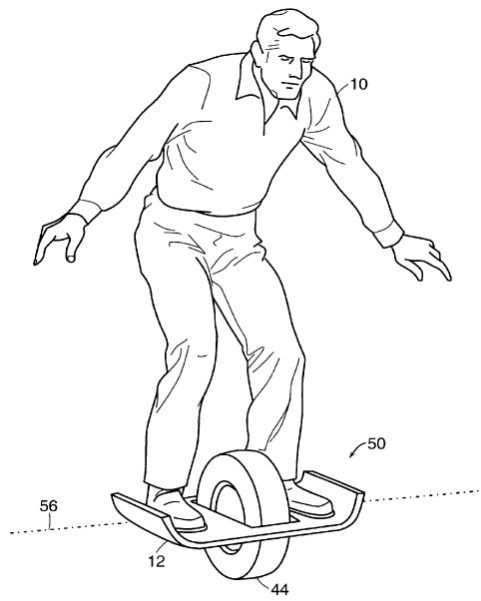


FIG. 11

Figure 11 depicts an embodiment of Kamen's balancing vehicle having a single wheel centered on a support platform. *Id.* at 6:32–34, 18:4–8. With respect to another single wheel embodiment, Kamen states that the single wheel may be “supplemented, as shown in FIG. 10, by a nearby wheel providing a pair of adjacent and coaxial wheels.” *Id.* at 17:8–11. Figure 10 of Kamen is reproduced below

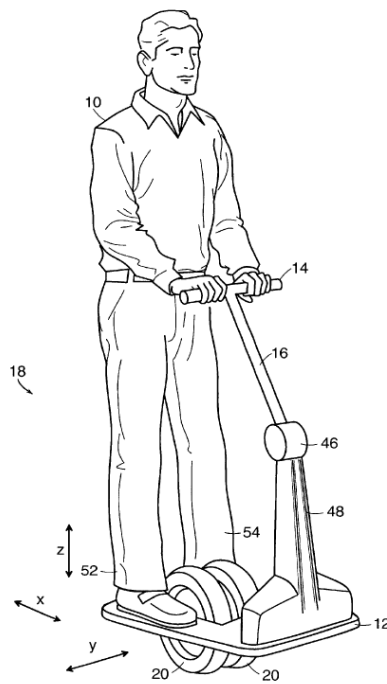


FIG. 10

Figure 10 depicts another embodiment of Kamen's balancing vehicle having two coaxial wheels centered on a support platform. *Id.* at 6:27–30. Kamen states:

[T]he vehicle of FIG. 10, like vehicles of various other embodiments disclosed in this description, when relying on wheels 20 for contacting the ground, is inherently unstable in the fore-aft direction with respect to a vertical z. While the vehicle of FIG. 10 is relatively stable in the lateral direction, vehicles of some other embodiments are unstable in both lateral and fore-aft directions.

Id. at 17:11–18.

Nishikawa is a patent titled “Vehicle Steerable by Movement of Center of Gravity” and issued on January 27, 2009. Ex. 1007, [45], [54]. Nishikawa discloses a vehicle having base 2, step-board 3, two wheels 4L, 4R, two drive motors, and four pressure sensors. *Id.* at 5:10–15. Figure 10 of Nishikawa is reproduced below.

FIG. 10

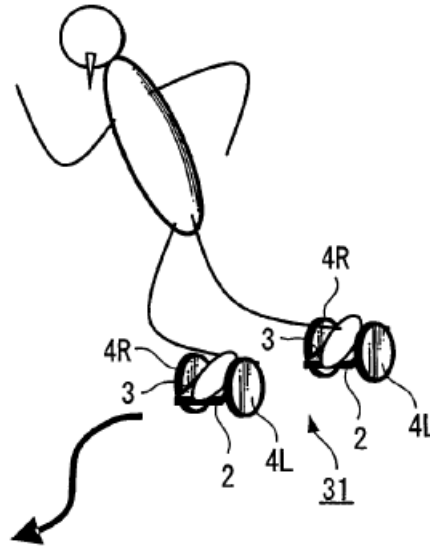


Figure 10 depicts a “bicycle type vehicle” embodiment, in which a vehicle is attached to each leg like roller skates. *Id.* at 9:59–62. “[T]he rider is able to run and steer this bicycle by only moving the balance.” *Id.* at 9:63–65.

Petitioner argues that “[i]t would have been obvious to a [person of ordinary skill in the art] at the time of the invention to modify the vehicle of *Kamen* by providing two one-wheeled devices—one for each foot of the rider, as disclosed in *Nishikawa*—to improve the stability of the vehicle.” Pet. 50 (citing Ex. 1008 ¶ 121). According to Petitioner, the benefit of such a modification would be greater “stability afforded by the two contact points with the ground than the single-wheel configuration of *Kamen*.” *Id.*

Petitioner’s argument is unpersuasive. Petitioner does not sufficiently show that providing *Kamen*’s one-wheeled balancing vehicle depicted in Fig. 11 on each foot of rider would result in a more stable vehicle. Likewise, Dr. Cook fails to provide any sufficient explanation, as Dr. Cook’s testimony substantially repeats the arguments in the Petition. See Ex. 1008 ¶ 121. As Patent Owner points out, such a combination may result in the

opposite—a more unstable vehicle. *See* Prelim. Resp. 32.

Second, Petitioner argues that “[t]o the extent that self-balancing devices provided on each foot of the rider are not considered to be coupled and independently movable or rotatably coupled,” it would have been obvious to further combine Kamen and Nishikawa with Jiang. Pet. 50–51, 54–55.

Jiang is a patent titled “Skateboard” and issued on May 6, 2008. Ex. 1003, [45], [54]. Figure 3 of Jiang is reproduced below.

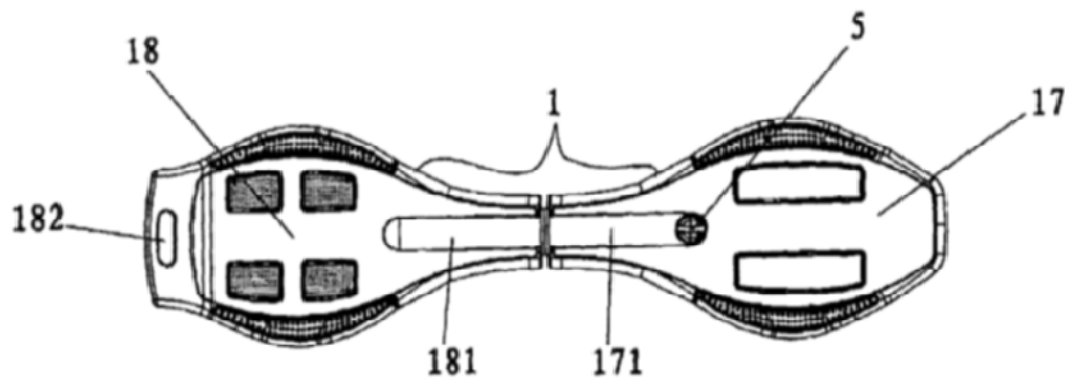


FIG. 3

Figure 3 depicts a skateboard. *Id.* at 2:17–19. The skateboard has front plate 17 and rear plate 18 connected by a flexible torsional mechanism. *Id.* at 2:27–32. According to Jiang, this allows skaters to easily adjust their center of gravity to balance themselves. *Id.* at 1:54–61, 3:44–63.

Petitioner argues that

it would have been obvious to modify the vehicle of *Kamen* to include left- and right-side vehicles, as taught by *Nishikawa*, to improve lateral stability and balance, and then to further modify the combination of *Kamen/Nishikawa* to include the torsional device of *Jiang* to connect the left and right sides.

Pet. 51 (citing Ex. 1008 ¶ 123).⁹ According to Petitioner, the benefit of such a combination is “that the rider would be able to more easily maintain stability while standing on the vehicle, and differential drive steering of the two-wheel vehicle by simply tilting his left and right feet independently of each other would be enabled.” *Id.*

Petitioner’s argument is unpersuasive. As Patent Owner points out, Jiang discloses providing the torsional device parallel to a forward direction of motion and not perpendicular to the forward direction of motion. Prelim. Resp. 35. Petitioner does not sufficiently explain how the torsional device would function and whether the torsional device would provide the same benefit when placed perpendicular to the forward direction of motion to couple two of Kamen’s single wheel devices. Likewise, Dr. Cook fails to provide a sufficient explanation, as Dr. Cook’s testimony substantially repeats the arguments in the Petition. *See* Ex. 1008 ¶ 121.

Petitioner’s rationales for combining Kamen, Nishikawa, and Jiang are conclusory and not sufficiently supported by the evidence of record. Petitioner’s proposed combinations appear to improperly rely upon hindsight reconstruction. “A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *See KSR*, 550 U.S. at 421. “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to

⁹ The Petition also argues “it would have been obvious to a POSITA at the time of the invention to have combined two single-wheel devices of *Kamen* using the torsional mechanism of *Jiang* to achieve a more stable vehicle.” Pet. 50 (citing Ex. 1008 ¶ 122).

support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

It is Petitioner’s burden to establish the reasonable likelihood of unpatentability. *See* 37 C.F.R. § 42.108(c). Claims 2–9 depend directly or indirectly from claim 1. We determine that the Petition fails to show that there is a reasonable likelihood that claims 1–9 are obvious over Kamen, Nishikawa, and Jiang.

III. CONCLUSION

We determine that the Petition fails to show that there is a reasonable likelihood that Petitioner would prevail with respect to any of the challenged claims on any of the proposed grounds.

IV. ORDER

In consideration of the foregoing, it is hereby:
ORDERED that the Petition is *denied*.

IPR2016-01778
Patent 8,738,278 B2

PETITIONER:

Joshua L. Goldberg
James R. Barney
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
Joshua.goldberg@finnegan.com
James.Barney@finnegan.com
Chic-IPR-team@finnegan.com

PATENT OWNER:

Ellisen S. Turner
Kamran Vakili
IRELL & MANELLA LLP
eturner@irell.com
kvakili@irell.com
RazorChenIPR@irell.com

cdc