

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DGL GROUP, LTD.,
Petitioner,

v.

HANGZHOU CHIC INTELLIGENT TECHNOLOGY CO., LTD.,
Patent Owner.

IPR2022-00844
Patent 10,597,107 B2

Before JEREMY M. PLENZLER, CARL M. DEFRANCO, and
JAMES A. WORTH, *Administrative Patent Judges*.

DEFRANCO, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

Hangzhou Chic Intelligent Technology Co., Ltd. (“Hangzhou”) is the owner of U.S. Patent No. 10,597,107 B2 (Ex. 1001, “the ’107 patent”). DGL Group Ltd. (“DGL”) filed a Petition requesting *inter partes* review of claims 1 and 4–25 of the ’107 patent. Paper 1 (“Pet.”). After considering

the preliminary record, we instituted *inter partes* review of all the claims as challenged in the Petition. Paper 8 (“Inst. Dec.”). Hangzhou filed a patent owner response (Paper 10, “PO Resp.”), DGL filed a reply (Paper 12, “Pet. Reply”), and Hangzhou followed with a sur-reply (Paper 17, “PO Sur-Reply”). We held an oral hearing on July 12, 2023, a transcript of which is in the record. Paper 28 (“Hrg. Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons below, we determine that DGL demonstrates by a preponderance of the evidence that challenged claims 1 and 4–25 are unpatentable as obvious under 35 U.S.C. § 103.

I. BACKGROUND

A. *Related Matters*

The ’107 patent is the subject of a parallel district court action filed March 18, 2021, namely, *Unicorn Global, Inc.*¹ and *Hangzhou Chic Intelligent Technology Co., Ltd.* v. *DGL Group, Ltd.*, No. 1:21-cv-1443 (E.D.N.Y.). See Pet. 3; Paper 6, 3. Both DGL and Hangzhou inform us that the ’107 patent was also the subject of several other actions, including: *Unicorn Global, Inc.* v. *Golabs Inc.*, No. 3:20-cv-02023 (N.D. Tex.); *Golabs Inc.* v. *Unicorn Global, Inc.*, No. 3:21-cv-00311 (N.D. Tex.); *Unicorn Global, Inc.* v. *E-Link Technology Co., Ltd.*, No. 1:20-cv-04127 (N.D. Ill.); *Golabs Inc.* v. *Hangzhou Chic Intelligent Technology Co. Ltd.*, No. 3:19-cv-01019 (N.D. Tex.); *Unicorn Global, Inc.* v. *Walmart Inc.*, No. 3:20-cv-03111 (N.D. Tex.); and *Unicorn Global, Inc.* v. *Jetson Electric Bikes LLC*,

¹ Hangzhou informs us that “Unicorn Global, Inc., is the exclusive licensee of the ’107 Patent, and thus is a real-party-in-interest.” Paper 6, at 2.

No. 1:21-cv-01436 (E.D.N.Y.). *See* Pet. 3–4; Paper 6, 3–4. According to DGL and Hangzhou, each of those actions is now terminated. *See id.*

B. The '107 Patent

The '107 patent is directed to a two-wheeled, electric self-balancing personal vehicle that has “two platforms” on which a user places their feet. *See* Ex. 1001, 1:21–22. The foot platforms “rotate relative to each other” to drive the vehicle and “enable the user to stand more stably” as the vehicle moves. *Id.* at 1:22–23, 5:65–6:1. Each foot platform includes an inner cover disposed between a top cover and a bottom cover. *Id.* at 1:50–62. The inner cover operates “as the internal framework of the entire self-balancing vehicle [] to indirectly bear the weight of the user,” thereby making the vehicle “firmer and stronger,” while also protecting the electronic components within the vehicle body. *Id.* at 6:20–29. Figure 2 of the '107 patent, reproduced below, illustrates an embodiment of the self-balancing vehicle.

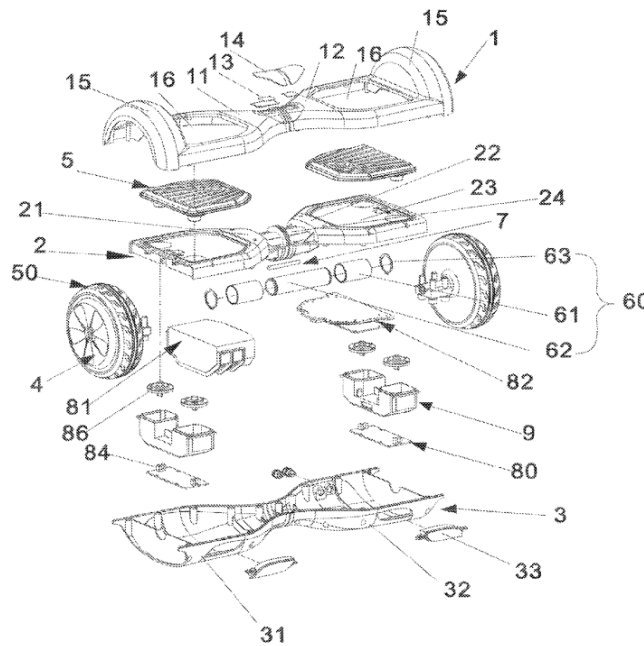


FIG. 2

Figure 2 is an exploded schematic diagram of electric self-balancing vehicle 100. Ex. 1001, 3:56–57. As shown, electric self-balancing vehicle 100 includes top cover 1, inner cover 2, bottom cover 3, two hub motors 4, two wheels 50, rotating mechanism 60, plural sensors 80, power supply 81, and controller 82. *Id.* at 4:8–12. Inner cover 2 is fixed between top cover 1 and bottom cover 3, and includes *first inner cover 21 and second inner cover 22* disposed symmetrically and rotatable relative to each other. *Id.* at 5:43–47 (emphasis added). Rotating mechanism 60 is fixed between first inner cover 21 and second inner cover 22. *Id.* at 6:45–46.

C. The Asserted Challenges

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
8, 10, 11, 14–16	103	Chen ² and Guangjing ³
1, 5, 6, 12, 13, 25	103	Chen, Guangjing, and Kakinuma ⁴
4	103	Chen, Guangjing, Kakinuma, Dunn ⁵
7	103	Chen, Guangjing, Kakinuma, and Osamu ⁶
9, 17, 18	103	Chen, Guangjing, and Hye ⁷
19, 20	103	Chen, Guangjing, and Dunn

² US 2013/0238231 A1, pub. Sept. 12, 2013 (Ex. 1004, “Chen”).

³ CN 103144715 A, pub. June 12, 2013 (Ex. 1005, “Guangjing”) (Ex. 1006, certified English translation).

⁴ US 7,958,956 B2, iss. June 14, 2011 (Ex. 1007, “Kakinuma”).

⁵ US 2006/0226675 A1, pub. Oct. 12, 2006 (Ex. 1010, “Dunn”).

⁶ JP 2005-94898 A, pub. Apr. 7, 2005 (Ex. 1008, “Osamu”) (Ex. 1009, certified English translation).

⁷ KR 10-2008-0062416 A, pub. July 3, 2008 (Ex. 1011, “Hye”) (Ex. 1012, certified English translation).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
21, 24	103	Chen, Guangjing, Dunn, and Cosby ⁸
22, 23	103	Chen, Guangjing, and Larson ⁹
1, 5, 8, 10–16, 25	102(a)	Kickstarter ¹⁰
6	103	Kickstarter and Guangjing
7	103	Kickstarter and Osamu
9, 17, 18	103	Kickstarter and Hye
4, 19, 20	103	Kickstarter and Dunn
21, 24	103	Kickstarter, Dunn, and Cosby
22, 23	103	Kickstarter and Larson

Pet. 9–10.

In support of these challenges, DGL also submits the declaration of Glenn E. Vallee, Ph.D., P.E. *See* Ex. 1003. Hangzhou, in turn, submits the declaration of David C. Hartup, Ph.D. *See* Ex. 2006.

D. The Challenged Claims

Four of the challenged claims are independent—claims 1, 8, 10, and 25. Claims 1, 8, and 25 each require that the electric balance vehicle have a top cover, a bottom cover, and an inner cover, as well as other components for operating the vehicle. Claim 10 requires an inner cover for the vehicle, but does not require the top and bottom covers. Claim 8 is representative and recites:

⁸ US 2011/0023652 A1, pub. Feb. 3, 2011 (Ex. 1013, “Cosby”).

⁹ US 2013/0206493 A1, pub. Aug. 15, 2013 (Ex. 1014, “Larson”).

¹⁰ *Hovertrax* by Inventist, <https://web.archive.org/web/20130504083823/http://www.kickstarter.com/projects/687658339/hovertrax>, May 4, 2013 (Ex. 1015, “Kickstarter”).

8. An electric balance vehicle, comprising:
- [1] a top cover;
 - [2] a bottom cover;
 - [3] an inner cover positioned between the top cover and the bottom cover, the inner cover comprising a first inner cover and a second inner cover disposed symmetrically and rotatable relative to each other, the inner cover comprising a left edge and a right edge;
 - [4] a rotating mechanism disposed between the first inner cover and the second inner cover and comprising a shaft sleeve installed in inner ends of the first inner cover and the second inner cover, the first inner cover and the second inner cover capable of rotating relative to each other through the rotating mechanism; and
 - [5] wheels rotatably fixed to the left edge and the right edge, respectively.

Ex. 1001, 11:11–27 (nomenclature added).

II. ANALYSIS

A. *Burden of Proof*

To prevail in its challenges, DGL must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2018); *see also Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”). This burden of persuasion never shifts to Hangzhou as the patent owner.¹¹ *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burdens of proof in an *inter partes* review).

¹¹ Although occasionally we may focus on Hangzhou’s arguments, we do not shift the ultimate burden from DGL. Rather, we focus on Hangzhou’s arguments merely to identify issues in dispute.

B. Level of Ordinary Skill in the Art

In its petition, DGL adopts the definition of the level of skill in the art as proposed by Hangzhou in the parallel district court litigation. Pet. 11 (citing Ex. 1016, 8). There, Hangzhou asserted that one skilled in the art—

would have at least (1) a bachelor’s degree in mechanical engineering, electrical engineering, computer science, or a related field, or equivalent experience, and (2) at least two years of experience in the area of: (i) robotics or feedback control for electromechanical systems; (ii) mechanical design, dynamic analysis, and/or control design for mechatronic systems, or (iii) equivalent experience in (i) or (ii).

Ex. 1016, at 8. Hangzhou agrees that the above definition from the parallel litigation should control. See PO Resp. 4–5. Because the parties’ definition of the level of skill in the art appears consistent with the level reflected by the prior art, we adopt it for purposes of our analysis.

C. Claim Construction

The standard for claim construction in an *inter partes* review is the same as that used in a district court action. See 37 C.F.R. § 42.100(b). To that end, we generally give the words of a claim their ordinary and customary meaning. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Here, the parties summarize their claim construction positions from the parallel district court litigation for three claim terms: “electric balance

vehicle,” “controller,” and the various iterations of the “control” limitation of the claims, i.e., “control the hub motors,” “controls the motors,” and “controlling the first and second hub motors.” *Compare* Pet. 22–23, with PO Resp. 8–9. At the same time, however, the parties state that an express claim construction is not needed for purposes of this *inter partes* review. *See* PO Resp. 8–9 (submitting “no construction was necessary.”); Pet. Reply 1 (submitting that “[c]laim construction is not required in this *inter partes* review.”). Nonetheless, the parties note their agreement that “electric balance vehicle” means “electric self-balancing vehicle.” PO Resp. 8; Pet. Reply 1. We find the parties’ construction of that term is reasonable and adopt it for purposes of our analysis. As for the other two claim terms, we agree with the parties that no further construction is needed to decide this case. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (approving Board decision not to construe claim language where the construction is not material to the dispute).

D. Obviousness Over Chen and Guangjing

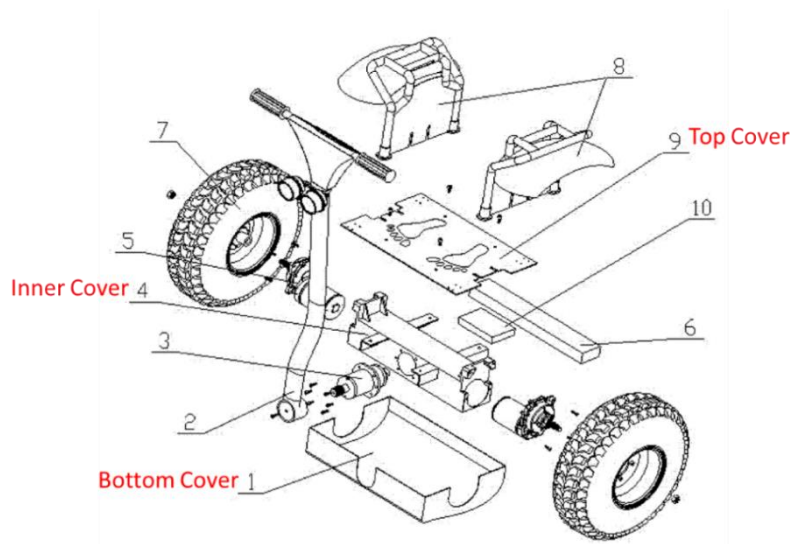
DGL challenges claims 8, 10, 11, and 14–16 as obvious over Chen and Guangjing. *See* Pet. 24–39. We begin with DGL’s challenge of independent claim 8.

1. Claim 8

DGL divides claim 8 into five elements, i.e., elements [1]–[5] as enumerated above in section I.D, and explains how the combination of Chen and Guangjing meets those five elements and why one skilled in the art would have combined their collective teachings with a reasonable expectation of success in arriving at the claimed invention. *See* Pet. 24–32 (citing Ex. 1003 ¶¶ 71–91). With the exception of claim element [3],

Hangzhou does not contest DGL’s showing as to claim elements [1], [2], [4], and [5]. See PO Resp. 27–33; Hrg. Tr. 37:11–18, 37:24–38:2, 41:22–42:15. Thus, our analysis focuses on disputed claim element [3] and the parties’ arguments and evidence with respect to that element. See *In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (“The Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters.”); see also Paper 9, 8 (emphasizing that “any arguments not raised in the response may be deemed waived”).

Element [3] of claim 8 recites “an inner cover positioned between the top cover and the bottom cover” and “comprising a first inner cover and a second inner cover disposed symmetrically and rotatable relative to each other.” With respect to element [3], DGL contends that Guangjing teaches an electric balance vehicle having “an inner cover (framework 4) between a top cover (upper housing 9) and a bottom cover (lower housing 1),” as depicted in annotated Figure 1 of Guangjing, reproduced below. See Pet. 28–29.



Guangjing (Ex. 1005), Fig. 1

DGL also points to Guangjing’s explanation of the “beneficial effects” of inner cover 4—“the structural strength is greatly improved, and compared with various self-balancing vehicles of the prior art, the weight is slightly lighter, the battery load is lower, the speed is faster, the response speed is faster, and the battery run-time is longer.” *Id.* at 29 (citing Ex. 1006, 2:26–30). With those teachings in mind, DGL’s expert opines that one skilled in the art would have “employ[ed] the inner cover of Guangjing with the electric balance vehicle of Chen because of the benefits expressly taught by Guangjing: improved structural strength, lighter weight, lower battery load, faster response speed, and longer battery run-time.” *Id.* (citing Ex. 1003 ¶ 83). Also, according to DGL’s expert, “the use of an inner cover with the vehicle of Chen would have merely been the predictable result of using the elements of Guangjing according to their known function” and “the inner cover should be symmetric to balance the weight of the two sections.” Ex. 1003 ¶¶ 83, 86.

Hangzhou, in turn, responds that DGL’s proposed combination of Guangjing’s inner cover with Chen’s electric balance vehicle “would lead to an inoperative result.” PO Resp. 24. According to Hangzhou, “combining the *single piece, non-rotatable-frame* of Guangjing, with that of Chen would result in a device capable of only moving directly forward or directly backward” and “[i]ncluding the steering mechanism of Guangjing would be necessary for the user to control turning of the device.” PO Resp. 24 (emphasis added). Hangzhou surmises that one skilled in the art would not have undertaken the combination because, in Guangjing, “turning is achieved through a handlebar structure that ascends from the platform upward toward the chest of the user,” whereas, “Chen and the ’107 Patent

specifically teach away from [Guangjing’s] ‘Segway’ type devices where the device is controlled not by the user’s feet, but through an operating or steering rod” that is “controlled by the arms.” *Id.* at 25–28 (citing Ex. 2006 ¶¶ 32–33).

At the outset, we note that Hangzhou does not dispute that framework 4 underneath Guangjing’s foot platform 9 is an “inner cover.” *See* PO Resp. 24 (discussing “the inner cover of Guangjing”); Ex. 2006 ¶ 33 (same). Nor does Hangzhou dispute that Guangjing’s inner cover serves the same purpose as the inner cover described in the ’107 patent, explaining that the inner cover of the ’107 patent “makes the strength higher and the structure more stable” while agreeing that “inner cover in Guangjing . . . adds strength.” *Compare* Hrg. Tr. 38:8–14, *with id.* at 56:18–26. And, finally, Hangzhou does not dispute that the whole idea behind Chen is to have independently rotatable foot platforms. *Id.* at 55:18–20, 57:1–5 (explaining Chen “wants a device that’s controllable via the user’s feet” and “doesn’t want to have wheels fixed relative to each other” but “wants each wheel to be fixed to each platform, and those platforms are rotatable”). Thus, rather than dispute what Chen and Guangjing teach individually, Hangzhou disputes whether one skilled in the art would have combined their respective teachings with a reasonable expectation of success at arriving at the claimed invention.

We find that DGL has the better position because Hangzhou focuses too narrowly on an element in Guangjing that DGL does not rely on—Guangjing’s “steering rod” or “steering column” for controlling the self-balancing vehicle—when, more aptly, the focus should be on Guangjing’s foot platform that houses the vehicle’s electrical components. *See* PO

Resp. 25–29. In doing so, Hangzhou makes the mistake of arguing the references individually without ever acknowledging the combination of their teachings as a whole. For instance, Hangzhou argues that the asserted combination is improper “because Chen at least does not disclose the inner cover.” PO Resp. 24. But DGL never argued that Chen discloses an inner cover. Instead, DGL observed that one skilled in the art “would have been inclined to employ the inner cover of *Guangjing* with the electric balance vehicle of Chen because of the benefits expressly taught by *Guangjing*: improved structural strength, lighter weight, lower battery load, faster response speed, and longer batter[y] run-time,” which “would have merely been the predictable result of using the elements of *Guangjing* according to their known function.” Pet. 29 (quoting Ex. 1003 ¶ 83) (emphases added).

Similarly, Hangzhou argues that the asserted combination is improper because “*Guangjing* discloses controlling the device through the use of a steering rod” (PO Resp. 25–26) and “[i]ncluding the steering mechanism of *Guangjing* would be necessary for the user to control turning of the device” (*id.* at 24). But, again, DGL never proposed using *Guangjing*’s steering mechanism in the asserted combination. Instead, DGL argued that one skilled in the art would have modified *each* of the foot platforms in Chen to include an inner cover, thereby preserving the rotatable relationship of the two foot platforms and their ability to independently turn and otherwise operate the wheels as originally intended by Chen. See Pet. 30 (citing Ex. 1003 ¶ 85).

We also disagree with Hangzhou’s contention that the asserted combination “would lead to an inoperative result.” PO Resp. 24. Apparently, Hangzhou believes that “combining the *single piece, non-*

rotatable-frame of Guangjing, with that of Chen would result in a device capable of only moving directly forward or directly backward.” *Id.* (emphasis added). But that argument relies on the false premise that Guangjing’s single-piece framework would extend the length of *both* of Chen’s foot platforms, while ignoring DGL’s express position that one skilled in the art would necessarily account for the rotatable relationship of Chen’s foot platforms when incorporating Guangjing’s teaching of an inner cover. See Pet. 30 (citing Ex. 1003 ¶¶ 85–86); Pet. Reply 3–4 (same). Indeed, in undertaking the combination, it would have been unthinkable for one skilled in the art to destroy the very essence of Chen’s invention— independently rotatable foot platforms for steering the vehicle. More reasonably, one skilled in the art, seeing Guangjing’s teaching of an inner cover for improving the structural strength of a self-balancing vehicle, would have immediately envisaged installing an inner cover into *each* of Chen’s foot platforms in a manner that preserved the ability of the user to steer the vehicle via the rotatable foot platforms. In that regard, we find the testimony of DGL’s expert more persuasive and credible than Hangzhou’s expert. Compare Ex. 1003 ¶¶ 83–86, with Ex. 2006 ¶¶ 31–33, 36.

We also find unpersuasive Hangzhou’s argument that Chen “teaches away” from structures like Guangjing’s inner framework. PO Resp. 30. According to Hangzhou, Guangjing’s inner framework equates to the “prior art” device that Chen disparages, which includes “a multi-component parallelogram structure” that “adds to the weight, bulk, complexity, and potential for mechanical failure.” *Id.* at 29 (quoting Ex. 1004 ¶ 5). We disagree. In quoting Chen, Hangzhou omits that the “multi-component” structure disparaged by Chen is used “to coordinate/link movement of the

two platform sections and the wheels,” which reasonably refers to a *mechanical* linkage for steering the vehicle. Ex. 1004 ¶ 5. Chen’s disparagement of a multi-part steering linkage does not, in our view, teach away from using a *static* cover or frame to strengthen the underside of the foot platform itself, as taught by Guangjing. Nor can Hangzhou reasonably argue that Guangjing’s inner cover would add to the vehicle’s weight or bulk, given Guangjing’s express disclosure that the inner framework “reduc[es] the overall weight of the vehicle body.” Ex. 1006, 2:15–16; *see also id.* at 2:27–29 (“the weight is slightly lighter”).

Similarly, Hangzhou argues that Chen’s disclosure of the platform sections being formed of “metal, sturdy plastic, or other suitable material” that is “reinforced” means that Chen “specifically teaches away from including additional structures, which would include an inner cover.” PO Resp. 29–30 (citing Ex. 1004 ¶ 18). Again, we disagree. Chen simply states that “[t]he housing *may be* molded and incorporate strengthening reinforcements” and “[t]he housing *may be* formed of metal, sturdy plastic or other suitable material.” Ex. 1004 ¶ 18 (emphasis added). Thus, these are not requirements in Chen. At most, Chen is describing a preferred embodiment. However, “[a] reference does not teach away ‘if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.’” *Huawei Techs. Co. v. Iancu*, 813 F. App’x 588, 591–92 (Fed. Cir. 2020) (quoting *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009)).

Here, while Chen may indicate a “general preference” for the use of strengthening reinforcements or certain materials, nothing in Chen criticizes, discredits, or otherwise discourages the use of Guangjing’s inner cover. Indeed, in our view, one skilled in the art would have recognized that replacing Chen’s molded strengthening reinforcements in each of the foot platforms with an inner cover, as taught by Guangjing, is nothing more than substituting one strength-enhancing structure for another equivalent structure. Accordingly, Chen does not teach away from employing the inner cover of Guangjing in the electric balance vehicle of Chen.

Having considered the evidence of record and the parties’ arguments, we find that one skilled in the art would have been led to modify each of the foot platforms in Chen to include an inner cover, as taught by Guangjing, and would have had a reasonable expectation of success in doing so. Hangzhou does not persuade us of the contrary. And, as noted above, Hangzhou does not dispute DGL’s showing of how Chen and Guangjing meet the other elements of claim 8. Thus, for all the above reasons, we determine that DGL demonstrates by a preponderance of the evidence that challenged claim 8 is unpatentable as obvious over the combined teachings of Chen and Guangjing.

2. Claims 10, 11, and 14–16

DGL also relies on Chen and Guangjing to challenge independent claim 10 and dependent claims 11 and 14–16. Pet. 32–39. Hangzhou responds that “[s]imilar to claim 8, claim 10 also requires ‘a first inner cover and a second inner cover disposed symmetrically and rotatable relative to each other.’” PO Resp. 30 (quoting Ex. 1001, 11:34–36). That argument is no more persuasive than when made against DGL’s challenge of claim 8,

and, thus, fails for the same reasons discussed above with respect to that claim.

Hangzhou also argues claim 10's recitation of "a plurality of sensors comprising at least one gyroscope" and contends it would not have been obvious to combine the sensors of Chen with the sensors of Guangjing. *See* PO Resp. 30–32 (quoting Ex. 1001, 11:40). Hangzhou points to differences in the control systems of Chen and Guangjing and argues that "Chen specifically teaches away from the control mechanisms of Guangjing." *See id.* at 31–32. Again, Hangzhou ignores the specific combination of Chen and Guangjing proposed by DGL. In particular, DGL never proposed modifying Chen with the sensors of Guangjing. No such modification is necessary because, as DGL noted, Chen already teaches "a position sensor 120,140, which may be a gyroscopic sensor." Pet. 34 (quoting Ex. 1004 ¶ 20, Fig. 2). DGL only relies on Guangjing for teaching the use of a strength-enhancing inner cover underneath each of Chen's foot platforms.

Hangzhou does not treat DGL's challenge of dependent claims 11 and 14–16 any differently than DGL's challenge of claim 10. *See* PO Resp. 32–33. For instance, like it does for claim 10, Hangzhou argues that the asserted combination of Chen and Guangjing "fails to disclose the inner cover of claim 10" and "would lead to an inoperative result." *Id.* (citing Ex. 2006 ¶ 33). As such, Hangzhou makes essentially the same arguments in support of dependent claims 11 and 14–16 as it made with respect to independent claims 8 and 10.

Keeping in mind that DGL bears the burden of persuasion, we have fully considered DGL's showing with respect to claims 10, 11, and 14–16, and, from our review, we conclude that DGL demonstrates by a

preponderance of the evidence that claims 10, 11, and 14–16 are unpatentable as obvious over Chen and Guangjing for the reasons discussed above. *See* Pet. 32–39.

E. Obviousness Over Chen, Guangjing, and Kakinuma

DGL challenges claims 1, 5, 6, 12, 13, and 25 as obvious over Chen, Guangjing, and Kakinuma. *See* Pet. 39–49. Hangzhou disputes that one skilled in the art would have undertaken the asserted combination. *See* PO Resp. 33–40. We begin with claim 1.

1. Claim 1

Hangzhou argues that “[m]uch the same as in regard to ground 1, one of skill in the art would not have been motivated to combine the inventions of Chen with that of Guangjing and Kakinuma” because this combination “would lead to an inoperative result.” PO Resp. 33 (citing Ex. 2006 ¶ 43). According to Hangzhou, “much like Guangjing, Kakinuma is also one of the ‘Segway’ type devices that Chen specifically teaches away from.” *Id.* But, as it did in arguing against DGL’s combination of Chen and Guangjing, Hangzhou repeats its mistake of focusing on an element in a teaching reference that is not relied upon by DGL—this time, pointing to Kakinuma’s handle and link mechanism for steering the vehicle. *See id.* at 33–34. But DGL only relies on Kakinuma’s “hub motors” for driving the wheels in the proposed combination. *See* Pet. 41–43. Thus, Hangzhou’s argument with respect to Kakinuma’s handle and link mechanism is irrelevant.

In addition, Hangzhou argues that “Kakinuma fails to disclose a first and second inner cover which are rotatable in relation to one another as required by claim 1.” PO Resp. 35. Again, Hangzhou ignores DGL’s proposed combination. DGL never relied on Kakinuma for teaching first

and second inner covers that are rotatable relative to each other. Rather, DGL relied on the combination of Chen *with Guangjing* for supplying that teaching. *See* Pet. 40. Thus, Hangzhou’s argument in this regard is no more persuasive than when made against DGL’s challenge based on Chen and Guangjing, and, thus, fails for the same reasons discussed above with respect to that challenge.¹²

2. *Dependent Claims 5 and 6*

Claims 5 and 6 depend from claim 1, and recite, respectively, that “the bottom cover is coupled to the top cover” and “the power supply and the controller are disposed at a side of the inner cover, and the side is adjacent to the bottom cover.” Ex. 1001, 11:1–6. Aside from faulting their dependency on claim 1, Hangzhou also argues that claims 5 and 6 are not rendered obvious by the asserted combination because, “[w]hile Chen does disclose a top cover and a bottom cover which are coupled together[,] one of skill in the art would not have been motivated to combine the vehicle body of Kakinuma or the framework of Guangjing as neither is capable of rotating relative to another part of the framework or vehicle body.” PO Resp. 36. But Hangzhou’s focus on the alleged incapability of Kakinuma and Guangjing ignores DGL’s actual reliance on Chen for teaching the claim 5 element of coupling together the top and bottom covers. *See* Pet. 43 (citing Ex. 1004 ¶ 18).

¹² Hangzhou also states, without further explanation, that “Kakinuma does not balance itself but instead adjusts the position of the wheels relative to a fixed frame” PO Resp. 35. To the extent this amounts to an argument, we note that DGL relies on Chen for teaching a self-balancing vehicle, not Kakinuma.

Regarding claim 6, Hangzhou contends that “the battery box 6 disclosed in Guangjing is placed at the rear of the frame” but “is not adjacent to the bottom cover.” PO Resp. 36–37. We disagree. The evidence says otherwise. Figure 1 of Guangjing clearly shows that battery box 6 is positioned within lower housing 1 such that its front side is adjacent inner cover 4 and its bottom side is adjacent lower housing 1, i.e., the bottom cover of the vehicle. *See* Ex. 1005, Fig. 1.

3. Dependent Claims 12 and 13

Claims 12 and 13 depend from claim 10, and recite, respectively, that “the motors are hub motors fixed in the wheels” and “the vehicle comprises only two wheels and two hub motors.” Ex. 1001, 11:54–58. Aside from faulting their dependency on claim 10, Hangzhou argues that “Chen also teaches away from the ‘two platform’ construction of Kakinuma.” PO Resp. 39. But DGL never proposed to modify the combination of Chen and Guangjing with the platform section of Kakinuma. Instead, DGL argued that one skilled in the art would have found it obvious to modify Chen and Guangjing with the hub motors of Kakinuma “because placing hub motors in the wheels allows for a smaller housing to be used, increases stability, and distributes the weight of the vehicle more evenly.” Pet. 42 (citing Ex. 1003 ¶ 125). Hangzhou ignores this reason for DGL’s proposed combination. Nor does Hangzhou offer any evidence that Chen teaches away from incorporating hub motors in its wheels. Thus, we are not persuaded by Hangzhou’s argument to the contrary.

4. Independent Claim 25

Hangzhou does not treat DGL’s challenge of independent claim 25 any differently than DGL’s challenge of claims 1 and 10, relying simply on

“the same reasons as addressed above in relation to claims 1 and 10.” *See* PO Resp. 39–40. Those reasons are no more persuasive with respect to claim 25 than they were for claims 1 and 10.

5. Conclusion

Keeping in mind that DGL bears the burden of persuasion, we have fully considered DGL’s showing with respect to claims 1, 5, 6, 12, 13, and 25. *See* Pet. 39–49. From our review of the record, we conclude that DGL demonstrates by a preponderance of the evidence that those claims are unpatentable as obvious over Chen, Guangjing, and Kakinuma.

F. Obviousness Over Chen, Guangjing, and Hye

DGL challenges claims 9, 17, and 18 as obvious over Chen, Guangjing, and Hye. *See* Pet. 52–55 (citing Ex. 1012). Claim 9 depends from independent claim 8, and claims 17 and 18 depend from independent 10, with each reciting “a rotating mechanism” comprised of “bearings.” Ex. 1001, 11:28–32, 12:5–12. Hangzhou disputes that one skilled in the art would have undertaken to modify the combination of Chen and Guangjing with Hye’s rotating mechanism because Chen “teaches away” from “skateboards,” such as the one disclosed in Hye, where “platform sections are arranged longitudinally, one primarily behind the other in the longitudinal line-of-direction of travel.” PO Resp. 40–42 (quoting Ex. 1004 ¶ 7).

Hangzhou’s argument fails because, once again, it focuses on an element that DGL never relies on. In particular, DGL never argues that the combination of Chen and Guangjing should be modified to incorporate the orientation of the platform sections taught by Hye. Rather, DGL reasons that one skilled in the art would have found it obvious to modify Chen and

Guangjing to incorporate Hye’s bearing-type rotating mechanism “because of the well-known benefits taught by Hye: bearings provide smooth rotation and reduce wear,” which would have led to nothing more than “the predictable result of using the elements of Hye according to their known function.” Pet. 54 (quoting Ex. 1003 ¶ 171). Hangzhou never addresses this reason for combining Hye’s teaching with Chen and Guangjing, nor otherwise offers any evidence that Chen teaches away from the use of bearings in its rotating mechanism. Based on our review of the record, DGL provides a persuasive reason for why one skilled in the art would have modified the combination of Chen and Guangjing with Hye’s bearing-type rotating mechanism. See Ex. 1003 ¶¶ 171–173. Thus, we determine that DGL demonstrates by a preponderance of the evidence that claims 9, 17, and 18 are unpatentable as obvious over the combined teachings of Chen, Guangjing, and Hye.

G. The Remaining Chen/Guangjing-Based Challenges

DGL challenges dependent claims 4, 7, and 19–24 as obvious over Chen and Guangjing in various combinations that include Dunn, Osamu, Cosby, and/or Larson. See Pet. 49–52, 56–62. Hangzhou argues that DGL’s proposed combination of Chen and Guangjing with these additional teaching references fails for the same reasons as Hangzhou argued against DGL’s challenge of independent claims 1 and 10. See PO Resp. 40, 42–43. We do not find those reasons any more persuasive with respect to dependent claims 4, 7, and 19–24 than when Hangzhou argued them in support of independent claims 1 and 10. In any event, we have considered them in light of DGL’s showing with respect to dependent claims 4, 7, and 19–24, but nonetheless conclude that DGL demonstrates by a preponderance of the

evidence that those dependent claims are unpatentable as obvious over Chen and Guangjing in combination with Dunn, Osamu, Cosby, and/or Larson.

H. The Kickstarter-Based Challenges

DGL also challenges claims 1, 5, 8, 10–16, and 25 as anticipated by Kickstarter and claims 4, 6, 7, 9, and 17–24 as obvious over Kickstarter in combination with various other references that include Guangjing, Osamu, Hye, Dunn, Cosby, and/or Larson. *See* Pet. 10, 63–80. As discussed above, we determine that DGL shows by a preponderance of the evidence that these same claims are unpatentable as obvious over Chen and Guangjing along with additional references that include Osamu, Hye, Dunn, Cosby, and/or Larson. Thus, we need not address whether they are also unpatentable under DGL’s alternative Kickstarter-based challenge. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that petitioner “is entitled to a final written decision addressing all of *the claims* it has challenged”) (emphasis added); *Boston Scientific Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

III. CONCLUSION

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
8, 10, 11, 14–16	103	Chen, Guangjing	8, 10, 11, 14–16	
1, 5, 6, 12, 13, 25	103	Chen, Guangjing, Kakinuma	1, 5, 6, 12, 13, 25	

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
4	103	Chen, Guangjing, Kakinuma, Dunn	4	
7	103	Chen, Guangjing, Kakinuma, Osamu	7	
9, 17, 18	103	Chen, Guangjing, Hye	9, 17, 18	
19, 20	103	Chen, Guangjing, Dunn	19, 20	
21, 24	103	Chen, Guangjing, Dunn, Cosby	21, 24	
22, 23	103	Chen, Guangjing, Larson	22, 23	
1, 5, 8, 10–16, 25 ¹³	102(a)	Kickstarter		
6 ¹³	103	Kickstarter, Guangjing		
7 ¹³	103	Kickstarter, Osamu		
9, 17, 18 ¹³	103	Kickstarter, Hye		
4, 19, 20 ¹³	103	Kickstarter, Dunn		
21, 24 ¹³	103	Kickstarter, Dunn, Cosby		
22, 23 ¹³	103	Kickstarter, Larson		
Overall Outcome			1, 4–25	

¹³ As noted above, because we find that these claims are unpatentable over the Chen/Guangjing-based grounds, we do not reach whether they also would have been unpatentable over the Kickstarter-based grounds.

IV. ORDER¹⁴

Accordingly, it is hereby:

ORDERED that claims 1 and 4–25 of the '107 patent are determined to be unpatentable; and

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

¹⁴ Should Hangzhou wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to issuance of this decision, we draw Hangzhou's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Hangzhou chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Hangzhou of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

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