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Paper 9
Entered: December 23, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

ARSUS, LLC,
Patent Owner.

IPR2022-01216
Patent 11,077,877 B1

Before HYUN J. JUNG, RICHARD H. MARSCHALL, and JASON W. MELVIN, *Administrative Patent Judges.*

JUNG, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Tesla, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting institution of an *inter partes* review of claims 1–21 of U.S. Patent No. 11,077,877 B1 (Ex. 1001, "the '877 patent"). Arsus, LLC ("Patent Owner") filed a Preliminary Response (Paper 5, "Prelim. Resp.").

Under 35 U.S.C. § 314, an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." Upon consideration of the Petition in view of the present record and for the reasons explained below, we determine that Petitioner has shown a reasonable likelihood of prevailing with respect to at least one of the challenged claims.

Thus, we institute an *inter partes* review of claims 1–21 of the '877 patent on all presented challenges. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

B. Real Parties in Interest

Petitioner identifies only itself as a real party in interest, and Patent Owner only identifies itself as a real party in interest. Pet. 71; Paper 4, 1.

C. Related Matters

The parties identify *Arsus, LLC v. Tesla, Inc.*, 6:22-cv-00476 (W.D. Tex.) as a related matter. Pet. 71; Paper 4, 1. A related patent was challenged in IPR2020-00948.

D. The '877 Patent (Ex. 1001)

The '877 patent issued on August 3, 2021 from an application filed on April 15, 2019, which is the latest continuation application of several previously filed continuation and continuation-in-part applications. Ex. 1001, codes (22), (45), (63). The earliest filing date among those

applications is August 31, 2011, and the '877 patent claims priority to a provisional application filed on September 22, 2010. *Id.* at codes (60), (63).

The '877 patent "relates to steering control devices . . . for use in preventing steering to the point of vehicle rollover." Ex. 1001, 1:29–31. Figure 1 of the '877 patent is reproduced below.

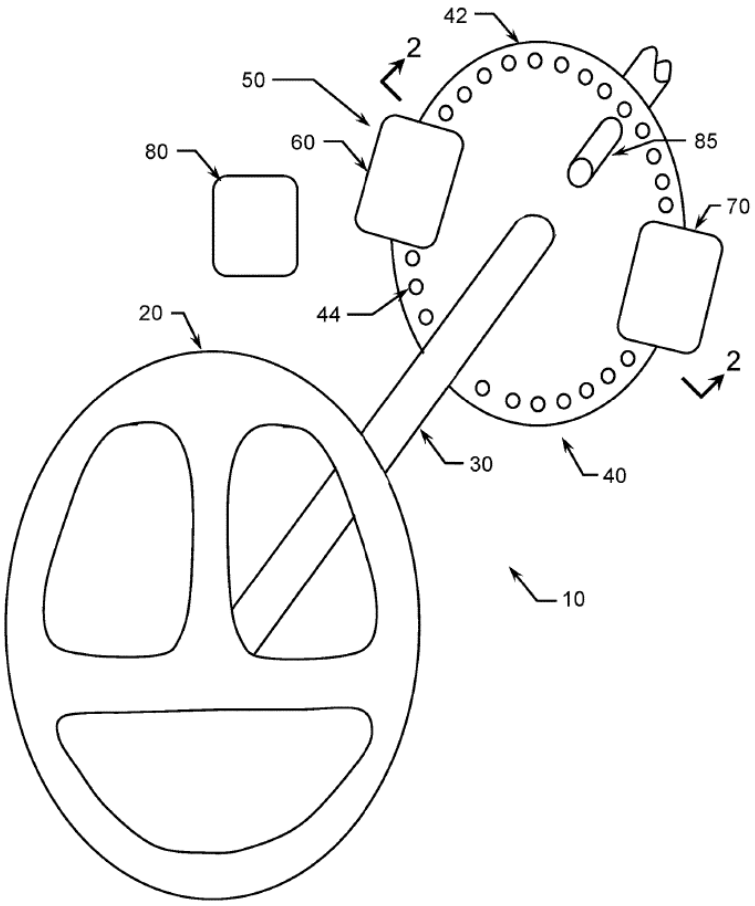


Figure 1

Figure 1 shows "a trimetric view" of an embodiment of the steering control device. Ex. 1001, 3:32–33. Adaptive steering range limiting device ("ASRLD") 10 includes steering column 30 with steering wheel 20 connected at one end of steering column 30 and steering column position detection device ("SCPDD") 40 also connected to steering column 30. *Id.* at 5:15–21, 5:58–61. Steering wheel 20 can be a conventional steering wheel of a passenger vehicle, and steering column 30 can be a conventional

steering column that transmits torque from steering wheel 20 to a rack and pinion or other vehicle wheel control device. *Id.* at 5:24–29.

SCPDD 40 has magnetic targets 44 spaced substantially equally around the periphery of disc 42. Ex. 1001, 5:29–33. Sensor 85 can detect when magnetic target 44 is near to provide a rotational position of SCPDD 40. *Id.* at 5:53–57.

Brake assemblies 50 include left-hand unidirectional brake assembly 60 and right-hand unidirectional brake assembly 70. Ex. 1001, 2:35–39, 5:33–36. The unidirectional brake assemblies 60, 70 each include extendable and retractable rollers 64, 74. *Id.* at 5:36–39, 5:44–46, Figs. 3A, 3B, 4A, 4B. Brake assemblies 50 are placed near SCPDD 40 so that disc 42 can rotate past rollers 64, 74. *Id.* at 2:35–39, 5:61–63. Brake assemblies 50 are also connected to a structural member of the vehicle to remain stationary relative to SCPDD 40. *Id.* at 6:2–6.

Electronic control unit 80 electronically receives speed, position, and other sensor inputs and transmits actuation signals based on those inputs. Ex. 1001, 5:48–53. Electronic control unit 80 is connected to sensor 85 and brake assemblies 50. *Id.* at 5:63–65.

When the vehicle is below a predetermined speed, such as 10 miles per hour, brake assemblies are not actuated, and steering wheel 20 can be rotated through its full range of motion. Ex. 1001, 6:17–22. When the vehicle moves at or above the predetermined speed and SCPDD 40 is at or above a predetermined rotational limit, electronic control unit 80 determines a steering prevention threshold has been reached and actuates one of the unidirectional brake assemblies 60, 70 to prevent further rotation of steering wheel 20. *Id.* at 6:27–38. ASRLD 10, thus, prevents steering wheel 20 from being turned to a point that would cause vehicle rollover. *Id.* at 7:7–13.

E. Illustrative Claim

The '877 patent includes 21 claims, all of which Petitioner challenges. Of the challenged claims, claims 1, 8, and 15 are independent, and claim 1 is reproduced below.

> 1. A rollover prevention apparatus having a mode that allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered beyond a rollover threshold of said vehicle at any rollover capable speed of said vehicle regardless of the source of an oversteer rotational load applied to a steering wheel of said vehicle, wherein said apparatus transitions from said mode in response to a predetermined application of rotational load to said steering wheel.

Ex. 1001, 10:6–15.

F. Asserted Prior Art and Proffered Testimonial Evidence

Petitioner identifies the following references as prior art in the asserted grounds of unpatentability:

Name	Reference	Exhibit
Inagaki	US 5,022,480, issued June 11, 1991	1008
Nishikawa	US 6,053,270, issued Apr. 25, 2000	1007
Schramm	US 8,634,989 B1, issued Jan. 21, 2014	1004
Husain	US 2005/0082107 A1, published Apr. 21, 2005	1006
Dechamp	WO 2007/031817 A1, published Mar. 22, 2007	1005

Pet. 1–2. Petitioner contends that all of the above-listed references are prior art under § 102(a)(1). *Id.* at 2. Petitioner also contends that, "even if the '877 patent was entitled to an earlier priority date in 2010 (which it is not), Grounds 2–4 would still apply because each of the relevant references published years beforehand." *Id.* Petitioner also provides a Declaration of Scott Andrews. Ex. 1003.

G. Asserted Grounds

Petitioner asserts that claims 1–21 are unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
1–21	102	Schramm
1–21	103	Dechamp, Husain
1–21	103	Dechamp, Nishikawa
15, 16, 19–21	102	Inagaki
15, 16, 19–21	103	Inagaki

Pet. 1.

II. 35 U.S.C. § 325(d)

Petitioner contends that institution should not be denied under 35 U.S.C. § 325(d). Pet. 68–69. Petitioner argues that no rejection based on the proposed combinations of (1) Dechamp and Husain and (2) Dechamp and Nishikawa were raised during prosecution. *Id.* (citing Ex. 1002, 401–410, 611–612). According to Petitioner, Husain and Nishikawa were never cited, and Applicant addressed Dechamp five months after issuance. *Id.* (citing Ex. 1002, 611–612).

Petitioner also argues that, although Schramm was cited in an obviousness-type double patenting rejection, the asserted defects in the priority claim were not presented, and the issue of Schramm being prior art was not examined. Pet. 69 (citing Ex. 1002, 399–401). As for Inagaki, Petitioner contends that, even though Inagaki was cited, it was not substantively addressed, and, in Petitioner's view, the failure to consider Inagaki was a material error. *Id.* at 69–70.

Patent Owner responds that the '877 patent was allowed over Dechamp and Inagaki, but Petitioner does not address that fact. Prelim. Resp. 4. Patent Owner also argues that the Office did not err in concluding

that the claims are allowable over Dechamp and Inagaki. *Id.* at 4–5. To the extent that Patent Owner is arguing that we should exercise our discretion under § 325(d) to deny institution, we analyze below if that discretion should be used.

Pursuant to 35 U.S.C. § 325(d), in determining whether to institute an *inter partes* review, "the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office." In evaluating arguments under § 325(d), we use

> [a] two-part framework: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential); *see also Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (precedential as to Section III.C.5, first paragraph) (listing factors (a)–(f) to consider in evaluating the applicability of § 325(d)).

Dechamp is listed on the cover of the '877 patent. Ex. 1001, code (56). However, we agree with Petitioner that Husain and Nishikawa were not cited during prosecution, and so the combinations of Dechamp and Husain and Dechamp and Nishikawa could not have been considered. *See id.* We also agree that, even though Dechamp was cited, Dechamp was not applied in any rejection. *See, e.g.*, Ex. 1002, 390–412 (Office Action), 489–501 (Final Office Action). Thus, no arguments regarding Dechamp were

presented to the Office. In view of these facts, we determine that the same or substantially the same art and arguments were not previously presented to the Office. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8. Because Petitioner's proposed combinations involving Dechamp were not previously presented, we do not need to consider whether the Office erred in a material manner.

Regarding Inagaki, although it was cited during prosecution, Inagaki was also not applied in any rejection. Ex. 1001, code (56); Ex. 1002, 390–412, 489–501. Furthermore, for the reasons discussed below, based on Petitioner's analysis of the challenged claims and the relied-upon disclosures of Inagaki, Petitioner shows that the Examiner erred in not evaluating it substantively. We, thus, agree with Petitioner that the failure to consider it substantively was material error. Pet. 69–70; *Advanced Bionics*, IPR2019-01469, Paper 6 at 8.

Turning to Schramm, the Examiner was aware of the claim to priority that includes Schramm, and Petitioner's challenge based on Schramm is only one of five challenges that may present concerns under § 325(d). For the reasons explained below, however, at this stage, the challenge based on Schramm is insufficient for institution, but Petitioner's remaining challenges show a reasonable likelihood of prevailing on at least one of the challenged claims. Thus, even if we were to use our discretion under § 325(d) to deny the single challenge based on Schramm, as explained above, Patent Owner does not provide sufficient reasons for extending our discretion under § 325(d) to deny the remaining four challenges.

Accordingly, for the reasons above, we decline to exercise our discretion under § 325(d).

III. ANALYSIS

A. Legal Standards

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent [claim] it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The Board may authorize an *inter partes* review if we determine that the information presented in the Petition shows that there is a reasonable likelihood that Petitioner will prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314(a).

Petitioner contends that the challenged claims of the '877 patent are unpatentable under §§ 102 and 103. Pet. 1. A claim is anticipated under § 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. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A claim is unpatentable under § 103 if the differences between the claimed subject matter 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 question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a

combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of elements produces a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–17.

B. Level of Ordinary Skill in the Art

Petitioner asserts that one of ordinary skill in the art "would have had at least a Bachelor's of Science in mechanical engineering, electrical engineering, or a related technical field pertinent to automotive control or safety systems, along with two or more years of experience working with automotive control or safety systems." Pet. 14 (citing Ex. 1003 ¶ 21). Patent Owner does not propose a level of ordinary skill and does not dispute Petitioner's proposal. *See generally* Prelim. Resp.

Based on the preliminary record, we adopt Petitioner's asserted level of ordinary skill only to determine whether there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition.

C. Claim Construction

In an *inter partes* review based on a petition filed on or after November 13, 2018, the claims are construed

> 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) (2021); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Petitioner argues that the "mode" of independent claims 1 and 8 and "apparatus" of independent claim 15 are nonce words followed by functional recitations with insufficient structure. Pet. 14, 19. Petitioner contends that claims 1, 8, and 15 should thus be given means-plus-function interpretations. *Id.* Petitioner also argues what the asserted functions and corresponding structures for these claims are with support from the record. *Id.* at 15–21.

Patent Owner responds that claims 1, 8, and 15 recite sufficient structure to avoid means-plus-function interpretations. Prelim. Resp. 16. Patent Owner points to the recitations of "vehicle," "steering wheel," and "rolling wheel" in these claims. *Id.* at 16–17, 19. Patent Owner also responds with citations to case law that the absence of express means-plus-function language (i.e., "means for") in the claims raises a presumption that § 112(f) does not apply. *Id.* at 18.

At this stage, Petitioner sufficiently shows that claims 1, 8, and 15 do not recite sufficient structure for performing the recited function. *See* Pet. 14–15 (citing Ex. 1003 ¶ 51), 20 (citing Ex. 1003 ¶¶ 52–53). Based on the preliminary record, we agree with Petitioner that (1) claims 1, 8, and 15 include functional recitations, (2) the phrase "mode that allows" recited by claims 1 and 8 is equivalent to using the means-plus-function language "means for," and (3) the "apparatus" recited by claim 15 does not provide sufficient structure to avoid interpreting under § 112(f). *See id.* at 14–15, 20.

Without further argument or supporting evidence from the record, the mere recitations of "vehicle," "steering wheel," and "rolling wheel" do not show how these recited components, without others, can perform the recited functions of independent claims 1, 8, and 15. *See* Prelim. Resp. 16–17, 19.

For example, the Specification of the '877 patent indicates more components would be required to "prevent[] said vehicle from being steered beyond a rollover threshold of said vehicle," as recited by claim 1. *See, e.g.*, Ex. 1001, Fig. 1. Patent Owner also does not address at this stage why "mode that allows" should not be considered equivalent to means-plus-function language. *See* Prelim. Resp. 18. At this early stage, Petitioner sufficiently rebuts the presumption that § 112(f) does not apply. *See* Pet. 14–21.

We, therefore, preliminarily adopt Petitioner's proposed means-plus-function interpretations for claims 1, 8, and 15. In particular, for claim 1, we agree that the recited function is

> allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered beyond a rollover threshold of said vehicle at any rollover capable speed of said vehicle regardless of the source of an oversteer rotational load applied to a steering wheel of said vehicle.

Pet. 15–16 (citing Ex. 1003 ¶ 51); Ex. 1001, 10:7–12. We also agree that the corresponding structure for the asserted function is the first embodiment of the '877 patent ("Corresponding Structure #1"). Pet. 17–18 (citing Ex. 1001, 2:35–39, 2:48–52, 2:57–3:18, 5:15–21, 5:29–57, 5:63–65, 6:17–7:38, 7:45–54, Figs. 1–4B). We further agree that the corresponding structure can also be the fourth embodiment of the '877 patent ("Corresponding Structure #2"). *Id.* at 18–19 (citing Ex. 1001, 7:45–54, 8:12–17, 8:25–34, 8:58–10:4, Figs. 5–7A; Ex. 1003 ¶ 54).

For independent claim 8, we agree with Petitioner that the function is "allows a vehicle to be steered within a non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered to a point

of vehicle roll regardless of the source of a oversteer rotational load applied to a steering wheel of said vehicle," and the corresponding structures are the same as those for claim 1. Pet. 16 (citing Ex. 1003 ¶ 51), 17–19; Ex. 1001, 10:42–46.

For independent claim 15, we agree with Petitioner that the function is

> allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle but prevents the turning of a steering wheel of said vehicle from being rotated to a point of causing a rolling wheel of said vehicle being turned to an angular position of vehicle roll at any rollover capable speed of said vehicle regardless of the source of an oversteer rotational load applied to said steering wheel of said vehicle,

and corresponding structures are the same as those for claim 1. Pet. 20–21 (citing Ex. 1003 ¶¶ 53, 54); Ex. 1001, 11:5–12.

The parties provide no other proposed interpretations. *See generally* Pet.; Prelim. Resp. Based on the present record, we determine that no other claim term requires express interpretation. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. Asserted Anticipation by Schramm

Petitioner contends with citations to the record that the '877 patent cannot claim priority to the provisional applications filed in 2010 and, thus, Schramm, a patent that issued from a great-great-grandparent application in the priority chain of the '877 patent, is prior art and anticipates claims 1–21. Pet. 6–13, 21–32.

Patent Owner responds that the '877 patent is entitled to its claimed priority and Petitioner, therefore, fails to show anticipation. Prelim. Resp. 8–11.

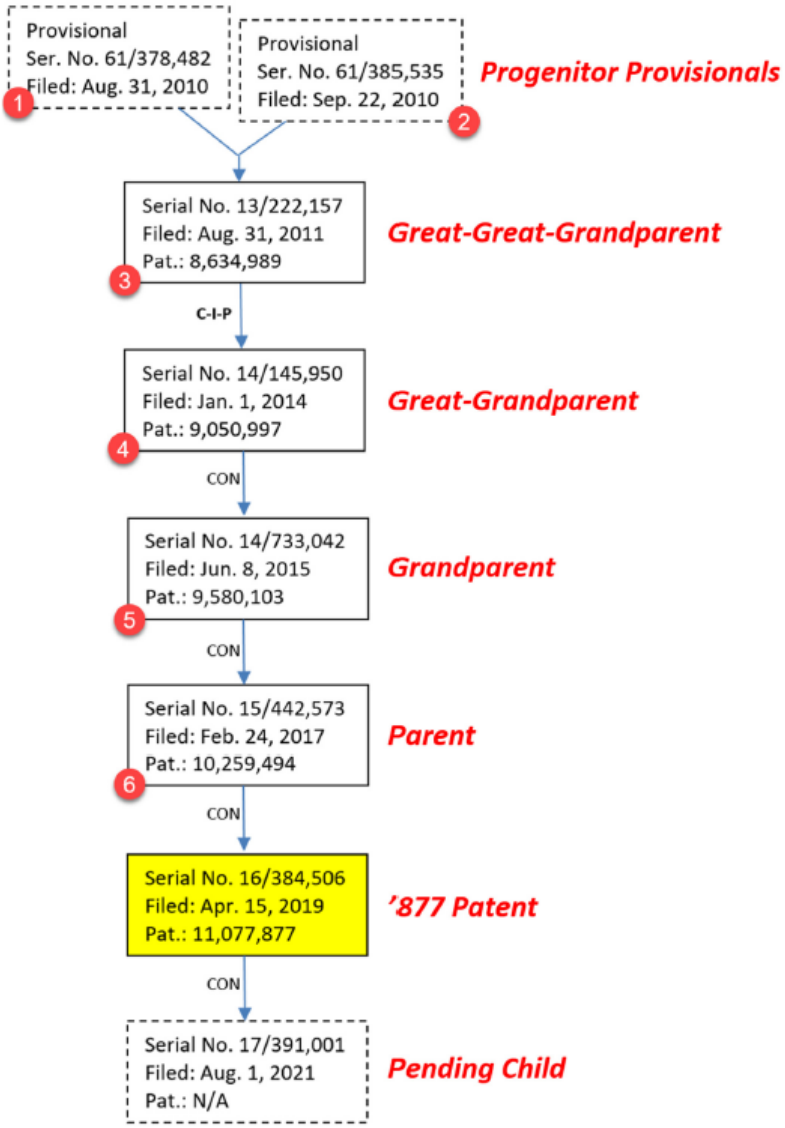
For the reasons that follow, Petitioner does not show a reasonable likelihood of prevailing with respect to at least one claim for this anticipation challenge.

1. Schramm (Ex. 1004)

Schramm issued from a great-great-grandparent application of the application that issued as the '877 patent. Ex. 1001, code (63) (listing "application No. 13/222,157 filed on Aug. 31, 2011, now Pat. No. 8,634,989"); Ex. 1004, codes (10) ("US 8,634,989 B1"), (21) ("Appl. No.: 13/222,157").

2. Priority Date

According to Petitioner, the '877 patent cannot claim priority to provisional applications filed in 2010 because there is a lack of copendency between a great-grandparent application filed on January 1, 2014 and a grandparent application filed on June 8, 2015, as required by 35 U.S.C. § 120, so they cannot be treated as if they were filed on the same date as an earlier application. Pet. 6–9. Reproduced below is Petitioner's flowchart of the applications in the '877 patent's priority chain.



Petitioner's flowchart shows the two provisional applications with reference numbers 1 and 2, the first non-provisional application filed which would issue as Schramm at reference number 3, a subsequently filed continuation-in-part application at reference number 4, three following continuation applications, and another pending continuation application, each with its filing date, serial number, and issued patent number if applicable. Pet. 7.

Petitioner argues that the Applicant statutorily abandoned the great-grandparent application (Appl. No. 14/145,950 at reference number 4)

shortly after it was filed because the same great-grandparent application 4 was filed with a non-publication request and the next day, the Applicant filed a PCT application with the same drawings and embodiments. Pet. 9–10 (citing Ex. 1011). Petitioner also argues that Applicant should have filed a rescission of that non-publication request within 45 days under 35 U.S.C. § 122(b)(2)(B)(iii), which would have been February 15, 2014, but that rescission was not filed until February 7, 2015, almost a year later. *Id.* at 11 (citing Ex. 1010, 43).

According to Petitioner, the following grandparent application 5 filed on June 8, 2015, could not have been copending with great-grandparent application 4, which was never revived, and so the priority chain would have been broken because of lack of copendency between those two applications. Pet. 12. Petitioner, thus, argues that the '877 patent is only entitled to an effective filing date of June 8, 2015, the filing date of the grandparent application 5. *Id.* Petitioner further argues that Patent Owner has the burden to prove entitlement to an earlier filing date in a priority claim but cannot do so because the evidence shows the same invention was claimed in the great-grandparent application and the PCT application. *Id.* at 10–11 (citing Ex. 1003 ¶¶ 46–49).

Patent Owner responds that, while the great-grandparent application 4 was filed with a non-publication request, the PCT application only referred to and applied to the great-great-grandparent application 3 that issued as Schramm. Prelim. Resp. 8–9 (citing Pet. 6–13). Patent Owner also argues that the rescission of non-publication request cited by Petitioner applied to the same great-great-grandparent application 3, not the great-grandparent application 4, as argued by Petitioner. *Id.* at 10 (citing 35 U.S.C. § 122(b)(2)(B)(iii)).

Patent Owner further argues that the great-grandparent application 4 includes additional disclosure that is not in the great-great-grandparent application 3. Prelim. Resp. 9–10 (citing Ex. 1004, 7:24–31, claims 7, 15, 20). Patent Owner contends that the invention disclosed in the PCT application was the invention of the great-great-grandparent application 3, not the great-grandparent application 4, and would also lack the additional disclosure. *Id*. at 11 (citing Paper 6).

The Office records indicate that the great-great-grandparent application 3 was filed with a non-publication request on August 31, 2011, and a Rescission of Previous Nonpublication Request for that same application was filed on December 31, 2013. The PCT application was filed on January 2, 2014. Paper 6, code (22). The PCT application only identifies the great-great-grandparent application and the provisional applications as related applications. Prelim. Resp. 9; Paper 6 ¶ 1. The PCT application, like the great-great-grandparent application 3, lacks additional description of the second embodiment. Prelim. Resp. 9–10; *compare* Paper 6, *with* Ex. 1004; *see also* Ex. 1003, 125–135 (comparing Ex. 1001 to Ex. 1004 to show additions made to Ex. 1001). At this stage, we agree with Patent Owner that the PCT application relates to the great-great-grandparent application 3.

We also agree with Patent Owner at this stage that the relevant rescission of a non-publication request for the PCT application is the one for the great-great-grandparent application 3, not the rescission for the great-grandparent application 4 identified by Petitioner. Prelim. Resp. 10. The preliminary record indicates that such a rescission for the great-great-grandparent application 3 was filed before the PCT application was filed. Therefore, the filing of the PCT application after another rescission for the great-grandparent application 4 would not have caused a statutory

abandonment of the great-grandparent application 4 so that there would have been a lack of copendency between the great-grandparent application 4 and the grandparent application 5.

In view of the above, the present record indicates that the copendency requirement under § 120 for the great-grandparent and the grandparent applications was satisfied. Thus, the '877 patent can claim priority back to the provisional applications filed in 2010.

3. Claims 1–21

Petitioner argues that, because Schramm has drawings and description identical to the '877 patent, Schramm anticipates claims 1–21 with support from declarant testimony and citations to Schramm. Pet. 21–32. Petitioner also applies its proposed interpretations of "mode" and "apparatus." *Id.* at 22–27, 29, 30–31. Petitioner further argues that Patent Owner cannot reasonably argue that Schramm fails to anticipate claims 1–21 "without also contending the Challenged Claims lack written description support from those identical embodiments disclosed in both the '877 patent and Schramm." *Id.* at 22.

Patent Owner responds that the '877 patent is entitled to priority back to 2010 and, thus, Schramm cannot be prior art to the '877 patent. In Patent Owner's view, Petitioner cannot show that Schramm anticipates the claims of the '877 patent. Prelim. Resp. 11.

At this stage, for the reasons explained above regarding the priority date of the '877 patent, we agree with Patent Owner that Schramm would not be prior art to the claims of the '877 patent and cannot anticipate the challenged claims.

4. Petitioner Fails to Show a Reasonable Likelihood of Prevailing

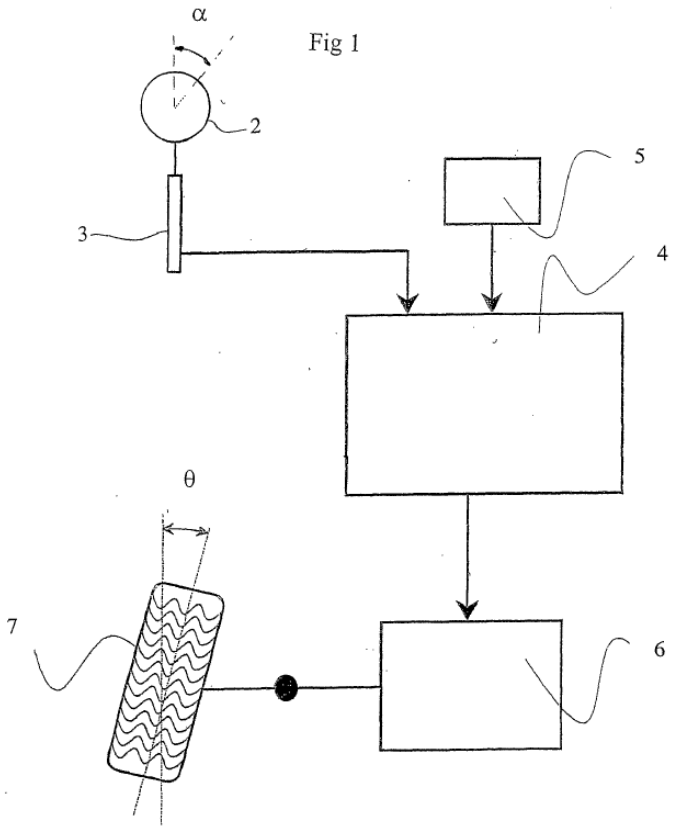
Based on the preliminary record, for the reasons above, Petitioner fails to show a reasonable likelihood of prevailing on its challenge that Schramm anticipates claims 1–21.

E. Asserted Obviousness Based on Dechamp and Husain

1. Dechamp (Ex. 1005)

Dechamp "relates to a method of determining a steering ratio in a steer-by-wire system for a vehicle." Ex. 1005, Abstr. Dechamp explains that, in a steer-by-wire system, a driver moves a control member to fix a setpoint direction for the vehicle, and position sensors send a signal based on the movement of that control member. *Id.* at 1:21–26. The signal is processed and sent to an actuator to change the orientation of wheels on a vehicle. *Id.* at 1:26–29. Dechamp also explains that the steering can be parameterized so that "the steering angle of the steerable wheel[] is a function of the angle of the control member and of the speed of the vehicle." *Id.* at 2:8–10.

Dechamp's method includes "determining a maximum allowable steering angle θ of the steerable wheel based on said detected speed and a predetermined maximum transverse acceleration criterion." Ex. 1005, 3:16–20. In one implementation, Dechamp determines a maximum steering angle based on "a rollover transverse acceleration criterion," and, in another, steering is limited to a range in which the vehicle can be safely moved. *Id.* at 4:4–8, 4:28–35, 7:31–8:17. Figure 1 of Dechamp is reproduced below.



"Figure 1 is a block diagram of a steer-by-wire steering system." Ex. 1005, 5:32. The system includes control member 2, which can be a steering wheel and can be turned to angle α. *Id.* at 6:3–8. Position sensor 3 detects the angular displacement and sends a signal to CPU 4. *Id.* at 6:10–12. CPU 4 also receives a signal from speed sensor 5. *Id.* at 6:17–19. CPU 4 sends a signal based on sensed angle α and speed to actuator 6 that is mechanically linked to steerable wheels 7. *Id.* at 6:21–23. Steering angle θ depends on angle α and speed, and the ratio of angle α to steering angle θ defines a reduction ratio. *Id.* at 6:32–7:3.

2. Husain (Ex. 1006)

Husain "relates to a steer-by-wire system that includes a driver interface system comprising a steering wheel" and particularly to one "wherein the steering wheel is rotatable by an operator between limits that

are dependent upon the ability of the road wheels to respond." Ex. 1006 ¶ 1. Figure 1 of Husain is reproduced below.

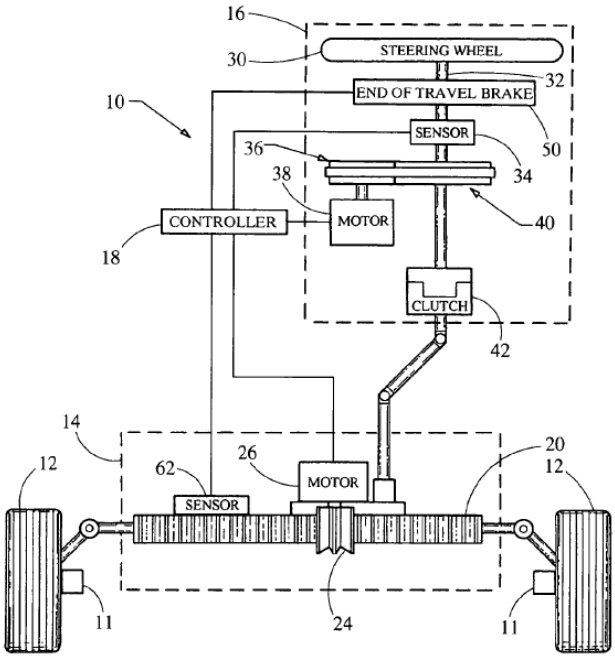


Fig. 1

Figure 1 shows a driver interface system. Ex. 1006 ¶ 9. Steer-by-wire system 10 includes steering wheel 30 on steering column 32 and sensor 34 that detect the rotation of steering column 32. *Id.* ¶ 13. Sensor 34 provides an input signal to controller 18. *Id.* Controller 18 sends a signal to electric motor 26 that drives pinion gear 24. *Id.* ¶ 12. Pinion gear 24 engages teeth of rack 20, and rack 20 can thereby be displaced laterally to alter the orientation of road wheels 12. *Id.*

System 10 also includes end of travel brake 50 that can lock steering column 32 and prevent rotating steering wheel 30. Ex. 1006 ¶ 17. Controller 18 can receive an input from sensor 62 that detects the position of pinion gear 24 and can actuate end of travel brake 50. *Id.* ¶ 18. Also, controller 18 can calculate the lateral displacement of rack 20 based on sensor 62 and determine if road wheels 12 have engaged stops 11 or if

rack 20 cannot move because of a vehicle-mounted stop, curb, or other obstacle. *Id.* ¶¶ 19, 20. By actuating end of travel brake 50, system 10 can alert the driver when the road wheels 30 engage a stop or some other obstacle. *Id.* ¶ 21.

3. Claim 1

For "[a] rollover prevention apparatus," Petitioner argues that, if the preamble is limiting, the proposed combination of Dechamp and Husain teaches such an apparatus. Pet. 39 (citing Ex. 1003 ¶ 109; Ex. 1005, 6:1–30; Ex. 1006 ¶¶ 17–20); Ex. 1001, 10:6; *see also* Pet. viii (labeling the preamble "[1.1]").

Petitioner also argues that Dechamp teaches the limitation "allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered beyond a rollover threshold of said vehicle," because Dechamp teaches a maximum steerable angle for wheels based on speed and transverse rollover acceleration. Pet. 39–40 (citing Ex. 1003 ¶¶ 94, 111; Ex. 1005, 3:22–23, 4:28–35, 5:8–12); Ex. 1001, 10:7–10; *see also* Pet. viii (labeling the limitation "[1.2]").

Petitioner further argues Dechamp teaches "at any rollover capable speed of said vehicle" because Dechamp provides its technique for any rollover capable speed. Pet. 41 (citing Ex. 1003 ¶¶ 94, 112; Ex. 1005, 3:16–20, 3:22–23); Ex. 1001, 10:10; *see also* Pet. viii (labeling the limitation "[1.2]").

For "regardless of the source of an oversteer rotational load applied to a steering wheel of said vehicle," Petitioner contends that, consistent with arguments made during prosecution, the "source" does not require or exclude any particular source and the source can be a human driver. Pet. 41

(citing Ex. 1003 ¶ 114); Ex. 1001, 10:11–12. Petitioner also contends that dependent claim 2 recites that the source is a human driver and that both Dechamp and Husain teach a human driver being the source of a load applied to a steering wheel. Pet. 41–42 (citing Ex. 1003 ¶ 115; Ex. 1005, 1:21–29, 2:4–6, 3:33–35, 6:7–8, 7:1-17; Ex. 1006 ¶¶ 5–7, 13, 21). Based on the '877 patent's description, Petitioner further contends that Dechamp teaches the required "oversteer." *Id.* at 42 (citing Ex. 1001, 1:47–48, 1:53, 1:58, 3:14–18; Ex. 1003 ¶ 116; Ex. 1005, 4:28–35, 5:8–12).

For "a mode," Petitioner argues that "mode" is a "generic nonce term" and its proposed combination has a mode under two alternative mappings that each satisfy the limitation. Pet. 42 (citing Ex. 1003 ¶¶ 51, 117). Under a first mapping, Petitioner contends that Dechamp teaches steering wheel 2 being engaged by brakes when it reaches a maximum angle and disengaged from the brakes below that angle. *Id.* at 42–43 (citing Ex. 1005, 3:22–4:2). Petitioner, thus, contends that Dechamp would have been understood to have a brake engaged mode and a brake disengaged mode, and in both asserted modes, Dechamp's vehicle is steered within a maximal rollover steerable range and prevented from being steered beyond a rollover threshold, as claimed. *Id.* at 43 (citing Ex. 1003 ¶ 118; Ex. 1005, 3:31–4:11, 4:28–35, 5:8–12, 6:1–33, 7:19–8:17).

Under an alternative mapping, Petitioner argues that, when Dechamp's steering wheel 2 is turned in one direction, steering wheel 2 sends a command angle that causes the CPU to send a signal to actuator 6 so that steerable wheels 7 go to angle θ that is speed dependent and prevents rollover. Pet. 43–44 (citing Ex. 1005, 3:31–4:11, 4:28–35, 5:8–12, 6:1–33, Fig. 1). Petitioner also argues that a similar operation occurs when steering wheel 2 is turned in the other direction. *Id.* at 44. Petitioner asserts that

Patent Owner's infringement contentions support Petitioner's alternative mapping of mode being modes in opposite directions of the steering wheel. *Id.* at 44 (citing Ex. 1001, 10:6–15; Ex. 1009, 10:33–43).

Petitioner further argues that, for both alternative mappings, the proposed combination provides an identical function with a structure equivalent to Corresponding Structure #1. Pet. 44–45 (citing Ex. 1003 ¶¶ 119–120; Ex. 1006 ¶¶ 17–20).

For "wherein said apparatus transitions from said mode in response to a predetermined application of rotational load to said steering wheel," Petitioner argues that the proposed combination of Dechamp and Husain transitions between a brake-engaged mode and brake-disengaged mode under Petitioner's first mapping. Pet. 45–46 (citing Ex. 1003 ¶¶ 65, 114, 121; Ex. 1005, 3:22–4:2; Ex. 1006 ¶¶ 17–21); Ex. 1001, 10:12–15; *see also* Pet. viii (labeling the limitation "[1.3]"). Petitioner also argues that, under its alternative mapping, the proposed combination transitions between a right-hand turning mode and a left-hand turning mode. *Id.* at 46–47 (citing Ex. 1005, 1:21–29, 2:24–29, 4:33–35, 6:7–8, 7:19–23).

Regarding the reasons for combining the two references, Petitioner argues that one of ordinary skill in the art would have been motivated to implement Husain's end of travel brake in Dechamp because of Dechamp's fixed angular travel for a steering wheel. Pet. 36 (citing Ex. 1003 ¶¶ 99–108; Ex. 1005, 3:22–4:2; Ex. 1006 ¶¶ 17–20). Petitioner also argues that Husain expressly identifies benefits for using its end of travel brake, such as providing a resistive torque that simulates feel and ready release when turning the steering wheel in the other direction. *Id.* at 36–37 (citing Ex. 1003 ¶¶ 102, 103; Ex. 1006 ¶¶ 17, 20, 21). Petitioner further argues that

providing a tactile feedback would have also motivated the ordinary skilled artisan to combine Dechamp and Husain. *Id.* at 37 (citing Ex. 1003 ¶ 104).

Petitioner additionally argues that one of ordinary skill in the art would have been motivated to make the proposed combination, because Husain's brake can be used for other purposes, such as preventing the steering wheel from moving when a curb or some other obstacle prevents the road wheels from moving. Pet. 38 (citing Ex. 1003 ¶ 105; Ex. 1006 ¶¶ 7, 21). According to Petitioner, one of ordinary skill in the art would have had a reasonable expectation of success in making the combination. *Id.* at 38–39 (citing Ex. 1003 ¶¶ 26–40, 106–107).

a) Petitioner Shows a Reasonable Likelihood of Prevailing

Based on the preliminary record, Petitioner sufficiently shows that Dechamp and Husain teach the limitations of claim 1 and that one of ordinary skill in the art would have combined those references with a reasonable expectation of success for the reasons asserted. *See* Pet. 36–47.

(1) Litigation Claim Charts

Patent Owner responds that the proposed combination lacks several elements of independent claims 1, 8, and 15 with citation to its claim charts from related litigation. Prelim. Resp. 6–8, 31. Patent Owner argues that Petitioner failed to submit the same charts which, according to Patent Owner, clearly show that the applied references lack several elements of the claims. *Id.* at 6.

At this stage, Patent Owner's claim charts by themselves are insufficient to show why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1 based on Dechamp and Husain. *See* Prelim. Resp. 6–8. The claim charts merely assert what limitations are missing in the applied references but do not cite to any supporting evidence

in the record. *See id.* At most, the charts identify what the parties dispute but do not aid in us resolving any of those disputes based on the record before us.

(2) Dechamp

Patent Owner also responds that, unlike the proposed combination, the claims of the '877 patent allow maximum steering range and maneuverability up to the point of vehicle rollover but not beyond that point. Prelim. Resp. 29–30, 37. Patent Owner asserts that the Petition and the declaration cite to portions of Dechamp that fail to teach steering up to, but not beyond, rollover threshold. *Id.* at 36–37 (citing Ex. 1005, 3:8–4:2, 7:31–8:17, 8:26–9:2, Fig. 2).

Patent Owner further responds that Dechamp allows a vehicle to go into rollover and does not disclose how to recover when rollover begins. Prelim. Resp. 32–33 (citing Ex. 1005, 7:1–6, 10:19–24). Patent Owner contends that, even when Dechamp does not allow a vehicle to go into rollover, Dechamp does not teach that a vehicle is allowed "to be steered within a maximal non-rollover steering range of motion of the vehicle," as claimed. *Id.* at 33 (citing Ex. 1005, 3:28–4:2, 10:10–17). In Patent Owner's view, Dechamp teaches a range less than "a maximal non-rollover steering range." *Id.* at 33–34.

Claim 1 recites "a mode that allows a vehicle to be steered within a maximal non-rollover steering range . . . but prevents said vehicle from being steered beyond a rollover threshold." Ex. 1001, 10:6–9. Petitioner contends that Dechamp teaches the limitations because it teaches a maximum steerable angle based on speed and transverse rollover acceleration. Pet. 39–40 (citing Ex. 1003 ¶¶ 94, 111; Ex. 1005, 3:22–23, 4:28–35, 5:8–12). Petitioner's arguments indicate that, even if Dechamp's

maximal non-rollover steering range was less than Patent Owner's asserted maximum range, Dechamp would still teach the limitation. *See id.* Patent Owner's responsive argument also implies a narrower interpretation for claim 1 (Prelim. Resp. 29–30, 36–37), but Patent Owner has not yet proposed any interpretations (*see generally id.*). Thus, at this stage, Patent Owner's arguments about steering up to rollover threshold and steering range do not show that Petitioner fails to demonstrate a reasonable likelihood of prevailing.

Patent Owner further contends that Dechamp does not calculate "transverse rollover acceleration criterion" based on acceleration or speed but based on vehicle data. Prelim. Resp. 34. Patent Owner argues that Dechamp lacks written description and an enabling disclosure because Dechamp does not describe how to calculate the transverse rollover acceleration criterion. *Id.* at 34–36. Patent Owner also argues that, because Dechamp uses fixed vehicle parameters, it does not allow reaching up to the threshold of rollover, as permitted by the challenged claims. *Id.* at 35. Patent Owner further argues that the challenged claims do not calculate transverse rollover acceleration criterion. *Id.*

Patent Owner also asserts that the Petition and the declaration acknowledge that Dechamp's formula is not optional and required by Dechamp's methods. Prelim. Resp. 37 (citing Pet. 25–35; Ex. 1003 ¶¶ 92–96). Patent Owner further asserts that Dechamp does not disclose that its formula has been applied to any real-world vehicle because the formula is unworkable. *Id.*

Although the Specification of the '877 patent describes that "[m]any factors are involved in a vehicle rollover" and that such vehicle rollover can occur "when a vehicle steering wheel is turned too sharply for the vehicle

speed," it does not indicate how to calculate when vehicle rollover will occur or how far a steering wheel can be turned before it is considered to be "too sharply." *See* Ex. 1001, 1:44–45, 2:1–3. The '877 patent thus indicates it is a matter of ordinary skill in the art to determine rollover thresholds. At this stage, because the '877 patent indicates determining rollover thresholds is a matter of ordinary skill, the record indicates that calculating Dechamp's "transverse rollover acceleration criterion" would have also been within ordinary skill in the art.

Also, Petitioner asserts an obviousness challenge based on Dechamp and Husain. *See* Pet. 36–47. While a reference must enable someone to practice the invention in order to anticipate under § 102, a non-enabling reference may qualify as prior art for the purpose of determining obviousness under § 103. *See Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1380–81 (Fed. Cir. 2021). Patent Owner's responsive arguments about whether Dechamp is enabling do not show why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1.

Patent Owner also responds that the challenged claims were allowed over Dechamp alone so Dechamp cannot by itself render the claims obvious. Prelim. Resp. 28–29, 37, 38–39. In Patent Owner's view, Petitioner has not demonstrated that any error was made in issuing the claims over Dechamp and that determination should be followed to deny institution. *Id.* at 29.

Because Petitioner relies on Dechamp modified in view of Husain, Patent Owner's responsive argument about Dechamp alone does not address Petitioner's challenge based on both Dechamp and Husain and, thus, does not show why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1.

(3) Dechamp and Husain

Patent Owner responds that one of ordinary skill in the art would not have combined Dechamp and Husain because Husain does not disclose preventing vehicle rollover. Prelim. Resp. 37–38 (citing Ex. 1006 ¶ 7). Patent Owner argues that Husain applies a brake to a steering column when vehicle wheels engage a mechanical stop or are prevented from moving. *Id.* at 38 (citing Ex. 1006 ¶ 7). According to Patent Owner, such conditions would be beyond rollover thresholds, and so Husain would permit steering beyond rollover thresholds, unlike the challenged claims. *Id.*

Petitioner, however, relies on Dechamp, not Husain, for teaching maximum steerable angle based on speed and transverse rollover acceleration and proposes modifying Dechamp with Husain's end of travel brake to implement Dechamp's maximum steerable angle. Pet. 36–40. Also, as discussed above, Petitioner sufficiently shows at this stage that Dechamp teaches "allow[ing] a vehicle to be steered within a maximal non-rollover steering range . . . but prevents said vehicle from being steered beyond a rollover threshold," and Patent Owner's responsive argument requires an interpretation not yet supported by the record. *See id.*

(4) Petitioner's Declarant

Patent Owner also responds that Petitioner's declarant is neither an expert nor a person of ordinary skill in the art, and, thus, Petitioner's declaration is inadmissible or entitled to no weight. Prelim. Resp. 5, 11. According to Patent Owner, Petitioner's declarant admitted that he was not an expert in patent law, authored or co-authored publications that are not prior art to the '877 patent, and has had no role in autonomous vehicles since his retirement in 2010. *Id.* at 12–13. Patent Owner argues that, in a previous proceeding, Petitioner's declarant never stated that he was a person of

ordinary skill in the art but now states that he is a person of ordinary skill in the art without an explanation for the change. *Id.* at 13.

Patent Owner also argues that Petitioner's declarant has no personal knowledge of the statements made in his declaration, his statements should be considered hearsay, and he cannot testify as a lay witness based on perceived facts. Prelim. Resp. 13–16 (citing Ex. 1003 ¶¶ 15–28, 50–55, 33–108). Patent Owner further argues that testimony regarding the asserted references is conclusory. *Id.* at 15 (citing Ex. 1003 ¶¶ 195, 202–214). Patent Owner, thus, argues that, because the declaration has no evidentiary value, Petitioner fails to meet its burden, and trial should not be instituted. *Id.* at 14, 15.

Petitioner argues that one of ordinary skill in the art "would have had at least a Bachelor's of Science in mechanical engineering, electrical engineering, or a related technical field pertinent to automotive control or safety systems, along with two or more years of experience working with automotive control or safety systems." Pet. 14 (citing Ex. 1003 ¶ 21). Patent Owner does not yet dispute Petitioner's proposal for the level of ordinary skill. *See generally* Prelim. Resp.

According to Petitioner's declarant, he has a Bachelor of Science degree in Electrical Engineering and, prior to 2010, had years of experience in automotive control or safety systems. *See, e.g.*, Ex. 1003 ¶¶ 6–10. Comparing the not yet disputed level of ordinary skill with the declarant's credentials, we are satisfied that Petitioner's declarant qualifies as a person of ordinary skill in the art under the only definition proposed so far. Whether he was or was not an ordinary skilled artisan in another proceeding does not affect whether he is such an artisan in this proceeding because the

record of this proceeding presently before us indicates he is. We, thus, see no reason at this stage to alter the weight we give to his declaration.

(5) Remaining Responsive Arguments

Patent Owner further responds that Petitioner fails to show that estoppel applies to this proceeding because the claims of the '877 patent are patentably distinct from the claims challenged in IPR2020-00948 and not inconsistent with the judgment in that proceeding. Prelim. Resp. 20. Patent Owner contends that certain language in the claims in the '877 patent was not present in the previous proceeding, and that Petitioner fails to argue why the claims would not be patentably distinct. *Id.* at 20–24. Patent Owner additionally responds that Petitioner cannot remedy the defects of its Petition with new evidence or arguments. *Id.* at 41–42.

We see no reason at this stage to apply estoppel; however, if Petitioner identifies an argument that should be considered inconsistent with the judgment of IPR2020-00948, we will revisit this issue. Patent Owner's remaining responsive arguments summarized above do not show why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1.

Accordingly, based on the preliminary record and for the reasons above, Petitioner shows a reasonable likelihood of prevailing on its challenge to claim 1 based on Dechamp and Husain.

4. Dependent Claims 2–7

Claim 2 depends from claim 1 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said steering wheel." Ex. 1001, 10:16–19. Petitioner refers to its argument for claim 1. Pet. 47 (citing Ex. 1003 ¶ 122).

Claim 3 depends from claim 1 and recites "wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 10:20–23. Petitioner argues that each of its mappings for the wherein clause of claim 1 involves a predetermined rotational load and one of ordinary skill in the art would have understood that changing rotational direction would not induce rollover. Pet. 47 (citing Ex. 1003 ¶ 123).

Claim 4 depends from claim 1 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said steering wheel, and wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 10:24–30. Petitioner refers to its arguments for claims 2 and 3. Pet. 47 (citing Ex. 1003 ¶¶ 124, 125).

Claim 5 depends from claim 1 and recites "wherein if said vehicle is steered beyond a rollover threshold of said vehicle, said vehicle rolls." Ex. 1001, 10:31–33. Petitioner argues that the limitations of claim 5 would have been understood from Dechamp. Pet. 47–48 (citing Ex. 1003 ¶¶ 26–28, 128; Ex. 1005, 4:28–35, 5:8–12).

Claim 6 depends from claim 1 and recites "wherein said apparatus includes an electronic control unit adapted to send an actuation signal to an actuator when a sensed driving parameter exceeds a predetermined magnitude." Ex. 1001, 10:34–37. Petitioner argues that Dechamp teaches sensing vehicle speed and CPU 4 sends an actuation signal to actuator 6 based on sensed vehicle speed. Pet. 48 (citing Ex. 1003 ¶¶ 127–130; Ex. 1005, 6:17–19, 6:21–23, 7:10–9:2).

Claim 7 depends from claim 1 and recites "wherein said apparatus is automatically actuated in response to the speed of said vehicle." Ex. 1001, 10:38–40. Petitioner refers to its argument for claim 6. Pet. 48 (citing Ex. 1003 ¶ 131).

Patent Owner responds that the proposed combination fails to include limitations of dependent claims 2–7 with reference to its claim charts from related litigation. Prelim. Resp. 8. For the same reasons discussed above for claim 1, the claim charts do not sufficiently explain why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claims 2–7. Other than the arguments for claim 1 described above, Patent Owner does not provide any additional arguments for any of the dependent claims. *See generally id.*

At this stage, based on the preliminary record, Petitioner shows a reasonable likelihood of prevailing in its challenge to claims 2–7 based on Dechamp and Husain.

5. Independent Claim 8

Claim 8 recites "[a] rollover prevention apparatus." Ex. 1001, 10:41. Petitioner refers to its arguments for the preamble of claim 1. Pet. 48 (citing Ex. 1003 ¶ 132); *see also id.* at ix (labeling the preamble "[8.1]").

Claim 8 also recites "a mode that allows a vehicle to be steered within a non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered to a point of vehicle roll regardless of the source of a oversteer rotational load applied to a steering wheel of said vehicle." Ex. 1001, 10:41–46. Petitioner refers to its arguments for a similar limitation in claim 1. Pet. 49 (citing Ex. 1003 ¶ 133); *see also id.* at ix (labeling the limitation "[8.2]").

Claim 8 further recites "wherein said apparatus transitions from said mode in response to a predetermined application of rotational load to said steering wheel." Ex. 1001, 10:46–48. Petitioner refers to its arguments for a similar limitation in claim 1. Pet. 49 (citing Ex. 1003 ¶ 134); *see also id.* at ix (labeling the limitation "[8.3]").

Patent Owner responds with the same arguments presented for claim 1. *See generally* Prelim. Resp. The language of claim 8 more closely follows Patent Owner's response that the claims of the '877 patent allow maximum steering range and maneuverability up to the point of vehicle rollover but not beyond that point. *See* Prelim. Resp. 29–30, 37.

For the reasons discussed above for claim 1, however, based on the record at this stage, Petitioner shows a reasonable likelihood of prevailing in its challenge to claim 8 based on Dechamp and Husain.

6. Dependent Claims 9–14

Claim 9 depends from independent claim 8 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said steering wheel." Ex. 1001, 10:49–52. Petitioner refers to its argument for claim 2. Pet. 49 (citing Ex. 1003 ¶ 135).

Claim 10 depends from independent claim 8 and recites "wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 10:53–56. Petitioner refers to its argument for claim 3. Pet. 49 (citing Ex. 1003 ¶ 136).

Claim 11 depends from independent claim 8 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said

steering wheel, and wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 10:57–63. Petitioner refers to its arguments for claims 2–4. Pet. 49 (citing Ex. 1003 ¶¶ 137, 138).

Claim 12 depends from independent claim 8 and recites "wherein said steering point of vehicle roll varies according to the speed of said vehicle." Ex. 1001, 10:64–65. Petitioner argues that one of ordinary skill in the art would have understood that Dechamp teaches the limitations of claim 12. Pet. 49–50 (citing Ex. 1003 ¶ 139; Ex. 1005, Abstr., 3:12–20, 4:4–11, 4:28–35, 7:1–17).

Claim 13 depends from independent claim 8 and recites "wherein if said vehicle is steered beyond a point of vehicle roll, said vehicle rolls." Ex. 1001, 10:66–67. Petitioner refers to its argument for claim 5. Pet. 50 (citing Ex. 1003 ¶ 140).

Claim 14 depends from independent claim 8 and recites "wherein said apparatus includes an electronic control unit adapted to send an actuation signal to an actuator when a sensed driving parameter exceeds a predetermined magnitude." Ex. 1001, 11:1–4. Petitioner refers to its arguments for claim 6. Pet. 50 (citing Ex. 1003 ¶ 141).

Patent Owner responds that the proposed combination fails to include limitations of dependent claims 9–14 with reference to its claim charts from related litigation. Prelim. Resp. 8. For the same reasons discussed above for claim 1, the claim charts do not sufficiently explain why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claims 9–14. Other than the arguments for the independent claims, Patent Owner does not provide any additional arguments for any of the dependent claims. *See generally id.*

At this stage, based on the preliminary record, Petitioner shows a reasonable likelihood of prevailing in its challenge to claims 9–14 based on Dechamp and Husain.

7. Independent Claim 15

Petitioner argues that the combination of Dechamp and Husain teaches the asserted function and the corresponding structure for the reasons asserted for claim 1 that includes, according to Petitioner, similar and overlapping functional claim language. Pet. 50 (citing Ex. 1003 ¶¶ 142–144). Petitioner contends that claim 15 more narrowly recites a steering wheel instead of a vehicle but that difference is not dispositive because Dechamp teaches the functional language of claim 15. *Id.* at 50–51 (citing Ex. 1003 ¶ 143; Ex. 1005, 3:22–4:11, 4:28–35, 5:8–12).

Patent Owner responds with the same arguments presented for claim 1. *See generally* Prelim. Resp. For the reasons discussed above for claim 1, based on the record at this stage, Petitioner shows a reasonable likelihood of prevailing in its challenge to claim 15 based on Dechamp and Husain.

8. Dependent Claims 16–21.

Claim 16 depends from independent claim 15 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said steering wheel." Ex. 1001, 11:13–16. Petitioner refers to its argument for claim 2. Pet. 51 (citing Ex. 1003 ¶ 145).

Claim 17 depends from independent claim 15 and recites "wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 11:17–20. Petitioner refers to its argument for claim 3. Pet. 51 (citing Ex. 1003 ¶ 146).

Claim 18 depends from independent claim 15 and recites "wherein said source of an oversteer rotational load applied to a steering wheel of said vehicle comprises a human applying an oversteer rotational load to said steering wheel, and wherein said predetermined application of rotational load to said steering wheel comprises a non-oversteer rotational load applied to said steering wheel." Ex. 1001, 12:1–7. Petitioner refers to its arguments for claims 2–4. Pet. 51 (citing Ex. 1003 ¶¶ 147, 148).

Claim 19 depends from independent claim 15 and recites "wherein said steering point where said steering wheel causes a rolling wheel of said vehicle to be turned to an angular position of vehicle roll varies according to the speed of said vehicle." Ex. 1001, 12:8–11. Petitioner refers to its argument for claim 12. Pet. 51 (citing Ex. 1003 ¶ 149).

Claim 20 depends from independent claim 15 and recites "wherein if said rolling wheel of vehicle is turned beyond an angular position point of vehicle roll, said vehicle rolls." Ex. 1001, 12:12–14. Petitioner refers to its argument for claim 5. Pet. 51 (citing Ex. 1003 ¶ 150).

Claim 21 depends from independent claim 15 and recites "wherein said apparatus includes an electronic control unit adapted to send an actuation signal to an actuator when a sensed driving parameter exceeds a predetermined magnitude." Ex. 1001, 12:15–18. Petitioner refers to its argument for claim 6. Pet. 51 (citing Ex. 1003 ¶ 151).

Patent Owner responds that the proposed combination fails to include limitations of dependent claims 16–21 with reference to its claim charts from related litigation. Prelim. Resp. 8. For the same reasons discussed above for claim 1, the claim charts do not sufficiently explain why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claims 16–21. Other than the arguments for the independent claims, Patent Owner does not

provide any additional arguments for any of the dependent claims. *See generally id.*

At this stage, based on the preliminary record, Petitioner shows a reasonable likelihood of prevailing in its challenge to claims 16–21 based on Dechamp and Husain.

F. Asserted Obviousness Based on Dechamp and Nishikawa

1. Nishikawa (Ex. 1007)

Nishikawa "relates to a steering angle correcting system in a vehicle." Ex. 1007, 1:7–8. Nishikawa provides such a system "in a vehicle, which has a semi-automatic steering concept and includes a man-machine interface in such a manner that a driver normally maintains a cooperating relationship to the system." *Id.* at 2:54–58. "[W]henever a driver's intention and the determination by the system are different from each other, the driver can drive the vehicle, i.e, to provide a simple system in which an automatic steering and a manual steering can be reconciled." *Id.* at 2:59–62.

In Nishikawa, when the steering wheel is "at a central position of the play, equal controllable angles are always prepared on opposite sides of the set position of the steering wheel 5." Ex. 1007, 18:24–27. When a vehicle is traveling automatically in a lane along a target course and "the driver desires to drive the vehicle to travel on a slight right-side course within the lane when there is a small object fallen within the lane," "a traveling as intended by the driver can be easily realized by applying a slight torque to the steering wheel 5." *Id.* at 18:35–37, 18:39–41.

2. Claims 1–21

Petitioner contends that Dechamp discloses the preamble "[a] rollover prevention apparatus" by referring to previous arguments. Pet. 55 (citing Ex. 1003 ¶ 163). Petitioner also contends with reference to previous

arguments that Dechamp discloses the limitations "allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle but prevents said vehicle from being steered beyond a rollover threshold of said vehicle," "at any rollover capable speed of said vehicle," and "regardless of the source of an oversteer rotational load applied to a steering wheel of said vehicle." *Id.* (citing Ex. 1003 ¶¶ 165–167).

For "mode," Petitioner argues that, to the extent the claim is not limited to the corresponding structure of the '877 patent, the proposed combination of Dechamp and Nishikawa would have a rollover prevention mode and a direct steering mode that would be based on Nishikawa's teachings. Pet. 55–56 (citing Ex. 1003 ¶ 168; Ex. 1007, 18:24–45). Petitioner, thus, argues that the proposed combination would have the recited mode. *Id.* at 55 (citing Ex. 1003 ¶¶ 164–169).

For "wherein said apparatus transitions from said mode in response to a predetermined application of rotational load to said steering wheel," Petitioner argues that the proposed combination would transition from rollover prevention mode to direct-steering mode. Pet. 56 (citing Ex. 1003 ¶ 169; Ex. 1007, 18:24–45).

According to Petitioner, one of ordinary skill in the art would have been motivated to modify Dechamp to include Nishikawa's direct driving control in a semi-automatic steering system so that the combination would allow the driver to steer the vehicle directly for limited steering wheel angles without having to apply Dechamp's reduction ratio. Pet. 52 (citing Ex. 1003 ¶¶ 153–162; Ex. 1005, 2:8–18, 3:31–4:11; Ex. 1007, 18:24–45). Petitioner argues that the proposed modification would have "facilitate[d] small corrections at highway speeds with minimal effort by the driver," while still preventing rollover as taught by Dechamp. *Id.* at 53 (citing Ex. 1003 ¶¶ 156,

158). Petitioner also explains how Nishikawa's teachings would have been included in Dechamp so that Dechamp's CPU would not apply a reduction ratio for a limited range of steering wheel motion. *Id.* at 53–54 (citing Ex. 1003 ¶ 157).

Petitioner further argues that, "because the resulting steering system would more accurately reflect the driver's intent within the limited range of steering wheel angles," the ordinary skilled artisan would have been motivated to make the proposed combination for another reason. Pet. 54 (citing Ex. 1003 ¶ 159; Ex. 1007, Abstr., 2:54–62, 3:14–20). Petitioner additionally argues that the benefits stated in Nishikawa would have motivated the proposed combination for a third reason. *Id.* at 54–55 (citing Ex. 1003 ¶ 160; Ex. 1007, 18:24–45). Petitioner provides reasons why one of ordinary skill in the art would have had a reasonable expectation of success in making the proposed combination. *Id.* at 55 (citing Ex. 1003 ¶ 161).

For dependent claims 2–7, Petitioner generally refers to the above-summarized arguments for claim 1 or its arguments from the previous challenge based on Dechamp and Husain. Pet. 56–57 (citing Ex. 1003 ¶¶ 170–176). For independent claim 8, Petitioner refers to the above arguments for claim 1. *Id.* at 57–58 (citing Ex. 1003 ¶¶ 177–179). For claims 9–14 that depend from claim 8, Petitioner refers to previous arguments. *Id.* at 58 (citing Ex. 1003 ¶¶ 180–186). For independent claim 15 and its dependent claims 16–21, Petitioner again refers to previous arguments. *Id.* at 58–59 (citing Ex. 1003 ¶¶ 187–194).

a) Petitioner Shows a Reasonable Likelihood of Prevailing

Based on the preliminary record, Petitioner sufficiently shows that Dechamp and Nishikawa teach the limitations of claims 1–21 and that one of

ordinary skill in the art would have combined those references with a reasonable expectation of success for the reasons asserted. *See* Pet. 52–59.

Patent Owner responds that the asserted references lack several claimed elements as shown by Patent Owner's claim charts and that Nishikawa does not address rollover at all. Prelim. Resp. 31, 39, 40. For the reasons discussed above for the challenge to claim 1 based on Dechamp and Husain, the claim charts do not sufficiently explain why Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1. Petitioner also relies on Dechamp for limitations related to preventing rollover.

Patent Owner also responds that one of ordinary skill in the art would not have combined Dechamp with Nishikawa. Prelim. Resp. 38–39. Patent Owner argues that both references each allow steering a vehicle beyond a rollover threshold and neither provides for any correction after reaching rollover. *Id.* at 39. Patent Owner again argues that Dechamp's formula is unworkable and not enabling. *Id.*

For the reasons discussed above for the challenge to claim 1 based on Dechamp and Husain, these responsive arguments do not sufficiently demonstrate that Petitioner fails to show a reasonable likelihood of prevailing in its challenge to claim 1 based on Dechamp and Nishikawa. On the preliminary record, Patent Owner's arguments would need support for a narrower interpretation that has not yet been proposed, and, as discussed above, a non-enabling reference may qualify as prior art for the purpose of determining obviousness.

Patent Owner also argues that Nishikawa discloses a direct steering system, not a steer-by-wire system like Dechamp. Prelim. Resp. 40. In Patent Owner's view, an ordinary skilled artisan would not have replaced

Dechamp's system with Nishikawa's because it would be contrary to Dechamp. *Id.* Patent Owner contends that the proposed modification would have rendered Dechamp inoperable. *Id.*

Petitioner, however, proposes modifying Dechamp in view of Nishikawa to allow a driver to steer directly for limited steering wheel angles without having to apply Dechamp's reduction ratio. Pet. 52 (citing Ex. 1003 ¶¶ 153–162; Ex. 1005, 2:8–18, 3:31–4:11; Ex. 1007, 18:24–45). At this stage, Petitioner's explanation of how Nishikawa's teachings would have been included in Dechamp would not have required replacing Dechamp's steer-by-wire system with Nishikawa's direct steering system or rendered Dechamp inoperable. *Id.* at 53–54 (citing Ex. 1003 ¶ 157).

G. Asserted Anticipation by Inagaki

1. Inagaki (Ex. 1008)

Inagaki "relates to an effective steering safety mechanism which assures safety when the driver of an automotive vehicle turns the steering wheel of the vehicle suddenly and sharply." Ex. 1008, 1:6–9; *see also id.* Abstr. (stating that "[t]his makes it possible to prevent the vehicle from skidding sideways and rolling over when the driver turns the steering wheel too sharply"), 1:42–46 (stating that "an object of the invention is to provide a steering safety mechanism capable of preventing a vehicle from skidding sideways and from rolling over when the steering wheel of the vehicle is turned too sharply and suddenly by the driver"), 2:9–11 (stating that "the invention makes it possible to prevent the vehicle from skidding sideways and rolling over when the driver turns the steering wheel to[o] sharply"). Figure 1 of Inagaki is reproduced below.

FIG. 1

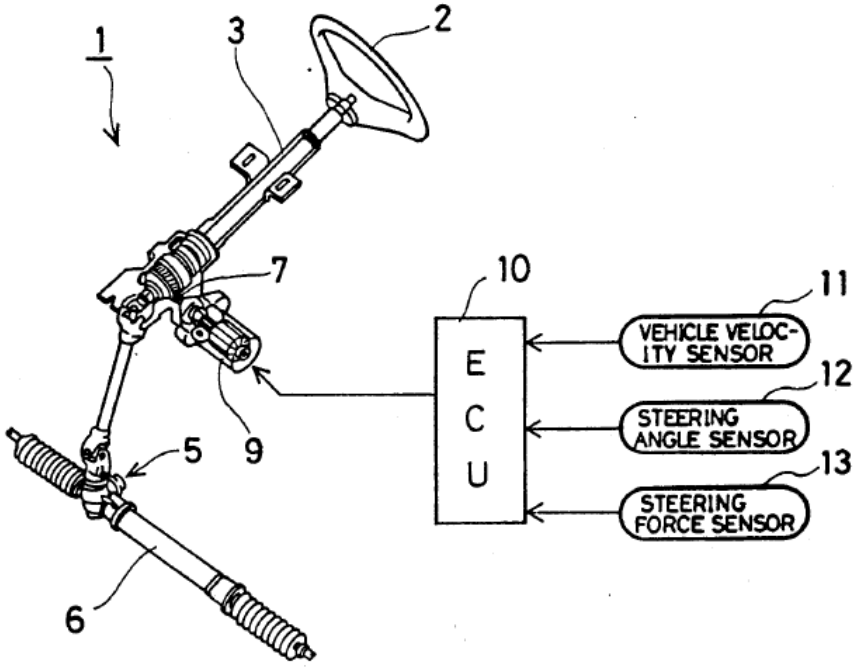


Figure 1 shows an overall arrangement of Inagaki's steering safety mechanism. Ex. 1008, 2:28–31. Power steering system 1 has steering wheel 2 that transmits a rotation to steering gear 5 via steering shaft 3 and worm gear 7. *Id.* at 2:46–48, 2:51–52. Steering gear 5 drives steering rack 6 left or right to steer the vehicle. *Id.* at 2:49–50.

Electronic control unit 10 receives signals from vehicle velocity sensor 11, steering angle sensor 12, and steering force sensor 13. Ex. 1008, 2:52–55. Electronic control unit 10 processes these signals to send a control signal to steering motor 9. *Id.* at 2:55–57. Figures 4 and 5 of Inagaki are reproduced below.

FIG. 4

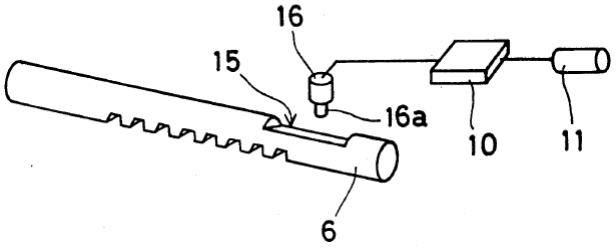
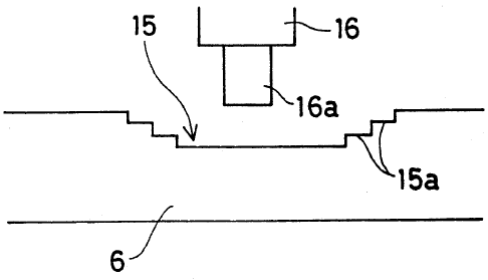


FIG. 5



Figures 4 and 5 show embodiments of a steering safety mechanism. Ex. 1008, 2:35–37. In the embodiment of Figure 4, steering rack 6 has recess 15, and solenoid 16 has plunger 16a opposite recess 15. *Id.* at 3:16–18. When velocity sensor 11 detects speed above a predetermined value, electronic control unit 10 energizes solenoid 16 which causes plunger 16a to strike recess 15 to limit steering to the range defined by recess 15. *Id.* at 3:18–27.

In the embodiment of Figure 5, recess 15 has steps 15a, and the output of solenoid 16 varies with vehicle speed to control the projecting length of plunger 16a. Ex. 1008, 3:34–39. "[T]his arrangement makes it possible to vary the range over which steering is restricted." *Id.* at 3:41–43.

2. Claims 15, 16, and 19–21

Independent claim 15 recites "[a] rollover prevention apparatus." Ex. 1001, 11:5. Petitioner argues that Inagaki describes a power steering apparatus that limits steering to a range defined by recess 15 so that the apparatus "makes it possible to prevent the vehicle from skidding sideways and rolling over when the driver turns the steering wheel to[o] sharply." Pet. 62–63 (citing Ex. 1003 ¶ 203; Ex. 1008, Abstr., 1:40–46, 2:9–11, 2:46–50, 3:14–43, Figs. 1, 4, 5) (alteration in original).

Claim 15 also recites "allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle." Ex. 1001, 11:5–7. Petitioner argues under a first mapping that, when solenoid plunger 16a does not obstruct steering rack 6, the vehicle can be steered in its full range of motion which is also a non-rollover steering range of motion. Pet. 63 (citing Ex. 1003 ¶ 204; Ex. 1008, 3:14–43). Under a second mapping, Petitioner argues that, when plunger 16a is in recess 15, Inagaki describes that the vehicle can be steered within a certain range or maximal non-rollover steering range. *Id.* at 63–64 (citing Ex. 1003 ¶ 206; Ex. 1008, 2:9–11, 3:14–43).

Claim 15 further recites "but prevents the turning of a steering wheel of said vehicle from being rotated to a point of causing a rolling wheel of said vehicle being turned to an angular position of vehicle roll at any rollover capable speed of said vehicle." Ex. 1001, 11:7–11. Petitioner argues that Inagaki discloses preventing the steering wheel from being turned to the point of causing a rollover event. Pet. 64 (citing Ex. 1003 ¶¶ 208–212; Ex. 1008, 2:9–11, 3:14–43). Petitioner contends that, under a first mapping, because recess 15 limits steering rack 6, steerability is limited and prevented from being rotated to the point of rollover regardless of the state of the steering wheel. *Id.* at 65 (citing Ex. 1003 ¶ 209; Ex. 1008, 3:14–43). Petitioner also contends that, under a second mapping, when plunger 16a prevents the movement of both steering rack 6 and its mechanically linked steering wheel 2, Inagaki is preventing a rollover event "at any rollover capable speed." *Id.* at 65–66 (citing Ex. 1003 ¶¶ 210, 211; Ex. 1008, Abstr., 1:40–46, 2:9–11, 2:46–50, 3:14–43, Fig. 1).

Claim 15 finally recites "regardless of the source of an oversteer rotational load applied to said steering wheel of said vehicle." Ex. 1001,

11:11–12. Petitioner argues that the source can be a human driver, and that Inagaki describes a human that can apply an oversteer rotational load to a steering wheel. Pet. 66 (citing Ex. 1003 ¶ 213; Ex. 1008, Abstr., 1:5–30, 1:40–45, 2:9–11). Petitioner also argues that oversteer means turning too sharply, which Inagaki describes. *Id.* at 66–67 (citing Ex. 1001, 1:47–48, 1:53, 1:58, 3:14–18; Ex. 1003 ¶ 214; Ex. 1008, Abstr., 1:5–30, 1:40, 2:9–11).

For dependent claim 16, Petitioner refers to its arguments for claim 15 regarding a human driver turning the steering wheel sharply. Pet. 67 (citing Ex. 1003 ¶ 215). For claim 19, Petitioner argues that Inagaki describes variable steering ranges based on vehicle speed. *Id.* at 67–68 (citing Ex. 1003 ¶ 216; Ex. 1008, 3:34–43).

For claim 20, Petitioner contends that Inagaki prevents rollover by limiting the steering of the vehicle. Pet. 68 (citing Ex. 1003 ¶ 217; Ex. 1008, Abstr., 1:40–46, 2:9–11, 3:14–43). Petitioner also contends that, because Inagaki discloses electronic control unit 10 sending a signal to solenoid 16 when vehicle speeds exceeds a predetermined value, Inagaki discloses an apparatus with a control unit that sends an actuation signal to an actuator when a sensed parameter exceeds a predetermined magnitude, as required by claim 21. *Id.* (citing Ex. 1003 ¶ 218; Ex. 1008, 3:14–43).

a) Petitioner Shows a Reasonable Likelihood of Prevailing

Based on the preliminary record, Petitioner sufficiently shows that Inagaki discloses the limitations of claims 15, 16, and 19–21. *See* Pet. 62–68.

As summarized above, Patent Owner responds that Inagaki lacks several claimed elements as shown by Patent Owner's claim charts. Prelim. Resp. 24. Patent Owner argues that Inagaki does not disclose any limitation

of claim 15 except for "regardless of the source of an oversteer rotational load applied to said steering wheel of said vehicle." *Id.* at 24–25. Patent Owner also responds that Inagaki was already considered during prosecution. *Id.* at 25.

For same reasons stated above for challenge based on Dechamp and Husain, these responsive arguments do not show why Petitioner fails to show a reasonable likelihood of prevailing in its anticipation challenge based on Inagaki. Also, as discussed above, we determine that there was a material error in failing to consider Inagaki substantively, even though it was cited during prosecution based on Petitioner's analysis of claims 15, 16, and 19–21 in view of Inagaki's disclosures.

Unlike the challenged claims, Patent Owner responds that Inagaki corrects vehicle steering after a rollover threshold has been crossed. Prelim. Resp. 25, 27–28; *see also id.* at 26–27 (arguing what Inagaki discloses) (citing Ex. 1008, 1:2, 1:38, 2:4–8, 2:65, 3:6, 3:8, Figs. 2, 3). Patent Owner also contends that Petitioner's declarant misstates what Inagaki discloses and ignores Inagaki's reliance on a "restoring force." *Id.* at 26 (citing Ex. 1003 ¶¶ 105, 202–214). Patent Owner further contends that the challenged claims do not recite a "restoring force" and that Inagaki fails to disclose an apparatus that "prevents turning of a steering wheel of said vehicle from being rotated to a point of causing a rolling wheel of said vehicle being turned to an angular position of vehicle roll at any rollover capable speed of said vehicle." *Id.* at 26, 27.

Inagaki's "restoring force," however, is only described in connection with the embodiments shown in Figures 2 and 3, wherein electronic control unit 10 determines a restoring force. Ex. 1008, 2:61–3:13. Petitioner does not cite to this embodiment. *See* Pet. 62–68. Petitioner, instead, cites to

descriptions related to the embodiment of Figures 4 and 5, which Inagaki describes as "illustrat[ing] another embodiment of the present invention." *See id.*; Ex. 1008, 3:14–15. Patent Owner's arguments regarding the restoring force do not provide a reason for determining Petitioner fails to show a reasonable likelihood of prevailing in its anticipation challenge based on Inagaki.

Based on the preliminary record, for the reasons above, Petitioner shows a reasonable likelihood of prevailing on its challenge that Inagaki anticipates claims 15, 16, and 19–21.

H. Asserted Obviousness Based on Inagaki

1. Claims 15, 16, and 19–21

For the limitation "allows a vehicle to be steered within a maximal non-rollover steering range of motion of said vehicle" of claim 15, Petitioner argues that, under its first mapping, if Inagaki does not expressly disclose a predetermined value for vehicle velocity to preclude a rollover event, then it would have been obvious in view of Inagaki's suggestion to do so. Pet. 63 (citing Ex. 1003 ¶ 205; Ex. 1008, 2:9–11), 64 (citing Ex. 1003 ¶ 207; Ex. 1008, 2:9–11), 66 (citing Ex. 1003 ¶ 212; Ex. 1008, 2:9–11); Ex. 1001, 11:5–7.

For dependent claims 16 and 19–21, Petitioner provides the same arguments as summarized above for the anticipation challenge based on Inagaki. Pet. 67–68.

a) Petitioner Shows a Reasonable Likelihood of Prevailing

Based on the preliminary record, Petitioner sufficiently shows that Inagaki would have rendered obvious claims 15, 16, and 19–21. *See* Pet. 62–68.

Patent Owner responds with the same arguments summarized above for the anticipation challenge based on Inagaki. *See, e.g.*, Prelim. Resp. 4–5, 24–25. For the reasons above, those arguments do not indicate that Petitioner fails to show a reasonable likelihood of prevailing on this challenge.

Accordingly, Petitioner shows a reasonable likelihood of prevailing on its challenge that Inagaki would have rendered obvious claims 15, 16, and 19–21.

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition and the cited evidence, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in proving that at least one of claims 1–21 of the '877 patent is unpatentable, and thus, we institute an *inter partes* review of all challenged claims on all presented challenges. *SAS*, 138 S. Ct. at 1359–60.

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim or any underlying factual and legal issues.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–21 of U.S. Patent No. 11,077,877 B1 is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of U.S. Patent No. 11,077,877 B1 shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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