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Paper 41
Entered: May 10, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE TORO COMPANY,
Petitioner,

v.

MTD PRODUCTS INC.,
Patent Owner.

Case IPR2016-00194
Patent 8,011,458

Before WILLIAM V. SAINDON, RICHARD E. RICE, and TIMOTHY J. GOODSON, *Administrative Patent Judges*.

SAINDON, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

Finding All Challenged Claims Unpatentable
Denying Patent Owner's Motion to Exclude Evidence
35 U.S.C. § 318(a); *37 C.F.R. § 42.73*

I. INTRODUCTION

We have jurisdiction under 35 U.S.C. § 6. We enter this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

With respect to the grounds asserted in this trial, we have considered the papers submitted by the parties and the evidence cited therein. For the reasons discussed below, we determine that Petitioner has shown, by a preponderance of the evidence, claims 1–16 of U.S. Patent No. 8,011,458 (Ex. 1001, "the '458 patent") are unpatentable. We also deny Patent Owner's Motion to Exclude Evidence.

A. Procedural History

Petitioner requested an *inter partes* review of claims 1–16 of the '458 patent. Paper 6 ("Pet."). Patent Owner filed a Preliminary Response to the Petition. Paper 10 ("Prelim. Resp."). Upon consideration of the Petition and Patent Owner's Preliminary Response, we instituted trial on all challenged claims and grounds. Paper 13 ("Dec. on Inst.").

During the trial, Patent Owner filed its Response (Paper 17, "PO Resp.") and Petitioner filed its Reply (Paper 21, "Pet. Reply"). We also permitted Patent Owner to file a Sur-Reply (Paper 25, "Sur-Reply") and Petitioner to file a Sur-Sur-Reply (Paper 30, "Sur-Sur Reply"). An oral hearing was held. Paper 40 ("Tr.").

B. Related Matters

The parties represent that the '458 patent is asserted in *MTD Products Inc. v. Toro Company et al.*, 1:15-cv-00766-PAG (N.D. Ohio). Pet. 1; Paper 9, 2. Petitioner also has filed a petition challenging Patent Owner's U.S.

Patent No. 8,136,613 (IPR2016-00219). Patent Owner identifies U.S. Patent No. 6,962,219 as a related patent. Paper 9, 2.

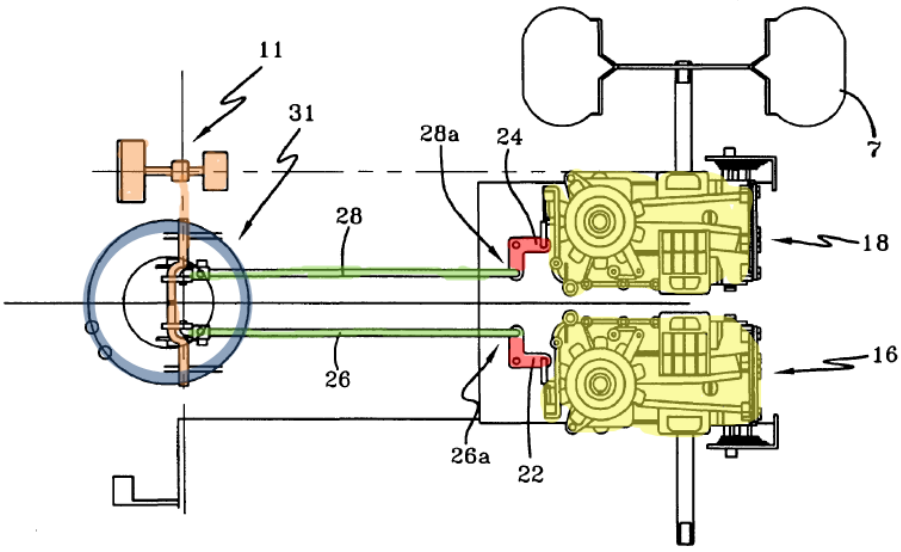
C. The '458 Patent

The '458 patent is directed to a steering and driving system. Ex. 1001, Abstract. In particular, the patent is directed to the steering systems of Zero Turn Radius (ZTR) lawn mowers. *Id.* at 1:17–19. According to the '458 patent, a problem in existing ZTR vehicles is that when a steering wheel is used for steering input, the user of the vehicle expects it to steer like an automobile, but existing ZTR vehicles allegedly do not steer in this way. Ex. 1001, 1:27–30. For example, in an automobile, if a user turns the wheel to the right and goes forward, the car turns to the right. If the user leaves the wheel to the right, stops, and then goes in reverse, the car also goes to the right. *See id.* at 1:30–35. According to the '458 patent, however, in a ZTR vehicle, forward movement is the same as in an automobile but, when in reverse, the movement is the opposite. *Id.*; *see also* Ex. 1004 ¶ 52 (depicting the steering paths of an automobile vs. ZTR vehicle). The steering and speed control mechanisms of the '458 patent, described next, purportedly allow the ZTR vehicle to steer in reverse like an automobile.

In general, the steering system of the '458 patent operates by controlling the output speed of two independent drive motors, one for each rear wheel. *Id.* at 3:13–21. By controlling the speed and direction of spin for each motor, the mower can be caused to move forward and backward, as well as to steer. For example, if the left wheel is operated to spin faster than the right wheel, then the mower will turn to the right. *Id.* at 3:59–64. If the

wheels are operated to spin in opposite directions, then the mower will execute a zero radius turn. *Id.* at 3:64–67.

Because the operating speed and direction of two independent drive motors provides both speed and steering functions, the mower must integrate steering and speed signals. The '458 patent describes a mechanical control assembly that serves this function. Figure 2 of the '458 patent, reproduced below with color added by the Board, depicts a schematic showing some portions of this assembly:

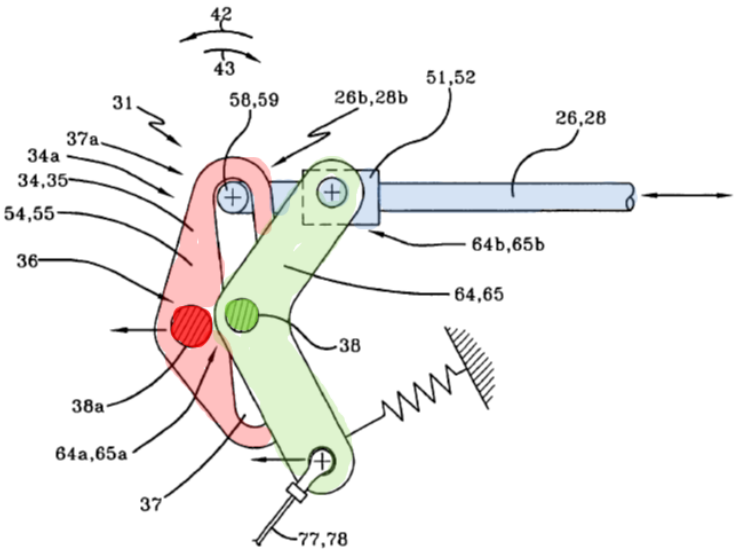


FIG–2

Figure 2 of the '458 patent shows independent drive motors 16, 18 (in yellow) that are connected to speed control member 11 (e.g., a foot pedal, in orange) and steering control assembly 31 (e.g., a steering wheel, in blue) by way of various mechanical linkages, including input shafts 26, 28 (in green) and pintle links 22, 24 (in red). When there is no steering or speed input, pintle links 22, 24 rest at a neutral position and the drive motors do not spin the wheels. The more a pintle link is pivoted from this neutral position, the more power is applied to its corresponding wheel. *Id.* at 3:21–27. Pivoting

in one direction past neutral results in spin in one direction, whereas pivoting in the other direction past neutral results in spin in the other direction. *See id.*

The mechanical linkage that integrates steering and speed inputs into a movement of the pintle links is depicted in Figure 4, with color added by the Board:

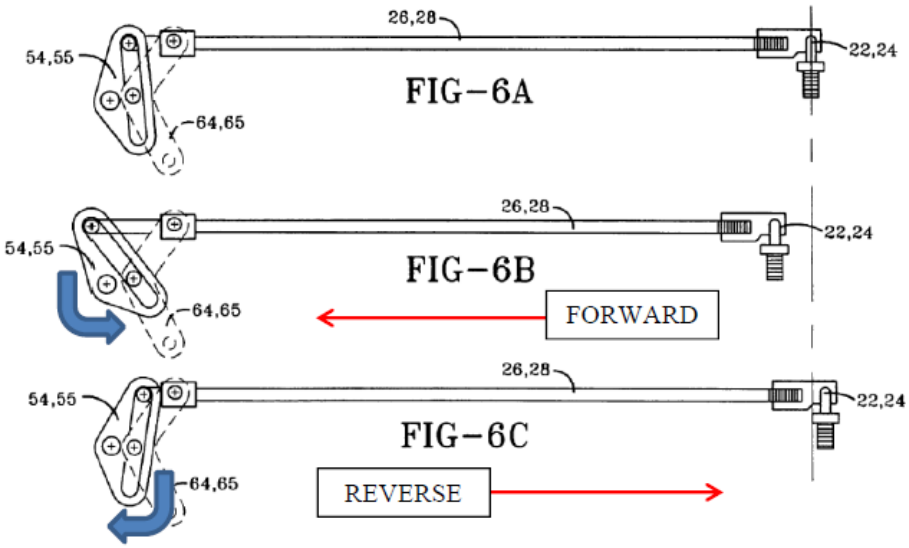


FIG–4

Figure 4 of the ’458 patent depicts steering member 64 (in green), speed control member 54 (in red), and input shaft 26 (in blue). There is one set for controlling the left motor and another set for controlling the right motor. *See* Fig. 2. Relative to a neutral position, increasing movement of input shaft 26 to the left in this Figure would result in increasing forward speed output of the particular wheel to which it is attached and, conversely, increasing movement to the right would result in increasing reverse speed output of the wheel. *See id.* at 3:21–35. Speed control member 54 (in red) is fixedly attached to rod 38a (in darker red), such that pressing down on speed petal 11 causes rod 38a and speed control member 54 to rotate and then to pull or push input shaft 26 (in blue), whose end is captured in a slot 37 of speed

control member 54, which in turn affects the speed of the motor. *Id.* at 4:11–37; *see id.* at Fig. 2. The speed control applies equally to both sides. *Id.* at 4:35–37. Steering member 64 (in green) is rotatably attached to rod 38 (in darker green) and rotates according to a steering input by being pulled by tension cable 77, wherein greater pull translates into greater movement by input shaft 26 (in blue), as steering member 64 pulls or pushes input shaft 26 by their connection at sleeve 51. *Id.* at 4:37–57, 5:19–47. The steering control does not apply equally to both sides, as only one tension cable will be pulled when the wheel is turned. *See id.*

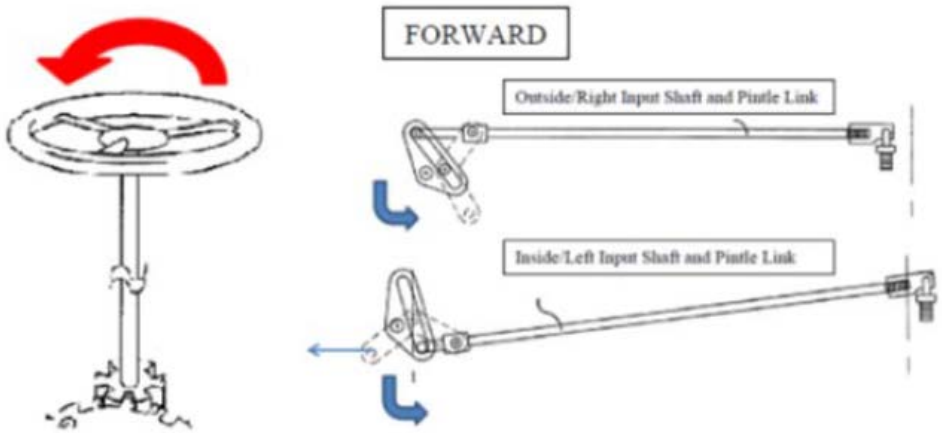
Figures 6A–6C of the '458 patent illustrate forward and reverse speed control, and are reproduced below with annotations added by Petitioner's declarant, Mr. Smith:



Ex. 1004 ¶ 28. Figures 6A–6C show the orientation of speed control member 54, steering member 64, input shaft 26, and pintle 22 in a scenario with no steering input and: no speed input (Fig. 6A), forward speed input (Fig. 6B), and reverse speed input (Fig. 6C). These figures show how

rotation of speed control member 54 affects the movement of pintle 22 fore or aft from the neutral position (shown as a dashed line).

The following Figure illustrates how the mechanical control assembly performs steering. Mr. Smith created the following Figure by annotating portions of Figures 5, 6B, and 7B.



Ex. 1004 ¶ 32. This Figure shows a steering wheel turning left, the control assembly with neutral steering and forward speed control, and the control assembly with left steering and forward speed control. Notably, turning the steering wheel causes steering member 64 (in dashed lines) to rotate clockwise, which in turn moves input shaft 26 downward and slightly backward, causing the pintle to move from a position indicating forward movement to a position indicating reverse movement. This would cause the mower to execute a left turn as the wheels on the left side would be moving backwards or more slowly than before (the wheel on the right would be moving forward from the speed input, which is the same on both sides). By the particular configuration of the linkages, the vehicle is made to steer in the same direction in reverse as going forward. Ex. 1001, 3:54–64.

D. Challenged Claims

Petitioner challenges claims 1–16, of which claims 1 and 9 are independent. Claim 1 is reproduced below.

> 1. A vehicle capable of making a small radius turn, comprising:
> a frame;
> a left drive wheel and a right drive wheel, both coupled to the frame;
> two independent left and right drive units, the left drive unit coupled to the left drive wheel via an axle and the right drive unit coupled to the right drive wheel via another axle;
> a steering device coupled to the frame;
> a speed control member coupled to the frame; and
> a mechanical control assembly coupled to the left and right drive units that is configured to actuate the left and right drive units based on a steering input received from the steering device and a speed input received from the speed control member;
> the mechanical control assembly being configured such that if the speed control member is shifted from (a) a forward position in which the left drive wheel is rotating in a forward direction at a first forward speed and the right drive wheel is rotating in a forward direction at a second forward speed that is less than the first forward speed as a result of the steering device being in a first right turn position to (b) a reverse position while the first right turn position of the steering device is maintained, then the left drive wheel will rotate in a reverse direction at a first reverse speed and the right drive wheel will rotate in a reverse direction at a second reverse speed that is less than the first reverse speed.

E. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–16 of the '458 patent are unpatentable on the following grounds:

Reference(s)	Basis	Claim(s) Challenged
Barnes[1]	§ 102	1–16
Barnes	§ 103	1–16
Richard[2]	§ 102	1 and 9
Richard	§ 103	1 and 9
Richard and Barnes	§ 103	2–8 and 10–16

Petitioner also relies on the declaration of Fred P. Smith, a Professional Engineer with a background in mechanical engineering. Ex. 1004 ¶ 4.

II. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner moved to exclude Exhibits 1004 and 1030, the declarations of Petitioner's expert, Mr. Fred Smith. Paper 28 ("Mot."). Petitioner filed its Opposition (Paper 32), and Patent Owner filed its Reply (Paper 35).

Patent Owner's Motion argues that Mr. Smith is not qualified to testify as an expert in the relevant art. Patent Owner asserts that the "pertinent art" is "vehicle control systems." Mot. 2–3. Patent Owner relies on the testimony of its expert, Dr. Charles Reinholtz, in support of its assertion of the pertinent art. Dr. Reinholtz testifies, however, that the relevant experience is not "vehicle control systems," but rather "vehicle systems." Ex. 2016 ¶ 22. Later, Dr. Reinholtz testifies that the person of

[1] U.K. Patent App. GB 2,303,829 A, published March 5, 1997 (Ex. 1002).

[2] U.K. Patent Specification 968,260, published Sept. 2, 1964 (Ex. 1003).

ordinary skill in the art would have "specific knowledge and experience in vehicle design *to allow understanding of* the requirements of the mechanism for vehicle power and steering control and integration of the same." *Id.* ¶ 24 (emphasis added). Accordingly, Patent Owner's assertion of the pertinent art is not supported by its own expert. That is, Dr. Reinholtz does not specifically identify knowledge in vehicle *control* systems, but rather vehicle systems, and knowledge that would allow a person to understand control systems. The remainder of this part of Patent Owner's Motion focuses on measuring Mr. Smith to the wrong standard, and is unpersuasive.

Instead, we find that Mr. Smith is sufficiently qualified by his experience and education to testify as an expert in this proceeding. In determining who is "qualified in the pertinent art" under Federal Rule of Evidence ("FRE") 702, we need not find a complete overlap between the witness's technical qualifications and the problem confronting the inventor or the field of endeavor for a witness to qualify as an expert. *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010) (upholding admission of the testimony of an expert who admittedly lacked expertise in the design of the patented invention, but had experience with materials selected for use in the invention); *Mytee Prods., Inc. v. Harris Research, Inc.*, 439 F. App'x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who "had experience relevant to the field of the invention," despite admission that he was not a person of ordinary skill in the art). Mr. Smith has experience in vehicle design, and has provided photographs of vehicles that he has helped design. *See* Ex. 1004, 98–99. Although Mr. Smith's expertise is mostly focused on linkages not related to steering, the relevant field here

is vehicle systems, as agreed by Patent Owner's expert Dr. Reinholtz and Mr. Smith. Ex. 2016 ¶ 22; Ex. 1004 ¶ 20. Once having demonstrated knowledge and experience in vehicle systems design, in combination with an engineering degree, we see little additional experience or knowledge required for a person to have "specific knowledge and experience in vehicle design *to allow understanding of* the requirements of the mechanism for vehicle power and steering control and integration of the same." Ex. 2016 ¶ 24 (emphasis added). Accordingly, we deny Patent Owner's Motion to exclude Mr. Smith's testimony on this basis.

Patent Owner also moves to exclude Mr. Smith's testimony on the theory that he offers "improper attorney argument." Mot. 6–7. To the extent any expert testifies as to patent law, we do not consider it. 37 C.F.R. § 42.65(a) ("Testimony on United States patent law or patent examination practice will not be admitted."). Mr. Smith's testimony is generally offered as an expert factual witness, not as a legal witness. As such, we see little reason to spend the resources to decide whether some of his testimony on particular claim language, for example, strays from factual opinion to legal opinion—issues of claim construction are a mixture of the two. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 838 (2015) ("While we held in *Markman* that the ultimate issue of the proper construction of a claim should be treated as a question of law, we also recognized that in patent construction, subsidiary factfinding is sometimes necessary."). Patent Owner's Motion to exclude Mr. Smith's testimony on this basis is denied.

Patent Owner next argues that Petitioner submitted belated evidence in its Reply. Mot. 8–12. Patent Owner argues that "Petitioner cannot submit additional, belated evidence in its Reply that supports its Petition if it could

have been presented in a prior filing." *Id.* at 8 (citing 37 C.F.R. § 42.23). This statement of the law is wrong. Our Rule instead states that "[a] reply may only respond to arguments raised in the corresponding . . . patent owner response." 37 C.F.R. § 42.23. The mere fact that a Reply presents evidence that was not in the record previously does not make that evidence improper. *See Genzyme Therapeutic Prods. Ltd. v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1367 (Fed. Cir. 2016) ("The purpose of the trial in an *inter partes* review proceeding is to give the parties an opportunity to build a record by introducing evidence—not simply to weigh evidence of which the Board is already aware.").[3] Patent Owner blurs "belated evidence" with reply evidence; not all evidence first submitted in a reply is belated.

The majority of what Patent Owner alleges is improper in Petitioner's Reply relates to Patent Owner's means-plus-function argument, discussed in detail in a later section, which it raised in its Patent Owner Response (and Patent Owner Preliminary Response). Mot. 9–10. We find it entirely reasonable that Petitioner responded to Patent Owner's proposed claim construction in its Reply, and given the nature of the claim construction argument, provided evidence in support of its position. Patent Owner argues that Petitioner should have at least presented this evidence as supplemental evidence after institution, in view of Patent Owner's means-plus-function argument in its Patent Owner Preliminary Response. *Id.* We disagree. Notably, our Decision on Institution did not agree with Patent Owner's preliminary argument regarding means-plus-function. Dec. on Inst. 10–12.

[3] The issue of whether a given patent owner should be afforded an opportunity to respond to the new evidence is a separate issue.

It is Patent Owner's burden to show that § 112, ¶ 6, applies (because the limitation lacks the word "means").[4] *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015) (en banc) ("When a claim term lacks the word 'means,' the presumption can be overcome and § 112, para. 6 will apply if the challenger demonstrates that the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function.'") (citing *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)). We consider it to have been appropriate for Petitioner to await Patent Owner's Response, to see whether Patent Owner would maintain its argument and what evidence it would provide in support. Once Patent Owner offered evidence and renewed this line of argument for which it held the burden, Petitioner properly responded to it in its Reply. Furthermore, we permitted Patent Owner to file a Sur-Reply to address arguments raised by Petitioner in its Reply.

Patent Owner also argues that other evidence is improper because "Petitioner should have presented this evidence with its Petition." Mot. 10–12. As we stated above, this is an improper interpretation of our Rule. Further, we find persuasive Petitioner's explanations for how these passages are in response to arguments in Patent Owner's Response. Opp. 10–11. We adopt them as our own.

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[4] JUDGE GOODSON: Do you agree with Petitioner's position that in the context of this case it is Patent Owner's burden to show that 112,6 applies to the mechanical control assembly?

MR. CIPOLLA: I do believe that it is Patent Owner's burden to meet that presumption.

Tr. 43:1–5.

Patent Owner next moves to exclude Exhibits 1031 and 1032 as not relevant, and Exhibit 1035 as inadmissible hearsay. Mot. 12–14. Because we do not rely on any of these exhibits in our analysis below, we deny Patent Owner's Motion as moot as it applies to these exhibits.

Patent Owner lastly moves to exclude portions of Exhibit 1030 on the basis that Petitioner improperly incorporates it by reference. Mot. 14–15. As Patent Owner acknowledges, "the Board indicated that a motion to exclude is not ordinarily the proper vehicle to address improper incorporation by reference." *Id.* at 15; *see also* Paper 24. Indeed, we will address issues of incorporation on an argument-by-argument basis, as they come up in our analysis, and if we determine it to be a critical issue. To do otherwise would invite a quagmire of form over substance.

III. PATENTABILITY ANALYSIS

A. Claim Construction

We interpret the claims of an unexpired patent using the broadest reasonable interpretation in light of the specification of the patent. 37 C.F.R. § 42.100(b). In our Decision on Institution, we construed the terms "mechanical control assembly" (Dec. on Inst. 10–12) and "two independent left and right drive units" (*id.* at 12–13). Petitioner did not offer any particular terms to construe. Although the phrase "mechanical control assembly" does not include the phrase "means for," Patent Owner, in its Preliminary Response, argued that the phrase should be interpreted as a means-plus-function term, an argument we found unpersuasive. *Id.* at 10–12. Patent Owner also argued that the phrase "two independent left and

right drive units" meant that the drive units must operate independent of one another, and we agreed. *Id.* at 12–13.

During trial, the only term at issue was the phrase "mechanical control assembly," which Patent Owner argued again was a means-plus-function term, and Petitioner argued was not.[5] Based on a more complete record, we again determine that the phrase "mechanical control assembly" is not a means-plus-function term, and instead should be afforded its plain and ordinary meaning. We determine that no other term requires explicit construction.

Independent claims 1 and 9 both contain the following limitations:

> a mechanical control assembly coupled to the left and right drive units that is configured to actuate the left and right drive units based on a steering input received from the steering device and a speed input received from the speed control member;

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[5] Separate from the merits of whether § 112, ¶ 6 applies, Patent Owner argues that "Petitioner had a duty to construe 'mechanical control assembly'" in its initial Petition and its failure to do so should result in a finding that the claims at issue are patentable. PO Resp. 24–26. We disagree that the absence in the Petition of an express claim construction proposal or discussion as to whether § 112, ¶ 6 applies to this limitation is a basis for finding in Patent Owner's favor on the merits of Petitioner's patentability challenges. While there is certainly a colorable basis for Patent Owner's contention that § 112, ¶ 6 applies, it was not inevitable *ex ante* that this claim construction dispute would materialize. For one thing, the phrase lacks the "means for" language that creates a presumption that § 112, ¶ 6 applies. Moreover, whether § 112, ¶ 6 applies to this limitation has been a disputed issue since the early stages of this proceeding, *see* Dec. on Inst. 10–12, and the parties have had ample opportunity to develop their positions on that issue over the course of trial. *See* PO Resp. 10–24; Pet. Reply 2–10; Sur-Reply 1–4; Sur-Sur-Reply 1–3. Thus, Patent Owner cannot plausibly complain that it lacked sufficient notice of or an opportunity to respond to Petitioner's position on this claim construction issue.

> the mechanical control assembly being configured such that if the speed control member is shifted from (a) a forward position in which the left drive wheel is rotating in a forward direction at a first forward speed and the right wheel is rotating in a forward direction at a second forward speed that is less than the first forward speed as a result of the steering device being in a first right turn position to (b) a reverse position while the first right turn position of the steering device is maintained, then the left drive wheel will rotate in a reverse direction at a first reverse speed and the right drive wheel will rotate in a reverse direction at a second reverse speed that is less than the first reverse speed.

Ex. 1001, 8:7–11, 8:61–65.

For convenience and clarity, we refer in this subsection to the entire portion of the claim quoted above as the "disputed phrase."

The failure to use the word "means" creates a rebuttable presumption that § 112, ¶ 6 does not apply. *Williamson*, 792 F.3d at 1348. "In determining whether this presumption has been rebutted, the challenger must establish by a preponderance of the evidence that the claims are to be governed by § 112, ¶ 6." *Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1347 (Fed. Cir. 2016). In that analysis,

> [t]he standard is whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. When a claim term lacks the word "means," the presumption can be overcome and § 112, para. 6 will apply if the challenger demonstrates that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function.

Williamson, 792 F.3d at 1349.

Patent Owner argues that the disputed phrase is a means-plus-function limitation because an ordinarily skilled artisan "would not understand 'mechanical control assembly' as a sufficiently definite name for structure."

PO Resp. 13. In support of that contention, Patent Owner cites the testimony of its expert, Dr. Reinholtz, that "mechanical control assembly" has no reasonably well understood meaning in the art and it simply amounts to a collection of parts, similar to "mechanism" or "machine." *Id.* at 14 (citing Ex. 2016 ¶¶ 37–38, 44). Usage of "mechanical control assembly" in the prior art demonstrates, according to Patent Owner, that this term can refer to widely varying structures with different parts and purposes. *Id.* at 15–17. Patent Owner also discusses dictionary definitions of the words "mechanical," "control," and "assembly," none of which indicate that they, alone or in combination, refer to a sufficiently definite structure. *Id.* at 17–18.

Patent Owner urges that the disputed phrase "consists of language describing its function—essentially, actuating the left and right drive units based on steering and speed inputs, so that the vehicle steers consistently in the direction that the steering wheel is turned in forward and reverse." *Id.* at 19. Patent Owner further argues that "[a]lthough the 'mechanical control assembly' clause states that it is 'coupled to the left and right drive units' . . . this language is not enough to provide definite structure to the limitation" because the Federal Circuit has applied § 112, ¶ 6 to terms even when the claims specified structural components with which a nonce word interfaced. *Id.* at 21–23 (citing *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1213 (Fed. Cir. 1998); *Williamson*, 792 F.3d at 1351). Regarding the specification, Patent Owner states that it "does not define 'mechanical control assembly' and provides no indication that a POSA would understand the term as being a name for a sufficiently definite structure." *Id.* at 23–24.

Petitioner responds that "mechanical control assembly" is structural because a skilled artisan would understand that each of those words denotes structure. Pet. Reply 4 (citing Ex. 1030 ¶¶ 33–37). According to Petitioner, Patent Owner's arguments are premised on the notion that a precise physical structure is necessary to avoid application of § 112, ¶ 6, which the Federal Circuit has rejected as unduly restrictive. *Id.* at 5 (citing *Watts v. XL Sys. Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)). Petitioner asserts that the description in the specification of the linkage making up the ZTR control assembly conveys to the skilled artisan that "mechanical control assembly" is structure. *Id.* at 5–6 (citing Ex. 1001, 3:40–47, 4:11–13, 4:39–41). Petitioner also relies on the prosecution history of the '458 patent, particularly a Response to Office Action in which Patent Owner (then, applicant) distinguished a reference by arguing that the claimed configuration of the mechanical control assembly is structural. *Id.* at 7 (citing Ex. 1028, 176–82). With respect to the extrinsic evidence Patent Owner cited in support of its proposed construction, Petitioner argues that the cited prior art references are irrelevant to the meaning of "mechanical control assembly" in the context of the '458 patent, and that Patent Owner's dictionary definitions actually support a finding that "mechanical control assembly" is structural. *Id.* at 8–9.

Following the filing of Petitioner's Reply, at Patent Owner's request, we authorized additional briefing so that the parties could present further argument on this claim construction issue. *See* Paper 24. In its Sur-Reply, Patent Owner reaffirms its contention that the analysis under § 112, ¶ 6 focuses on whether the claim term recites "sufficiently definite structure" and argues that *Watts* is not to the contrary. Sur-Reply 1 (citing *Williamson*,

792 F.3d at 1349). According to Patent Owner, Petitioner is incorrect in asserting that "[a] term need only denote structure." *Id.* at 2. Patent Owner also defends its use of extrinsic evidence in support of its proposed construction. *Id.* Regarding the prosecution history, Patent Owner asserts that "[t]he statements Applicant made about 'structure' were directed to a different issue—not whether [mechanical control assembly] is a nonce term." *Id.* at 3. Patent Owner argues that the response to the Examiner's rejection was simply "that the functional language was not an intended use because it limited the claimed invention's structure." *Id.* at 3–4. Nevertheless, according to Patent Owner, "[n]othing in the prosecution history discusses whether [mechanical control assembly] connotes sufficiently definite structure or what the structure of the [mechanical control assembly] is." *Id.* at 4. Finally, Petitioner filed a Sur-Sur-Reply, which reiterates many of the points from the Reply summarized previously. *See* Sur-Sur-Reply 1–2.

After considering all of the evidence and arguments, we agree with Petitioner that the disputed phrase is not a means-plus-function limitation under § 112, ¶ 6. The factor that weighs most heavily in that determination is the prosecution history, but we will begin our analysis with the claim language before turning to the other intrinsic and extrinsic evidence.

Looking first at the words "mechanical control assembly" in isolation, the genericness of this term bears similarities to other words or phrases that have been held to be subject to § 112, ¶ 6 because they do not connote sufficiently definite structure, such as "mechanism," "element," "device" (*Williamson*, 792 F.3d at 1350), "link member" (*Mas-Hamilton*, 156 F.3d at 1215), and "control mechanism" (*Toro Co. v. Deere & Co.*, 355 F.3d 1313,

1325 (Fed. Cir. 2004)). Petitioner's argument, to the contrary (*see* Pet. Reply 4–5), seems to assume that any term that refers to a tangible item as opposed to a purely abstract or functional placeholder is sufficiently structural to remove the limitation from § 112, ¶ 6. That understanding of what it means for a term to have a sufficiently definite meaning for the name of a structure is at odds with the cases just cited, insofar as mechanism, device, link member, and control mechanism all refer to tangible, real world items. Further, the testimony of Petitioner's expert that "[m]echanical control assemblies or systems can trace their origins to J.C. Maxwell's work on speed governors . . . for steam engines" (Ex. 1030 ¶ 36) does not show that Maxwell or anyone else described the speed governor as a "mechanical control assembly" and, therefore, does not indicate that that term has an established meaning in the art.

We also consider how the "mechanical control assembly" term is "used in the context of the relevant claim language." *Advanced Ground Info.*, 830 F.3d at 1348. The remaining language of the disputed phrase includes some structural aspects and some functional aspects. The recitation that the mechanical control assembly is "coupled to the left and right drive units" is structural. The language reciting what the mechanical control assembly is "configured to" do (i.e., "actuate the left and right drive units based on a steering input received from the steering device and a speed input received from the speed control member") fits the mold of functional language because it describes the mechanical control assembly by what it does. *See In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). Although this seemingly functional portion of the disputed phrase specifies how the mechanical control assembly interacts with other structures recited in the

claim, that is equally true of the claim language in *Mas-Hamilton*, which the Federal Circuit held was properly construed as a means-plus-function limitation. *See Mas-Hamilton*, 156 F.3d at 1215 (addressing limitation that recited "a movable link member for holding the lever out of engagement with the cam surface before entry of a combination and for releasing the lever after entry of the combination"). In our view, the claim language of the disputed phrase is primarily, but not entirely, functional, which tends to favor Patent Owner's position that § 112, ¶ 6 applies. On the other hand, if the disputed phrase were means-plus-function, it would seem to render the second part of the disputed phrase (beginning, "the mechanical control assembly being configured such that . . .") superfluous. It would no longer serve to define functionally the structural features of the mechanical control assembly, as those features would be part and parcel of what the Patent Owner alleges is the corresponding structure. If the disputed phrase is read to be structural, then the second part of the disputed phrase serves as a further limitation.

The specification favors Petitioner's view. The parties agree that the claimed "mechanical control assembly" is referred to in the specification as a "ZTR control assembly." PO Resp. 5; Pet. Reply 6. The specification illustrates and describes the specific structure that makes up the ZTR control assembly, and how it connects to and operates with other components. *See, e.g.*, Ex. 1001, Figs. 2–4 (showing ZTR control assembly as reference number 31), 3:30–47, 56–59, 4:11–13, 38–40. The detailed description of the structure of the ZTR control assembly in the specification supports the testimony of Petitioner's expert that a skilled artisan, upon reviewing the specification, would understand the term "mechanical control assembly" to

denote structure. *See* Ex. 1030 ¶¶ 39–42. Further, the "ZTR" modifier used throughout the specification is purely functional, whereas the "mechanical" modifier in the disputed phrase is structural, also suggesting that the claim term refers to structure.

As part of the intrinsic record of the '458 patent, the prosecution history is also relevant to whether the disputed phrase is subject to § 112, ¶ 6. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 n.2 (Fed. Cir. 2015) (noting that courts should consider "the entire intrinsic record" when assessing whether a claim term invokes § 112, ¶ 6). Because it remains true in Board proceedings applying the broadest reasonable interpretation that "the prosecution history . . . serves as intrinsic evidence for purposes of claim construction," *Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 977 (Fed. Cir. 2014), the Federal Circuit has reminded us that we should consult the patent's prosecution history in construing claims in *inter partes* review proceedings. *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015). The prosecution history is informative of a limitation's meaning because "[t]he evolution of restrictions in the claims, in the course of examination in the PTO, reveals how those closest to the patenting process—the inventor and the patent examiner—viewed the subject matter." *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1478 (Fed Cir. 1998).

During prosecution of the '458 patent, the Examiner rejected the claims as being anticipated by a reference called Middlesworth, and made a finding in support of that rejection that Middlesworth disclosed the claimed "mechanical control assembly." Ex. 1028, 246. In contesting that rejection, Patent Owner took issue with the Examiner's "impli[cation] that the current

claims do not recite a mechanical control assembly that is structurally different from what Middlesworth discloses." *Id.* at 177. Patent Owner continued: "The claim language at issue concerns the **configuration** of the claimed mechanical control assembly." *Id.* After reproducing the language of claim 1, Patent Owner argued that "[t]his claimed configuration **is** indeed structural." *Id.*

These arguments during prosecution are very difficult to square with Patent Owner's position in this proceeding, which is that the disputed phrase consists of "purely functional language [that] does not inform a POSA of any definite structure. To the contrary, it evidences an absence of structure bringing the limitation squarely within the scope of § 112, ¶ 6." PO Resp. 19. The difficulty of reconciling these arguments is perhaps best demonstrated by the cross-examination testimony of Patent Owner's expert, Dr. Reinholtz. When asked about this portion of the prosecution history, Dr. Reinholtz testified as follows:

> Q. The fact that MTD has argued to the patent office and told the world that the claimed configuration for the mechanical control assembly is indeed structural has no impact on your opinion. Is that your testimony?
>
> A. My reading of this is again that this -- nothing here gives sufficiently definite structure to the mechanical control assembly. ***It may be structural***, but it doesn't give specific definite structure that would allow us to understand what that claim term means. I still don't see that here.
>
> Q. You don't see that MTD argued that it is indeed structural, and that that structure makes it different than Middlesworth. That's not how you interpret this.
>
> MR. JOHNSON: Objection, form.
>
> A. I'm comfortable with the language that's here. It is -- ***It is structural***, and it's distinguished from Middlesworth.

Ex. 1029, 93:12–94:5 (emphasis added).

Similarly, in addressing this portion of the prosecution history during the hearing, Patent Owner again suggested that the disputed phrase is structural. Tr. 49:10–11 ("And so our people admitted this is limitations on the structure. . . ."). In response to a follow-up question seeking clarification on that point, Patent Owner explained as follows:

> JUDGE GOODSON: I just want to make sure I understand what you are saying about this prosecution history. You are saying that during the prosecution, even though the Patent Owner agreed that this was structural, they didn't mean it in the context of means-plus-function, or did I misunderstand what you just argued?
>
> MR. CIPOLLA: No, ***what they agreed was is that those were structural limitations***. The actual functions were limitations on how the structure would operate. There was never any discussion as to what a mechanical control assembly is or was. That wasn't an issue.

Tr. 50:6–16.

We find that the prosecution history presents strong evidence that the disputed phrase should be understood as a structural limitation rather than a means-plus-function limitation under § 112, ¶ 6.

The extrinsic evidence cited by Patent Owner does not materially alter our analysis because it is offered in support of Patent Owner's position that the term "mechanical control assembly," in isolation, does not have an established meaning in the art and is instead simply a generic label for a collection of parts. *See* PO Resp. 13–18. As discussed above, we tend to agree with Patent Owner on that specific point in the abstract, but that is only one portion of the analysis of how a skilled artisan would understand

the disputed phrase in view of the claim language, specification and prosecution history.

We also observe that if Patent Owner had wished for its claims to be given a narrow construction by being subject to § 112, ¶ 6, the mechanism for doing so was both clear and entirely in Patent Owner's control: by employing claim language that creates a presumption that § 112, ¶ 6 applies. *See Williamson*, 792 F.3d at 1359–60 (Newman, J., dissenting) ("The burden of determining whether paragraph 6 applies to a particular element is on the applicant, not the court."). Instead of drafting or amending the claims to employ "means for" format during prosecution, Patent Owner's arguments during prosecution indicated that the disputed phrase was intended to be structural. Indeed, Patent Owner had another opportunity to amend the claims in this proceeding to utilize the "means for" format, but did not file a motion to amend.

Based on the foregoing, we conclude that Patent Owner has not established by a preponderance of the evidence that the disputed phrase is governed by § 112, ¶ 6. *Advanced Ground Info.*, 830 F.3d at 1347. Accordingly, we agree with Petitioner that the disputed phrase does not invoke § 112, ¶ 6 and that it should be given its plain and ordinary meaning. *See* Pet. 14; Pet. Reply 9–10.

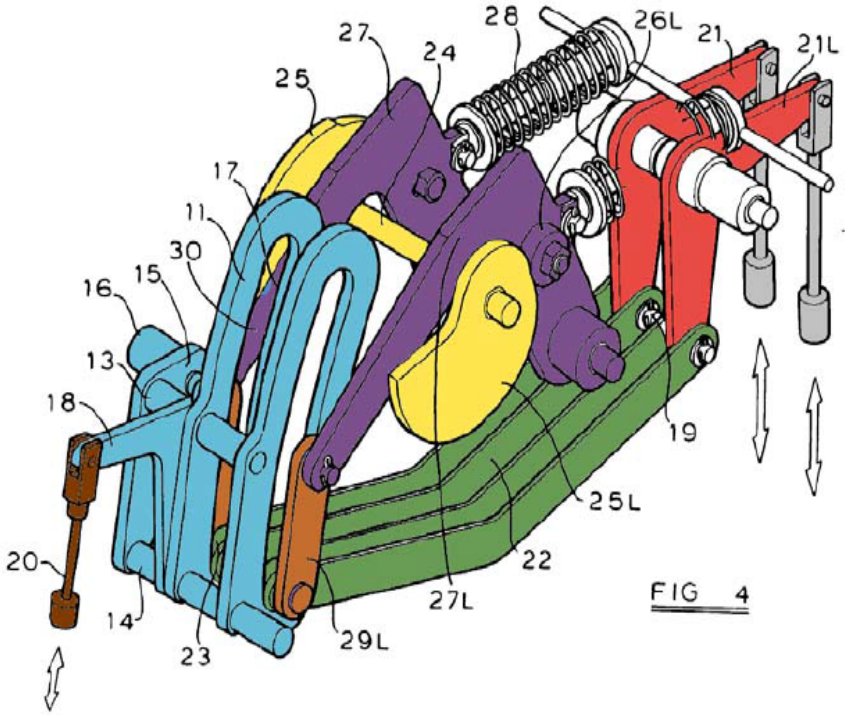
B. Overview of the Prior Art and Level of Ordinary Skill

Petitioner asserts that the subject matter of one or more of claims 1–16 is anticipated and/or obvious in view of Barnes, Richard, or Barnes and Richard. Pet. 2. We provide an overview of each of these references and the level of ordinary skill before turning to the individual grounds.

1. Barnes

Barnes discloses a control system for steering vehicles having left and right side driving units. Ex. 1002, (57). The vehicles discussed in Barnes are generally tracked vehicles, also known as "skid steer" vehicles, where the left and right hand wheel or track move independent of one another. *Id.* at 1:1–16. These vehicles are often controlled by levers, but can also be controlled by a steering wheel. *Id.* at 1:17–2:5. When controlled by a steering wheel, however, the vehicle can be dangerous because operators generally expect a steering wheel to operate like a normal motor car, but existing skid steer vehicles do not. *Id.* at 2:1–5. The object of the invention in Barnes is to provide an improved steering control system. *Id.* at 2:7–8. This is accomplished by independently receiving the turning input and the speed input, and combining those inputs into outputs for each of the driving units. *Id.* at 2:27–3:2. Thus, when the steering wheel is turned the vehicle does not move unless a forward or reverse speed input is also received, just like a normal motor car.

Figure 4 of Barnes, reproduced below with color added by Mr. Smith, depicts a mechanical system for processing the various speed and steering inputs:

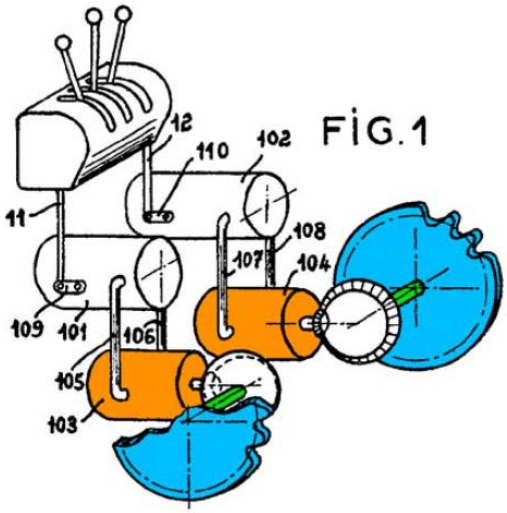


Ex. 1004 ¶ 57.

Figure 4 of Barnes depicts a mechanical control system that takes a speed input from link 20 (dark brown) and steering input from cams 25, 25L (yellow) and combines them using steer lever 27, 27L (purple), speed cam 11 (blue), links 29, 29L (light brown), and links 22 (green) to move left and right hand speed signal levers 21, 21L (red). *See id.*

2. Richard

Richard discloses a control system for a vehicle such as a tracked vehicle. Ex. 1003, 1:8–11. The control system independently controls one side of tracks or wheels from the other. Ex. 1003, 1:8–17. Figure 1 of Richard, reproduced below with color added by Mr. Smith, depicts such a system:



Ex. 1004 ¶ 109.

Figure 1 of Richard depicts a series of speed and direction control levers that are connected via connecting rods 11, 12 and levers 109, 110 to hydraulic pumps 101, 102, which in turn feed hydraulic motors 103 and 104 (in orange), which then drive the left and right wheels (in blue). Ex. 1003, 2:55–63. Figure 1 depicts three control levers, with the middle controlling the speed of the vehicle and the left and right controlling the steering. *Id.* at 7:42–48; Figs. 13, 14.

3. Level of Ordinary Skill in the Art

Petitioner proposes that a person of ordinary skill in the art "would have at least a four-year bachelor's degree in engineering *and* two to three

years of experience in vehicle design, or a high school degree *and* at least ten years of experience in vehicle design." Pet. 5 (citing Ex. 1004 ¶¶ 19–20). Patent Owner's Response does not propose a level of ordinary skill. Patent Owner's expert, Dr. Reinholtz, offers a similar level of skill to that of Petitioner, proposing "at least 5 years' experience in designing such vehicle systems or a bachelor's degree in mechanical engineering or equivalent, closely-related field and at least 2 years' experience designing vehicle systems." Ex. 2016 ¶ 22. Petitioner and Dr. Reinholtz appear to agree that a representative person of ordinary skill in the art would have an engineering degree and about two years' experience in vehicle design. Therefore, we find that a person of ordinary skill in the art would have an engineering degree and about two years' experience in vehicle design.

C. Analysis of the Teachings of the Cited References

Petitioner's grounds can be divided into two groups—those starting with Barnes and those starting with Richard.

1. Barnes-led Grounds

Petitioner asserts that claims 1–16 are anticipated and/or obvious in view of Barnes. Pet. 15–36. Reviewing Petitioner's claim charts and accompanying explanation, we find that Barnes describes a vehicle capable of making a small radius turn (Ex. 1002, 1:2–4) and that has a frame (*id.* at 7:9–12), left and right drive wheels (*id.* at 1:5–11) and drive units (*id.* at 1:10–16), a steering device (*id.* at 28–15), a speed control member (*id.* at 3:3–10, 4:8–15), and a mechanical control assembly (*id.* at Figs. 1, 4) as recited in independent claims 1 and 9.

There does not appear to be any dispute over these features. Patent Owner, however, disputes whether the drive units are coupled to the wheels *via axles*, and whether the steering device and speed control member are *coupled to the frame*. PO Resp. 45–46. We address these aspects of the claims in detail.

a. "Steering Device Coupled to the Frame"

Both independent claims 1 and 9 require the steering device to be "coupled to the frame." Neither party proposes a construction of this phrase. Petitioner asserts that the steering device must be coupled to the frame in order to effect a change in direction of the vehicle. Pet. 19 (citing Ex. 1004 ¶¶ 69–70). Specifically, Barnes discloses that a steering wheel is connected to steering signal shaft 24, which is "rotatable around a fixed axis C on the frame 12." Ex. 1002, 8:28–9:2. Thus, the steering input is connected to various linkages, which are connected to the frame, and which ultimately result in the turning of the vehicle. Ex. 1004 ¶ 70 (Mr. Smith discussing this section of Barnes and testifying, "[a]bsent coupling, movement of the steering device would not result in turning of the vehicle."). Petitioner's assertion is persuasive.

Patent Owner argues that "[s]teering systems using an uncoupled steering wheel are well known in the art." PO Resp. 55 (citing Ex. 2016 ¶ 106; Ex. 2008, 1:11–52; Ex. 2009, Fig. 2, 1:65–2:20). This argument is unpersuasive for two reasons. First, Barnes explicitly discloses the steering wheel connected, via linkages, to the frame, as we found above. Patent Owner does not persuasively address this disclosure in Barnes. Second, a steering device as claimed is not limited only to the structural feature

actually touched by a human. That is, Patent Owner does not explain why we should read "steering device" in such a narrow fashion in this context.

Notably, Patent Owner argues in its claim construction analysis that a "steering device" more broadly reads on the structural feature actually touched by human (e.g., steering wheel), as well as further structural features attached thereto, such as an axle and a pinion gear. Dr. Reinholtz explains that the mechanical control assembly receives steering input from the steering device, which is shown in Figure 5 of the '458 patent. Ex. 2016 ¶ 53. According to Dr. Reinholtz, the mechanical control assembly includes tension cables 77, 78 and steering disc 72 of Figure 5. *Id.* ¶ 54. Accordingly, Patent Owner's position must be that the steering device includes steering wheel 10, as well as the shaft and pinion gear 70. Tr. 61:6–8 (Patent Owner's counsel arguing that "the way that someone ordinarily skilled in the art interpreted the steering device was the wheel coupled with the gear 70 together"); *see also* Ex. 1001, 2:22–23 (explaining that Figure 5 shows a "steering wheel and steering mechanism," which the term "steering device" is broad enough to cover). As a result, "steering device" is not just the steering wheel, but also other components used to provide steering input. This is why Patent Owner's position regarding remote-control steering fails to take into consideration the breadth of the term at issue. Because even if the steering wheel itself is remote, some number of components of the "steering device" in Barnes must be coupled to the frame, because we know that the linkages that provide steering input depicted in, e.g., Figure 4, are coupled to the frame. We find that Barnes describes a steering device coupled to the frame.

b. "Speed Control Member Coupled to the Frame"

Both independent claims 1 and 9 require the speed control member to be "coupled to the frame." Petitioner asserts that the speed control member must be coupled to the frame in Barnes because the change in motion of the vehicle, due to the input from the speed control member, could only occur if it were coupled to the frame. Pet. 20 (citing Ex. 1004 ¶¶ 71–72). The input from the speed control member in Barnes is shown in Figure 4 with a speed input linkage 20. Ex. 1004, Fig. 4, 7:12–23. Speed input linkage 20 is ultimately attached to speed cam 11, which Barnes describes as "pivotally mounted to the frame 12 about an axis A fixed with respect to the frame." *Id.* at 7:12–13. Thus, just like the steering device, the speed control member is coupled to the frame.

Patent Owner's arguments are effectively the same as with the steering device. PO Resp. 54–56. These arguments are unpersuasive for the same reasons, namely that Barnes explicitly discloses components of the speed control member coupled to the frame, and even if the initial input were remote-controlled, some aspects of the speed control member must be on the frame in order to effect the speed control. We find that Barnes describes a speed control member coupled to the frame.

c. Drive Units Coupled to Drive Wheels "Via an Axle"

Both independent claims 1 and 9 require the drive units to be coupled to the drive wheels "via an axle." Petitioner asserts that "for a drive motor to provide force to a drive wheel there must be a connecting member between the drive motor and the drive wheel. That connecting member is an axle." Pet. 18 (citing Ex. 1004 ¶¶ 35, 67–68). We agree with Petitioner that every wheel must have an axle; an object labeled "wheel" that does not have

an axle is just a disc with a hole in it—potentially a wheel, if an axle is added.

Claims 1 and 9 however, require the drive units to be "coupled . . . *via* an axle" (emphasis added). This is a particular arrangement of the drive unit and wheel, one in which there are separate and distinct drive units, wheels, and axles. As Patent Owner points out, it was known in the art to effectively use the drive motor as the axle, i.e. inside the wheel hub as the structure around which the wheel rotated. PO Resp. 51–53. Specifically, Patent Owner directs our attention to the Mann reference, which discloses a drive unit integrated into the drive wheel and a tracked vehicle like Barnes. *Id.* (citing Ex. 2012). In such a configuration, a separate axle is not required to couple the drive unit to the drive wheel. As such, we agree with Patent Owner that Barnes does not necessarily disclose an axle as claimed.[6] We find that Barnes does not inherently teach an axle as claimed.

Nevertheless, the use of separate axles to connect drive units and wheels is nothing new or special. Petitioner's expert, Mr. Smith, testifies that a person of ordinary skill in the art would understand that there has to be some connection between a drive motor and the drive wheel, in order for the former to drive the latter. Ex. 1004 ¶ 68. Mr. Smith testifies that this would be an axle. *Id.* That it was known to connect a wheel to a motor via an axle seems beyond reasonable dispute. It would be difficult to imagine a degreed

[6] To be clear, we agree with Mr. Smith that all wheels have axles. The issue here is that the particular arrangement required by the claim specifies that the drive unit, drive wheel, and axle are separate. Thus, the drive unit cannot function as the axle inside the drive wheel and still meet the requirements of claims 1 and 9.

engineer working on vehicle design for two years not having an understanding of axles used in this fashion. Accordingly, we credit the testimony of Mr. Smith that it was known to connect drive units to wheels *via* an axle as claimed. In addition, the evidence of record supports Mr. Smith's testimony. Richard teaches an axle between its drive motor and drive wheel. Ex. 1003, Fig. 1. We find that it would have been known by a person of ordinary skill in the art to couple drive units to drive wheels via an axle as claimed.

d. Limitations Found in Dependent Claims

Petitioner addresses where Barnes discloses the elements of dependent claims 2–8 and 10–16. Pet. 27–33. Petitioner asserts that Barnes discloses a steering wheel as required by claims 2 and 10. *Id.* at 27 (citing Ex. 1002, 4:16–25; Ex. 1004 ¶¶ 79–80). Petitioner asserts that Barnes discloses the drive unit coupled to the mechanical control assembly, as required by claims 3 and 11, in the structure found in Figure 4, specifically the speed signal control levers 21, 21L, which are connected to a hydrostatic pump. *Id.* at 27–28 (citing Ex. 1002, 7:24–8:2, Fig. 2; Ex. 1004 ¶¶ 81–82). Petitioner asserts that Barnes discloses the mechanical control assembly capable of moving one drive control member but not the other, as required by claims 5 and 13. *Id.* at 29–31 (citing Ex. 1002, 9:18–10:4, 11:22–27, 12:7–13; Ex. 1004 ¶¶ 85–87). Specifically, Petitioner asserts that the steering cam (sometimes referred to as "speed cam") has a section at which its rotation produces no movement of the steering lever or follower. *Id.* at 30–31. Petitioner asserts that because the cams for each side are oriented in the opposite direction, as one cam moves through the non-moving portion of the cam, the other cam moves through the moving portion of the cam. *Id.* at 31.

With respect to claim 6 and 14, Petitioner asserts that Figure 1 in Barnes mathematically demonstrates that the same drive speed may be achieved while in forward or reverse motion after the vehicle is steered in a first direction, as required by these claims. *Id.* at 31–33. Petitioner asserts that Barnes discloses the right hand and left hand drive units operated at opposite directions, as required by claims 7 and 15. *Id.* at 33 (citing Ex. 1002, 5:23–25, Fig. 1; Ex. 1004 ¶¶ 91–92). Petitioner asserts that Barnes discloses hydrostatic drive systems as required by claims 8 and 16. *Id.* (citing Ex. 1002, 1:10–16; Ex. 1004 ¶¶ 93–95).

We have reviewed Petitioner's assertions regarding the dependent claims and adopt Petitioner's analysis as our own. Accordingly we find Barnes to disclose each element of dependent claims 2–8 and 10–16, in the manner required by the claims. Patent Owner does not challenge any of Petitioner's assertions. Accordingly, the issue of whether Barnes discloses these limitations has not been raised before us.

e. Conclusions Regarding the Teachings of Barnes

Based our analysis above, we find that Barnes discloses each element of claims 1–16 arranged in the manner as claimed, except for the requirement in independent claims 1 and 9 that the drive wheels be coupled to the drive units via an axle. At this point, we can conclude that Petitioner has failed to demonstrate by a preponderance of the evidence that Barnes anticipates any claims in the '458 patent. As we explained, however, this missing element, the claimed axle, would have been known to a person of ordinary skill in the art. As such, we can proceed with our analysis of the Barnes obviousness ground, having found the prior art to teach or suggest

each limitation arranged in the manner as claimed. Before analyzing Petitioner's rationale, however, we analyze the teachings of Richard.

2. Richard-led Grounds

Petitioner asserts that independent claims 1 and 9 are anticipated and/or obvious in view of Richard. Pet. 36–50. Petitioner also asserts that claims 2–8 and 10–16 would have been obvious in view of Richard and Barnes. *Id.* at 50–60. Reviewing Petitioner's claim charts and accompanying explanation, we find that Richard describes a vehicle capable of making a small radius turn (Ex. 1003, 1:34–37, 5:52–54, Figs. 7–12, Claim 1) and that has a frame (*id*. at Fig. 8), left and right drive wheels (*id.* at 1:10–17, 2:63–66, 2:95–102, Fig. 1) and drive units (*id.* at 1:50–63, 2:63–66, Fig. 1), a steering device (*id.* at 7:42–48, Fig. 14), a speed control member (*id.* at 7:72–48, Figs. 13, 14), and a mechanical control assembly (*id.* at 4:41–56, 4:114–5:2, 5:18–117, Figs. 7, 9, 11) as recited in independent claims 1 and 9.

There does not appear to be any dispute over these features. Patent Owner, however, disputes whether the drive units are coupled to the wheels *via axles*, and whether the steering device and speed control member are *coupled to the frame*. PO Resp. 45–46. Patent Owner's arguments are the same as those addressed above, and unpersuasive for the reasons given, while Petitioner's arguments are persuasive, for the same reasons.

As to the axle limitation, unlike Barnes, Richard discloses an axle that couples the drive units to the drive wheels. This is shown in Figure 1, reproduced in above in our discussion of Richard. We credit the testimony of Mr. Smith that a person of ordinary skill in the art reviewing Figure 1 of

Richard would understand the drive unit to be coupled to the drive wheels via an axle. As Mr. Smith puts it, "Barnes expressly identifies [an axle] in Figure 1." Ex. 1004 ¶ 109. That Barnes does not explicitly label or otherwise discuss this feature is not determinative, because "things patent drawings show clearly are [not] to be *disregarded*." *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) (holding that description via drawings and pictures can be relied upon alone as well as by words to anticipate claimed subject matter if they clearly show the structure claimed). Mr. Smith is not relying on the precision of the drawing, but rather the presence or absence (and in this case the unambiguous presence) of an axle. As a person having an engineering degree and relevant experience in vehicle design, Mr. Smith is qualified to offer his opinion as to what a person of ordinary skill in the art would understand upon review of Figure 1 of Richard, to the extent it is not plainly apparent to a layperson.

Patent Owner argues that what Petitioner identifies in Richard as axles are not labeled, discussed, or identified explicitly as an axle. PO Resp. 54. Patent Owner therefore alleges that the Figure is "unclear." *Id.* For the reasons just expressed, this argument is not persuasive. We do not credit the testimony of Dr. Reinholtz, Patent Owner's expert, over the testimony of Mr. Smith. Dr. Reinholtz testifies that "it is not entirely clear what the components are or how they function with respect to the control arrangement." Ex. 2016 ¶ 103. He suggests that what is shown in Figure 1 could be "as discussed above, . . . a flexible shaft or a torque converter." *Id.* ¶ 104. But Dr. Reinholtz does not direct us to this "discuss[ion] above," nor can we find it by searching the document. Accordingly, the underlying facts or evidence relied on by Dr. Reinholtz have been not provided and his

testimony cannot be given weight. 37 C.F.R. § 42.65. In addition, even if his position were supported by evidence, it would seem that a person of ordinary skill in the art would consider a flexible shaft or a torque converter to be an axle. Ex. 1030 ¶ 99 (Mr. Smith testifying that, by definition, "[t]he mechanical piece(s) that couple the drive motor and the drive wheel and upon which the drive wheel rotates is an axle"). We find that Richard discloses an axle as claimed.

Accordingly, we find that Richard describes each limitation of independent claims 1 and 9. Therefore, we find that Petitioner has shown by a preponderance of the evidence that Richard anticipates the subject matter of claims 1 and 9.

As to dependent claims 2–8 and 10–16, Petitioner directs us to the same teachings in Barnes for these claims that we discussed above. Pet. 50–60. We have found already that Barnes describes in each limitation of dependent claims 2–8 and 10–16. We now turn to the rationales.

D. Analysis of the Rationales

1. Barnes-led Ground

We have found that Barnes describes each element of independent claims 1–16, except for the particular configuration of the axle required in independent claims 1 and 9. As to the axle, we found that a person of ordinary skill in the art would have understood an axle to be a way to connect the drive unit to the drive wheels.

The difference between the claims and the prior art is well within the level of ordinary skill in the art. It simply requires a separate axle; i.e., not to use the particular configuration in which the drive unit is inside the drive

wheels. Richard describes a drive unit connected to the drive wheel via an axle, to the extent the difference is not readily apparent to a person involved in vehicle design having an engineering degree. Given the minimal distinction between the claims and prior art, Petitioner's rationale to use a distinct axle for the purposes of using a "common . . . and well-accepted structure" is sufficient. Pet. 35 (citing Ex. 1004 ¶¶ 35, 56, 98; Ex. 1017, Ex. 1025, Ex. 1026). Petitioner's citations to other examples in the art having this arrangement of drive unit-axle-drive wheel provide further evidence in support of its rationale and are persuasive. Ex. 1017 (depicting two axles 23L, 23R in Figure 2), Ex. 1025 (depicting two axles 86, 186 in Figure 3), Ex. 1026 (depicting a separate wheel 30 driven by its own motor 26, wherein the motor is not inside the wheel hub).

Patent Owner's attempt to shoehorn this argument into an impermissible use of the "common sense" type rationale is unpersuasive. PO Resp. 56–58. First, Petitioner's rationale is not premised on "common sense," but rather that the claimed configuration is common and well-accepted. Second, we disagree with Patent Owner regarding the complexity of the technology. *Id.* at 57–58. The technology involved in the modification is a wheel and axle, a simple machine known since ancient times. Patent Owner relies on the testimony of Dr. Reinholtz to say that the technology is not simple, but Dr. Reinholtz offers no explanation, and merely parrots Patent Owner's Response. Ex. 2016 ¶¶ 101, 107. Patent Owner's evidence that there are other, or more complex options such as wheel hub motors does not weigh against Petitioner's position. PO Resp. 58 (citing Exs. 2008, 2009, 2012, 2041). That evidence simply shows other options.

In view of the evidence before us, we find that Petitioner has shown that it was a common and well-accepted solution to have a drive unit and wheel coupled via an axle, providing a person of ordinary skill in the art a reason to use such a configuration when requiring a transmission of power between a drive wheel and a drive unit.

2. Richard-led Grounds

We have found that Richard describes each element of independent claims 1 and 9, and that Barnes describes each element of dependent claims 2–8 and 10–16. The proposed modification as it relates to claims 2 and 10 involves modifying the steering levers of Richard to be a steering wheel as disclosed in Barnes. Pet. 51–52. Petitioner notes that Barnes considers these two types of steering devices to be interchangeable. *Id.* at 52 (citing Ex. 1002, 1:17–2:22, 4:15–25; Ex. 1004 ¶¶ 53–56, 128). Specifically, Petitioner directs us to the portion in Barnes that describes how skid steer vehicles are controlled typically by one or two levers, but also describes instances when the skid steer is controlled by a steering wheel. We find this to be evidence that a person of ordinary skill in the art designing vehicles like Barnes and Richard was aware of the interchangeability of steering levers and wheels and the feasibility of such a change, and evidence that supports the rationale behind Petitioner's proposed modification.

Patent Owner argues that Petitioner has failed to show that the combination would yield a predictable result and has failed to articulate a reason for making the change. PO Resp. 59–60. We disagree. The first argument is rebutted by the fact that Barnes itself discusses steering levers

and steering wheels in the same type of vehicle. Barnes teaches that it could be done, providing evidence of a predictable result.

Patent Owner argues that the combination would require a significant reengineering of the Richard control system, but this fails to consider how analogous the two systems actually are. *See* PO Resp. 60–61. The output of the lever steering system and Richard is the vertical movement of links 11 and 12 as shown in Figure 1. This is highly analogous to the output of the lever or steering wheel system in Barnes, which again is the vertical movement of the left and right hand speed signal levers (Figure 4). Dr. Reinholtz's testimony regarding Barnes being a planar mechanism and Richard being a spherical mechanism fails to consider this relationship, to the extent we can discern what Dr. Reinholtz means by these characterizations, as he has provided no cogent explanation. Ex. 2016 ¶ 91 (alleging that Barnes is "planar" and Richard is "spherical" and that "[a] person of ordinary skill in the art designing a mechanical structure would not look to combine elements from a plane or mechanism with a spherical mechanism," without any further explanation).

As to the reason to combine, Patent Owner's argument that Petitioner fails to provide a reason to combine is unpersuasive. As articulated by the Supreme Court in *KSR*, "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l Co. v. Teleflex, Inc.*, 550 US 398, 418 (2007); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of

obviousness."). In both these instances, the words "reason" or "reasoning" are directed to the explanation for why the combination would have been made. In other words, a synonym for "reason" is "explanation." Patent Owner would like for "reason" to mean "motivation," but the Supreme Court in *KSR* states that an explicit motivation is not required for a claim to be obvious. *KSR*, 550 US at 419.

Here, Petitioner's reason for modifying the levers of Richard to be a steering wheel as in Barnes is because a person of ordinary skill in the art knows that both are known options on this type of vehicle. As the Supreme Court has articulated, "a person of ordinary skill has good *reason* to pursue the known options within his or her technical grasp." *Id.* at 421 (emphasis added). Thus, in appropriate circumstances, a reason to combine can simply be that the added feature was a known option for achieving that particular purpose in the art. Here the known option is to choose either levers or a steering wheel to steer the vehicle, both options presented by Barnes. Thus, under Supreme Court case law, Petitioner's reasoning is sufficient.

Patent Owner lastly argues that Richard teaches away from a steering wheel type steering system. PO Resp. 62. That argument is premised on the mere fact that Richard teaches a lever system but not a steering system. A teaching of alternatives is not a teaching away. Patent Owner does not direct us to, nor do we find, any disclosure in Richard that teaches away from a steering wheel.

In view of the above, we find that Petitioner has established a reason with rational underpinnings for modifying the lever system of Richard to be a steering wheel as described in Barnes, namely, that it was a known option to a person of ordinary skill in the art to use either type of steering system.

Given that Barnes describes each limitation of the dependent claims as we found above, and that Petitioner has offered a reason with rational underpinnings for modifying the lever control system of Richard to include the steering wheel controlled system of Barnes, we have effectively addressed each of the remaining dependent claims. Patent Owner does not dispute the ground as to these claims.

3. Conclusion for Obviousness Grounds

We found that Petitioner has established that Barnes describes each limitation of claims 1–16, with the exception that Petitioner has not established that Barnes necessarily describes the axle as claimed. Notwithstanding, we found that Petitioner has established that a person of ordinary skill in the art would have considered the axle configuration claimed. No objective evidence of non-obviousness is before us. Accordingly, on the record before us, we determine that Petitioner has established by a preponderance of the evidence that the subject matter of claims 1–16 would have been obvious in view of Barnes.

We found that Petitioner has established that Richard describes each element of independent claims 1 and 9, and has established that Richard anticipates these claims. Because Petitioner has established that Richard describes each element, we also determine that Petitioner has established by a preponderance of the evidence that the subject matter of claims 1 and 9 would been obvious in view of Richard.[7,8] We have also found that Barnes

[7] No objective evidence of non-obviousness is before us.

[8] We recognize that not all claims that are anticipated are also obvious, but that is the case here, as we have no evidence of non-obviousness and no

and Richard, in combination, describe each element of claims 2–8 and 10–16, and that Petitioner has established a person of ordinary skill in the art, upon review of Barnes, would have considered modifying the lever steering system of Richard to be steering wheel system as in Barnes as a known alternative option. Again, no objective evidence of non-obviousness is before us. Accordingly, on the record before us, we determine that Petitioner has established by a preponderance of the evidence that the subject matter of claims 2–8 and 10–16 would have been obvious in view of Richard and Barnes.

IV. ORDER

In view of the foregoing, it is hereby:

ORDERED that claims 1–16 of the '458 patent have been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *denied*;

FURTHER ORDERED that this is a Final Written Decision under 35 U.S.C. § 318(a), and that parties to the proceeding seeking judicial review of the decision under 35 U.S.C. § 319 must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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other contraindications unique to the law of obviousness.

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