

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARCTIC CAT, INC.,
Petitioner,

v.

POLARIS INDUSTRIES INC.,
Patent Owner.

Case IPR2017-00433
Patent 9,217,501 B2

Before KARL D. EASTHOM, PHILLIP J. KAUFFMAN, and
MICHAEL W. KIM, *Administrative Patent Judges*.

KAUFFMAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. PROCEDURAL MATTERS

A. OVERVIEW

Arctic Cat, Inc., “Petitioner,” filed a corrected¹ Petition (Paper 16, “Pet.”) requesting *inter partes* review of claims 1–12 and 14–22 of U.S. Patent No. 9,217,501 B2 (Ex. 1002, “the ’501 patent”). Pet. 4. Polaris Industries Inc., “Patent Owner,” filed a Preliminary Response (Paper 9, “Prelim. Resp.”) to the Petition.

We instituted an *inter partes* review of claims 1–9 on three grounds of unpatentability, but did not institute on claims 10–12 or 14–22 on a fourth ground of unpatentability.² Paper 17 (“Dec.”).

Subsequently, Patent Owner submitted a response. Paper 33 (“PO Resp.”). Petitioner submitted a Reply. Paper 48 (“Pet. Reply”).

We held an oral hearing on March 13, 2018, and a transcript is included in the record. Paper 89 (“Tr.”).

On April 27, 2018, due to *SAS institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), and the Director’s *Guidance on the Impact of SAS on AIA Trial Proceeding*,³ we amended our Institution Decision to include the ground that we previously did not institute (“the newly instituted ground”). Paper 93. Given the late stage of the proceeding, the Chief Judge granted an extension

¹ Essentially, Petitioner had to redact sections IV and V to meet the word count limit. See Paper 15.

² Although our Institution Decision prohibited Petitioner from further pursuing some of the proposed rationale, we subsequently removed that prohibition. See Paper 24.

³ Available on line at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>.

of the one-year deadline to enter a Final Written Decision. *See* Papers 99, 110, 111.

Petitioner submitted a brief addressing the newly instituted ground, Patent Owner submitted a response, and Petitioner submitted a reply. Papers 107, 109, 113, respectively. We held an oral hearing on the newly instituted ground on July 19, 2018, and a transcript is included in the record. Paper 116 (“Second Tr.”).

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

Petitioner has not shown by a preponderance of the evidence that any of the challenged claims are unpatentable.

B. RELATED PROCEEDINGS

The parties indicate that the ’501 patent is at issue in: *Polaris Industries Inc., et al. v. Arctic Cat Inc., et al.*, Case No. 0:14-cv-3412, pending in the United States District Court for the District of Minnesota (“the related litigation”). Pet. 4; Paper 5, 2.

The ’501 patent was also the subject of IPR2017-00455, filed concurrently with the Petition at hand. There, Petitioner challenged the same claims of the ’501 patent. We denied institution and denied the request for rehearing. *See* IPR2017-00455, Papers 17, 22.

C. MOTION TO EXCLUDE

We previously denied Patent Owner’s Motion to Exclude with respect to Exhibits 1033, 1036, and 1037, and granted that Motion with respect to Exhibit 1038. Paper 117. As detailed below, if we had evaluated Patent

Owner's Motion to Exclude as part of this Final Written Decision, we would have denied the Motion as moot.

Exhibits 1036–1038 are not relevant to this Final Written Decision because we do not reach the secondary considerations at issue.

In our Decision on Patent Owner's Motion to Exclude, we stated that Patent Owner's point of contention regarding the photograph of the 2009 Polaris Ranger in Exhibit 1033 was whether the product depicted is a commercial embodiment of Sundahl. Paper 117, 4. That is not entirely correct. In the Preliminary Response, Patent Owner asserted that Petitioner only made a conclusory assertion that the 2009 Polaris Ranger RZR is an embodiment of Sundahl, but then in the Response, Patent Owner no longer disputed the point. *See* Paper 9, 47–48; PO Resp. 20. This inaccuracy did not impact our analysis because the salient point was that Patent Owner did not dispute that the photograph was what it purports to be (a 2009 Polaris Ranger RZR). Because Patent Owner no longer disputes that the 2009 Polaris Ranger RZR is a commercial embodiment of Sundahl, we need not rely on Exhibit 1033 as evidence of that fact.⁴

D. MOTIONS TO SEAL

Patent Owner's Preliminary Response and Patent Owner's Response were each filed as a Board and Parties Only copy and as a public, redacted copy. Papers 7, 9, 33, 34. Similarly, Petitioner filed the Reply as a Board and Parties Only copy and as a public, redacted copy. Papers 48, 47. Several other papers and exhibits were filed as Board and Parties Only. Papers 41,

⁴ The photograph is in also in the record at Exhibit 1001 ¶ 92.

42, 61, 67, 73, 74, 81, 91, 102, 104, 117; Exs. 1036–1038, 1040, 1041, 1045, 2015, 2049, 2052–2059, 2067, 2079–2082, 2119–2124, 2128.

Patent Owner submitted unopposed Motions to Seal. Papers 8, 35, 59, 65, 79; *see also* Paper 26 (Protective Order). Petitioner also submitted Motions to Seal. Papers 46, 64, 71, 96, 106. We previously granted the Motions in Papers 8, 35, and 46, with the exception of denying the request for Exhibit 2067.⁵ Paper 69.

There is an expectation that information will be made public where the information is identified in a final written decision, and that confidential information that is subject to a protective order ordinarily would become public 45 days after final judgment in a trial, unless a motion to expunge is granted. 37 C.F.R. § 42.56; Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,761 (Aug. 14, 2012).

In rendering this Final Written Decision, it was not necessary to identify, nor discuss in detail, any confidential information. However, a party who is dissatisfied with this Final Written Decision may appeal the Decision pursuant to 35 U.S.C. § 141(c). Thus, we maintain the record, as is, until resolution of an appeal, if any.

E. OBJECTIONS TO PETITIONER’S DEMONSTRATIVES

We need not take any action regarding Patent Owner’s objections to slides 38–40 of Petitioner’s Demonstratives because these slides deal with secondary considerations that are not addressed in this opinion. *See* Paper 87 (objections); Ex. 1042 (Petitioner’s Demonstratives).

⁵ We do not direct Patent Owner to refile Exhibit 2067 as a public exhibit because we do not rely on that information for this decision.

F. OBSERVATIONS

Patent Owner submitted observations regarding the cross-examination testimony of Dr. Davis, and Petitioner submitted a response. Papers 62, 75. We considered this information when analyzing this case.

We need not consider Patent Owner's other observations because they pertain to evidence that is not addressed in this decision. See Papers 66, 67.

II. CLAIMED SUBJECT MATTER

A. THE '501 PATENT

Side-by-side vehicles were known prior to the '501 patent. Ex. 1002, 1:21. Figure 1 of the '501 patent follows.

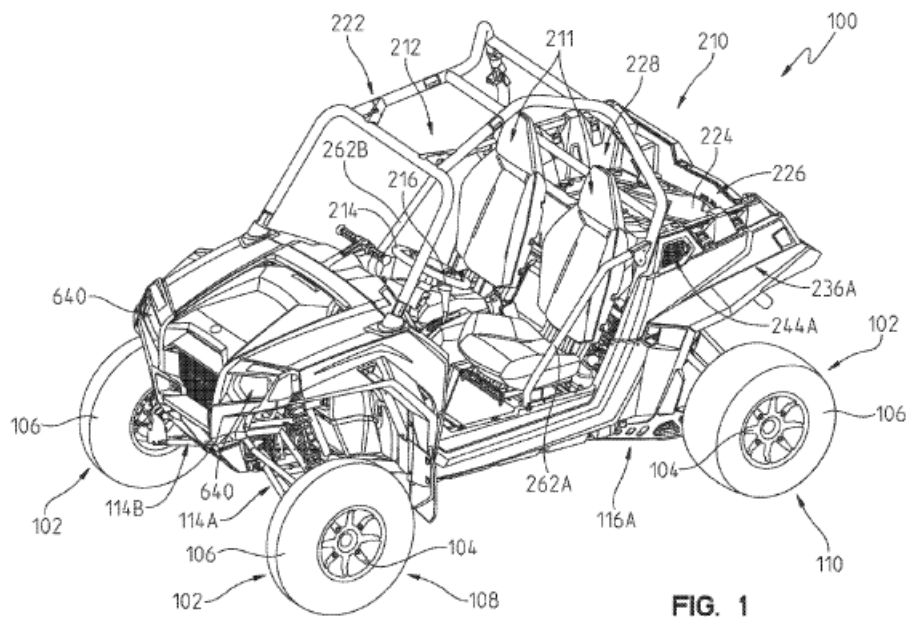
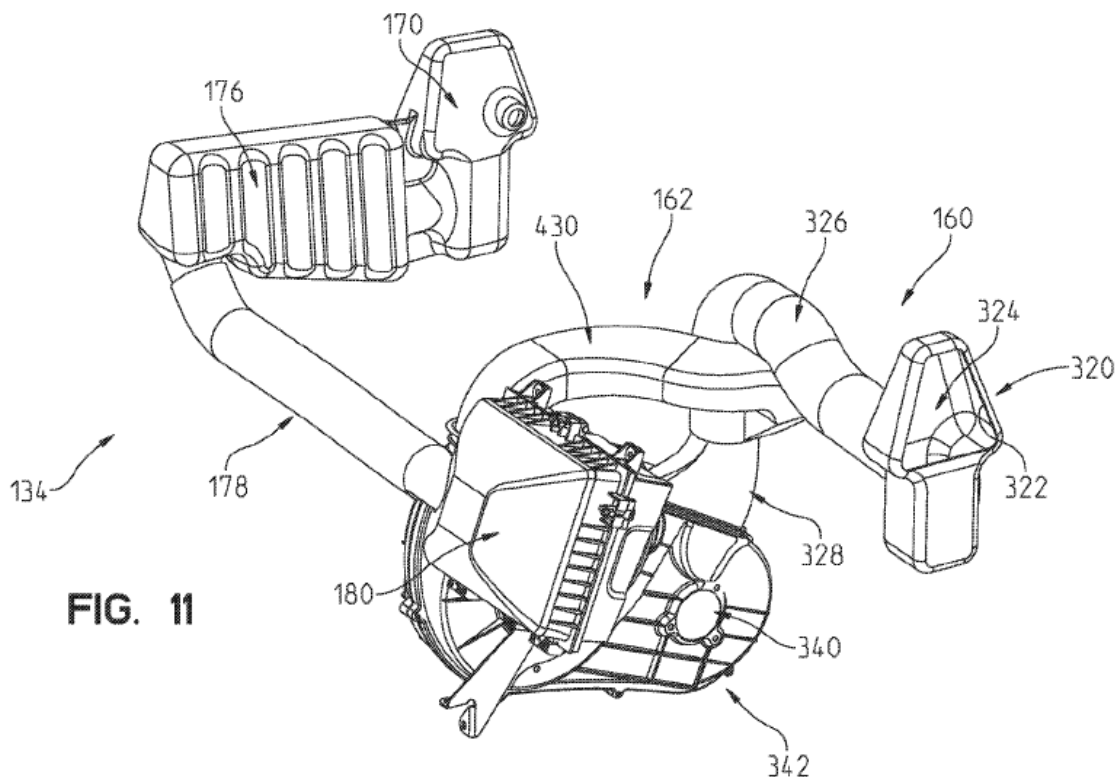


Figure 1 is a front perspective view of an exemplary side-by-side vehicle. Ex. 1002, 9:54–55.

The '501 patent, titled "Side-by-Side Vehicle," relates to vehicles, including utility vehicles, and in particular to air handling systems and suspension systems for vehicles. *Id.* [54], 1:21–24.

The '501 patent describes embodiments that include a first air intake system operatively coupled to the power source (e.g., engine), and a second air intake system operatively coupled to a continuously variable transmission (CVT⁶). *Id.* at 6:21–7:2, 7:37–9:43. In an exemplary embodiment, CVT unit 140 receives ambient air through air intake system 160 and expels air through exhaust system 162. *Id.* at 12:30–35; Figs. 9–11. Figure 11 of the '501 patent follows.



⁶ See Prelim. Resp. 2.

Figure 11 is a right perspective view of the CVT air handling system of the side-by-side vehicle shown in Figure 1. *Id.* at 10:14–16. Air inlet housing 320 includes air inlet 322, and is in fluid communication with interior 340 of CVT housing 342 via fluid conduit 326 and fluid duct 328. *Id.* at 16:32–35.

Figure 4 of the '501 patent follows.

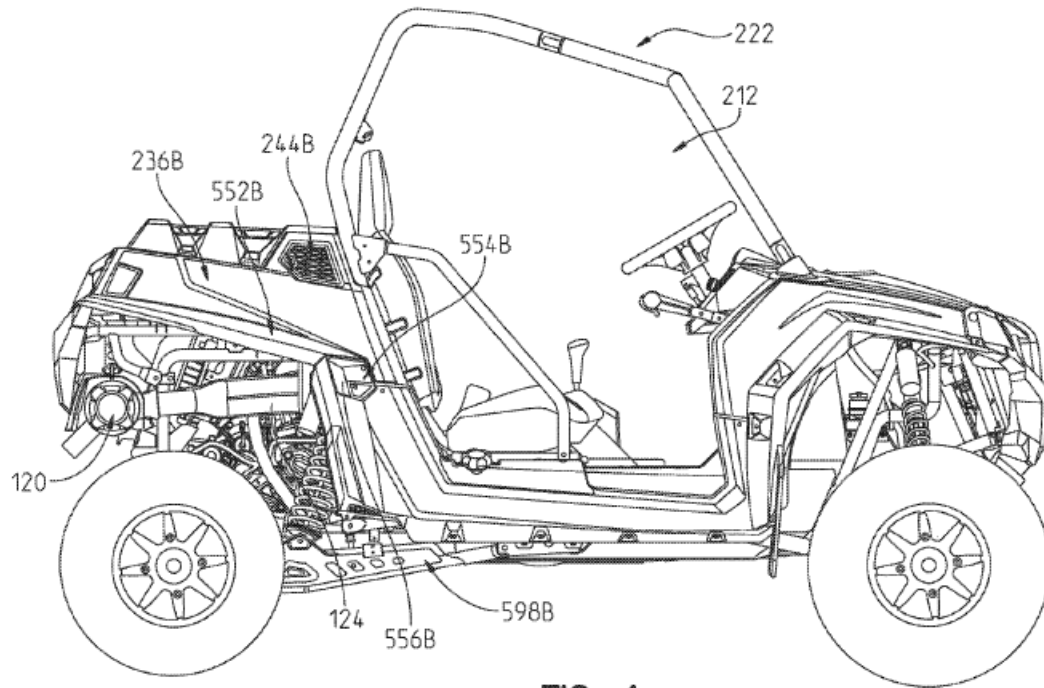


FIG. 4

Figure 4 is a right side view of the side-by-side vehicle shown in Figure 1. *Id.* at 9:60–61. Ambient air enters through cover 244B before entering air inlet 322. *Id.* at 16:20–31. Cover 244B is coupled to body panel 236B. *Id.* at 16:23–26; *see also* 14:52–56 (discussing body panel 236), Fig. 15.

B. ILLUSTRATIVE CLAIM

Claim 1 is the sole independent challenged claim and follows
(emphasis added):

1. A vehicle comprising:
 - a frame;
 - a plurality of ground engaging members supporting the frame;
 - a power source supported by the frame and operatively coupled to at least one of the plurality of ground engaging members to propel the vehicle;
 - a CVT unit supported by the frame and operatively coupled between the power source and the at least one of the plurality of ground engaging members;
 - an operator area supported by the frame, the operator area including seating and operator controls, a first portion of the plurality of ground engaging members being located forward of the seating and a second portion of the plurality of ground engaging members being located rearward of the seating, the seating including a plurality of seats in a side-by-side arrangement, the first portion of the plurality of ground engaging members including a first ground engaging member including a first wheel and a first tire, the second portion of the plurality of ground engaging members including a second ground engaging member including a second wheel and a second tire;
 - a cargo carrying portion supported by the frame and located rearward of the seating;
 - a plurality of exterior body panels supported by the plurality of ground engaging members; and
 - an air intake system operatively coupled to the CVT unit to communicate ambient air to an interior of the CVT unit, the air intake system receiving ambient air through an inlet in a portion of the plurality of exterior body panels, the inlet in the portion of the plurality of exterior body panels being located rearward of the first wheel of the first ground engaging member and forward of the second wheel of the second ground engaging member and located laterally outside of a lateral extent of the power source and the CVT unit.*

C. CLAIM CONSTRUCTION

For the purposes of this decision, and on this record, we determine that no claim terms need express interpretation. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only those terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy).

III. PATENTABILITY

A. EVIDENCE AND GROUNDS

Petitioner asserts the following grounds of unpatentability under 35 U.S.C. § 103(a):

Claim(s)	References
1, 6–9	Sunsdahl, ⁷ Suzuki ⁸ and Brown ⁹
2	Sunsdahl, Suzuki, Brown, and Chonan ¹⁰
3–5	Sunsdahl, Suzuki, Brown, Chonan, and Nallinger ¹¹
10–12, 14–22	Sunsdahl, Suzuki, Brown, and Ranger ¹²

Pet. 5–6.

⁷ U.S. Pub. 2008/0023249 A1, published Jan. 31, 2008 (Ex. 1004) (“Sunsdahl”).

⁸ U.S. Pub. 2006/0270503 A1, published Nov. 30, 2006 (Ex. 1005) (“Suzuki”).

⁹ U.S. Patent 4,681,178, issued July 21, 1987 (Ex. 1006) (“Brown”).

¹⁰ U.S. Patent 7,427,248, issued Sept. 23, 2008 (Ex. 1007) (“Chonan”).

¹¹ U.S. Patent 2,033,731, issued Mar. 10, 1936 (Ex. 1010) (“Nallinger”).

¹² 2007 Ranger 500 EFI Service Manual (Ex. 1009) (“Ranger”).

B. SUNSDAHL, SUZUKI, AND BROWN – CLAIMS 1 AND 6–9

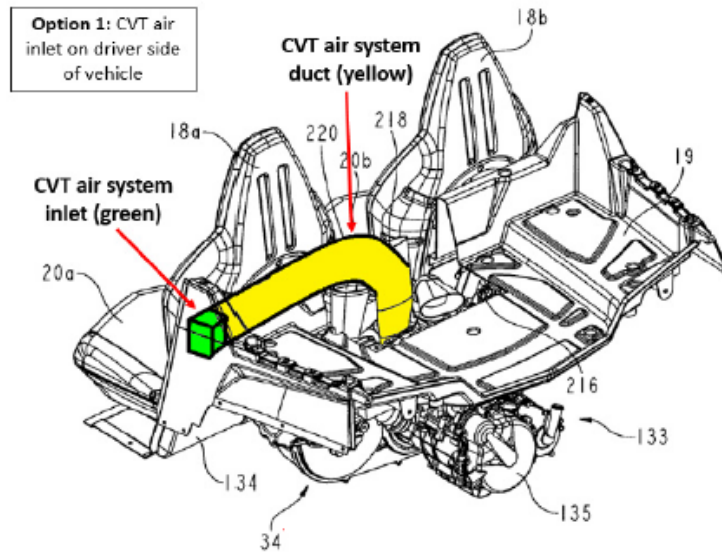
Petitioner contends that claims 1 and 6–9 would have been obvious over Sundahl, Suzuki, and Brown. Pet. 24–63.

1. *Claim 1*

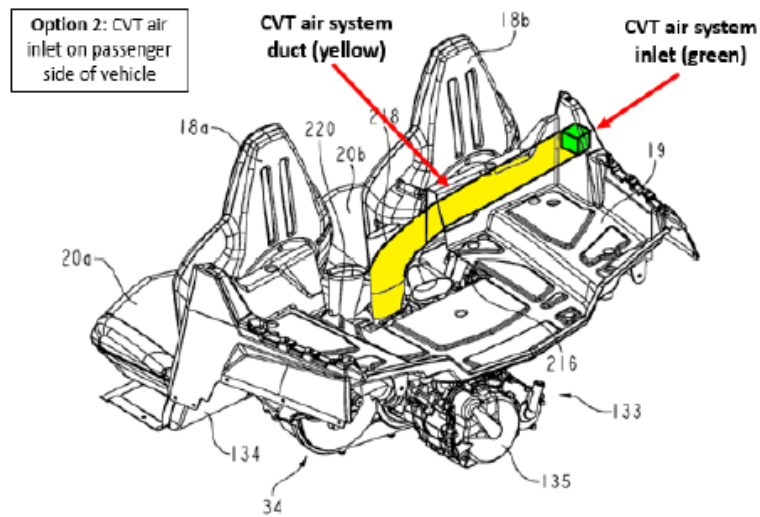
a. *Proposed Modifications*

Petitioner contends that Sundahl discloses a vehicle as recited in claim 1, except that the CVT intake is positioned between the driver and passenger seats rather than through an inlet in a portion of an exterior body panel as claimed. Pet. 24–33 (overview and rationale); 33–50 (element by element analysis). According to Petitioner, a person of ordinary skill would have modified Sundahl in two respects: one, reconfiguring the intake duct to extend toward the side of the vehicle, as taught by Suzuki, and two, reconfiguring the intake duct to be positioned through an exterior side panel, as taught by Brown. *Id.* at 28, 45–50; Ex. 1001 ¶¶ 92–95, 123–126. Petitioner provides the following illustrations of Option 1 and Option 2 as examples of the proposed combination.

Option 1:



Option 2:



Option 1 and Option 2, shown in these illustrations, are each Figure 25 of Sundahl as annotated by Petitioner to depict the modified CVT air duct (yellow) and the added inlet (green). Pet. 28–29.

b. Prior Art References

We disagree with several important aspects of Petitioner's characterizations of the prior art. Proper characterization of the references is critical to understanding the differences between the prior art and the claimed subject matter as it relates to Petitioner's proposed rationale for this ground of unpatentability.

1) Sundahl

a) Overview

Sundahl discloses a side-by-side All-Terrain Vehicle (ATV).
Ex. 1004, (54), Abstract, Fig. 1. Figure 1 of Sundahl follows:

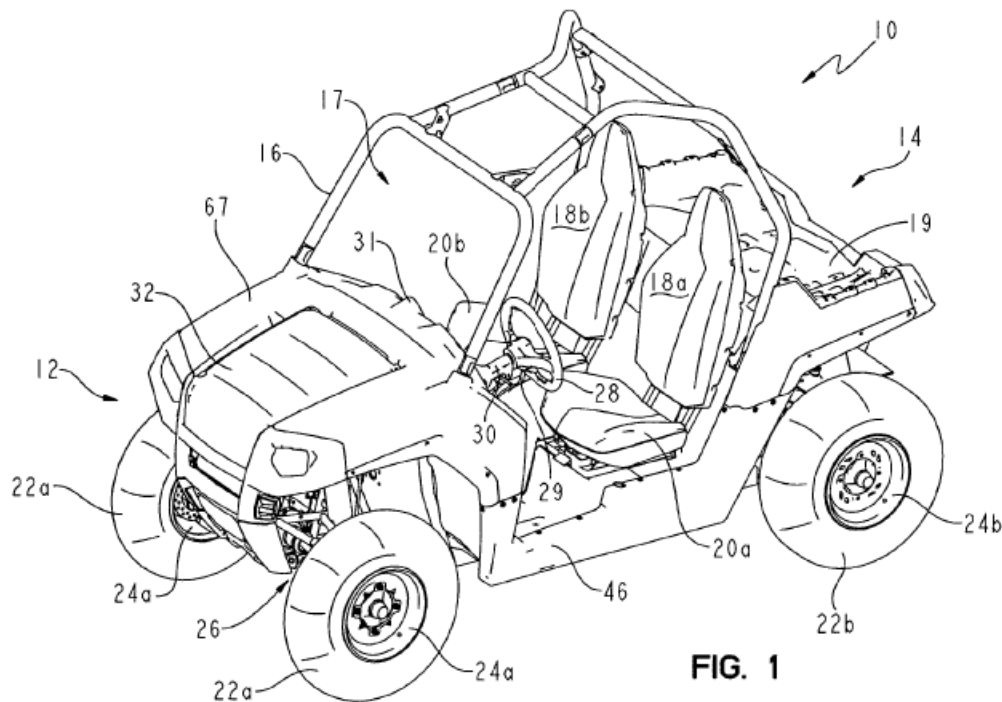


Figure 1 is a perspective view of one embodiment of a side-by-side ATV.
Id. ¶ 7.

Sunsdahl's vehicle 10 includes both an engine cooling system and a CVT cooling system.¹³ *Id.* ¶ 66, Figs. 25, 26. Figure 25 of Sunsdahl follows:

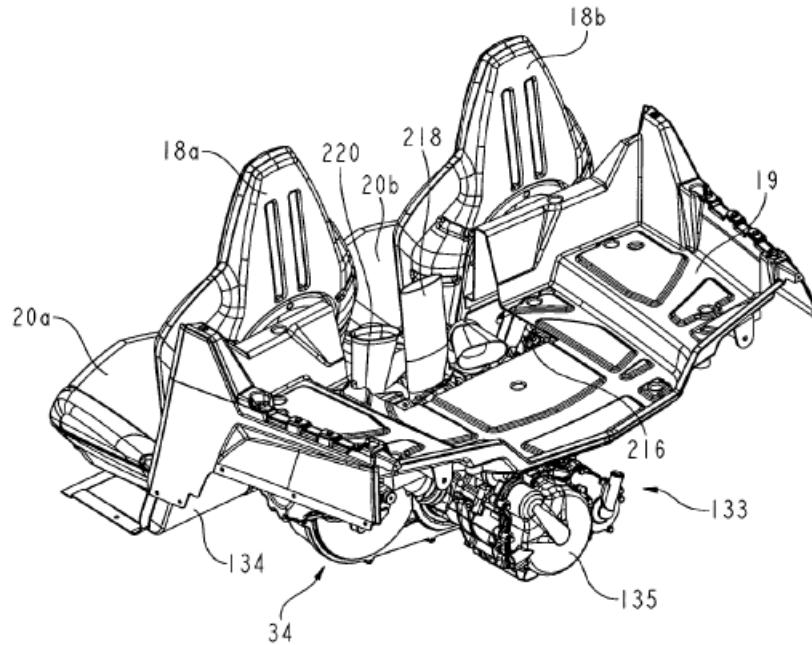


FIG. 25

Figure 25 is an elevated rear perspective view of the engine and CVT cooling components of the side-by-side ATV show in Figures 1–4. *Id.* ¶ 31. Modular engine assembly 34 includes engine cooling intake 220 and CVT cooling intake 218 extending upward through opening 216 in engine cover 19. *Id.* ¶ 66; Pet. 42. Intakes 218 and 220 are positioned between the driver and passenger seating surfaces 18 “to collect air passing between upper seating surfaces 18a and 18b when ATV is driven in the forward direction.” Ex.1004 ¶ 66; Pet. 42.

¹³ Sunsdahl refers to the CVT system as a “clutch” cooling system. *See, e.g.*, Ex. 1004 ¶ 66. In the related litigation, Patent Owner did not contest reference to the system as a CVT cooling system. *See* Ex. 1012, 3 (the pages of this exhibit are not numbered).

i. Differences

Petitioner acknowledges that Sundahl’s air intake system does not receive air through a body panel in the position required by claim 1. *See* Pet. 45–50.

ii. Alleged Susceptibility to Blockage or Restriction

Petitioner characterizes Sundahl’s CVT air intake system as “more susceptible to being blocked/restricted by objects or by two occupants wearing protective gear (as is advised) or cold weather gear” than the modified system of the proposed ground of unpatentability.¹⁴ Pet. 29–30.

We analyze the argument and associated evidence in the Petition and then address the Petitioner’s Reply.

In the Petition, Petitioner provides the following photograph of a 2009 Polaris Ranger RZR and asserts that it is a commercial embodiment of Sundahl. *Id.* at 30.¹⁵



¹⁴ At times, we refer to the driver and passengers collectively as “occupants.”

¹⁵ The Petition cited a website as the source of the photo, and we cautioned the parties in our Institution Decision (Dec. 14, fn. 8) that we do not consider evidence that is not of record. The photograph was of record in the cited portion of Dr. Davis’s Declaration. *See* Pet. 29–30 (citing Ex. 1001 ¶ 92).

The photograph above depicts a driver and a passenger, each wearing a helmet and jacket, operating a 2009 Polaris Ranger RZR through a wooded area. *See* Pet. 30; Ex. 1001 ¶ 92; Ex. 1033, 2.

We accept that the vehicle depicted is a commercial embodiment of Sundahl. As explained above¹⁶, Patent Owner initially contended that Petitioner's assertion was conclusory, but now does not dispute that the vehicle depicted is a commercial embodiment of Sundahl (Ex. 1004). *See* PO Resp. 20, n.3; *see also* IPR2015-01783, Ex. 2045 (U.S. 8,596,405, issued Dec. 3, 2013 (continuation of Application 11/494,891 (Ex. 1004, Sundahl))).

The Petition and associated evidence do not show that Sundahl had a blockage/restriction problem. The Petition, and Dr. Davis, simply conclude, without a persuasive supporting explanation, that the occupants and their associated equipment could block air flow to the CVT inlet. As pointed out in our Institution Decision, the photograph at issue reveals little or nothing regarding airflow. Dec. 16. Further, Dr. Davis's testimony is entitled to little or no weight because it is not supported by underlying facts or data. *See* Pet. 29–30; Ex. 1001 ¶ 92; 37 CFR § 42.65(a). Petitioner does not provide any reports or other evidence indicating Sundahl or the 2009 Ranger RZR had an intake blockage/restriction problem. Further, Petitioner does not address the impact to airflow of the longitudinal distance¹⁷ between the seats and the CVT inlet. *See* PO Resp. 27; Ex. 1001 ¶ 92; Ex. 2033 ¶ 115.

¹⁶ *See* Section I.C.

¹⁷ Here, and throughout, we use “longitudinal distance” to refer to the distance along the longitudinal axis (front to rear) of the vehicle.

In the Reply, Petitioner asserts very generally that blocking the flow of air to a CVT intake was a known problem, and then somewhat more specifically asserts that Sundahl had a known blockage problem.

In support of the assertion that blocking the flow of air to a CVT intake was a known problem, Petitioner provides three citations. Pet. Reply 3 (citing Paper 33, 27–30; Ex. 1001 ¶¶ 48–50, 55, 90, 92; Ex. 1009, 6.2). We analyze each of the three citations in turn.

First, a more accurate characterization of Paper 33 is that Patent Owner asserts that Sundahl does *not* have an inlet blockage/restriction problem. *See e.g.*, Paper 33, 27 (“there is no evidence in the record supporting a conclusion that Sundahl would have an airflow problem”), 28 (referring to the analysis of Petitioner’s expert as “rank speculation”). This is logical, given that Paper 33 is Patent Owner’s Response.

Second, in the cited portion of Exhibit 1001, Dr. Davis testifies that it was known that CVT systems require cooling and that cooling provided known benefits. Ex. 1001 ¶¶ 48–50. Dr. Davis testifies that at the time of the invention it was known to locate intakes “such that they are not likely to be blocked or the flow of air otherwise restricted.” *Id.* ¶ 55; *see also id.* ¶ 90 (similar assertion).¹⁸

Third, Exhibit 1009 is a service manual for a 2007 Ranger 500. Petitioner has not explained the relevance of this Exhibit, which concerns a different product, either to a 2009 Ranger RZR or to Sundahl’s system. Even if this information is applicable to Sundahl, page 6.4 simply states

¹⁸ As mentioned above in this section, we find paragraph 92 of Dr. Davis’s testimony is not supported by underlying facts or data.

under “Overheating/Diagnosis” that obstructions to airflow ducts can significantly increase system-operating temperatures. Ex. 1009, 6.4.¹⁹

Petitioner’s evidence supports the general idea that CVT systems benefit from air cooling and that reduction of that airflow, such as through intake blockage or restriction, is undesirable. We are unpersuaded, however, that this evidence adequately suggests that Sunsdahl’s particular system had such a problem so as to motivate the ordinarily skilled artisan to make the modification proposed by Petitioner.

In support of the assertion that Sunsdahl had a “known blockage problem,” and that the “evidence shows that Sunsdahl would have airflow restrictions that would not exist with a side air intake,” Petitioner provides several evidentiary citations. Pet. Reply 4–7 (citing Ex. 1004 ¶ 66; Ex. 1001 ¶¶ 55, 92, 124, 126; Ex. 1032 ¶¶ 5–7; Ex. 1033, 2; Ex. 1018, 1, 6, 9; Ex. 2002, 8–9). We analyze each of these evidentiary citations in turn.

The cited disclosure in Sunsdahl (Exhibit 1004) describes that CVT intake 218 is positioned between the driver and passenger seating surfaces 18 “to collect air passing between upper seating surfaces 18a and 18b when ATV is driven in the forward direction.” Ex.1004 ¶ 66; *see also* Pet. 42. We agree that this shows that a person of ordinary skill would have recognized that Sunsdahl’s system is configured to take in air from between the upper seating surfaces during forward movement of the vehicle. We do not agree, however, that this disclosure adequately suggests that Sunsdahl’s CVT intake is susceptible to blockage.

¹⁹ Based on the material quoted, it appears the correct citation is page 6.4 rather than page 6.2. *See* Pet. Reply 3.

In paragraph 55 of Exhibit 1001, Dr. Davis testifies that, in general, CVT inlets should be located where they are not likely to be blocked and where the air is not heated by passing near the hotter parts of the vehicle, such as the engine. Ex. 1001 ¶ 55.²⁰ As discussed above, Dr. Davis's opinion in paragraph 92 of Exhibit 1001, that the occupants and their associated equipment could block air flow to the CVT inlet, is not supported by test data, other objective data, or adequately analysis. Likewise, in paragraphs 124 and 126 of Exhibit 1001, Dr. Davis opines that the modified side location has the benefit of decreasing the chance that the inlet would be blocked, but this conclusion is not supported by underlying facts or data, or a persuasive explanation.

In paragraphs 5–7 of his Reply Declaration (Exhibit 1032), Dr. Davis testifies that inlet blockage could have been caused by a passenger removing their jacket and placing it so that it obstructs the intake. Ex. 1032 ¶¶ 5–7. This opinion is also not supported by underlying facts or data. *See* 37 C.F.R. § 42.65(a). The lack of support is particularly telling, given that our Institution Decision stated that the photograph reveals little or nothing about airflow, and that the CVT intake is positioned longitudinally rearward of the occupants. Dec. 16. In other words, Petitioner was aware of our concerns regarding the lack of evidentiary support for the blockage/restriction allegation, and yet did not address them.

²⁰ Dr. Davis cites to Suzuki (Ex. 1005 ¶ 54, filed May 27, 2005) as evidence of that knowledge. *Id.* This predates Sunsdahl (Ex. 1004, filed July 28, 2006). Consequently, prior to Sunsdahl, it was known in the art to place CVT air intakes to prevent blockage/restriction.

Exhibit 1033 is the same photograph of a 2009 Polaris Ranger RZR found in the Petition at page 30 and in Exhibit 1001 at paragraph 92. *See* Pet. 30; Ex. 1001 ¶ 92. As explained above, Patent Owner no longer disputes the 2009 Polaris Ranger RZR is a commercial embodiment of Sundahl, and consequently we need not rely on Exhibit 1033.

Exhibit 1018 is a brochure pertaining to a Polaris 2008 Ranger and Exhibit 2002 is a 2011 Ranger RZR XP Owner's Manual. Petitioner has not explained the relevance of this brochure either to a 2009 Ranger RZR or to Sundahl's system. Even if this information is applicable to Sundahl, none of the cited pages show that CVT inlet blockage/restriction was a known problem in Sundahl. *See* Ex. 1018, 1, 6, 9; Ex. 2002, 8–9.

In sum, Petitioner's evidence supports the conclusion that CVT inlets should be positioned to prevent blockage and heating from other parts of the vehicle. The evidence does not show that Sundahl had an intake blockage/restriction problem. Indeed, we agree with Patent Owner (PO Resp. 28–29) that Petitioner's photograph of the commercial embodiment of Sundahl (Pet. 30) shows the vehicle apparently properly operating with the occupants in the very gear that Petitioner alleges causes blockage or restriction. Further, given Dr. Davis's testimony that it was known to locate intakes "such that they are not likely to be blocked or the flow of air otherwise restricted," we find that it is likely that Sundahl was designed with that knowledge in mind. *See* Ex. 1001 ¶ 55; *see also id.* ¶ 90.

Petitioner argues that the Board has recognized that Patent Owner "does not argue that a person of ordinary skill would not expect air intakes near passenger compartments to have air flow problems." Pet. Reply 4 (quoting Paper 45, 3). Petitioner has taken the quote out of context to

suggest that Patent Owner does not contest that Sundahl had a known intake blockage problem. The full paragraph of the cited paper, which follows, makes clear that we understood that Patent Owner *does* contest Petitioner's contention that Sundahl had a known inlet blockage problem.

Petitioner mischaracterizes Patent Owner's argument. In the portion of the Response that Petitioner cites, Patent Owner does not argue that a person of ordinary skill would not expect air intakes near passenger compartments to have air flow problems. See Paper 34, 27–29. Rather, Patent Owner argues that there is no evidence of record supporting a conclusion that Sundahl's vehicle would have an airflow problem, and that Petitioner's conclusions based on the photograph of the RZR® 800 vehicle, again, not demonstrated to be the Sundahl vehicle, provided in the Petition are conclusory, and further that the photograph, in fact, shows the contrary. *Id.* Patent Owner also argues that “the prior art advocates inlets located rearward of the seating directly behind, or even ‘in the back’ of, the seating itself.” *Id.* at 28 (citing Ex. 2077 ¶ 104, Figs. 20–21; Ex. 2033 ¶ 117). An argument that it was known to place air inlets rearward of the seating is not an argument that those inlets were not known to have blockage or restriction problems. In short, Patent Owner does not argue that no such problem existed; rather, Patent Owner argues that Petitioner has not demonstrated that a skilled artisan would have considered such problems to exist in Sundahl's vehicle.

Paper 45, 3.

Patent Owner asserts that other vehicles provided sufficient cooling with systems having CVT inlets positioned rearward of the seats, as in Sundahl. See PO Resp. 28; Ex. 2033 ¶¶ 76–81, 117; Ex. 2077 ¶ 104, Figs. 20, 21. The fact that the CVT inlet placement used in Sundahl was used in other systems suggests that this location provides effective cooling. Petitioner does not provide argument or evidence to counter Patent Owner's assertion.

We agree with Patent Owner that Petitioner has not shown that Sundahl (embodied as a 2009 Ranger RZR or otherwise) had an intake blockage/restriction problem. See PO Resp. 27–28; Ex. 2033 ¶¶ 115–116.

iii. Alleged CVT ingestion problem

As detailed below in our analysis of Petitioner’s rationale, Petitioner contends that orienting Sundahl’s CVT air intake to extend horizontally and face laterally outward, as taught by Suzuki and Brown, would reduce the likelihood of the inlet ingesting incoming rain, snow, or other water during forward movement of the vehicle. Pet. 31, 45–47; Ex. 1001 ¶¶ 94, 123. A premise of Petitioner’s reasoning is that Sundahl’s CVT inlet is open to the sky. See Ex. 2032, 94:17–95:12. For the reasons that follow, Petitioner has not adequately demonstrated that Sundahl’s CVT inlet is open to the sky.

First, if Petitioner’s characterization were correct, it would seem that the engine and CVT inlets would be visible from the exterior of the vehicle, but they are not. Patent Owner’s modified versions of Sundahl’s Figures 1 and 4 follow.

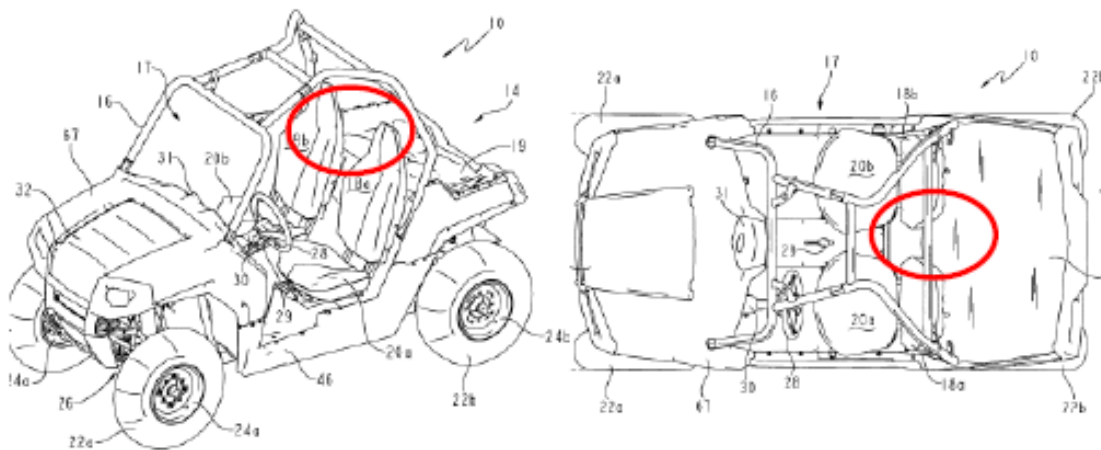


Figure 1 is a perspective view of one embodiment of a side-by-side ATV,

and Figure 4 is a top plan view of the ATV of Figure 1. PO Resp. 19; Ex. 1004 ¶¶ 7, 10. Patent Owner has added a red circle to each Figure to identify where the intakes would appear if they were open to the sky. Petitioner's Reply does not address Patent Owner's interpretations of Figures 1 and 4. Pet. Reply 7–9. We find that Sundahl's Figures 1 and 4 do not depict that the engine or the CVT inlets are open to the sky. Ex. 1004, Figs. 1, 4.

Similarly, Patent Owner contends, and Petitioner does not dispute, that other embodiments of Sundahl illustrate that the engine and CVT inlets are not open to the sky. See PO Resp. 20 (citing Ex. 1014, 1.4²¹; Ex. 2014; Ex. 2021); Pet. Reply 7–9. The following photograph from the bottom right corner of page 2 of Exhibit 2014 is particularly illustrative.²²



²¹ Petitioner submitted Exhibit 1014 with the Petition, and relied on that Exhibit as if it described Sundahl's system. See, e.g., Pet. 45, 65, 72. The Exhibit was filed in three parts and the parts are not in order.

²² The pages of this Exhibit are not numbered.

The preceding photograph is a perspective view from somewhat above and behind the right-hand side of the Sundahl vehicle so that the cargo area is visible. Ex. 2014. No inlets that are open to the sky are visible in this picture.

Second, if Petitioner is correct that Sundahl's engine and CVT inlets are open to the sky, then those inlets would also be open to the cargo area of the vehicle. Petitioner's interpretation is strained because cargo could then be placed on top of those openings and cause a blockage or restriction. We agree with Dr. Bower that a person of ordinary skill would have understood that a vehicle would not have been designed with inlets open to the cargo area, because of the risk of cargo entering or blocking those inlets. *See* Ex. 2033 ¶ 99.

Third, Sundahl's Figures 25 and 26 are consistent with this interpretation. These figures are partial views that highlight the engine and CVT systems and remove some other structure. *Compare* Ex. 1004, Fig. 14, *with* Ex. 1004, Fig. 26; *see also* PO Resp. 18–19 (providing an annotated version of Ex. 1004, Fig. 14); Ex. 2033 ¶¶ 44–49, 97 (Dr. Bower explaining that some frame members, a portion of the engine cover, as well as the rear differential, transmission, and muffler are omitted for clarity in Figures 25 and 26). In other words, structure is not depicted in Figures 25 and 26 to permit the engine and CVT cooling systems, including the inlets, to be seen.

Petitioner's Reply does not persuade us otherwise. There, Petitioner contends that Patent Owner concedes that Sundahl's CVT inlet "extends through and above an opening in the engine cover." Pet. Reply 8 (citing PO Resp. 27; Ex. 1004 ¶ 66; Ex 1032 ¶ 7 & n.1). In support, Dr. Davis opines that Figures 25 and 26 show that Sundahl's Engine and CVT inlets are vertical openings. Ex. 1032 ¶ 7 & n.1.

Petitioner mischaracterizes Patent Owner's assertion. Sundahl discloses that engine cooling intake 220 and clutch cooling intake 218 (CVT intake) extend upward through opening 216 in engine cover 19. Ex. 1004 ¶ 66, Fig. 25. Sundahl's Figure 25 follows.

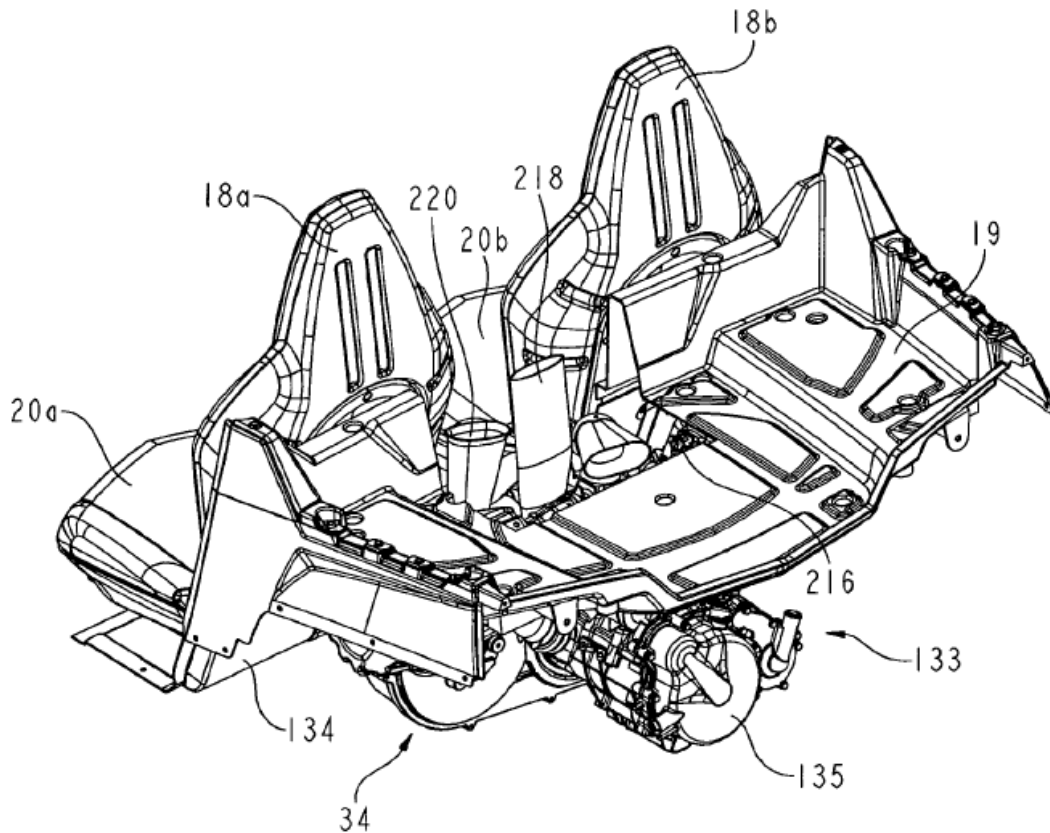


FIG. 25

Figure 25 is an elevated rear perspective view of the engine and cooling components of the side-by-side ATV shown in Figures 1–4. Ex. 1004 ¶ 31. As mentioned above, Patent Owner asserts that Figures 25 and 26 are intended to illustrate the engine and CVT cooling systems, and for that reason, some components are removed from the figures to permit the cooling components to be seen. This includes cutting away (not depicting) a portion of engine cover 19 (opening 216). See PO Resp. 27; Ex. 2033 ¶¶ 44–49. In

other words, opening 216 is created for Figure 25 simply to illustrate the engine and CVT cooling system.

Other evidence supports the determination that opening 216 is illustrative in Figure 25, and not actually included in engine cover 219. If engine cover 219 actually included opening 216, items could just fall from the cargo area onto the engine. *See* Ex. 2033, 45. Further, as pointed out above, the engine and CVT inlets are not visible in Figures 1 and 4, and this is another indication that “opening 216” is simply a portion of engine cover 19 omitted for clarity.

Fourth, Dr. Bower opines that Sundahl’s intakes are not open to the sky and that this was in line with the general practice in the art at the time. Ex. 2033 ¶¶ 100–101. Petitioner does not directly contest this testimony; rather, Petitioner contends that, during his cross-examination, Dr. Bower discredited Patent Owner’s argument that Sundahl’s engine and CVT inlets are not open to the sky. Pet. Reply 7–8 (citing Ex. 1031, 126:21–25, 125:5–11). Specifically, Petitioner points out that Dr. Bower testified that he could not determine if the CVT and engine intakes were omitted from Figures 1 and 4 or were covered by the engine cover. For the reasons that follow, Patent Owner’s argument is not undermined by the cited portion of Dr. Bower’s testimony.

Dr. Bower testified that Sundahl’s intakes are covered from above (not open to the sky). *See generally* Ex. 1031, 118:14–126:25. Dr. Bower repeatedly testified that the intakes were not visible because they are behind either surface 19 or upper seating surface 18a. *Id.* at 123:18–24, 124:8–15, 125:5–11. As the line of questioning continued, Dr. Bower stated that he was evaluating a patent application and not a physical embodiment of the

vehicle, and for that reason, he could not know every specific part of the vehicle. *Id.* at 126:9–20. Following this, Dr. Bower stated that he did not have enough information to form an opinion whether the intakes were omitted from Figures 1 and 4, and then the questioner changed the subject. *Id.* at 124:16–126:25. Dr. Bower later explained that in his experience he had never seen a CVT inlet open to the sky. *Id.* at 127:1–10. Although Dr. Bower pointed out that some detail was unclear due to a patent application having less detail than the actual device, his opinion consistently remained that Sundahl's engine and CVT inlets are not open to the sky. When Dr. Bower's testimony is considered in the proper context, along with the fact that Petitioner provides no evidence to counter Dr. Bower's opinion, we are persuaded that the general practice in the art at the time of the claimed invention was that engine and CVT inlets were not open to the sky.

Based on the record as a whole, our view is that opening 216 in engine cover 19 is simply illustrative to better depict the engine and CVT cooling system, and engine cover 19 does not actually include opening 216. A modified version of Sundahl's Figure 25 follows.

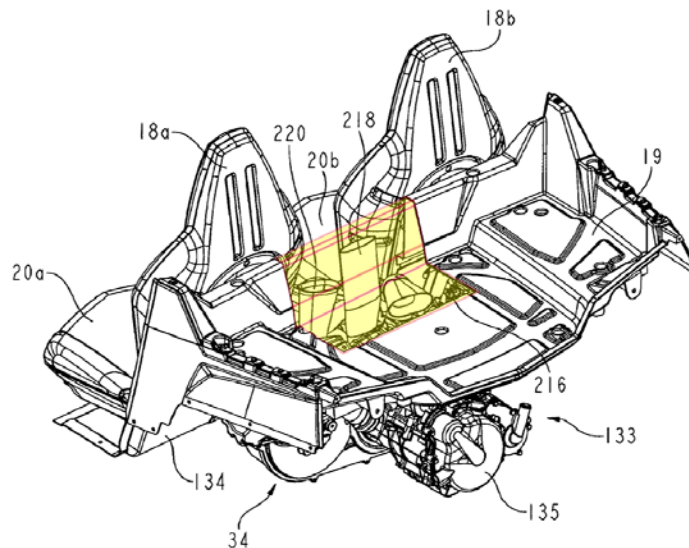


FIG. 25

In the preceding figure, the Board modifies Sundahl's Figure 25 with yellow, transparent highlighting and red edges filling opening 216 to illustrate our view of how Sundahl's engine cover 19 is actually configured, based on the evidence provided and arguments made. Our modified version is consistent with the photograph in Exhibit 2014 (reproduced above).

In this configuration, cover 19 includes a horizontal portion above cooling intakes 218 and 220 near the back of upper seating surfaces 18a and 18b. The record does not reveal the exact configuration of the portion of cover 19 between seating surfaces 18a and 18b when viewed from the front; however, we know that the configuration permits air to flow between the upper seating surfaces and through the back of the vehicle with more air flowing as speed increases. *See* Ex. 1004 ¶ 66; PO Resp. 21.

Consequently, we agree with Patent Owner that Sundahl's intake openings (the engine and CVT) are covered from above and are not open to the sky. PO Resp. 18; Ex. 2033 ¶¶ 47–49, 94.

Significantly, Petitioner's assertion that Sundahl's CVT inlet is susceptible to blockage/restriction (see previous section) is premised upon the mischaracterization that Sundahl's intakes 218 and 220 are open to the sky, when in fact the intakes are covered by engine cover 19. This mischaracterization further undermines Petitioner's assertion.

2) *Suzuki*

Suzuki discloses a CVT cooling system for a vehicle such as an ATV, Side-by-Side Vehicle, or other off-road vehicle. Ex. 1005 ¶ 2. As background, Suzuki explains that CVT's must be cooled during operation and that heat increases as load increases. *Id.* ¶¶ 4–5. Suzuki's system was intended to provide more effective cooling. *Id.* ¶ 11. In particular, Suzuki's

system is configured to greatly increase the speed of airflow to provide improved cooling. *Id.* ¶¶ 54, 56.

Suzuki discloses an embodiment of vehicle 10 that includes CVT 64 associated with engine 40 within engine compartment 38. *Id.* ¶¶ 30, 37, 39; Fig. 1. CVT 64 includes air intake duct 68. *Id.* ¶ 39. An annotated version of Figure 1 of Suzuki follows:

FIG. 1

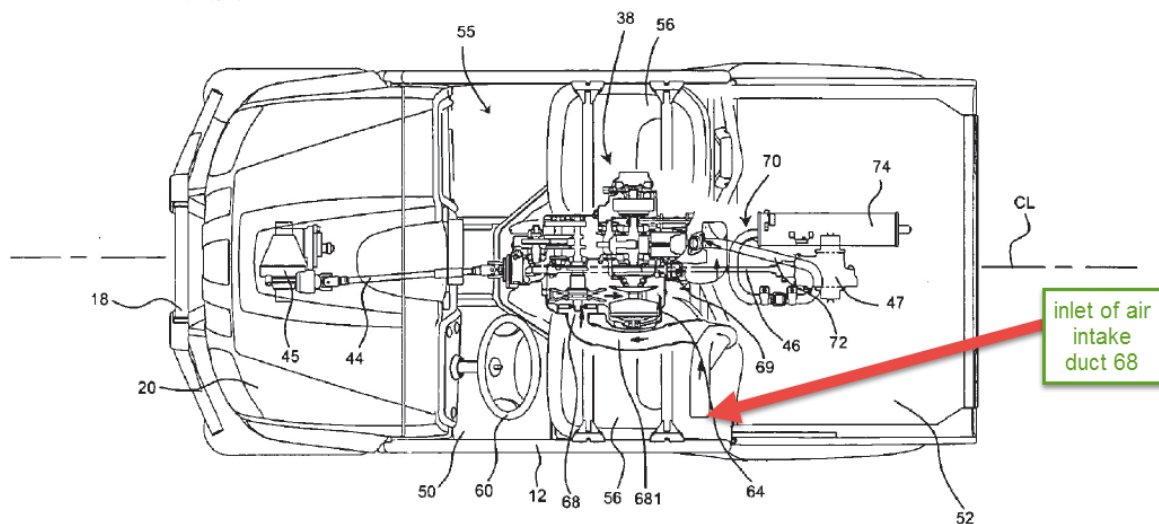


Figure 1 is a top plan view of vehicle 10, and we have added a label and arrow to identify the inlet of air intake duct 68 of CVT 64. Ex. 1005 ¶¶ 20, 30, 39. We agree with Patent Owner’s expert, Dr. Bower, that as depicted in Figure 1, air intake duct 68 does not extend to the exterior of vehicle 10. *See* PO Resp. 10; Ex. 2033 ¶ 54.

Suzuki describes that axial alignment with the drive pulley’s shaft provides better airflow speed (and, thus, better cooling) than either axial alignment with the drive pulley’s shaft or no alignment at all. *See, e.g.* Ex. 1005 ¶¶ 55-56, claims 1 and 10; Ex. 2033 ¶ 58.

Suzuki discloses that “[i]n some applications, side panels may be provided to at least partially enclose the engine compartment 38.” Ex. 1005

¶ 39. From this disclosure, a person of ordinary skill in the art would have understood that Suzuki discloses two engine compartment configurations, one having no side panels and an alternative having side panels that at least partially enclose that compartment. Suzuki's system operates to cool the CVT in both configurations.

Suzuki's intake duct 68 and pipe 681 are positioned to provide a compact layout in unused space in the engine compartment enabling the size of passenger compartment 55 to be increased. Ex. 1005 ¶ 55.

3) Brown

Brown discloses a "Vehicle Air Intake Scoop" for the vehicle's engine where that scoop is located in a side body panel. Ex. 1006, [54], Abstract, Figs 1, 2. Figure 2 of Brown follows.

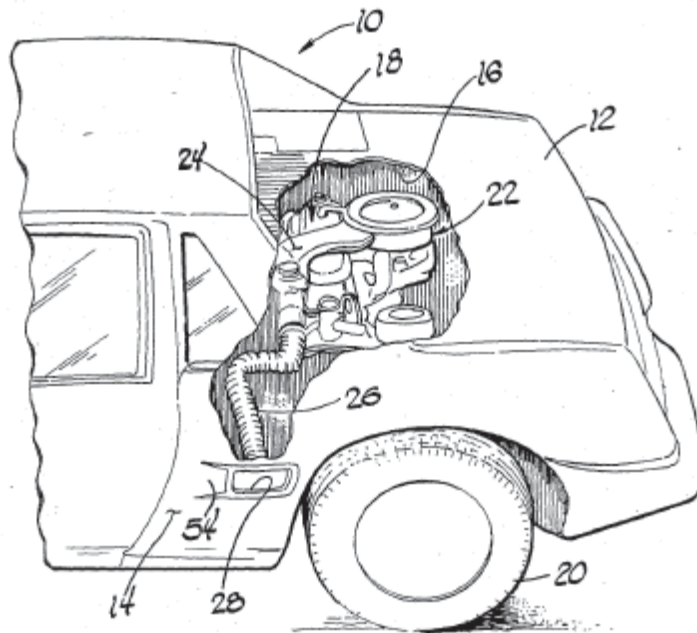


Fig 2

Figure 2 is an enlarged fragmentary view of vehicle 10 depicting engine air intake passage 28 secured to quarter panel 14. *Id.* at 2:5–8, 3:1–15.

c. *Rationale to Combine*

1) *Inquiry*

Before addressing Petitioner’s proposed rationale to combine the teachings of Sundahl with those of Brown and Suzuki, we clarify our inquiry. Petitioner argues that the law does not require that the first reference (Sundahl) have a known problem. Pet. Reply 3–4 (citing *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002–1003 (Fed. Cir. 2016) and *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1362 (Fed. Cir. 2007)).

Unwired Planet and *Pfizer* are distinguishable from the case at hand. In *Unwired Planet*, the petitioner proffered a reason to improve a first reference (Brohoff) based on a benefit provided by a second reference (Galitz). *Unwired Planet*, 841 F.3d at 1003. Likewise, in *Pfizer*, the proposed rationale was not a problem in the reference. *Pfizer*, 480 F.3d at 1362. Here, in contrast, Petitioner proffers that the reason for combining the references is a shortcoming of a first reference (Sundahl).

As the Supreme Court tells us, the reason for combining the references is not required to be found in an explicit teaching, suggestion, or motivation in the prior art. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417–422 (2007). A reason to combine could, for example, arise from “interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art.” *Id.* at 418. Although the reason to combine may arise from sources other than the prior art references, the law does not prohibit a reason to combine being found in

the prior art references.²³ What is required is that “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* Both *Unwired Planet* and *Pfizer* (a case that predates *KSR*) are consistent with these principles.

We do not require Petitioner to find an explicit reason to combine the references in the prior art; however, Petitioner chose to assert that the reason to combine the references was, in part, found in the reference (i.e., that Sundahl had a known inlet blockage/restriction problem and a water ingestion problem). We analyze Petitioner’s proposed evidence, including Sundahl itself, to determine if Petitioner’s reasoning has a sufficient rational underpinning.

Petitioner reasons that a person of ordinary skill would have made the proposed modifications for four reasons: (1) to reduce restriction of air flow to the CVT; (2) to reduce the likelihood of the inlet ingesting incoming rain, snow, or other water during forward movement of the vehicle; (3) to reduce noise and vibration in the operator area; and (4) the application of a known technique to a known device, arranging old elements with each performing the same function it had been known to perform, yielding what would be expected from such an arrangement. Pet. 29–32, 45–47, 49–50. As detailed below, each of Petitioner’s reasons lacks a sufficient rational underpinning.

2) Reducing Restriction of Flow

Petitioner contends that the modification would have reduced the likelihood of objects or occupants blocking or restricting the flow of cooling

²³ See generally Manual of Patent Examining Procedure (“MPEP”) § 2141 (9th ed., rev. 8; Jan. 2018) (stating that a teaching, suggestion, or motivation may be relied upon for a reason to combine).

fresh air into the CVT. Pet. at 29. This reasoning is based on the characterization that Sundahl had a CVT inlet blockage/restriction problem. As detailed above, the evidence of record does not support that characterization. Consequently, Petitioner's reasoning lacks a sufficient rational underpinning.

3) Ingestion of Rain or Water

Petitioner contends that orienting Sundahl's CVT air intake to extend horizontally and face laterally outward, as taught by Suzuki and Brown, would have reduced the likelihood of the inlet ingesting incoming rain, snow, or other water during forward movement of the vehicle. Pet. 31, 47. In support, Dr. Davis opines that a horizontal inlet is less likely to ingest rain or snow than Sundahl's inlet. Ex. 1001 ¶¶ 92–95, 124. A premise of this contention is that Sundahl's intakes are "open to the sky" and susceptible to ingestion of rain or other water during forward movement of the vehicle. See Ex. 2032, 94:23–95:3 (Dr. Davis testifying that Sundahl's CVT inlet is a vertical input more susceptible to rain and snow from the sky than the side); Pet. Reply 7 (referring to Sundahl's inlets as vertical inlets); Ex. 1001 ¶¶ 55, 80; Ex. 1032 ¶¶ 8–10.

In the Preliminary Response, Patent Owner argued that Sundahl does not have the CVT intake exposed upward. Prelim. Resp. 49. In our Institution Decision, we observed that this contention by Patent Owner may be persuasive, but that it was unsupported by any evidence of record. Dec. 14. We now assess this argument in light of the full record.

As detailed above, Petitioner has not shown that Sundahl's inlets are open to the sky. Rather, Sundahl's inlets are covered from above by engine cover 19 and are open towards the front "to collect air passing between

upper seating surfaces 18a and 18b when ATV is driven in the forward direction.” Ex.1004 ¶ 66; Pet. 42. Consequently, Petitioner’s reasoning that the modified position is better than Sundahl’s original position lacks a sufficient rational underpinning.

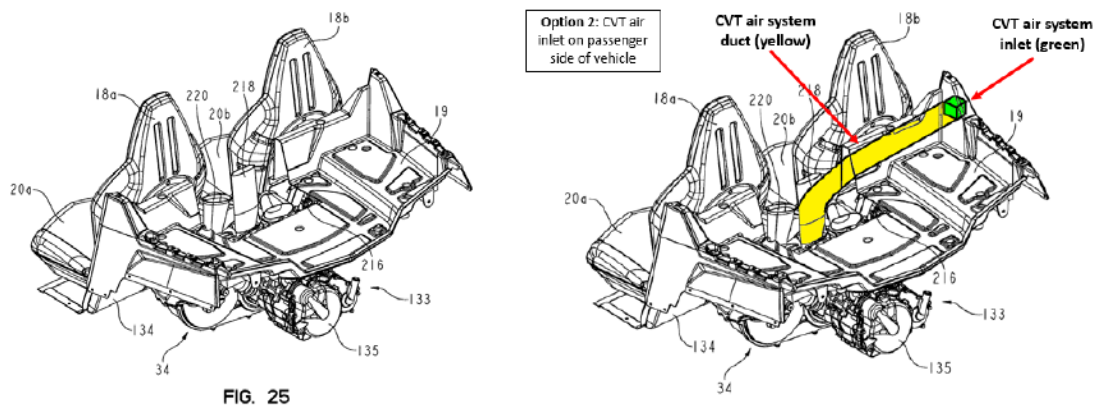
4) Noise and Vibration

Petitioner reasons that a person of ordinary skill would have made the two proposed modifications to reduce noise and vibration in the operator area, resulting in a quieter, more comfortable ride. Pet. 31.

In support of this rationale, Petitioner contends that noise is produced at the CVT inlet from both the noise of CVT operation being carried through the air ducts to the inlet and from air flowing into the inlet. Pet. 31 (citing Ex. 1001 ¶ 93). Dr. Davis echoes the Petition. Ex. 1001 ¶ 93 (citing ¶¶ 44, 55). Dr. Davis also testifies regarding the general rules for engine inlets and opines that these general rules apply to CVT inlets as well. Ex. 1001 ¶¶ 44, 55. One of these general rules, according to Dr. Davis, is that CVT inlets, as sources of noise, are typically located “behind, below, or otherwise away from the passenger seating of the vehicle.” *Id.* ¶ 55.

Petitioner’s reason lacks a sufficient rational underpinning for four reasons.

First, Petitioner has not adequately explained how the modified inlet duct would produce less noise. The modified CVT inlet duct is longer than the unmodified duct. An unmodified version of Sundahl’s system (left) and a depiction of the proposed modification follows (right).



Each of the preceding figures is a version of Sunsdahl's Figure 25, depicting an elevated rear perspective view of the engine and clutch (CVT) cooling components of the side-by-side ATV shown in Figures 1–4. Ex. 1004 ¶ 31. The modified CVT air inlet duct shown in yellow (right) is longer than unmodified CVT cooling intake 218 (left).²⁴ See Pet. 28–29.

Dr. Davis relies on Bouffard in support of the proposition that air inlets are a source of noise and vibration. Ex. 1001 ¶ 44 (citing Ex. 1011, Abstract, 2:55–63, 3:28–32, 6:28–40). One of the portions of Bouffard that Dr. Davis cites discloses that shorter intake ducts are less prone to vibration, helping to avoid sound resonance. See Ex. 1011, 6:28–40. Neither the Petition, nor Dr. Davis, addresses how this disclosure from Bouffard impacts the proposed modification. In other words, Petitioner does not address how Petitioner's own evidence, which states that longer intake ducts increase noise, contradicts Petitioner's assertion that the proposed modification decreases noise.

²⁴ On cross-examination, Dr. Davis testified that the illustrations of the proposed modifications are conceptual and not necessarily the exact configuration that would have been used, but acknowledged that the modified duct was "a bit longer" than the unmodified duct. Ex. 2032, 101:23–102:9, 121:14–123:13.

Our Institution Decision observed that Petitioner's reasoning in favor of a longer intake duct was unpersuasive in the face of evidence that shorter intake ducts are less prone to vibration and sound resonance. Dec. 18 (citing Ex. 1011, 6:28–35). Likewise, Patent Owner pointed out that the proposed modifications would increase rather than decrease noise. PO Resp. 31. Patent Owner also pointed out that Petitioner's expert did not know how much noise emanated from either Sundahl's intake inlet or his own hypothetical intake inlets. PO Resp. 32 (citing Ex. 2032, 114:2–116:23). Faced with these observations, Petitioner's Reply still does not address that a longer duct increases vibration and sound resonance, nor does it meaningfully compare the amount of noise produced by the unmodified inlet to the modified inlet location.

Second, Petitioner did not address other known negative aspects of the modification. Petitioner's own expert, Dr. Davis, opined that longer ducts have the negative characteristics of adding to the volume and weight of the vehicle as well as adding to the suction force required to move air from the inlet to the interior of the CVT. Ex. 1001 ¶ 55. We recognize that the location of a CVT inlet is a tradeoff involving numerous factors, but Petitioner's failure to address the negative aspects of lengthening the CVT inlet (increasing each of the vehicle volume, vehicle weight, and the suction force to move air to the CVT) undermines Petitioner's reasoning.

Third, Sundahl's CVT inlet is already positioned where Petitioner's expert testified that inlets should be positioned to alleviate noise. Specifically, Sundahl's inlets are positioned behind and below the level of the occupants' heads. Ex. 1004, Figs. 1, 25, 26; PO Resp. 30; *see also* Ex. 1001 ¶ 55 (testifying that because inlets are sources of noise, they should

be located “behind, below, or otherwise away from the passenger seating of the vehicle”).

Fourth, Patent Owner contends, with support from its expert, that the proposed modifications would place the inlets closer to the heads of occupants. PO Resp. 33–35; Ex. 2033 ¶ 127 (providing an annotated version of Sundahl’s Figure 26 with lines to indicate distance from the unmodified inlet to the occupant’s head and from the modified inlet to the occupant’s head).²⁵

In the Reply, Petitioner does not address Patent Owner’s contention that the modified inlet is actually closer to the occupant’s head. Consequently, we are persuaded by Patent Owner that the modified location is closer to each occupant’s head than the unmodified location. Dr. Davis’s testimony that inlets should be located “away from the passenger seating” suggests that Petitioner’s modified location, moving the inlet closer to the occupant’s head, would increase rather than decrease the noise to the occupants. *See* Ex 1001 ¶ 55; *see also* ¶ 93 (testifying that a person of ordinary skill would have recognized that locating the inlet “away from the heads of the riders” would reduce effect of noise on the riders); Ex. 2032, 114:8–15 (testifying that greater distance between the CVT intake and passengers makes noise less objectionable).

²⁵ Patent Owner analyzed the three-dimensional distance between the inlet and the occupant’s head on a two-dimensional figure. Specifically, Figure 26 of Sundahl is a rearview (Ex. 1004 ¶ 32), and Patent Owner’s lines (from inlet to occupant head) do not account for the longitudinal distance from the inlet to the occupant’s head (distance into the page). However, this longitudinal distance (third dimension) may be ignored because the longitudinal position of the unmodified inlet and the modified inlet is the about same. *See* proposed modification at Pet. 28–29.

Petitioner's Reply does not cure these shortcomings. Petitioner asserts that Dr. Davis testified that Sundahl's inlet "would have carried noise from the CVT and directed it towards the occupants." Pet. Reply 9 (citing Ex. 1001 ¶ 93; Ex. 1032 ¶ 13). Petitioner's assertion is partially incorrect. In the Declaration submitted with the Petition (Ex. 1001), Dr. Davis made no mention of the direction the CVT inlet was pointed with respect to the occupants. See Ex. 1001 ¶ 93. It is in his Reply Declaration (Ex. 1032) that Dr. Davis first mentions that noise to the occupants is impacted by the direction that the CVT inlet is pointed with respect to those occupants. See Ex. 1032 ¶ 13. It is too late for Petitioner to make this change because Patent Owner has not had an opportunity to comment on this new factual assertion.

Even considering this new assertion, it is not persuasive that the proposed modification would have reduced noise for the occupants. Petitioner's argument and Dr. Davis's opinion are each premised on the characterization that Sundahl's CVT inlet is directed towards the occupants. That characterization does not account for the fact that, as detailed above, Sundahl's CVT inlet is not open to the sky. Rather, Sundahl's CVT inlet is covered from above by engine cover 19 and open towards the front of the vehicle, a direction orthogonal to the CVT inlet. Further, the occupants are longitudinally forward of the CVT inlet, and Petitioner has not addressed the impact of longitudinal distance on noise being directed to the passengers.

For these reasons, Petitioner has not persuaded us that the proposed modifications would reduce the effect of noise on the vehicle occupants.

5) Rationale for One Modification, Not Two

Patent Owner argues, and we agree, that even if any of Petitioner's first three reasons for combining the references sufficiently explain why a

person of ordinary skill would have modified Sundahl in view of Suzuki, those reasons do not explain why a person of ordinary skill would have further modified the Sundahl-Suzuki combination in view of Brown “to extend the CVT inlet all the way to the side body panel.” See PO Resp. 14–16. Specifically, accepting for sake of argument that Sundahl had an intake blockage/restriction problem, modification in view of Suzuki would have placed the inlet so that there is no longer an intake blockage/restriction problem. After modification in view of Suzuki, Petitioner has not explained why there would be reason to further modify the combination in view of Brown “to extend the CVT inlet all the way to the side body panel.” PO Resp. 15. Likewise, the water ingestion and noise and vibration problems would have been resolved by modification in view of Suzuki, leaving no reason to make the additional modification in view of Brown.

6) Known Technique

Petitioner reasons that the proposed modifications were within the level of skill in the art and was the application of a known technique to a known device, and simply arranged old elements with each performing the same function it had been known to perform, yielding what would be expected from such an arrangement. Pet. 31–32; Ex. 1001 ¶¶ 95, 97. Petitioner provides two examples: one, that the modified inlet location helps minimize the problems associated with longer ducts, and two, that the modified inlet location is relatively high on the vehicle, permitting the vehicle to traverse relatively deep water. Pet. 32 (citing Ex. 1001 ¶ 95).

As an initial matter, Petitioner’s assertion is largely a generic statement of the law that does little to tie that law to the proposed

modifications at issue here. Further, for the reasons that follow, each of the examples provided is not persuasive.

Petitioner contends that the modified inlet location minimizes problems associated with longer ducts. Pet. 32. As explained above, the modified location is longer than the original location, and Dr. Davis acknowledged that longer ducts have the negative characteristics of adding to the volume and weight of the vehicle, as well as adding to the suction force required to move air from the inlet to the interior of the CVT. *See* Ex. 1001 ¶ 55. Dr. Davis’s observation that the modified CVT inlet location is “relatively close to the CVT unit” (Ex. 1001 ¶ 95) does not persuasively explain how the negative aspects of lengthening the inlet duct would have been minimized.

Petitioner contends that the modified inlet location permits the vehicle to traverse relatively deep water. Pet. 32. Patent Owner points out, with support from Dr. Bower, that the CVT exhaust and engine inlet are both lower than the modified CVT intake inlet, and for that reason the modified vehicle cannot traverse deeper water than the unmodified version. PO Resp. 14–15, n.2; Ex. 2033 ¶ 131. Further, Petitioner does not explain how the modified location outside the vehicle is less susceptible to ingesting splashing water than Sundahl’s unmodified location along the centerline of the vehicle. *See* Ex. 2033 ¶ 131.

Petitioner’s Reply does not persuade us otherwise.

Petitioner contends that Suzuki praises its lateral inlet duct as compact. Pet. Reply 14 (citing Ex. 1005 ¶¶ 11, 55, 58). Indeed, Suzuki describes a positive aspect of its cooling system as being compact. Ex. 1005 ¶¶ 11, 55, 58. This cuts against, rather than supports, Petitioner because

Petitioner's proposed modifications increase the length of the inlet duct beyond the size of Suzuki's duct (make it less compact).²⁶

Petitioner asserts that Dr. Bower concedes that it was known that tubing could be made of different materials and shapes to accommodate increased length. Pet. Reply 14 (citing Ex. 1031, 92:23–93:5, 94:12–22; Ex. 1032 ¶ 23; Ex. 1001 ¶¶ 89–90; Ex. 1001 ¶ 83). Petitioner's own evidence shows that longer ducts have drawbacks, and Petitioner does not effectively explain how those drawbacks would have been overcome. Petitioner cannot shift that burden to Patent Owner. Similarly, Petitioner contends that Patent Owner's arguments about a side panel potentially ingesting water are overstated. Pet. Reply 14. Here again, it is Petitioner's burden to provide a rationale for the proposed modifications, and we are not persuaded Petitioner has done so.

Consequently, we agree with Patent Owner that Petitioner has not adequately shown that the proposed modifications were the application of known techniques to a known problem. See PO Resp. 14–15, n.2.

d. Conclusion – Claim 1

Petitioner's reasoning that the proposed modification decreases the potential for intake blockage/restriction is premised on the mischaracterization that Sundahl's system is susceptible to blockage/restriction. Petitioner has not shown that Sundahl's system had that problem.

²⁶ As explained above in Section III.B.1.b.2), Suzuki's inlet terminates within the engine compartment and Petitioner's second modification in view of Brown extends the inlet duct so that it extends to the lateral exterior of the vehicle.

Petitioner's reasoning that the proposed modification is less susceptible to ingestion of rain, snow, or other water is based on the mischaracterization that Sundahl's inlets are open to the sky.

Petitioner's reasoning that the proposed modification reduces noise and vibration is not adequately supported by the evidence. Indeed, the longer inlet duct may produce more noise and vibration and may be positioned closer to the heads of the vehicle occupants.

Even if each of Petitioner's first three reasons for combining the references explain why a person of ordinary skill would have modified Sundahl in view of Suzuki, those reasons do not explain why a person of ordinary skill would further modify that combination in view of Brown.

Petitioner's reasoning that the proposed modification is the application of a known technique is conclusory and not adequately supported by the examples given.

In our analysis, we do not require that Petitioner show that the proposed modifications are optimal. Rather, we require that Petitioner weigh the benefits lost and gained against each other. *See Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 (Fed. Cir. 2000). Here, when weighing, Petitioner mischaracterizes the evidence. Further, Petitioner did not adequately explain the impact of negative aspects, such as the increased noise, suction force, volume and weight added by lengthening the inlet duct.

Indeed, when taken as a whole, Petitioner's approach appears to provide several rationales for the proposed modification in the hopes that one would be persuasive. To be sure, Petitioner is certainly entitled to pursue that approach, and not every rationale requires extensive evidentiary support or lengthy explanation. And should any of those rationales be adequately

supported, it would be dispositive. Having said that, we cannot ignore the fact that Petitioner's inability to provide a persuasive rationale, despite pursuing so many different paths, weighs against a finding that the proposed modification would have been made.

In sum, Petitioner's reasons for combining the references lack a sufficient rational underpinning. Consequently, Petitioner has not shown by a preponderance of the evidence that claim 1 would have been obvious over Sunsdahl, Suzuki, and Brown.

2. Claims 6–9

Claims 6–9 depend from independent claim 1. The ground of unpatentability against these claims fails for the same reasons as the ground against claim 1 analyzed above.

C. REMAINING GROUNDS AND CLAIMS

Claims 2–5 each depend, directly or indirectly, from independent claim 1. The grounds of unpatentability against these claims rely on the same combination of Sunsdahl, Suzuki, and Brown as used against independent claim 1, and add an additional prior art reference to address the additional limitations of the dependent claims. *See* Pet. 105–113. Consequently, these grounds of unpatentability suffer from the same shortcomings as that of the ground asserted against independent claim 1 that we analyze above.

The newly instituted ground challenges claims 10–12 and 14–22. These claims all depend, directly or indirectly, from independent claim 1. This ground of unpatentability relies upon the combination of Sunsdahl, Suzuki, and Brown relied upon against independent claim 1, and adds

Ranger for the additional limitations of the dependent claims. *See* Pet. 63–105; *see also* Paper 107, 2 (citing Pet. 63–92 with regard to claim 10). Petitioner’s additional briefing for the newly instituted claims (Papers 107 and 113) does not address the underlying combination of combination of Sundahl, Suzuki, and Brown, and therefore the ground of unpatentability against claims 10–12 and 14–22 suffers from the same shortcomings as that of the ground asserted against independent claim 1 that we analyze above.

IV. CONCLUSION

For the foregoing reasons, we determine that Petitioner has not shown that the challenged claims are unpatentable.

V. ORDER

It is

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–12 and 14–20 of the ’501 patent are unpatentable;

FURTHER ORDERED that Patent Owner’s and Petitioner’s Motions to Seal are granted as described above; and

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

IPR2017-00433
Patent 9,217,501 B2

PETITIONER:

Conrad Gosen
Michael T. Hawkins
Joseph Herriges
John Adkisson
FISH & RICHARDSON P.C.
gosen@fr.com
hawkins@fr.com
herriges@fr.com
adkisson@fr.com

PATENT OWNER:

Dennis C. Bremer
Alan G. Carlson
CARLSON, CASPERS, VANDENBURGH, L
INDQUIST & SCHUMAN, P.A.
dbremer@carlsoncaspers.com
acarlson@carlsoncaspers.com