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Paper No. 26
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BLASTERS, INC,
Petitioner,

v.

WATERBLASTING, LLC,
Patent Owner.

Case IPR2018-00504
Patent 7,255,116 B2

Before JEFFREY W. ABRAHAM, MICHAEL L. WOODS and JOHN R. KENNY, *Administrative Patent Judges.*

KENNY, *Administrative Patent Judge*.

DECISION
Final Written Decision
35 U.S.C. § 318(a)

I. INTRODUCTION

This *inter partes* review, instituted pursuant to 35 U.S.C. § 314, challenges the patentability of claims 1–6 and 10 ("challenged claims") of U.S. Patent No. 7,255,116 B2 (Ex. 1001, "challenged patent," "'116 patent"), owned by Waterblasting, LLC ("Patent Owner"). 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.

For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 1–4 and 10 are unpatentable. Petitioner, however, has not shown that claims 5 and 6 are unpatentable.

A. Procedural Background

Blasters, Inc. ("Petitioner") filed a Petition for *inter partes* review of the challenged claims. Paper 1 ("Pet."). Patent Owner filed a Preliminary Response. Paper 5 ("Prelim. Resp."). We instituted an *inter partes* review of all challenged claims on all asserted grounds. Paper 6 ("Institution Decision," "Inst. Dec."). Patent Owner filed a Patent Owner Response to the Petition (Paper 14, "PO Resp."), to which Petitioner filed a Reply (Paper 17, "Pet. Reply"), to which Patent Owner filed a Sur-Reply (Paper 20, "Sur-Reply").

A final oral hearing was held on March 29, 2019, and a transcript of the hearing is included in the record. Paper 25 ("Hr'g Tr.").

B. Related Proceeding

The parties indicate that the challenged patent is at issue in *Waterblasting, LLC v. Blasters, Inc.*, Case No. 8:17-cv-02660-CEH-MAP (M.D. Fla). Pet. 8; Paper 4, 2.

C. Overview of the Challenged Patent

The challenged patent is directed to high pressure water cleaning devices for highways, runways, parking decks, and other hard surfaces. Ex. 1001, 1:5–7. The patent explains that when paint is used for roadway marking, it penetrates into the pavement so mere surface removal does not sufficiently remove the paint. *Id.* at 1:25–29. According to the patent, paint can be removed by using abrasive wheels or teeth, but these techniques can melt thermoplastic materials, causing equipment to gum up. *Id.* at 1:29–33. The challenged patent discloses, instead, removing paint from a hard surface using a high pressure liquid. *Id.* at 2:23–24.

Figure 1 of the challenged patent is shown below:

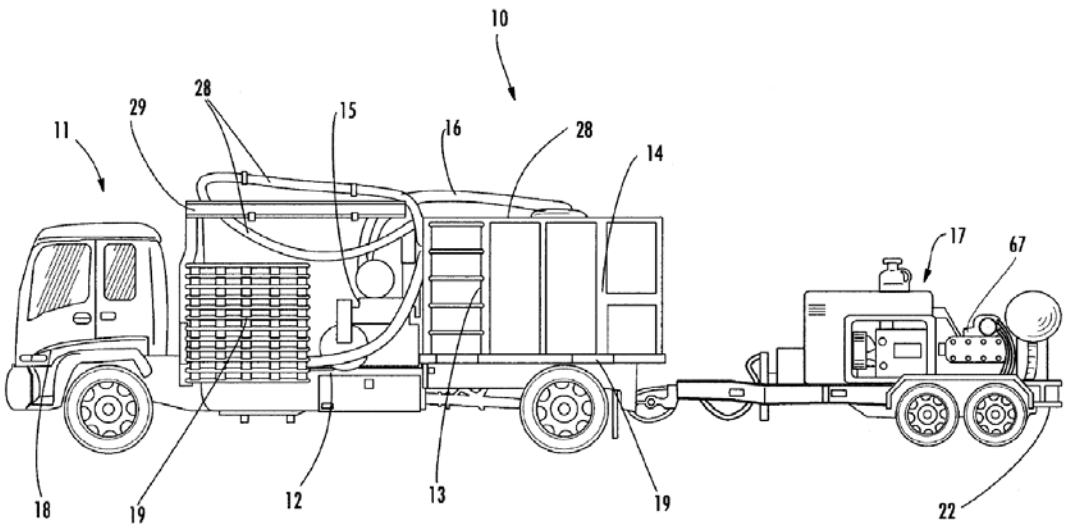


FIG. 1

Figure 1 is a side view of stripe removal system 10 of the challenged patent. Ex. 1001, 3:21–22. Stripe removal system 10 includes truck 11 and trailer 17. *Id.* at 3:33–34. Truck 11 includes swinging boom 29, vacuum hose 28, vacuum pump 15, hose 16, sump 14, liquid reservoir 13, bed 12, ramp 19, and cab-over 18. *Id.* at 3:33–4:10. The vacuum tank is capable of

pumping approximately 1100 cubic feet per minute. *Id.* at 3:46–48. Trailer 17 includes water blasting pump 67, trailer bed 22, and a pump that delivers fluid at a pressure greater than 25,000–40,000 psi (pounds per square inch) and at a rate of 2–15 gallons per minute. *Id.* at 3:57–60, 4:57–61.

Figure 2 of the challenged patent is shown below:

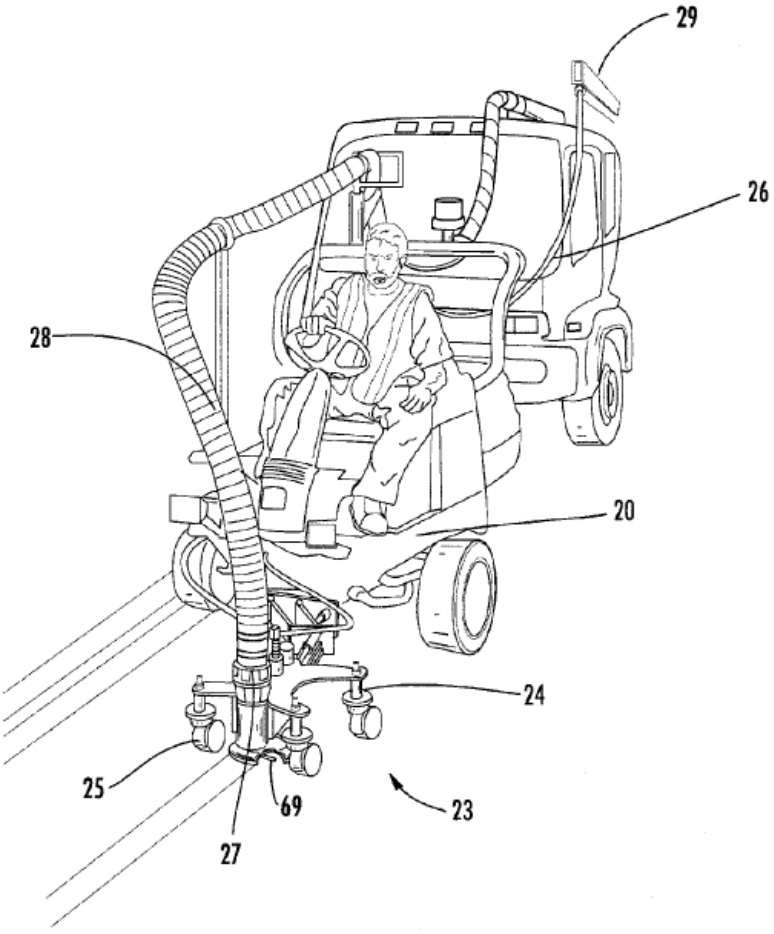


FIG. 2

Figure 2 is a perspective of stripe removal system 10 with blast head 23 deployed. Ex. 1001, 3:21–22. Blast head 23 has one to sixteen high pressure nozzles 69. System 10 includes chassis 24, shroud 27, and castors 25. *Id.* at 3:65–4:10.

D. Illustrative Claim

As indicated above, Petitioner challenges claims 1–6 and 10 of the '116 patent, of which claim 1 is independent and is reproduced below:

> 1. A cleaning system for removing coatings from a hard surface by high pressure liquid comprising in combination
>
> a liquid reservoir connected to a high pressure pump,
>
> said pump connected to a mobile blast head by a high pressure hose,
>
> said blast head having at least one high pressure nozzle for delivering high pressure liquid onto a hard surface,
>
> a waste removal hose connected at one end to said blast head and at the other end to a sump for collection of liquid and coating,
>
> said sump connected to said liquid reservoir,
>
> whereby liquid is pumped through said high pressure hose from said reservoir and exits said high pressure nozzle onto the hard surface for removing coatings therefrom,
>
> said liquid and coatings conveyed through said waste removal hose to said sump via a high power vacuum pump, said coatings collected in said sump,
>
> said liquid reservoir, said sump and said high power vacuum pump being mounted on a mobile frame,
>
> said mobile frame forming an integral part of a truck having a bed portion and a cab portion, said truck being self-propelled,
>
> said mobile blast head being mounted at a distal end of an articulating link, a proximal end of said articulating link secured to a tractor,

said tractor including an engine for propulsion thereof,

wherein said high pressure hose and said waste removal hose extend between said truck and said tractor and

whereby said tractor is utilized to maneuver said blast head.

Id. at 6:35–59.

E. Asserted Prior Art and Declarations

Petitioner asserts grounds of unpatentability based on the following references:[1]

Reference		Issue/Publication Date	Exhibit
Jones	U.S. Patent No. 3,902,219	Sept. 2, 1975	Ex. 1002
Breither	U.S. Patent No. 3,011,206	Dec. 5, 1961	Ex. 1003
Herhold	U.S. Patent No. 6,889,914 B2	May 10, 2005 (filed Jan. 31, 2003)	Ex. 1004
Schrunk	U.S. Patent No. 5,494,393	Feb. 27, 1996	Ex. 1005
NLB	Water Jet Solutions for Removing Pavement Markings and Runway Rubber	Mar. 27, 2004[2]	Ex. 1006
Clemons	U.S. Patent No. 6,381,801 B1	May 7, 2002	Ex. 1008

Petitioner relies on a declaration from Scott Boos (Ex. 1009) and affidavits from Christopher Butler (Exs. 1016, 1021). Patent Owner relies on a declaration from Dr. Randall King. Ex. 2012.

[1] The challenged patent issued from an application that was filed on July 2, 2004. Ex. 1001, [22].

[2] Ex. 1016, 1, 9–15; Ex. 1009 ¶ 53 (citing Ex. 1016, 7–15). (Ex. 1009 ¶ 53 also cites Ex. 1006, 7, but Ex. 1006 does not have a page 7.)

F. Asserted Grounds

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

Ground	Claims Challenged	References
1	1, 2, and 10	Jones, Breither , and NLB
2	3 and 4	Jones, Breither, NLB, and Herhold
3	5 and 6	Jones, Breither, NLB, Herhold, and Schrunk
4	1–4 and 10	Clemons and NLB
5	5 and 6	Clemons, NLB, and Schrunk

G. Real Parties in Interest

Petitioner identifies Blasters, Inc., as its real party in interest. Pet. 8. Patent Owner identifies Waterblasting LLC as its real party in interest. Paper 4, 2.

II. LEVEL OF SKILL IN THE ART AND CLAIM CONSTRUCTION

A. Level of Skill in the Art

In determining the level of ordinary skill in the pertinent art at the time of the invention, various factors may be considered, including the "types of problems encountered in the art; prior art solutions to those problems; rapidity with which innovation are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation and citation omitted). Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovention Toys, LLC v. MGA Entm't, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) ("A less sophisticated

level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.").

Mr. Boos proposes that an ordinarily skilled artisan with respect to the challenged patent would have had (i) four to five years of experience working with surface cleaning devices and systems and/or a degree in mechanical engineering or an equivalent education and (ii) knowledge of known systems, services, and techniques used in the field, such as those described in the challenged patent and the prior art references. Ex. 1009 ¶ 11. Dr. King proposes that an ordinarily skilled artisan with respect to the challenged patent would have at least a bachelor's degree in mechanical engineering and at least two years of experience designing and analyzing very high-pressure pumping and spray equipment. Ex. 2012 ¶ 18. Dr. King further specifies that a mechanical engineering degree would normally be required to have the background necessary to successfully use high water pressure blasting to successfully remove very tenacious coatings from hard surfaces without abrading away the upper layers of the surface itself and also to insure that the system could be operated safely, given the inherent danger involved with operating at these high pressures. *Id.* In addition, Dr. King testifies that extensive experience and technical training might substitute for educational requirements, while advanced degrees might substitute for experience. *Id.*

Both Mr. Boos's and Dr. King's assessments appear consistent with the level of ordinary skill in the art at the time of the invention as reflected in the prior art in the instant proceeding. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Further, neither expert has testified, and neither party has argued, that the difference in the experts' assessments

would affect the analysis of any asserted ground. Under the circumstances, we adopt Dr. King's assessment due to its greater specificity. We, however, determine the differences between the experts' assessments would not affect our analysis; we would reach the same conclusions using either assessment.

B. Law of Claim Construction

In an *inter partes* review where, as here, the Petition was filed prior to November 13, 2018, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b).[3] Under this standard, we presume that a claim term carries its "ordinary and customary meaning," which "is the meaning the term would have to a person of ordinary skill in the art in question" at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc); *see also Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016) ("Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history." (citing *Straight Path IP Grp., Inc. v. Sipnet EU S.R.O.*, 806 F.3d 1356, 1362 (Fed. Cir. 2015))). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir.

[3] A recent amendment to this rule does not apply here because the Petition was filed on January 15, 2018, which is prior to the November 13, 2018 effective amendment date. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340 (Oct. 11, 2018).

1994). Finally, only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g. Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

C. Claim Construction

Petitioner proposes that we construe ten terms recited in the challenged claims. Pet. 13–17. Patent Owner proposes that we construe seven terms. PO Resp. 7–12. We determine that only one term—articulating link—requires construction. We also, however, address Patent Owner's proposed construction for "cleaning system." *Id.* at 7. As we explain below, for the other terms proposed to be construed, the parties' disputes are not material to any issue of patentability addressed in this decision. For many terms, the parties' disputes are material only to alternative arguments advanced by Petitioner that we do not reach in this Decision. For example, as its main argument for each asserted ground, Petitioner asserts that an ordinarily skilled artisan would combine NLB with other asserted references and the combination of NLB and the other references would have rendered the challenged claims obvious.[4]

[4] *See e.g.*, Pet. 27–28 ("[I]t would have been obvious to combine Jones and Breither with NLB to achieve 'ultra-high pressure water' of up to 40,000 psi capable of removing 'coating[s]' from a concrete floor." (citation and emphasis omitted)); 63 ("[I]t would have been obvious to combine Clemons with NLB to achieve 'ultra-high pressure water' of up to 40,000 psi to improve the cleaning system and extend its applications to '[f]loor coating removal.'" (citations omitted)).

Alternatively, for each ground, Petitioner argues that, even if an ordinarily skilled artisan would not have combined NLB with the other asserted references, the other asserted references without NLB would have rendered the challenged claims obvious.[5] In this Decision, we do not need to reach Petitioner's alternative arguments because, as set forth below, we determine that Petitioner has proven that an ordinarily skilled artisan would have combined NLB with the other asserted references. For the remaining terms, we do not need to construe those terms because no party has identified any materiality of the construction of those terms to resolving any patentability dispute between the parties, and we see no such materiality.

1. "articulating link"

Petitioner proposes construing "articulating link" as "a connecting structure that connects two parts in such a way as to permit relative movement." Pet. 17 (citing Ex. 1009 ¶ 33). Patent Owner proposes construing the term as "a structure that mounts the blast head to the tractor and which allows the blast head to have least two translational degrees of freedom and at least one rotational degree of freedom." PO Resp. 12 (citing Ex. 2012 ¶¶ 40–44).

[5] *See e.g.*, Pet. 27 ("Jones discloses a 'pressurized cleaning medium' and a 'pressure booster pump [] which build[s] the pressure of the water to approximately 200 pounds per square inch,' which is more than thirteen times greater than the normal atmospheric pressure." (citations omitted)), 63 ("Clemons discloses that 'pressurized water loosens solid debris and other contaminants from [the] surface' and that desirable results were obtained using a high-pressure water at 4,000 psi." (citation omitted)); *see also* Pet. 13 (containing the Petition's proposed construction for "high pressure").

To support its proposed construction for "articulating link," Petitioner relies on a technical dictionary's definition of "articulating," a general dictionary's definition of "link," and the testimony of Mr. Boos. Pet. 17 (citing Ex. 1009 ¶ 33; Ex. 1011[6]; Ex. 1012); Pet. Reply 8–9 (citing Ex. 1009 ¶ 33; Ex. 1012; Ex. 1015). Citing the technical dictionary, Petitioner argues that the technical definition of "articulation" prior to the filing of the challenged patent was "[t]he connection of two parts in such a way (usually by a pin joint) as to permit relative movement." Pet. Reply 8 (quoting Ex. 1015); *see also* Ex. 1009 ¶ 33. Citing the general dictionary, Petitioner argues that the definition of the term "link" in 2004 was "a connecting structure." Pet. Reply 8–9 (quoting Ex. 1012); *see also* Ex. 1009 ¶ 33. Citing Mr. Boos's testimony, Petitioner argues that, therefore, "articulating link" should be construed as "a connecting structure that connects two parts in such a way as to permit relative movement." Pet. Reply 9; Ex. 1009 ¶ 9.

Patent Owner relies on the testimony of Dr. King to support its proposed construction. PO Resp. 12 (citing Ex. 2012 ¶¶ 40–44). Dr. King testifies that the specification of the challenged patent ("Specification") describes that the disclosed articulating link permits horizontal movement of the blast head, left and right (Ex. 2012 ¶ 40). Dr. King cites the following passage (*id.*):

> As shown in FIGS. 3-5, the blast head 23 is connected to the tractor 20 by an articulated link 31 which is capable of

[6] The citation of Ex. 1011 appears to be a typographical error because Exhibit 1011 is an excerpt from a Merriam Webster that defines the term "sump." Exhibit 1015 appears to be the intended citation.

> horizontal movement, as shown in FIGS. 3 and 4, and vertical movement, as shown in FIG. 5.

Ex. 1001, 4:11–14.[7]

Dr. King further testifies that the Specification also describes the articulated link as permitting vertical movement of the blast head, up and down (Ex. 2012 ¶ 41), citing the following passage:

> As the piston 51 moves, the distance between the [surface] to be cleaned and the blast head 23 changes. The vertical movement permits elevation changes to accommodate the contours of the surface.

Ex. 1001, 4:35–38.

Further, Dr. King testifies that the articulating link in the Specification also allows the blast head to be "raised to the vertical position and then manually flipped up and back reducing the overall length to permit the tractor to be stowed on a truck bed sideways consuming a space less than 8'6" for highway travel." Ex. 2012 ¶ 42 (quoting Ex. 1001, 4:38–42).

Dr. King testifies that, therefore, the articulating link described in the challenged patent allows the blast head to move with three degrees of freedom: horizontal translation (left and right), vertical translation (up and down), and vertical rotation (flipped up and back). *Id.* ¶ 43. Dr. King

[7] Dr. King illustrates the movements described in the patent by reference to photos he indicates are from a brochure produced by Waterblasting, LLC in January 2004. Ex. 2012 ¶¶ 40–42. Dr. King appears to use these photos reprinted at paragraphs 40–42 of Exhibit 2012 solely for demonstrative purposes, and we consider them solely for that purpose. To the extent they were intended to be used as substantive evidence for claim construction, Dr. King does not provide any cites to any exhibit containing this brochure nor does he cite any exhibit or declaration establishing the authenticity or date of such a brochure. *Id.* Accordingly, we would not accord them any weight for any purpose other than as demonstrative evidence.

concludes that an ordinarily skilled artisan would have understood an "articulating link" to be a structure that mounts the blast head to the tractor that allows the blast head to have least two translational degrees of freedom and at least one rotational degree of freedom. *Id.* ¶ 44.

Each party argues that the other party's proposed construction is unreasonable. Petitioner argues that Patent Owner relies on the Specification's disclosure of exemplary movements for an articulating link to unreasonably narrow its proposed construction. Pet. Reply 9. Petitioner asserts that the Specification does not provide a limiting definition for articulating link and does not mandate that all articulating links enable all exemplary movements the Specification discloses. *Id.*

Patent Owner argues that Petitioner's proposed construction is overly broad. Sur-Reply 10. Patent Owner asserts that the term "articulating link" has no inherent meaning to an ordinarily skilled artisan as evidenced by Petitioner's use of separate dictionary definitions for "articulating" and "link." *Id.* at 10–11. Patent Owner further argues that Petitioner's proposed construction would be more properly associated with a claim construction of pivotably coupled, which is different from an articulating link. *Id.* at 10. Further, Patent Owner argues that claim 1[8] specifies that the "mobile blast head is mounted at the distal end of an articulating link," and "a proximal end of said articulating link [is] secured to a tractor." *Id.* Patent Owner

[8] In making this argument, Patent Owner refers to "[t]he claim," rather than claim 1. Sur-Reply 10. It is clear from context, however, that Patent Owner is referring to claim 1 because Patent Owner cites to column 6, lines 53–55 of the challenged patent. *Id.*

argues that this claim language makes clear that an articulating link is a specific structure being claimed. *Id.* at 10–11.

In addition, Patent Owner argues that because the term "articulating link" is not readily known to an ordinarily skilled artisan, an ordinarily skilled artisan would have to look to the Specification to determine what an articulating link is. Sur-Reply 11. Patent Owner argues that an articulating link is more than a structure that allows an operator to position the mobile blast head. *Id.* According to Patent Owner, instead, an articulating link is the structure that allows a tractor to be stored in a compact configuration, which Patent Owner argues Petitioner has admitted. *Id.* Patent Owner asserts that Mr. Boos admits that the claimed articulating link must be able to move in the horizontal and vertical planes. *Id.* (citing Ex. 1009 ¶ 117). Further, Patent Owner argues that Mr. Boos admits that the articulating link allows for the blast to be flipped up and back. *Id.* (citing Ex. 1009 ¶¶ 134–153). Patent Owner further cites Dr. King's testimony that the articulating link allows for the tractor to have a width of less than 8'6". *Id.*

After reviewing the parties' arguments and evidence, we adopt Petitioner's proposed construction for "articulating link." In this proceeding, we construe a claim term to have its broadest reasonable construction. Petitioner's proposed construction, which is broader than Patent Owner's proposal, is reasonable in light of the Specification. The only non-testimonial evidence in the record for the ordinary meanings of the terms "articulating" and "link" are the dictionary definitions provided by Petitioner (Ex. 1012, 1015), and those dictionary definitions support Petitioner's proposed construction. The 1999 edition of the Chambers Dictionary of Science and Technology provides an engineering definition for

"articulation," which is "[t]he connection of two parts in such a way (usually by a pin joint) as to permit relative movement." Ex. 1015. The 2004 edition of the Merriam-Webster Dictionary defines "link" as "a connecting structure." Ex. 1012. Mr. Boos testifies, and we agree, that these definitions are evidence that an ordinarily skilled artisan would have understood the ordinary meaning of "articulating link" to be "a connecting structure that connects two parts in such a way as to permit relative movement." Ex. 1009 ¶ 9. Further, Petitioner's proposed construction is consistent with the disclosure of an articulating link in the Specification, which describes articulating link 31 as connecting blast head 23 and tractor 20, and permitting relative movement between those parts. Ex. 1001, 4:11–14 ("horizontal movement" and "vertical movement").

In addition, we determine that Patent Owner's proposed construction is not a reasonable construction in light of the Specification. Neither Patent Owner nor Dr. King directs us to any portion of the Specification that expressly defines the term "articulating link." Instead, the cited portions of the Specification describe what one exemplary articulating link, link 31, does. For example, a cited portion of the Specification describes that articulating link 31 is capable of horizontal and vertical movement and has a rotatable connection with arms 37, 38, 44, and 45. Ex. 1001, 4:11–43 (cited by Ex. 2012 ¶ 40). Nowhere does the Specification, however, indicate that all articulating links must have such a capacity and such a connection. *See id.* Instead, the Specification merely discloses that this particular exemplary articulating link has these features. *Id.* In the absence of an explicit or implicit definition, we cannot read limitations from the Specification into the claims. *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed.

Cir. 1998) ("[L]imitations from the specification are not to be read into the claims.").

We also disagree with Patent Owner's argument that because Petitioner relied on separate definitions for "articulation" and "link" to support its proposed construction, the term "articulating link" must not be readily known to an ordinarily skilled artisan. Sur-Reply 11. Patent Owner relies solely on attorney argument to support this assertion, which we do not find persuasive. *Id.* Further, Patent Owner has given us no reason to believe that the cited Chambers Dictionary attempted to expressly define all two-word terms that include "articulating," rather than, for example, choosing to define "articulating" and letting the reader determine the meaning for two-word terms with "articulating" by considering both the definition for "articulating" and the definition for the additional word (e.g., "link"). We also disagree with Patent Owner's argument that Mr. Boos admits that the claimed articulating link must be able to move in the horizontal and vertical planes or that the claimed articulating link must allow for a blast head to be flipped up and back. Sur-Reply 11. In the testimony cited by Patent Owner, Mr. Boos testifies about the purported capabilities of a particular structure he opines is an articulating link. Ex. 1009 ¶¶ 117, 134–153. In that cited testimony, Mr. Boos does not define the term "articulating link." *Id.* To the contrary, the definition Mr. Boos provides for the term is Petitioner's proposed construction. *Id.* ¶ 9.

Accordingly, in light of the evidence of record, we construe "articulating link" as "a connecting structure that connects two parts in such a way as to permit relative movement."

2. "Cleaning System"

Patent Owner proposes construing the "cleaning system" in the preamble of claim 1 to be "a high velocity water blasting system." PO Resp. 7–8. Patent Owner relies exclusively on the testimony of Dr. King to support this proposed construction. *Id.* (citing Ex. 2012 ¶¶ 20–21). Dr. King does not actually testify that the term "cleaning system" means a "high velocity water blasting system," but states that the recited cleaning system is not the same as more commonly encountered cleaning systems. *Id.* ¶¶ 20–23. In that regard, Dr. King testifies that the Specification describes using high-velocity jets in its cleaning system to remove coatings. Ex. 2012 ¶ 21. Dr. King also describes ideal characteristics of the claimed cleaning system. *Id.* ¶ 23 ("ideally removes . . ."). Petitioner argues that Patent Owner's proposed construction is too narrow. Pet. Reply 27–28.

We agree with Petitioner. None of the passages cited in the Specification define the term "cleaning system" to be a high velocity water blasting system. To the contrary, the Specification states the disclosed invention relates to the field of "high pressure water cleaning devices." Ex. 1001, 1:5–7. Further, the fact that the Specification specifies that its disclosed cleaning devices are high pressure water cleaning devices strongly suggests that the term "cleaning" by itself is not limited to high pressure cleaning applications. *Id.* Confirming this fact, the Specification also uses the term "cleaning" to refer to applications that are not disclosed as involving high velocity blasting. *Id.* at 4:55–57 ("The liquid reservoir has a hatch 60 for inspecting and *cleaning* the reservoir with approximately 600-1500 gallons of liquid.") (emphasis added); 5:19–21 ("A permanent filter material can also be utilized which requires *cleaning* after each use but does

not waste a filter bag each time it is dumped.") (emphasis added). Therefore, we do not agree with Patent Owner's proposed construction for "cleaning system."

We do not need to provide a different construction because Patent Owner does not dispute that NLB discloses a cleaning system. Therefore, any dispute between the parties that could exist regarding the meaning of the term "cleaning system" is not material to any patentability issue we need to decide.

3. Disputes that Concern Only Petitioner's Alternative Arguments

The parties propose differing constructions for the terms "hard surface," "high pressure," "blast head," "coatings," and "high power vacuum pump." *Compare* Pet. 13–17, *with* PO Resp. 7–9. The differences in the parties' constructions for these terms are material only to Petitioner's alternative arguments that the asserted references without NLB would disclose the recited "hard surface," "high pressure," "blast head," "coatings," and "high power vacuum pump." Because we do not need to address those alternative arguments in this Decision, we do not need to construe these terms, as we explain in more detail below.

First, Petitioner proposes construing "hard surface," recited in claims 1 and 4, as "any surface having rigidity sufficient to support the weight of a vehicle carrying the blast head." Pet. 13. Patent Owner proposes construing the term as "the surface of a material that is hard enough to withstand high-pressure water blasting without disintegrating, for instance paving material in common use for road, parking lot, and airport runway surfaces such as asphalt or concrete." PO Resp. 8–9. The differences between these proposed claim constructions are material only to Petitioner's alternative

arguments that the asserted references without NLB would disclose a hard surface. Under both parties' constructions, NLB's roads, concrete, and asphalt are "hard surfaces," which neither party has disputed. Ex. 1006, 2. Therefore, we do not need to construe "hard surface."

Second, Petitioner proposes construing "high pressure," recited in claim 1, as "a pressure greater than 2,000 psi." Pet. Reply 7–8. Patent Owner proposes construing "high pressure" as "greater than 25,000 psi." PO Resp. 9–10. This claim construction dispute is material only to Petitioner's alternative arguments that the asserted references without NLB would disclose a high pressure. Both parties' proposed constructions encompass NLB's 40,000 psi, and neither party disputes that 40,000 psi is a high pressure. Ex. 1006, 2. Accordingly, we do not need to construe "high pressure."

Third, Petitioner proposes construing "blast head," recited in claims 1, 3, and 5, as "a mechanical component having one or more nozzles for ejecting a substance onto a surface." Pet. 14. Patent Owner proposes construing "blast head" as "a mechanical component having one or more high pressure nozzles for delivering high pressure fluid onto a surface." PO Resp. 11. This dispute is material only to Petitioner's alternative arguments that the asserted references without NLB would disclose a blast head. Both parties' proposed constructions encompass NLB's nozzle assembly that has up to 16 nozzles that deliver water at a pressure of up to 40,000 psi (Ex. 1006, 2, 4), and neither party has disputed that NLB's nozzle assembly is a blast head. Therefore, we do not need to construe "blast head."

Fourth, Petitioner proposes construing "coatings," recited in claim 1, as "a layer of any substance spread over a surface." Pet. 15–16. Patent

Owner proposes construing "coatings" as "a layer of durable material applied and strongly adhered to a surface." PO Resp. 8. This dispute is material only to Petitioner's alternative arguments that the asserted references without NLB would disclose "coatings." Both parties' proposed constructions encompass NLB's "coatings" (Ex. 1006, 2, 4), and neither party has disputed that NLB's coatings are the recited coatings. Therefore, we do not need to construe "coatings."

4. Proposed Constructions that Are Not Material to Any Patentability Issue

Petitioner proposes construing "connected to," recited in claims 1–3 and 6, as "directly or indirectly joined or linked together." Pet. 15. Patent Owner proposes construing "connected to" as "directly joined or linked together." PO Resp. 12. Neither party, however, demonstrates any materiality of this dispute to any issue of patentability, and we see none. Patent Owner has not disputed that the asserted prior art satisfies the "connected to" limitations in claims 1–3. PO Resp. 13–23. Accordingly, we do not need to construe "connected to."

Petitioner also proposes constructions for "high power vacuum pump," "sump," "mobile frame," and "controlled movement." Pet. 15–17. For these terms, Patent Owner does not propose any constructions and does not oppose Petitioner's proposed constructions. PO Resp. 7–12. Neither party, however, has identified any materiality of the construction of any of these terms to any issue of patentability, and we see none. Patent Owner has not disputed that the asserted prior art discloses the recited high power vacuum pump, the recited sump, the recited mobile frame, or the recited controlled movement. PO Resp. 13–23. Accordingly, we do not need to construe these terms.

III. CHALLENGES TO EXPERT TESTIMONY

Both parties argue that we should discount the testimony of the opposing party's expert for differing reasons. Neither party, however, requests that we strike the testimony of the other party's expert.

A. Patent Owner's Challenges to Mr. Boos's Testimony

Patent Owner makes several challenges regarding Mr. Boos's testimony. First, Patent Owner argues that Mr. Boos is not an independent technical expert. PO Resp. 5. Patent Owner notes that Mr. Boos is the President and CEO of Petitioner and, as of the last disclosed accounting, owned more than forty percent of Petitioner's stock. PO Resp. 5 (citing Ex. 1023[9], 100); *see also* Ex. 1023, 4, 99–100. As a result, Patent Owner argues that, under *Ethicon, Inc. v. U.S. Surgical Corp*.,135 F.3d 1456 (Fed. Cir. 1998), we should discount Mr. Boos's testimony. PO Resp. 5.

Second, Patent Owner argues that we should discount Mr. Boos's testimony because Mr. Boos admitted that the technical contributions in his declarations were a collaborative effort between himself and his attorneys. PO Resp. 6 (citing Ex. 1023, 17–18).

Finally, Patent Owner asserts that we should discount Mr. Boos's testimony because Mr. Boos, in his declarations and during his deposition, was unable to articulate a rationale as to why an ordinarily skilled artisan would have modified the asserted references to achieve the claimed invention. *Id.* To support this assertion, Patent Owner argues that during

[9] Patent Owner cites "Waterblasting Ex 20??, Cross Examination of Scott F. Boos," but the actual exhibit being cited appears to be to the deposition transcript marked as Exhibit 1023. PO Resp. 6. Therefore, for this and other cites to Mr. Boos's testimony, we will interpret "Ex 2000?" to be Exhibit 1023.

cross-examination Mr. Boos merely provided statements like: "And my motivation was to basically make the best system by combining the best components that are commonly known on the market and integrate them together to have the best system." PO Resp. 6–7 (quoting Ex. 1023, 162:14–17). Another statement quoted by Patent Owner is: "The motivation would be to ultimately yield the best system." *Id.* at 7 (quoting Ex. 1023, 231:17–25). Patent Owner further argues that during redirect Mr. Boos could not articulate a rationale why an ordinarily skilled artisan would have been motivated to combine the cited references. *Id.* (citing Ex. 1023, 240–248).

In response, Petitioner argues that Patent Owner has not shown that Mr. Boos is unable to provide objective testimony because of his relationship with Petitioner. Pet. Reply 10. Petitioner also argues that Mr. Boos's declaration provides motivations to modify the asserted prior art to reach the claimed invention. *Id.* at 10–11.

After evaluating the parties' arguments and evidence, we agree with Patent Owner that Mr. Boos is an interested witness because of his positions with and his equity stake in Petitioner, and in evaluating his testimony, we consider his status as an interested witness in determining the probative weight of his opinions. For example, when Mr. Boos's testimony is not sufficiently corroborated by objective evidence, we attribute little or no weight to his testimony due to that interest. When Mr. Boos's testimony is sufficiently corroborated by objective evidence, however, we do not so discount his testimony.

We do not agree with Petitioner's suggestion that Patent Owner had to prove that Mr. Boos's interest influenced his testimony for us to take into account that interest. Patent Owner established Mr. Boos's interest.

Therefore, we consider that interest when evaluating Mr. Boos's testimony. *Ethicon*, 135 F.3d at 1465.

We are not persuaded by Patent Owner's other arguments for discounting Mr. Boos's testimony. First, we do not read the testimony of Mr. Boos cited by Patent Owner as demonstrating that Petitioner's attorneys, rather than Mr. Boos, were responsible for the technical opinions provided in his declarations. Ex. 1023, 16:10–18:3. Mr. Boos describes the preparation of his declaration as a collaboration with Petitioner's attorneys. *Id.* Mr. Boos clarified that Petitioner's attorneys helped with the legal parts of the declarations, but that Mr. Boos wrote the technical conclusions in his declaration. *Id.* at 240:24–241:23. Second, Mr. Boos articulated a motivation for combining references. *See, e.g.*, Ex. 1009 ¶¶ 142–147.

B. Petitioner's Challenge to Dr. King's Testimony

Petitioner argues that we should discount Dr. King's testimony for several reasons. First, Petitioner argues that Dr. King lacks personal experience with systems that remove coatings from surfaces. Pet. Reply 13–14 (citing Ex. 1018, 23:1–24:7). Second, Petitioner asserts that some of Dr. King's testimony is based on information that Dr. King recently received from one of Patent Owner's employees. *Id.* at 14 (citing Ex. 1018, 40:17–41:6). Third, Petitioner argues that Dr. King testified that his interpretation of at least some aspects of the cleaning system claimed in the challenged patent was based on the information pertaining to the cleaning systems currently produced by Patent Owner. *Id.* (citing Ex. 1018, 40:19-25). Finally, Petitioner asserts that Dr. King's cross-examination testimony contradicts his declaration. *Id.* at 12.

Patent Owner argues that Dr. King satisfies Mr. Boos's definition of an ordinarily skilled artisan and has pertinent experience. Sur-Reply 6–7. Patent Owner also argues that Dr. King's cross-examination testimony is consistent with his declaration testimony. *Id.* at 7.

We are not persuaded by Petitioner that we should discount the testimony of Dr. King for any of the above reasons. Petitioner does not explain why personal experience with systems that remove coatings from surfaces is necessary to provide expert testimony in this proceeding. As Patent Owner notes, Petitioner's own definition of an ordinarily skilled artisan does not require such experience. Further, although in this Decision we do not credit all of the testimony from Dr. King that Petitioner cites, we do not find any of that testimony undermines Dr. King's overall credibility. And Petitioner has not set forth any persuasive reason why it would.

IV. ASSERTED OBVIOUSNESS

A. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness,

i.e., secondary considerations.[10] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). "To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Claims 1–4 and 10

As set forth below, we determine that Petitioner has proven that the combination of Clemons and NLB would have rendered claims 1–4 and 10 obvious. Therefore, we do not need to address and do not address Petitioner's other challenges to those claims (i.e., the asserted obviousness of claims 1, 2, and 10 over Jones, Breither, and NLB and the asserted obviousness of claims 3 and 4 over Jones, Breither, NLB, and Herhold).

1. Clemons

Clemons discloses a cleaning system for removing debris from a hard surface, such as a runway or a street. Ex. 1008, Abstr., 1:54–59. The system includes a cleaning head mounted onto the front of a self-propelled vehicle via a pivoting arm and a vacuum reclamation system for recovering the spent liquid and debris. *Id.* at Abstr., 3:36–38. Both the liquid delivery system and the vacuum recovery system are mounted on the vehicle frame and are fluidly coupled to the cleaning head. *Id.* at 4:46–48.

Figure 1 of Clemons is reproduced below:

[10] Patent Owner does not contend in its Preliminary Response that such secondary considerations are present.

FIG. 1

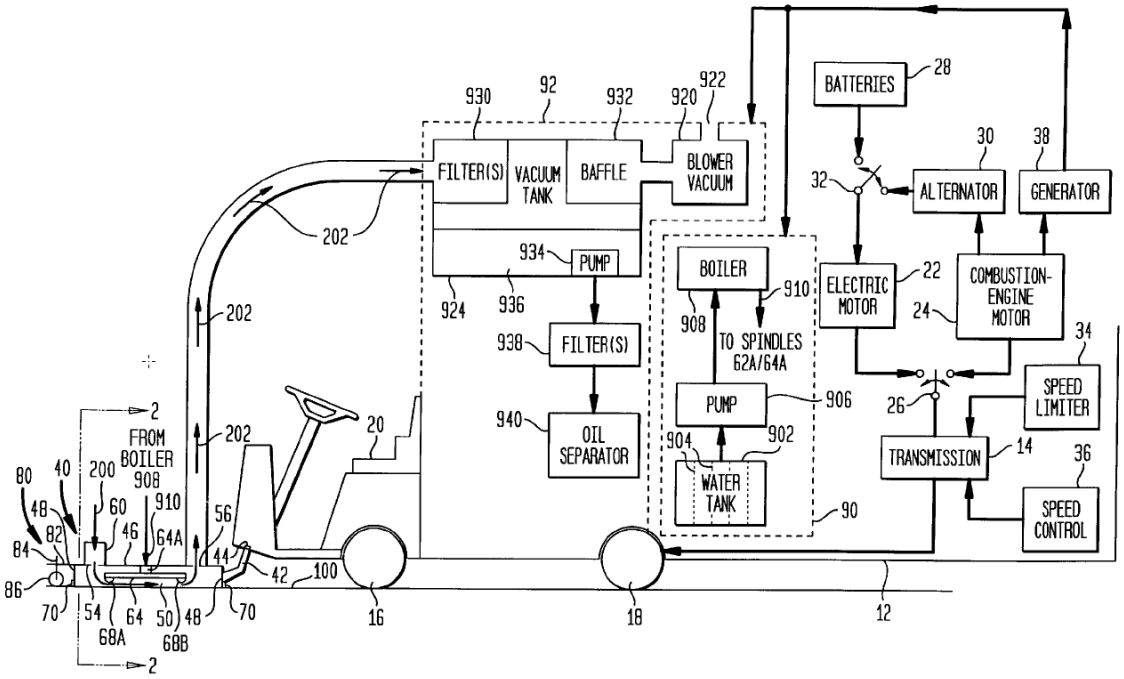


Figure 1 is a side schematic view of self-propelled brushless surface cleaner 10. Ex. 1008, 2:43–45, 2:64–67. Surface cleaner 10 is designed to clean runways, streets, sidewalks, and parking surfaces. *Id.* at 2:67–3:4. Clemons discloses mounting cleaning head 40 to the front surface of cleaner 10 by arm 42, which is pivotally attached to frame 12 at pivot point 44. *Id.* at 3:36–38. Arm 42 can be pivoted to raise or lower cleaning head 40 and to set a forward to rear pitch angle of cleaning head 40 to surface 100. *Id.* at 3:37–41. Liquid delivery system 90 includes large water storage tank 902 and high pressure pump 906. *Id.* at 4:55–60. Vacuum recycling system 92 includes vacuum 920 and vacuum tank 924. *Id.* at 5:3–6. Water and loosened debris and contaminants are drawn into hose 942 and delivered to vacuum tank 924.

2. NLB

NLB is a brochure that describes two water jetting systems that deliver "ultra-high pressure" water (up to 40,000 psi) to remove pavement markings. Ex. 1006, 1–2. NLB explains that the StarJet system is designed for long-line jobs, whereas the StripeJet system is compact and is designed for short-line jobs, like parking decks and intersections. *Id.* NLB notes advantages of water jetting versus grinding to remove pavement markings. *Id.*

An image of the tractor for the StripeJet system is shown below:

Ex. 1006, 4.

The above image depicts the StripeJet vehicle and nozzle assembly. Ex. 1006, 4. The nozzle assembly has a rotating seal with up to 16 nozzles. *Id.*

3. Asserted Obviousness of Claim 1 over Clemons and NLB

The parties raise three disputes regarding whether Petitioner has proven that the combination of Clemons and NLB would have rendered claim 1 obvious. In particular, the parties dispute whether Petitioner has

proven that (i) an ordinarily skilled artisan would have combined Clemons and NLB, (ii) Clemons discloses a cleaning system, and (iii) the combination of NLB and Clemons discloses the recited articulating link. PO Resp. 21–22; Reply Br. 27–31. We address these disputed issues first. Then, we address Petitioner's proof regarding the other limitations of claim 1.

a. Rationale for Combining Clemons and NLB

Petitioner argues that Clemons and NLB disclose systems that employ pressurized water to remove coatings from a hard surface and utilize a vacuum recovery system to remove spent liquid and dislodged coatings. Pet. 59; Ex. 1008, Abstr, 1:60–63; Ex. 1006, 2.

According to Petitioner, one shortcoming of the cleaning system disclosed in Clemons is the inability of its large vehicle to efficiently clean areas with limited access or areas that need a vehicle with a tight turning radius. Pet. 59; Ex. 1009 ¶ 143. Petitioner argues an ordinarily skilled artisan would have understood that the cleaning system of Clemons could be improved by including a secondary "compact and maneuverable" utility vehicle, such as the StripeJet tractor disclosed in NLB, which is specifically designed to clean "areas with limited access (e.g., parking lots, garages, intersections)." Pet. 59–60; Ex. 1006, 4–5; Ex. 1009 ¶¶ 143–144.

According to Petitioner, NLB discloses that the StripeJet system has a high-pressure nozzle assembly and a vacuum recovery system. Pet. 60; Ex. 1006, 4. And Petitioner argues NLB depicts the StripeJet system as having a vacuum hose and a high-pressure water supply hose. Pet. 60; Ex. 1009 ¶ 143. Further, Petitioner asserts one end of each hose is coupled to the blast head, while the other end is shown as free. Pet. 60; Ex. 1006, 4; Ex. 1009 ¶ 143. According to Petitioner, the free end of the vacuum hose

must be connected to a vacuum tank, and the free end of the high-pressure water hose must be connected to a high-pressure water pump to achieve a complete, functioning cleaning system. Pet. 60; Ex. 1006, 2; Ex.1009 ¶ 143.

Thus, according to Petitioner, the StripeJet of NLB readily avails itself for being combined with the cleaning system disclosed in Clemons, which teaches a truck carrying a vacuum tank coupled to a vacuum pump and a water tank coupled to a high-pressure pump. Pet. 61; Ex. 1008, Fig. 1. Citing the testimony of Mr. Boos, Petitioner further asserts that combining these two cleaning systems would have been within the level of ordinary skill in the art. Pet. 61; Ex.1009 ¶¶ 144–146. Petitioner explains that, in this combination, the free ends of the water and vacuum hoses of StripeJet system disclosed in NLB are coupled to Clemons's water pump and vacuum tank, respectively, thereby tethering the tractor of NLB to the truck of Clemons. Pet. 61; Ex. 1009 ¶ 145.

Petitioner argues this improved system of Clemons combined with NLB would remain self-contained and operable by a single person, thereby meeting key objectives of Clemons and NLB. Pet. 62; Ex. 1009 ¶ 142. According to Petitioner, an ordinarily skilled artisan would have been motivated to further improve the cleaning system of Clemons in view of NLB by replacing the vacuum pump, the water pump, the water supply hose, and the spray nozzles of Clemons with the high-power, 1,000 CFM vacuum pump and "ultra-high pressure" water pump, water supply hose, and spray nozzles of NLB, which are specifically designed for pressures of up to 40,000 psi. Pet. 62–63; Ex. 1006, 2, 4; Ex. 1009 ¶ 147. Petitioner explains these additional improvements would extend the capabilities of the cleaning

system to a wider array of applications including "[f]loor coating removal." Pet. 63; Ex. 1005, 4; Ex. 1009 ¶ 147.

Patent Owner argues that Clemons discloses a self-propelled brushless surface cleaner, which is a self-contained unit and which sprays hot, pressurized water onto a surface to loosen dirt, rubber, oil, grease, etc. PO Resp. 21 (citing Ex. 1008, 1:12–15). Patent Owner asserts that Clemons does not have a "cleaning system," that is, "a system for removing durable coatings which are tightly bonded to a hard surface by abrading away the hard surface by impacting it with high velocity water." *Id.* at 22 (citing Ex. 2012 ¶ 99).

Patent Owner further argues that an ordinarily skilled artisan would not look to Clemons for concepts to combine with NLB to remove "durable coatings which are tightly bonded to a hard surface by abrading away the hard surface by impacting it with high velocity water." PO Resp. 22 (citing Ex. 2012 ¶ 100). Patent Owner also asserts that Mr. Boos does not explicitly explain the rationale as to why an ordinarily skilled artisan would have combined Clemons and NLB. *Id.* at 22 (citing Ex. 1023,[11] 235–246).

Petitioner responds that both Clemons and NLB systems employ pressurized water to remove coatings from a hard surface and utilize a vacuum recovery system to remove spent liquid and dislodged coatings. Pet. Reply 29 (citing Ex. 1008, Abstr.; Ex. 1006, 2). Petitioner argues that an ordinarily skilled artisan would have understood that the cleaning system

[11] Patent Owner cites to Exhibit 2019, but no Exhibit 2019 has been filed. PO Resp. 22. Because Patent Owner indicates it is citing the cross examination of Mr. Boos (*id*.), we assume Patent Owner meant to cite Exhibit 1023, which is Mr. Boos's deposition transcript.

of Clemons could have been improved by including a secondary "compact and maneuverable" utility vehicle, such as the StripeJet™ tractor disclosed in NLB, which is specifically designed to clean "areas with limited access (e.g., parking lots, garages, intersections)." *Id.* at 29 (citing Ex. 1006, 4–5; Ex. 1009 ¶¶ 143–144. According to Petitioner, the improved system of Clemons combined with NLB would remain self-contained and operable by a single person, thereby meeting key objectives of Clemons and NLB and improving upon the capabilities of the Clemons system. *Id.* (citing Ex. 1009 ¶ 142).

Petitioner also asserts it would have been obvious to further improve the cleaning system of Clemons by replacing the vacuum pump, the water pump, the water supply hose, and the spray nozzles of Clemons with the high-power, 1,000 CFM vacuum pump and "ultra-high pressure" water pump, water supply hose, and spray nozzles of NLB, which are specifically designed for pressure of up to 40,000 psi. *Id.* at 29–30 (citing Ex. 1006, 2, 4; Ex. 1009 ¶ 147). Petitioner asserts that this additional improvement would extend the capabilities of the cleaning system to a wider array of applications including "[f]loor coating removal." *Id.* at 30 (citing Ex. 1005, 4; Ex. 1009 ¶ 147). Petitioner concludes that, accordingly, an ordinarily skilled artisan would have been motivated to combine Clemons with NLB, thus achieving the cleaning system of claim 1. *Id.*

In its Sur-Reply, Patent Owner argues that Petitioner's only "motivation" to add the NLB ultra-high-pressure pump to Clemons is based on hindsight, attempting to create a device capable of removing roadway markings, which Patent Owner asserts is the invention of the challenged patent. Sur-Reply 14 (citing Ex. 1023, 243:2–18). Patent Owner further

asserts that although Mr. Boos describes the motivation for combining Clemons and NLB is to build the best system for the objective of Clemons, Mr. Boos's testimony indicates that the motivation for the combination is to remove pavement markings, which is not the objective of Clemons. *Id.* Further, Patent Owner argues (at Sur-Reply 15) that, in the following testimony, Mr. Boos admits that his opinion for combining Clemons and NLB is based on hindsight:

> Q. Why would a person of ordinary skill in the art as of July 2nd of 2004 consider adding the pump from NLB to the Clemons device?
>
> A To achieve the objective. The Clemons machine was a street cleaning machine. And if you wanted to take off markings, you know, if you wanted to do marking removal or stipe removal, you would want to utilize the higher pressure. So the motivation is to combine the technologies to yield paint or marking removal.

Ex. 1023, 246:1–10.

Patent Owner also argues that Petitioner impermissibly seeks to shift to Patent Owner the burden of proof regarding obviousness. Sur-Reply 15. Further, Patent Owner argues that Clemons teaches away from adding the NLB pump because Clemons is a street cleaning machine, and Mr. Boos's only motivation to add the NLB pump is to remove roadway markings that Clemons is designed to clean. *Id.* at 17.

We agree with Patent Owner that the burden of proof regarding obviousness never rests with Patent Owner. After considering the full record developed during the trial, we determine that Petitioner has proven by a preponderance of evidence that an ordinarily skilled artisan would have had reason to combine Clemons and NLB, and would have had a reasonable expectation of successfully arriving at the claimed invention.

We credit the testimony by Mr. Boos that Clemons and NLB disclose systems that employ pressurized water on a hard surface and utilize a vacuum recovery system to remove spent liquid and debris. Ex. 1009 ¶ 142. Consistent with that testimony, Clemons describes "a brushless surface cleaner with reclamation," with nozzles in which "liquid under pressure is supplied and sprayed" and a vacuum recycling system in which liquid and loosened contaminants are suctioned. Ex. 1008, Abstr. Clemons also describes cleaning airport runways, streets, and parking surfaces. *Id.* at 1:55–58. NLB describes employing ultra-high pressure water to completely remove coatings from a road. Ex. 1006, 2. NLB also describes the use of vacuum recovery. *Id.*

We further credit Mr. Boos's testimony that the cleaning system disclosed in Clemons is essentially a large cleaning truck that suffers from a long turning radius typical of larger vehicles and an inability to efficiently clean areas with limited access. Ex. 1009 ¶ 143. Consistent with that testimony, Clemons describes system 10 as self-contained and self-propelled. Ex. 1008, 2:64–3:2. Further, as illustrated, system 10 in Clemons contains liquid delivery system 90 with large water storage tank 902 and high pressure pump 906, and vacuum recycling system 92 with vacuum 920 and vacuum tank 924. *Id.* at 4:55–60, 5:3–6. Further, NLB teaches that smaller non-self-contained vehicles, such as its StripeJet vehicle, have better, tighter turning radii than large self-contained vehicles, such as its StarJet vehicle. Ex. 1006, 5.

We also credit Mr. Boos's testimony that NLB teaches using a secondary "compact and maneuverable" utility vehicle, such as the StripeJet tractor, for "areas with limited access (e.g., parking lots, garages,

intersections)." Ex. 1009 ¶¶ 143–144. While NLB describes using its large self-contained vehicle, StarJet, for open roads, NLB teaches using its compact, non-self-contained vehicle, StripeJet, for limited-access areas, such as parking lots, garages, and intersections. Ex. 1006, 5. NLB discloses that StipeJet's "short wheelbase and tight turning radius assure easy maneuverability." *Id.*

Mr. Boos testifies that StripeJet would have to fluidly couple its blast head to a pump to achieve its water pressure and would have to have a vacuum hose extending to a vacuum tank. Ex. 1009 ¶ 143. Patent Owner does not substantively contest this testimony. Clemons discloses a pump and a vacuum tank that could be attached to a blast head and vacuum hose. Ex. 1008, 4:55–60, 5:4–8.

We further credit Mr. Boos's testimony that an ordinarily skilled artisan would have understood from Clemons and NLB that Clemons would benefit from a secondary vehicle, such as StripeJet, for cleaning areas with limited access or that require a vehicle with a tight turning radius. Ex. 1009 ¶ 144. As discussed above, Clemons and NLB support this testimony.

We further credit Mr. Boos's testimony that an ordinarily skilled artisan would have had a reasonable expectation of success in modifying Clemons's system to include a compact vehicle, such as StripeJet, for use in areas having limited access. Ex. 1009 ¶ 146. In addition, we credit Mr. Boos's testimony that an ordinarily skilled artisan would have modified Clemons's vacuum pump, water pump, water supply hose, and spray nozzles to have the high power vacuum pump, water pump, water supply hose, and spray nozzles of NLB to increase the ability to remove coatings. *Id.* ¶ 147. This testimony is corroborated by the admitted commercial existence of high

pressure stripe removal systems made by NLB and Blasters and further corroborated by NLB's teachings of the desirability of using high pressure systems to remove coatings. Ex. 1001, 1:52–2:8; Ex. 1006, 2–6. (We address Dr. Hale's testimony regarding the purported difficulties regarding this modification below.)

As a result, we find an ordinarily skilled artisan would have combined Clemons and NLB, and would have had a reasonable likelihood of success in doing so.

We disagree with Patent Owner's argument that Mr. Boos's rationale for combining Clemons and NLB is based on impermissible hindsight or that Mr. Boos admitted that it was so based. Sur-Reply 14–15. Although, as Patent Owner notes, the challenged patent describes removing roadway markings, so does NLB. Ex. 1006, 2, 4. And Mr. Boos relies on NLB, not the challenged patent, for the teaching and suggestion of removing roadway markings. Ex. 1009 ¶ 147 (citing Ex. 1006, 2, 4).

Patent Owner's argument that Clemons is not "a system for removing durable coatings which are tightly bonded to a hard surface by abrading away the hard surface by impacting it with high velocity water" misses the point of the proposed combination. PO Resp. 22 (citing Ex. 2012 ¶ 99). NLB teaches removing durable coatings that are tightly bonded to a hard surface. Ex. 1006, 2, 4. And a reason an ordinarily skilled artisan would combine NLB with Clemons is to increase Clemons's capabilities so that it could remove such coatings. Ex. 1009 ¶ 147.

We also do not agree with Patent Owner that Mr. Boos has failed to articulate a rationale for combining the teachings of Clemons and NLB. *See* discussion above.

Further, we do not agree with Patent Owner that Clemons teaches away from NLB's pump because Clemons wants to clean a surface, rather than remove a coating. Sur-Reply 17. Merely because Clemons does not discuss removing pavement markings does not mean that Clemons teaches away from doing so. Patent Owner cites nothing, and we see nothing, in Clemons that criticizes, discredits, or otherwise discourages the removal of pavement markings. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

Dr. Hale's testimony that one who would attempt to replace the pump, hoses, blast head, and other equipment on Clemons with high-pressure equipment from NLB would be met with substantial design challenges also does not rebut Mr. Boos's testimony that such modifications would be within the knowledge of an ordinarily skilled artisan. Ex. 2012 ¶ 101. Dr. Hale testifies that such modifications would require a large engineering design and development effort, involving a great deal of engineering expertise, man hours, and cost. *Id.* To support this opinion, Dr. Hale refers to his testimony regarding modifications to Jones, where he indicates that an ultra-high pressure pump would be much larger and heavier than the small booster pump on Jones, would require a larger power source, and would pose more issues of weight distribution, large and expensive gearboxes, and hydraulic motors. *Id.* ¶¶ 82, 101. This testimony does not rebut Mr. Boos's testimony because Dr. Hale does not testify that these modifications would be beyond the level of an ordinarily skilled artisan, that an ordinarily skilled artisan would not know how to do them, or that they would actually deter an ordinarily skilled artisan from making these modifications. *Id.*

Essentially Dr. Hale testifies that an ordinarily skilled artisan would have incurred significant costs and effort in increasing the capabilities of

Clemons, and Dr. Hale cites nothing to support that testimony. Rather, Dr. Hale's testimony appears to be based only on his personal knowledge, and by his own admission Dr. Hale has no personal experience with equipment that uses pressures of 40,000 psi to remove pavement markings. Ex. 1018, 23:1–24:7. This means Dr. Hale is relying on presumably known facts that an ordinarily skilled artisan would also be aware of. Further, the record indicates that the costs and effort involved with making such a high pressure system would be worthwhile to an ordinarily skilled artisan given the disclosure in NLB. Specifically, NLB describes a system that uses high pressure, and based on Dr. Hale's testimony, such a system would use an ultra-high pressure pump with a large power supply. Ex. 1006, 2. In fact, the challenged patent itself admits in its Prior Art Background that "NLB Corporation markets a high pressure water jet system for removing paint from pavement under the name 'StarJet,'" acknowledging that a high pressure system had already been commercially developed in the prior art. Ex. 1001, 1:52–54. The record indicates, therefore, that an ordinarily skilled artisan would have found the modifications to develop a high pressure system to be worthwhile (certainly NLB did), and Dr. Hale has provided no reason for us to find otherwise. Ex. 2012 ¶ 101; *see also* Ex. 1009 ¶¶ 63, 146–147.

In conclusion, we determine that Petitioner has proven that an ordinarily skilled artisan would have made the proposed combination of Clemons and NLB discussed above.

b. Articulating Link

Petitioner argues that arm 42 in Clemons is the articulating link recited by claim 1. Pet. 74. Patent Owner disagrees, arguing that Clemons does not disclose an "articulating link." PO Resp. 16.

As set forth above, we construe an "articulating link" as "a connecting structure that connects two parts in such a way as to permit relative movement." Clemons discloses that arm 42 connects cleaning head 40 to frame 12. Ex. 1008, 3:36–38. Further, Clemons discloses that arm 42 is pivotally attached to frame 12 at pivot point 44. *Id.* Clemons further discloses that arm 42 can be manually pivoted or pivoted via a motorized force to raise or lower cleaning head 40 and set a forward-to-rear pitch angle of cleaning head 40 relative to surface 100." *Id.* Mr. Boos testifies, and we credit this testimony, that these disclosures describe that arm 42 permits movement of cleaning head 40, which Mr. Boos identifies as the blast head, relative to frame 12. Ex. 1009 ¶ 172. As a result, arm 42 satisfies the above construction for articulating link, and Patent Owner does not set forth any reasons why arm 42 would not be an articulating link with the above construction.[12] PO Resp. 21–22; Sur-Reply 11–13.

After reviewing the parties' arguments and evidence, we determine Petitioner has proven that Clemons discloses an articulating link.

c. Cleaning System

Petitioner argues that Clemons discloses a cleaning system. Pet. 63; Reply 27–28. Patent Owner disagrees. PO Resp. 22.

[12] The above construction is Petitioner's proposed construction for the term, so Patent Owner had the opportunity to address whether arm 42 would be an articulating link with this construction.

We find Clemons discloses a cleaning system, but in any event, such a finding would not be necessary because it is undisputed that NLB discloses a cleaning system. *See* Pet. 59–60 (proposing to combine Clemons's cleaning system with NLB's cleaning system). Therefore, Clemons as modified by NLB would disclose such a system even if we were to accept Patent Owner's arguments that Clemons lacks such a system.

Regarding Clemons, however, we credit Mr. Boos's testimony that Clemons describes a cleaning system. Ex. 1009 ¶ 148. Corroborating this testimony, Clemons's title is "Self-Propelled Brushless Surface Cleaner with Reclamation." Ex. 1008 [54]. And Clemons describes component 10 as a "surface cleaner." *Id.* at 2:64–3:2.

Patent Owner argues that Clemons does not disclose a cleaning system because Clemons does not disclose "a system for removing durable coatings which are tightly bonded to a hard surface by abrading away the hard surface by impacting it with high velocity water." PO Resp. 21–22. As discussed above, however, we do not believe the term "cleaning system" should be limited to "a system for removing durable coatings which are tightly bonded to a hard surface by abrading away the hard surface by impacting it with high velocity water."

Further, as discussed above, the dispute over whether Clemons by itself discloses a cleaning system is not pertinent to any asserted grounds of unpatentability that we need to address because Patent Owner has not disputed that NLB discloses a cleaning system or that Clemons, as Petitioner proposes modifying it based on NLB's teachings, is a cleaning system. PO Resp. 21–22.

We determine that Petitioner has proven that Clemons by itself and Clemons in combination with NLB disclose a cleaning system.

d. Limitations of Claim 1

Patent Owner does not dispute that the combination of Clemons and NLB disclose the limitations of claim 1, other than with respect to the recitation of an articulating link, which we addressed above. Below we summarize Petitioner's showing regarding the limitations of claim 1. After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that its proposed combination of Clemons and NLB would teach or suggest each of these limitations.

(1) A cleaning system for removing coatings from a hard surface by high pressure liquid

Petitioner argues that Clemons discloses a cleaning system for removing foreign matter from hard surfaces, such as "runways, streets, sidewalks, parking surfaces, decks of ships and industrial floor areas." Pet. 63 (citing Ex. 1008, Abstr., 1:54–59; 2:64–3:4). Further, Petitioner argues that an ordinarily skilled artisan would have combined Clemons with NLB to achieve "ultra-high pressure water" of up to 40,000 psi to improve the cleaning system and extend its applications to "[f]loor coating removal." *Id.* (citing Ex. 1006, 2; Ex. 1009 ¶ 149). Therefore, Petitioner argues that the combination of Clemons and NLB teaches "a cleaning system for removing coatings from a hard surface by high pressure liquid." *Id.* at 63–64 (citing Ex. 1009 ¶ 150). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches this limitation.

(2) in combination a liquid reservoir connected to a high pressure pump,

Petitioner argues that Clemons's cleaning system includes high-pressure pump 906,[13] which is coupled to large water storage tank 902. Pet. 64 (citing Ex. 1008, 4:57–58, Fig. 1). Therefore, Petitioner asserts that Clemons discloses a liquid reservoir connected to a high pressure pump. *Id.* Petitioner also argues that an ordinarily skilled artisan would modify Clemons's pump to accommodate the pressure disclosed in NLB. *Id.* at 62–63 (citing Ex. 1009 ¶ 147). In the Patent Owner Response, Patent Owner does not dispute that Clemons discloses a high pressure pump. PO Resp. 21–22. Patent Owner's proposed construction for high pressure, however, would exclude the pressure disclosed as being generated by Clemons's pump. PO Resp. 9–10; Ex. 1008, 6:12–18. In any event, Clemons as modified by NLB would have the recited high pressure pump using either party's proposed construction for "high pressure." As discussed above, Patent Owner does not dispute that NLB discloses the requisite high pressure. After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches this limitation.

(3) said pump connected to a mobile blast head by a high pressure hose,

Petitioner argues that Clemons discloses that "[c]oupled to cleaning head 40 [is] a liquid (e.g., water) delivery system" which is driven by a "high-pressure pump 906." Pet. 64 (citing Ex. 1008, 4:46–47, 4:55–58).

[13] This was referred to in the Petition as high pressure pump 102, but in the passage of Clemons cited by Petitioner and in Clemons Figure 1, the pressure pump is identified as pump 906. Ex. 1008, 4:57–58, Fig. 1.

Petitioner argues that an ordinarily skilled artisan would have combined Clemons with the StripeJet system disclosed in NLB and, in that combination, the water supply hose of StripeJet would be coupled to the outlet of high pressure pump 906 and the water supply hose would deliver pressurized water from high pressure pump 906 to the mobile blast head of StripeJet. *Id.* at 65 (citing Ex. 1006, 4; Ex. 1008, Fig. 1). Petitioner further argues that an ordinarily skilled artisan would have replaced pump 906 with NLB's 40,000 psi pump. *Id.* at 66 (citing Ex. 1009 ¶ 154; Ex. 1005, 2). Further, Petitioner asserts that NLB discloses that its water does not have to be heated, as 40,000 psi pressure is sufficient for removing pavement markings. *Id.* (citing Ex. 1009 ¶ 154; Ex. 1006, 2). Therefore, Petitioner contends that an ordinarily skilled artisan would have eliminated the boiler in Clemons and directly coupled the water supply hose of StripeJet to the outlet of the high pressure pump. *Id.* at 65 (citing Ex. 1009, ¶ 153). As a result, Petitioner argues that the combination of Clemons and NLB teaches or suggests[14] "said pump connected to a mobile blast head by a high pressure hose." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches this limitation.

[14] Petitioner uses the phrase "renders obvious." Pet. 65. We interpret Petitioner's use of that phrase when referring to an individual claim element to mean "teach or suggest." In that regard, Petitioner argues that the combination of Clemons and NLB teaches or suggests every limitation of claim 1. Pet. 76.

> *(4) said blast head having at least one high pressure nozzle for delivering high pressure liquid onto a hard surface,*

Petitioner argues that Clemons discloses a "cleaning head having a deck" and "a plurality of nozzles mounted to said deck . . . [wherein] liquid under pressure is supplied thereto and sprayed therefrom." Pet. 66 (citing Ex. 1008, 7:11-17). Further, Petitioner argues that NLB discloses a "nozzle assembly" (i.e., a blast head) having "up to 16 nozzles" for delivering ultra-high pressure water of up to 40,000 psi onto concrete. *Id.* at 66–67 (citing Ex. 1006, 2, 4). Thus, Petitioner asserts that the combination of Clemons and NLB teaches or suggests "said blast head having at least one high pressure nozzle for delivering high pressure liquid onto a hard surface." *Id.* at 67 (citing Ex. 1009 ¶ 156). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches this limitation.

> *(5) a waste removal hose connected at one end to said blast head and at the other end to a sump for collection of liquid and coatings*

Petitioner argues that Clemons discloses a waste removal hose, which is colored in brown in the annotated figure on page 67 of the Petition. Pet. 67. As shown in the annotated figure, this waste removal hose is connected at one end to vacuum tank 924, which Petitioner argues is a sump because it collects spent liquid and debris. *Id.* at 68 (citing Ex. 1008, 6:9–12; Ex. 1009 ¶ 158). Petitioner argues that an ordinarily skilled artisan would have connected the vacuum hose of NLB's Stripe Jet to NLB's blast head on one end and to vacuum tank 924 on the other end. *Id.* (citing Ex. 1009 ¶ 159). As a result, Petitioner argues that the combination of Clemons and NLB discloses "a waste removal hose connected at one end to said blast head and

at the other end to a sump for collection of liquid and coating." *Id.* at 69 (citing Ex. 1009 ¶ 160). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches this limitation.

(6) said sump connected to said liquid reservoir,

Petitioner argues that Clemons discloses a "sump pump" (pump 934) disposed within the vacuum tank, which Petitioner maps to the sump. Pet. 69 (citing Ex. 1008, 5:12–20). Petitioner asserts that pump 934 pumps the recovered liquid and debris through a series of filters to produce "clean water that is returned to tank 902 for reuse in the cleaning process." Pet. 69 (citing Ex. 1008, 5:12–20). Therefore, Petitioner argues that Clemons's vacuum tank and the water tank are fluidly connected and Clemons discloses "said sump connected to said liquid reservoir." *Id.* (citing Ex. 1009 ¶ 161). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that Clemons discloses this limitation.

(7) whereby liquid is pumped through said high pressure hose from said reservoir and exits said high pressure nozzle onto the hard surface for removing coatings therefrom,

Petitioner argues that, with its combination of Clemons and NLB, high-pressure pump 906 draws water from water tank 902 and supplies pressurized water via the high pressure hose to the "up to 16 nozzles" disposed within the blast head of the StripeJet, which direct a water jet onto a concrete surface for "[f]loor coating removal." Pet. 69–70 (citing Ex. 1009 ¶ 162; Ex.1006, 2, 4). As a result, Petitioner argues the combination of Clemons and NLB teaches or suggests this limitation of claim 1. *Id.* at 70 (providing an illustration of the combination) (citing Ex. 1006, 4; Ex. 1009

¶ 162). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches or suggests "whereby liquid is pumped through said high pressure hose from said reservoir and exits said high pressure nozzle onto the hard surface for removing coatings therefrom."

(8) said liquid and coatings conveyed through said waste removal hose to said sump via a high power vacuum pump,

Petitioner argues that Clemons discloses that a "vacuum force created by vacuum/recycling system 92 is applied through hose 942" and "[t]he resulting mixture 202 of water and loosened debris/contaminants is drawn into hose 942 and delivered to vacuum tank 924." Pet. 70–71 (citing Ex. 1008, 5:59–61, 6:10–12). Petitioner further argues that an ordinarily skilled artisan would have replaced Clemons's vacuum pump with NLB's high power vacuum pump, which would cause liquid and coatings to be conveyed through the vacuum hose from the blast head on the StripeJet to vacuum tank 924. *Id.* Petitioner asserts that, therefore, the combination of Clemons and NLB discloses this limitation. *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches or suggests "said liquid and coatings conveyed through said waste removal hose to said sump via a high power vacuum pump."

(9) said coatings collected in said sump,

Petitioner argues that Clemons discloses that vacuum tank 924, which it maps to the recited sump, has filter 930 disposed therein, which traps "larger solid particles." Pet. 71 (citing Ex. 1008, 5:10–11, 6:19–20, Fig. 1). Petitioner argues that, therefore, Clemons discloses "said coatings collected

in said sump." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that Clemons teaches or suggests "said coatings collected in said sump."

> *(10) said liquid reservoir, said sump and said high power vacuum pump being mounted on a mobile frame,*

Petitioner argues that Clemons discloses "a liquid (e.g., water) delivery system and a vacuum/recycling system, both of which are mounted on frame 12." Pet. 71–72 (quoting Ex. 1008, 4:46–48). Petitioner further argues that frame 12 is the base frame of the Clemons truck, the liquid delivery system includes the water tank, and the vacuum/recycling system includes the vacuum tank and the vacuum pump. *Id.* at 72 (citing Ex. 1008, 3:5–8, 4:55–58, 5:4–6, Fig. 1). Accordingly, Petitioner argues that Clemons discloses "said liquid reservoir, said sump and said high power vacuum pump being mounted on a mobile frame." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the Clemons discloses "said liquid reservoir, said sump and said high power vacuum pump being mounted on a mobile frame."

> *(11) said mobile frame forming an integral part of a truck having a bed portion and a cab portion, said truck being self-propelled.*

Petitioner argues Figure 1 of Clemons illustrates a truck having a cab portion and a bed portion. Pet. 73 (citing annotated figure on Pet. 73; Ex. 1009 ¶¶ 168–170). Further, Petitioner asserts that Clemons discloses that "[s]urface cleaner 10 includes a self-propelled vehicle having a frame 12, a drive train coupled to frame 12." *Id.* (citing Ex. 1008, 3:5–8). Petitioner argues that, therefore, frame 12 is an integral part of the truck. *Id.* (citing Ex. 1009 ¶ 168). And Petitioner asserts that Clemons teaches "said

mobile frame forming an integral part of a truck having a bed portion and a cab portion." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that Clemons discloses this limitation.

(12) said mobile blast head being mounted at a distal end of an articulating link, a proximal end of said articulating link secured to a tractor

As discussed above, Patent Owner disputes that Clemons discloses the recited articulating link. As set forth above, however, we determine that Petitioner has proven that arm 42 in Clemons is the recited articulating link. Regarding the remaining recitations in this limitation, Petitioner argues that when combining Clemons with NLB, an ordinarily skilled artisan would have connected the blast head of NLB to the tractor of NLB using arm 42 of Clemons to enable the blast head to adjust the forward-to-rear pitch angle according to the teachings of Clemons. Pet. 74 (citing Ex. 1009 ¶ 173). Petitioner asserts that such modification would have been straightforward, not requiring undue experimentation, and would produce predictable results. *Id.* Thus, Petitioner argues that the combination of Clemons in view of NLB discloses "said mobile blast head being mounted at a distal end of an articulating link, a proximal end of said articulating link secured to a tractor." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB discloses this limitation.

(13) said tractor including an engine for propulsion thereof

Petitioner argues that the challenged patent admits that the StripeJet system disclosed in NLB "is a self-propelled tractor." Pet. 74 (citing

Ex. 1001, 2:5). Petitioner further argues that NLB confirms that the StripeJet tractor has an engine and suggests that the engine is used for propulsion. *Id.* (citing Ex. 1006, 4; Ex. 1009 ¶ 174). Therefore, Petitioner argues that NLB teaches or suggests "a tractor including an engine for propulsion thereof." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that both NLB and the admitted prior art disclose this limitation.

> *(14) wherein said high pressure hose and said waste removal hose extend between said truck and said tractor*

Petitioner argues that the challenged patent admits that Petitioner had a prior art system having a tractor "connected to the prime-mover by high pressure lines." Pet. 75 (quoting Ex. 1001, 2:10–14). Petitioner asserts that an ordinarily skilled artisan in combining Clemons and NLB would have coupled the vacuum and water supply hoses at one end to the blast head, while at the other end, would have coupled those hoses to the vacuum tank and the water pump of Clemons, respectively. *Id.* (citing Ex. 1006, 4; Ex. 1008, Fig 1; Ex. 1009 ¶ 175). Petitioner further asserts that this is a simple arrangement of common components with each performing its known function as expected from such an arrangement, and is, therefore, an obvious combination. *Id.* at 76. Accordingly, Petitioner contends that the combination of Clemons and NLB teaches or suggests the limitation "wherein said high pressure hose and said waste removal hose extend between said truck and said tractor." *Id.* (citing Ex. 1009 at ¶¶ 175–176). After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that the combination of Clemons and NLB teaches or suggests this limitation.

(15) whereby said tractor is utilized to maneuver said blast head

Petitioner argues that NLB depicts its blast head as secured to its tractor. Pet. 76 (citing Ex. 1006 at 1, 4, 5). Petitioner asserts, therefore, that an ordinarily skilled artisan would have understood that the tractor is utilized to maneuver the blast head. *Id.* (citing Ex. 1009 ¶ 177). Therefore, Petitioner argues that NLB teaches or suggests "whereby said tractor is utilized to maneuver said blast head." *Id.* After reviewing the arguments and evidence in the record, we determine that Petitioner has proven that NLB teaches or suggests this limitation.

e. Conclusion

In view of the foregoing, we find Petitioner has shown, by a preponderance of evidence, that Clemons and NLB teach or suggest all limitations in claim 1. We also find that Petitioner has shown, by a preponderance of evidence, that a person of ordinary skill in the art would have combined the teachings of Clemons and NLB, and would have had a reasonable likelihood of success in doing so. Accordingly, Petitioner has demonstrated that claim 1 is unpatentable under 35 U.S.C. § 103 in view of Clemons and NLB.

4. Asserted Obviousness of Claims 2–4 and 10 over Clemons and NLB

Claim 2–4 and 10 each directly or indirectly depend from claim 1. Petitioner directs us to portions of Clemons and NLB that teach or suggest each limitation recited in claims 2–4 and 10. Pet. 76–82. Patent Owner does not dispute Petitioner's showing that Clemons and NLB teach or suggest the additional limitations recited in claims 2–4 and 10. PO Resp. 21–22. All of Patent Owner's arguments for these claims concern the limitations recited in claim 1 or concern Petitioner's rationale for combining the references to

satisfy the limitations of claim 1, which we have addressed above. *Id.* After reviewing Petitioner's uncontested arguments and the evidence in the record concerning Clemons and NLB's teachings with respect to claims 2–4 and 10, we determine Petitioner has proven that Clemons and NLB would have rendered claims 2–4 and 10 obvious. We summarize Petitioner's showing regarding these claims below.

a. Claim 2

Claim 2 depends from claim 1 and adds the limitation "wherein a high power vacuum pump is connected to said sump." Petitioner argues that, in Figure 1 of Clemons, blower vacuum 920 is connected to vacuum tank 924, which Petitioner maps to the recited sump. Pet. 76 (citing Ex. 1008, Fig. 1, 5:4–6). Petitioner argues that, further, an ordinarily skilled artisan would have improved the cleaning system achieved by the combination of Clemons and NLB by replacing the blower vacuum of Clemons with a high-power, 1,000 CFM vacuum pump of NLB. *Id.* at 77 (citing Ex. 1009 ¶ 180). Petitioner asserts that an ordinarily skilled artisan would have been motivated to exchange the vacuum pump in Clemons for the more powerful vacuum pump in NLB because a more powerful vacuum pump would have more efficiently retrieved spent liquid and debris. *Id.* (citing Ex. 1009 ¶ 180). Accordingly, Petitioner argues that the combination of Clemons and NLB discloses "a high power vacuum pump is connected to said sump" and would have rendered claim 2 obvious. *Id.* at 77–78. After reviewing the parties' arguments and evidence, we determine that Petitioner has proven that claim 2 would have been obvious over the combination of Clemons and NLB.

b. Claim 3

Claim 3 depends from claim 2 and adds the limitation "a shroud is connected to said blast head, said shroud surrounds said at least one nozzle and forms a negative pressure chamber." Petitioner argues that the challenged patent admits that the StripeJet has a blast head with a shroud (Pet. 78 (citing Ex. 1001, 2:4–7)), that the images in NLB disclose a shroud (*id.* (citing Ex. 1006, 1, 4, 5)), and that skirt 48 of Clemons is a shroud because it covers, screens, or guards (*id.* (citing Ex. 1012)).

Petitioner further argues that Clemons discloses that "[a] plurality of nozzles [is] mounted for movement within the cleaning volume." Pet. 78 (quoting Ex. 1006, 2:22–23). In addition, Petitioner argues that Clemons discloses that "the suction force from [a] vacuum draws outside air into cleaning volume 50 via duct(s) 60. The use of ducts 60 prevent water sprayed into cleaning volume 50 from escaping." *Id.* at 78–79 (quoting Ex. 1006, 5:61–64). Petitioner argues that, therefore, Clemons discloses that the skirt (i.e., shroud) surrounds a plurality of nozzles and the vacuum pump coupled to ducts 60 creates a negative pressure chamber within the cleaning volume encompassed by the skirt, as illustrated on page 79 of the Petition. *Id.* at 79.

Petitioner further contends that even if NLB did not expressly disclose a shroud, it would have been obvious to dispose the shroud disclosed in Clemons around the blast head of NLB, such that the nozzles and the vacuum inlet are enclosed within the shroud. Pet. 78 (citing Ex. 1009 ¶ 184). Petitioner argues an ordinarily skilled artisan would have made this modification because Clemons discloses that, by employing a shroud creating a negative pressure chamber around the nozzles, the shroud

"prevent[s] water sprayed into cleaning volume 50 from escaping therefrom." *Id.* (citing Ex. 1008, 5:61–64). As a result, Petitioner argues that the combination of Clemons and NLB would have rendered claim 3 obvious. *Id.* After reviewing the parties' arguments and evidence, we determine that Petitioner has proven that claim 3 would have been obvious over the combination of Clemons and NLB.

c. Claim 4

Claim 4 depends on claim 3 and adds the limitation that "said mobile blast head is attached to a wheeled chassis for maneuvering over the hard surface." Petitioner argues that the challenged patent admits that NLB Corporation employed a system with a blast head attached to a wheeled chassis. Pet. 80 (citing Ex. 1001, 1:54–58). Petitioner further argues that the images in NLB depict a blast head attached to a wheeled chassis. *Id.* (citing Ex. 1006, 1, 4, 5; Ex. 1009 ¶ 185). Petitioner asserts that, therefore, NLB teaches this additional limitation of claim 4 and the combination of Clemons and NLB would have rendered claim 4 obvious. After reviewing the parties' arguments and evidence, we determine that Petitioner has proven that claim 4 would have been obvious over the combination of Clemons and NLB.

d. Claim 10

Claim 10 depends on claim 1 and adds the limitation that "said articulating link is constructed and arranged for controlled movement in a horizontal and a vertical plane." Petitioner argues that an ordinarily skilled artisan would have connected the blast head disclosed in NLB to the StripeJet tractor using pivoting arm 42 of Clemons, which Petitioner maps to the recited articulating link. Pet. 81 (citing Ex. 1008, 3:38–41). Petitioner

argues that, therefore, the combination of Clemons and NLB teaches an articulating link designed for controlled movement in the vertical plane. *Id*. (citing Ex. 1009 ¶ 186).

With respect to movement in the horizontal plane, Petitioner argues that the images of the StripeJet on page 4 of NLB show the nozzle assembly positioned at two separate locations along a horizontal support member, which suggests that the structural link is constructed and arranged for controlled movement in a horizontal plane. Pet. 81 (citing Ex. 1009 ¶ 187). Therefore, Petitioner argues that the combination of Clemons and NLB would have rendered claim 10 obvious. *Id.* at 82.

After reviewing the parties' arguments and evidence, we determine that Petitioner has proven that claim 10 would have been obvious over the combination of Clemons and NLB.

5. Asserted Obviousness of Claims 5 and 6

As discussed above, Petitioner argues that the combination of Clemons, NLB, and Schrunk would have rendered the subject matter of claims 5 and 6 obvious. Petitioner also argues that the combination of Jones, Breither, Herhold, and Schrunk would have rendered the subject matter of claims 5 and 6 obvious. Because we determine that Petitioner has not proven that the combination of Clemons, NLB, and Schrunk would have rendered claim 5 and 6 unpatentable as obvious, we also address Petitioner's arguments that the claims would have been unpatentable as obvious over Jones, Breither, Herhold, and Schrunk. Further, because Petitioner's arguments regarding Clemons, NLB, and Schrunk reference its arguments regarding Jones, Breither, Herhold, and Schrunk, we begin with Petitioner's

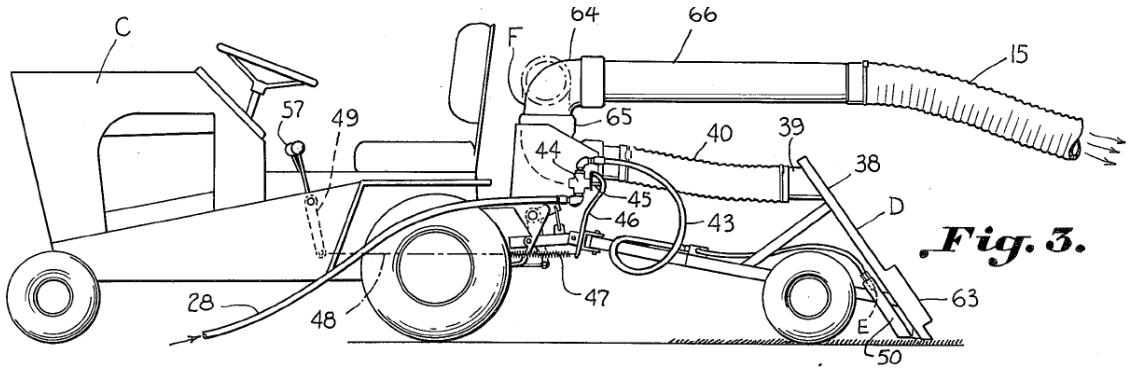
arguments and Patent Owner's responses regarding the combination involving Jones.

a. Asserted Obviousness of Claim 5 over Jones, Breither, Herhold, and Schrunk

Claim 5 depends from claim 4 and adds two limitations: (i) "wherein said wheeled chassis is attached to said tractor" and (ii) "said mobile blast head and tractor are of a size for removably docking transversely on said bed portion of said truck." Petitioner argues that Jones and Schrunk teach, suggest, or otherwise render obvious these additional limitations of claim 5. Pet. 50–56. Our analysis focuses on the size limitation, but, for background, we also address Petitioner's showing regarding the attachment limitation.

1. Overview of Jones

Jones discloses a portable device for cleaning artificial turf. Ex. 1002, Abstr. In particular, Jones discloses that oily fallout, soot, broken glass, and other hazardous materials collect on artificial turf. *Id.* at 1:7–11. To remove those materials, Jones discloses a water jet cleaning system with a service truck and a motorized utility cleaning vehicle. *Id.* at 1:53–64. Figure 3 of Jones is shown below:



Ex. 1002, Fig. 3.

Figure 3 is a side elevational view of the motorized utility cleaning vehicle of Jones. *Id.* at 1:45–46. As illustrated, the motorized utility

cleaning vehicle C contains cleaning head D, spray means E, hose 28, pipe 39, vacuum hose 40, elbows 64 and 65, metallic tubular member 66, and vacuum hose 15. *Id.* at 2:41–4:35.

Figure 4 of Jones is reproduced below:

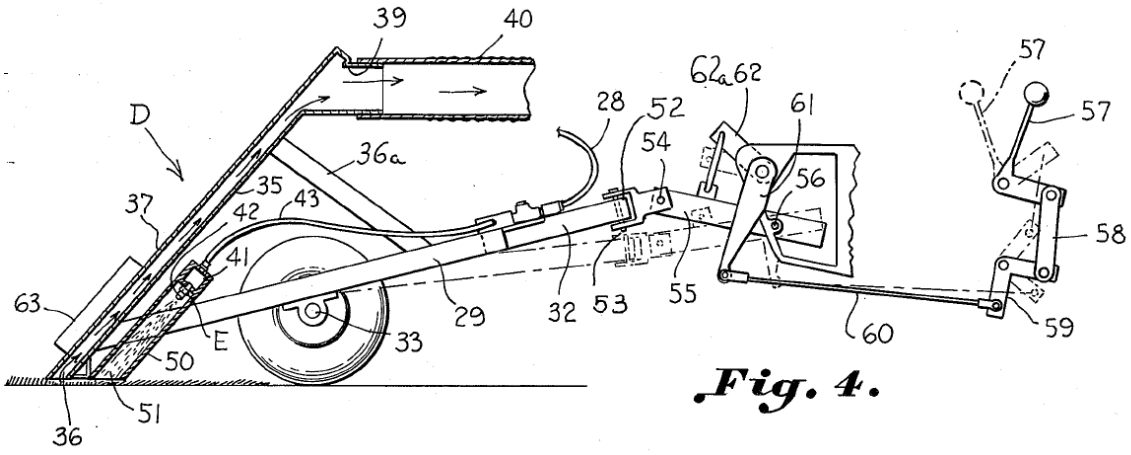


Fig. 4.

Figure 4 is an enlarged, side elevational view of a portion of the mobile utility cleaning vehicle with cleaning head D. Ex. 1002, 1:48–50. As illustrated, cleaning head D includes sprayer means E, spray nozzles 42, and suction nozzle 36. *Id.* at 3:23–37. Also illustrated is swivel joint 52, bolt 53, and transverse pin 54. *Id.* at 3:64–68.

2. Overview of Schrunk

Schrunk discloses a truck-mounted, vehicle carrier apparatus. Ex. 1005, 1:1–2. Figure 1 of Schrunk is reproduced below:

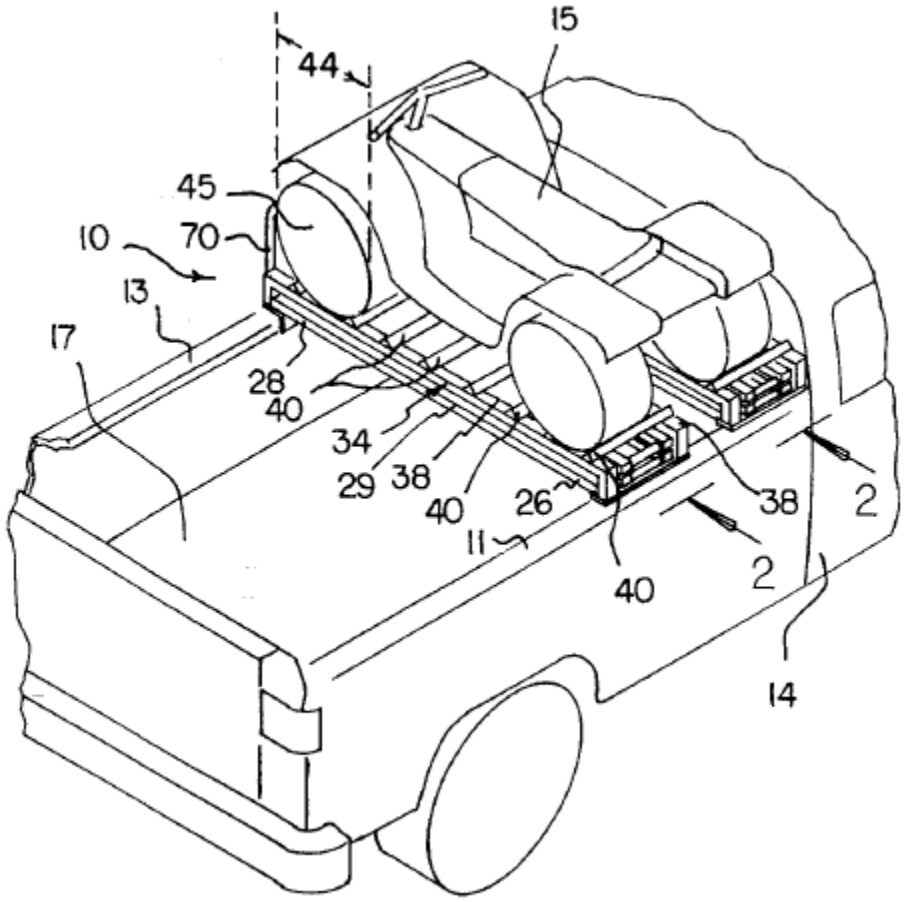
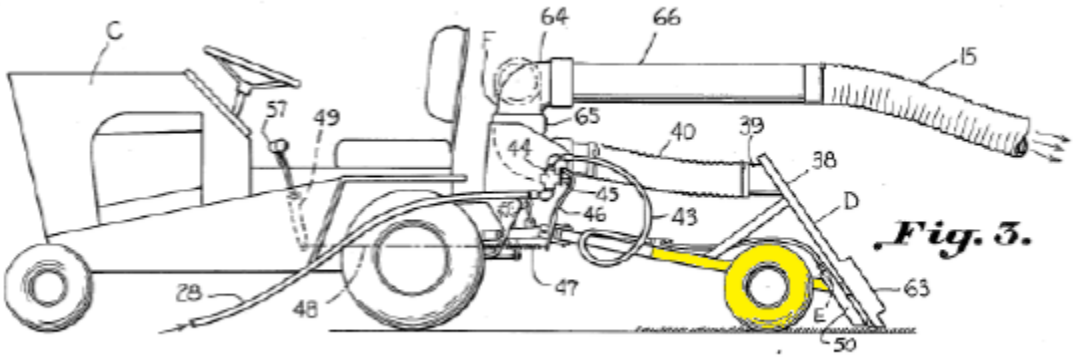


Figure 1 is a perspective view showing a truck-mounted, vehicle carrier apparatus 10 mounted on side walls of a pickup 14, carrying a four-wheeled all-terrain vehicle 15. Ex. 1005, 5:1–4, 5:55–60, 6:33–36.

3. "wherein said wheeled chassis is attached to said tractor"

Petitioner argues that Figure 3 of Jones discloses that the wheeled chassis of its cleaning head is attached to the motorized vehicle utility vehicle. Pet. 51. An annotated version of Jones Figure 3 prepared by Petitioner is reproduced below:



Id. In this annotated figure, the yellow highlighting identifies what Petitioner maps in Jones to the recited wheeled chassis. *Id.* Patent Owner does not dispute that Jones discloses the recited chassis. PO Resp. 18–21. After reviewing the parties' arguments and evidence, we determine Petitioner has proven that Jones discloses a wheeled chassis (as shown in yellow above) attached to a tractor (cleaning vehicle C).

> *4. said mobile blast head and tractor are of a size for removably docking transversely on said bed portion of said truck."*

(a) Asserted Obvious Design Choice

Petitioner argues that the size limitation of claim 5 merely requires that the blast head and the tractor be "of a size" for removably docking transversely on a bed portion of a truck. Pet. 51. Petitioner asserts that claim 5 does not specify any dimensions for the tractor, the blast head, or the bed portion of the truck. *Id.* (citing Ex. 1009 at ¶ 127). Petitioner also argues that claim 5 also does not recite any structural features required for transverse docking. *Id.* Petitioner argues that, therefore, the size limitation is rendered obvious by any tractor with an attached blast head, whose combined size enables them to be docked transversely on a bed portion of a truck. *Id.*

Petitioner further argues that Jones discloses that its "motorized vehicle C may be any suitable conventional utility vehicle" and that Jones does not impose any minimum size requirements for the utility vehicle or the cleaning head. Pet. 52 (quoting Ex. 1002, 3:10–11) (emphasis omitted). Petitioner further asserts that the cleaning system disclosed in Jones is "portable" and requires contemporaneous presence of the service truck, the motorized utility vehicle, and the cleaning head. *Id.* (citing Ex. 1002, Abstr.) Petitioner argues that these components are interconnected and must be deployed together. *Id.* (citing Ex. 1009 ¶ 129). According to Petitioner, thus, an ordinarily skilled artisan would have been motivated to transport the service truck, the motorized utility vehicle, and the cleaning head to the work site as a cohesive unit. *Id.* (citing Ex. 1009 ¶ 129).

Petitioner continues that an ordinarily skilled artisan's search for a suitable transportation solution would have led to Schrunk. Pet. 52 (citing Ex. 1009 ¶ 129). Petitioner asserts that Schrunk discloses several advantages of transversely docking a motorized utility vehicle on a bed portion of a truck. *Id.* (citing Ex. 1005, 1:50–60, 4:32–35). Petitioner argues that Schrunk explains that when the utility vehicle is docked transversely, it can be loaded and unloaded by moving exclusively in the forward direction, thereby obviating the challenges associated with unloading the utility vehicle in reverse. *Id.* (citing Ex. 1005, 4:32–35). Further, Petitioner argues that Figure 1 of Schrunk illustrates a motorized utility vehicle docked transversely on the bed portion of a truck. *Id.* at 52–53.

According to Petitioner, after learning of the advantages of transversely docking a utility vehicle on a bed portion of a truck, an

ordinarily skilled artisan would have been motivated to select the utility vehicle and the cleaning head of such sizes that would enable transverse docking on the bed portion of the support truck disclosed in Jones to achieve the benefits taught in Schrunk. Pet. 53 (citing Ex. 1009 ¶ 131). Petitioner contends that, from there, it would have been an obvious design choice to select the tractor and the blast head such that "said mobile blast head and tractor are of a size for removably docking transversely on said bed portion of said truck." *Id.* (citing Ex. 1009 ¶ 131).

(b) Assertion that the Swivel Joint of Jones Enables Substantially the Same Space-Saving Configuration of the Blast Head as Disclosed in the Challenged Patent

Petitioner also argues that the challenged patent recites an objective of reducing the overall length of the tractor and blast head assembly to under 8'6". Pet. 54 (citing Ex. 1001, 2:41–49). Petitioner asserts that the challenged patent discloses that this objective can be achieved by transitioning the blast head into a space-saving configuration, in which the blast head is rotated in the vertical and/or horizontal planes. *Id.* (citing Ex. 1001, 2:41–49). According to Petitioner, the mechanical component that allows the blast head to transition into this space-saving configuration is the "articulating link," which enables the blast head to move in both vertical and horizontal planes. *Id.* (citing Ex. 1009 ¶ 133).

Further, Petitioner asserts that the challenged patent discloses that the length of the tractor and blast assembly can be reduced by articulating the blast head in a vertical plane as follows: "blast head may be raised to a vertical position and then manually flipped up and back reducing the overall length." Pet. 54 (quoting Ex. 1001, 4:38–43). In addition, Petitioner argues

that the challenged patent discloses that the length of the blast head assembly can also be reduced by articulating the blast head in the horizontal plane: "when moved all the way to the right this also brings the blast head closer to the wheels of the tractor thereby reducing its overall dimension to under 8'6" when in its upright and locked position." *Id.* (quoting Ex. 1001, 2:41–49). Further, Petitioner argues that the challenged patent does not disclose any other methods or structural components for reducing the length of the tractor and blast head assembly. *Id.* (citing Ex. 1009 ¶ 136). Petitioner asserts that, like the challenged patent, Jones also discloses that its cleaning head can rotate in both the vertical and horizontal planes. *Id.* at 55 (citing Ex. 1002, 3:63–4:18, Figs. 4–5). Petitioner further contends swivel joint 52 in Jones enables the cleaning head to rotate in the horizontal plane about bolt 53 and in the vertical plane about transverse pin 54. *Id*. (citing Ex. 1002, 3:63 –4:3) (referencing annotated version of Jones Figure 4 at Pet. 55.)

Petitioner contends that the cleaning head of Jones can be flipped up and back about the transverse pin 54 and can also be moved all the way to the right about bolt 53. Pet. 55 (citing Ex. 1009 ¶ 135). According to Petitioner, thus, swivel joint 52 of Jones enables the position of the cleaning head to be adjusted in substantially the same manner as disclosed in the challenged patent. *Id.* at 55–56 (citing Ex. 1009 ¶ 135).

Petitioner further argues that it would have been obvious to an ordinarily skilled artisan to have adjusted the position of the cleaning head of Jones to decrease the overall length of the blast head and the utility vehicle. *Id.* (citing Ex. 1009 ¶ 135). Petitioner contends that Schrunk provides an explicit motivation for transversely docking the utility vehicle

on the truck, which would motivate an ordinarily skilled artisan to flip the blast head up and move it to a side, which would enable the utility vehicle and the blast head to fit transversely on the bed portion of the service truck. *Id.* (citing Ex. 1009 ¶ 135). Further, Petitioner argues, the challenged patent discloses that when the blast head is "moved all the way to the right" and "flipped up and back," the utility vehicle and the blast head can be docked transversely on the bed portion of the truck. *Id.* (citing Ex. 1001, 2:41–49, 4:38–42).

Petitioner argues that, as a result, Jones in view of Schrunk would have rendered obvious "said mobile blast head and tractor [being] of a size for removably docking transversely on said bed portion of said truck." Pet. 56.

(c) Patent Owner's Arguments

Patent Owner argues that Petitioner has not set forth a sufficient motivation for modifying the asserted references to achieve the claimed invention. PO Resp. 20. Patent Owner further argues that StripeJet is 10'2" long and that the maximum width allowed on U.S. highways is 8'6." *Id.* (citing Ex. 2012 ¶ 94). Patent Owner further argues that Schrunk's small vehicle was not meant to carry a mobile blast head. *Id.* at 21.

(d) Petitioner's Reply

In its Reply, Petitioner repeats its position that lengths of the trunk and blast head were obvious design choices, noting that Jones discloses that motorized vehicle C may be any suitable conventional utility vehicle without imposing any size requirements for the vehicle or its cleaning head. Pet. Reply 24. Petitioner also argues that Schrunk discloses the advantages of transversely docking and transporting a utility vehicle on a truck bed and

a system for accomplishing this objective. *Id.* (citing Ex. 1005, 2:12–31). Further, Petitioner repeats its argument that Jones discloses an articulating link that enables the cleaning head to be flipped back and up, reducing the overall length of the tractor-cleaning head assembly. *Id.* at 26.

(e) Discussion

We agree with Patent Owner that Petitioner has not set forth a sufficient rationale to modify the references to achieve the claimed invention. In particular, we determine that Petitioner has not provided a sufficient rationale for modifying the teachings of the asserted references to meet the size limitation of claim 5. First, although Petitioner argues that an ordinarily skilled artisan would have utilized Schrunk's teachings of transverse loading to overcome problems with unloading vehicles in reverse, Petitioner has not set forth any persuasive evidence that Jones's vehicle has any problem being unloaded in reverse. Pet. 51–53. Further, Petitioner has not set forth any persuasive evidence that the mechanisms that Schrunk teaches for permitting transverse loading would work with Jones's truck, and Petitioner has not proposed any other mechanism for transversely loading Jones's vehicle. *Id.* Second, Petitioner's only evidence that it would have been an obvious design choice to select the tractor and blast head so they are of the size for removably docking transversely on the bed portion of the truck is the conclusory testimony of its expert, which is entitled to little or no weight. *Id.* (citing Ex. 1009 ¶ 131); *see also* Ex. 1009 ¶ 132.

Third, Petitioner's argument that the truck and blast head assembly can be made to have an overall length of under 8'6", which Dr. King testifies is the width limit for transportation on U.S. highways (Ex. 2012 ¶ 92), misses the point. *Id.* at 54–56. In particular, Petitioner argues that the

challenged patent discloses (i) bringing the blast head closer to the wheels of the tractor and (ii) raising the blast head to a vertical position and flipping it up and back to bring the dimensions of the tractor with the blast head to under 8'6" for transverse highway travel. *Id.* at 54 (citing, Ex. 1001, 2:41–49, 4:38–43; Ex. 1009 ¶¶ 133, 136). Petitioner then argues that these teachings in the challenged patent could be applied to Jones because bolt 53 allows the cleaning head to be rotated all the way to one side bringing the cleaning head closer to the motor vehicle and pin 54 allows the blast head to be raised and manually flipped up and back. *Id.* at 55–56 (citing Ex. 1002, 3:63–4:18, Figs. 4, 5; Ex. 1009 ¶ 135). This argument, however, relies on impermissible hindsight. The issue for obviousness is not merely whether an ordinarily skilled artisan could have made the claimed invention, but whether that artisan would have been motivated to do so. *Personal Web Techs., LLC v. Apple, Inc.*, 849 F.3d 987, 993 (Fed. Cir. 2017); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

Petitioner does not direct us to any portion of Jones or any other prior art reference that suggests rotating Jones's cleaning head all the way to one side to bring the cleaning head closer to the motor vehicle or suggests raising and manually flipping up and back Jones's cleaning head. Pet. 51–56. And we see none. For instance, the passage from Jones that Petitioner cites as disclosing the capacity to raise and manually flip the cleaning head does not suggest raising and flipping the cleaning head; instead, it merely states: "A transverse pin 54 is provided between bifurcated ends of the swivel 52 for coupling the tongue 32 to an elongated bar-type member 55 carried on the motorized vehicle." Ex. 1002, 3:63–4:3 (cited by Pet. 53).

Fourth, we are not persuaded by Petitioner that, in Jones, bolt 53 allows the cleaning head to rotate all the way to one side or that pin 54 allows the cleaning head to be raised and manually flipped up. Pet. 55. Petitioner fails to direct us to any portion of Jones that describes or suggests that bolt 53 or pin 54 permit such motion. *Id.* at 55–56. The motion described in Jones involving bolt 53 and pin 54 is movement from a full-line position to a phantom line position. Ex. 1002, 4:3–7. As shown in Figure 4 of Jones, neither position involves rotating the cleaning head all the way to one side and manually flipping the cleaning head up and back. *Id.* at Fig. 4. And Petitioner has not set forth any modifications to Jones to permit bolt 53 to allow the cleaning head to rotate all the way to one side or permit pin 54 to allow the cleaning head to be raised and manually flipped up. Pet. 55–56.

Fifth, even with Petitioner's proposed construction for high pressure,[15] Jones's cleaning head does not use a high pressure liquid. Pet. Reply 7–8 ("'High pressure' should be construed as 'a pressure greater than 2,000 psi.'"); Pet. 27 ("Jones discloses . . . approximately 200 pounds per square inch"). By necessity, Petitioner relies on modifying Jones in light of NLB's teachings to meet the high pressure limitation of claim 1, from which claim 5 depends. *Id.* at 26–28. Petitioner, however, has not set forth how Jones, as adapted to meet the high pressure limitation of claim 1, would also be adapted to meet the size limitation of claim 5, or how the cited prior art would have suggested such a modification. Pet. 50–56; Pet. Reply 24–27. Petitioner has not alleged that an ordinarily skilled artisan could merely use NLB's tractor for this purpose. Pet. 50–56; Pet. Reply 24–27. And the

[15] In its Reply, Petitioner modified its proposed construction for "high pressure." Pet. 13–14; Pet. Reply 7–8.

evidence before us indicates that NLB's tractor could not be used for that purpose. In particular, Dr. King testifies that NLB's tractor is 10' 2" long and that the maximum width allowed for transportation on U.S. highways is 8'6". Ex. 2012 ¶¶ 92, 95. Based on this record, we credit this testimony by Dr. King, which Petitioner has not disputed. Pet. Reply 24–27; Ex. 1002, 2:16–20 (indicating the importance of achieving a width of less than 8'6"); Ex. 1006, 4. In sum, Petitioner has not set forth any persuasive evidence that an ordinarily skilled artisan, without impermissible hindsight, would have reduced the width of Jones as modified by NLB to be of a size for transverse transportation.

Therefore, we determine that Petitioner has not proven that Jones, Breither, Herhold, and Schrunk would have taught or suggested or otherwise rendered obvious the size limitation of claim 5. Accordingly, Petitioner has not proven that claim 5 would have been obvious over Jones, Breither, Herhold, and Schrunk.

b. Asserted Obviousness of Claim 6 over Jones, Breither, Herhold, and Schrunk.

Claim 6 depends on claim 5. For the reasons described above for claim 5, we determine that has not proven that claim 6 would have been obvious over Jones, Breither, Herhold, and Schrunk.

c. Asserted Obviousness of Claim 5 over Clemons, NLB, and Schrunk

Petitioner argues that the images of StripeJet in NLB disclose a wheeled chassis attached to a tractor. Pet. 82. Patent Owner does not dispute that assertion, and we accept this assertion. PO Resp. 22–23.

For the size limitation of claim 5, Petitioner presents similar arguments to those presented for the combination of Jones, Breither,

Herhold, and Schrunk. Petitioner argues that Schrunk discloses a vehicle of a size to be stowed transversely on the bed portion of a truck and enumerates advantages to transversely stowing the vehicle. Pet. 84. Petitioner further contends that, in view of Schrunk, an ordinarily skilled artisan would have been motivated to select a tractor and cleaning head with a combined size that would enable them to be transversely docked on the bed portion of the truck. *Id.* (citing Ex. 1009 ¶ 195). Petitioner further argues that NLB does not require that the tractor and blast head combined be of a certain size, but rather discloses that a "compact" vehicle is desirable for addressing areas of limited access. *Id.* (citing Ex. 1006, 5). Further, Petitioner asserts the mere scaling of the blast head and the tractor would not have been uniquely challenging or difficult for an ordinarily skilled artisan. *Id.* (Ex. 1009 ¶ 196).

Petitioner further argues that the combination of Clemons and NLB teaches mechanical components that provide the same size-conserving capabilities as disclosed in the challenged patent. Pet. 84 (citing Ex. 1009 ¶ 197). Petitioner reiterates that the challenged patent discloses an articulating link that is adapted to be flipped up and back. *Id.* at 84–85. Petitioner argues that arm 42 in Clemons has this same capability: "[a]rm 42 can be manually pivoted or pivoted via a motorized force to raise/lower cleaning head 40 and set a forward-to-rear pitch angle of cleaning head 40 relative to surface 100." *Id.* at 85 (citing Ex. 1008, 3:36-41). Petitioner argues that by pivoting up arm 42 to increase the pitch angle, the overall length of Clemons's cleaning head and vehicle is reduced. *Id.* (citing Ex. 1009 ¶ 197). Furthermore, Petitioner argues that an ordinarily skilled artisan would have been motivated to modify the articulating arm of the

NLB tractor to include structural features for adjusting the front-to-rear pitch of the blast head to account for the surface over which the tractor is to be driven. *Id.* (citing Ex. 1009 ¶ 198).

Petitioner argues that, as a result, claim 5 would have been obvious over Clemons, NLB, and Schrunk for two reasons. Pet. 85. First, Petitioner contends claim 5 does not impose any structural limitations on either the tractor or the blast head and instead only requires that they be "of a size" for transversely docking on a truck bed, which is a mere design choice. *Id.* Further, Petitioner asserts that, in view of Schrunk, it would have been obvious to select a tractor and a cleaning head of such sizes as to enable transverse docking on the bed portion of the Clemons truck. *Id.* Second, Petitioner argues that Clemons discloses a pivoting arm to manipulate the pitch of the cleaning head in substantially the same manner as disclosed in the challenged patent for reducing the combined size of the tractor and blast head. *Id.*

In the Patent Owner Response, Patent Owner argues that Clemons is not a cleaning system as that term is used in the challenged patent. PO Resp. 23. In its Reply, Petitioner argues that Clemons is a cleaning system. Pet. Reply 27–28, 31.

For essentially the same reasons as discussed above regarding Petitioner's showing the asserted obviousness of claim 5 over Jones et al., we determine that Petitioner has not proven that claim 5 would have been obvious over Clemons, NLB, and Schrunk.[16] In particular, we determine

[16] As discussed above, we are not persuaded by Patent Owner's argument that Clemons does not disclose a cleaning system.

that Petitioner has not provided a sufficient rationale for modifying the teachings of the asserted references to meet the size limitation of claim 5.

First, Petitioner has not set forth any persuasive evidence that StripeJet has any problem being unloaded in reverse, so as to motivate an ordinarily skilled artisan to use Schrunk's solution of transverse docking for that issue. Pet. 83–86. Nor has Petitioner presented any evidence that Schrunk's apparatus for transverse loading would work for StripeJet. *Id.* Petitioner has also not proposed any modification to Schrunk's apparatus to adapt it for StripeJet. *Id.* Second, Petitioner's only evidence that it would have been an obvious design choice to select the tractor and blast head so they are of the size for removably docking transversely on the bed portion of the truck is the conclusory testimony of its expert, which is entitled to little or no weight. *Id.* at 84 (citing Ex. 1009 ¶¶ 195–196).

Third, Petitioner's argument that arm 42 could be used to increase a pitch angle and decrease the overall length of the vehicle misses the point. *Id.* at 84–85. The size limitation of claim 5 does not require reducing the length of the vehicle; rather, it requires that the vehicle be of a size for removably docking transversely on the bed portion of a truck. Petitioner has not identified how much the overall length of the Clemons vehicle could be reduced by an increase in the pitch angle, and Petitioner has presented no evidence, other than the conclusory testimony of Mr. Boos, that an ordinarily skilled artisan would be able to transversely dock Clemons's cleaning vehicle or StipeJet to a truck in manner that an ordinarily skilled artisan would find acceptable by increasing that pitch angle. Pet. 84–85 (citing Ex. 1009 ¶¶ 195–197). Fourth, as discussed, the issue for obviousness is not merely whether an ordinarily skilled artisan could have

combined or modified the teachings of the prior art to arrive at the claimed invention, but whether that artisan would have been motivated to do so. And Petitioner has not set forth sufficient evidence of such a motivation. *Id.* Instead, Petitioner relies on conclusory testimony from Mr. Boos for this purpose, which we do not credit. *Id.* Accordingly, we determine that Petitioner has not proven that claim 5 would have been obvious over Clemons, NLB, and Schrunk.

d Asserted Obviousness of Claim 6 over Clemons, NLB, and Schrunk.

Claim 6 depends on claim 5. For the reasons described above for claim 5, we determine that has not proven that claim 6 would have been obvious over Clemons, NLB, and Schrunk.

V. CONCLUSION

Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 1–4 and 10 would have been obvious over the combination of Clemons and NLB. Petitioner, however, has not demonstrated that the subject matter of claims 5 and 6 would have been obvious over the combination of Jones, Breither, NLB, and Schrunk or that it would have obvious over the combination of Clemons, NLB, and Schrunk.

VI. ORDER

Accordingly, it is:

ORDERED that claims 1–4 and 10 of the challenged patent have been shown to be unpatentable and that claims 5 and 6 of the challenged patent have not been shown to be unpatentable, and

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

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