Case: 19-1778

Document: 31-1 Page: 7 Filed: 03/19/2020

Trials@uspto.gov 571-272-7822 Paper 83 Entered: February 14, 2019

PARTIES AND BOARD ONLY

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PROPPANT EXPRESS INVESTMENTS, LLC, PROPPANT EXPRESS SOLUTIONS, LLC, Petitioner,

v.

OREN TECHNOLOGIES, LLC, Patent Owner.

> Case IPR2017-01918 Patent 9,403,626 B2

Before MITCHELLG. WEATHERLY, KEVIN W. CHERRY, and MICHAELL. WOODS, *Administrative Patent Judges*.

WOODS, Administrative Patent Judge.

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

I. INTRODUCTION

Proppant Express Investments, LLC, and Proppant Express Solutions, LLC, (collectively, "Petitioner"), filed a Petition (Paper 1, "Pet.") seeking *inter partes* review of claims 1–7, 9, 10, and 12–20 of U.S. Patent No. 9,403,626 B2 ("the '626 patent") under 35 U.S.C. § 314(a). Pet. 1.

Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, on February 16, 2018, we instituted an *inter partes* review of the challenged claims. *See* Paper 18, 43 ("Decision to Institute" or "Inst. Dec."); *see infra* Part II.E (explaining that our original Decision to Institute was modified to include all grounds presented in the Petition); *see also* Paper 26 (modifying our original Decision to Institute).

After institution of trial, Oren Technologies, LLC ("Patent Owner") filed a Patent Owner Response (Paper 31, "PO Resp."), to which Petitioner replied (Paper 45, "Pet. Reply"). With our authorization, Patent Owner also filed a Sur-Reply (Paper 62, "PO Sur-Reply").

Oral argument was conducted on November 30, 2018, and the transcript of the hearing has been entered as Paper 78.

We have jurisdiction under 35 U.S.C. § 6. After considering the evidence and arguments of both parties, and for the reasons set forth below, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1-7, 9, 10, and 12-20 of the '626 patent are unpatentable.

A. Related Proceedings

The '626 patent is involved in two pending lawsuits entitled SandBox Logistics, LLC v. Grit Energy Solutions, LLC, No. 3:16-cv-00012 (S.D. Tex.)

and SandBox Logistics, LLC v. Proppant Express Investments, LLC, No. 4:17-cv-00589 (S.D. Tex.), the second of which names Petitioner as a defendant. Pet. 2.

Proppant Express Solutions, LLC—one of the named petitioners in this proceeding—filed a petition in IPR2017-00768, challenging certain claims of U.S. Patent 8,585,341. *Id.* The '626 patent is related to the '341 patent and is also owned by Patent Owner. *Id.*

Petitioner also filed petitions in IPR2017-01917, IPR2017-02103, and IPR2018-00914, which challenge related US Patent Nos. 9,296,518 and 9,511,929, also owned by Patent Owner.

B. The '626 patent (Ex. 1003)

The '626 patent is titled "Proppant Storage Vessel and Assembly Thereof." Ex. 1003, [54]. As described in the '626 patent, proppant is a "material, such as grains of sand, ceramic, or other particulates, that prevent the fractures [from hydraulic fracturing] from closing when the injection [highly-pressurized fracking fluid] is stopped." *Id.* at 1:41–43. The '626 patent purports to improve upon prior art storage vessels. *See id.* at 2:10–3:6.

Figure 1 of the '626 patent depicts a preferred embodiment of the Patent Owner's invention. *Id.* at 5:10–12. We reproduce Figure 1, below:



FIG. 1

As shown above, Figure 1 depicts proppant storage assembly 10 with first container 12, second container 16, and third container 44. *See id.* at 5:10–6:17. The containers are spaced apart from one another and each includes a bottom wall (20, 30, 50) with a hatch (22, 28, 48) affixed thereto so that proppant from third container 44 can flow through hatch 48 into second container 16, and proppant in second container 16 can flow through hatch 28 into first container 12. *See id.*

Figure 2 of the '626 patent depicts a portable conveyor below the first proppant storage assembly. *See id.* at 6:47–54. We reproduce Figure 2, below:





As shown above, Figure 2 depicts portable conveyor 60, which is transportable, located directly beneath first container 12. *See id.* Bottom hatch 22 of first container 12 can be opened to discharge proppant onto conveyor 60. *See id.*

Figure 3 of the '626 patent depicts a plan view of a proppant storage container (*id.* at 4:63–65), which figure we reproduce below:



As shown above, Figure 3 depicts the interior construction of first container 12. *Id.* at 6:64–65. Container 12 has first end wall 70, second end wall 72, first side wall 74, and second side wall 76, along with inclined surfaces (78, 80, 82, 84) that extend from the side walls and end walls to bottom hatch 22. *See id.* at 6:65–7:6. The inclined surfaces funnel proppant toward bottom hatch 22. *See id.* at 7:11–16.

C. Illustrative Claim

Of the challenged claims, claims 1, 7, 13, and 18 are independent. Ex. 1003, 8:63–12:23. Claim 1, reproduced below, illustrates the claimed subject matter, and we add emphases to particular limitations addressed in this Decision:

1. A container structurally strengthened to transport and store large volumes of proppant effectively therein, the container comprising:

a top;

a bottom, having an outlet formed therein;

sidewalls coupled to the top and bottom, so as to define an interior volume of the container thereby to store the proppant therein;

a plurality of sidewall supports positioned to provide structural support to the sidewalls when large volumes of

> proppant are positioned within the interior volume, the proppant comprising sand having a substantially spherical shape and a tightly graded particle distribution, the plurality of sidewall supports including a *plurality of support braces extending in a substantially horizontal position and positioned in direct contact with interior surfaces of the sidewalls* to enhance support of the sidewalls when the container is filled with the proppant, the container including a container frame structurally arranged to support another container when filled with large volumes of proppant and when positioned in a vertically stacked arrangement thereabove, and *the large volumes are at least 30,000 pounds*;

> ramps downwardly inclined and extending inwardly from the sidewalls to direct the proppant toward the outlet when the proppant is stored therein, at least one support brace of the plurality of support braces being positioned vertically higher than the ramps; and

> a hatch positioned proximate the outlet, the hatch being moveable between open and closed positions.

Id. at 8:63-9:25 (emphases added).

D. References Relied Upon

Petitioner relies on the following references:

Name	e Reference		
Smith	US 2008/0226434 A1, published Sept. 18, 2008	1005	
Hedrick	US 5,290,139, issued Mar. 1, 1994	1006	
Krenek	US 2009/0078410 A1, published Mar. 26, 2009		
Claussen	US 2011/0127178 A1, published June 2, 2011	1008	
Uhryn	US 2013/0022441 A1, published Jan. 24, 2013	1045	
Racy	US 3,752,511, issued Aug. 14, 1973	1048	

Case: 19-1778

IPR2017-01918 Patent 9,403,626 B2

E. Alleged Grounds of Unpatentability

Petitioner challenges claims 1–7, 9, 10, and 12–20 of the '626 patent are unpatentable under the following grounds:

Grounds	References	Basis	Claim(s)
1–3	Smith, Krenek and/or Uhryn, Hedrick, and Racy	§ 103(a)	7, 9, 10, and 12
4-6	Smith, Krenek and/or Uhryn	§ 103(a)	13, 16, and 17
7–9	Smith, Krenek and/or Uhryn, Racy	§ 103(a)	14
10-12	Smith, Krenek and/or Uhryn, and Hedrick	§ 103(a)	15
13-15	Smith, Krenek and/or Uhryn, Hedrick	§ 103(a)	1–3
16–18	Smith, Krenek and/or Uhryn, Hedrick, and Claussen	§ 103(a)	4–6 and 18–20

Pet. 6.

Petitioner also relies on the declaration testimony of Dr. Gary R. Wooley, Ph.D. (Ex. 1001), and Michael Stock (Ex. 1059) in support of its Petition.

II. ANALYSIS

A. Claim Construction

As a first step in our analysis, we determine the meaning of the claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b); ¹ *Cuozzo Speed*

¹ The revised claim construction standard for interpreting claims in *inter partes* review proceedings as set forth in the final rule published October 11, 2018, does not apply to this proceeding, because the new "rule is effective on November 13, 2018, and applies to all IPR, PGR, and CBM petitions

Techs., LLC v. Lee, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation approach). Under that standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In our Decision to Institute, we determined that no claim term required express construction for the purpose of that decision. Paper 18, 9; *see also Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy." (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

Patent Owner did not offer construction of any term in its Response (PO Resp. 35) and Petitioner did not offer construction of any term in its Reply (*see generally* Pet. Reply). Having reviewed the record developed during trial, we maintain that there is no claim term that requires express construction for the purposes of this Final Written Decision.

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if "the differences between the subject matter sought to be patented 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

filed on or after the effective date." Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (to be codified at 37 C.F.R. pt. 42).

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. Graham v. John Deere Co., 383 U.S. 1,
17–18 (1966).

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

C. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17.

In our Decision to Institute, we adopted Petitioner's proposed level of ordinary skill, and determined that a person of ordinary skill in the art ("POSITA") "would have had at least an undergraduate degree in mechanical engineering or an equivalent discipline and at least 2–3 years' experience with discharge systems for use with particulate material, such as proppant" and that "[s]omeone lacking higher education could qualify as a POSITA if they had an aptitude for mechanical systems and possessed an equivalent amount of training and experience with such discharge systems." Inst. Dec. 12–13 (citing in part Pet. 15).

Patent Owner does not submit its own definition of a POSITA. *See generally* PO Resp. We agree with and maintain the statement of the level of skill in the art as set forth in our Decision to Institute.

D. Real Party in Interest

In its Response, Patent Owner argues that we should deny the Petition because Petitioner failed to name as a real party-in-interest ("RPI") Big Box Proppant Investments LLC ("Big Box"), which is related to Liberty Oilfield Services, LLC ("Liberty"). *See* PO Resp. 3–4 ("There can be no dispute that Big Box—funded by Liberty executives and Liberty's parent company—Hi-Crush, and Grit funded this Petition and participated in strategy discussions regarding the filing of this Petition. This makes all three RPI, but [Petitioner] only identified Hi-Crush and Grit as RPI.").

Petitioner has since amended its mandatory notice to name Big Box and Liberty as RPIs. Paper 41; *see also* Paper 82 (denying Patent Owner's Motion to Terminate). Accordingly, Patent Owner's argument is moot.

E. Order Modifying Original Decision to Institute

In our Decision to Institute, we denied review of several of Petitioner's grounds for lacking the particularity and specificity required by 35 U.S.C. § 312(a)(3) and 37 C.F.R. § 42.104(b)(2). Inst. Dec. 11. As explained in that decision, Petitioner submitted *thirty-six* different grounds of unpatentability by relying on "Krenek and/or Uhryn," and we explained that it was not clear why these two references were being relied upon in the "and/or" alternative. *Id.* We explained that the function of the Board was not to comb through Petitioner's arguments in order to decipher the strongest argument or to determine the strongest combination of references to

11

Patent 9,403,626 B2 challenge the claims. *Id.* (citing *LG Elecs., Inc. v. Rosetta-Wireless Corp.,* Case IPR2016-01516 (PTAB Apr. 3, 2017) (Paper 25)). As such, we

Case IPR2016-01516 (PTAB Apr. 3, 2017) (Paper 25)). As such, we considered *Krenek instead of Uhryn* in each ground of unpatentability, as we also found that to be the most consistent reading of the Petition. *Id.*; *see also* Pet. 61–63 (citing Krenek, not Uhryn, in Grounds 4–6 for claimed "method for delivering large volumes of proppant")).

On April 24, 2018, the Supreme Court held that a decision to institute under 35 U.S.C. § 314 may not institute on fewer than all claims challenged in the petition (*SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018)) and on April 26, 2018, the Office issued Guidance on the Impact of *SAS* on AIA Trial Proceedings, which states that "if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition."

https://www.uspto.gov/patents-application-process/patent-trial-and-appealboard/trials/guidance-impact-sas-aia-trial.

To comply with the Office's Guidance, on May 7, 2018, we issued an Order modifying our Decision to Institute effectively instituting on all grounds presented in the Petition, namely, those that included Uhryn. Paper 26, 2. In that Order, we permitted the parties to submit additional briefing to address the newly-instituted grounds that include Uhryn. *Id.* The parties did not submit additional briefing and the parties did not subsequently address Uhryn or our original determination that relying on Krenek "and/or" Uhryn lacked the requisite specificity. *See generally* PO Resp. (ignoring Uhryn in its Response and focusing only on those grounds in which we originally instituted); *see also generally* Pet. Reply (failing to contest our initial determination that relying on Uhryn in the "and/or" alternative lacked the needed specificity).

Accordingly, and as determined in our original DI, we determine again that several of Petitioner's original grounds (that is, those that rely on Uhryn) lack the particularity and specificity required by 35 U.S.C. § 312(a)(3) and 37 C.F.R. § 42.104(b)(2). Inst. Dec. 11. As such, in this Final Written Decision, we consider *Krenek instead of Uhryn* in each ground of unpatentability, and we find this to be the most consistent reading of the Petition. *See, e.g.*, Pet. 61–63 (citing Krenek, not Uhryn, in Grounds 4–6 for claimed "method for delivering large volumes of proppant")).

To summarize, the remainder of this Decision addresses the following grounds:

References	Basis	Claim(s)
Smith, Krenek, Hedrick, and Racy	§ 103(a)	7, 9, 10, and 12
Smith and Krenek	§ 103(a)	13, 16, and 17
Smith, Krenek, and Racy	§ 103(a)	14
Smith, Krenek, and Hedrick	§ 103(a)	15
Smith, Krenek, and Hedrick ²	§ 103(a)	1–3
Smith, Krenek, Hedrick, and Claussen	§ 103(a)	4–6 and 18–20

See Inst. Dec. 43 (instituting review under these same grounds).

F. Smith, Krenek, Hedrick, and Racy (claims 7, 9, 10, and 12)

Petitioner challenges claims 7, 9, 10, and 12 as obvious over Smith,

² Although Petitioner's challenges of claim 15 and claims 1–3 each rely on the same three references (i.e., Smith, Krenek, and Hedrick), because these challenges rely on different findings, we list the challenges separately in this summary. Our listing is also consistent with Petitioner's summary of the challenged grounds as set forth in its Petition. Pet. 6.

Krenek, Hedrick, and Racy. Pet. 6.

1. Smith (Ex. 1005)

Smith is titled "Hopper Container." Ex. 1005, [54]. Smith discloses "a container comprising a structural frame defining a rectangular volume suitable for stacking with conventional intermodal containers." *Id.* ¶ [0007]. To illustrate a particular embodiment of Smith, we reproduce Figures 14 and 15, below:



Smith describes Figure 14 as depicting a hopper container with Figure 15

depicting a side view of that same container. *Id.* ¶¶ [0033], [0034]. In particular, these figures depict hopper container 10 with rectangular frame 12. *Id.* ¶ [0036]. Frame 12 includes corner connectors 22 at each of the corners to permit the containers to be interlocked with one another when stacked. *Id.* ¶ [0038]. Smith describes this container as a 20-foot container with two equal compartments (*id.* ¶ [0040]) that has a maximum payload of 52,500 pounds (*id.* ¶ [0056]).

2. *Hedrick* (*Ex.* 1006)

Hedrick is titled "Portable Hopper with Internal Bracing." Ex. 1006, [54]. Hedrick discloses a "lightweight, small portable hopper for bulk materials that is removably mountable on a tractor trailer." *Id.* at [57]. Hedrick discloses a hopper for holding particulate material, such as sand or gravel. *Id.* at 1:12–15, 4:57–64. We reproduce Figure 4 of Hedrick, below:



Hedrick describes Figure 4 as depicting hopper 10 with bracing structure 30. *Id.* at 3:44–47, 5:11–35. In particular, bracing structure includes first braces 30a and second braces 30b. *Id.* at 5:11–35. First braces 30a are preferably positioned transversely of second braces 30b. *Id.* Hedrick also discloses dispensing port 26 and hinged gate 28 that permit for dispensing of the bulk material. *Id.* at 4:57–64.

3. Krenek (*Ex.* 1007)

Krenek is titled "Aggregate Delivery Unit." Ex. 1007, [54]. Krenek discloses a delivery unit for providing aggregate, such as proppant, to a worksite, such as a wellsite location. *Id.* at [57], ¶ [0002]. In particular, Krenek discloses the use of a conveyor belt running below modular containers. *Id.* ¶ [0028].

4. Racy (Ex. 1048)

Racy is titled, "Container Coupler." Ex. 1048, [54]. Racy discloses a "container coupler having a housing which acts as a spacing means." *Id.* at [57]; *see also id.* at 1:33–37 ("a container coupler is provided for joining together in vertical arrangement standard freight containers. The coupler also acts as a spacing device between adjacent freight containers.").

5. Analysis

a) Independent Claim 7

In addressing the claimed "[system] structurally strengthened to transport and store large volumes of proppant," Petitioner relies on Smith's container "for storing particulate material therein" (Pet. 35) (emphasis omitted), and reasons that "a POSITA would have been motivated to use the

Smith System similarly to how Krenek uses its containers—for storing proppant at a wellsite" (*id.* at 36 (citing Ex. 1001 \P 87)). Dr. Wooley testifies that a POSITA would have appreciated that using Smith's system to store proppant would avoid costs associated with using different containers for transporting the proppant. Ex. 1001 \P 78–81.

To address the claimed "first container comprising," "a first top," "a first bottom," and "a first plurality of sidewalls coupled to the first top and first bottom," Petitioner relies on Smith's container 10 and submits several annotated versions of Smith's Figures 14 and 15 (Pet. 40, 41, 42, and 45), four of which we reproduce, below:



According to Petitioner, Smith's container 10 satisfies the claimed "first top," "first bottom," and "first plurality of sidewalls coupled to the first top and the first bottom. *See* Pet. 40–45 (citations omitted). The embodiment of Figures 14 and 15 depicts a 20-foot container with two equal-sized

compartments. See Ex. $1005 \P$ [0040] ("A twenty foot container, as shown in FIG. 14, is typically divided into two equal compartments").

To address the claimed first bottom "having a first outlet formed therein . . .," Petitioner relies on Smith's chute opening 38 and submits annotated versions of Smith's Figures 9 and 10 (Pet. 43), which we also reproduce, below:



According to Petitioner, and as shown above, "when gate panel 46, which covers chute opening [38] . . . is in the claimed open position, large volumes of proppant could have flowed through the chute opening." Pet. 44 (citing Ex. 1005 ¶¶ [0044], [0045], [0051]).

To address the claimed "first plurality of structural supports positioned to provide structural support to the first plurality of sidewalls . . .," Petitioner relies on "Hedrick's bracing structure 30 [to] meet this element." Pet. 45. Petitioner also submits an annotated version of Hedrick's Figure 4, which we reproduce, below:



Hedrick's FIG. 4 - Annotated

According to Petitioner, Hedrick's internal bracing structure 30, which includes horizontal support members 30a and upwardly extending support members 30b, strengthens the hopper. *See id.* at 49 (citations omitted).

In combining Smith with Hedrick, Petitioner reasons that a "POSITA would have been motivated to use such bracing to reinforce the rectangular section of at least one . . . of the compartments of [Smith's] container 10" for several reasons, including increasing the maximum payload of Smith's containers. *Id.* at 45, 46 (citations omitted); *see also id.*; Ex. 1001 ¶ 149 ("POSITA would have found it desirable to modify Smith's container to include support members like Hedrick's horizontal and/or upwardly extending support members because they would increase the strength of the container (as taught by Hedrick) and thus the maximum payload of the container.").

To address the claimed "first plurality of ramps downwardly inclined and extending inwardly from the first plurality of sidewalls . . .," Petitioner relies on Smith and submits annotated versions of Smith's Figures 6 and 15

to illustrate how Smith satisfies this limitation. Pet. 51. We reproduce these figures, below:



According to Petitioner, the above figures illustrate Smith's ramps and depict these ramps as being downwardly inclined and extending inwardly from the first plurality of sidewalls. *See id.* (citing Ex. 1005 ¶¶ [0008], [0041], [0065]).

To address the claimed "second container adapted to be positioned below the first container to receive proppant when flowing from the first outlet of the first container," Petitioner points to Smith's system that includes second container positioned below first container. Pet. 52 (citing Ex. 1005 ¶ [0051]). Petitioner further points out that Smith's second container has the same features as its first container and, thus, also satisfies the claimed "second top, having an opening," "second bottom, having a second outlet," "second plurality of sidewalls . . .," and "second plurality of ramps" *Id.* at 53 (emphasis omitted).

To address the claimed "second plurality of structural supports," as with the claimed "first plurality of structural supports," Petitioner reasons that a "POSITA would have been motivated to use [Hedrick's] bracing to

20

reinforce the rectangular section of each of the compartments of Smith's second container for" those same reasons discussed above, including to increase the maximum payload of the second container. *See id.* (citing in part Ex. 1001 ¶¶ 149, 150).

To address the claimed "one or more spacers positioned between the first container and the second container," Petitioner relies on Racy's disclosure of container couplers and reasons using Racy's couplers with Smith's system "would have allowed a POSITA to interlock those stacked Smith containers, just as Smith (and Racy) taught) . . . [and that t]his would have increased the space between the stacked Smith containers." Pet. 56 (citing Ex. 1001 ¶ 167); *see also id.* at 53–56 (citing Ex. 1001 ¶ 163–167). Dr. Wooley testifies that adding Racy's spacers would "allow sufficient access to the bottom of the top container in order to facilitate lifting or removing it from the stack, such as by a suitably-sized forklift." Ex. 1001 ¶ 168.

To address the claimed "conveyor positioned below the second outlet . . .," Petitioner relies on Krenek's disclosure of a conveyor. Pet. 57 (citing in part Ex. 1007 ¶¶ [0028], [0038]). Krenek discloses that its "conveyor belt . . . run[s] below the modular containers . . . [and] may be employed to direct aggregate from the modular containers." Ex. 1007 ¶ [0028]. Petitioner reasons that a "POSITA would have recognized the advantages of using a conveyor like Krenek's conveyor belt to direct proppant away from [Smith's container system] after it was discharged," including by "allow[ing] proppant discharged from a container to be conveyed to a mixer or other device without requiring the container to be

lifted above the mixer or other device." Pet. 57 (citing Ex. 1001 ¶¶ 172, 173).

Patent Owner presents numerous arguments, which we address separately, below.

(1) Increasing Smith's Load Capacity

Patent Owner disagrees with Petitioner's reasoning that a POSITA would have modified Smith to increase the amount of proppant that Smith's container could carry. *See* PO Resp. 37 (citing in part Pet. 46). Patent Owner argues that a POSITA would not be "motivated to fill Smith's container with as many grains of sand as the volume of Smith's container can hold." *Id.* In support of this argument, Patent Owner presents two subarguments, which we address separately, below.

First, Patent Owner asserts that for a twenty-foot ISO container, the gross mass rating is 52,900 pounds, and argues that increasing Smith's container so that it can carry 80,000 pounds of payload, as Petitioner proposes, would exceed this ISO rating, preventing it from "being picked up and moved by standardized equipment" (*id.* at 38) and making it too dangerous while increasing equipment and repair costs (*id.* at 38–39). In support of this argument, Patent Owner's expert, Mr. Fred P. Smith, testifies that the containers would be dangerously heavy, potentially causing a forklift or crane to "tip or break" and would further increase "equipment and repair costs." Ex. 2049 ¶ 72.

We are not persuaded that reinforcing Smith's containers would make them dangerous or too expensive, however.

First, although Mr. Smith testifies that "[a] POSITA would have

known that picking up containers that weigh more than the standardized weight for a given size of container could be dangerous," this argument is premised on an unfounded assumption that Smith's containers are ISO-compliant containers. Ex. 2049 ¶ 72. We are not persuaded that Smith's containers must comply with ISO standards and Mr. Smith acknowledges that the containers are not necessarily ISO containers. *See* Ex. 1082, 44:6–7 (testifying that Smith's containers are "likely," but not necessarily, ISO containers).

Second, and although Mr. Smith testifies that reinforcing the containers would make them dangerously heavy as they would more likely cause a forklift or crane to tip over or placed on trailers too weak to haul the heavy load, Mr. Smith fails to cite to evidence that specifically support these assertions. See Ex. $2049 \ 72$. "Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." $37 \text{ C.F.R.} \ 42.65(a)$; see also Fed. R. Evid. 702(b) ("A witness who is qualified as an expert . . . may testify . . . if . . . the testimony is based on sufficient facts or data."). As such, we are not persuaded that reinforcing Smith's containers would make them too dangerous.

Second, Patent Owner argues that Smith's containers are designed to be transported on *interstate roads* and are already capable of carrying as much proppant as lawfully permitted (PO Resp. 39).

Addressing Patent Owner's second sub-argument (2), even if we assume to be true Patent Owner's assertion that Smith's containers are designed to be transported on *roads*—thereby subjecting themselves to interstate highway weight limits of 80,000 pounds—and that because of this, Smith's containers "can already carry more weight than can be carried over

an interstate" (*id.* at 39), Patent Owner's argument is not persuasive. For several reasons, we remain persuaded by Petitioner's reasoning that a POSITA would have nevertheless reinforced Smith's containers to increase the amount of proppant that the containers can transport and store. Pet. 50.

For instance, Smith also discloses that its containers are for transportation by *marine* and *rail* (Ex. 1005 ¶ [0055]), and the record supports a finding that some roads are not subject to the 80,000 weight limit (*see*, *e.g.*, Ex. 1082, 35:9–18 ("[A] road doesn't necessarily have to be an interstate highway There are some roads that, you know - - or even private roads that wouldn't have any weight limitation.")). Accordingly, we agree with Petitioner and find that a POSITA would have had reason to reinforce Smith's containers so that they may carry and store more proppant (Pet. 50), even if doing so would increase Smith's carrying capacity beyond the interstate highway weight limit of 80,000 pounds, so that the containers can carry more proppant on non-interstate roads, rail, and/or marine vessel.

(2) Adding Hedrick's "support braces"

Patent Owner further argues that a "POSITA would not have been motivated to add bracing like that taught by Hedrick to Smith's container because it would be unnecessary; the top of Smith's container provided the necessary support." POResp. 50. In support of this argument, Patent Owner asserts that "Smith's containers are intermodal, optimized to support large payload weights" (*id.* at 49 (citing Ex. 1005 ¶¶ 55–56)) and Mr. Smith testifies that "[c]ontainers having an enclosed top, like those of Smith, would not benefit from Hedrick's support braces. A POSITA would have known that the top of Smith's container provides the *same lateral support* to the

side and end walls of Smith's container that is provided by Hedrick's support braces." Ex. 2049 ¶ 103 (emphasis added).

Having weighed the evidence and competing testimony, we find Patent Owner's argument unpersuasive and instead credit Dr. Wooley's testimony that "Hedrick's horizontal and/or upwardly extending support members . . . would increase the strength of [Smith's] container . . . and thus the maximum payload of the container." Ex. 1001 ¶ 149.

As argued persuasively by Petitioner, Patent Owner's assertion that adding Hedrick's bracing structure to Smith's container would not further reinforce Smith's container is simply "not credible." Pet. Reply 17 ("PO's position isn't credible"). Indeed, Patent Owner's expert, Mr. Smith, appears to concede that adding Hedrick's bracing to Smith's container would help to prevent Smith's walls from expanding out. *See* Ex. 1082, 58:11–25 (testifying, "would [Hedrick's braces] keep the walls [of Smith's container] from expanding out; well, *they may very well do that* at the expense of having a much higher stress which you don't want" (emphasis added)).

Furthermore, Patent Owner's expert fails to cite sufficient evidence to support his assertion that a "POSITA would have known that the top of Smith's container *provides the same lateral support* to the side and end walls of Smith's container that is provided by Hedrick's support braces." Ex. 2049¶ 103. Other than Mr. Smith's conclusory statement, we find no evidence to support the assertion that Smith's container provides the *same* lateral support as Hedrick's braces. As explained above, "Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." 37 C.F.R. §42.65(a); *see also* Fed. R. Evid. 702(b) ("A witness who is qualified as an expert . . . may testify . . .

25

if . . . the testimony is based on sufficient facts or data.").

Having weighed the competing testimony and evidence, we credit

Dr. Wooley's testimony that

[a] POSITA would have realized that a support member that extended between opposing sidewalls of a compartment, particularly near the middles where they are least supported other [sic] portions of Smith's frame, would increase the ability of those sidewalls to bear such loads, via, for example, facilitating load sharing between those walls, resisting buckling of those walls, etc.

(Ex. 1001 ¶ 150) and we are persuaded by Petitioner's reasoning that Smith's container would be strengthened by adding support braces like Hedrick's (Pet. 55–56).

(3) Adding Racy's Spacers

Patent Owner argues that a

POSITA would have understood that Smith teaches that the bottom gate and top latch of [Smith's] containers could be opened while the containers were stacked without any additional components . . . [and b]ecause of that, a POSITA would not be motivated to combine Smith and Racy because the combination would not provide any benefits.

PO Resp. 51 (citing Ex. 2049 ¶ 111, 113).

Patent Owner's argument is not persuasive. *Even though* Smith discloses that its frame has corner connectors at each of its corners to permit stacked containers to be interlocked (Ex. 1005 \P [0038]), and *even if* its stacked containers could already be opened while they were stacked, as Patent Owner asserts (PO Resp. 51), we agree with Petitioner that a POSITA would have nevertheless added Racy's spacers to "increase[] the space between the stacked Smith containers" (Pet. 56).

As argued correctly by Petitioner, "a POSITA's motivation need not match the patentee's" (Pet. Reply 19 (citation omitted)), and we find persuasive Petitioner's reasoning that a POSITA would have added Racy's spacers "to allow sufficient access to the bottom of the top container in order to facilitate lifting or removing it from the stack, such as by a suitably-sized forklift." Ex. 1001 ¶ 168.

(4) 10-foot, one-compartment container

As discussed above, Petitioner relied on Smith's disclosure of a 20foot (two-compartment) container. In addition to relying on Smith's 20-foot, two-compartment container, Petitioner alternatively contends that it would have been obvious for a POSITA to use a 10-foot, *one-compartment* version of Smith's container at the time of the invention. *See* Pet. 82–83. In particular, Dr. Wooley testifies that modifying Smith's two-compartment container to become a one-compartment container would provide numerous benefits, including occupying "less space at the well side" (Ex. 1001 ¶ 191) and allowing the container to be filled with proppant while not exceeding the instate highway limit of 80,000 lbs (*id.*).

Patent Owner argues that "a POSITA would not be any more motivated to reinforce a single-compartment container than it would Smith's twenty-foot container, as the container Petitioners propose would still violate the ISO gross mass rating." PO Resp. 40. In support of this argument, Patent Owner argues that "the gross mass rating for a ten-foot container such as Petitioners propose is 22,400 pounds... making the single-compartment container non-ISO-compliant." *Id.* at 40–41 (citing Ex. 2051, 7). Patent Owner further argues that the modification "would make the single-

compartment container *commercially unacceptable* and potentially *dangerous* to use and transport." *Id.* at 41 (citing Ex. 2049 ¶ 73 (emphases added)). Patent Owner's expert testifies that a "POSITA would not have been motivated to further deviate from the ISO standard . . . because such container would not be 'commercially feasible' and could even be dangerous." Ex. 2049 ¶ 73.

Patent Owner's arguments are not persuasive.

As to Patent Owner's ISO-compliance argument, we are not persuaded that Smith's containers require ISO compliance. Patent Owner's expert acknowledges that the containers are not necessarily ISO containers. *See* Ex. 1082, 44:6–7 (testifying that Smith's containers are "likely," but not necessarily, ISO containers).

Regarding Patent Owner's *dangerous* argument, Patent Owner's expert fails to cite to evidence that specifically supports this assertion. *See* Ex. 2049 ¶ 73. "Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." 37 C.F.R. §42.65(a); *see also* Fed. R. Evid. 702(b) ("A witness who is qualified as an expert . . . may testify . . . if . . . the testimony is based on sufficient facts or data."). As such, we are not persuaded that reinforcing Smith's containers would make them too dangerous.

(5) Secondary considerations

Notwithstanding what the teachings of the prior art would have suggested to one skilled in the art, objective evidence of non-obviousness ("secondary considerations") may lead to a conclusion that the challenged claims would not have been obvious. *In re Piasecki*, 745 F.2d 1468, 1471–

72 (Fed. Cir. 1984). Objective evidence of non-obviousness "may often be the most probative and cogent evidence in the record" and "may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012) (citation omitted).

Patent Owner puts forth evidence of commercial success and praise by others. PO Resp. 62–68. As explained below, however, Petitioner submits evidence to persuade us that Patent Owner's commercial success and industry praise were a result of additional, unclaimed features, thereby rebutting Patent Owner's presumption of nexus.

To be relevant, evidence of non-obviousness must be commensurate in scope with the claimed invention. In re Kao, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Thus, to be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. In re GPAC Inc., 57 F.3d 1573, 1580 (Fed. Cir. 1995). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining non-obviousness. Demaco Corp. v. F. Von Langsdorff Licensing Ltd., 851 F.2d 1387, 1392 (Fed. Cir. 1988). There is a "presumption of a nexus" when a product is "coextensive" with a patent claim. Teva Pharms. USA, Inc. v. Sandoz, Inc., 723 F.3d 1363, 1372 (Fed. Cir. 2013). The Federal Circuit has held that "if the marketed product embodies the claimed features, and is coextensive with them, then a nexus is presumed and the burden shifts to the party asserting obviousness to present evidence to rebut the presumed nexus." Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1130 (Fed. Cir. 2000).

Patent Owner presents evidence that its product (the "SandBox Product" or "Product") is covered by the challenged claims. *See* PO Resp. 58–62. In particular, Patent Owner submits multiple pictures of its SandBox Product and explains in detail how each element of the challenged claims are covered by its Product. *See id.* at 59–61. Patent Owner also submits the testimony of Mr. Smith. *Id.* at 58 (citing Ex. 2049, App. A, 1– 3). Within his declaration, Mr. Smith presents detailed claim charts of the challenged claims precisely identifying how the SandBox Product embodies each of the claimed features. Ex. 2049, App. A, 1–17. In light of this testimony and evidence, Patent Owner submits that the SandBox Product is the product disclosed and claimed in the '626 patent, thereby establishing a *presumption* of nexus. *See* PO Resp. 54 (citing *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1071 (Fed. Cir. 2018)).

Petitioner responds that "*unclaimed components* contributed to PO's purported commercial success and industry praise [and] undercuts any presumed nexus." Pet. Reply 24 (emphasis added). In particular, Petitioner asserts that Patent Owner "leases an equipment set that includes boxes, a conveyor (as part of PO's cradle, discussed below), rig mats, a fork lift, a light-duty loader, and chassis (plural, which are trailers)." *Id.* at 22 (emphasis and citation omitted).

Petitioner's evidence and argument are persuasive to rebut Patent Owner's presumption of nexus.

Patent Owner is entitled to a presumption of a nexus if it shows that "the asserted objective evidence is tied to a specific product and that product 'is the invention disclosed and claimed in the patent." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016) (citation omitted). The Federal

Circuit has explained that "[t]his is true even when the product has additional, unclaimed features." *PPC Broadband, Inc. v. Corning Optical Commc 'ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016). Even if unclaimed features do not prevent the presumption of a nexus, however, they may be the basis for rebutting the presumption. *Id.* To do so, a person challenging patent validity must show that the commercial success, or other objective evidence of non-obviousness, was due to "extraneous factors" including "additional unclaimed features." *Polaris Indus.*, 882 F.3d at 1072.

In the present case, Petitioner submits evidence to persuade us that Patent Owner's commercial success and industry praise were a result of additional, unclaimed features, namely, scales (or load cells), specialized forklifts, specialized mats, and specialized trucks (or chassis). Although the challenged claims are directed to a "container" (independent claims 1, 18), a system comprising containers (independent claim 7), or a method for delivering proppant (independent claim 13), the claims do not require these additional features. Ex. 1003, 8:63–12:23.

In support of Petitioner's argument, we find particularly persuasive Byron Aiken's deposition testimony (Ex. 1093), John Oren's deposition testimony (Ex. 1085), and initial disclosures (Ex. 1094) submitted by SandBox Enterprises, LLC and SandBox Logistics, LLC (collectively "SandBox") in an unrelated case.

Turning first to Mr. Aiken's testimony, Mr. Aiken is a mechanical engineer with Aiken Engineering (Ex. 1093, 10:1–16), with about 50 years of experience, and who specializes in oil field equipment (*id.* at 11:7–12). In around 2015, Mr. Aiken testified for SandBox in a *trade secret* dispute with another party, which related to the SandBox Product. *Id.* at 39:2–16. In

response to a question pertaining to SandBox's trade secrets (*id*, at 40:17–20), Mr. Aiken testified:

There were special features that SandBox developed to make their system successful in the field. An example was a *very special forklift* that they researched extensively that would lift the containers, the weight of the containers and also the height and reach out far enough for the service. They had *special mats* on the ground to keep the heavy forklifts and containers from sinking into the dirt. The truck was a *special truck*, a double drop low bed truck that would – with containers on it would meet the regulations of the transportation department, issues like that.

Id. 40:22–41:8 (emphases added). Mr. Aiken's testimony supports Petitioner's argument that it was other, unclaimed features (i.e., special forklifts, special trucks, and special mats) that contributed to the SandBox Product's commercial success and industry praise.

Mr. Oren's testimony (Ex. 1085) also supports Petitioner's argument. Mr. Oren was the Chairman at SandBox Enterprise and its related entities (Ex. 1085, 12:18–13:2) and served as its "[i]nventor, strategist, salesman, marketer, motivator, mentor" (*id.* at 13:9–10). Mr. Oren testified that the "selling point for [the] system," which was "received by customers" as "[r]evolutionary," was the "precise measurement of sand into the blender." *Id.* at 118:16–119:6. In particular, Mr. Oren testified that the SandBox Product has weight scales that allow for the precise measurement of sand. *Id.* at 118:4–23. Mr. Oren's testimony is further corroborated by Exhibit 1094, in which SandBox submitted "Initial Disclosures for the Purposes of the Temporary Injunction Hearing." Ex. 1094, 2 ("SandBox Initial Disclosures").

In the SandBox Initial Disclosures, SandBox explains that the "SandBox Container System" is "SandBox's unique and highly-efficient

compilation of public *and secret information*... associated with a combination of equipment, vehicles, and logistics services... for the hydraulic fracturing ... industry ... [that] constitute *trade secrets* of SandBox." *Id.* at 1 (emphases added). The SandBox Initial Disclosures further provide that

the SandBox Cradle has innovated the use and accuracy of *load cells*...[and that r]eal-time readings of the amount of sand being dispensed onto the conveyor and into the blender improves [the] accuracy for frac engineers and enables customers to bill for precisely the amount of proppant used at each well—a huge industry and financial advantage.

Id. at 11 (emphasis added).

Based on Mr. Aiken's testimony, Mr. Oren's testimony, and the SandBox Initial Disclosures, we find that SandBox Product's commercial success and industry praise were largely a result of Patent Owner's trade secret "scales" (or load cells), "special forklift," "special mats," and "special truck," rather than the features of the challenged claims.

(6) Summary of Independent Claim 7

After considering the evidence and arguments of both parties, and for the reasons set forth above, we agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that independent claim 7 of the '626 patent is unpatentable over Smith, Krenek, Hedrick, and Racy.

b) Dependent Claim 9

Claim 9 depends from claim 7 and further recites, *inter alia*, "wherein the proppant comprises sand, and wherein the large volumes comprise at least 30,000 pounds of sand." Ex. 1003, 10:42–45.

To address this claimed limitation, Petitioner relies on the declaration testimony of Dr. Wooley, who testifies that Smith's containers would have been capable of holding 30,000 pounds of sand. See Pet. 58–59 (citing Ex. 1001 ¶¶ 180–181). Dr. Wooley testifies that although Smith's container has a maximum payload of 26,250 pounds, it "would be capable of holding 30,000 pounds of proppant" as it "would have had to have been designed using a *safety factor* of 1.15 with respect to maximum payloads." Ex. 1001 ¶ 181 (emphasis added).³

Patent Owner argues that Smith's container has a maximum payload of 26,250 pounds, and fails to disclose anything about a safety factor that would allow its container to carry 30,000 pounds. *See* PO Resp. 52 (citing Pet. 44).

Although we agree with Patent Owner that Smith does not disclose anything about a safety factor, such safety factor is not needed to meet the claimed limitation.

As discussed above, *even if* Smith's 20-foot container is only capable of carrying 52,500 pounds, or 26,250 pounds per compartment, the claimed limitation is satisfied through the proposed modification of Smith, in which

³ Smith discloses that its 20-foot (2-compartment) container has a "maximum payload of 52,500 pounds" (Ex. 1005 ¶ 56), and the 26,250 pounds maximum payload is derived for each 10-foot compartment. *See also id.* ¶ 40 ("A twenty foot container . . . is typically divided into two equal components.").

Petitioner proposes to modify and reinforce Smith's container to carry more proppant, possibly above 80,000 pounds, or about 40,000 per compartment. *See supra* Part II.F.5.a.1. Indeed, Patent Owner acknowledges as much. *See* PO Resp. 37–38 ("[T]he weight of the proppant that would fill [Smith's full volume] would be between 79,751.7 and 84,182.32 pounds."). Because Petitioner proposes to modify Smith's container to be capable of holding about 80,000 pounds of proppant, or 40,000 pounds per compartment, the claimed limitation is satisfied.

We agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claim 9 of the '626 patent is unpatentable over Smith, Krenek, Hedrick, and Racy.

c) Dependent Claim 10

Claim 10 depends from claim 7 and further recites, *inter alia*, "wherein the first plurality of structural supports comprises a first plurality of support braces ... [that] comprises a first set of support braces attached to a first pair of sidewalls and a second set of support braces attached to a second pair of sidewalls." Ex. 1003, 10:46–52.

To address this claimed limitation, Petitioner reasons that it would have been obvious to "position multiple sets of Hedrick-like support braces (structural supports) between and attached to each pair of opposing sidewalls ... such that they were running perpendicular to each other." Pet. 59–60. In relying on the testimony of Dr. Wooley, Petitioner explains that "doing so would strengthen the compartments." *Id.* at 60 (citing Ex. 1001 ¶ 150).

Other than those arguments discussed above (*see supra* Part II.F.5.a), Patent Owner does not respond specifically to Petitioner's challenge of

claim 10. See generally PO Resp.

We agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claim 10 of the '626 patent is unpatentable over Smith, Krenek, Hedrick, and Racy.

d) Dependent Claim 12

Claim 12 depends from claim 6 and further recites, *inter alia*, "wherein each of the first and second containers includes a container frame" Ex. 1003, 10:59–65.

To address this claimed limitation, Petitioner asserts that "Smith also discloses that each container . . . includes a 'structural frame,'" as called for in the claims. Pet. 60–61 (citations omitted).

Other than those arguments discussed above (*see supra* Part II.F.5.a), Patent Owner does not respond specifically to Petitioner's challenge of claim 12. *See generally* PO Resp.

We agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claim 12 of the '626 patent is unpatentable over Smith, Krenek, Hedrick, and Racy.

6. Summary of Smith, Krenek, Hedrick, and Racy

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that Smith, Krenek, Hedrick, and Racy, combined, teach all elements of claims 7, 9, 10, and 12, and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

G. Smith and Krenek (claims 13, 16, and 17)

Petitioner challenges claims 13, 16, and 17 as obvious over Smith and Krenek. Pet. 6.

1. Independent Claim 13

Independent claim 13 recites a "method for delivering large volumes of proppant to a fracturing site." Ex. 1003, 10:66–11:26. Claim 13 also recites, *inter alia*, the steps of "positioning a first container to structurally support large volumes of proppant," "stacking a second container . . . above the first container," "moving the [first and] second container to a position at the fracturing site." *See id*.

In addressing this method claim, Petitioner reasons that "a POSITA would have been motivated to use the Smith System for delivering large volumes of proppant to a wellsite" in light of Krenek's disclosure. Pet. 61 (referencing Grounds 1–3). As similarly required by claim 7, claim 13 requires the claimed "first container" and "second container" to each have "openings" and "outlets." *See* Ex. 1003, 10:66–11:26. Petitioner relies on the same findings discussed above with respect to claim 7 in addressing these claimed features. *See* Pet. 63–66.

To address the claimed "moving the second container to a position at the fracturing site" and "moving the first container to a position adjacent the second container at the fracturing site to allow proppant to flow from the first container onto a conveyor," Petitioner relies on Krenek's teaching of "moving pre-filled mobile containers from a position near a fracturing site . . . to a position at the fracturing site . . . so that proppant discharged from those containers can be directed by the conveyor belt." Pet. 66 (citing Ex. 1007 ¶ [0027], [0028], [0042]; Ex. 1001 ¶ 170). In combining Krenek

with Smith, Petitioner reasons that a "POSITA would have been motivated to use the Smith System in a similar fashion . . . in order to use its proppant for fracturing operations at the fracturing site." *Id.* at 66–67 (citing Ex. 1001 ¶ 171); *see also id.* at 68–69.

2. Dependent Claim 16

Claim 16 depends from and further recites, *inter alia*, "replacing the second container with a third container" "when the second container is empty." Ex. 1003, 11:36–44.

To address the limitation, Petitioner relies on Smith's disclosure of a third container—similar in structure to its other containers—and reasons that it also would have been obvious to use the additional container as called for in the claims. *See* Pet. 69–70.

3. Dependent Claim 17

Claim 17 depends from claim 16 and further recites, *inter alia*, "wherein each of the first and second containers includes a container frame." Ex. 1003, 11:45–51.

To address this limitation, Petitioner relies on the same findings discussed above with respect to claim 7. *See* Pet. 70.

4. Summary of Smith and Krenek

Other than those arguments discussed above (*see supra* Part II.F.5), Patent Owner does not respond specifically to Petitioner's challenge of claims 13, 16, and 17 under Smith and Krenek. *See generally* PO Resp.

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that

Smith and Krenek, combined, teach all elements of claims 13, 16, and 17, and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

H. Smith, Krenek, and Racy (claim 14)

Petitioner challenges claim 14 as obvious over Smith, Krenek, and Racy. Pet. 6.

Claim 14 depends from claim 13 and further recites, *inter alia*, "arranging spacers between the first and second containers." Ex. 1003, 11:27–30.

To address this limitation, Petitioner relies on Racy's couplers and reasons that a POSITA would have used these couplers with Smith's system "to provide clearance for the first open position." *See* Pet. 70–71.

Other than those arguments discussed above (*see supra* Part II.F.5), Patent Owner does not respond specifically to Petitioner's challenge of claim 14 under Smith, Krenek, and Racy. *See generally* PO Resp.

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that Smith and Krenek, combined, teach all elements of claim 14, and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

I. Smith, Krenek, and Hedrick (claim 15)

Petitioner challenges claim 15 as obvious over Smith, Krenek, and Hedrick. Pet. 6.

Claim 15 depends from claim 13 and further recites, *inter alia*, "wherein the first and second containers each comprises a plurality of structural supports" Ex. 1003, 11:31–35.

To address this limitation, Petitioner relies on Hedrick's bracing structure and reasons that a POSITA would have added these structural supports to Smith's containers for the same reasons discussed above with respect to claim 7, namely, to increase the containers' strength and maximum payload. *See* Pet. 71.

Other than those arguments discussed above (*see supra* Part II.F.5), Patent Owner does not respond specifically to Petitioner's challenge of claim 15 under Smith, Krenek, and Hedrick. *See generally* PO Resp.

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that Smith, Krenek, and Hedrick, combined, teach all elements of claim 15, and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

J. Smith, Krenek, and Hedrick (claims 1–3)

Petitioner challenges claims 1–3 as obvious over Smith, Krenek, and Hedrick. Pet. 6.

1. Independent Claim 1

Independent claim 1 recites a container comprising a "top," "bottom, having an outlet," "sidewalls coupled to the top and bottom," "ramps downwardly inclined and extending inwardly from the sidewalls," and "a hatch positioned proximate the outlet." Ex. 1003, 8:63–9:25. As with independent claim 7, discussed above, Petitioner relies on Smith for

40

satisfying these claimed features, and relies on Krenek's disclosure of containers for storing proppant at a wellsite. *See* Pet. 72 (referencing grounds challenging claim 7).

Claim 1 also recites, "a plurality of sidewall supports positioned to provide structural support to the sidewalls . . . including a plurality of support braces extending in a substantially horizontal position." Ex. 1003, 8:63–9:25. To address this limitation, and as with claim 7, Petitioner relies on Hedrick's braces and reasons that it would have been obvious to add these braces to Smith's structure and that "a POSITA would have found it desirable to orient such Hedrick-like support braces horizontally." *See* Pet. 72–73.

2. Dependent Claims 2 and 3

Claims 2 and 3 depend from claim 1 and further recite, *inter alia*, "wherein the outlet is adapted to be positioned adjacent a second container" and "a second set of support braces attached to a second pair of sidewalls," respectively. Ex. 1003, 9:26–38.

To address the limitations of claims 2 and 3, Petitioner relies on the same findings and reasoning discussed *supra* with respect to claim 7. *See* Pet. 74.

3. Summary of Smith, Krenek, and Hedrick (claims 1–3)

Other than those arguments discussed above (*see supra* Part II.F.5), Patent Owner does not respond specifically to Petitioner's challenge of claims 1–3 under Smith, Krenek, and Hedrick. *See generally* PO Resp.

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that

Smith, Krenek, and Hedrick, combined, teach all elements of claims 1–3 and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

K. Smith, Krenek, Hedrick, and Claussen (claims 4–6 and 18–20)

Petitioner challenges claims 4–6 and 18–20 as obvious over Smith, Krenek, Hedrick, and Claussen. Pet. 6.

1. Claussen

Claussen is titled "Bulk Material Storage Apparatus" and discloses its apparatus as including adjustable leg members. Ex. 1008, [54], [57]. Claussen discloses bulk material storage apparatus. *Id.* at [57]. We reproduce Figure 1 of Claussen, below:



According to Claussen, Figure 1 depicts bulk material storage apparatus 10 with two containers 50 and frame 100. *Id.* \P [0024].

We also reproduce Figure 2 of Claussen, below:



Claussen describes Figure 2 as depicting frame 100 without container 50. See *id.* ¶ [0016]. In particular, this figure depicts frame 100 for supporting a container above the ground. *Id.* ¶ [0031]. Frame 100 may also contain a lower container support apparatus 155 to support the lower portion of a container and an upper container support apparatus 157 to support the upper portion of the container. *Id.* ¶ [0049].

2. Analysis

a) Dependent Claim 4 and Independent Claim 18

Claim 4 depends directly from claim 1 (the claimed "container") and independent claim 18 similarly recites a container "to transport and store large volumes of proppant." Ex. 1003, 9:39–47, 11:52–12:23. Unlike the

claims previously discussed, however, claims 4 and 18 further recite, *inter alia*, "a plurality of support members attached to a bottom surface of the ramps." *Id.*

To address this limitation, Petitioner relies on Claussen. Pet. 74–82. In particular, Petitioner asserts that "Claussen teaches support members that meet this element, and a POSITA would have been motivated to use support members like Claussen's to increase the ability of [Smith's] hopper defined by the ramps . . . to carry proppant." *Id.* at 74 (citations omitted). In support of this combination, Petitioner submits an annotated version of Claussen's Figure 1 (*id.* at 76), which we reproduce, below:



According to Petitioner, the above Figure illustrates "support members . . . that extend between the bottom end of the frame and the cradle to support the cradle—and thus the hoppers of the containers—relative to the frame." *Id.* (citing Ex. 1001 \P 154). Dr. Wooley testifies that a "POSITA would have understood that these support members strengthen the containers, allowing

for larger loads to be applied to the hoppers of the containers." Ex. 1001 \P 154.

In combining Claussen with Smith, Petitioner reasons that a "POSITA would have modified Smith's container to include support members like Claussen's to strengthen Smith's container, just as Claussen did." Pet. 78 (citing Ex. 1001 ¶ 157). Petitioner also cites to Claussen's disclosure that its containers and frame may be integral (Ex. 1008 ¶ [0029]) and further reasons that "a POSITA would have found it logical to attach such support members directly to Smith's ramps in view of Claussen's integral embodiment, and would have had the ability to accomplish the attachment with or without a cradle." Pet. 79 (citing Ex. 1001 ¶ 158).

In contesting Petitioner's reliance on Claussen, Patent Owner asserts that "Claussen does not disclose 'support members'" (PO Resp. 42) (emphasis omitted) and that a POSITA would not have even added Claussen's "alleged 'support members' [because they] would weaken [Smith's] container, not strengthen it" (*id.* at 47, 49). In support of this argument, Patent Owner argues that Claussen provides no discussion of the alleged "support members" (*id.* at 43–44 (citing Ex. 2049 ¶¶ 83–84)) and fails to disclose "support member[s] that extend between the bottom and inclined surface[s]" as required by the claims (*id.* (citing Ex. 1003, claims 4, 18)). Patent Owner asserts that Claussen's alleged "support members" are used to support Claussen's "cradle," rather than Claussen's container. *See id.* at 45–46. In support of this argument, Patent Owner references an annotated version of Claussen's Figure 2 (*id.* at 43), which we reproduce below:



According to Patent Owner, and as shown in the above annotated Figure, the blue "support members" do not extend between the bottom and inclined surfaces of Claussen's container, as required by the claims, but instead to its cradle. PO Resp. 45 ("What Petitioners identify as the alleged support members are attached to the cradle, not to the container itself."). Patent Owner argues that "[n]othing in Claussen would have taught or suggested to a POSITA to attach support members directly to the inclined surfaces of a container as claimed." *Id.* at 46.

We are not persuaded by Patent Owner's argument. Although Claussen does not provide a detailed discussion of its "support members," we credit Dr. Wooley's testimony that "[a] POSITA would have understood that such support members allow for larger loads to be applied to the hoppers of the containers, at least by permitting such loads to be shared by those hoppers and the frame, thereby strengthening the containers." Ex. 1001 ¶ 154.

Furthermore, even if we assume to be true Patent Owner's assertion that Claussen's "support members" are attached to its "cradle," rather than

its "container," we still find that the support members provide support to the containers vis-à-vis its cradle. Indeed, the Petition contemplates as much. *See* Pet. 76 ("A POSITA would have understood that . . . support members (shown in blue) that extend between the bottom end of the frame and the cradle to support the cradle—and thus the hoppers of the containers—relative to the frame"); *see also* Ex. 1001 ¶ 154 (testifying in support of the same).

Turning to Patent Owner's argument that adding Claussen's "support members" would *weaken* Smith's container, Patent Owner submits finite element analysis ("FEA") evidence to support a finding that "the stress on [Smith's] container [would be] more than three times higher than in the model without [Claussen's support members]." PO Resp. 47 (citing Ex. 2049 ¶¶ 92–94). In particular, Patent Owner submits two FEA models of Smith's container—one with and one without the "support members" which we reproduce (*id.* at 47–48), below:



Model without Alleged Support Members

48

Model with Alleged Support Members

According to Patent Owner, the bottom figure depicts increased stress in the container with the "support members," while the top figure is a model without the "support members." *See* PO Resp. 47–48 (citing in part Ex. 2049 ¶¶ 92–94). Mr. Smith testifies that "[t]he high stresses are 3.5 times higher when Claussen's 'support members' are included." Ex. 2049 ¶ 93.

We find Patent Owner's FEA evidence unpersuasive.

Having weighed Petitioner's and Patent Owner's competing evidence and testimony, we find Petitioner more persuasive, and agree with Petitioner's assessment that "Mr. Smith's underlying FEA analysis is incorrect." Pet. Reply 9. In particular, we agree with and credit the analysis of Petitioner's expert, Dr. David Rondinone (Ex. 1086), that Mr. Smith's FEA analysis is premised on an unrealistic stress singularity that a POSITA would have never arrived at.

Dr. Rondinone testifies that in Mr. Smith's FEA model, "the support members meet the cradle at a sharp corner: an impossible geometry that is likely to produce a stress singularity." Ex. 1086 ¶ 31. Dr. Rondinone further testifies, "[f]rom these observations, it is likely that Mr. Smith's identified stress 'approach[ing] 8,900 psi' is a result of a stress singularity and should not be credited." Id. (citing Ex. 2049 ¶ 93). We further agree with Dr. Rondinone's testimony that a POSITA"would not have seen this singularitydriven stress at the connection of the support members to the cradle as the final answer for the ... [c]ontainer, as Mr. Smith suggests." Id. ¶ 33. Rather, a POSITA "would have been aware of the variety of options they had for reducing stress at the connection ... [and] could have ... reduced such stresses by tailoring the dimensions and thicknesses of the support members and the cradle ... [and would] choose an option that reduced stresses at those connections." Id. We further agree with and credit Dr. Rondinone's expert testimony that "including the support members strengthened, not weakened, Claussen's container." Id. ¶36.

After considering the evidence and arguments of both parties, and for the reasons set forth above, we agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 4 and 18 of the '626 patent is unpatentable over Smith, Krenek, Hedrick, and Claussen.

b) Dependent Claims 5 and 19

Claims 5 and 19 depend directly from claims 4 and 18, respectively, and further recite, "wherein the plurality of support members are arranged at

respective angles relative to the bottom and the support members are attached to the bottom." Ex. 1003, 9:42–44, 12:17–20.

To address these limitations, Petitioner asserts that "[e]ach of the support members . . . would have the claimed configur[ation] when attached to the ramps and bottom as described." Pet. 80.

Other than those arguments discussed above (*see supra* Parts II.F.5.a, II.K.2.a), Patent Owner does not respond specifically to Petitioner's challenge of claims 5 and 19. *See generally* PO Resp.

We agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 5 and 19 of the '626 patent are unpatentable over Smith, Krenek, Hedrick, and Claussen.

c) Dependent Claims 6 and 20

Claims 6 and 20 depend directly from claims 4 and 18, respectively, and further recite, "wherein at least one support member of the plurality of support members is positioned vertically lower than the plurality of support braces." Ex. 1003, 9:45–47, 12:21–23.

To address the limitations of claims 6 and 20, Petitioner asserts that "[e]ach of the support members described immediately above . . . would be positioned" as claimed. Pet. 80.

Other than those arguments discussed above (*see supra* Parts II.F.5.a, II.K.2.a), Patent Owner does not respond specifically to Petitioner's challenge of claims 6 and 20. *See generally* PO Resp.

We agree with Petitioner and determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 6 and 20

of the '626 patent are unpatentable over Smith, Krenek, Hedrick, and Claussen.

3. Summary of Smith, Krenek, Hedrick, and Claussen

Having considered Patent Owner's arguments and Petitioner's analysis, we find Petitioner's analysis persuasive. Petitioner establishes that Smith, Krenek, Hedrick, and Claussen teach all elements of claims 4–6 and 18–20, and that a POSITA would have had reason to combine those teachings with a reasonable expectation of success.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 7, 9, 10, and 12 of the '626 patent are unpatentable over Smith, Krenek, Hedrick, and Racy;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claims 13, 16, and 17 of the '626 patent are unpatentable over Smith and Krenek;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claim 14 of the '626 patent is unpatentable over Smith, Krenek, and Racy;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–3 and 15 of the '626 patent are unpatentable over Smith, Krenek, and Hedrick;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claims 4–6 and 18–20 of the '626 patent are unpatentable over Smith, Krenek, Hedrick, and Claussen;

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.

FOR PETITIONER:

Mark Garrett W. Andrew Liddell Jeffrey Kitchen Jeremy Albright Charles Walker Catherine Garza NORTON ROSE FULBRIGHT US LLP mark.garrett@nortonrosefulbright.com andrew.liddell@nortonrosefulbright.com jeff.kitchen@nortonrosefulbright.com jeremy.albright@nortonrosefulbright.com charles.walker@nortonrosefulbright.com

FOR PATENT OWNER:

Gianni Cutri Eugene Goryunov Adam Kaufmann Kyle Kantarek KIRKLAND & ELLIS LLP gianni.cutri@kirkland.com egoryunov@kirkland.com adam.kaufmann@kirkland.com

54