

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARROWS UP, LLC
Petitioner

v.

OREN TECHNOLOGIES, LLC
Patent Owner

Case No. ____
U.S. Patent No. 9,248,772

DECLARATION OF ROBERT SCHAAF

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I. INTRODUCTION AND SCOPE OF WORK

1. My name is Robert Schaaf. I have been retained by Arrows Up, LLC (“Petitioner”) as an independent expert in the relevant art.

2. I am over the age of eighteen and am otherwise competent to make this declaration.

3. I have been asked to provide an analysis of the scope and content of U.S. Patent No. 9,248,772 (the “‘772 patent”) relative to the state of the art in 2012. Upon information and belief, the ‘772 patent is assigned to Oren Technologies LLC (“Patentee”). I have also been retained to provide an analysis regarding what a person of skill in the art (“POSITA”) would have understood at the time of the invention of the ‘772 patent.¹ Furthermore, I have been asked to consider whether certain prior art references teach or suggest the features recited in claims 1-11 (the “Challenged Claims”) of the ‘772 patent.

4. In consideration for my services, my work on this matter is being billed at my usual rate of \$350 per hour. My fee is not contingent on the outcome of any matter or on any of the technical positions set forth in this declaration. I have no financial interest in Petitioner.

¹ See discussion in Section VI.

II. PROFESSIONAL BACKGROUND

5. I have extensive experience in the field of Petroleum Engineering with an emphasis on well stimulations (hydraulic fracturing and acidizing). I am currently a Petroleum Engineering consultant providing advice regarding the development and management of oil/gas wells and fields across the world.

6. I have presented papers at many industry gatherings and symposia. A listing of my publications is included as part of my curriculum vitae ("CV"), which is attached as Appendix A. For example, in October 1997, I presented a paper titled "Adapting a Reservoir-Management Strategy to Changing Reservoir Conditions" at the Society of Petroleum Engineers ("SPE") conference in San Antonio, Texas, which was also published in the Journal of Petroleum Technology in December 1997. I currently serve as the Chairman of the Los Angeles Basin Society of Petroleum Engineers. I also received the Outstanding Engineering Merit Award for 2015 from the Orange County Engineering Council.

7. I have also presented several papers on petroleum engineering topics at events including the Offshore West Africa Conference, the Prevention First 2014 Symposium, the SPE Middle East Oil Show, the SPE European Formation Damage Conference, the SPE Annual Technical Conference, and the Emerson Global Users Exchange.

8. Before I became a consultant, I was a senior project manager at Occidental Petroleum Corporation (“Occidental”). I was also project manager for Aera Energy, LLC (“Aera”). For the 25 years before that, I worked for Chevron Corporation (“Chevron”), where I became Engineering and Drilling Manager for Chevron’s Congo operations. During my time at Chevron, I also served in various roles for Chevron’s operations in Kuwait, Angola, Zaire, Bakersfield, and the Los Angeles Basin.

9. During my over 30 years in the practice of petroleum engineering I have engaged in a number of projects which have provided me with relevant experience and expertise in a number of the foundational technologies and industries within the scope of the ‘772 patent.

10. From 1979 to 1981, I was employed as a Reservoir Engineer for Chevron in Bakersfield, California. As part of my duties, I designed well stimulation projects for various fields and zones within these oil and gas fields. I had to employ means to stimulate multiple zones within one well. In order to successfully plan a stimulation job, I had to determine the types and quantities or materials required to perform the work. My duties required me to ensure that all the equipment and resources made it to the well site. I also had to make sure that these materials could be properly mixed and pumped into the well. This work included having the proper amount of proppant, sand, to do the job.

11. From 1981 to 1983, I was employed as a drilling engineer for Chevron where I supervised drilling rigs for an ongoing development program and designed and oversaw drilling programs for a wide variety of development and exploration wells. Many of these newly drilled wells required stimulation in order to produce at an optimal level. I oversaw the execution of hydraulic fracturing jobs on many of these new wells. My job required that I coordinate the activities of those contractors performing the fracturing jobs. This included getting materials and equipment to the well, proper placement of equipment, overseeing the actual hydraulic fracturing treatment, and resolving the many issues that happened during the treatment. Among the materials I was responsible for was the proppant, that was in almost all cases a properly sized sand.

12. From 1983 to 1985, I was the lead engineer for Chevron for field operations in the Los Angeles Basin. There, I oversaw rig operations, new facilities installations, and production optimization. Among the projects that I supervised was stimulation work on existing oil wells. I had to design, coordinate, and supervise many fracturing jobs as part of this assignment. My team and I designed the jobs, ordered the materials and equipment, and then supervised the actual fracturing work. We had to coordinate the various contractors so that all the pumping equipment and materials could be placed on the well site. Fracturing jobs require a considerable amount of water and sand. The frac design determined how

much of each would be needed. The challenge was then to properly get the loads of materials as well as the pumping equipment situated on the, sometimes small, locations.

13. I was a production engineer from 1985 to 1987 where I worked in oil fields in California. I developed drilling and workover programs for both onshore and offshore fields as part of this assignment. A large part of the work in this position required the design of stimulation jobs to help increase oil production. The oil fields in California have many stacked zones that make up the oil reservoirs. Thus, the stimulation jobs required a significant amount of materials in order to successfully treat a well. As part of my work on these jobs, I had to get enough sand placed at the location to perform hydraulic fracturing jobs as they were designed.

14. Then, from 1989 to 1993 I was Chief Engineer in Zaire for Chevron. During my time there, I oversaw the first horizontal well drilled in West Africa. The horizontal wells posed a different type challenge for stimulation. Fracturing jobs required multiple stages in order to treat the entire long horizontal section. With multiple stages, considerable amounts of proppant, sand, are required. Offshore work requires that fracturing be done from a drilling rig or by a stimulation vessel. Either way there is limited space for materials. Various methods of stacking materials, including sand, were used to get enough supplies to

do the frac job as designed. Part of my assignment was to work with the stimulation companies to figure out a way to get all the materials on the drilling rig or stimulation vessel. Once the job was started, I oversaw the fracturing work and solved any problems that would arise during the treatment.

15. From 1993 to 1997 I was a senior staff engineer in Angola. While in Angola, I designed development drilling programs to build on existing production, as well as oversaw expansion into new fields. The wells drilled required various means of stimulation in order to maximize oil recovery. Since the reservoirs were multi-layered, the stimulation treatments required large amounts of materials, such as sand, to complete the work. I was responsible for the treatment design for these projects. I had to make sure we had enough materials for each job and had to find ways to fit the necessary equipment and materials on the vessel or rig doing the work.

16. From 1997 to 1999, I was the planning manager for the Southern Africa Business Unit that oversaw the offshore operations in West Africa. From 1999 to 2001, I was the chief engineer for the Congo where I was in charge of drilling new wells, well completions, and increasing production of existing wells. This assignment required me to oversee a number of hydraulic fracturing jobs in horizontal wells. These projects all required getting large amounts of materials

placed on stimulation vessels. I had to make sure that enough sand, water, frac gel, and fracturing chemical additives were available for the work.

17. I was a technical consultant for Chevron in Kuwait from 2001 to 2003, where I worked on the Burgan Oil Field. From 2003 to 2004, I was the drilling and engineering manager for Chevron in the Congo. From 2005 to 2011 I worked for Aera as a project manager. All these assignments, I worked on oil fields that required multiple zone or horizontal stimulation work that required getting an extensive amount of equipment and supplies to an onshore or offshore well site. I had to coordinate the effort to get all the necessary material and supplies set up to successfully complete the projects.

18. Based on all of these experiences, I have extensive expertise in fracking logistics, including establishing and troubleshooting supply chains for proppant (commonly sand), including proppant that has been shipped by rail, among other modes of transportation.

19. Further detail on my education, work experience, and the cases in which I have previously given testimony in the past five years is contained in my CV, attached hereto as Appendix A.

III. OVERVIEW AND SUMMARY OF OPINIONS

20. I understand that a petition for *inter partes* review has been filed regarding the '772 patent. I understand that the petition for *inter partes* review

challenges claims 1-11 of the '772 patent ("Challenged Claims") as obvious in view of the prior art.

21. Having reviewed the '772 patent, its file history, and the prior art, it is my opinion that claims 1-11 of the '772 patent should be cancelled as obvious.

22. Claim 1 of the '772 patent is exemplary:

1. A method of transporting proppant, the method comprising:

a) vertically stacking a plurality of empty proppant containers in close proximity to a rail spur so that one of the plurality of empty proppant containers overlies another one of the plurality of empty containers thereby to reduce footprint of the area required adjacent the rail spur to store the plurality of empty proppant containers, each of the plurality of empty containers including at least a first end surface and at least a second different end surface and each of the first and second end surfaces having a plurality of upright structural support members thereon to enhance integrity of the container so that a large amount of weight can be stacked upon the container and so that heavy weight can be stored therein;

b) filling the plurality of empty proppant containers with proppant from one or more proppant transporting rail vehicles thereby to produce a plurality of proppant filled containers;

c) transferring the plurality of proppant filled containers with a loader onto one or more support platforms associated with one or more proppant transporting road vehicles.

23. For the reasons set forth herein, it is my opinion that claims 1-2 and 6-10 of the '772 patent are all obvious in light of U.S. Published Appl. No. 2013/0206415 ("Sheesley") and should be cancelled.

24. Further, it is my opinion that claim 1 of the '772 patent is rendered obvious by Sheesley in combination with U.S. No. 8,915,691 ("Mintz"), and should be cancelled.

25. In addition, it is my opinion that claims 3-5 and 11 of the '772 patent are rendered obvious by Sheesley in combination with U.S. Published Appl. No. 2013/0022441 ("Uhryn"), and should be cancelled.

IV. LIST OF DOCUMENTS I CONSIDERED IN FORMULATING MY OPINIONS

Exhibit No.	Description
Ex. 1001	U.S. 9,248,772
Ex. 1003	U.S. Published Appl. No. 2013/0206415 ("Sheesley")

Ex. 1004	U.S. 8,915,691 (“Mintz”)
Ex. 1005	U.S. Published Appl. No. 2013/0022441 (“Uhryn”)
Ex. 1006	U.S. Appl. No. 13/332,937 (“‘937 Application”)
Ex. 1007	Redline of U.S. Appl. No. 13/332,937 and U.S. 9,248,772
Ex. 1008	U.S. Provisional Application No. 61/429,046 (“Mintz Provisional”)
Ex. 1009	U.S. Provisional Application No. 61/509,943 (“Uhryn Provisional”)
Ex. 1010	The prosecution history for U.S. Appl. No. 14/314,468 (“‘468 File History”) (portions of which are attached as Ex. 1010)
Ex. 1011	The prosecution history for U.S. Appl. No. 14/841,942 (“‘066 patent file history”) (portions of which are attached as Ex. 1011)
Ex. 1012	ISO 1496-1: Series 1 Freight Containers—Specification and Testing—Part 1, General Cargo Containers (August 1990) (“ISO 1496 Standard”)
Ex. 1013	Portions of Intermodal Transportation: Moving Freight in a Global Economy (published 2011)

In addition to these materials, I have relied upon my education, experience, and my knowledge of practices and principles in the relevant field and timeframe.

V. DESCRIPTION OF THE RELEVANT FIELD AND THE RELEVANT TIMEFRAME

26. Based on my review of these materials, I believe that the relevant field for purposes of the ‘772 patent is hydraulic fracturing and discharge systems, and logical support techniques related to the same.

27. I believe the relevant time frame for my analysis is approximately 2012, for the reasons discussed below in Section VI.²

28. As described above, I have extensive experience in the relevant field. Based on this experience, I have an established understanding of the relevant field in the relevant time frame.

VI. OVERVIEW OF THE ‘772 PATENT

A. Priority Date

29. The ‘772 patent, entitled “Method of delivering, transporting, and storing proppant for delivery and use at a well site” is directed to exactly that. Ex. 1001 (‘772 patent). The ‘772 patent claims priority to PCT Application No. PCT/US13/32819, U.S. patent application 13/427,140, and U.S. patent application 13/332,937.

30. The earliest priority application the ‘772 patent claims priority to is U.S. patent application 13/332,937 (the “‘937 Application”), filed on Dec. 21, 2011. But none of the Challenged Claims are entitled to the ‘937 Application’s filing date because the ‘937 Application does not disclose at least claim limitations

² My opinions regarding claim interpretation as stated herein would not be affected if the relevant time frame was 2011 rather than 2012.

[1a(i)], [1b], and [1c] (as labeled below).³ None of these limitations appear in the ‘937 Application, which is significantly different from the specification of the ‘772 patent. See Ex. 1006; Ex. 1007. The ‘937 Application describes only a vessel for proppant storage and provides no details on the logistics of “delivering, transporting, and storing proppant for delivery and use at a well site,” as is claimed in the ‘772 patent. Specifically, the ‘937 Application lacks disclosure of at least: “vertically stacking a plurality of empty proppant containers in close proximity to a rail spur,” “filling the plurality of empty proppant containers with proppant from one or more proppant transporting rail vehicles thereby to produce a plurality of proppant filled containers,” and “transferring the plurality of proppant filled containers with a loader onto one or more support platforms associated with one or more proppant transporting road vehicles.”

31. To the extent that Patentee argues that disclosure of only a vessel for proppant storage provides written description for these claim limitations, numerous

³ I understand that a patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application.

references would anticipate the claims of the ‘772 patent, as they disclose a vessel for proppant storage.

32. Accordingly, the earliest priority date the Challenged Claims are even arguably entitled to is March 22, 2012, the filing date of U.S. patent application 13/427,140. Accordingly, the earliest priority date the Challenged Claims are even arguably entitled to is March 22, 2012, the filing date of U.S. patent application 13/427,140.

B. The Purported Invention

33. As the “Description of Related Art” section of the ‘772 patent explains, proppant is a particulate material, such as sand or ceramic, used in hydraulic fracturing, and “a large amount of such proppant is required” during hydraulic fracturing, though it purportedly “has been found to be rather difficult to effectively transport the proppant to the desired location,” and “to effectively store the proppant at the fracturing sites.” Ex. 1001 (‘772 patent) 1:59-2:7.

34. According to the ‘772 patent, in the prior art “proppant is hauled to the desired locations on the back of trucks and is dumped onsite” where it “is often exposed to adverse weather conditions” and “requires a large capital investment in storage facilities,” as expensive “silos have been built in order to store proppant for use in the fracturing operation.” Ex. 1001 (‘772 patent) 1:59-2:17. “Whenever such silos are used, there is a possibility of contamination of the proppant that is

contained within the silo.” Ex. 1001 (‘772 patent) 2:12-17. As such, the ‘772 patent seeks to provide a system for the storage and transport of proppant that is “mobile, scalable and flexible” and “to provide a system for the storage and transport of proppant that can be located in proximity to the rail spur.” Ex. 1001 (‘772 patent) 4:14-19.

35. The ‘772 patent purports to solve these problems associated with proppant transport and storage through the use of a container to transport and store the proppant. Specifically, the container contains an outlet on the top “so as to allow the proppant to be introduced into the interior volume of the container,” as well as a second outlet having a “flow gate” “so as to allow the proppant to flow outwardly of the interior volume of the container.” Ex. 1001 (‘772 patent) 4:62-67. This container can be used to transport proppant from a rail site to another location. Ex. 1001 (‘772 patent) 5:27-34. These containers are also stackable and “can be stacked until such time as proppant is required or until such time as equipment is available for the unloading of such containers.” Ex. 1001 (‘772 patent) 8:63-65. Because of the use of containers, rather than silo facilities, the “number of containers is scalable for inventory requirements.” Ex. 1001 (‘772 patent) 9:38-40.

VII. THE PERSON OF ORDINARY SKILL IN THE RELEVANT FIELD IN THE RELEVANT TIMEFRAME

36. I have been informed that a person of ordinary skill in the relevant field is a hypothetical person to whom an expert in the relevant field could assign a routine task with reasonable confidence that the task would be successfully carried out. Further, a POSITA is a hypothetical person who is presumed to be aware of all pertinent art, thinks along the lines of the conventional wisdom in the art, and is a person of ordinary creativity. I have been informed that evidence of the level of ordinary skill in the art can be found in the relevant patent and prior art references.

37. It is my opinion that the prior art discussed herein demonstrates that a POSITA as of the relevant time period, a POSITA in the technical field of the '772 patent would have been someone with either (a) a bachelor's degree in an engineering or logistics discipline plus 1-2 years of experience in hydraulic fracturing and logistical support of fracking operations, or (b) 4-5 years of experience in hydraulic fracturing and logistical support for fracking operations. In my opinion, a POSITA would look to bulk material technologies and techniques to inform their thinking about supporting fracking operations and logistics, as proppant sand is a kind of bulk material.

VIII. CLAIM CONSTRUCTION

38. I have been informed that during *inter partes* review, claim terms are ordinary construed using the "broadest reasonable construction."

39. As to all claim terms, I have applied the broadest reasonable interpretation in light of the specification. I reserve the right to seek different claim constructions in different forums or proceedings, including any proceeding where the broadest reasonable construction standard is not applied, should Petitioner ask me to opine in such forums or proceedings.

IX. DESCRIPTION OF THE PRIOR ART

A. U.S. Published Appl. No. 2013/0206415 (Sheesley)

1. Priority Date

40. U.S. Published Appl. No. 2013/0206415 (Sheesley) was filed on February 10, 2012 and published on August 15, 2013. This predates March 22, 2012, the earliest priority date the Challenged Claims are even arguably entitled to. I am informed that Sheesley is therefore prior art to the ‘772 patent under pre-AIA 35 U.S.C. § 102(e). Sheesley was before the Patent Office during prosecution of the ‘772 patent. Although Sheesley was discussed by the Examiner during prosecution of related patents, Sheesley was never cited during any office action with respect to these claims.

2. Overview of Sheesley

41. Sheesley “relates to the transportation of a granular substance such as sand and, more particularly, to the modification of cargo containers for the purpose of transporting sand therein to frac sites.” Ex. 1003 (Sheesley) ¶[0002]. Like the

‘772 patent, Sheesley recognizes that the transfer and storage of proppant sand in hydraulic fracturing “can cost five or six million dollars,” and that “[m]ost of the cost of the sand is for handling.” Ex. 1003 (Sheesley) ¶[0009]. As Sheesley explains, “the good quality fracing sand comes from such places as the State of Wisconsin, China, or Russia” and “is handled at multiple locations in multiple ways with very inefficient supply chain logistics for the handling of the fracing sand.” Ex. 1003 (Sheesley) ¶[0010].

42. Sheesley posits that “[i]f the sand can be handled fewer times, the cost can be greatly reduced” and that “[i]t is important that as soon as the sand is delivered to the frac site, that it can be immediately unloaded to eliminate the demurrage.” Ex. 1003 (Sheesley) ¶[0009], ¶[0011]. Sheesley proposes to solve these problems by “modify[ing] standard cargo containers for the delivery of granular material for fracing.” Ex. 1003 (Sheesley) ¶[0012]. This modified container can be used “to carry a fracing proppant such as sand from a quarry or source to the frac site.” Sheesley at Abstract. “By use of the modified cargo containers as described [in Sheesley], the number of times the fracing proppant, such as sand, is handled is greatly reduced. The reduction in the number of times the fracing proppant is handled greatly reduces the cost of completion of a single hydrocarbon well.” Ex. 1003 (Sheesley) ¶[0091]. Further, these modified containers are stackable and “may be stacked in any conventional means, either

while in transit or at the frac site,” which “eliminates the demurrage of waiting to unload sand into bulk sand containers at the frac site.” Ex. 1003 (Sheesley) ¶[0018]. This logistical scenario is illustrated in Figure 2 of Sheesley, below.

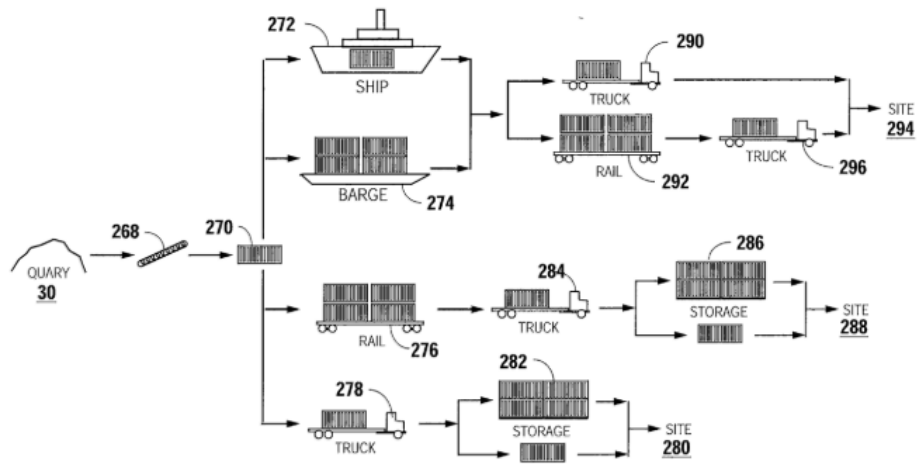


Fig. 2

43. Sheesley discloses a standard container that has been modified to have an “upper hatch” “located in hole in the top and used to load sand in the cargo container” and a “lower hatch” “in the opening in the bottom and may be opened to remove the sand therefrom.” Ex. 1003 (Sheesley) ¶[0016]; ¶[0050]. Sheesley’s modified container is illustrated in Figure 3, below.

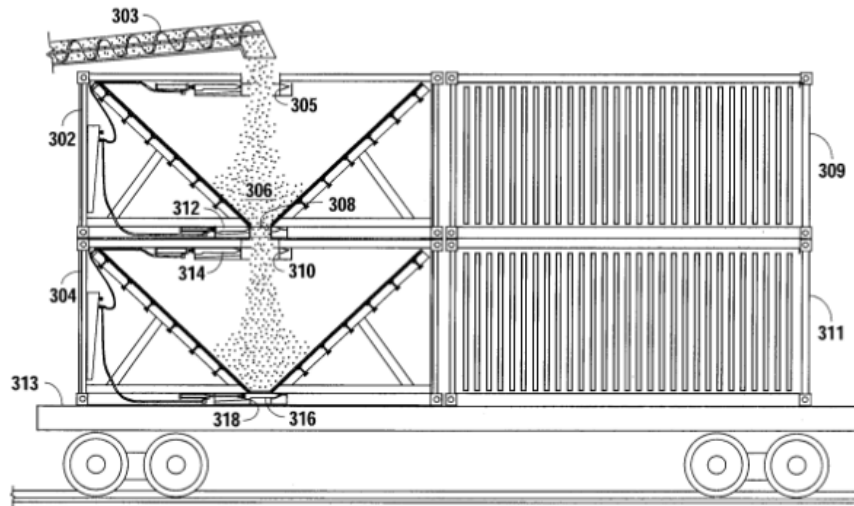


Fig. 5

B. U.S. 8,915,691 (Mintz)

1. Priority Date

44. U.S. 8,915,691 (Mintz) was filed on January 1, 2012 and granted on December 4, 2014. I am informed that Mintz is therefore prior art to the '772 patent under pre-AIA 35 U.S.C. § 102(e), as of January 1, 2012. This predates March 22, 2012, the earliest priority date the Challenged Claims are even arguably entitled to.

45. Further, Mintz claims priority to U.S. Provisional application No. 61/429,046, filed on Dec. 31, 2010. Mintz is entitled to this benefit because at least claim 1 is supported by the disclosure of the provisional application, as detailed below. *See* Ex. 1008 (Mintz Provisional). I am informed that Mintz is therefore prior art to the '772 patent under pre-AIA 35 U.S.C. § 102(e), as of Dec. 31, 2010.

Mintz Claim 1	Mintz Provisional
<p>[1pre] 1. In a standard 20-foot ISO intermodal shipping container having a plurality of walls including a first pair of parallel longitudinal walls and a second pair of parallel transverse walls, with said second pair of parallel transverse walls perpendicular to said first pair of parallel longitudinal walls, with one wall of said pair of transverse walls having a door disposed thereupon, and also having a floor and a roof perpendicular to said plurality of walls, a frac sand transporting apparatus comprising:</p>	<p>See Mintz Prov. at 8 (“a specially configured apparatus adapted for preferably being slidably inserted into and removed from an ISO intermodal container and the like”); (“there is depicted a preferred embodiment 1 of an apparatus for transporting frac sand in an intermodal container 2”); Figs. 1-6.</p> <div data-bbox="967 798 1265 1001" data-label="Image"> </div> <p data-bbox="1068 1066 1127 1087">FIG. 1</p>
<p>[1a] a first plurality of input ports disposed atop said roof with each of said input ports coupled with a first output pipe located in situ at a frac sand processing facility;</p>	<p>See Mintz Prov. at 8 (“plurality of intake and discharge ports to be routinely coupled with a preexisting conventional hopper assembly located in situ at the well site at which fracturing operations will be conducted”); at 9 (“there is seen a pair of tubular input ports 3 disposed atop roof 8”); at 10, claim 1 (“a plurality of inlet ports disposed atop said roof, said inlet ports receiving said frac sand and said proppant from said quarry or</p>

Mintz Claim 1	Mintz Provisional
	other frac sand supply source into a hopper”); Fig. 2; Figs. 7-8.
<p>[1b] a brace and truss framework enclosed within said standard 20-foot ISO intermodal rectangular shipping container and affixed to said plurality of walls, said floor and said roof, for reinforcing the strength of said plurality of walls, said floor and said roof by said brace and truss framework;</p>	<p>See Mintz Prov. at 8 (“While the base of apparatus 1 structurally devolves to a framework anchored by the fixed interconnection of pair of basal cross-braces 7 and pair of end supports 6 reinforced medially by plurality of saddle supports 5, the upper portion thereof is secured by roof 8. It will also be seen that the structure of frac sand transport apparatus 1 is further secured by medial cross-brace 17 which is affixed to the plurality of saddle supports 5.”); at 10, claim 1 (“an external framework comprising each of pair of longitudinal basal cross-braces fixedly interconnected at each end thereof with one of pair of end supports and intermediately thereof with plurality of saddle supports;”); at 10, claim 1 (“said external framework anchored by the fixed interconnection of pair of basal cross-braces and pair of end supports that are reinforced medially by a plurality of</p>

Mintz Claim 1	Mintz Provisional
	saddle supports, the upper portion thereof being secured by a roof;”); Figs. 1 & 2.
[1c] a hopper assembly disposed within and affixed to said brace and truss framework forming a sealable enclosure for receiving frac sand and/or proppant material from said first plurality of input ports, with said frac sand and/or proppant material collected and stored in a central chamber member disposed therewithin;	See Mintz Prov. at 9 (“Accordingly, the lids would preferably be situated just beneath the container roof and, once opened by hand, frac sand would be delivered into the hopper portion of apparatus 1. To assure that contained frac sand remains devoid of water incursion, it is contemplated that the apparatus lid could be enclosed within a hingedly-opened cut-out.”); Figs. 1-3.
[1d] said central chamber member disposed parallel to and longitudinally of said floor throughout the length of said ISO intermodal rectangular shipping container, and having a pair of arms forming a funnel member at a vertex thereof, with each arm of said pair of arms angled at about 31° relative to a horizontal base plate disposed therebetween and affixed at each end thereof to said brace and truss framework, to urge said sand and/or	See Mintz Prov. at 8 (“While the base of apparatus 1 structurally devolves to a framework anchored by the fixed interconnection of pair of basal cross-brace 7 and pair of end supports 6 reinforced medially by plurality of saddle supports 5, the upper portion thereof is secured by roof 8. It will also be seen that the structure of frac sand transport apparatus 1 is further secured by medial cross-brace 17 which is affixed to the plurality of saddle supports

Mintz Claim 1	Mintz Provisional
<p>proppant material into said central chamber member, and also having a pneumatic controller fluidly interconnected with a valve apparatus and an external compressed air source;</p>	<p>5.”); at 9 (“Accordingly, the lids would preferably be situated just beneath the container roof and, once opened by hand, frac sand would be delivered into the hopper portion of apparatus 1.”); at 10 (“Besides the hereinbefore described steel frac sand transport and delivery module, another embodiment of the modular apparatus contemplated by the present invention corresponds to a bladder apparatus using high-density elastomeric and like material similar to that used in military fuel storage applications. For such an embodiment, the central bladder would hold the frac sand material and a plurality of side-bladders would inflate to control the rate and extent of frac sand and proppant discharge.”); Figs. 1-3.</p>
<p>[1e] a second plurality of output discharge ports disposed upon an external transverse surface of said hopper assembly, with each said output port thereof coupled to a second discharge pipe located in situ at a well</p>	<p>See Mintz Prov. at 8 (“Referring collectively to FIGS. 1-8, there is depicted . . . plurality of outlet ports”); at 9; Fig. 2; Figs. 7-8.</p>

Mintz Claim 1	Mintz Provisional
site for transfer of said sand and/or proppant	
<p>[1f] said valve apparatus disposed within said hopper assembly parallel to and longitudinally of said floor throughout the length of said ISO intermodal rectangular shipping container, for pneumatically controlling flow of said frac sand and/or proppant material from said central chamber member to said second plurality of output discharge ports and, in turn, into said second discharge pipe; and</p>	<p>See Mintz Prov. at Abstract, 14 (“a plurality of outlet ports for receiving the frac sand and proppant within the hopper and delivering the frac sand and proppant proximal to the well site”); at 8 (“As will become evident to those skilled in the art, embodiments of this frac sand transport apparatus are configured to enable its plurality of intake and discharge ports to be routinely coupled with a preexisting conventional hopper assembly located in situ at the well site at which fracturing operations will be conducted.”); at 9 (“Also seen is discharge port 4 with a mechanical valve or the like typically having a 4" outlet and a 24" x 24" sliding gate valve.”); at 10 (“Besides the hereinbefore described steel frac sand transport and delivery module, another embodiment of the modular apparatus contemplated by the present invention corresponds to a bladder apparatus using high-density</p>

Mintz Claim 1	Mintz Provisional
	elastomeric and like material similar to that used in military fuel storage applications. For such an embodiment, the central bladder would hold the frac sand material and a plurality of side-bladders would inflate to control the rate and extent of frac sand and proppant discharge.”) Figs. 1-3.
[1g] said bladder-tube member cyclically inflated and deflated by a programmed circuit board contained within said pneumatic controller in order to control corresponding cyclical continuous input and discharge of said frac sand and/or proppant material.	See Mintz Prov. at 10 (“Besides the hereinbefore described steel frac sand transport and delivery module, another embodiment of the modular apparatus contemplated by the present invention corresponds to a bladder apparatus using high-density elastomeric and like material similar to that used in military fuel storage applications. For such an embodiment, the central bladder would hold the frac sand material and a plurality of side-bladders would inflate to control the rate and extent of frac sand and proppant discharge.”).

46. Although Mintz was listed on an Information Disclosure Statement submitted to the Patent Office during prosecution of the ‘772 patent, Mintz was

never cited during any office action. Instead, Mintz was presented as one document among an extensive list of patents, patent applications, and other materials. Further, there is no indication that the Patent Office considered the particular disclosures and arguments discussed below. Accordingly, Mintz is proper grounds for this Petition.

2. Overview of Mintz

47. Mintz “pertains to apparatus allowing adaptation of an ISO intermodal container for transporting frac sand from its supplier to a well site.” Ex. 1004 (Mintz) 1:11-16. Like the ‘772 patent, Mintz explains that prior “apparatus[es] and methodolog[ies] for transporting frac fluid containing sand and proppant suffer from several long-standing disadvantages,” including that “frac sand and proppant have typically not been well sealed from environmental incursions during transfer[,] [undermining] the integrity of this material.” Ex. 1004 (Mintz) 1:38-45. Mintz also explains that, because “it has been difficult . . . for special-purpose railcars and pneumatic trucks to be brought sufficiently close to well sites, it has become a prevalent occurrence for several material transfers to be prerequisite for ultimate delivery” of proppant to the well site. Ex. 1004 (Mintz) 1:48-53. Mintz further notes that “pneumatic trucks are frequently unavailable and unloading of frac sand from trucks or railcars is likewise frequently delayed, wherein railcars

remain idle, with railroads charging significant demurrage fees.” Ex. 1004 (Mintz) 1:54-58.

48. To address these deficiencies, Mintz proposes a “novel application of standard ISO shipping containers to accommodate an internal structure adapted to support and strengthen the walls and floor of such ISO shipping containers,” as well as “a valve apparatus configured to efficiently and securely achieve prerequisite sand and proppant material transfer from such adapted containers to fracking operations.” Ex. 1004 (Mintz) 1:65-2:3. Specifically, Mintz discloses incorporating into a standard ISO shipping container a “[h]orizontal and angular peripheral bracing framework” to strengthen the walls of the container, and to support “a funnel-hopper member of a hopper discharge assembly.” Ex. 1004 (Mintz) 2:55-60. The modified ISO container disclosed in Mintz is illustrated in Figures 1 and 2, below.

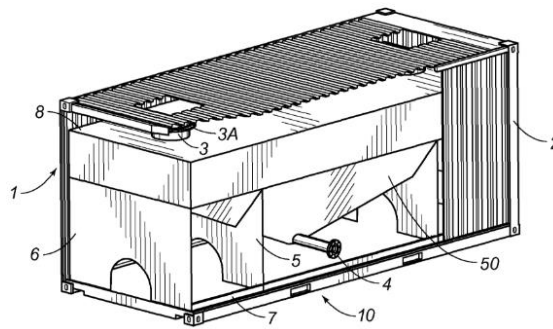


FIG. 1

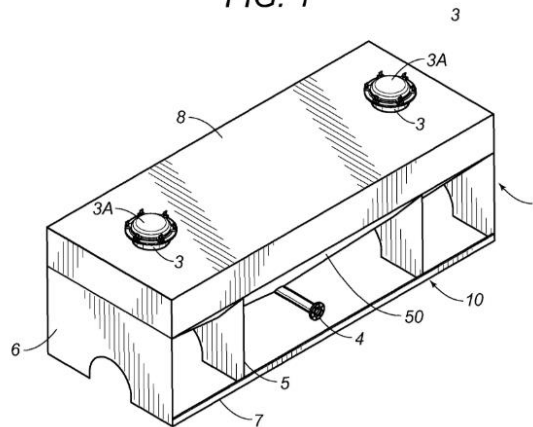


FIG. 2

C. U.S. Published Appl. No. 2013/0022441 (Uhryn)

1. Priority Date

49. U.S. Published Appl. No. 2013/0022441 (Uhryn) was filed on May 18, 2012 and granted on January 24, 2013. Uhryn claims priority to U.S. Provisional application No. 61/509,943, filed on July 20, 2011. Uhryn is entitled to this benefit because at least claim 1 is supported by the disclosure of the

provisional application, as detailed below. *See* Ex. 1009 (Uhryn Provisional).⁴ I am informed that Uhryn is therefore prior art to the ‘772 patent under pre-AIA 35 U.S.C. § 102(e), as of July 20, 2011.

Uhryn Claim 1	Uhryn Provisional
[1pre] 1. A method of bulk transport of proppant comprising:	Uhryn Prov. ¶[0004] (“A method of bulk transport of proppant is disclosed comprising”).
[1a] transporting proppant in an intermodal transport container to a well site, the intermodal transport container having four vertical walls, a roof, and a base, defining an enclosed interior, the proppant being loosely disposed within the enclosed interior; and	Uhryn Prov. ¶[0004] (“transporting proppant in an intermodal transport container to a well site, the intermodal transport container having four vertical walls, a roof, and a base, defining an enclosed interior,”); ¶[0017].
[1b] unloading at least a portion of the proppant through one or more gates in the intermodal transport container at the well site.	Uhryn Prov. ¶[0004] (“unloading at least a portion of the proppant through one or more gates in the intermodal transport container at the well site”); ¶[0020] (“at least a portion of the proppant is unloaded through one or more gates, such as rear gates 40”).

⁴ The Uhryn provisional application is identical to the published application.

50. Although Uhryn was listed on an Information Disclosure Statement submitted to the Patent Office during prosecution of the ‘772 patent, Uhryn was never cited during any office action. Instead, Uhryn was presented as one document among an extensive list of patents, patent applications, and other materials. Further, there is no indication that the Patent Office considered the particular disclosures and arguments discussed below with respect to these claims. Accordingly, Uhryn is proper grounds for this Petition.

2. Overview of Uhryn

51. Uhryn provides for a method and apparatus for “bulk transport of proppant,” through the use of an “intermodal transport container,” including “unloading at least a portion of the proppant through one or more gates in the intermodal transport container at the well site.” Ex. 1005 (Uhryn) ¶[0004]-¶[0005]. Like the ‘772 patent, Uhryn recognizes that conventional methods of transporting proppant “requires a large capital expenditure to acquire and operate the transloading facilities, the warehouse space at the port 14 and each transloading facility, and to acquire and operate the bulk rail cars, the pneumatic proppant trucks, and various other components required to make the system run smoothly,” and “if facility 17 is not ready to receive the proppant on arrival of the rail cars, even a one to two day sitting period for the rail cars may carry substantial expenses

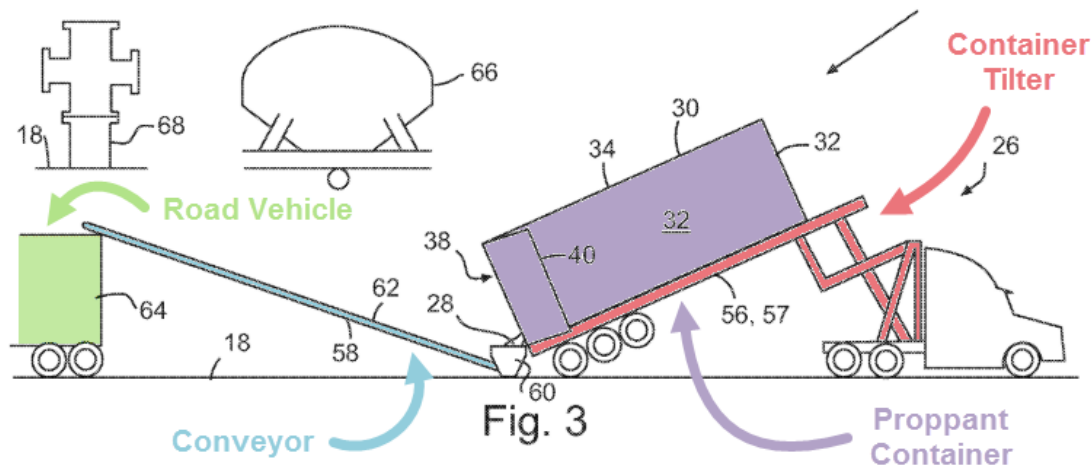
that are passed on to the end user directly or indirectly.” Ex. 1005 (Uhryn)

¶[0016].

52. To address these problems, Uhryn proposes the use of an intermodal transport container to transport and store proppant. As Uhryn explains, the use of such a container has numerous advantages, including reducing costs through the removal of one or more transloading steps, “is more secure than transport in bags [], as intermodal transport containers 30 are more damage-resistant and weatherproof,” is “cheaper, easier, and faster” for switching transport modes, permits “storing the proppant in the intermodal transport container,” and “is also advantageous due to the commonality and low cost of intermodal transport containers.” Ex. 1005 (Uhryn) ¶[0021]- ¶[0023].

53. In order to unload proppant at the well site, Uhryn discloses a method of unloading filled proppant containers onto conveyors using a tiltable platform. Uhryn states that “[u]nloading may be carried out using a container tilter 56, such as a hydraulic fifth wheel tilter as shown Tilter 56 may be mounted on a wheeled trailer 57 as shown” Ex. 1005 (Uhryn) ¶ [0020]. Uhryn Figure 3

illustrates a method of using a container tilter to unload proppant.



X. UNPATENTABILITY BASED ON PRIOR ART IN THE PRESENT PROCEEDING

54. I have been informed that a patent claim can be found unpatentable as anticipated when a single piece of prior art discloses every limitation of the claimed invention, either expressly or inherently, arranged in the same way as in the claim. For inherent anticipation to be found, it is required that the missing descriptive material is necessarily present in the prior art. I understand that, for the purpose of an *inter partes* review, prior art that anticipates a claim can include both patents and printed publications from anywhere in the world.

55. I have also been informed that a patent claim can be found unpatentable as obvious where 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 relevant field. I understand that an obviousness analysis involves a consideration of (1) the scope and content of the prior art; (2) the differences between the claimed inventions and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations of non-obviousness, sometimes also called objective indicia of nonobviousness.

56. I understand that a reason to combine prior art references must be shown. This reason to combine can come from a variety of sources, not just the prior art itself or the specific problem the Patentee was trying to solve. I understand that the references themselves need not provide a specific hint or suggestion of the alteration needed to arrive at the claimed invention; the analysis may include recourse to logic, judgment, and common sense available to a skilled person that does not necessarily require explanation in any reference. It is also my understanding that where there is a reason to modify or combine the prior art to achieve the claimed invention, there must also be a reasonable expectation of success in so doing.

57. I also understand that a combination of familiar limitations according to known methods is likely to be obvious when it does no more than yield predictable results. I understand that when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a skilled person has good reason to pursue the known options within his

or her technical grasp. If this leads to the anticipated outcome, then that outcome is likely a product not of innovation, but of ordinary skill and common sense, and therefore is considered obvious according to patent laws.

58. I understand that when considering the obviousness of an invention, one should also consider whether there are any secondary considerations (also known as objective indicia) that support the non-obviousness or obviousness of the invention. I understand that objective indicia of non-obviousness or obviousness can include commercial success, long-felt but unmet need, failure of others, praise in the industry, unexpected superior results, licensing, and simultaneous invention.

59. I am not aware of any secondary considerations of non-obviousness, and I reserve the right to respond if Patentee identifies any such secondary considerations of non-obviousness.

60. My analysis of these considerations is set forth in the following sections.

XI. SUMMARY OF GROUNDS

61. The table below summarizes the grounds for unpatentability set forth in my declaration.

Ground	Reference(s)	Basis	Claims Challenged
1	U.S. Published Appl. No. 2013/0206415 (“Sheesley”)	§103	1-2, 6-10

2	Sheesley in combination with U.S. 8,915,691 (“Mintz”)	§103	1
3	Sheesley in combination with U.S. Published Appl. No. 2013/0022441 (“Uhryn”)	§103	3-5, 11

62. It is my opinion that the grounds raised are meaningfully distinct from each other and are not redundant. Both Mintz and Uhryn are provided to fill in any gaps in the claims that are not disclosed within Sheesley. Moreover, while Mintz and Sheesley discuss similar concepts, they describe them differently, and Patentee may try to distinguish the presence of claim limitations in the prior art based on these differences in wording. Accordingly, all grounds should be included for trial.

XII. GROUNDS FOR INVALIDITY

A. Ground 1: Claims 1-2, 6-10 Are Rendered Obvious by Sheesley

1. Independent Claim 1 is Rendered Obvious by Sheesley **[1pre] 1. A method of transporting proppant, the method comprising:**

63. To the extent that the preamble is limiting, Sheesley describes a method of transporting proppant with containers constructed to store fracking proppant. Specifically, Sheesley relates to “the modification of cargo containers for the purpose of transporting sand therein to frac sites.” Ex. 1003 (Sheesley) ¶[0002]; Abstract. Sheesley further discloses that the “[m]odified cargo containers 270 can be loaded on a ship 272, barge 274, rail 276 or a flatbed truck trailer 278,”

and “[o]bviously, multiple modified cargo containers 270 may be loaded on each of these alternative modes of transportation.” Ex. 1003 (Sheesley) ¶[0078].

64. Therefore, it is my opinion that Sheesley discloses this limitation.

[1a(i)] a) vertically stacking a plurality of empty proppant containers in close proximity to a rail spur so that one of the plurality of empty proppant containers overlies another one of the plurality of empty containers thereby to reduce footprint of the area required adjacent the rail spur to store the plurality of empty proppant containers,

65. Sheesley discloses that the modified containers may be stacked while empty. *See* Ex. 1003 (Sheesley) ¶[0021] (“FIG. 3 is a pictorial illustration of the stackability of modified cargo containers, with or without sand therein.”); ¶[0018] (“Also, the modified frac containers may be stacked in any conventional means, either while in transit or at the frac site.”); Fig. 3. As shown in Figure 3, such containers are stacked so that one empty container overlies another empty container, necessarily reducing the footprint of the area taken up by the containers.

66. Sheesley further discloses that the modified containers can be filled with proppant at a rail site. As disclosed in Sheesley, the modified container can be used to obtain proppant at any of the locations in the supply chain. Specifically, Sheesley explains that “sand from the sand quarry 30 *or source* can now be loaded by a conveyer 268 to a modified cargo container.” Ex. 1003 (Sheesley) ¶[0078] (emphasis added); Abstract (“A cargo container is modified to carry a fracing

proppant such as sand from a quarry or source to the frac site.”). The source where proppant is obtained “may be any point along a supply chain of said proppant.”

Ex. 1003 (Sheesley) at claim 21; claim 15. As Sheesley explains, the supply chain includes a rail site. *See* Ex. 1003 (Sheesley) ¶[0017] (“The modified cargo containers can then move through all of the normal modes of transportation including ship, barge, rail or by truck, all the way to the frac site”); ¶[0019]; ¶[0042]; ¶[0049]; ¶[0077]; ¶[0078]; Fig. 1. Thus, it is my opinion that Sheesley discloses containers that may be filled with proppant at a rail site.

67. Moreover, Sheesley discloses that the modified containers may be filled while in a stacked configuration, where container 302 “receives sand 306 from auger 303 through upper hatch 305,” and “may feed sand 306 or any other granular proppant therein through lower hatch 308 in modified cargo container 302 and upper hatch 310 into modified cargo container 304 located immediately there below.” Ex. 1003 (Sheesley) ¶[0023]; ¶[0084]; Fig. 5. As shown in FIG. 5 (reproduced below), the container 302 underlies the source of proppant, auger 303.

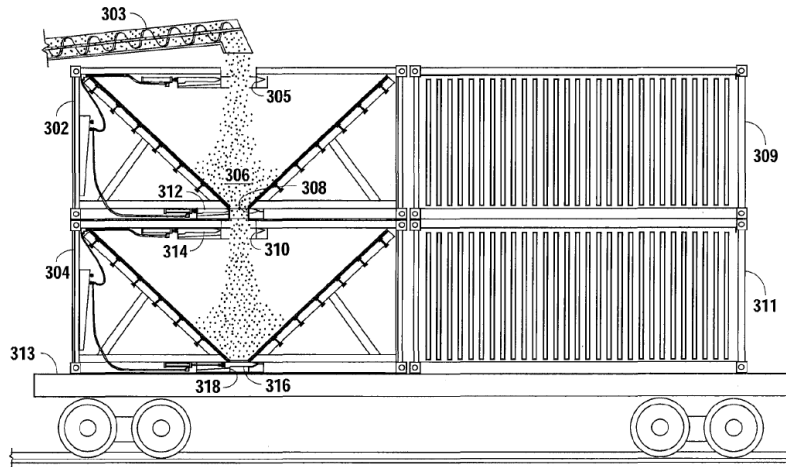


Fig. 5

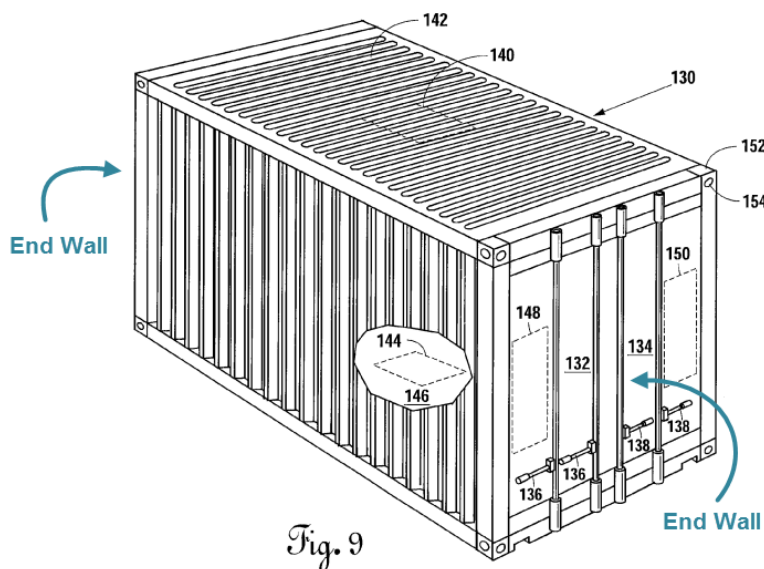
68. In my opinion, a POSITA at the time would understand Sheesley’s auger could provide proppant received from a rail car on the rail spur (the “source” on the supply chain of proppant) into Sheesley’s empty proppant containers, and that such containers would necessarily be in “close proximity” to the rail spur.

69. Therefore, in my opinion, Sheesley discloses this limitation.

[1a(ii)] each of the plurality of empty containers including at least a first end surface and at least a second different end surface and

70. Sheesley discloses the use of an ISO container modified to store and transport proppant. Ex. 1003 (Sheesley) Abstract; ¶[0004]; ¶[0012]. The modified ISO container disclosed in Sheesley contains a first end surface and a second different end surface, as shown in annotated Fig. 9 below. Ex. 1003 (Sheesley)

¶[0050]; Fig. 9.

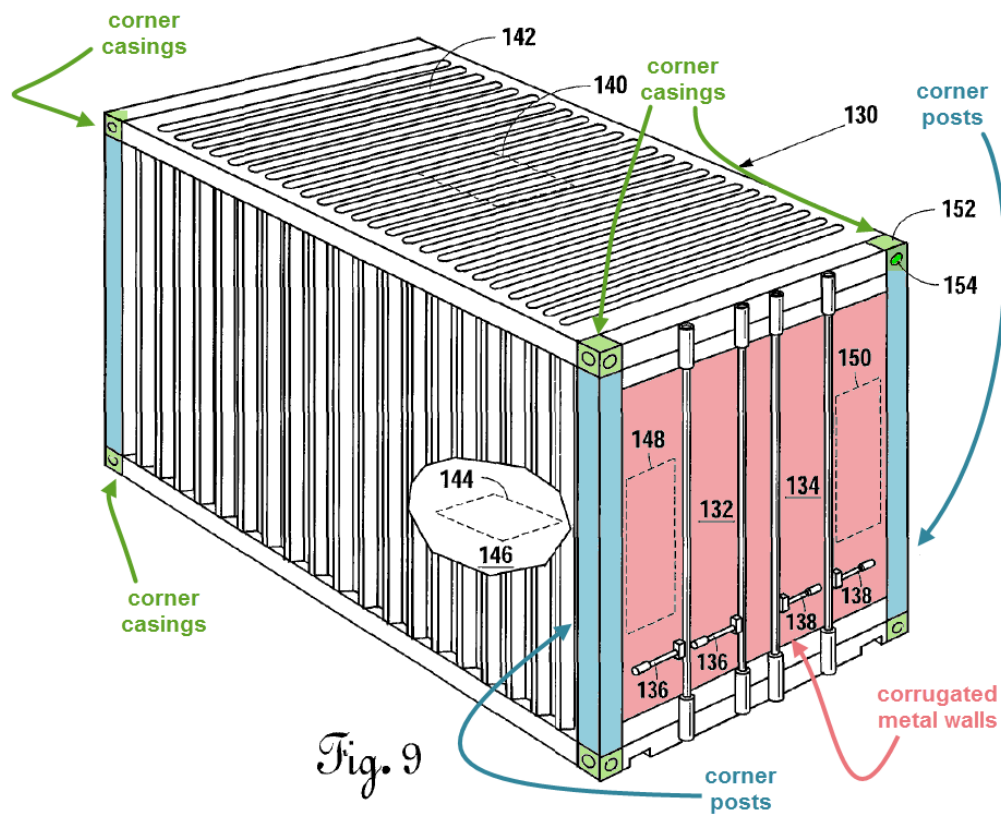


71. Therefore, it is my opinion that Sheesley discloses this limitation.

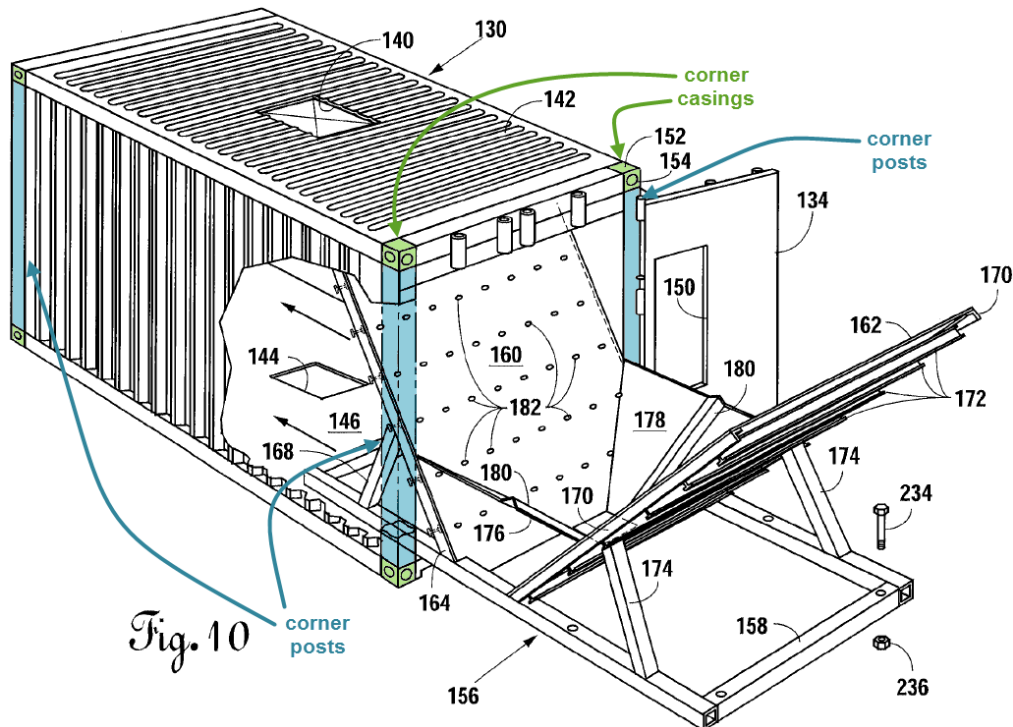
[1a(iii)] each of the first and second end surfaces having a plurality of upright structural support members thereon to enhance integrity of the container so that a large amount of weight can be stacked upon the container and so that heavy weight can be stored therein;

72. Sheesley discloses that the modified container contains one or more structural support members at the corners and edges positioned to support each of the end walls of the pair of end walls—specifically, corner castings, and corner posts. *See* Ex. 1003 (Sheesley) at Fig. 9; Fig. 10. Indeed, during prosecution of a

sister application (U.S. Appl. No. 14/314,468),⁵ the Patentee admitted that “Sheesley shows support members only at corners and edges of the containers where the side walls and end walls meet.” Ex. 1010 (‘468 File History) at 26. Such support structures can be seen in the corrugated metal walls (Ex. 1003 (Sheesley) ¶[0050]), corner castings 152, and corner posts. See Ex. 1003 (Sheesley) Fig. 9 (annotated below); Fig. 10 (annotated below).



⁵ The patent resulting from U.S. Appl. No. 14/314,468 and the ‘772 patent both claim priority to U.S. Appl. No. 14/310,648.



73. Furthermore, Sheesley discloses modifying a standard ISO cargo container. Ex. 1003 (Sheesley) ¶[0004]; ¶[0016]; ¶[0050]. The International Organization for Standardization (“ISO”) is a global federation of national standards-setting bodies that promulgates international technical, industrial, and commercial standards. In particular, the ISO’s implementation of a uniform standard for shipping containers was crucial to the rise of intermodal transportation in the second half of the 20th Century. Ex. 1013 (Intermodal Transportation) at 8-10. ISO standards are widely adopted and practiced in the hydraulic fracturing industry. ISO standards provide for a variety of mandatory and optional requirements of cargo shipping containers. All ISO containers must meet certain

strength requirements. Ex. 1012 (ISO 1496 Standard)⁶ 5.1; 5.2; 5.3.1 (“All containers shall be capable of being supported by their bottom corner fittings only.”); 6.3; 6.4. Thus, in my opinion, a POSITA would understand the modified ISO container disclosed in Sheesley must also provide this structural support.

74. Moreover, to the extent that the Patentee argues that certain structural requirements must be met in order for the container to hold a large amount of proppant, Sheesley discloses that the modified container is capable of holding proppant and of being stacked. Ex. 1003 (Sheesley) ¶[0018]; ¶[0021]; ¶[0080]; ¶[0084].

75. It is therefore my opinion that Sheesley discloses and renders obvious this limitation.

[1b] b) filling the plurality of empty proppant containers with proppant from one or more proppant transporting rail vehicles thereby to produce a plurality of proppant filled containers;

76. As discussed above regarding limitation [1a(i)], Sheesley discloses filling the modified containers at a rail site, thus resulting in containers filled with

⁶ ISO 1496 Standard was issued in August of 1990, and was therefore known to POSITA prior to the priority date of the ‘772 patent.

proppant. Ex. 1003 (Sheesley) ¶[0017]; ¶[0019]; ¶[0042]; ¶[0049]; ¶[0077]; ¶[0078]; Fig. 1; Abstract; claim 15; claim 21.

77. Thus, in my opinion, Sheesley discloses this limitation.

[1c] c) transferring the plurality of proppant filled containers with a loader onto one or more support platforms associated with one or more proppant transporting road vehicles.

78. Sheesley discloses that a trailer may be used to transport the modified cargo containers. Ex. 1003 (Sheesley) ¶[0025] (“FIG. 7 is an elevated side view of the trailer being used with modified cargo containers thereon which can be filled with frac sand.”); ¶[0078]; ¶[0079] (“If the modified cargo containers 270 are loaded on flatbed truck trailer 278 or container chassis, the modified cargo containers 270 can be taken directly to the fracing site 280 or placed in storage 282 at the fracing site 280.”); ¶[0088]; Fig. 2; Fig. 7. As shown in Figure 2, the “flatbed truck trailer” contains a flatbed, which is a support platform associated

with a road vehicle.

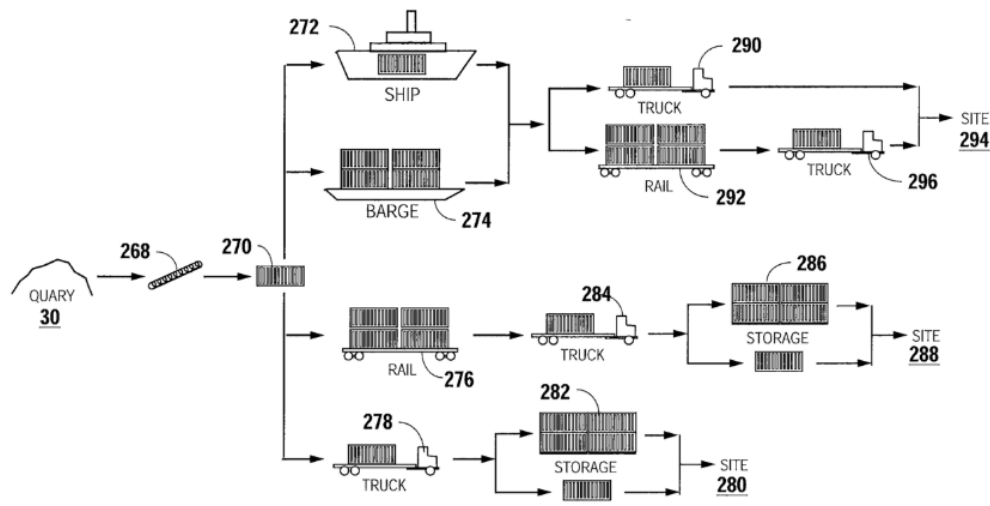


Fig. 2

79. Sheesley further discloses that a loader/unloader such as the “Rough Terrain Cargo Handler” can be used to move the filled modified containers. Ex. 1003 (Sheesley) ¶[0083] (“The Rough Terrain Cargo Handler 298 can pick up one of the modified cargo containers 270 full of sand and unload the modified cargo container 270 to a bulk sand container 300 at the frac site (see FIG. 4).”).

Regardless of this disclosure, in my opinion, it would be well within the knowledge of a POSITA that a loader/unloader would be used to load/unload the containers to/from a trailer. As such, it is my opinion that Sheesley discloses and renders obvious this limitation.

2. Dependent Claim 2 Is Rendered Obvious by Sheesley

The method of claim 1, wherein the plurality of proppant filled containers comprises a first plurality of proppant filled containers, and the method further comprising:

filling a second plurality of empty proppant containers with proppant from one or more proppant transporting rail vehicles thereby to produce a second plurality of proppant filled containers: and

vertically stacking the second plurality of proppant filled containers with a loader so that one of the plurality of proppant filled containers overlies another one of the plurality of filled containers to reduce the footprint of the area required for storage of the proppant in close proximity to the rail spur.

80. Claim 2 depends from claim 1 and further requires filling and stacking a second plurality of containers in close proximity to the rail spur. As discussed above regarding claim 1, Sheesley discloses filling and stacking a first plurality of containers in close proximity to the rail spur with a loader. In my opinion, a POSITA would understand that multiple containers could be filled with proppant and stacked at the rail spur, particularly in light of Sheesley's disclosures of multiple filled and stacked containers, as shown in Figure 3 below. Ex. 1003 (Sheesley) Fig. 3; ¶[0021] ("FIG. 3 is a pictorial illustration of the stackability of

modified cargo containers, with or without sand therein.”).

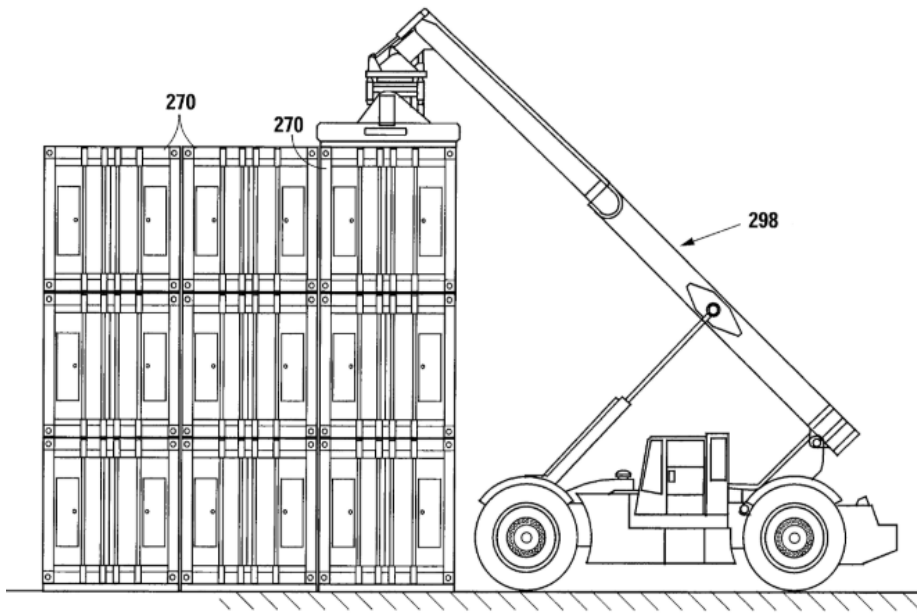


Fig. 3

81. It is therefore my opinion that Sheesley discloses this limitation.

3. Dependent Claim 6 Is Rendered Obvious by Sheesley

The method of claim 1, further comprising:

moving the plurality of empty proppant containers from the storage location,⁷ to the one or more proppant transporting rail vehicles and then to the one or more support platforms located on the one or more proppant transporting road vehicles.

82. As discussed above regarding limitations [1a(i)] and [1c], Sheesley discloses stacking empty containers in close proximity to a rail spur, filling those containers with proppant, and loading those containers onto one or more support platforms located on the one or more proppant transporting road vehicles. *See* Ex. 1003 (Sheesley) ¶¶[0017]; ¶¶[0019]; ¶¶[0042]; ¶¶[0049]; ¶¶[0077]; ¶¶[0078]; Abstract; claim 15; claim 21; ¶¶[0078]; Fig. 1.

83. Sheesley further discloses that the modified cargo containers filled with proppant can be placed in storage. Ex. 1003 (Sheesley) ¶¶[0079]-¶¶[0081]. In my opinion, a POSITA would understand that the containers could likewise be placed in storage if they were empty. It is my opinion that a POSITA would

⁷ I understand that the Petitioner has reserved the right to argue that the term “the storage location” is indefinite.

understand that the containers must go *somewhere* after they are emptied of proppant at the well site—such a place would necessarily be considered a storage location for the containers. Moreover, it is my opinion that a POSITA at the time would understand that in order to fill the modified containers at the rail site, there must be empty containers at the rail site. It is further my opinion that a POSITA would know to reuse the containers, and that these empty containers would be taken from wherever they are, which as discussed is necessarily a storage location, and brought to the rail site to be filled with proppant. To do otherwise would, in my opinion, end in the nonsensical result of continuously buying new containers to fill with proppant.

84. Thus, in my opinion, Sheesley renders this limitation obvious.

4. Dependent Claim 7 Is Rendered Obvious by Sheesley

[7a] The method of 1, wherein the one or more proppant transporting road vehicles comprises a plurality of proppant transporting road vehicles, and wherein the method further comprises:

staging the plurality of proppant transporting road vehicles so that each of the plurality of proppant transporting road vehicles receives one or more of the plurality of proppant filled containers,

85. As discussed above regarding limitation [1c], Sheesley discloses the use of a flatbed truck trailer to deliver sand from the source to the well site. *See also* Ex. 1003 (Sheesley) ¶[0078]. In my opinion, it would be obvious to a POSITA to stage more than one transporting road vehicles at the proppant's source, as to facilitate fast and efficient loading of the containers onto the road vehicles to transport the amount of proppant required to the frac site. Furthermore, I have been informed that it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

86. Claim 7 further requires "staging the plurality of proppant transporting road vehicles so that each respective trailer of the plurality of proppant transporting road vehicles receives one or more of the plurality of proppant filled containers." In my opinion, a POSITA would understand that the transporting road

vehicles could necessarily be staged such that the vehicle's trailers could be loaded with proppant filled containers. Indeed, Sheesley discloses loading the proppant onto a road vehicle (Ex. 1003 (Sheesley) ¶[0078] (“Modified cargo containers 270 can be loaded on a ship 272, barge 274, rail 276 or a flatbed truck trailer 278”)), that “[o]bviously, multiple modified cargo containers 270 may be loaded on each of these alternative modes of transportation.” Ex. 1003 (Sheesley) ¶[0078]. The same rationale applies that, if necessary, multiple road vehicles could be positioned to receive as many proppant-filled containers as necessary. Indeed, Figure 2 shows that truck 278 carries a single container, while there are multiple containers placed in storage, thus requiring multiple road vehicles. Ex. 1003 (Sheesley) ¶[0079] (“If the modified cargo containers 270 are loaded on flatbed truck trailer 278 or container chassis, the modified cargo containers 270 can be taken directly to the fracing site 280 or placed in storage 282 at the fracing site 280.”); Fig. 2 (below).

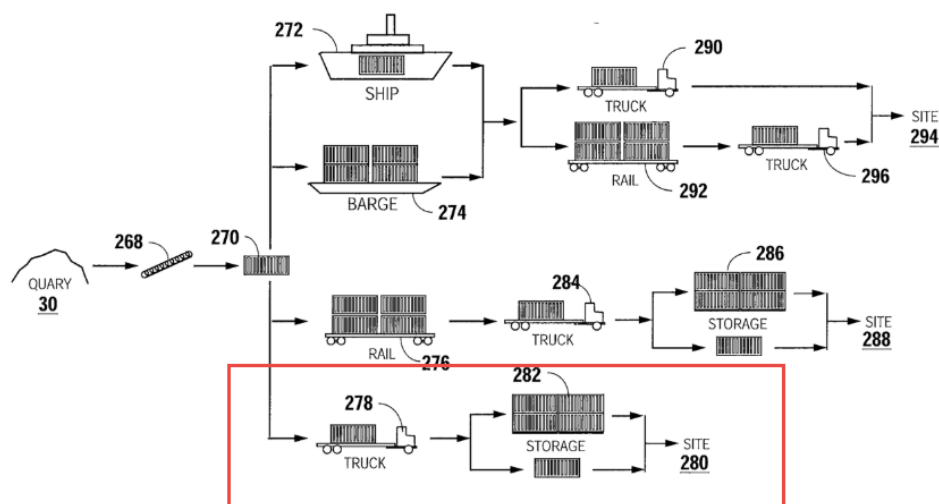


Fig. 2

87. Therefore, it is my opinion that Sheesley discloses or renders obvious this limitation.

[7b] delivers the container away from the one or more proppant transporting rail vehicles, thereby increasing the efficiency with which proppant is transferred from the one or more proppant transporting rail vehicles to the plurality of proppant transporting road vehicles.

88. As discussed above, Sheesley discloses transporting containers away from the loading site, (which, as explained above, can include a rail site), towards the fracking site. *See also*, Ex. 1003 (Sheesley) ¶[0017] (“The modified cargo containers can then move through all of the normal modes of transportation including ship, barge, rail or by truck, all the way to the frac site.”); Ex. 1003 (Sheesley) ¶[0079] (“If the modified cargo containers 270 are loaded on flatbed truck trailer 278 or container chassis, the modified cargo containers 270 can be taken directly to the fracing site 280 or placed in storage 282 at the fracing site 280.”).

89. Sheesley further explains that its method increases efficiency. Ex. 1003 (Sheesley) ¶[0082] (“By just comparing Figs. 1 and 2, it can be easily seen that the sand is being handled fewer times by the use of the modified cargo container 270. This results in considerably less expense, which reduces the price of fracing sand or other proppants to the well operator. The reduction in price can

be in the millions of dollars per well.”); ¶[0091] (“By use of the modified cargo containers as described herein above, the number of times the fracing proppant, such as sand, is handled is greatly reduced. The reduction in the number of times the fracing proppant is handled greatly reduces the cost of completion of a single hydrocarbon well.”); ¶[0011] (“It is important that as soon as the sand is delivered to the frac site, that it can be immediately unloaded to eliminate the demurrage.”); ¶[0018] (“Also, the modified frac containers may be stacked in any conventional means, either while in transit or at the frac site. This eliminates the demurrage of waiting to unload sand into bulk sand containers at the frac site.”).

90. It is therefore my opinion that Sheesley discloses this limitation.

5. Dependent Claim 8 Is Rendered Obvious by Sheesley

[8a] The method of claim 1, wherein step b) further comprises:

discharging the proppant from the one or more proppant transporting rail vehicles onto a conveyor; and

91. Sheesley discloses that the proppant from the source (which, as explained, can include a rail vehicle) may be unloaded from the rail vehicle into the empty modified cargo container using a conveyor. *See* Ex. 1003 (Sheesley) ¶[0078] (“Turning to FIG. 2, sand from the sand quarry 30 or source can now be loaded by a conveyer 268 to a modified cargo container”); ¶[0084] (“For example,

in Fig. 5, modified cargo container 302 receives sand 306 from auger⁸ 303 through upper hatch 305.”); Fig. 2; Fig. 5.

92. Therefore, it is my opinion that Sheesley discloses this limitation.

[8b] conveying the proppant on the conveyor from the proppant transporting rail vehicle to an inlet in each of the plurality of empty proppant containers.

93. Sheesley describes a modified container with an opening at the top to fill the container. Ex. 1003 (Sheesley) at Abstract; ¶[0016]; ¶[0014] (“It is still another object of the present invention to modify a cargo container so that sand can be inserted from the top and removed from the bottom of a totally self-contained unit.”); ¶[0084] (“For example, in FIG. 5, modified cargo container 302 receives sand 306 from auger 303 through upper hatch 305.”); claim 1 (“said hopper module in said cargo container is loaded through said top opening”); claim 15 (“loading said proppant into modified cargo containers through top notches therein”). Figure 10 of Sheesley illustrates these limitations.

⁸ In my opinion, a POSITA would understand that an auger moves sand through conveyance.

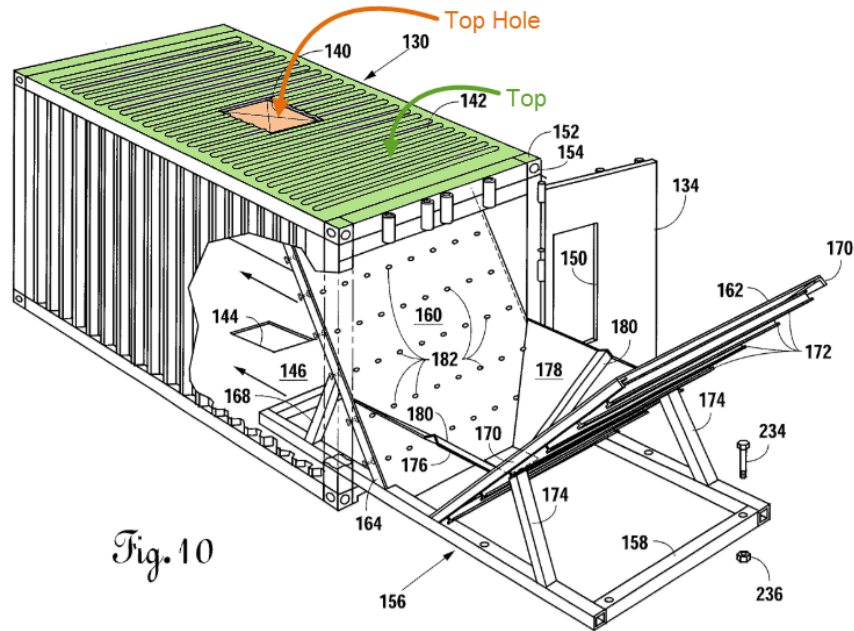


Fig. 10

94. As discussed above regarding limitation [8a], and as shown in Figures 2 and 5 (Figure 5 reproduced below), a conveyor may be used to transport proppant into the top opening of the container of Sheesley.

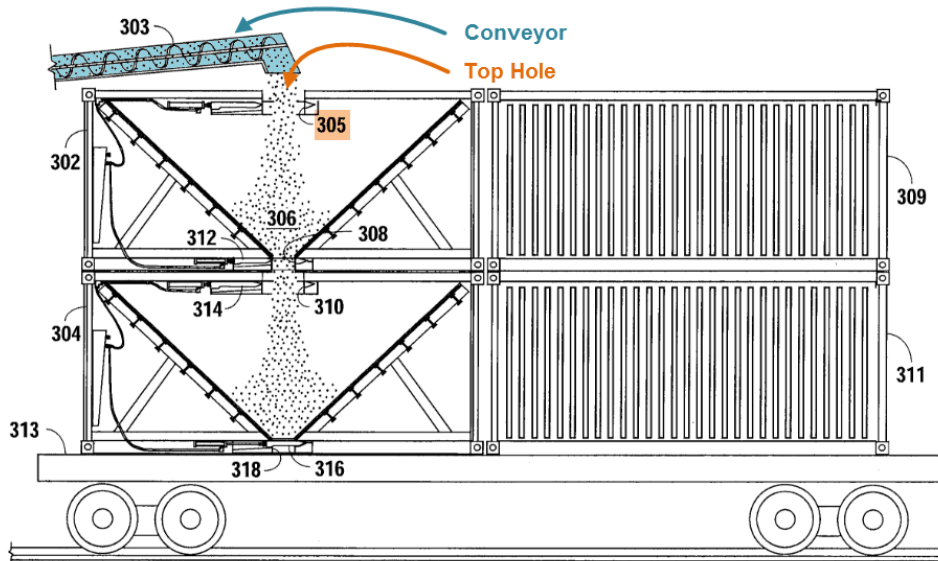


Fig. 5

95. It is thus my opinion that Sheesley discloses this limitation.

6. Dependent Claim 9 Is Rendered Obvious by Sheesley

[9a] The method of claim 1 further comprising:

after transferring the plurality of proppant filled containers to the one or more support platforms associated with the one or more proppant transporting road vehicles, returning another plurality of empty proppant containers to the proppant transporting rail vehicle to be filled proppant.

96. As disclosed above with respect to claim 1, Sheesley discloses that the modified containers can be filled with proppant at a rail site. *See* Ex. 1003

(Sheesley) ¶[0017]; ¶[0019]; ¶[0042]; ¶[0049]; ¶[0077]; ¶[0078]; Abstract; claim 15; claim 21; ¶[0078]; Fig. 1. Sheesley also discloses that multiple containers may be loaded with proppant at the same time. *See* Ex. 1003 (Sheesley) ¶[0078]

(“Obviously, multiple modified cargo containers 270 may be loaded on each of these alternative modes of transportation.”); ¶[0084]; ¶[0085]; Fig. 5; Fig. 7; Fig.

8. In my opinion, a POSITA would understand that in order to fill the modified containers at the rail site, there must be empty containers at the rail site.

97. Therefore, it is my opinion that Sheesley discloses this limitation.

7. **Dependent Claim 10 Is Rendered Obvious by Sheesley**

[10a] The method of claim 1, further comprising:

positioning a conveyor proximate a proppant transporting rail vehicle to receive proppant from the proppant transporting rail vehicle and thereby convey the proppant away from the proppant transporting rail vehicle when the conveyor operates;

98. Sheesley discloses that the proppant from the source (which, as explained, can include a rail vehicle) may be unloaded from the rail vehicle into the empty modified cargo container using a conveyor. *See* Ex. 1003 (Sheesley) ¶[0078] (“Turning to FIG. 2, sand from the sand quarry 30 or source can now be loaded by a conveyer 268 to a modified cargo container”); ¶[0084]; Fig. 2; Fig. 5.

99. Therefore, it is my opinion that Sheesley discloses this limitation.

[10b] positioning the plurality of empty proppant containers to receive proppant from the conveyor sequentially so that as one of the plurality of empty proppant containers is filled to a desired level, such one container then being removed in favor of another one of the plurality of empty proppant containers with the capacity to accept more proppant;

100. Sheesley does not expressly teach this sequential filling of proppant containers; however, in my opinion, it would have been obvious to a POSITA to

implement this common filling practice into the teachings of Sheesley. As noted by the Examiner during prosecution of related patent U.S. Application No. 14/841,942, “positioning containers sequentially to receive a load such that once a container is filled to a desired level, it is removed in favor of another empty container is a well-known method or feature for loading containers.” Ex. 1011 (‘066 patent file history) at 26 (05/12/2016 Final Rejection at ¶ 18) (noting that “trucks with containers line up sequential [sic] at quarry to receive gravel for use. As a container is filled the container is moved away and replaced by another empty container.”). The Patentee did not dispute the Examiner’s position.

101. It is therefore my opinion that Sheesley renders this limitation obvious.

**[10c] after removal of proppant from the conveyor,
transporting each of the plurality of proppant filled
containers away from the proppant transporting rail
vehicle.**

102. As discussed above regarding limitation [7b], Sheesley discloses transporting containers away from the loading site, (which, as explained above, can include a rail site), towards the fracking site. *See also*, Ex. 1003 (Sheesley) ¶[0017] (“The modified cargo containers can then move through all of the normal modes of transportation including ship, barge, rail or by truck, all the way to the frac site.”); Ex. 1003 (Sheesley) ¶[0079] (“If the modified cargo containers 270 are

loaded on flatbed truck trailer 278 or container chassis, the modified cargo containers 270 can be taken directly to the fracing site 280 or placed in storage 282 at the fracing site 280.”).

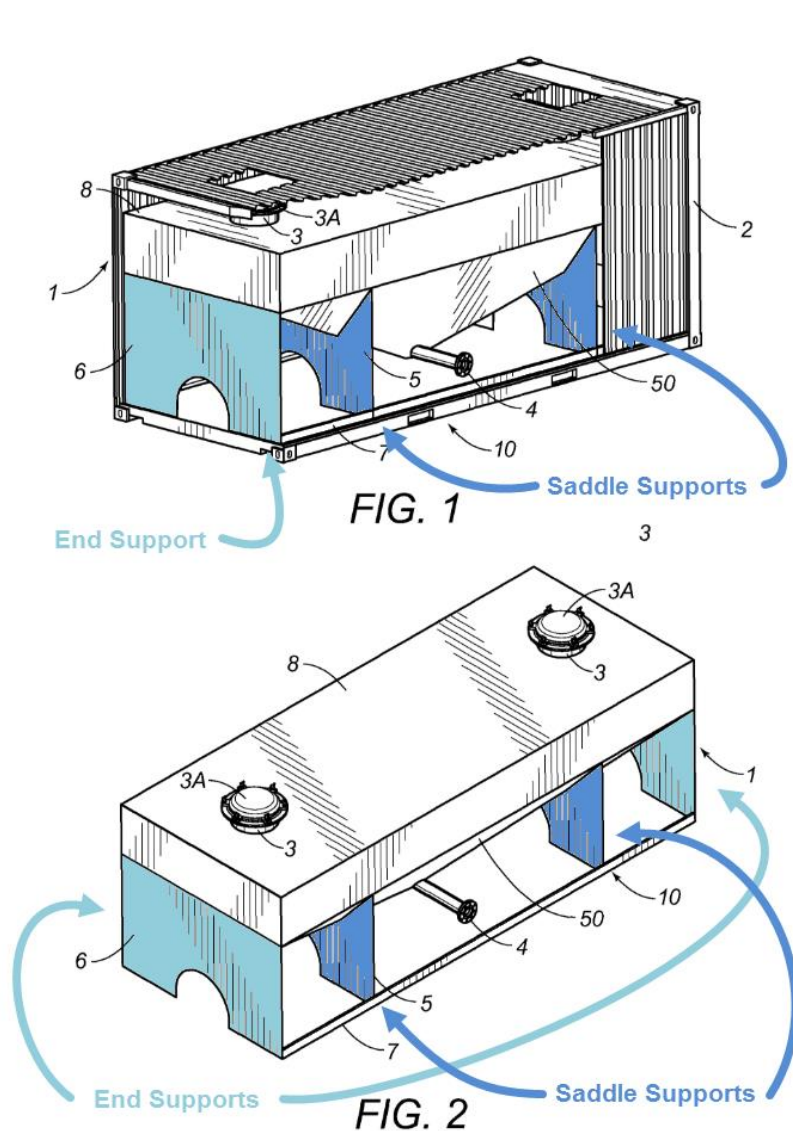
103. It is therefore my opinion that Sheesley discloses this limitation.

B. Ground 2: Claim 1 Is Rendered Obvious by Sheesley, in Combination with Mintz

104. To the extent that it is found that Sheesley does not disclose “each of the first and second end surfaces having a plurality of upright structural support members thereon to enhance integrity of the container so that a large amount of weight can be stacked upon the container and so that heavy weight can be stored therein,” in my opinion, Mintz discloses this limitation.

105. Mintz, like Sheesley, discloses the use of a modified ISO container having an internal hopper to store and transport proppant. Mintz explains that “standard ISO shipping containers” are modified to “accommodate an internal structure adapted to support and strengthen the walls and floor of such ISO shipping containers . . . to efficiently and securely achieve prerequisite sand and proppant material transfer from such adapted containers.” Ex. 1004 (Mintz) at 1:63-2:3; 2:28-31 (“the storage capacity of the enclosing walls and the like are reinforced with braces and trusses as taught hereunder to accommodate the quantity of sand and proppant as will be described hereinafter”); 2:16-20. Specifically, Mintz discloses “brace and truss support assembly 10[,] ... [which]

comprises each of pair of longitudinal basal cross-braces 7 fixedly interconnected at each end thereof with one of pair of end supports 6 and intermediately thereof with plurality of saddle supports 5.” Ex. 1004 (Mintz) at 4:56-61; 8:50-58. As shown below, these end supports and saddle supports are structural uprights positioned to extend from the bottom to the top of each of the plurality of containers.



106. In my opinion, a POSITA would have been motivated to combine the teaching and disclosures of Sheesley's and Mintz's containers and method of transporting storing proppant with a reasonable expectation of success for a number of reasons.

107. Mintz, like Sheesley, provides an apparatus, namely a container, "for transporting frac sand and/or proppant for use in standard ISO intermodal containers and for delivering frac sand and/or proppant to well sites." *See* Ex. 1004 (Mintz) Abstract; Ex. 1003 (Sheesley) ¶[0002] ("This invention relates to the transportation of a granular substance such as sand and, more particularly, to the modification of cargo containers for the purpose of transporting sand therein to frac sites."); Ex. 1003 (Sheesley) ¶[0004] ("Cargo containers (also called intermodal containers, freight containers, ISO containers ...)").

108. Both Sheesley's and Mintz's containers are configured to provide the necessary structural support to carry proppant. *See* Ex. 1004 (Mintz) 1:59-2:5; Ex. 1003 (Sheesley) ¶[0013]. Furthermore, each reference recognized a prevalent problem in the prior art, namely the need to handle and transport the proppant multiple times before the proppant reaches its final destination at the frac site and the significant expense related thereto. *See* Ex. 1004 (Mintz) 1:48-58; Ex. 1003 (Sheesley) ¶[0009] - ¶[0011].

109. Sheesley and Mintz each describe a method of loading the proppant at the proppant's source and transporting the proppant in containers by truck to the frac site in order to save money. *See* Ex. 1004 (Mintz) Fig. 9 (claiming "No Demurrage," "Huge Savings" "Huge savings on trucking" and "Eliminat[ing] crew/rig downtime"); Ex. 1003 (Sheesley) ¶[0091] ("By use of the modified cargo containers as described herein above, the number of times the fracing proppant, such as sand, is handled is greatly reduced. The reduction in the number of times the fracing proppant is handled greatly reduces the cost of completion of a single hydrocarbon well.").

110. In my opinion, a POSITA would thus have been motivated to combine the teachings of Sheesley and Mintz with a reasonable expectation of success. As discussed above regarding claim limitations 1(a)(ii), 1(a)(v) and 3(b), Sheesley discloses structurally strengthening a container to carry proppant. *See* Ex. 1003 (Sheesley) ¶[0018]; ¶[0021]; ¶[0050]; Fig. 3; Fig. 9; Fig. 10. Mintz also discloses adding structural support to a container, specifically in the form of braces and trusses. *See* Ex. 1004 (Mintz) 2:16-2; *see also* Ex. 1004 (Mintz) 5:1-6; 8:64-9:1; Fig. 9; Fig. 12. In my opinion, a POSITA would understand that Sheesley's container could receive further structural support when combined with the braces and trusses disclosed in Mintz. Combining the teachings of Sheesley with Mintz would have been obvious based upon the similarity of the apparatuses and their use

for transporting proppant. Implementing Mintz's support structures into Sheesley's container would, in my opinion, have yielded the predictable result of improved structural support for the container holding the proppant.

111. For these reasons, it is my opinion that Sheesley, in combination with Mintz, renders this limitation obvious.

C. Ground 3: Claims 3-5, 11 Are Rendered Obvious by Sheesley, in Combination with Uhryn

1. Dependent Claim 3 Is Rendered Obvious by Sheesley

The method of claim 1, wherein the support platform is a tiltable support platform, the method further comprising:

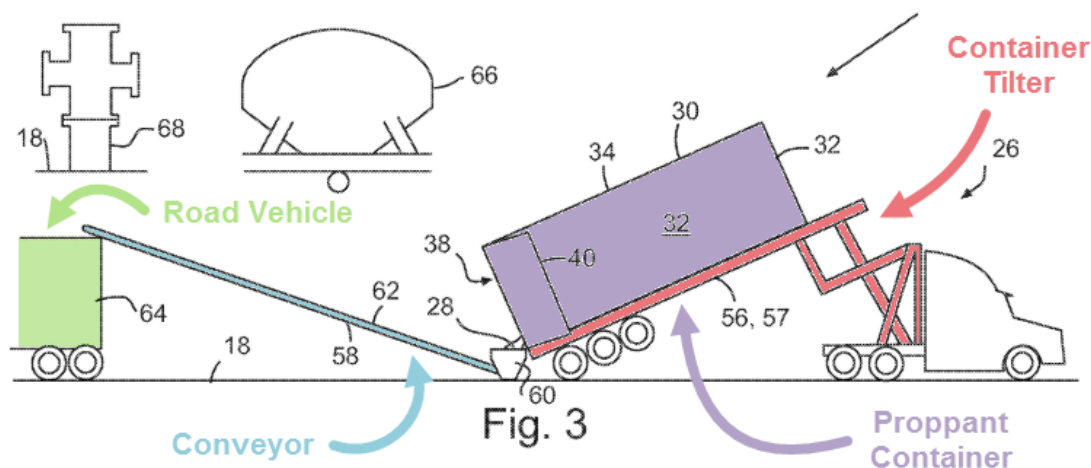
tilting the support platform and one or more of the plurality of proppant filled containers located on the platform to discharge proppant from an opening adjacent an end of the one or more of the plurality of proppant filled containers.

112. As discussed above regarding limitation [1c], Sheesley discloses placing proppant filled containers onto the support platform of a truck. In my opinion, to the extent that Sheesley does not disclose the use of a tiltable support platform, Uhryn provides such a disclosure.

113. Uhryn discloses a method of unloading filled proppant containers onto conveyors using a tiltable platform. Uhryn states that "[u]nloading may be carried out using a container tilter 56, such as a hydraulic fifth wheel tilter as shown Tilter 56 may be mounted on a wheeled trailer 57 as shown" Ex. 1005

(Uhryn) at ¶ [0020]. Uhryn specifies that the unloading process may be accomplished in four stages of tilting, with the proppant filled container held at zero degrees, then 10 degrees, then 20 degrees, and finally at 30 degrees, to allow proppant to flow until all proppant is unloaded. Ex. 1005 (Uhryn) at ¶ [0020]. The proppant flows out of the container through “rear gates; Ex 40,” which is on an end wall. Ex. 1005 (Uhryn) at ¶ [0020] (“Proppant may be unloaded from intermodal transport container 30 into a proppant transfer device 58 positioned to receive, for example by gravity as shown, proppant unloaded from the one or more rear gates 40 of the intermodal transport container 30.”). Further, Uhryn discloses using a conveyor to transfer the proppant from the proppant container to a road vehicle, such as a mountain mover. Ex. 1005 (Uhryn) at ¶ [0020].

114. Uhryn Figure 3 illustrates a method whereby a container tilter is used to unload proppant from an end wall of a proppant container onto a conveyor, thus transferring it to a road vehicle.



115. In my opinion, therefore, Uhryn teaches this limitation.

116. As such, it is my opinion that Sheesley, in combination with Uhryn, renders this limitation obvious.

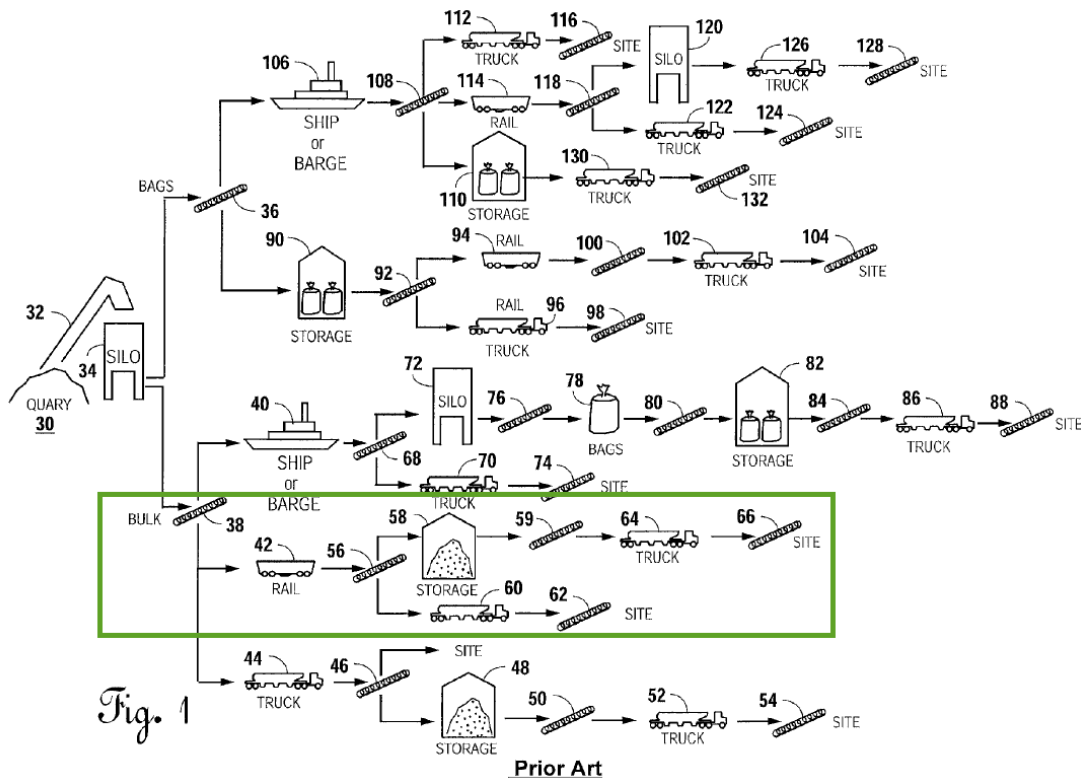
2. Dependent Claim 4 Is Rendered Obvious by Sheesley

[4a] The method of claim 1, further comprising:

conveying the proppant from the one or more proppant transporting rail vehicles to the plurality of empty proppant containers on a first conveyor; and

117. As discussed above, Sheesley discloses that the proppant can be loaded from a “source,” which can be “any point along a supply chain of said proppant.” Ex. 1003 (Sheesley) Claim 21 (“The method for delivering proppant to the site of a well being fraced as recited in claim 19 wherein *said source may be any point along a supply chain of said proppant.*”) (emphasis added); ¶[0078] (“Turning to Fig. 2, sand from the sand quarry 30 *or source* can now be loaded by a conveyer 268 to a modified cargo container which hereinafter will be referred to by reference numeral 270.”); ¶[0020] (“Fig. 2 illustrates the present invention being used to deliver sand from the quarry *or source* to the frac site.”); Claim 15 (“A method for delivering a proppant such as sand to a site of a well being fraced, the method including the following steps: ... obtaining a proppant *at its source*; . . .”) (emphasis).

118. Sheesley further discloses that one of the potential sources “along a supply chain of said proppant,” could be a transporting rail vehicle. *See* Ex. 1003 (Sheesley) Fig. 1 (annotated below, depicting a “rail”).



119. Sheesley further discloses that the proppant from the source (which, as explained above, can include a rail vehicle) may be unloaded from the rail vehicle into the empty modified cargo container using a conveyor. *See* Ex. 1003 (Sheesley) ¶[0078] (“Turning to FIG. 2, sand from the sand quarry 30 or source can now be loaded by a conveyer 268 to a modified cargo container”); ¶[0084] (“For example, in Fig. 5, modified cargo container 302 receives sand 306 from auger 303 through upper hatch 305.”); Fig. 2; Fig. 5.

120. As such, it is my opinion that Sheesley discloses this limitation.

[4b] conveying the proppant from one or more of the plurality of proppant tilled⁹ containers to one or more proppant transporting road vehicles on a second conveyor.

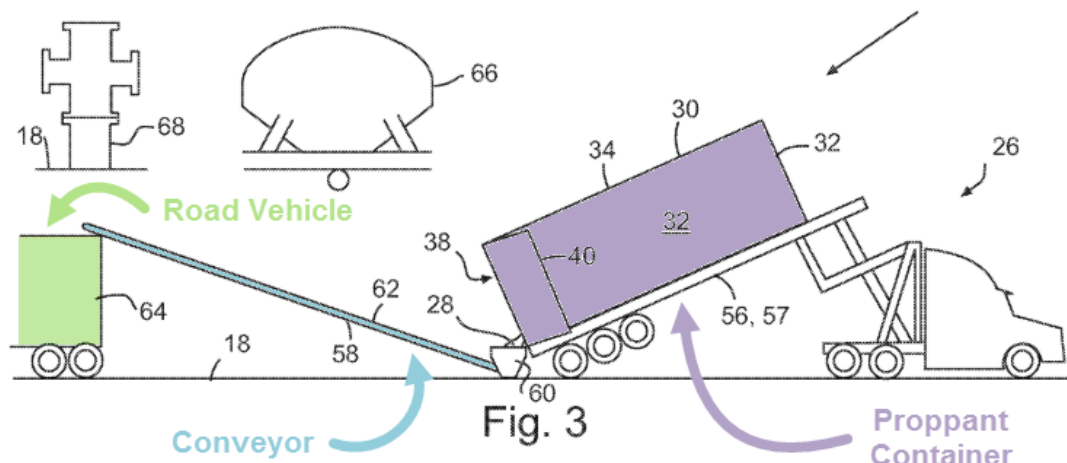
121. Sheesley discloses that proppant may be unloaded from the filled containers by opening the lower hatch, unloading proppant onto a second conveyor which conveys proppant into the blender. Ex. 1003 (Sheesley) ¶[0084] (“For example, in FIG. 5 . . . [t]he sand 306 may either be transferred from the modified cargo container 302 into the modified cargo container 304 located immediately there below *or delivered to a conveyor* (not shown) located below the lower modified cargo container 304 by opening its lower sliding door 316 to open lower hatch 318. The sand flowing from the lower hatch 318 *may be dumped on a belt* (not shown), *which will feed the sand to the blenders* (not shown).”) (emphasis added); ¶[0089] (“In FIG. 7, only the outside view of the belt system 330 is shown. However, fracing sand will be delivered through the dispensing end 332 of the belt system 330 to deliver the fracing sand to the blender.”); Fig. 5; Fig. 7. In my opinion, a POSITA would understand that proppant could just as easily be

⁹ The numerous references to “tilled” containers in claims 4, 5, 10, and 11 appears to be a typographical error meant to refer to “filled” containers.

unloaded from the filled containers by opening the lower hatch, unloading proppant onto a second conveyor which conveys proppant into proppant transporting road vehicles, particularly where Sheesley discloses the use of a conveyor to unload containers, and that containers may be emptied into bulk proppant containers such as the Sand King. Ex. 1003 (Sheesley) ¶[0083]; ¶[0089].

122. Thus, it is my opinion that Sheesley renders this limitation obvious.

123. To the extent that this limitation is not rendered obvious by Sheesley alone, it is my opinion that it is rendered obvious by Sheesley in view of Uhryn. Uhryn discloses unloading proppant “from intermodal transport container 30 into a proppant transfer device 58 positioned to receive . . . proppant unloaded from the one or more rear gates 40 of the intermodal transport container.” Ex. 1005 (Uhryn) at ¶ [0020]. Uhryn further states that “[p]roppant transfer device 58 may comprise one or more of a hopper 60 and a *conveyor* 62.” Ex. 1005 (Uhryn) at ¶ [0020]. Uhryn also explains that “[a] mountain mover 64, also called a sand king, may be connected to receive proppant from the proppant transfer device 58” Ex. 1005 (Uhryn) at ¶ [0020]. In my opinion, a POSITA would understand that the “mountain mover” referenced in Uhryn is a road vehicle capable of transporting proppant. Uhryn Figure 3 illustrates a method of transferring proppant from a proppant filled container into a road vehicle via a conveyor:



Therefore, it is my opinion that Uhryn teaches conveying proppant from containers to road vehicles.

124. As such, it is my opinion that Sheesley, in combination with Uhryn, renders this limitation obvious.

3. Dependent Claim 5 Is Rendered Obvious by Sheesley

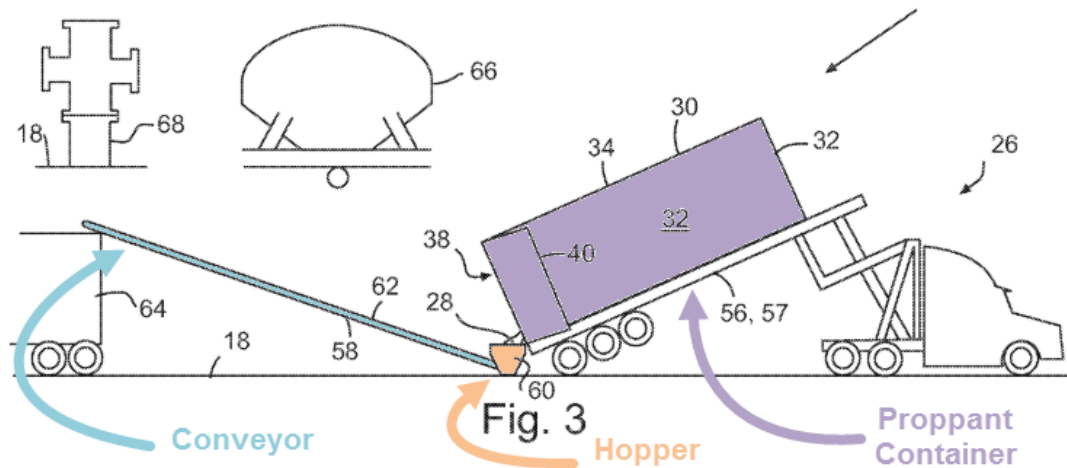
The method of claim 4, further comprising:

**channeling the proppant from the plurality of proppant
tilled containers to the second conveyor through a hopper.**

125. Claim 5 depends from claim 4 and further requires the use of a hopper. To the extent that Sheesley does not disclose channeling proppant through a hopper to a second conveyor, it is my opinion that Uhryn provides such a disclosure.

126. As discussed above regarding limitation [4b], Uhryn discloses transferring proppant from containers to road vehicles via “proppant transfer

device 58.” Ex. 1005 (Uhryn) at ¶ [0020]. Uhryn states that “[p]roppant transfer device 58 may comprise one or more of a **hopper** 60 and a conveyor 62.” Ex. 1005 (Uhryn) at ¶ [0020]. It is my opinion that a POSITA would understand, based on Uhryn’s disclosure of “**one or more of** a hopper 60 **and** a conveyor 62,” that the proppant transfer device taught by Uhryn could comprise both a conveyor and a hopper. Uhryn Figure 3 illustrates a method of unloading featuring a hopper than channels proppant from a proppant container onto a conveyor:



In my opinion, Uhryn therefore teaches channeling proppant from filled containers onto a conveyor through a hopper.

127. As such, it is my opinion that Sheesley, in combination with Uhryn, renders this limitation obvious.

4. Dependent Claim 11 Is Rendered Obvious by Sheesley

[11] The method of claim 10, further comprising:

loading each of the plurality of proppant filled containers onto a tiltable¹⁰ platform;

providing a conveyor between the tiltable platform and one or more proppant transporting road vehicles;

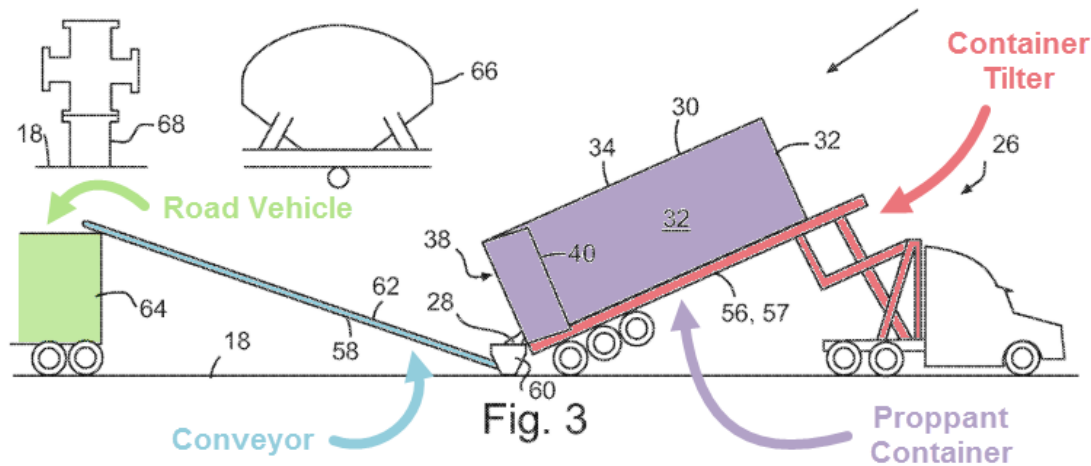
and tilting the platform to discharge the proppant from the container into the conveyor.

128. As discussed above regarding limitation [1c], Sheesley discloses placing proppant filled containers onto the support platform of a truck. As discussed above regarding claim 3, to the extent that Sheesley does not disclose the use of a tiltable support platform, Uhryn provides such a disclosure.

129. Uhryn discloses a method of unloading filled proppant containers onto conveyors using a tiltable platform. Uhryn states that “[u]nloading may be carried out using a container tilter 56, such as a hydraulic fifth wheel tilter as shown Tilter 56 may be mounted on a wheeled trailer 57 as shown” Ex. 1005 (Uhryn) at ¶ [0020]. Uhryn specifies that the unloading process may be

¹⁰ This appears to be a typographical error meant to refer to a “tiltable” platform.

accomplished in four stages of tilting, with the proppant filled container held at zero degrees, then 10 degrees, then 20 degrees, and finally at 30 degrees. Ex. 1005 (Uhryn) at ¶ [0020]. Further, as discussed above regarding limitation [4b], Uhryn discloses using a conveyor to transfer the proppant from the proppant container to a road vehicle, such as a mountain mover. Uhryn Figure 3 illustrates a method whereby a container tilter is used to unload proppant from a proppant container onto a conveyor, thus transferring it to a road vehicle.



In my opinion, Uhryn therefore teaches proppant filled containers onto tiltable platforms, tilting the platforms to discharge proppant onto a conveyor, and conveying the discharged proppant to proppant transporting road vehicles.

130. As such, it is my opinion that Sheesley, in combination with Uhryn, renders this limitation obvious.

5. Rationale to Combine Sheesley and Uhryn

131. In my opinion, a POSITA would have been motivated to combine the teaching and disclosures of Sheesley's and Uhryn's containers and method of transporting storing proppant with a reasonable expectation of success for a number of reasons.

132. Uhryn, like Sheesley, provides an apparatus, namely a container, to enable a "method of bulk transport of proppant is disclosed comprising: transporting proppant in an intermodal transport container to a well site." *See* Ex. 1005 (Uhryn) ¶[0004]; Ex. 1003 (Sheesley) ¶[0002] ("This invention relates to the transportation of a granular substance such as sand and, more particularly, to the modification of cargo containers for the purpose of transporting sand therein to frac sites."); Ex. 1003 (Sheesley) ¶[0004] ("Cargo containers (also called intermodal containers, freight containers, ISO containers ...)").

133. Both Sheesley's and Uhryn's containers are configured to provide the necessary structural support to carry proppant. *See* Ex. 1005 (Uhryn) ¶[0018]; Ex. 1003 (Sheesley) ¶[0013]. Furthermore, each reference recognized a prevalent problem in the prior art, namely the need to handle and transport the proppant multiple times before the proppant reaches its final destination at the frac site and the significant expense related thereto. *See* Ex. 1005 (Uhryn) ¶[0017]; Ex. 1003 (Sheesley) ¶[0009] - ¶[0011].

134. Sheesley and Uhryn each describe a method of loading the proppant at the proppant's source and transporting the proppant in containers by truck to the frac site in order to save money. *See* Ex. 1005 (Uhryn) ¶[0021] (“In addition, the expense of delay along the supply chain in the conventional method in the form of rail charges, storage fees at transloading sites, and other expenses related to the extra infrastructure required is avoided,”); ¶[0022]; Ex. 1003 (Sheesley) ¶[0091] (“By use of the modified cargo containers as described herein above, the number of times the fracing proppant, such as sand, is handled is greatly reduced. The reduction in the number of times the fracing proppant is handled greatly reduces the cost of completion of a single hydrocarbon well.”).

135. Therefore, in my opinion, a POSITA would have been motivated to combine the teachings of Sheesley and Uhryn with a reasonable expectation of success. As discussed above, Sheesley discloses loading a container filled with proppant on a support platform of a truck, transporting the proppant to a well site, and unloading the containers at the well site. Uhryn likewise discloses loading a container filled with proppant on a support platform of a truck, transporting the proppant to a well site, and unloading the containers at the well site. Ex. 1005 (Uhryn) ¶[0019]- ¶[0020]. Uhryn, however, provides the additional disclosure that the support platform may be tiltable, such that it can be tilted to empty the container. Ex. 1005 (Uhryn) ¶[0020]. Uhryn explains that the tiltable support

platform provides many advantages, including that “[u]nloading by container tilting has been found to be advantageous over pneumatic unloading in that container tilting is quicker and less hazardous to worker health in that less fine dust is produced,” and that “[c]ontainer tilter 56 also allows substantially all, if not all, of the proppant contained within intermodal transport container 30 to be unloaded.” Ex. 1005 (Uhryn) ¶[0020].

136. Moreover, it is my opinion that a POSITA would recognize that the container disclosed in Uhryn does not require the modified internal hopper structure of the container disclosed in Sheesley in order to unload proppant from the container, thereby permitting transfer of greater quantities of proppant in a single container. Thus, in my opinion, a POSITA would understand that Sheesley’s container could hold more proppant while still providing a convenient way to unload the container by applying unloading teachings disclosed in Uhryn. Combining the teachings of Sheesley with Uhryn would, in my opinion, have been obvious based upon the similarity of the apparatuses and their use for transporting proppant. Moreover, it is my opinion that implementing Uhryn’s unloading methods into Sheesley’s container would have yielded the predictable result of increasing the amount of proppant while still permitting ease of unloading said proppant.

XIII. OBJECTIVE INDICIA DO NOT SUPPORT PATENTABILITY

137. The Challenged Claims are all invalid. I am not aware of any objective indicia supporting a contrary conclusion. To my knowledge, the Patentee did not provide any evidence of objective indicia of non-obviousness during prosecution. I am unaware of any such objective indicia that are relevant to the challenged claims. I reserve the right to supplement my opinions should Patentee later assert such objective indicia in this matter.

XIV. CONCLUSION

138. As explained in detail above, it is my opinion that each of claims 1-11 of the '772 patent are obvious in view of the prior art.

139. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Respectfully submitted,

A handwritten signature in cursive script, reading "Robert Schaaf", written over a horizontal line.

Robert Schaaf

Dated: May 31, 2018

Location: Huntington Beach, California

APPENDIX A

ROBERT SCHAAF

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rschaaf@socal.rr.com

Petroleum and Drilling Engineering Expert

PROFESSIONAL EXPERIENCE

Consultant / Expert Witness

2014-Present

- Expert witness for over 50 oil/gas drilling & operation cases including patent litigation
- Instructor for industry classes on oil and gas drilling and operations
- Provided technical advice and background information to investment advisors
- Performed the reservoir and economic analysis of property acquisitions
- Consultant for various oil and gas projects including hydraulic fracturing

Occidental Petroleum

2011-2014

Senior Project Manager, Los Angeles Basin

- Project manager for the re-development of the Dominguez Hills Oil Field
- Designed and led the refurbishment of the Platform Emmy drilling rig
- Led the development of new wells and workovers of existing wells
- Supervised the new well installations of both onshore and offshore wells

Aera Energy, LLC

2005-2011

Project Manager, Los Angeles Basin

- Managed all engineering and implementation aspects for new projects
- Delivered 30+ projects annually on-time and on-budget
- Oversaw numerous well workover and stimulation projects

Chevron

1979-2004

Engineering and Drilling Manager, Congo

- In charge of all engineering, drilling, and construction functions
- Supervised drilling and completion program for all new wells
- Implemented multi-stage acid jobs and hydraulic fracturing projects that optimized production from multiple reservoir zones

Sr. Technical Consultant, Kuwait

- In charge of the \$1.5B Kuwait's Burgan effluent water project development
- Developed new well completion and stimulation program for new water injection wells that included hydraulic fracture stimulations in multiple zones
- Led team to review, design, and install new artificial lift equipment

Chief Engineer, Congo

- Ran Chevron Oil Congo's engineering department that included reservoir/production/drilling engineering, budgeting/planning, and facilities design
- Designed and implemented drilling program in the Congo that reduced per well drilling costs by 25%
- Oversaw all well completions and stimulation work that included multi-stage hydraulic fracturing of horizontal wells

Planning Manager, Southern Africa Business Unit

- Managed business unit's \$500 MM annual capital budget that adequately balanced short-term cash requirements with long-term earnings improvement
- Developed unique scheme to secure project funds for under-financed partner.
- Assembled innovative financing technique to move forward internal projects when capital was non-existent
- Performed the economic analysis for various offshore Angola concessions

Sr. Staff Engineer, Angola

- Coordinated the planning of the \$450 MM North Nemba offshore oil rig that set new standards for the interaction of multi-disciplined teams
- Led the development and implementation of the \$38 MM Northeast Numbi offshore oil rig that was on budget and put on line in 50% of the average time
- In charge of well completions and stimulation work that included multi-stage acid stimulations, gravel packs, and hydraulic fracturing
- Developed the reservoir simulation model that led to a new water injection strategy in the Vermelha reservoir of the Numbi Field. The realignment stabilized the reservoir pressure & reduced the oil decline from over 30% to fewer than 10%.

Chief Engineer, Zaire

- In charge of all reservoir/production/drilling engineering for Zaire Gulf Oil
- Developed new exploitation strategy that added 5.5 MM barrels of reserves to the Mibale field
- Applied horizontal drilling and multi-stage fracturing to develop the Libwa Field

Area Engineer, Los Angeles Basin

- Led the 10 production engineers overseeing Chevron's fields
- Led operations review that reduced annual costs by over \$1,000,000 at the Whittier and Huntington Beach fields
- Maintained a production decline of less than 6% at the Yorba Linda steam project by careful monitoring of reservoir energy and temperature
- Increased production by expanding water injection to reservoirs that were previously thought to be unsuitable for secondary recovery
- Led the effort to sell various small California leases. Obtained almost twice the anticipated transaction price by utilizing a coordinated marketing effort focusing on potential value of under-exploited resources

Production Engineer, Los Angeles Basin

- Increased oil production 68% in the Montebello Field (LA Basin) waterflood by identifying unseen fault blocks and the realignment of water injection patterns
- Developed multi-stage stimulation projects using both mechanical and chemical diverters at Montebello that raised oil production of various wells from under 10 BPD to 20-80 BPD
- Expanded pumping unit system to increase and optimize production

Lead Engineer, Los Angeles Basin

- Led team of 4 engineers on field operations including planning/supervising rig operations, new facilities installations, and production optimization
- Supervised well completions including perforating, acid stimulations, and multi-stage hydraulic fracturing
- Re-established economic viability to the aging Beverly Hills Field by optimizing hydraulic lift system at three drill sites

Drilling Engineer, Bakersfield

- Supervised drilling rigs for ongoing development program
- Designed, assembled, and coordinated drilling programs for a wide variety of development and exploration wells
- Oversaw well completions that included acid jobs and fracturing jobs

Reservoir Engineer, Bakersfield

- Designed and implemented deep cyclic steam project in the Fruitvale Field to recover an additional 10% of oil in place
- Implement well stimulus programs (acidizing and hydraulic fractures) for multi-layer reservoirs in the Fruitvale and Lost Hills Fields
- Significantly increased gas production from the West Grimes (Sacramento Valley) Field by discovering and exploiting bypassed gas zones

EDUCATION

Bachelor of Science, Chemical Engineering, University of Southern California

Graduate Business Classes, California State College Bakersfield

- Six Sigma Black Belt
- Chairman LA Basin Society of Petroleum Engineers
- Received R&A Award for the development of a company Toastmaster.
- Made numerous meeting presentations to communicate with project stakeholders including senior management.
- Outstanding Engineering Merit Award 2015 – Orange County Engineering Council

PAPERS

“Platform Emmy Deck Extension Project” presented at the Prevention First 2014 Symposium – October 2014

“Engineered Severe Service Valve Solution” presented at the Emerson Global Users Exchange – September 2010

“Advanced Wireless Application for Critical Service Valves” presented at the Emerson Global Users Exchange – September 2010

“Alternative Economic Criteria for Superior Project Analysis” presented at the SPE Middle East Oil Show in Bahrain – June 2003

“Stimulation of a Producing Horizontal Well Using Enzymes that Generate Acid In-Situ Case History” presented at the SPE European Formation Damage Conference held in The Hague, The Netherlands – May 2001

“An Innovative Technique of Obtaining Project Financing for the Equity Share of a Developing Country’s National Oil Company” presented at the SPE Annual Technical Conference in New Orleans, Louisiana – September 1998 and published in the Journal of Petroleum Technology – January 1999

“Calculated Risk Taking for Fast-Track Development” presented at the Offshore West Africa conference in Accra, Ghana – November 1997

“Adapting a Reservoir-Management Strategy to Changing Reservoir Conditions” presented at the SPE Annual Technical Conference in San Antonio, Texas – Oct. 1997 and published in the Journal of Petroleum Technology – December 1997

“Changing Reservoir Management Strategy in the Numbi Field” presented at the Offshore West Africa conference in Libreville, Gabon – November 1996

DEPOSITIONS AND TESTIMONY (Last 5 years)

Date: February 2018

Case: Schlumberger Technology Corporation v. Integrated Drive Systems LLC, U.S. Patent and Trademark Office Before the Patent Trial and Appeal Board: Cases IPR2018-00603 and IPR2018-00604 for Patent No. 9,644,431. Declaration.

Date: July 2016

Case: Seadrill v. Transocean: U.S. Patent and Trademark Office Before the Patent Trial and Appeal Board; Case IPR2015-01929. Deposition.

Date: December 2015

Case: Crescent Terminals v. ExxonMobil Oil Corp. and Saybolt, LP: Civil Action Number: D194,189, District Court of Jefferson County, Texas 136th Judicial District. Deposition.

Date: September 2015

Case: Larry Gilman, et al. v Mannon L. Walters, et al: American Arbitration Association; Case No. 52-198-Y-00012-12 FED INSD No. 3:12-cv-00114-SEB-WGH. Arbitration Hearing Testimony.

Date: June 2015

Case: Larry Gilman, et al. v Mannon L. Walters, et al: American Arbitration Association; Case No. 52-198-Y-00012-12 FED INSD No. 3:12-cv-00114-SEB-WGH. Deposition.

Date: March 2015

Case: Macpherson Oil Company, et al. v Pace Diversified Corporation: Kern County, California Superior Court; Case No. S-1500-CV-274945-DRL. Trial Testimony

Date: September 2014

Case: Macpherson Oil Company, et al. v Pace Diversified Corporation: Kern County, California Superior Court; Case No. S-1500-CV-274945-DRL. Deposition.

Date: June 2014

Case: Hayward Industries, Inc. v. Pentair Water Pool and Spa, Inc.: U.S. Patent and Trademark Office Before the Patent Trial and Appeal Board; Case IPR2013-00285. Deposition.

Date: February and March 2013

Case: Precision Energy Services, Inc. v. ThruBit, LLC: U.S. District Court for the Southern District of Texas; Civil Action No. 4:11-cv-04492. Deposition. Trial Testimony.