

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PERMIAN GLOBAL INC., AND
MANTICORE FUELS, LLC
Petitioners,

v.

FUEL AUTOMATION STATION, LLC,
Patent Owner.

Case IPR2023-01237

Patent No. 9,586,805

DECLARATION OF JOHN RODGERS, Ph.D., P.E.

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I, John Rodgers, Ph.D., P.E., declare:

I. SUMMARY OF OPINIONS

1. Here is a summary of my opinions in this declaration which are supported by the rest of my declaration and the materials I have considered:

2. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 1-22 are not rendered obvious by Van Vliet in view of Cable.

3. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 17 and 18 are not anticipated or rendered obvious by Van Vliet.

4. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 9-10 are not rendered obvious by Van Vliet in view of Cable and AFD.

5. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 4, 11, 12, and 20 are not rendered obvious by Van Vliet in view of Cable and Coxreels.

6. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 1, 7-10, 13-18, and 22 are not rendered obvious by Van Vliet in view of AFD.

7. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 2-3, 6, and 19 are not rendered obvious by Van Vliet in view of AFD and Lowrie.

8. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 4, 5, 20, and 21 are not rendered obvious by Van Vliet in view of AFD, Lowrie, and Coxreels.

9. Based upon my knowledge and experience and my review of the prior art publications, it is my opinion that claims 11 and 12 are not rendered obvious by Van Vliet in view of AFD and Coxreels.

II. QUALIFICATIONS

10. I have a B.S.E. in mechanical engineering and materials science and a second major in mathematics from Duke University. I have an M.S. from the Massachusetts Institute of Technology (“MIT”) and a Ph.D. from MIT, both from the Department of Aeronautics and Astronautics. In my research and academics at MIT, I worked with active material systems and their application to structural actuation and vibration control. Much of the work involved the development of actuation systems for helicopter vibration control and other industrial and defense applications.

11. I am a professional engineer licensed in Texas, North Dakota, and Connecticut and have twenty years of experience in the oilfield industry. I founded and have worked in my engineering consulting business, Starboard Innovations, LLC, since 2000. In my career, I have worked on a wide variety of applications across many industries, though the bulk of my work has come in the development of downhole tools where I have been focused since 2003. I have developed new mechanical tools and software tools focused on a variety of different downhole applications. Several of the tools focused on measuring and analyzing the dynamic response of downhole tools and the surrounding wellbore and formation. Other tools that I have developed involved mechanical actuation systems such as firing heads, frac sleeves, cementing sleeves, and plugging devices. One example was a through-tubing bridge plug, designed for high expansion-ratio applications, which is now a product used in the field. Another design involved an autonomous, self-navigating wellbore plug with the option for dissolvable components. I have developed or worked on downhole tool designs for several other applications including: acoustic telemetry, measurements while drilling (MWD), test valves, fracture and cementing sleeves, and wireline fluid sensing. My involvement with many of these development projects included designing, performing engineering analyses and simulations, developing manufacturing processes, building prototypes, running

qualification tests, and supporting field trials. My experience includes work on test wells in Texas and Oklahoma. In the context of testing, I have worked with high-pressure hydraulics, pressure vessels, tubing, fittings, and instrumentation including in the simulation of the downhole operating conditions.

12. I have extensive experience in directional drilling and in the development and application of downhole tools used for this purpose. I have worked as a consultant and/or expert in the drilling industry for Halliburton, Nabors, NOV, and Superior Drilling Products. Generally, my project experience includes the following areas: automated directional drilling steering software, rotary steerable tools, drillstring dynamic modeling and simulation using Finite Element Analysis (FEA), thermal isolation and active cooling of MWD electronics, turbine power generators, MWD pulsers, thermal/vibration testing of MWD electronics, Finite Element Analysis (“FEA”) of MWD electronics, accelerated life testing of mud pulsers, failure investigation of rotary steerable systems, design of vibration monitoring sensors for MWD tools, and the simulation of high-velocity erosive-jet drilling using Computational Fluid Dynamics (“CFD”). My experience also includes analysis of operations involving rig data systems and mud pumps.

13. Additionally, I have developed downhole electronic tools incorporating electronics, sensors, wiring, and connectors in drilling, perforating, and other well

completion applications. These tools involve metallic pressure housings, threaded connections, and seals—all elements involved in this case. I have worked to design, build, qualify, and field test these tools over the span of my career in the industry.

14. I have experience with developing tools and solutions and troubleshooting failures related to all phases of the well completion process including drilling, casing, cementing, perforating, fracturing, and configuring for production.

15. I am the sole and/or contributing author of over fifteen publications relating to this field. A comprehensive list of publications is in my attached *curriculum vitae*. I am a member of the Society of Petroleum Engineers (SPE) and American Society of Mechanical Engineers (ASME).

16. I have been named as an inventor on over thirty U.S. Patents. A comprehensive list of my patents is contained in my attached C.V. Ex. 2024 A number of these patents involve developments related to the perforating projects described above.

III. PRIOR TESTIMONY

17. In the last four years, I have testified as an expert in the matters listed in the attachment to my C.V. Ex. 2024.

IV. ENGAGEMENT AND COMPENSATION

18. I am making this declaration at the request of Patent Owner.

19. I am being compensated at my usual consulting rate for my work on this matter.

20. I am being reimbursed at cost for my expenses.

21. My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding.

V. MATERIALS CONSIDERED

22. In preparing this declaration, I have reviewed all filings and exhibits associated with IPR2023-01237.

VI. APPLICABLE LEGAL STANDARDS

23. I am not an attorney. I have been informed by my attorneys of the relevant legal principles and have applied them to arrive at the opinions set forth in this declaration.

A. Claim Construction

24. I understand that claim construction in an IPR is a legal question for the Board to decide. I also understand, however, that in construing claim terms, the Board asks what the terms would mean to a person of ordinary skill in the relevant art in view of the disclosures in the patent and the prosecution history of the patent. I understand that the Board may also consider external evidence, such as dictionaries. In general, however, I understand that claim terms are given the ordinary and customary meaning one of ordinary skill in the relevant art would apply to them in the context of the patent at the time of the invention. I have been informed that the relevant time frame here is October 11, 2016.

B. Anticipation

25. I understand that the following standards govern the determination of whether a patent claim is “anticipated” by the prior art.

26. I understand that, for a patent to be “anticipated” by the prior art, each and every limitation of the claim must be found, expressly, implicitly or inherently, in a single prior art reference. I further understand that the requirement of strict identity between the claim and the reference is not met if a single limitation of the claim is missing from the prior art reference.

27. I understand that claim limitations that are not expressly described in a prior art reference may still be adequately disclosed for anticipation purposes if they

are implicitly disclosed by the reference or are inherent (i.e., necessarily present) in what the reference describes.

28. I have been informed that in assessing whether a limitation is implicitly disclosed by a reference, I should consider the knowledge possessed by a POSITA and consider not only the specific teachings of the reference but also the inferences a POSITA would reasonably have been expected to have drawn from those teachings in light of such knowledge.

C. Obviousness

29. I have been advised that the burden is on Petitioner to demonstrate the unpatentability of the challenged claims based on a preponderance of the evidence.

30. I have been advised that a claimed invention is not patentable under 35 U.S.C. §103 if it is obvious.

31. I understand a patent claim is unpatentable if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. I have been informed that the relevant time frame here is October 11, 2016.

32. I have further been advised that the ultimate conclusion of whether a claim is obvious should be based upon several factual determinations including (1)

the level of ordinary skill in the field; (2) the scope and content of the prior art; (3) what differences, if any, existed between the claimed invention and the prior art; and (4) any objective indicia of non-obviousness (i.e., secondary considerations).

33. I have been advised that, in determining the level of ordinary skill in the field that someone would have had at the time the claimed invention was made, I should consider: (1) type of problems encountered in the art; (2) prior art solutions to those problems; (3) rapidity with which innovations are made; (4) sophistication of the technology; and (5) educational level of active workers in the field.

34. I have been advised that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, I may consider whether there is a reason that would have prompted a person of ordinary skill to combine the elements or concepts from the prior art in the same way as in the claimed invention. I understand that for obviousness to be found, the proposed obviousness ground must be supported by an articulated reason with a rational underpinning, as opposed to a mere conclusory statement.

35. I understand that all words in a claim must be considered when judging the patentability of a claim against the prior art. I also understand that the each and every element of a claim must be addressed in order to render the claim obvious.

36. I understand if a claim element is alleged to be present in a certain prior art reference, then the claim element must be shown to be present, with certainty, in that prior art reference. If the claim element is not proven to be present in the prior art with certainty, I understand it is inappropriate to rely on common sense to fill in the missing structural element.

37. I have also been advised that I must be careful not to evaluate the question of obviousness using the benefit of hindsight. Rather, I should put myself in the position of a person of ordinary skill at the time the claimed invention was made and I should not consider what is known today or what is learned from the teachings of the patent.

38. I have been advised that secondary considerations can serve as evidence of non-obviousness. Such secondary considerations include licensing, commercial success, long felt but unsolved needs, failure of others, unexpected results, copying, and industry praise. The secondary considerations should have a nexus to the claimed invention. I understand secondary considerations help guard against slipping into use of hindsight when making a determination of obviousness.

39. I have been advised that any obviousness rationale for modifying or combining prior art must include a showing that a person of ordinary skill would have had a reasonable expectation of success

D. Priority Date

40. I have been advised that the “priority date” of a patent is the earlier of: (a) the date on which a patent application is filed; or (b) the date on which an earlier-filed patent application is filed if the patentee claims the benefit of priority to that earlier-filed patent application. I have been informed that the relevant date here is October 11, 2016.

VII. GENERAL OVERVIEW OF CASE

41. I understand that this case was brought by Petitioner in an effort by Petitioner to render the claims of the '805 Patent invalid.

42. Petitioner has raised various proposed grounds under which Petitioner argue that the claims would have been anticipated or obvious.

43. I understand that Patent Owner submitted a preliminary response to the Petition.

44. I understand the Board granted institution of this case.

VIII. TECHNOLOGY AT ISSUE

45. Hydraulic fracturing, referred to as “fracking,” is a technique for extracting oil or natural gas from underground rock formations. Fracking involves injecting a high-pressure fluid mixture into the rock formation to create fractures in the rock. These fractures allow the oil or gas to flow more freely to the wellbore, where it can be brought to the surface for collection.

46. A hydraulic fracture is formed by pumping fracturing fluid into a wellbore at a rate sufficient to increase pressure at the target depth to exceed that of the fracture gradient of the rock.

47. Hydraulic fracturing equipment used at frac sites usually consists of slurry blenders and fracturing pumps. The pumps, blenders, and other machinery employed in hydraulic fracturing are typically stationed at the surface of the well site. These components conventionally run until they require refueling, which necessitates shutting them down temporarily. Shutdowns are costly and inefficient.

48. A frac site is an orchestration of machinery, horsepower, and manpower. It is a loud, dusty, and busy “factory” that carries out the hydraulic fracturing stimulation operation of a well.

49. On a typical modern frac site there is a barricade of proppant, water and chemical storage and transport equipment (trailers, cars, ponds and bins), as well as

frac blenders to process the powders, chemicals, gels, and liquids pumped downhole. A mobile data acquisition and control center or data van serves as the brains of the operation where engineers and supervisors monitor and direct a job as it is being pumped.

50. At the center of the operation there are tractor trailer-mounted frac pumps parked within inches of each other. The frac pumps provide the brute force that pumps the fracturing fluid (generally a blend of water and sand) downhole at extremely high pressures to fracture the formation. Over 50,000 frac horsepower may be required for modern completions. A maze of flow lines snakes between the pumps and trucks, culminating at the well-head (or multiple well-heads on some sites). The picture below depicts a common frac site plan, though the plan can vary from site to site. [Ex. 2026].

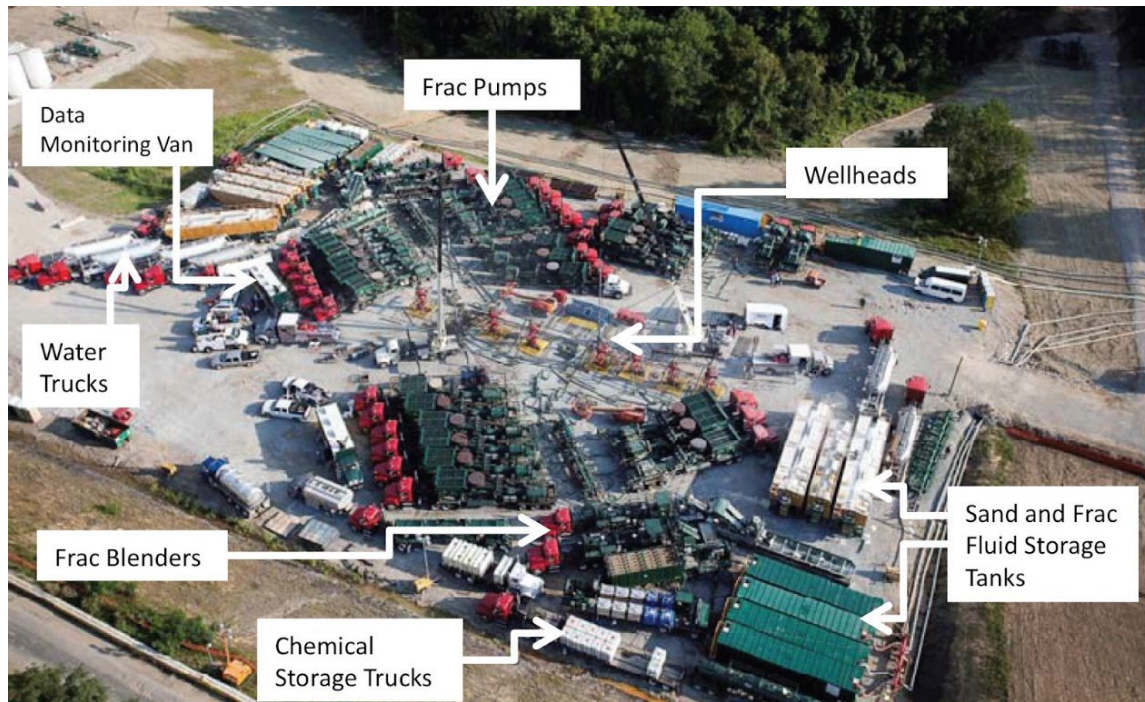


Image Credit: Kansas Geological Survey

51. The frac pumps are operated 24 hours a day and seven days a week, usually for days or weeks at a time. If a frac pump runs out of fuel, it must be taken off-line. If multiple pumps go down, then the frac job may have to be shut down, which is costly and inefficient for the well operator.

52. In order to keep the frac pumps fueled and running continuously, a mobile fuel delivery station, such as Patent Owner's patented Fuel Automation Station ("FAS unit"), may be used to automatically refuel each frac pump fuel tank

when it is low on fuel, which is also known as “hot refueling” because the pumps remain running during the refueling.

53. I have seen a FAS unit in person and have witnessed its operation in Victoria, Texas.

54. The ability to continuously run the frac pumps 24/7 is only as good as the reliability of the mobile fuel delivery station that refuels the frac pumps. If the mobile fuel delivery station malfunctions or breaks down, fuel delivery to the frac pumps may cease and the frac operation shuts down. If the mobile fuel delivery station experiences a safety event, fuel delivery to the frac pumps may cease and the frac operation shuts down. In other words, any issue that hinders operation of the mobile fuel delivery station also hinders the delivery of fuel and the operation of the frac job.

55. Additionally, to the extent that a mobile fueling station ever breaks down while on the frac site, the station may be repaired on-site. However, as access to well sites are restricted and the tools and parts required for a repair may be unavailable on-site, a station that needs repair is often transported from the well site to another location for repair/maintenance. As a result, a breakdown of the station may not only shut down a frac operation but may also require a station be taken out of commission, resulting in economic loss to the owner or lessee of the station.

56. The mobile fuel delivery station also must be operable under harsh environmental conditions. For instance, the well site may be located in regions that can be extremely cold, such as North Dakota or northern Canada in the winter where temperatures can fall below -30 °F, or in regions that can be extremely hot, such as Texas in the summer where well-site temperatures can exceed 120 °F. Moreover, rain, snow, and wind expose the station to ice and dirt that can infiltrate the station, contaminate the equipment, and even cause corrosion of the equipment.

57. Thus, the station must operate reliably over a wide range of conditions, including a temperature range of sub-zero to more than 120°F, that challenge the durability of the station.

58. In addition to reliable operation, a mobile fuel delivery station must also operate safely, to avoid fuel spills and to protect workers from injuries. Indeed, in hot refueling there is a risk that spilled fuel will ignite and cause a fire, which may destroy property and expose workers on the frac site to serious injuries, or worse. [Ex. 2025].

59. I understand that Petitioner has been issued U.S. Patent No. 11,305,979 titled “Automatic fueling system and method for hydraulic fracturing equipment.”

60. There are various dangers associated with frac sites. As Petitioner notes in its own patent, fracking equipment and machinery works in very high temperature

and pressure, and the chances of explosion and fire are significant and the associated risks of damage to life and equipment are high.

61. As also noted in Petitioner's patent, "the need for a mobile refueling system is in huge demand as these systems provide efficient and time-saving technique along with great safety for the workers during filling of fuel into multiple tanks around the work site."

62. The hoses in a mobile fuel delivery station are "multi-serve," i.e., rather than being used once and then stowed away, the hoses are secured to the fuel tanks for multiple cycles of refueling for the duration of the frac job over days or weeks. Workers generally work in 12hr shifts to monitor the refueling, maintain the station, and generally see to it that the station runs smoothly and safely.

63. If a mobile fuel delivery station is not reliable it will break down or malfunction and be unable to keep the frac pumps running continuously, and if a mobile fuel delivery station is not safe it will expose workers to injuries or death.

64. In the early 2010's, prior to automated fueling of frac pumps, the practice for refueling the pumps was one of the most dangerous jobs at a frac site. [Ex. 2028].

65. The frac pumps were loud (250 decibels, roughly double of a jet engine) and operated at pressures of 15,000 psi and temperatures of more than 300°C. To

refuel the pumps, a worker would take a fuel hose and slide sideways in between a line of frac pumps to get to the fuel tanks. The worker would have one hand on the hose and use the other hand to unscrew the fuel cap. If it was nighttime, the worker would also have a flashlight held under his chin so that he could see to put the hose into the fuel tank. Unable to see into the fuel tank, the worker hoped to have filled the tank -- but not too much because it could over-fill and splash back in his face. Once filled, the worker would move down the line of frac pumps to fill the next one. Once at the end of the line, the worker would start all over again because the first pump would just about be out of fuel. From time to time, over-pressure would cause a pipe to blow, but hopefully not at the time the worker was passing by. Workers did this for 12 hours shifts, day and night.

66. Around 2013, a company named Frac Shack came into the industry with an automated fueler. The automated fueler took the worker out of the hot zone in and around the frac pumps. Instead, the worker sat in the fueler shack and watched a screen to monitor filling. This was a tremendous advancement in safety, as workers no longer had to slide between frac pumps. Like anything new, however, automated fueling was unfamiliar to the industry, and even after a couple of years there was there were well operators that still needed to be convinced to adopt this new practice.

67. While removal of workers from the hot zone around the frac pumps was a great leap in safety, there was still work to be done to improve safety and reliability. Public perception of the oil and gas industry in general was poor, as there was public distrust over environmental performance, governance, and transparency. [Ex. 2027]

IX. LEVEL OF ORDINARY SKILL

68. I understand that Petitioner's proposed definition of a person having ordinary skill in the art (POSA) is:

As of the earliest claimed priority date, a person of ordinary skill in the art. ("POSITA") would have either (1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field as well as at least 2 years of academic or industry experience in the oil and gas industry, including well drilling, completion, or production, or (2) at least four years of industry experience in the oil and gas industry including well drilling, completion, or production. This definition is approximate, and more education may substitute for industry experience or *vice versa*.

See Petition at pages 16 and 17.

69. I have no opinion on Petitioner's definition. However, applying Petitioner's definition, at the time of the invention I was a POSA under this definition

because I had at least a bachelor's degree in mechanical engineering and at least 2 years of academic or industry experience in the oil and gas industry.

70. Based on my education and background, I am qualified to provide opinions as to what a POSITA would have known and understood by October 11, 2016. I am more than qualified as a POSITA as of October 11, 2016. Unless otherwise stated, my testimony herein refers to the knowledge of a POSITA as of October 11, 2016.

X. CLAIM CONSTRUCTION

71. I have applied the plain and ordinary meaning in my analysis of the claim terms, as a POSITA would have understood them in view of the specification and file history of the '805 Patent.

XI. PRIOR ART REFERENCES RELIED ON IN GROUNDS 1-8

72. In Grounds 1-8, Petitioners rely on prior art references to Van Vliet (Ex. 1004), Cable (Ex. 1005), AFD (Ex. 1007), and Coxreels (Ex. 1008). I have reviewed these references. I summarize them below.

A. Van Vliet

73. Van Vliet describes in its Abstract a fuel delivery system and method for reducing the likelihood that a fuel tank of equipment at a well site during fracturing of a well will run out of fuel. A fuel source has plural fuel outlets, a hose on each fuel outlet of the plural fuel outlets, each hose being connected to a fuel cap on a respective one of the fuel tanks for delivery of fuel to the fuel tank. At least a manually controlled valve at each fuel outlet controls fluid flow through the hose at the respective fuel outlet.

74. Van Vliet lists its “technical field” to be “fuel delivery systems and methods.” [Ex. 1004, at ¶1].

75. Van Vliet's schematic Figure 1 shows flow passages through manifolds 36, 38 and hoses 24, but does not show the flow passages that run through reels 30.

76. Permian's expert, Dr. Durham, acknowledges that Van Vliet's schematic Figure 1 “is a high-level representation and is not intended to depict the physical appearance or form” of the system's components. Ex. 1003 ¶112 n.146.

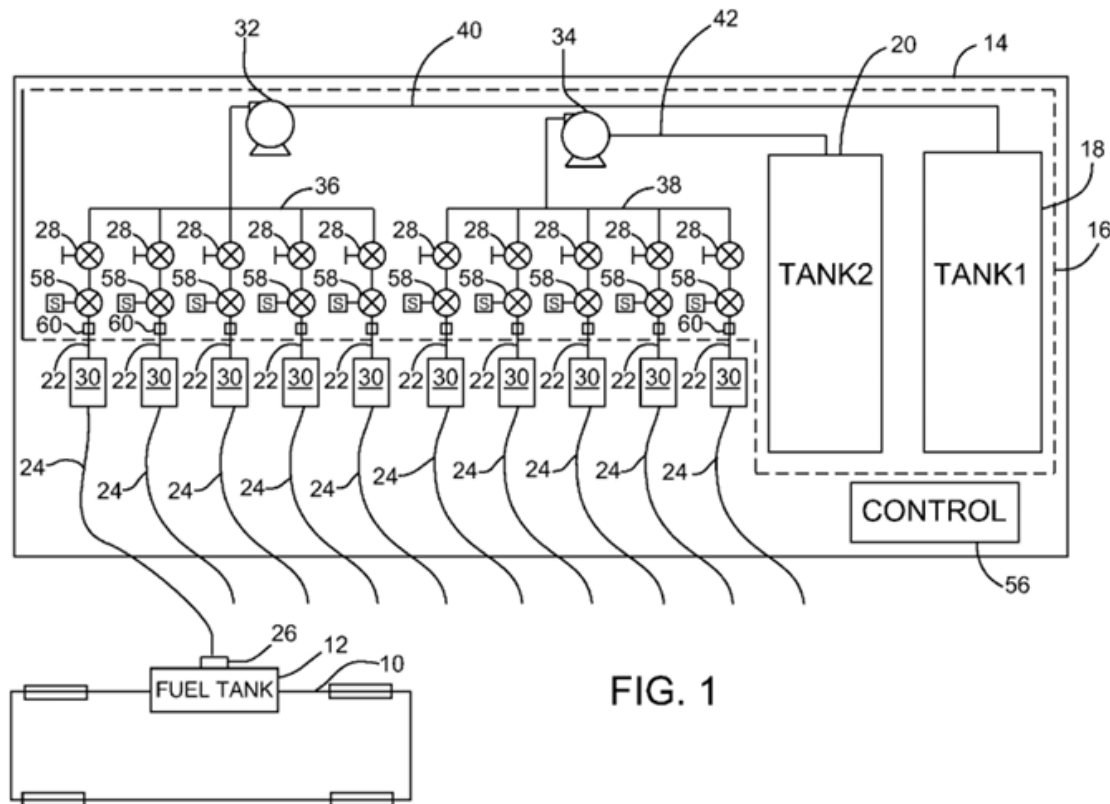


FIG. 1

77. Figure 1 of Van Vliet indicates the hose's flow passage as wrapping around the reel, rather than “running through” the reel.

78. Van Vliet describes that “hoses 24 are preferably stored on reels 30,” but it does not disclose or suggest that the hoses are fluidly connected to the reels. [Ex. 1004, ¶15].

79. Van Vliet explains that “each hose 24 is connected to a fuel outlet 22 by a dry connection 60 and to a cap 26 by a dry connection 62.” *Id.* at ¶ 22. Van Vliet's hose 24 therefore is not connected to reel 30 because the ends of the hose are connected to dry connection 60, which is not part of the reel.

80. Van Vliet disclosed dangers to the existing way of proceeding as including extreme operating temperatures and pressures, extreme noise levels, and fire hazard from fuel and fuel vapors. [Ex. 1004, ¶2].

B. Cable

81. Cable describes in its Abstract a mobile lubrication apparatus having a van truck with storage tanks mounted therein connected to pressure hoses. A pair of hose assemblies are mounted adjacent to the rear door of the truck with each assembly having four rotatably mounted reels with a hose wrapped around each reel. The hoses are extendable from the truck so as to allow lubrication of another vehicle. [Ex. 1005].

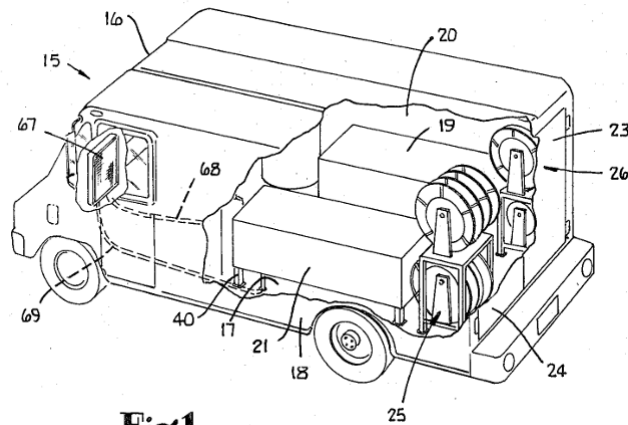


Fig. 1.

82. Each reel has a hose wrapped thereon which is extendable through the rear of the truck to another vehicle to be lubricated. Doors at the rear of the truck are openable to access the reels and hoses. [Ex. 1005; col. 3, ll. 3-5; Figure 4].

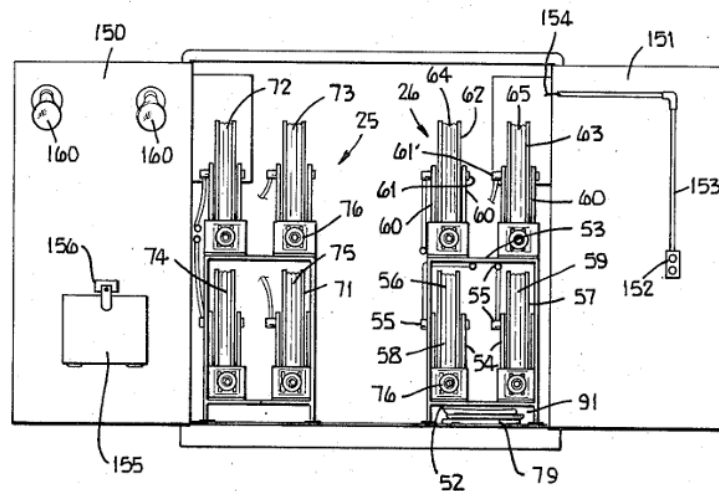
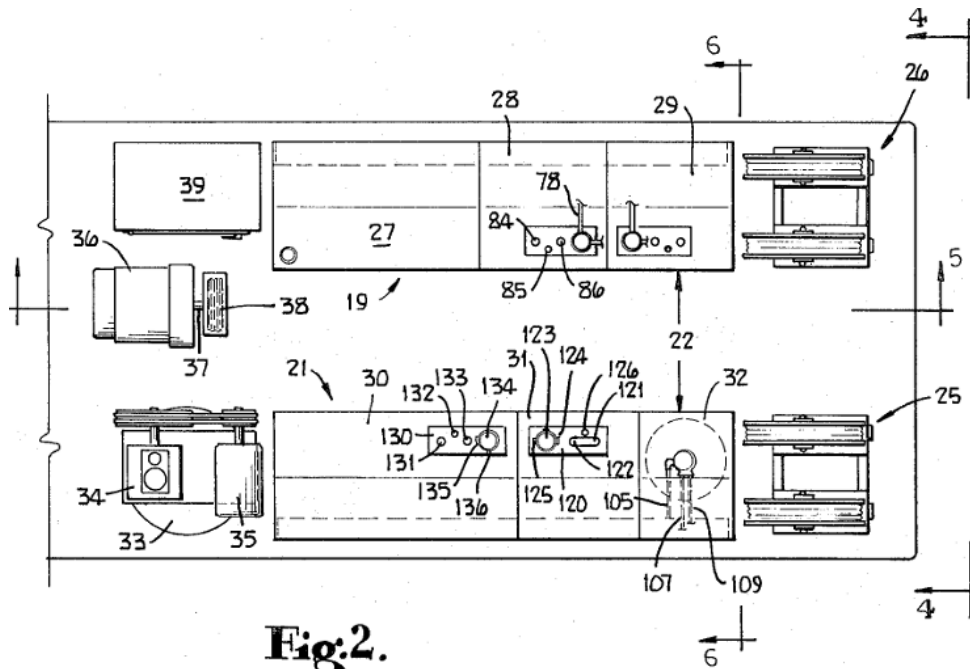


Fig. 4.

83. Cable's truck is a drivable road vehicle. [Ex. 1005, col. 2, ll. 50 ("driver compartment"); Fig. 1 above].

84. Cable mentions six prior art patents in its background section that all pertain to servicing automobiles or motor vehicles, which indicates that Cable too is directed to servicing automobiles. [Ex. 1005, at Background].

85. Cable is configured to quickly and easily provide lubricant to a vehicle being serviced. [Ex. 1005, Col. 1, ll. 17-22, 62-65].

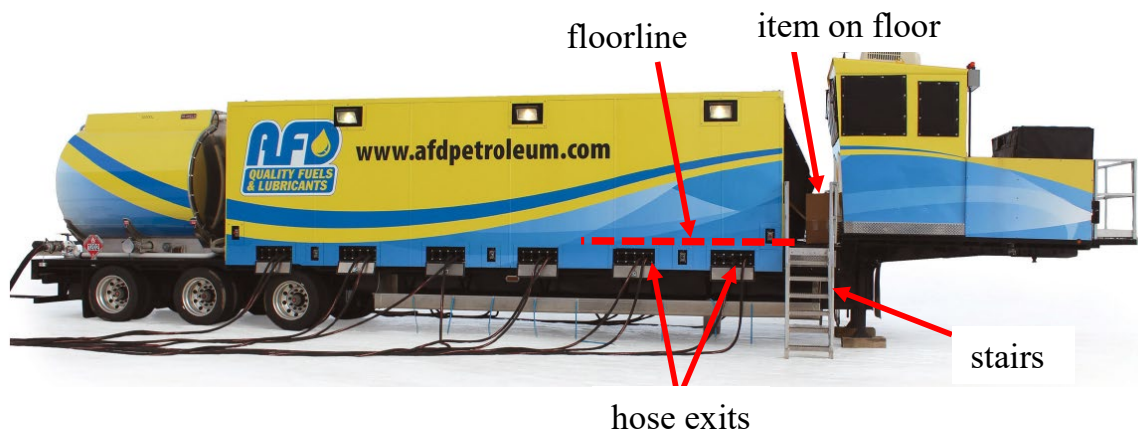


C. AFD

86. AFD shows limited photos of a refueling system. [Ex. 1007].

87. The photos do not show the interior of the system.

88. In the first photo of AFD's trailer, copied and annotated below, the hoses come out of the trailer below the floorline. There is a set of stairs between the main trailer and the control room. The stairs lead to a floor, which is apparent from an item sitting on the floor, which appears to be a box. Thus, the top stair is indicative of a floorline (the level at which the floor is at). The hoses exit from the side of the trailer at locations that are below the floorline. [Ex. 1007].



D. Coxreels

89. Petitioner relies on the Coxreels 1125 Series reel as alleged prior art. As shown below, Coxreels lists 14 different “Possible Fields of Application” of the 1125 Series reel. [Ex. 1008 at 1].



90. The “possible fields of application” list does not include fuel delivery, let alone automated fueling delivery in a fracking environment. [Ex. 1008].

91. According to Coxreels, the 1125 Series reels were available in 24 different models, which are shown in the table at pages 1 and 2 in Coxreels. [Ex. 1008].

REEL			CAPACITY			OPT. CAPACITY				SIZE INDEX			
MODEL	LBS	HOSE	I.D.	O.D.	FT.	I.D.	O.D.	FT.	PSI	W	H	L	
										Overall Dimensions			
1125-4-100	36	N	1/2"	7/8"	100	3/8"	3/4"	140'	3000	19-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-200	39	N	1/2"	7/8"	200	3/8"	3/4"	300'	3000	25-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-325	48	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-450	52	N	1/2"	7/8"	450	3/8"	3/4"	625'	3000	37-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-500	58	N	1/2"	7/8"	500	3/8"	3/4"	700'	3000	41-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-5-50	38	N	3/4"	1-1/4"	50	1/2"	7/8"	100'	3000	20-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-100	42	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175	50	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote

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5/31/23, 6:15 PM Coxreels 1125 Series "Competitor" hand crank and motorized hose reels have the features demanded by industry professionals. |

1125-5-200	55	N	3/4"	1-1/4"	200	1/2"	7/8"	450'	3000	38-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-250	59	N	3/4"	1-1/4"	250	1/2"	7/8"	500'	3000	42-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-6-35	50	N	1"	1-7/16"	35	3/4"	1-1/4"	50'	3000	26"	18-1/2"	17-5/8"	Add to Quote
1125-6-50	55	N	1"	1-7/16"	50	3/4"	1-1/4"	75'	3000	32"	18-1/2"	17-5/8"	Add to Quote
1125-6-75	62	N	1"	1-7/16"	75	3/4"	1-1/4"	120'	3000	38-1/2"	18-1/2"	17-5/8"	Add to Quote
1125-6-100	69	N	1"	1-7/16"	100	3/4"	1-1/4"	150'	3000	44-1/2"	18-1/2"	17-5/8"	Add to Quote
1125-4-100-C	39	N	1/2"	7/8"	100	3/8"	3/4"	140'	3000	19-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-200-C	42	N	1/2"	7/8"	200	3/8"	3/4"	300'	3000	25-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-325-C	51	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-450-C	55	N	1/2"	7/8"	450	3/8"	3/4"	625'	3000	37-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-500-C	61	N	1/2"	7/8"	500	3/8"	3/4"	700'	3000	41-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-5-50-C	41	N	3/4"	1-1/4"	50	1/2"	7/8"	100'	3000	20-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-100-C	45	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175-C	53	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-200-C	58	N	3/4"	1-1/4"	200	1/2"	7/8"	450'	3000	38-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-250-C	62	N	3/4"	1-1/4"	250	1/2"	7/8"	500'	3000	42-3/4"	18-3/4"	17-5/8"	Add to Quote

92. Neither the Petition nor Dr. Durham have identified a particular 1125 Series model to be used with Van Vliet. However, in his deposition when discussing the models and hose lengths Dr. Durham asserted, "I think 700 feet probably would be a good number for a maximum length [of hose] at a fracturing site." [Ex. 2012 – Page 68].

93. There are two models of the 1125 Series reel that have 700 ft capacity, which are models 1125-4-500 and 1125-4-500-C. [Ex. 1008 at 1-2]. Both of these models are configured for a 700 ft. long, 3/8 in. inner diameter hose.

REEL			CAPACITY			OPT. CAPACITY			PSI	SIZE INDEX			Add to Quote
MODEL	LBS	HOSE	I.D.	O.D.	FT.	I.D.	O.D.	FT.		W	H	L	
1125-4-100	36	N	1/2"	7/8"	100	3/8"	3/4"	140'	3000	19-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-200	39	N	1/2"	7/8"	200	3/8"	3/4"	300'	3000	25-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-325	48	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-450	52	N	1/2"	7/8"	450	3/8"	3/4"	625'	3000	37-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-500	58	N	1/2"	7/8"	500	3/8"	3/4"	700'	3000	41-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-5-50	38	N	3/4"	1-1/4"	50	1/2"	7/8"	100'	3000	20-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-100	42	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175	50	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote

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1125-5-250	59	N	3/4"	1-1/4"	250	1/2"	7/8"	500'	3000	42-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-6-35	50	N	1"	1-7/16"	35	3/4"	1-1/4"	50'	3000	26"	18-1/2"	17-5/8"	Add to Quote
1125-6-50	55	N	1"	1-7/16"	50	3/4"	1-1/4"	75'	3000	32"	18-1/2"	17-5/8"	Add to Quote
1125-6-75	62	N	1"	1-7/16"	75	3/4"	1-1/4"	120'	3000	38-1/2"	18-1/2"	17-5/8"	Add to Quote
1125-6-100	69	N	1"	1-7/16"	100	3/4"	1-1/4"	150'	3000	44-1/2"	18-1/2"	17-5/8"	Add to Quote
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1125-4-200-C	42	N	1/2"	7/8"	200	3/8"	3/4"	300'	3000	25-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-325-C	51	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-450-C	55	N	1/2"	7/8"	450	3/8"	3/4"	625'	3000	37-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-500-C	61	N	1/2"	7/8"	500	3/8"	3/4"	700'	3000	41-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-5-50-C	41	N	3/4"	1-1/4"	50	1/2"	7/8"	100'	3000	20-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-100-C	45	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175-C	53	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-200-C	58	N	3/4"	1-1/4"	200	1/2"	7/8"	450'	3000	38-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-250-C	62	N	3/4"	1-1/4"	250	1/2"	7/8"	500'	3000	42-3/4"	18-3/4"	17-5/8"	Add to Quote

94. The Coxreels 1125 Series reel uses a solid brass swivel inlet for most models. [Ex. 1008, at 1].

SWIVEL

- External fluid path with machined from solid brass 90° full-flow NPT swivel inlet (Nickel plated steel swivel on 1" models)
- Swivel Seals: NITRILE (AFLAS on 1" models)

95. The Coxreels 1125 Series reel uses AFLAS seals on 1" models. [Ex. 1008, at 1].

XII. THE CHALLENGED CLAIMS ARE NOT ANTICIPATED OR OBVIOUS

A. Grounds 1, 3, and 4: Claims 1-22 are not rendered obvious by Van Vliet in view of Cable; Claims 9 and 10 are not rendered obvious over Van Vliet in view of Cable, further in view of AFD; Claims 4, 11, 12, 20 are not rendered obvious over Van Vliet in view of Cable, further in view of Coxreels

96. The challenged claims under these grounds are not obvious over Van Vliet in view of Cable. Each of grounds 1, 3, and 4 rely on this combination of Van Vliet and Cable.

1. A POSITA would not have looked to Cable to modify Van Vliet.

97. A POSITA would have understood that the equipment in Cable's truck is configured for fast service in a roadside environment. Cable's truck is a drivable road vehicle. [Ex. 1005, col. 2, ll. 50 ("driver compartment")]. A POSITA would understand that Cable's vehicle would service other road vehicles, likely on or near a road or shoulder of the road.



98. A POSITA would have understood this from Cable’s explicit disclosure of servicing vehicles (Ex. 1005, col. 1, ll. 62-65) and the mentioning in Cable of six prior art patents in the background section that all pertain to servicing automobiles or motor vehicles, which indicates that Cable too is directed to servicing automobiles. [Ex. 2006, col. 1, ll. 6; Ex. 2007, col. 1, ll. 5; Ex. 2008, col. 1, ll. 55-56; Ex. 2009, col. 1, ll. 29; Ex. 2010, at col. 1, ll. 19-21; Ex. 2011, at col. 1, ll. 10]. Indeed, Cable states that “It is an object of the present invention to provide a lubrication system which is housed within a truck which will allow for the quick and easy lubrication of another vehicle.” [Ex. 1005 Col. 1, ll. 62-65].

99. A POSITA would have also appreciated that there are several reasons that the reels and hoses of Cable are situated at the rear of its truck. First, all of the

hoses are deployable from the rear of the truck so that the truck can be backed up to another vehicle that is to be serviced. [Ex. 1005, Figure 4]. A POSITA would have recognized that this would avoid the need to pull-up alongside the vehicle being serviced, which would be dangerous in a roadside environment, where automobiles are typically used.

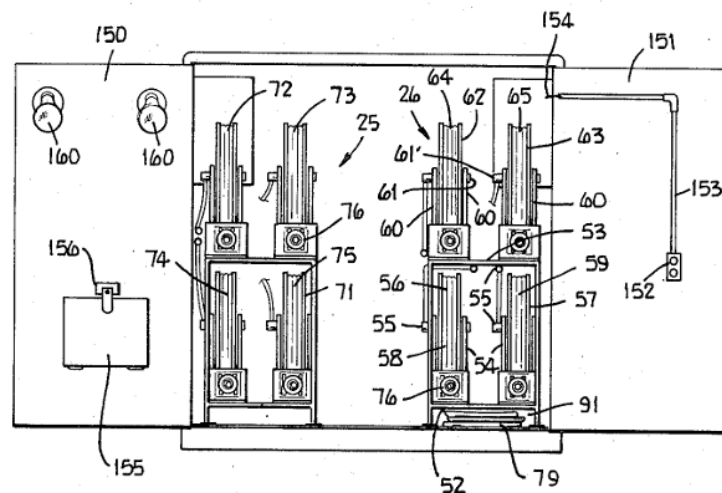


Fig. 4.

100. As another reason that the reels and hoses of Cable are situated at the rear of its truck, a POSITA would have understood that having all of the hoses deployable from the rear of the truck allows the driver operator to be at the rear of the truck, out of the way of any traffic passing alongside the truck while in a roadside environment.

101. As another reason that the reels and hoses of Cable are situated at the rear of its truck, a POSITA would have understood that the aisleway of Cable would allow a driver-operator to go from the driver compartment to the rear of the truck without having to get out of the truck into passing traffic. Thus, in view of the above, a POSITA would understand that the configuration of Cable's truck is predicated on its use for roadside service.

102. Further, Cable is configured to quickly and easily provide lubricant to a vehicle being serviced. [Ex. 1005, Col. 1, ll. 17-22, 62-65].

103. To quickly and easily provide lubricant to a vehicle being serviced, because the hoses deploy from the rear of Cable's truck, an operator would back Cable's truck up the vehicle being serviced, extend a hose from the reel through the rear of the truck to reach the vehicle, provide the lubricant through the hose to the vehicle (and/or collect lubricant from the vehicle), and then wind or wrap the hose back onto the reel. Having all of the reels and hoses in Cable at the rear of the truck allows the operator to quickly access and use each of the hoses, without having to move to different locations around the truck. [Ex. 1005 Col. 1, ll. 40-65]. Because the volumes involved are small, a POSITA would understand that the operator of Cable's truck will be manually controlling the process and will be directly

manipulating the hoses and reels during the operation from a position at the rear of the truck.

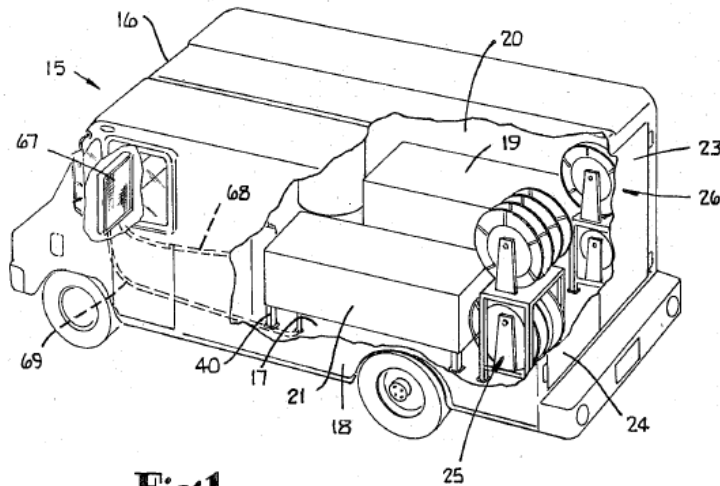


Fig. 1.

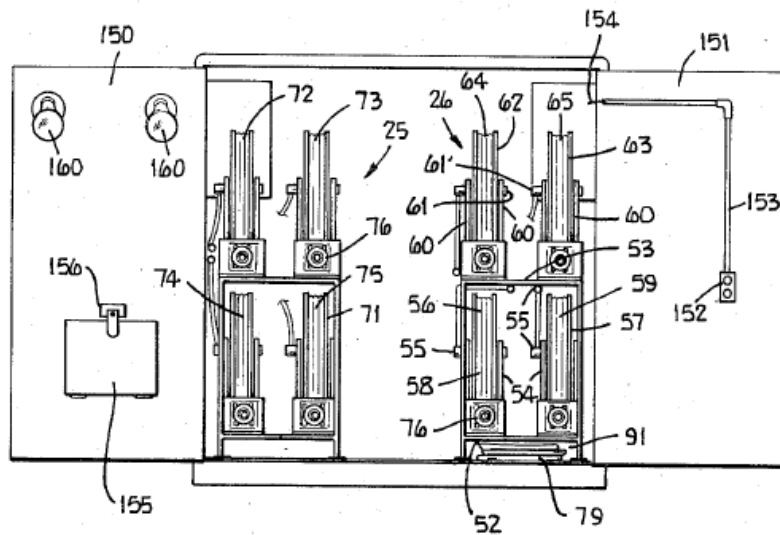


Fig. 4.

104. This configuration allows Cable to quickly service the vehicle, which would be desirable in order to minimize the amount of time that the vehicle being serviced is off-line so that the vehicle can be put back into use. Then, the truck can move on to a next vehicle to be serviced.

105. In view of the above, a POSITA would have understood Cable's configuration to be for roadside safety and rapid servicing.

106. Van Vliet, on the other hand, does not share the concerns of a roadside environment as in Cable. Although a mobile automated fueling station as in Van Vliet would be transported on roads from site to site, the system of Van Vliet is not a drivable road vehicle and it is not used to service road vehicles in a roadside environment. [Ex. 1004, [0014]].

107. A POSITA would have also understood that Van Vliet does not share this concern with rapid servicing. In Van Vliet, the hoses are secured to the fuel tanks by fuel caps in order to reduce the chances of spilling fuel during refueling, indicating that rapid service is not the intention of Van Vliet. In Van Vliet, the hoses remain in position for a significantly longer time.

108. In a fracking job, as is the intended environment of Van Vliet (Ex. 1004, Abstract, [0002]), A POSITA would have recognized the hoses would be secured to the fuel tanks during "rigging up" of the mobile automated refueling

station and remain secured to the fuel tanks until the end of the job several weeks later when the hoses are removed during “rigging down.”

109. Thus, unlike in Cable, there is no benefit or need in Van Vliet to quickly deploy, use, and collect hoses. In fact, “quick” is the opposite of what a POSITA would desire in a fracking environment where Van Vliet is used. In a fracking environment, the hoses are deployed for days or weeks at a time and must be carefully and safely routed around other equipment at the well site to reach the fuel tanks.

110. When the job is completed, hundreds of feet of multiple hoses are carefully collected under the supervision of operators to avoid “catching” on other equipment and damaging the hoses. Safe hose deployment and damage avoidance are the chief considerations and outweigh quickness. This is at least due to the cost of failure in the frac operation and the significant risk to personnel in the event of a leak.

111. The system of Van Vliet is not a drivable road vehicle like Cable’s truck and does not share Cable’s goal of rapid servicing. As a result, even though Van Vliet and Cable both have reels and hoses, a POSITA would have understood their significant differences. The mere presence of hoses and reels in both would not have motivated a POSITA to combine them.

112. Further, to the extent that there is design choice as suggested by Petitioner (Petition at 36), since Cable's configuration is a drivable truck for rapid servicing in a roadside environment, a POSITA would have been deterred from looking to Cable for a physical arrangement in Van Vliet, which is not a drivable vehicle and is not concerned with rapid servicing in a roadside environment.

2. Cable is not informative of a practical arrangement for Van Vliet.

113. A POSITA would understand that there is different equipment in Cable than there is in Van Vliet.

114. Cable includes a storage cabinet 39, a generator 36, an air compressor 34, an air tank 33, an electric motor 35, a water/anti-freeze tank 27, motor oil tanks 28/29, a waste oil tank 30, a transmission oil tank 31, and a lubrication storage cabinet 32. [Ex. 1005]. None of these pieces of equipment of Cable are found in Van Vliet.

115. And Van Vliet includes equipment that is not found in Cable, such as fuel sources 18/20, fuel pumps 32/34, manifolds 36/38, dry connections 60, and a control station 56. [Ex. 1004]

116. A POSITA would have understood that because there is different equipment between Cable and Van Vliet, Cable's arrangement would not represent

a viable option for arranging Van Vliet's equipment. For reference, Figure 2 of Cable and Figure 1 of Van Vliet are copied below.

117. The equipment in Van Vliet cannot be arranged according to Cable's arrangement because Van Vliet has different equipment that would differ in size and shape from Cable's. Therefore, a POSITA would not have expected the arrangement of equipment in Cable to improve Van Vliet in the same way. The combination would not have yielded predictable results.

118. Further, a POSITA would have understood Cable's arrangement to be detrimental to Van Vliet. Dr. Durham states that reels deployed on opposing sides of an aisle walkway adjacent to the sidewalls in Van Vliet would make Van Vliet's system more easily traversable for maintenance and repairs. [Petition at 34; Ex. 1003 at ¶172]. But such an arrangement would impede access to the reels for maintenance and repairs, because only one side of the reels facing the aisle would be accessible since the other side would back to the trailer sidewall and thus be inaccessible. This is not an issue in Cable because the reels back the rear doors of Cable's truck that open to provide access to the reels. [Ex. 1005, Fig. 4].

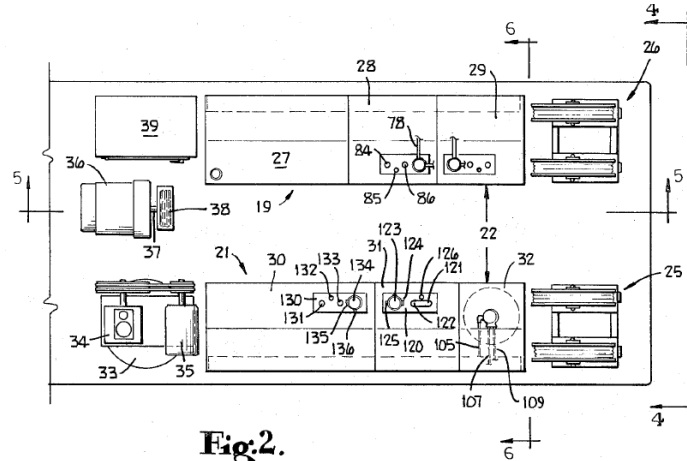


Fig.2.

Cable Fig. 2

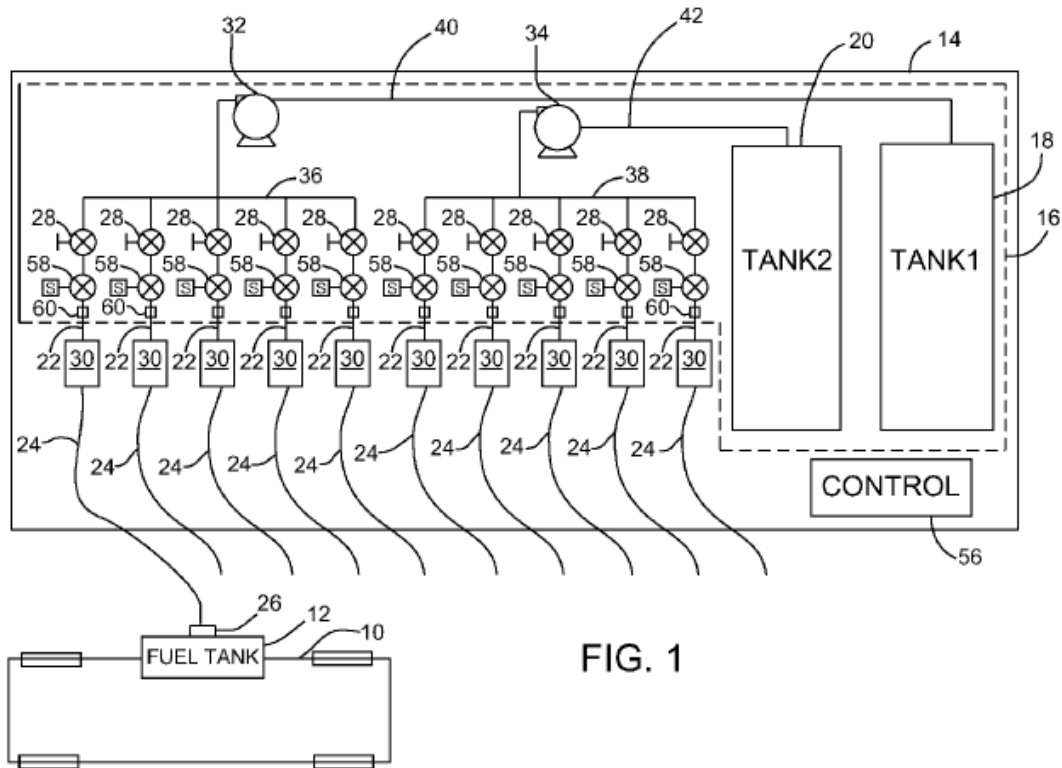


FIG. 1

Van Vliet Fig. 1

119. The proposed modification would make many components of Van Vliet more difficult to access, especially for the purpose of repairs, maintenance, cleaning, and physical inspection.

120. Additionally, Petitioner's proposed arrangement of reels deployed on opposing sides of an aisle walkway would not make Van Vliet's system more traversable, counter to a POSITA's desire for safety.

121. The Coxreels 1125 Series reel that Dr. Durham would use has a width of 41.5 inches. [Ex. 2012 – Page 68 ll. 8-12 suggesting 700 ft. hose; Ex. 1015].

REEL			CAPACITY			OPT. CAPACITY				SIZE INDEX			Add to Quote
MODEL	LBS	HOSE	I.D.	O.D.	FT.	I.D.	O.D.	FT.	PSI	W	H	L	
										Overall Dimensions			
1125-4-100	36	N	1/2"	7/8"	100	3/8"	3/4"	140'	3000	19-1/2"	18-3/4"	17-5/8"	Add to Quote
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1125-4-325	48	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
1125-4-450	52	N	1/2"	7/8"	450	3/8"	3/4"	625'	3000	37-1/2"	18-3/4"	17-5/8"	Add to Quote
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1125-5-50	38	N	3/4"	1-1/4"	50	1/2"	7/8"	100'	3000	20-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-100	42	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175	50	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote

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1125-6-35	50	N	1"	1-7/16"	35	3/4"	1-1/4"	50'	3000	26"	18-1/2"	17-5/8"	Add to Quote
1125-6-50	55	N	1"	1-7/16"	50	3/4"	1-1/4"	75'	3000	32"	18-1/2"	17-5/8"	Add to Quote
1125-6-75	62	N	1"	1-7/16"	75	3/4"	1-1/4"	120'	3000	38-1/2"	18-1/2"	17-5/8"	Add to Quote
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1125-4-100-C	39	N	1/2"	7/8"	100	3/8"	3/4"	140'	3000	19-1/2"	18-3/4"	17-5/8"	Add to Quote
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1125-4-325-C	51	N	1/2"	7/8"	325	3/8"	3/4"	450'	3000	31-1/2"	18-3/4"	17-5/8"	Add to Quote
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1125-5-100-C	45	N	3/4"	1-1/4"	100	1/2"	7/8"	200'	3000	26-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-175-C	53	N	3/4"	1-1/4"	175	1/2"	7/8"	325'	3000	32-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-200-C	58	N	3/4"	1-1/4"	200	1/2"	7/8"	450'	3000	38-3/4"	18-3/4"	17-5/8"	Add to Quote
1125-5-250-C	62	N	3/4"	1-1/4"	250	1/2"	7/8"	500'	3000	42-3/4"	18-3/4"	17-5/8"	Add to Quote

122. Given the 8 ft. width (96 inches) of Van Vliet's container, two reels across from each other on opposed sidewalls, oriented as in Cable such that the axis of the reel is perpendicular to the trailer wall, would take up at least 83 inches (41.5 x 2) of the trailer width, leaving only 13 inches for the aisle, which by Dr.

Durham's own admission would not meet the OSHA safety requirement that an aisle be at least 28 inches. [Ex. 1003 at ¶180]. Petitioner's arrangement would be unsafe and violate OSHA standards. Further, it would leave a 13-inch aisle width or less, which would be difficult or even impossible to traverse and would thus not be an "aisle walkway" as required by the claims.

123. Additionally, the 13 inches does not even account for spacing that would be needed between the reels for the hand crank or reel motor. Thus, 13 inches is the maximum amount of space that would be available for the "aisle," but providing spacing between the reels would take up a portion of the 13 inches. Therefore, the "aisle" is would likely be less than 13 inches. In fact, to a POSITA, I do not believe that any option listed in Coxreels would have a small enough width for two reels to be successfully situated across an aisle walkway from one another and still have sufficient spacing for use and accessibility. I note that the least wide Coxreels 1125 model listed is still 19.5" wide, which would only leave 57 inches for an aisleway and other needed spacing. And even in that scenario, only one reel on each side of any type of aisle would be provided widthwise, unlike Cable which has two on each side of the aisle. As Cable is in a road vehicle, a POSITA would

have recognized that Cable's reels are significantly less wide than any Coxreels 1125 model.

124. A POSITA would have recognized that rotating or other moving parts need clearance. A reel having a hand crank would require extra clearance because it is a pinch point where a hand could get jammed during the cranking process.

125. Further, four Coxreels reels with two on each side across from each other on opposed sidewalls, oriented as in Cable with each pair side-by-side, would not even fit in Van Vliet's container, as four reels would require 166 inches of space, which well exceeds Van Vliet's 96 inch wide container.

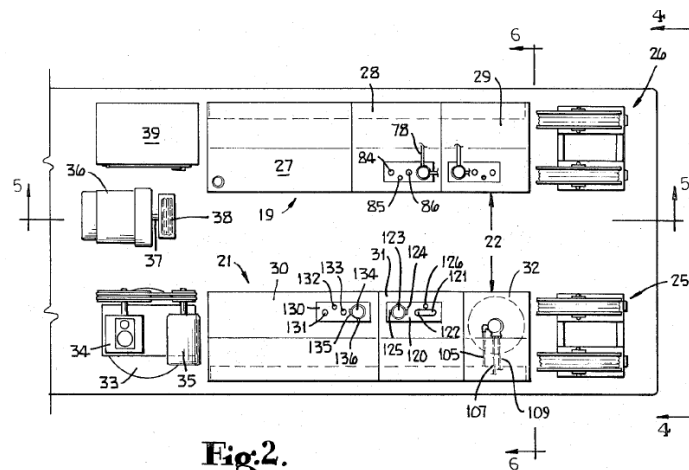


Fig.2.

Cable Fig. 2

126. Further, a POSITA would not have modified Van Vliet in a way that would significantly reduce the number of reels.

127. A POSITA also would have recognized that arranging the reels of Van Vliet as in Cable would put undue wear and stress on the hoses and reels. The reels of Cable are oriented such that the axes of the spindles about which the reels rotate is transverse (i.e., perpendicular) to the length of the aisle between the reels in Cable's truck. [Ex. 1003, Figs. 2 and 4; Ex. 2012 - Pages 117-118]. Arranging the reels of Van Vliet according to Cable, with the axes of the spindles transverse to the aisle, means that the reels of Van Vliet would all face toward the rear of Van Vliet's container. Therefore, in order to be deployed out of the sidewall in Van Vliet, each hose would need to turn 90° from its reel. This would cause the hose to come into the reel at a steep angle, which would be likely to i) cause the hose to rub/wear on the edge of the spindle, ii) interfere with the winding of the hose, iii) increase stress on the hose from being pulled around a 90° bend, and/or iv) increase winding resistance and stress on the reel. In order for the hose to be properly directed onto the reel, roller guides or other features would need to force the hose entering through the sidewall to make at least one 90-degree bend to turn into the reel. Given the significant width of the Coxreels 1125-4-500 drum ([Ex. 1008]), hose entering from the roller guide will be constrained to be fed into a single station along the width. As the 700 feet of hose is wound onto the reel, it will become impossible for the hose to wrap onto the drum in any controlled

manner as all the hose will tend to pile up at the one location. The result will be a tangled mess of hose and an inability to reel in the entire length before the reel jams up. In the process, the hose is likely to incur wear and to potentially be damaged as the operator continues to try and crank in the entire length of hose. This is particularly challenging given the 700-foot length and small, 3/8-inch diameter of the specified hose. The long, small-diameter hose is much more difficult to wind onto a reel as the settling of the coil wraps and effects of twist in the hose will create a compounding challenge as the reel is turned and hundreds of wraps are being formed. A POSITA would have desired the hose to come straight into and out of the reel.

128. In view of the above, a POSITA would not have had an expectation of success for employing the reel arrangement of Cable in Van Vliet because Cable's arrangement is impractical and dangerous for Van Vliet.

129. Further, to the extent Petitioner relies on assertions made with regard to claim 17[h] that a POSITA would have understood Van Vliet to describe first and second groups of hoses deployable through, respectively, first and second opposed side walls, Petitioner's reliance on Van Vliet is incorrect. [Petition at 47]. Van Vliet does not disclose such an arrangement.

130. I understand that Petitioner points to the following quote from Van Vliet:

“The hoses 24 are run out to equipment 10 through an opening in the trailer wall in whatever arrangement the well operator has requested that the fracturing equipment be placed around the well. For example, one manifold 36 may supply fluid to equipment 10 lined up on one side of a well, while another manifold 38 may supply fluid to equipment 10 lined up on the other side.”

[Ex. 1004, ¶24].

131. However, for several reasons, a POSITA would not have understood this quote to mean what Petitioner and Dr. Durham contend - that Van Vliet discloses an embodiment in which there are first and second groups of hoses deployable respectively through first and second opposed side walls. This quote does not convey such an arrangement to a POSITA.

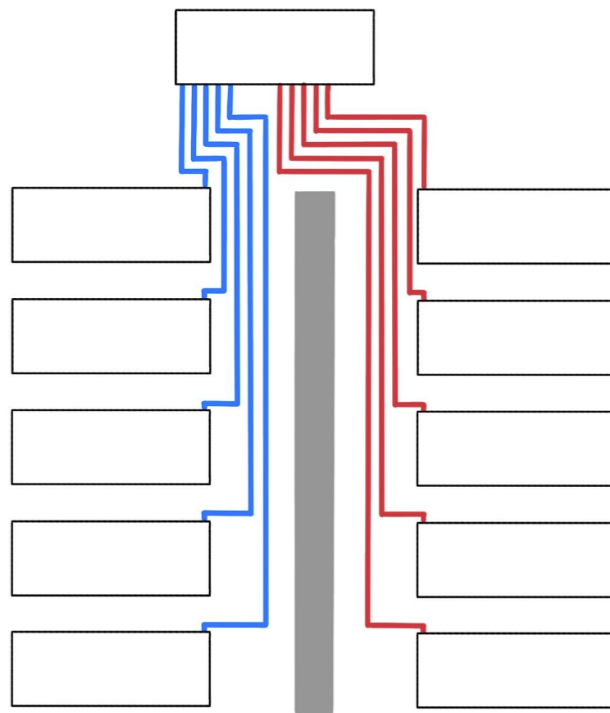
132. Petitioner’s contention is actually inconsistent with the quote. The quote explicitly reads that “The hoses 24 are run out to equipment 10 through an opening in *the trailer wall*.” [Ex. 1004, ¶24] (emphasis provided). Notably, a POSITA would have understood that the term “the trailer wall” is singular, not plural. Yet, contrary to the singular phrase “the trailer wall,” Petitioner contends that the quote would somehow be understood to mean that hoses are deployable through opposed side *walls*. I disagree with this contention. A POSITA would not

have this understanding proposed by Petitioner. For these reasons, Petitioner's interpretation of the quote is wrong. Van Vliet does not describe first and second groups of hoses deployed, respectively, through two opposed side walls.

133. Petitioner has not shown that either of the phrases "arrangement of the well" or "one manifold 36 may supply fluid to equipment 10 lined up on one side of a well, while another manifold 38 may supply fluid to equipment 10 lined up on the other side" would inherently require that Van Vliet has first and second groups of hoses that are deployable, respectively, through two opposed side walls. The phrases "arrangement of the well" and "one manifold 36 may supply fluid to equipment 10 lined up on one side of a well, while another manifold 38 may supply fluid to equipment 10 lined up on the other side" are silent as to hoses. It follows that the phrases are indeterminate to a POSITA as to the location where the hoses are deployed from the trailer.

134. Further, no matter where the well equipment is located with respect to the trailer, a POSITA would have understood deploying hoses from two opposed sidewalls would not have been necessary or even suggested because the hoses could safely reach the destinations if deployed from one sidewall by either routing the hoses underneath the trailer to the other side, routing the hoses around the end of the trailer to the other side, or routing the hoses so that some hoses coming out

of the sidewall are routed to the left and other hoses coming out of the sidewall are routed in the opposite direction to the right. With respect to hose routing, it would be just as easy to route the hoses from a single side, splitting off half to one side of the frac operation and the other half to the other side, as illustrated below. A POSITA would have had no reason to conclude that Van Vliet discloses or suggests hoses coming out of two sidewalls.



135. In view of the above, Van Vliet does not disclose or suggest to a POSITA claim feature 17[h]: “wherein the mobile trailer includes first and second

opposed trailer side walls, and a first group of the hoses are deployable from the first trailer side wall and a second group of the hoses are deployable from the second trailer side wall.”

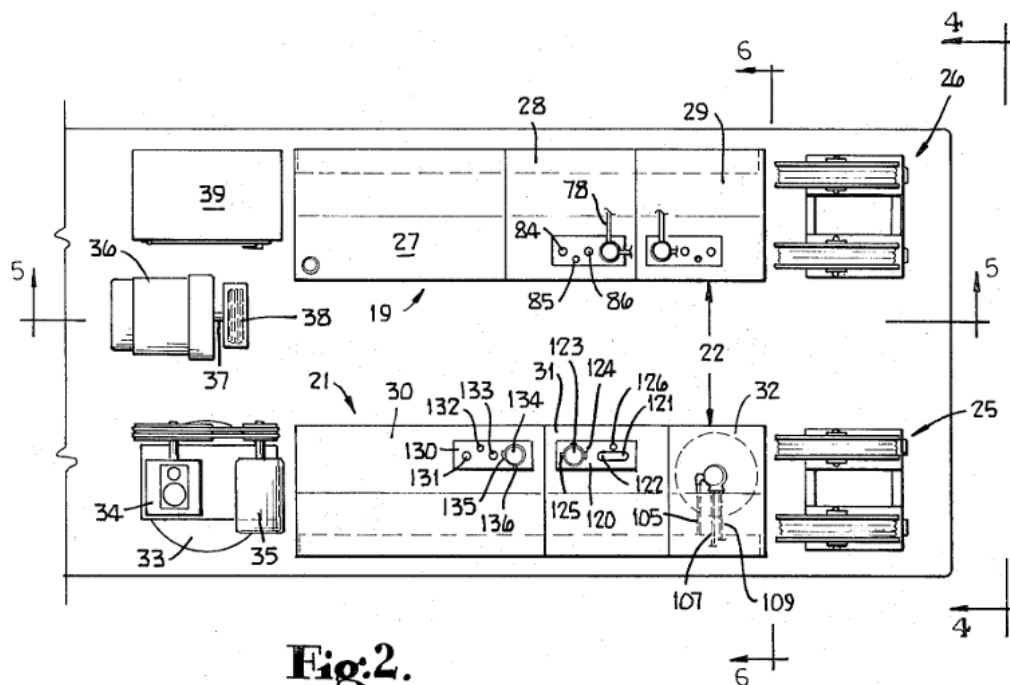
3. Cable teaches that the walkway is also a storage area

136. Cable teaches “a first row of storage tanks mounted to the truck and extending along one side thereof ... a-second row of storage tanks ... extending along the opposite side thereof and being spaced from said first row of tanks with *a storage area and a walkway therebetween.*” [Ex. 1005, 1:40-48; 2:58] (emphasis added).

137. The teaching of the space between the storage tanks as a storage area would deter a POSITA from looking to Cable to modify Van Vliet. In particular the Occupational Health and Safety Administration (OSHA) promulgates safety regulations applicable to workplaces. OSHA does not promulgate specific standards for a mobile automated refueling station that is on a well site, but OSHA’s “General Industry and Health Standards” are most applicable. One of these standards dictates “exit routes” in the workplace. A walkway that doubles as a storage area would not be acceptable, as items stored in the aisle walkway would block the walkway as an emergency exit route. This would likely draw the attention of a site safety supervisor that inspects the equipment before a frac operation starts.

138. This teaching of Cable would have discouraged a POSITA from modifying Van Vliet according to Cable.

139. Additionally, a POSITA would not have an expectation of success for arranging the reels of Van Vliet according to Cable. In particular, Cable has eight reels that all feed hoses out of the rear of the truck. Ex. 1005, Figs. 2, 4. Van Vliet has ten hoses [Ex. 1004, [0024] “five outlet per manifold”), and a POSITA would thus understand that any application of Cable’s arrangement with eight reels to Van Vliet would require two more reels to be added to the arrangement.



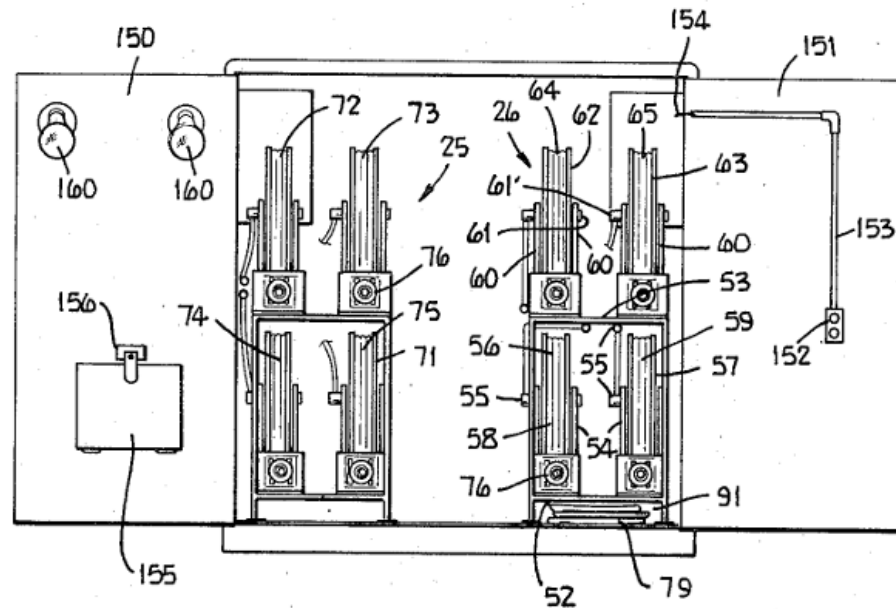


Fig. 4.

Ex. 1003, Figs. 2, 4.

140. The size and scale of frac operations has continued to increase from the time of Van Vliet's filing in 2011 to 2016, and as a result, the number of pumping units and other diesel-consuming pieces of equipment also increased such that the 10 hoses contemplated in Van Vliet would no longer be sufficient. A POSITA would have understood that larger frac jobs require 20 to 30 hoses to automatically deliver fuel to all of the diesel engines in operation on site. The larger number of hoses required drives up the number of reels that must be positioned in the trailer as well.

141. The only open space where two reels could be added in Cable's arrangement is the space between the existing reels in the location of the

walkway/storage area. Adding the reels at that location would eliminate the walkway/storage area because the two added reels would take up that space. Further, a Coxreels 1125 likely would not even fit there.

142. As a result, adding a walkway would not yield predictable results in Van Vliet. A POSITA would have no expectation to successfully incorporate Cable's arrangement in Van Vliet and maintain the presence of a walkway down the middle.

B. Ground 2: Claims 17 and 18 are not anticipated or rendered obvious by Van Vliet

143. For the reasons above, Van Vliet does not disclose or suggest to a POSITA the features of claim 17[h]. Claims 17 and 18 are not anticipated or rendered obvious by Van Vliet for at least this reason.

144. Further, Petitioner and Dr. Durham speculate that the features of claim 17[h] (““wherein the mobile trailer includes first and second opposed trailer side walls, and a first group of the hoses are deployable from the first trailer side wall and a second group of the hoses are deployable from the second trailer side wall”) would be the “most obvious” arrangement. I disagree with this assertion.

145. Neither Petitioner nor Dr. Durham adequately explain why the features of claim 17[h] would be the “most obvious” arrangement in view of Van Vliet,

especially since such a configuration is missing from the cited prior art. The sketch in Dr. Durham's report is created by Dr. Durham and not actually included in any of the cited prior art.

146. Dr. Durham's sketch is inconsistent with the disclosure in Van Vliet. For example, it is inconsistent with Van Vliet's disclosure that "The hoses 24 are run out to equipment 10 through an opening in *the trailer wall*" [Ex. 1004, ¶24] (emphasis provided).

147. A POSITA would understand the term "the trailer wall" is singular, not plural. Van Vliet does not disclose to a POSITA that a first group of the hoses are deployable from the first trailer side wall and a second group of the hoses are deployable from the second trailer side wall. If anything, as stated above, Van Vliet's Figure 1, although a schematic, shows hoses coming out of one sidewall only. [Ex. 1004, Figure 1].

148. Petitioner instead jumps right to the conclusion that the most obvious arrangement for a POSITA seeking to connect each of Vliet's manifolds to a respective opposite side of a well would be an arrangement in which the trailer faces directly toward or away from the well and the hoses extend from each side of the trailer to a corresponding side of the well. Petition at 48. But in this attempted explanation from Petitioner, the location of the trailer with respect to the well is

arbitrary. Further, it is unclear what the Petitioner even means when a trailer “faces” toward or away from a reference point.

149. Therefore, in view of the lack of teaching of the features of claim 17[h] in the cited art, and the fact that this feature is only present in the ‘805 Patent, Petitioner’s proposed “most obvious” arrangement has been gleaned from the ‘805 Patent in an exercise of impermissible hindsight.

C. Ground 4, 7, and 8: Claims 4, 11, 12, 20 are not rendered obvious over Van Vliet in view of Cable, further in view of Coxreels; Claims 4, 5, 20, and 21 are not rendered obvious over Van Vliet in view of AFD, further in view of Lowrie, further in view of Coxreels; Claims 11 and 12 are not rendered obvious over Van Vliet in view of AFD, further in view of Coxreels

150. I understand that Petitioner relies on the Coxreels 1125 series reel as prior art for grounds 4, 7, and 8. Each of these grounds requires a modification of Van Vliet to include Coxreels. It is my opinion that a POSITA would not have made such a modification. For the below reasons, a POSITA would not have utilized the Coxreels 1125 Series in the fuel delivery environment of Van Vliet.

1. The Coxreels 1125 Series reel is not for fracking or automated fuel delivery.

151. Coxreels may have been marketed for the oil industry, but it is not directed in particular to fuel delivery, let alone automated fuel delivery in a fracking

environment. For instance, Coxreels provides a bullet point list of 14 different “Possible Fields of Application” of the 1125 Series reel. [Ex. 1008 at 1].

POSSIBLE FIELDS OF APPLICATION

- Industrial Plant & Ground Maintenance
- Fire Suppression
- Farming
- Construction Sites
- Landscaping
- Pest & Weed Control
- Golf Course Maintenance
- Air Compressor
- Washdown
- High-Flow Watering
- Hydro Seeding
- Pressure Washing
- Agricultural Spraying
- Chemical Fluid Transfer

152. The list of fields of application does not explicitly include fuel delivery, let alone automated fuel delivery in a fracking environment. To the extent Coxreels suggested use of the 1125 Series in the oil industry, a POSITA would have understood that the “oil industry” is too broad to be of practical use.

153. The “oil industry” covers a wide variety of areas, such as exploration, extraction, refining, and transportation, and each of these areas would have its own sub-categories with unique technological challenges. In view of this, a POSITA would have drawn the reasonable conclusion that the marketing by Coxreels of the

1125 Series reel in the oil industry was not a representation that the reel is suited to every possible application across the entire oil industry, or particularly to automated fuel delivery.

154. Each of the 14 possible fields of application listed are so enormously broad that it would have been virtually impossible for a POSITA to determine from the list whether the 1125 Series reel would be suited for some other unlisted field.

155. For example, the listing of “Chemical Fluid Transfer” is unhelpful to determining whether the reel would be suited for automated fuel delivery. All fluids are necessarily “chemicals” and such a broad reference does not particularly inform a POSITA that the 1125 Series reel is suited for fuel delivery in an automated fueling station.

156. Likewise, the other listed categories are so broad that they do not particularly inform a POSITA that the 1125 Series reel is suited for fuel delivery in an automated fueling station. Exhibit 1030 does not cure these deficiencies.

2. A POSITA would have recognized that the Coxreels 1125 Series reel would have been susceptible to reliability issues.

157. In selecting components such as a reel for an automated fueling station, a POSITA would at least conduct an initial analysis of the component to determine whether it is likely to work or, conversely, whether it is likely to have safety concerns or reliability problems. This would include preliminary evaluation of the information and design details provided by the manufacturer.

158. In particular, a POSITA would not have relied solely on manufacturer representations of a component, as the manufacturer is not responsible for, or likely to be familiar with, the design, requirements, and operation of an automated fueling station. This is especially true where, as in Coxreels, the manufacturer representations are so broad. Indeed, a POSITA would recognize that the manufacturer has a financial interest in listing possible applications broadly, and would have exercised skepticism regarding these representations.

159. From the preliminary evaluation, a POSITA would have found that the Coxreels 1125 Series reel would have been unsuited for an automated fueling station as in Van Vliet.

160. The Coxreels 1125 Series reel uses a solid brass swivel inlet. [Ex. 1008 at 1, see also annotated picture below]. Copper and copper-containing alloys, i.e., brass (a copper-zinc alloy), should not be used with fuel.



161. A POSITA would have known that Copper can promote fuel degradation and can produce mercaptide gels, and zinc can react with water or organic acids in fuel to form gels. These gels can form deposits in downstream equipment that can plug lines, orifices, filter screens, and the like. [Ex. 2013 – Page 10].

162. A POSITA would have known that metals such as copper and zinc (brass) promote fuel degradation. Fuel degradation can lead to the formation of insoluble gums and particulate materials than can adhere to surfaces, limit fuel flow, or clog small clearances in fuel systems causing problems such as injector malfunction or seizures. [Ex. 2014 – Page 14].

163. Therefore, a POSITA would have understood that a component made of brass, such as the swivel of the Coxreels 1125 Series reel, would have been an unacceptable choice for a mobile fuel delivery station, such as in Van Vliet, because it could lead to formation of gels and insoluble gums and particulates that could interfere with operation of downstream equipment.

164. For these reasons, a POSITA would have understood that the Coxreels 1125 Series reel would have been unreliable and that, as a result, the reel would not have been a suitable choice to use or to even try in a mobile fuel delivery station such as in Van Vliet.

165. The Coxreels 1125 Series reel also comes in a 1-inch model that has a nickel-plated steel swivel instead of a brass swivel. [Ex. 1008]. However, a POSITA would not have found that option to be acceptable either.

166. As indicated in Coxreels, the swivel seals of the 1-inch models are made with AFLAS material (Ex. 1015 “AFLAS on 1" models”). I understand that AFLAS® is a registered trademark of AGC INC. for heat and chemical resistant fluororubber. [Ex. 2015]. AFLAS was known to have a service temperature of -5 °C to 200 °C and a glass transition temperature of -3 °C or -13 °C, depending on the exact grade. [Ex. 2016; Ex. 2017]

167. A POSITA would have known that a mobile fuel delivery station like the one disclosed in Van Vliet would be used in extreme conditions, such as North Dakota in the winter where well-site temperatures can fall below -30 °F (-34 °C). A POSITA would have found a reel with an AFLAS seal to have been unacceptable because the expected use in an environment of -30 °F (-34 °C) would have been lower than the minimum service temperature and glass transition temperature of the AFLAS seal, leading to failure of the seal.

168. Further, the 1-inch Coxreels options only have capacity for hoses up to 100 feet, which would not be sufficient for the intended fracking environment of Van Vliet. As one reference, AFD discloses that it utilizes 300-450' of 1-inch hoses "allowing for greater flexibility in tight locations." [Ex. 1007].

169. A POSITA would have therefore found the Coxreels 1125 Series 1 inch model reel to also have been an unacceptable choice to use or to even try in a mobile fuel delivery station such as in Van Vliet.

3. The Coxreels 1125 Series reel would result in an undesirable operating configuration.

170. The Coxreels 1125 Series reels were available in 24 different models, which are shown in the table in Coxreels.

171. Neither the Petition nor Dr. Durham's declaration identify a particular model, but in his deposition, when discussing the models and hose lengths, Dr. Durham asserts, "I think 700 feet probably would be a good number for a maximum length [of hose] at a fracturing site." [Ex. 2012 – Page 68]. As set forth above, there are two models of the 1125 Series reel that have 700 ft capacity, which are models 1125-4-500 and 1125-4-500-C. Ex. 1005 at 1-2. Both of these models are configured for a 700 ft. long, 3/8 in. inner diameter hose (hereafter the "Durham configuration" refers to model 1125-4-500 or 1125-4-500-C with a 700 ft. long, 3/8 in. inner diameter hose).

172. A POSITA would have recognized that the Durham configuration, if implemented in Van Vliet, would require an undesirable operating configuration.

173. A "small" frac operation may require 7,500 gallons of diesel in a 12-hr period, a "large" frac operation may require 12,000 gallons in a 12-hour period, and a "superfrac" may require 24,000 gallons or more in a 12-hour period. [Ex. 2018]. To support these numbers, I refer to a BJ Energy study of fuel consumption on four case study frac jobs. For a Tier 2 emissions-standard diesel engine, the consumption ranged from 14,000 to 31,000 gallons per 12 hours of operation. While the particular job parameters varied quite a bit between jobs, the

consumption study provides a quantified reference for comparison in-line with the typical jobs and conservative as to the maximum fuel required. *Id.*

174. A POSITA would have recognized that the flow rates required to meet such fuel volumes for a mobile fuel delivery station such as Van Vliet can be calculated based on the hose diameter, an assumption of a pump pressure, and an assumption of a “duty cycle.” [Appendix A]

175. A “duty cycle” is the percentage of time of a 12-hour period that the pump is ON and pumping fuel through the hoses at maximum flow rate in order to meet a given fuel demand. For instance, a 90% duty cycle means that the pump is operating to supply the maximum flow rate for 90% of the 12-hour period. In the remaining 10% of the time (i.e., “off-duty time”) there is little or no fuel flow through the hoses, which accounts for start-up and shut-down transients and switching valves between different output hoses.

176. A 90% duty cycle would be extreme because any downtime that causes the off-duty time to exceed 10% would prevent the station from meeting the given fuel demand, and a frac pump would then likely need to be taken offline (at the least). A 90% duty cycle would have represented a highly undesirable operating configuration.

177. For a given flow rate, there is also a required pump pressure needed to achieve the that flow rate. For safety purposes, pump pressure should be limited to approximately 60 psi. Limiting the pump pressure limits the rate at which fuel, if it spills, would leak out in the event of damage to a hose. Additionally, the number of hoses that are open and providing fuel simultaneously should also be limited, for safety and practical considerations.

178. For instance, the greater the number of hoses that are open simultaneously, the greater the burden on the operator(s) to safely monitor and manage those hoses. As an example, a limit of three simultaneously open hoses means that once three hoses are open and providing fuel, if there is a signal for a fourth hose to open and provide fuel, the opening of the fourth hose would be delayed until one of the first three hoses has completed filling a tank. A limit of three open hoses would be considered very safe. A limit of five or six hoses would be considered marginally safe, and a limit seven hoses or more would likely be a safety risk. Some of the safety risk could be mitigated with a greater number of operators - but at the expense of increasing safety risks elsewhere (e.g., more personnel on the well site, more opportunity for human error, etc.).

179. A pressure loss for a desired flow rate through the internal plumbing of the station from the pump, through a fuel filter, a manifold, an elbow fitting, and a hose can also be determined based on a pump outlet pressure limit.

180. For the Durham configuration operating with 3 hoses delivering fuel simultaneously and a comfortable 50% duty cycle, the estimated pressure required to meet the fuel delivery for even a small frac job with 7,500 gallons in 12 hours would be 440 psi. This configuration would pose a higher safety risk because, if there were to be a leak, the higher pump pressure would cause more fuel to be leaked (than 60 psi) and at that pressure the leak may also spew fuel into the air, adding risk of spraying onto an operator or onto a hot surface that could ignite the fuel.

181. Additionally, the pressure would exceed the maximum pressure rating of Brent Hose 3106 that Dr. Durham indicated in IPR2023-01236 to be “designed for use on engines and fuel lines.” [Ex. 2019]. Brent lists five hose sizes and the 10 mm size is closest to the 3/8 inch of the Durham configuration and has a pressure rating of 90 psi. *Id.*

182. A POSITA would have recognized that this is clearly not an acceptable operating configuration due to the high pressure, the limited fuel delivery, and risk of hose burst.

183. With an increase to seven simultaneously open hoses and a 90% duty cycle, the Durham configuration could achieve delivery of 7,500 gallons in a 12-hour period with a pump pressure under 60 psi. The use of seven simultaneously open hoses at the 90% duty cycle would have been considered a “redline” operating configuration because there would be a safety risk associated with having seven of Van Vliet’s ten hoses being simultaneously open and the use of the extreme 90% duty cycle.

184. There would be no margin for error with this configuration, as a problem with any hose would immediately risk a fuel shortfall and, consequently, a frac pump having to be taken offline. More importantly, even at this “redline” configuration, the fuel volume output could only barely meet the fuel requirement of a small frac job and would, without pressing the limits more, be unable to deliver enough fuel for a larger frac or superfrac.

185. In order to deliver 12,000 gal. for a large frac, the pump pressure for the Durham configuration would have to be increased to 85 psi with seven simultaneously open hoses and a 90% duty cycle, still at the “red line” for number of hoses and duty cycle. This configuration would also pose a higher safety risk if there were to be a leak, as discussed earlier above.

186. Additionally, the pressure would be approaching the maximum pressure rating of Brent Hose 3106 that Dr. Durham indicated in IPR2023-01236 to be “designed for use on engines and fuel lines.” This too is clearly not an acceptable operating configuration due to the high pressure, extreme duty cycle, and risk of hose burst.

187. In order to provide 24,000 gal. of fuel required for a superfrac over 12 hours, the pump pressure for the Durham configuration would have to be increased to 280 psi, with seven simultaneously open hoses and a 90% duty cycle. This would be an extreme safety risk due to the use of seven simultaneously open hoses at the 90% duty cycle, the capacity for a large volume leak, and likelihood of leaked fuel spraying into the air. Moreover, such a pressure level would also be several multiples in excess of the hose pressure rating (discussion above), resulting in a likely hose burst.

188. In view of the above, the Durham configuration with the Coxreels 1125 Series reel and the 3/8 inch hose would lead to an undesirable, unsafe operating configuration. A POSITA would have understood this and therefore would have found the Durham configuration to be unacceptable in a mobile fuel delivery station such as Van Vliet.

D. Ground 5-8: Claims 1, 7-10, 13-18, and 22 are not rendered obvious over Van Vliet in view of AFD; Claims 2, 3, 6, and 19 are not rendered obvious over Van Vliet in view of AFD, further in view of Lowrie; Claims 4, 5, 20, and 21 are not rendered obvious over Van Vliet in view of AFD, further in view of Lowrie, further in view of Coxreels; Claims 11 and 12 are not rendered obvious over Van Vliet in view of AFD, further in view of Coxreels

189. I understand that each of grounds 5-8 require the combination of Van Vliet and AFD. I disagree with the Petitioner's assertions regarding AFD.

190. Claim 1[h] recites "wherein the reels are arranged on first and second opposed sides in the mobile trailer, with an aisle walkway down the middle of the mobile trailer." Claims 18-22 also recite these features. Neither of Van Vliet or AFD disclose or suggest this feature to a POSITA.

1. AFD does not definitively disclose hoses deployed from both sides.

191. I understand that Petitioner claims that the AFD unit has hoses deployed from both sides of the unit and relies on the photograph of the refueling system in AFD at 2. Petition at 63-66, 71-72. In particular, Petitioner contends that AFD's system has hoses coming out of the far side of the main body. *Id.* I disagree with this contention.

192. The far side is not visible in the photo, and it is therefore not clear where those hoses are deployed from. In fact, it is clear that the photo was modified/cropped to at least remove the background, as is evident from the lack of

any background in the photo of AFD's system at p. 2, in which other equipment on the site should be visible. [Ex. 1007].

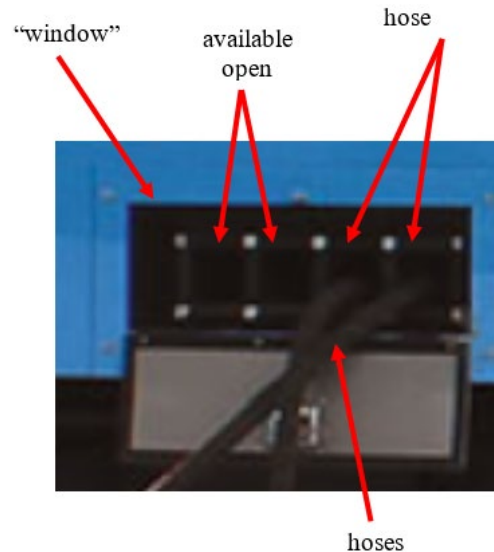
193. The other two photos on pages 3 and 4 of AFD show other equipment and structures in the background. [Ex. 1007]. Since no background is shown, it is plausible that there was another system or piece of equipment behind the depicted trailer that was removed when the photo was modified.

194. A POSITA therefore would have understood that just because the hoses are visible underneath the system in the first photo, this does not mean that those hoses are coming out of the depicted system.

195. Further, the AFD photo suggests to a POSITA that all 24 hoses would have been deployed from the one (visible) side. In the annotated excerpt below there is a window where hoses exit through the trailer wall. Each window has rectangular hose guides through which the hoses deploy. In each window there are four hose guides. Two of those hose guides have hoses coming out and two other hose guides do not have hoses coming out. [Ex. 1007].

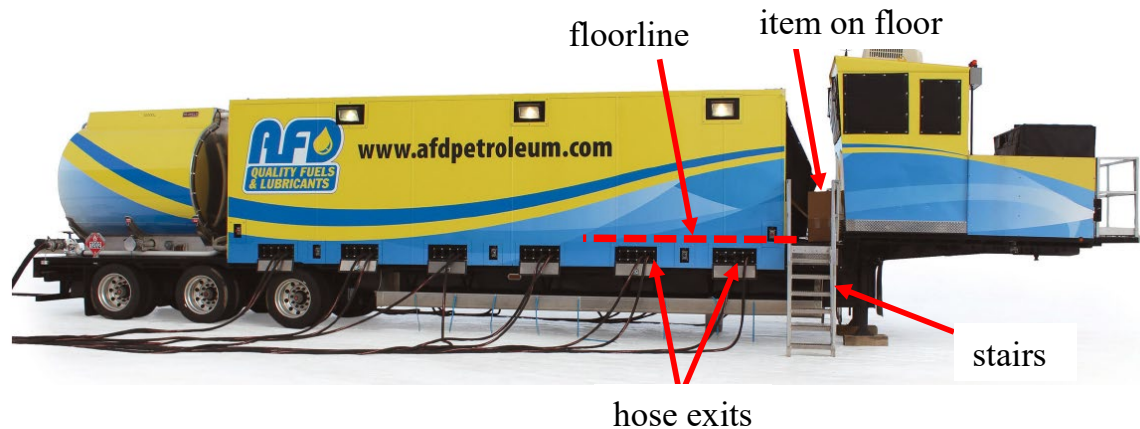
196. This indicates to a POSITA that additional hoses could be deployed through the unused hose guides in each of the six windows, which would be a total of 24 hoses (as AFD discloses) all deployed from one side. Having 24 hose guides

on one side indicates deployment of all of the hoses out of the sidewall of the trailer that is shown.



2. AFD's hoses do not indicate an aisle walkway.

197. In the first photo of AFD's trailer, copied and annotated below, the hoses come out of the trailer below the floorline. There is a set of stairs between the main trailer and the control room. The stairs lead to a floor, which is apparent from an item sitting on the floor, which appears to be a box. Thus, the top stair is indicative of a floorline (the level at which the floor is positioned). The hoses exit from the side of the trailer at locations that are below the floorline. [Ex. 1007].



198. Such an exit location indicates to a POSITA that the hoses run beneath the floor of the trailer. With the hoses running beneath the floor of the trailer, there would have been no tripping hazard within the trailer as alleged by Dr. Durham at paragraph 278 of his report. to directly refute Dr. Durham's contention, a POSITA would have recognized that arranging the reels along only one wall would not have resulted in a tripping hazard or have obstructed any exit route in AFD.

199. At the very least, the hoses of AFD do not necessitate that the reels are on opposed sides of the trailer. Accordingly, AFD's hoses do not indicate that there is an aisle walkway.

3. AFD's hoses do not require that there must be an aisle walkway down the middle of the trailer for maintenance and safety

200. Petitioner has failed to provide any explanation of how an aisle walkway down the middle of the trailer in AFD is necessarily present from the depicted configuration of hoses -- or anything else in AFD for that matter.

201. Instead, at best, Petitioner has merely alleged that it is possible that there could be an aisle walkway down the middle. I understand that this is not enough to establish that a feature is inherent (i.e., necessarily present) in a prior art reference.

202. Further, in Dr. Durham's deposition, he admitted the disclosure of AFD does not necessitate having two rows of reels inside the trailer. He further admitted the AFD disclosure does not necessitate any type of aisleway inside the trailer either. [Ex. 2012 – Pages 56 and 57]. I agree with these admissions, as neither two rows of reels nor an aisleway are necessarily present in AFD, and AFD does not show how the reels are arranged inside.

203. Indeed, a POSITA would have recognized that an aisle walkway down the middle of the trailer would not be needed for maintenance and safety. Replacement of reels, attachment of the hoses, and the operation of the reels to retract the hoses would only require access to the reels, not that there is an aisle walkway down the middle of the trailer.

204. Reels deployed on opposing sides of an aisle walkway adjacent to the sidewalls would impede access to the reels for maintenance and repairs, because

only one side of the reels facing the aisle would be accessible since the other side would back to the trailer sidewall and thus be inaccessible. Accordingly, maintenance and safety do not require an aisle walkway, let alone one that is “down the middle of the trailer” as claimed.

205. I understand Petitioner also contends that AFD's stairs and flap for access to the main body of the trailer would be interpreted by a POSITA to mean that AFD has an aisle walkway down the middle (Petition at 65). I disagree with this contention.

206. It is my opinion that Petitioner has read too much into the presence of the flap and the stairs. A POSITA would have recognized that the presence of stairs and a flap does not require that there be an aisle walkway down the middle of the trailer.

207. Instead, the stairs and flap at best suggest that there might be access to the main trailer body. Even if there is access, mere access does not require any specific arrangement in the trailer, let alone an aisle walkway down the middle. Further, since the control room is elevated, the most evident reason for the stairs to a POSITA would have been to provide access to AFD's control room, rather than suggesting any particular kind of access to the main trailer.

208. Simply put, AFD does not show an aisle walkway in its trailer, and nothing that AFD actually does show requires an aisle walkway in its trailer.

4. An aisle walkway down the middle of the trailer is not obvious from Van Vliet.

209. As discussed above with respect to Ground 2, Van Vliet does not disclose or render obvious an aisle walkway down the middle of a trailer.

5. The challenge to claims 7-10 should be dismissed for additional reasons.

210. Claim 7 recites “wherein the mobile trailer includes trailer end wall that has an outside door, an inside wall that defines first and second compartments in the mobile trailer, the outside door opening into the first compartment, and at least the manifolds and the reels are in the first compartment.”

211. I understand that Petitioner alleges the flap in AFD maps to the outside door. [Petition at 66]. Per claim 7, it is the trailer end wall that has the outside door. Petitioner has failed in its challenge to claim 7 to identify a trailer end wall or explain how a flap is considered to be a door in that end wall, especially since AFD does not show any wall where the flap is located.

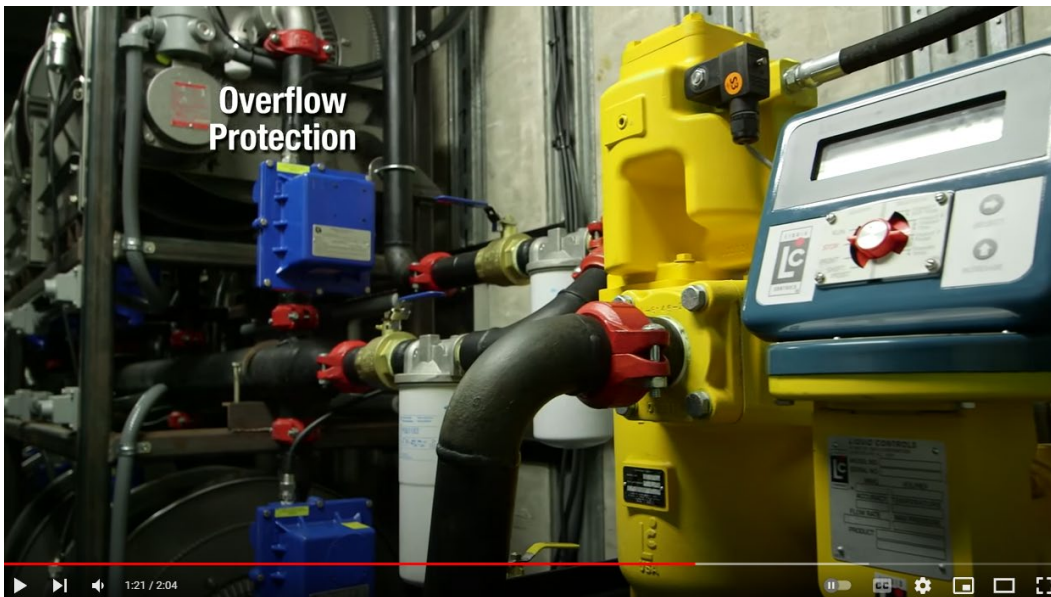
212. Further, Petitioner fails to even mention the claimed “inside wall that defines first and second compartments in the mobile trailer” in its analysis. Petition at 66. Lastly, Petitioner alleges that AFD’s control room maps to the claimed second

compartment. However, Petitioner fails to explain how the control room is “in the mobile trailer,” particularly when it is an “inside wall” that defines the second compartment “in the mobile trailer.” The AFD control room appears to be a completely isolated room that shares no common wall with the first compartment.

213. In view of at least the above, a POSITA would not understand the control room of AFD to be “in” the trailer or to be a compartment that is defined by an inside wall because, from the photo in AFD, the control room is outside of the trailer from which the hoses deploy.

XIII. SECONDARY CONSIDERATIONS

214. Based on my physical inspection of a FAS Unit and review of publicly available information on the FAS Unit (<https://www.youtube.com/watch?app=desktop&v=pl6NjmFUDHc>), the FAS Unit includes each and every limitation of at least the independent claims (1 and 17) of the '805 Patent. The FAS Unit I inspected in person is similar in all relevant ways (to the patent claim terms) to the FAS Unit depicted in the video cited above and screenshotted below.



(Screenshot showing FAS Unit manifolds and reels with fluid passage connected to the manifolds; source: <https://www.youtube.com/watch?app=desktop&v=pl6NjmFUDHc>)



(Screenshot showing FAS Unit manifolds and reels with fluid passage connected to the manifolds; aisle walkway between reels; source: <https://www.youtube.com/watch?app=desktop&v=pl6NjmFUDHc>)



(Screenshot showing FAS Unit having a first group of the hoses are deployable from the first trailer side wall and a second group of the hoses are deployable from the second trailer side wall; source: <https://www.youtube.com/watch?app=desktop&v=pl6NjmFUDHc>)

XIV. CONCLUSION

215. I understand and have been warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001). I 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 § 1001 of title 18 of the United States Code.

216. I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in black ink, appearing to read "J. Rodgers", is written over a horizontal line.

By: John Rodgers

Dated: 5/31/2024

APPENDIX A

Flow Calculations

5/28/2024

<https://energy-models.com/pipe-sizing-charts-tables>

<https://ntrs.nasa.gov/api/citations/19660024205/downloads/19660024205.pdf>

Assumptions:

1. Turbulent flow regime

2. Fluid properties

Fluid: diesel at 60 de specific gravity 0.88
dyn viscosity ft^2/s 4.31E-05

Schiller Darcy-Weisbach eqn
 $0.0054 + 0.396/R \cdot dP = f \cdot L \cdot \rho / 2 \cdot v^2 / D$

total flow rate, gpm 11.5
max duty cycle 50%
total fuel per 12 hrs gal 4100
Number of hoses 3
hose flow rate, gpm 3.8
P max psi 155

	Part	ID , in.	Length (ft)	L/D	velocity, ft/s	Re (vD/nu)	f	dP (psi)	total P (psi)	Notes
A	filter	2.00			0.39	1.52E+03	0.049	3.59		dP approximation per FAS
	manifold to reel	2.00	10.00	60.00	0.39	1.52E+03	0.049	0.00		
	manifold	4.00	30.00	90.00	0.10	7.58E+02	0.060	0.00		
	manifold welded tee	2.00		45.00	0.39	1.52E+03	0.049	0.00		
	elbow	2.00		45.00	0.39	1.52E+03	0.049	0.00		
	elbow	2.00		45.00	0.39	1.52E+03	0.049	0.00		
	hose	1.00	200	2400.00	1.57	3.03E+03	0.041	1.43	5.04	
B	filter	2.00			0.39	1.52E+03	0.049	3.59		dP approximation per FAS
	manifold to hose	1.00	6.00	72.00	1.57	3.03E+03	0.041	0.04		
	elbow	0.50		45.00	6.26	6.06E+03	0.034	0.36		
	hose	0.38	200	6400.00	11.14	8.08E+03	0.032	150.57	154.56	

Flow Calculations

5/28/2024

J. Rodgers

	Typical	Large	Superfrac
Peak Fuel Consumption (gal) per 12 hr.	7500	12000	24000
Avg Flow Rate (gpm)	10	17	33
Avg. Duty Cycle	90%	90%	90%
Total flow rate required (gpm)	12	19	37
Avg. Duty Cycle	50%	50%	50%
Total flow rate required (gpm)	21	33	67

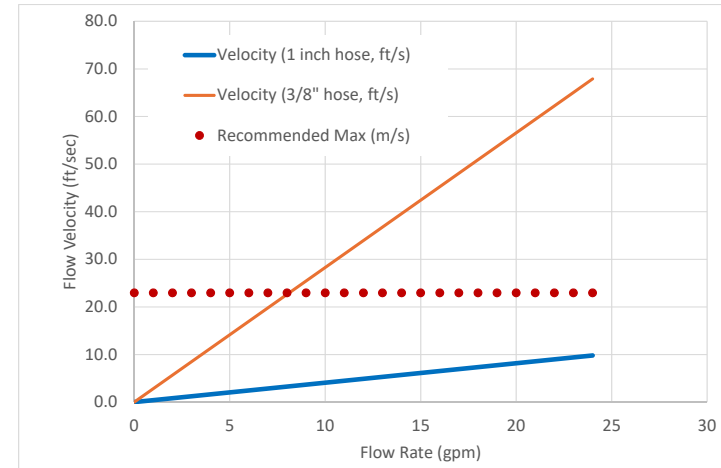
per information from FAS

assumed start-up and shut-down time required, max duty cycle achievable

comfortable duty cycle for nominal operations

Flow Calculations
5/28/2024

Flow Rate (gpm)	Velocity (1 inch hose, ft/s)	Velocity (3/4 inch hose, ft/s)	Velocity (1/2 inch hose, ft/s)	Velocity (3/8" hose, ft/s)	Recommended Max (m/s)	
0	0.0	0.0	0.0	0.0	0.0	23
1	0.4	0.7	1.6	2.8	2.8	23
2	0.8	1.5	3.3	5.7	5.7	23
3	1.2	2.2	4.9	8.5	8.5	23
4	1.6	2.9	6.5	11.3	11.3	23
5	2.0	3.6	8.2	14.1	14.1	23
6	2.5	4.4	9.8	17.0	17.0	23
7	2.9	5.1	11.4	19.8	19.8	23
8	3.3	5.8	13.1	22.6	22.6	23
9	3.7	6.5	14.7	25.5	25.5	23
10	4.1	7.3	16.3	28.3	28.3	23
11	4.5	8.0	18.0	31.1	31.1	23
12	4.9	8.7	19.6	33.9	33.9	23
13	5.3	9.4	21.2	36.8	36.8	23
14	5.7	10.2	22.9	39.6	39.6	23
15	6.1	10.9	24.5	42.4	42.4	23
16	6.5	11.6	26.1	45.3	45.3	23
17	6.9	12.3	27.8	48.1	48.1	23
18	7.4	13.1	29.4	50.9	50.9	23
19	7.8	13.8	31.0	53.7	53.7	23
20	8.2	14.5	32.7	56.6	56.6	23
21	8.6	15.3	34.3	59.4	59.4	23
22	9.0	16.0	35.9	62.2	62.2	23
23	9.4	16.7	37.6	65.1	65.1	23
24	9.8	17.4	39.2	67.9	67.9	23



Flow Calculations

5/28/2024

Hose Size (in)	1	0.38
Hose length (ft)	200	700
Hose volume (gal)	8.2	4.1