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 No. IPR2023-01236
Patent 10,815,118

DECLARATION OF DR. ROBERT DURHAM
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,815,118

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I, Robert A. Durham, Ph.D., hereby declare as follows:

I. INTRODUCTION

1. My name is Dr. Robert A. Durham. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2. I have been asked to provide technical assistance in the *inter partes* review of U.S. Patent No. 10,815,118, which I may abbreviate as "the '118 Patent" or refer to as the "Challenged Patent." This declaration is a statement of my opinions on issues related to the unpatentability of claims of the '118 Patent. I am being compensated at my normal hourly rate for my analysis, plus reimbursement for expenses. My compensation does not depend on the content of my opinions or the outcome of this proceeding.

II. EXPERIENCE AND QUALIFICATIONS

3. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art. My qualifications are stated more fully in my curriculum vitae, which has been provided as EX1002. My CV also lists publications on which I am a named author and identifies parties on behalf of whom I have previously provided expert testimony within the past four years. Here, I provide a summary of my qualifications.

4. I am a consulting engineer with experience in several technical areas. I have expertise in the electrification of the oil and gas industry from drilling and completion to downstream. I have been working with oil field production companies, refining and chemical plants and equipment manufacturers and technology development companies, as a consultant, for nearly twenty years. My work relates to the subject matter of the Challenged Patent, which I describe below in Section VII ("Overview of the Challenged Patent").

5. I received my Bachelor of Science in Electrical Engineering and Master of Engineering and Technology Management degrees, from the University of Tulsa in 1992 and 1997, respectively. After years of professional work and research I received my Ph.D. in Engineering Management from Kennedy Western University in 2004.

6. I have also served in positions of leadership in the Petroleum and Chemical Industry Committee (PCIC) of the Institute of Electrical and Electronics Engineers (IEEE) for nearly twenty years. IEEE is the world's largest technical professional association. The PCIC is the premier forum for the exchange of electrical applications technology related to the petroleum and chemical industry. From 2005–2012, I served as secretary, then vice chair and then ultimately chair of the Production Subcommittee of the PCIC. The Production Subcommittee is the primary method for PCIC members to communicate technical papers related to

drilling, well head and facilities operations of oil and gas wells. In 2013, I was appointed as Vice-Chair of the Standards Subcommittee of the PCIC, a role which transitioned to Chair in 2014. I served as chair until 2022, at which time I transitioned to an executive role in the PCIC. The Standards subcommittee of the PCIC is the Sponsor of IEEE standards relating to electrification and electrical equipment operations in the Oil and Gas Industry. The PCIC Standards Subcommittees sponsors nearly 50 electrical and oil and gas related standards.

7. My peers have recognized my contributions, particularly in the area of electrical equipment in the oil and gas industry. Because of this recognition, in 2019 I was elevated to the grade of Fellow of the IEEE for "contributions to submersible electrical equipment analysis and multi-point ground methods in hazardous petroleum and chemical environments." The IEEE Fellow grade is limited to the top 0.1% of the membership of IEEE worldwide.

8. I have worked directly in the area of electrification of oil and gas fields both as an employee and as a consulting engineer. From 2000 until the end of 2002, I was employed as Manager of Electric Infrastructure for New Dominion, LLC (NDL). In that capacity I administratively owned and was responsible for all electrical equipment including overhead power lines, transformers, switchgear, drives and motors throughout NDL's production, exploration and drilling areas.

9. After a brief stint as Vice President for EDG Power Group, responsible for Engineering and Project Management of generation and co-generation facilities across the U.S., I transitioned to the role of consulting engineer. In that role I have served as consulting engineer relating to the design, construction and analysis of all kinds of power systems, especially those in the oil and gas industry. This has included not only design and selection of equipment but also analysis of failures of equipment in the oil and gas field from drilling/completion sites to production facilities, midstream and downstream (refinery) locations.

10. In addition, I am a principal of PEDOCS, Inc., an oil and gas production company operating over 50 oil and gas production wells in Oklahoma. As such, I am familiar with operations of oil and gas wells including well stimulation, completion, hydraulic fracturing and production.

11. I have been familiar with oil and gas drilling, fracturing (fracking) and completion operations for over twenty years. In addition to being responsible for interfacing with drilling and fracturing operations with regards to electrical needs as an employee of New Dominion, LLC, I have been further educated about drilling, fracturing and operations as I have consulted and investigated incidents on multiple well drilling, fracturing and completion pad sites over my engineering consulting engagements.

12. I have been familiar with power distribution, including generation transmission and distribution equipment. As an employee I worked as a design and construction engineer for generation facilities for Central and Southwest (now American Electric Power AEP). I was also responsible for design and construction of generation facilities when employed by EDG Power Group, as discussed above. While at AEP, I spent three years as a transmission planner, responsible for modeling transmission systems and developing plans for increased power distribution capacities at high voltages. While at New Dominion LLC, I owned and was responsible for design, construction and maintenance of several hundred miles of medium voltage (5 – 25 kV) distribution lines, switchgear, drives and motors used for oil and gas drilling, completion and production. Over the last ~ 20 years I have consulted with numerous clients ranging from utilities to oil and gas development and production companies on the design, upgrades and maintenance of generation and power distribution facilities.

13. I have been familiar with Occupational Safety and Health Administration ("OSHA") and its responsibilities at oil and gas locations. I have consulted and investigated incidents on multiple oil and gas sites where OSHA has also performed investigations regarding injuries and fatalities that have occurred at oil and gas locations, including drilling, fracturing and completion operations. As Principal Scientist of THEWAY Labs, part of my responsibilities includes

overseeing the Health Safety and Environmental (HSE) program at THEWAY Labs, including establishing policies and procedures commensurate with OSHA requirements at all locations, including requirement for oil and gas sites.

14. I am the author or co-author of over fifty published papers and five books. A list of publications that I have authored over the last thirty years is included in my professional CV, which is attached as EX1002.

15. Therefore, based on my education, professional experience of 30 years, and scholarly books and publications, I am an expert in the relevant field of the Challenged Patent at issue (as explained further in Section IX) and have been an expert in this field since before the Challenged Patent was filed with the United States Patent and Trademark Office ("USPTO"). I am familiar with how a person having ordinary skill in the art would have understood and used the terminology found in the '118 Patent at the time of its filing.

III. TASK SUMMARY AND MATERIALS REVIEWED

16. I have been asked to review the Challenged Patent and its prosecution history, to provide an understanding of the technology relevant to the Challenged Patent, to review certain prior-art references, and to analyze whether those references disclose or teach limitations of claims from the Challenged Patent. The opinions stated in this declaration are from the perspective of a person of ordinary skill in the art (POSITA).

IV. LIST OF EXHIBITS

17. In forming my opinions, I have reviewed the Challenged Patent, its prosecution history and references cited by the Examiner, the materials cited in the List of Exhibits, and the materials cited throughout my declaration.

Exhibit #	Description
EX1001	U.S. Patent No. 10,815,118 to Shock ("the **'118 Patent**")
EX1002	CV of Dr. Robert A Durham, PE, FIEEE
EX1003	Expert Declaration of Dr. Robert A Durham, PE, FIEEE
EX1004	U.S. Patent Pub. No. 2011/0197988 to Van Vliet et al. ("***Van Vliet***")
EX1005	Coxreels 1125 Series Hand Crank and Motorized Hose Reels, https://web.archive.org/web/20140408035634/http://www.coxreels.com/products/hand-crank/1125-series (Apr. 08, 2014) ("***Coxreels***")
EX1006	U.S. Patent No. 7,819,345 to Shoap ("***Shoap***")
EX1007	CLAMPS Accessories, https://web.archive.org/witeb/20130702084457/http:/www.hosecraftusa.com/accessory-category/Hose_Clamps (Jul. 02, 2013) ("***Hosecraft***").
EX1008	File History of '118 Patent
EX1009	Affidavit of Internet Archive Representative (applicable to *Coxreels*)
EX1010	Affidavit of Internet Archive Representative (applicable to *Hosecraft*)
EX1011	Claim Listing
EX1012	Intentionally Omitted
EX1013	Intentionally Omitted
EX1014	U.S. Patent Pub. No. 2007/0181212 to Joe Fell ("*Fell*")
EX1015	U.S. Patent Pub. No. 2008/0223482 to Dagmar Hockner ("*Hockner*")
EX1016	Michael Morton, "Unlocking the Earth: A Short History of Hydraulic Fracturing," GEO ExPro, Vol. 10, No. 6, December 2013 (https://geoexpro.com/unlocking-the-earth-a-short-history-of-hydraulic-fracturing/) (last accessed July 17, 2023)
EX1017	Frac Shack "Technology" Page, https://web.archive.org/web/20150711214455/http:/www.fracshack.com/technology) (archived on July 11, 2015) (last accessed July 17,

	2023)
EX1018	Intentionally Omitted
EX1019	B.A. Wells and K.L. Wells. "Shooters – A "Fracking" History." American Oil & Gas Historical Society, (https://aoghs.org/technology/hydraulic-fracturing) (last accessed July 17, 2023)
EX1020	Intentionally Omitted
EX1021	Intentionally Omitted
EX1022	schematic, Vocabulary.com, https://www.vocabulary.com/ dictionary/schematic (accessed June 29, 2023).
EX1023	Bourgoyne, A. T., Jr., K. K. Millheim, M. E. Chenevert and F. S. Young, Jr. (1986). Applied Drilling Engineering, Society of Petroleum Engineers
EX1024	Vassiliou, M. S. (2018), Historical dictionary of the petroleum industry, Rowman & Littlefield
EX1025	U.S. Patent Application Publication No. 2013/0306322 to Sanborn *et al.* entitled "System and Process for Extracting Oil and Gas by Hydraulic Fracturing" ("*Sanborn*")
EX1026	U.S. Patent Publication No. 2012/0255734 to Coli *et al.* ("*Coli*") entitled "Mobile, Modular, Electrically Powered System for Use in Fracturing Underground Formations"
EX1027	U.S. Patent No. 4,187,962 to Henry *et al.* ("*Henry*")
EX1028	Excerpts from Prosecution History of U.S. Patent App. 15/290304
EX1029	U.S. Patent No. 10,882,732 to Haile *et al.* ("*Haile*")
EX1030	Archived Designation Ltd. Website, http://web.archive.org/web/20160818200712/http://www.desihose.com/default.aspx , (archived on August 18, 2016) (last accessed on August 4, 2023).
EX1031	Archived Designation Ltd. Website, Brent Oil/Fuel Hose, http://web.archive.org/web/20160713193942/http://www.desihose.com/viewproduct.aspx?pid=192 , (archived on July 13, 2016) (last accessed on August 4, 2023).
EX1032	Archived Rhino Sleeve Website, http://web.archive.org/web/20161025131730/http://www.rhinosleeve.com/ , (archived on October 25, 2016) (last accessed on August 4, 2023).
EX1033	Archived Rhino Sleeve Website, HT Rhino Sleeve HT, http://web.archive.org/web/20180815044032/http://rhinosleeve.com/rhino-sleeve-ht/ , (archived on August 15, 2018) (last accessed on

	August 4, 2023).
EX1034	Archived Rhino Sleeve PDF Spec Sheet, http://web.archive.org/web/20180815043704/http://rhinosleeve.com/wp-content/uploads/2018/05/rhino-sleeve-ht-2-3-26may2018.pdf , (archived August 15, 2018) (last accessed on August 4, 2023).
EX1035	Archived Coxreels Website, Oil, http://web.archive.org/web/20151225184335/http://www.coxreels.com/industries/oil/ , (archived on December 25, 2015) (last accessed on August 4, 2023).
EX1036	Archived Hosecraft U.S.A. Home Page, https://web.archive.org/web/20130630092921/http://www.hosecraftusa.com/ , (archived on June 30, 2013) (last accessed on August 4, 2023).

18. All citations to exhibits reference original page numbers found in the underlying document, and all emphases are added unless otherwise noted.

V. SUMMARY CONCLUSIONS AND GROUNDS FOR CHALLENGE

19. After reviewing the materials identified in the List of Exhibits, I have concluded that each of the challenged claims of the ’118 Patent would have been obvious to a person of ordinary skill in the art, based on the following grounds:

Ground	’118 Claims	Summary
1	1-3	Anticipated and/or rendered obvious by *Van Vliet*
1A	1-3	Obvious over *Van Vliet* in view of *Coxreels*
2	4-18	Obvious over *Van Vliet* in view of *Shoap*
2A	4-9, 15-18	Obvious over *Van Vliet* in view of *Coxreels* further in view of *Shoap*
3	12-13	Obvious over *Van Vliet* in view of *Shoap* further in view of *Hosecraft*

VI. LEGAL STANDARDS

A. Level of Ordinary Skill in the Art

20. When interpreting a patent, I understand that it is important to identify the relevant art pertaining to the patent-in-suit as well as the level of ordinary skill in that art at the time of the claimed invention. The “art” is the field of technology to which the patent is related.

21. I have been instructed by counsel that the person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art. I understand that the actual inventor’s skill is not determinative of the level of ordinary

skill. I further understand that the factors that may be considered in determining the level of skill include: the types of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field. I understand that not all such factors may be present in every case, and one or more of them may predominate.

B. Legal Standard for Claim Construction

22. I understand that the first step in determining whether a patent claim would have been anticipated or obvious is to ascertain how a POSITA would have understood the claim terms.

23. I have been instructed by counsel on the law regarding claim construction and patent claims, and I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim, or it can further depend from another dependent claim. I understand that a dependent claim includes all the limitations that it recites, in addition to all the limitations recited in the claim(s) from which it depends.

24. It is my understanding that in proceedings before the USPTO, the claims of a patent are to be construed under what is referred to as the "Phillips standard." I understand that this means that claim terms of a patent are given the

meaning the terms would have to a POSITA, in view of the description provided in the patent itself and the patent's file history.

25. I understand that to determine how a person of ordinary skill would have understood a claim term, one should look to those sources available that show what a person of skill in the art would have understood the disputed claim language to mean. I understand that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent, and the patent's prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

26. I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, the claims, the remainder of the patent, and the prosecution history are of paramount importance. Additionally, the patent and its prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (*i.e.*, provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

27. In comparing the claims of the Challenged Patent to the prior art, I have considered the Challenged Patent and its file history considering the understanding of a person of skill at the time of the alleged invention.

C. Anticipation

28. It is my understanding that the claims of a patent are anticipated by a prior art reference if each and every element of the claim is found either explicitly or inherently in a single prior art reference or system. I understand that inherency requires a showing that the missing descriptive matter in the claim is necessarily or implicitly present in the allegedly anticipating reference, and that it would have been so recognized by a POSITA. In addition, I understand that an enabling disclosure is a disclosure that allows a POSITA to make the invention without undue experimentation. Although anticipation typically involves the analysis of a single prior art reference, I understand that additional references may be used to show that the primary reference has enabling disclosure, to explain the meaning of a term used in the primary reference, and/or to show that a characteristic is inherent in the primary reference.

D. Obviousness

29. I understand that the prior art may render a patent claim "obvious." I understand that two or more prior art references (*e.g.*, prior art articles, patents, or publications) that each disclose fewer than all elements of a patent claim may

nevertheless be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and one of ordinary skill in the art at the time would have been motivated or had sufficient rationale to combine the prior art in such a way. I understand that this rationale or motivation to combine need not be explicit in any of the prior art but may be inferred from the knowledge of one of ordinary skill in the art at the time the patent was filed. I also understand that one of ordinary skill in the art is not an automaton but is a person having ordinary creativity. I further understand that one or more prior art references, articles, patents, or publications that disclose fewer than all the elements of a patent claim may render a patent claim obvious if including the missing element would have been obvious to one of skill in the art (*e.g.*, the missing element represents only an insubstantial difference over the prior art or a reconfiguration of a known system).

30. I understand that under the doctrine of obviousness, a claim may be invalid if the differences between the invention and the prior art are such that the subject matter would have been obvious at the time the invention was made to a POSITA to which the subject matter pertains.

31. To assess obviousness, I understand that I am to consider the scope and content of the prior art, the differences between the prior art and the claim, the level of ordinary skill in the art, and any secondary considerations to the extent they exist.

32. I understand that any evidence of secondary indicia of non-obviousness should be considered when evaluating whether a claimed invention would have been obvious to one of ordinary skill at the time of invention. These secondary indicia of non-obviousness may include, for example:

- a long felt but unmet need in the prior art that was satisfied by the claimed invention;
- commercial success of processes claimed by the patent;
- unexpected results achieved by the invention;
- praise of the invention by others skilled in the art;
- the taking of licenses under the patent by others; and
- deliberate copying of the invention.

33. I understand that there must be a nexus between any such secondary indicia and the claimed invention.

34. It is also my understanding that there are additional considerations that may be used as further guidance as to when the above factors will result in a finding that a claim is obvious, including the following:

- the claimed subject matter is simply a combination of prior art elements according to known methods to yield predictable results;
- the claimed subject matter is a simple substitution of one known element for another to obtain predictable results;
- the claimed subject matter uses known techniques to improve similar devices or methods in the same way;

- the claimed subject matter applies a known technique to a known device or method that is ready for improvement to yield predictable results;
- the claimed subject matter would have been "obvious to try" choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- there is known work in one field of endeavor that may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a POSITA;
- there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims; and
- there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed subject matter.

35. Finally, I understand that a claim may be deemed invalid for obviousness in light of a single prior art reference, without the need to combine references, if the elements of the claim that are not found in the reference can be supplied by the knowledge or common sense of one of ordinary skill in the relevant art.

E. Priority Date

36. I understand that, subject to the next paragraph, the asserted "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.

37. I understand that it is not enough for a patent to merely claim the benefit of an earlier-filed application, but that additional criteria must be met. In particular, the prior application itself must describe the claimed invention, and must do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought. First, I understand that a priority-date analysis is on a claim-by-claim basis. Second, I understand that, in order for a patent claim to be entitled to the filing date of an earlier patent application, a "Section 112 analysis" must be conducted. I am informed that a "Section 112" analysis encompasses looking to the earlier patent application and ascertaining whether that earlier patent application meets both the written-description and enablement requirements as of the filing date of the earlier application. I understand that it is not enough that the claim would have been obvious from the earlier application, but that application itself must describe the claimed invention.

38. I understand that in order to satisfy the written description requirement the earlier application must reasonably convey to those skilled in the art that the inventors had possession of the subject matter of the patent as of the filing date of the earlier application. I have been informed that it is the disclosures of the earlier patent application that count, and that while the meaning of terms, phrases, or diagrams in the earlier patent application must be interpreted from the vantage point of one skilled in the art, all the claimed limitations must appear in the specification.

Further, I understand that this analysis is not a question of whether one skilled in the art might be able to construct the claimed invention from the teachings of the disclosure. The question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification; rather, I understand that an earlier application must itself describe each of the claim limitations.

39. I also understand that in order to satisfy the enablement requirement, the earlier application must enable a person of ordinary skill in the art to practice the claimed invention without undue experimentation.

F. Burden of Proof

40. I understand that a party alleging a patent claim is invalid (including by obviousness) bears the burden of proof by "clear and convincing evidence." I have been informed that clear and convincing evidence means evidence that produces a firm belief or conviction as to truth of the matter sought to be established. I have further been informed that the parties submitted that clear and convincing evidence is evidence that is so clear, direct, weighty and convincing as to enable one to come to a clear conviction without hesitancy.

VII. OVERVIEW OF THE CHALLENGED PATENT

41. I have reviewed U.S. Patent No. 10,815,118 ("the '118 Patent"), which is entitled "Mobile Distribution Station Having Sensor Communication Lines

Routed With Hoses."[1] I understand that the application which led to the '118 patent (Appl., No. 16/148,403, the "'403 application") was filed on October 1, 2018, and that the '118 Patent was issued on Oct. 27, 2020.[2] I understand that the '118 Patent claims priority to Application No. 15/290,304 filed on Oct. 11, 2016 (issued as U.S. Patent No. 10,087,065, the "'065 Patent"). I understand that Petitioners, for purposes of the Petition, assume the Oct. 11, 2016 filing date of the parent application as the priority date of the '118 Patent. Regardless of whether a priority date of Oct. 1, 2018 or Oct. 11, 2016 is applied, my opinions remain the same.

A. Summary of Subject Matter

42. The '118 Patent describes a distribution station for distributing fuel or other fluids to equipment at a hydraulic fracturing site.[3] The '118 Patent includes a section entitled "Background."[4] The Background section discusses several known aspects of hydraulic fracturing, including the process of "hot-refueling" during fracturing operations:[5]

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[1] EX1001, Title.

[2] EX1001, Cover.

[3] EX1001, 1:28-37, 1:66-2:10.

[4] EX1001, 1:28-37, 1:66-2:10.

[5] EX1001, 1:13-24.

> Hydraulic fracturing (also known as fracking) is a well stimulation process that utilizes pressurized liquids to fracture rock formations. Pumps and other equipment used for hydraulic fracturing typically operate at the surface of the well site. The equipment may operate until refueling is needed, at which time the equipment may be shut-down for refueling. Shut-downs are costly and reduce efficiency. More preferably, to avoid shut-downs fuel is replenished in a hot-refueling operation while the equipment continues to run. This permits fracking operations to proceed continuously. However, hot-refueling can be difficult to reliably sustain for the duration of the fracking operation.

43. More specifically, the ’118 Patent is directed to a distribution station having a pump, manifolds, reels, and hoses located on a mobile trailer.[6] The ’118 Patent discusses that it was known that hydraulic fracturing equipment operates semi-continuously and that, in order to reduce unwanted shutdowns, it was known to “hot-refuel” the equipment, or to re-fuel the equipment while it was still running.[7] A known problem of hot-refueling, according to the ’118 Patent, was that “hot-refueling can be difficult to reliably sustain for the duration of the fracking

[6] EX1001, 1:28-37.

[7] EX1001, 1:19-22.

operation."[8] The '118 patent purports to solve this problem by combining known components, such as a mobile trailer, a pump, manifolds, a plurality of reels, a plurality of hoses (including wired hoses), a plurality of valves, a plurality of fluid level sensors, and a controller, among others, according to their known functions.[9]

B. The Challenged Claims of the '118 Patent

44. The challenged claims of the '118 Patent, which are Claims 1-18, are set forth below. Some of the claim elements have been further sub-divided for ease of reference.

Claim #	Claim Element
1(pre)	A distribution station comprising:
1(a)	a mobile trailer;
1(b)	a manifold on the mobile trailer and connected with the pump;
1(c)	a plurality of reels on the mobile trailer;
1(d)	a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels;
1(e)	a plurality of hoses, each said hose being connected with a respective one of the flow passages via a respective one of the reels;
1(f)	a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the reels and being operable to control fluid flow through a respective one of the flow passages;

[8] EX1001, 1:23-24.

[9] EX1001, 1:28-37; *see also id.*, Claims 1-18.

1(g)	a plurality of fluid level sensors, each aid fluid level sensors being connected or connectable with a respective different one of the hoses; and
1(h)	a controller configured to operate the valves responsive to fluid level thresholds to control fluid flow to the hoses.
2	The distribution station as recited in claim 1, wherein the controller is configured to determine fluid levels based on signals from the fluid level sensors and determine whether one or more of the fluid levels are below one or more of the fluid level thresholds.
3	The distribution station as recited in claim 2, wherein the controller is configured to open the valves for which the fluid levels are below the fluid level thresholds.
4	The distribution station as recited in claim 2, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors, and each said sensor communication line being routed with a respective different one of the hoses.
5	The distribution station as recited in claim 4, wherein each of the hoses includes a tube and a sleeve that circumscribes the tube, and each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve.
6	The distribution station as recited in claim 5 wherein each said sensor communication line is routed through a respective different one of the reels.
7	The distribution station as recited in claim 6 further comprising a plurality of connectors, each of the connectors being mounted on a respective different one of the reels and each of the connectors receiving a respective different one of the sensor communication lines.
8	The distribution station as recited in claim 7, wherein each of the reels includes a respective spindle, and each of 10 the sensor communication lines is routed through a respective different one of the spindles.

9	The distribution station as recited in claim 8, wherein controller is operable to open and close the plurality of valves responsive to a fuel level threshold.
10(pre)	A distribution station comprising:
10(a)	a mobile trailer;
10(b)	a pump on the mobile trailer
10(c)	a manifold on the mobile trailer and connected with the pump
10(d)	a plurality of reels on the mobile trailer;
10(e)	a plurality of hoses, each said hose being connected with the manifold and each said hose including a tube and a sleeve that circumscribes the tube;
10(f)	a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the hoses and being operable to control fluid flow from the manifold to the respective different one of the hoses;
10(g)	a plurality of fluid level sensors, each aid fluid level sensors being connected or connectable with a respective different one of the hoses; and
10(h)	a controller configured to operate the valves responsive to fluid level thresholds to control fluid flow to the hoses.
11	The distribution station as recited in claim 10 wherein the sleeve is a fabric sleeve.
12	The distribution station as recited in claim 10, further comprising bands around the hoses, the bands securing the sleeve on the tube.
13	The distribution station as recited in claim 12, wherein the bands are steel.
14	The distribution station as recited in claim 10, further comprising a communication line between the sleeve and the tube.
15(pre)	A distribution station comprising:
15(a)	a mobile trailer including a pump,
15(b)	a manifold connected with the pump,

15(c)	reels,
15(d)	flow passages connected to the manifold and running through the reels,
15(e)	hoses connected with the flow passages via the reels
15(f)	and each of the hoses including a tube and a sleeve that circumscribes the tube,
15(g)	valves situated between the manifold and the reels and operable to control fluid flow through the flow passages,
15(h)	fluid level sensors connected or connectable with the hoses,
15(i)	and a controller configured to operate the valves responsive fluid level thresholds to control fluid flow to the hoses.
16	The distribution station as recited in claim 15, wherein the controller is configured to determine fluid levels based on signals from the fluid level sensors, determine whether one or more of the fluid levels are below one or more of the fluid level thresholds, and open the valves for which the fluid levels are below the fluid level thresholds.
17	The distribution station as recited in claim 16, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors.
18	The distribution station as recited in claim 17, wherein each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve.

45. A Claim Listing is included as EX1011.

C. Relevant Prosecution History of the ’118 Patent

46. I have reviewed the prosecution history of the ’118 Patent. Application No. 16/148,403 (the “’403 Application”) was filed on October 1, 2018 with 18

claims (Claim 1 – Claim 18).[10] On August 18, 2020 the examiner issued a Notice of Allowance (NOA),[11] allowing all the filed claims, after one non-final office action.[12] In the NOA, the Examiner stated in the Reasons for Allowance:[13]

…

> [T]he cited documents do not disclose, in combination with the claimed invention as a whole, 'a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels; a plurality of hoses, each said hose being connected with a respective one of the flow passages via a respective one of the reels; a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the reels and being operable to control fluid flow through a respective different one of the reels and being operable to control fluid flow through a respective one of the flow passages.

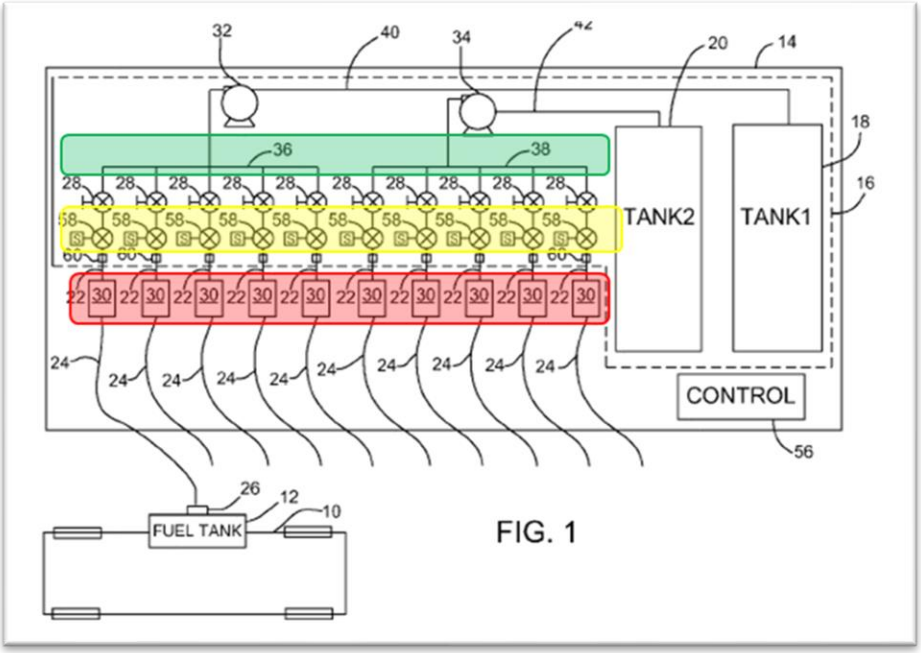
[10] EX1008, 793-796.

[11] EX1008, 16.

[12] EX1008, 72-73.

[13] EX1008, 23-24.

47. However, as explained further in Section XI below, the limitations relied on by the Examiner in allowing the '118 Patent claims were known in the art.[14] For example, *Van Vliet* discloses "a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the reels and being operable to control fluid flow through a respective different one of the reels and being operable to control fluid flow through a respective one of the flow passages":[15]



[14] *See infra* Section XI.

[15] EX1004, FIG. 1 (annotated).

48. As depicted in FIG. 1 above, *Van Vliet* discloses a plurality of valves **58** (annotated in yellow).[16] The fuel delivery system **14** (including valves **58**) is on a mobile trailer.[17] Each of the valves **58** (annotated in yellow) is illustrated schematically downstream of manifold **36** or **38** (annotated in green).[18] Furthermore, each of the valves **58** (annotated in yellow) is illustrated schematically upstream of a respective different one of the reels **30** (annotated in red).[19]

49. Based on this disclosure, a POSITA would have understood that at least *Van Vliet*'s valves **58** are each "situated between the manifold and a respective different one of the reels."[20] Further, *Van* Vliet discloses valves **58** "control fluid flow through the hose **24** [] to permit independent operation of each hose **24**."[21] Further, according to *Van Vliet*, reels **30** reside between valves **58** and hoses **24**.[22] A POSITA would have understood that for valves **58** to control fluid flow to and

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[16] *See* EX1004, FIG. 1.

[17] EX1004, [0008], [0014].

[18] EX1004, FIG. 1.

[19] *See* EX1004, FIG. 1.

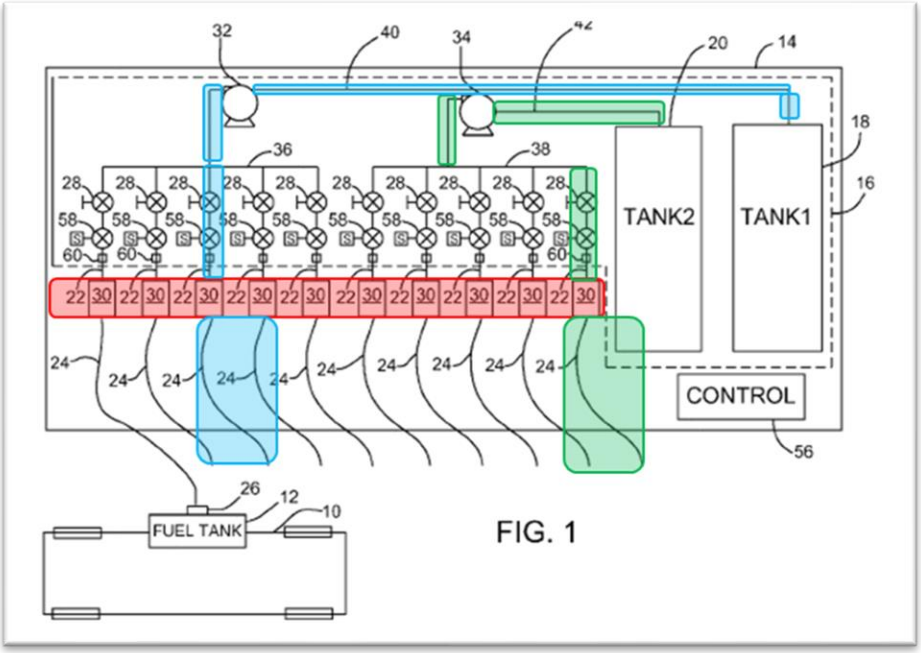
[20] *See* EX1004, FIG. 1.

[21] EX1004, [0015].

[22] EX1004, FIG. 1.

through the hose **24**, the valves **58** would have been operable to control fluid flow through the flow passages that pass through reels **30**, and then to hose **24**.[23] Further, a POSITA would have understood that each of valves **58** control fluid through the respective flow passages so that each hose **14** operates independently.

50. As another example, *Van Vliet* discloses "a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels":[24]



[23] EX1004, FIG. 1, [0015].

[24] EX1004, FIG. 1 (annotated to show reels 30 highlighted in red and example flow paths highlighted in blue and green).

51. In the system shown in *Van Vliet's* FIG. 1, "each tank **18**,**20** is connected to pump **32**, **34** and then to respective manifolds **36**, **38** via lines **40**,**42**."[25] Further, each of hoses **24** is indirectly connected to either manifold **36** or **38** via a fluid outlet **22** and stored on a reel **30.**[26] Fluid flow through the fluid outlet **22** to each hose **24** also may be controlled using valves **28** and/or **58,** dependent on whether the operator uses manual valve operation or electrical valve operation by the controller. Accordingly, based on this disclosure, *Van Vliet* discloses a plurality flow passages connected to the manifold that each include at least: line **40** or **42**; a fluid outlet **22**; and the connections between each set of an outlet **22**, valve **28**, valve **58**, and hose **24** shown in FIG. 1 of *Van Vliet*.

52. Further, as shown above in FIG. 1, each of these flow passages passes through a reel **30**.[27] Indeed, *Van Vliet* states that the hose reels **30** may leak fluid, confirming that the reels include flow passages.[28] Thus, a POSITA would have understood that each of the flow passages of *Van Vliet* pass through the reels **30**.

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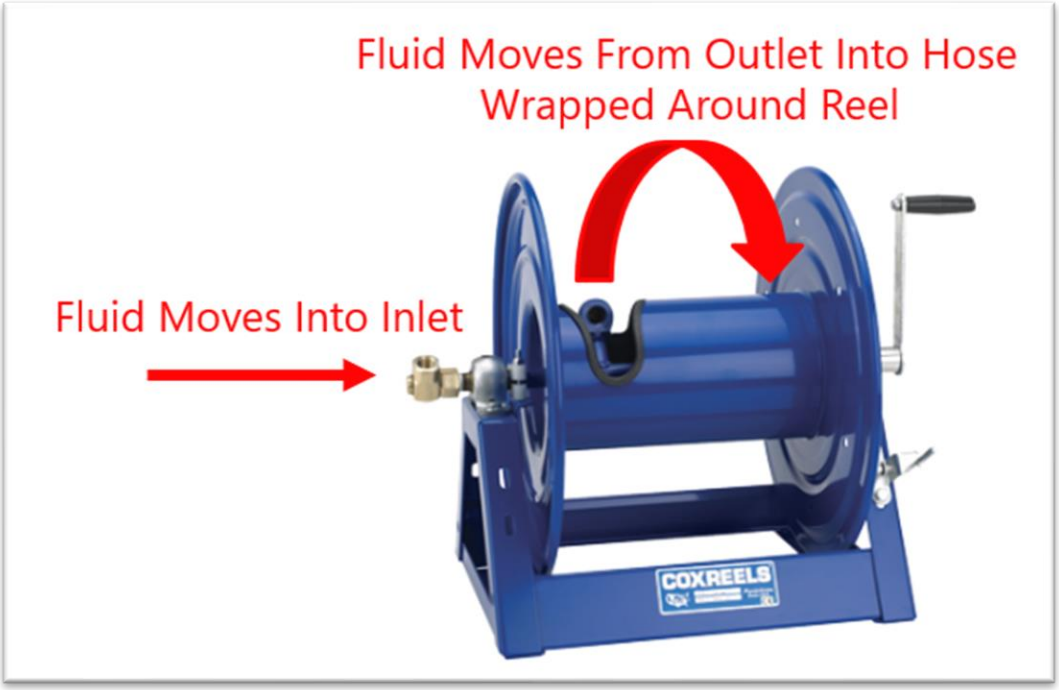
[25] EX1004, [0016].

[26] EX1004, [0015-0016].

[27] EX1004, FIG. 1.

[28] EX1004, [0022] ("The pan or pans may be positioned to catch fluids leaking from each or both manifolds, and hose reels 30.").

53. To the extent that the flow passages in *Van Vliet*'s reels are somehow insufficient, Coxreels 1125 Series Hand Crank and Motorized Hose Reels was made available online at least as early as Apr. 8, 2014 (a full two years before the '118 Patent's claimed priority date of October 11, 2016) as explained in the affidavit of the Internet Archive representative.[29] An example figure showing Coxreels' reel (with a flow passage annotated in red) is depicted below:[30]



[29] *See* EX1009.

[30] EX1005 (excerpted and annotated to show path of fluid).

54. Accordingly, based on the disclosures of *Van Vliet* and *Coxreels*, a POSITA would have understood the ’118 Patent presents no novel or non-obvious advance over the prior art.

D. Claim Construction

55. In my opinion, all the claim terms in the ’118 Patent should be given their plain and ordinary meaning, as a POSITA would have understood them in light of the specification and file history of the ’118 Patent. Except as otherwise noted, I have applied such a plain and ordinary meaning in my analysis of the claims. I reserve the right to offer additional opinions on claim construction in response to arguments that may be made by Patent Owner.

VIII. TECHNOLOGY BACKGROUND

56. In the subsections below, I describe some of the basic aspects of the technology field of the alleged invention of the Challenged Patent that were well-known as of filing.

A. History of Hydraulic Fracturing

57. Fracturing the hydrocarbon bearing formations is a technique that has been used to increase or speed up oil and gas production for nearly as long as oil and gas production has existed. Fracturing methods as early as the 1850’s used

explosives such as gunpowder ignited by red-hot iron or nitroglycerin "torpedoes."[31] Hydraulic fracturing, in its modern form of pumping liquids and proppants (sand) into the formation, began in the 1940s using a process developed by Stanolind Oil and used by Halliburton in the mid-continent region. On March 17, 1949, Stanolind and Haliburton performed the first commercial application of hydraulic fracturing at a location about 12 miles east of Duncan, Oklahoma.[32]

58. The expansion of directional and horizontal drilling extended the use of hydraulic fracturing into previously underdeveloped "tight" formations, including

[31] EX1016.

[32] EX1019.

shale.[33] In oil and gas exploration, directional drilling is a technique for accessing hydrocarbon bearing formations (oil and gas formations) that are not located immediately beneath the surface location, or to increase the amount of formation exposed to the wellbore. Some tool or process is used to cause the well bore to deviate from the vertical to reach previously inaccessible formation locations, to expose more of the hydrocarbon bearing formation to the well bore, or to drill several wells from a single surface location, such as an offshore platform or a land-based drilling pad. Like most developments in the oil and gas industry "the early drilling of directional wells was clearly motivated by economics."[34] It was the offshore fields of California that spawned the technology which led to modern directional and horizontal drilling. In the 1930s, directional drilling was being used in the Huntington Beach, California field to reach an offshore oil-bearing formation from a well initiated on an onshore pad.

59. Throughout the 1980s, directional drilling increased, in particular on offshore pads and in the Austin Chalk trend of central Texas. The Austin Chalk is a soft, loosely cemented, easily pulverized limestone characterized by natural fractures oriented primarily vertically. Horizontally deviated wells were drilled into

[33] EX1016.

[34] EX1023, 351.

the chalk to intersect several of the natural fractures, allowing for transport of the hydrocarbons into the wellbore. This was combined with artificial fracturing to increase the flowrate of hydrocarbons. By at least 1986, the techniques of horizontal drilling were well known and heavily developed. In 1986, the "first successful multifracture horizontal well is drilled in Wayne County, West Virginia."[35] This well used directional drilling to cause the wellbore to enter a more or less horizontal orientation (parallel to the surface of the earth) and combined it with advanced hydraulic fracturing techniques (originally developed in the 1940s) to not only expose large lengths of the hydrocarbon formation to the wellbore, but also to create artificial cracks or "fractures" in the formation from multiple location in order to allow the hydrocarbons to "leak" out of the formation into the wellbore.

60. The use of horizontal drilling and fracturing systems in shale formations led to the U.S. vastly increasing its oil and especially natural gas production—starting in the 1980s and continuing to present day.[36]

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[35] EX1024, xliii.

[36] EX1019 (2011 map from the Energy Information Administration showing shale plays where hydraulic fracturing is common).

61. As more formation is exposed to be fractured, horizontal wells use much higher volumes of fracturing fluid and proppant than do vertical wells. This requires the use of more and bigger blending and pumping systems. As discussed by Sanborn, pumping systems of 32,000 hp were typically used as early as 2012.[37] Other references, such as *Coli*, suggest systems of pumps as large as 2,500 hp each, with total system power as high as 40,000 hp were used in the same time period (four

[37] EX1025, [0005].

trailers, each with four 2500 hp pumps operating in parallel).[38] These pumps are typically triplex or quintuplex positive displacement (plunger) type pumps.[39] Although some fracturing systems have been converted to electric driven pump motors, the large majority of hydraulic pumping systems "are typically mobilized on skids or tractor-trailers and powered using diesel motors."[40] These diesel engines require large amounts of diesel fuel, along with the requisite extra safeguards to address potential safety concerns.[41]

62. Fracturing is often conducted in remote locations and is typically powered using fuel brought to the frac site. The large amount of fuel necessary to be delivered to the fracturing site, and the diesel-powered fracturing pumps, presented known logistical challenges such as site congestion, orientation and arrangement of fracturing equipment, and safety concerns for personnel in the "red zone."[42]

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[38] EX1026, [0049], FIG. 2.

[39] EX1025, [0005]; EX1026, [0011].

[40] EX1026, [0005]; *see also Id.,* [0007] ("standard fluid pumps require large volumes of diesel fuel and extensive equipment maintenance programs").

[41] EX1025, [0007].

[42] The "red zone" at a fracturing site is an area surrounding the fracturing pumps and the wellheads where personnel would be exposed to high pressure piping, risk of fire

B. Mobile Fuel Delivery

63. Although the volumes of fuel used in fracturing sites continued to increase, mobile fuel delivery was well-known in the prior art for many years before the ’118 Patent was filed. For example, as a licensed pilot I am familiar with “fuel trucks” that deliver aviation fuel to aircraft which are parked on the ramp. These fuel trucks carry and deliver fuels, such as Aviation Gasoline (AvGas) or Jet Fuel (Jet A) to aircraft without the necessity of moving the aircraft. As the fuel trucks are generally smaller and more maneuverable than the aircraft, this practice increases not only convenience but safety when refueling aircraft. As an example, US Patent 4,187,962 (“*Henry*”) describes a mobile liquid-dispensing apparatus usable for refueling airplanes and the like. *Henry*’s apparatus includes “a reel-mounted, extensible and retractable, fluid delivery conduit connected to an adjacent liquid supply.”[43] *Henry* also discloses that such a practice is not limited to aircraft but is applicable to “airplanes or other equipment which cannot conveniently be brought to a central fuel depot.”[44]

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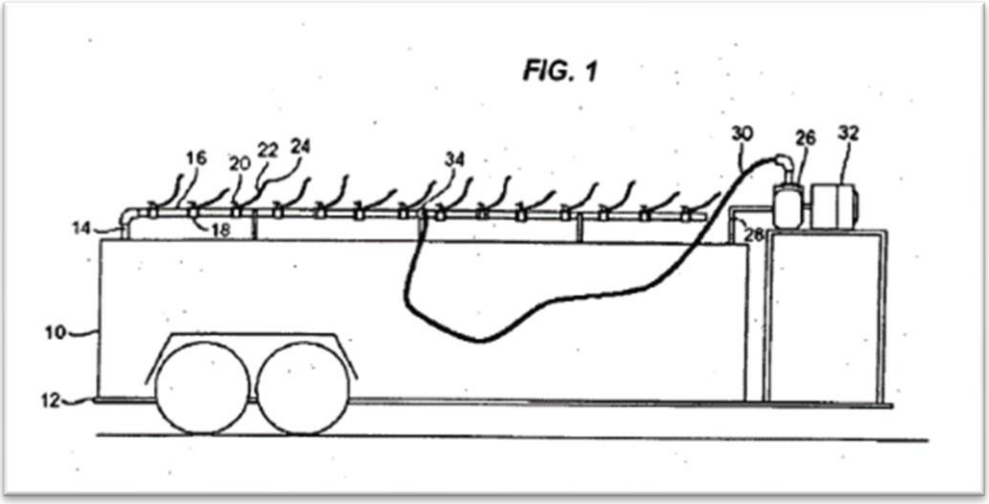
and high noise. As such, it is a dangerous environment and common practice is to keep personnel out of the red zone whenever practical.

[43] EX1027, Abstract.

[44] EX1027, 1:9-11.

64. This practice was not limited to refueling equipment one at a time. As another example of mobile fueling, U.S. Patent Pub. No. 2007/0181212 ("*Fell*") (published on August 9, 2007) discloses a portable refueling dock for simultaneously refueling multiple pieces of equipment.[45] *Fell* describes fueling in the context of "a construction site, [where] large vehicles that are used in moving and hauling dirt and debris need to be refueled."[46] As illustrated in FIG. 1 (below), *Fell* discloses that its portable refueling dock has a fuel tank 10 supported by a wheeled base 12, such as a trailer.[47]



[45] EX1014, Abstract, [0003]-[0004], [0007].

[46] EX1014, [0003].

[47] EX1014, [0005], [0014]-[0015], FIG. 1, FIG. 2.

65. As another example, U.S. Patent Pub. No. 2008/0223482 ("*Hockner*") (published September 18, 2008) discloses a tank truck for fuel delivery.[48] ("During filling of the tanks 3 [sic; 8], hoses 6 are extended from the tank truck 7 to the tanks 8 and connected thereto."). *Hockner* describes mobile fuel delivery in the context of "filling of tanks at filling stations."[49] As illustrated in FIG. 1 (below), *Hockner* discloses a tank truck 7 with a fuel tank. A plurality of hoses 6 connect to the tank truck, where the fuel flow in each hose is controlled by a respective valve 10.[50] Hoses 6 extend from the valves to simultaneously deliver fuel to a plurality of fuel tanks 8.[51]

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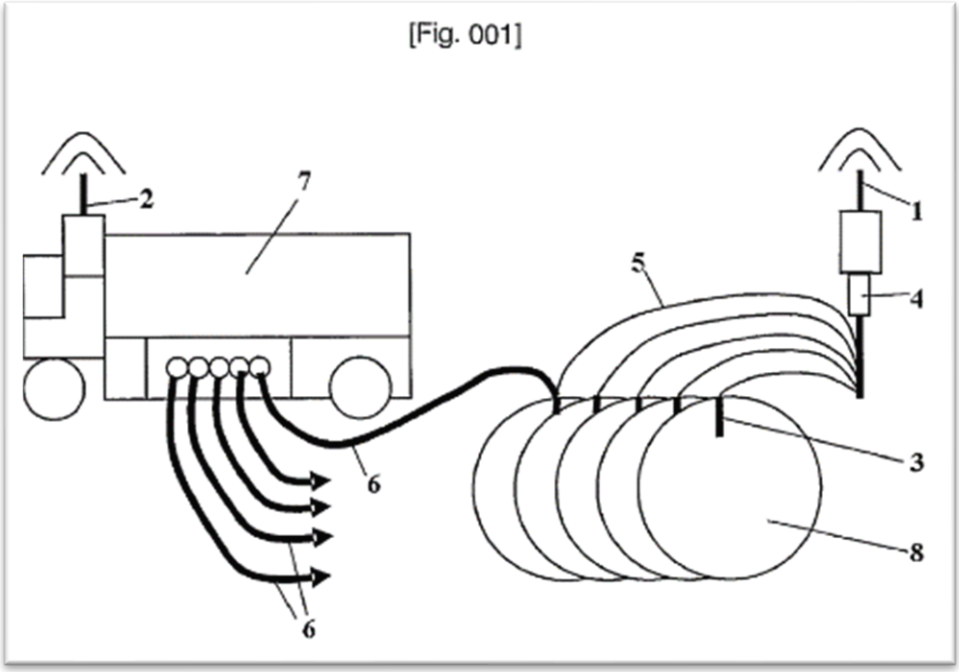
[48] *See* EX1015, [0016].

[49] EX1015, [0004].

[50] EX1015, FIG. 1, 2:54- 3:10.

[51] EX1015, FIG. 1.



66. As yet another example, Frac Shack advertised on its website's "Technology" page at least as early as July 11, 2015, a "modular" "fuel delivery system."[52] *Frack Shack* describes mobile fuel delivery in the context of fracking operations.[53] The archived video embedded on that page shows the product being stored and moved on mobile trailers:[54]

[52] EX1017.

[53] *See* EX1017.

[54] *See* EX1017, (video around timestamps 00:12 and 00:31 respectively).

67. U.S. Patent Pub. No. 2011/0197988 to Van Vliet et al. ("*Van Vliet*"), U.S. Patent Pub. No. 2018/0057348 to Lowrie ("*Lowrie*"), and AFD Onsite Refueling

(http://web.archive.org/web/20150922012312/https:/www.afdpetroleum.com/fuel/onsite_refuelling) ("*AFD*")[55] provide still further examples of mobile fuel delivery and are discussed further in Section XI.[56]

C. Hoses and Reels

68. As seen above, regarding Mobile Fuel Delivery, the use of hoses and reels for fuel delivery was well-known in the art. For example, *Fell* discloses that "hoses 22 can be unspooled from hose reels that can be used to store the hoses" and the hoses reels may be mounted on the base of a portable refueling dock.[57] As another example, *Hockner* describes that "[d]uring filling of the tanks 3 [sic; 8], hoses 6 are extended from the tank truck 7 to the tanks 8 and connected thereto."[58] Further, *Henry* describes "a reel-mounted, extensible and retractable, fluid delivery conduit connected to an adjacent liquid supply" for use in delivering fuel to "aircraft or other

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[55] I note that *AFD* appears to be associated with a service offered by AFD Petroleum Ltd. (*see* copyright mark at the bottom of EX1007) and *Lowrie* appears to be an application assigned to AFD Petroleum Ltd. (*see* EX1006, Cover).

[56] *See infra*. Section XI.

[57] EX1014, [0022].

[58] EX1015, [0016].

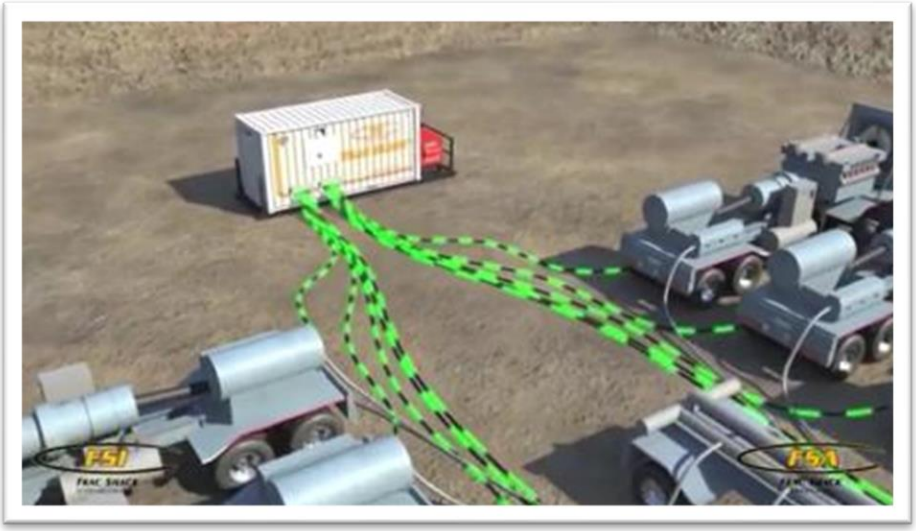
equipment which cannot conveniently be brought to a central fuel depot."[59]As yet another example, Frac Shack's advertisement for its fuel delivery system on its website's "Technology" page shows hoses arranged on reels:[60]

69. The embedded video on that webpage shows fuel being distributed using the hoses:[61]

[59] EX1027, 1:9-11.

[60] EX1017 (excerpted).

[61] EX1018, 00:43.

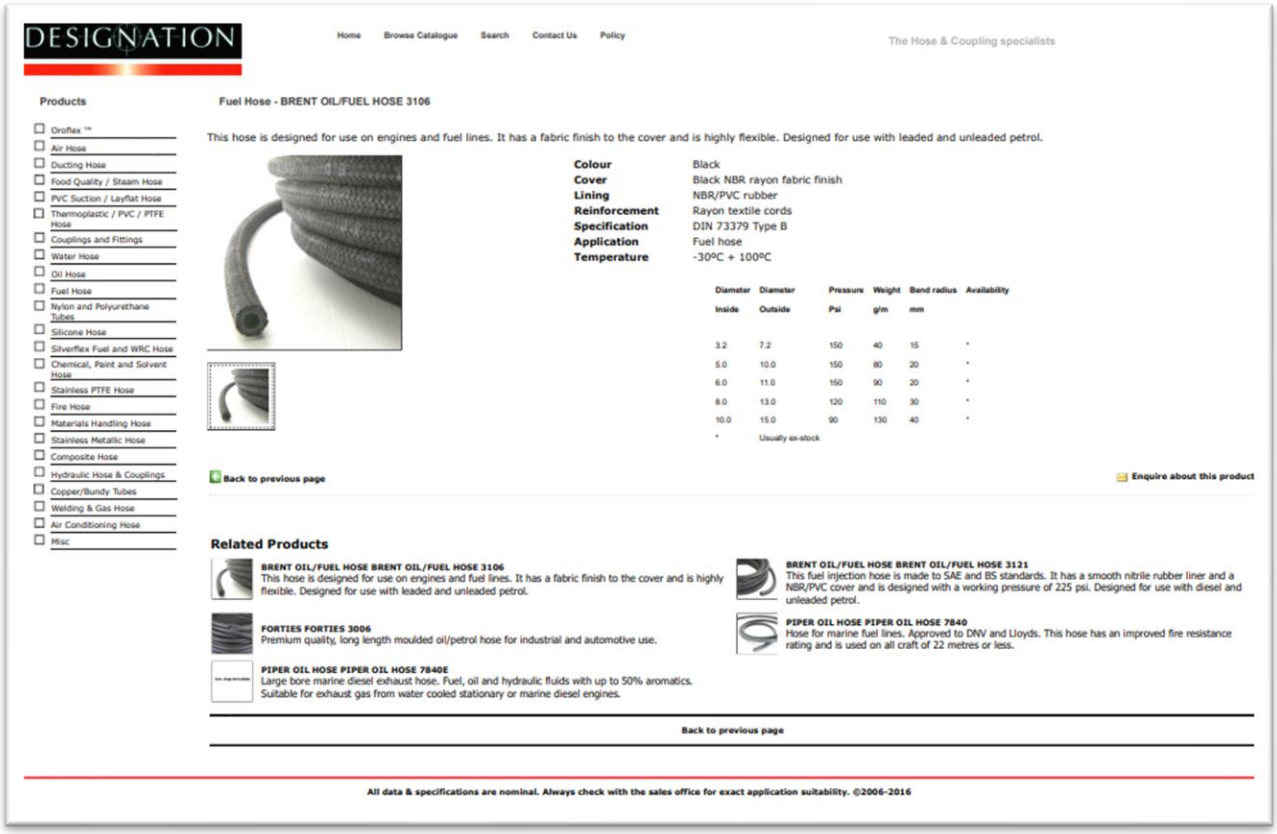


70. A variety of hose constructions were available at the time of the ’118 patent. For example, Designation ltd., was “an independent company specializing in the supply and assembly of hoses and couplings,” often referred to as a “Desihose.”[62] One of the offerings of Desihose was the “Brent Oil/fuel Hose 3106”.[63] Brent hose is “designed for use on engines and fuel lines. It has a fabric finish to the cover and is highly flexible.”[64]

[62] EX1030.

[63] EX1031.

[64] EX1031.



DESIGNATION

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- Chemical, Paint and Solvent Hose
- Stainless PTFE Hose
- Fire Hose
- Materials Handling Hose
- Stainless Metallic Hose
- Composite Hose
- Hydraulic Hose & Couplings
- Copper/Bundy Tubes
- Welding & Gas Hose
- Air Conditioning Hose
- Misc

Fuel Hose - BRENT OIL/FUEL HOSE 3106

This hose is designed for use on engines and fuel lines. It has a fabric finish to the cover and is highly flexible. Designed for use with leaded and unleaded petrol.

Colour	Black
Cover	Black NBR rayon fabric finish
Lining	NBR/PVC rubber
Reinforcement	Rayon textile cords
Specification	DIN 73379 Type B
Application	Fuel hose
Temperature	-30ºC + 100ºC

Diameter Inside	Diameter Outside	Pressure Psi	Weight g/m	Bend radius mm	Availability
3.2	7.2	150	40	15	*
5.0	10.0	150	80	20	*
6.0	11.0	150	90	20	*
8.0	13.0	120	110	30	*
10.0	15.0	90	130	40	*
*	Usually ex-stock				

Back to previous page

Enquire about this product

Related Products

BRENT OIL/FUEL HOSE BRENT OIL/FUEL HOSE 3106
This hose is designed for use on engines and fuel lines. It has a fabric finish to the cover and is highly flexible. Designed for use with leaded and unleaded petrol.

BRENT OIL/FUEL HOSE BRENT OIL/FUEL HOSE 3121
This fuel injection hose is made to SAE and BS standards. It has a smooth nitrile rubber liner and a NBR/PVC cover and is designed with a working pressure of 225 psi. Designed for use with diesel and unleaded petrol.

FORTIES FORTIES 3006
Premium quality, long length moulded oil/petrol hose for industrial and automotive use.

PIPER OIL HOSE PIPER OIL HOSE 7840
Hose for marine fuel lines. Approved to DNV and Lloyds. This hose has an improved fire resistance rating and is used on all craft of 22 metres or less.

PIPER OIL HOSE PIPER OIL HOSE 7840E
Large bore marine diesel exhaust hose. Fuel, oil and hydraulic fluids with up to 50% aromatics. Suitable for exhaust gas from water cooled stationary or marine diesel engines.

Back to previous page

All data & specifications are nominal. Always check with the sales office for exact application suitability. ©2006-2016

71. As another example, at least by October 25, 2016, SRM Industries marketed several types of hose protection sleeves, including those made of nylon, metal and fabric:[65]

[65] EX1032.

72. For example, RHINO Sleeve HT is a high temperature hose protection constructed of "Densely twisted proprietary engineered fabric [which]offers optimum UV & abrasion protection,"[66] and was offered in sizes ranging from 0.68 inches to 5.5 inches.[67] The fabric sleeve had "ultra tight construction [which] contains oil spillage from pin hole leaks" and "meets conductivity requirements of ISO 8031.[68] Accordingly, a POSITA would have understood that RhinoSleeve was appropriate for protection of hoses transferring hydrocarbons.

[66] EX1033.

[67] EX1034.

[68] EX1034.

D. Fluid Level Sensors

73. Fluid level sensors were well-known in fuel delivery systems. For example, *Hockner* describes a "fill-level threshold sensor" in the context of measuring fuel in a tank: [69]

> Multiple tanks, i.e. fuel tanks **8**, are provided at a filling station, not illustrated in greater detail in FIG. 1. In each of these tanks **8a** fill-level threshold sensor **3** is provided that generates a signal when a predetermined level, preferably the maximum level, is reached in the respective tank **8**.
>
> These threshold sensors **3** may be known optical systems in which light is emitted, refracted in a defined manner on a glass prism on the probe, and reflected to a light sensitive element. When the liquid reaches the prism the index of refraction is altered, and less light or no light at all is reflected to the light-sensitive element, whereupon a signal is outputted.

74. As another example, Frac Shack advertised its fuel delivery system on its website's "Technology" page as having "[w]ireless remote fuel level monitoring on every tank, in real time."[70]

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[69] EX1015, [0012]-[0013].

[70] EX1017.

IX. LEVEL OF ORDINARY SKILL IN THE ART

75. I understand that the claims and specification of a patent must be read and construed through the eyes of a person of ordinary skill in the art ("POSITA") at the time of the priority date of the claims.

76. I have also been advised that to determine the appropriate level of a person having ordinary skill in the art, the following factors may be considered: (a) the types of problems encountered by those working in the field and prior art solutions thereto; (b) the sophistication of the technology in question, and the rapidity with which innovations occur in the field; (c) the educational level of active workers in the field; and (d) the educational level of the inventors.

77. It is my opinion that a person of ordinary skill in the art of the '118 Patent 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*.

78. Based on my educational and employment background, I am qualified to provide opinions concerning what a POSITA would have known and understood

by October 11, 2016. Indeed, as reflected in my qualifications above, I am more than qualified as a person of ordinary skill in the art as of the relevant date of the ’118 Patent.

X. OVERVIEW OF THE PRIOR ART

79. As explained below, it is my opinion that the following prior art reference discloses or renders obvious all technical features of the challenged claims of the ’118 Patent, thus rendering them unpatentable:

A. *Van Vliet* (EX1004)

1. Status of *Van Vliet*

80. *Van Vliet* is a publication of a United States patent application, U.S. Patent Publication No. 2011/0197988. *Van Vliet* entitled “Fuel Delivery System and Method.”[71] *Van Vliet* was filed February 6, 2011, and published August 18, 2011.[72] Each of these dates is before the earliest possible priority date of all challenged claims of the ’118 Patent. *Van Vliet* was cited by the examiner during prosecution of the ’118 Patent.[73]

[71] EX1004, Cover.

[72] EX1004, Cover.

[73] EX1011, 227.

2. Summary of *Van Vliet*

81. *Van Vliet* describes "[f]uel delivery systems and methods,"[74] and more specifically, "[a] fuel delivery system and method" for equipment used in oil and gas well fracturing operations.[75] The goal of *Van Vliet* is "reducing the likelihood that a fuel tank of equipment at a well site during fracturing of a well will run out of fuel."[76]

82. *Van Vliet* describes that "[e]quipment at a well site use[d] for a fracturing job may comprise several pumpers and blenders."[77] A pumper **10** is shown in FIG. 1 with a fuel tank **12**.[78] *Van Vliet* further describes "[a] fuel delivery system is provided for delivery of fuel to multiply fuel tanks **12** of multiple pieces of equipment **10** at a well site during fracturing of a well."[79] Further, *Van Vliet* discloses

[74] EX1004, [0001].

[75] EX1004, Abstract.

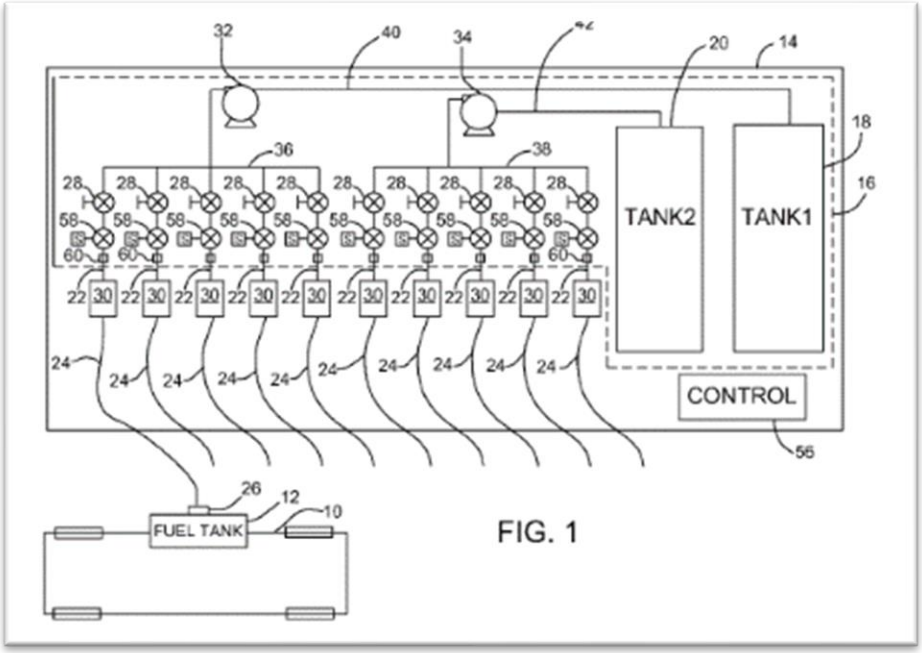
[76] EX1004, Abstract, [0003].

[77] EX1004, [0014].

[78] EX1004, [0014].

[79] EX1004, [0014].

that "[t]he fuel delivery system **14** may be contained on a single trailer," and is depicted in Figure 1.[80]



83. In the above fuel delivery system **14**, tanks **18** and **20** "are used to store fuel."[81] The tanks connect to pumps **32** and **34**, which further connect to manifold **36** and manifold **38** respectively.[82] The manifolds connect to valves **28** and **58** "to control fluid flow through the hose **24** connected to each respective fuel outlet **22** to

[80] EX1004, [0014], FIG. 1.

[81] EX1004, [0015].

[82] *See* EX1004, FIG. 1.

permit independent operation of each hose **24**."[83] Each hose **24** is "preferably stored on a reel[] **30**. The reels **30** may be manual reels, or may be spring loaded."[84] Each hose **24** connects to a fuel tank **12,** associated with a separate piece of equipment such as a fracturing pump engine.[85]

84. *Van Vliet* further describes "[e]each hose **24** is connected to a fuel cap or fuel head **26** on a respective one of the fuel tanks **12** for delivery of fuel to the fuel tank **12** through the hose **24**."[86] Further, *Van Vliet* discloses "[e]ach cap **26** also preferable comprises a fuel level sensor **54**."[87] This sensor "communicates with a control station **56** on the trailer **14** via a wireless communication channel, though a wired channel may also be used."[88] The controller **56** starts fuel flow to the fuel tank **12** in response to a low-level signal from sensor **54** and stops fuel flow to the fuel tank **12** in response to a high-level signal from sensor **54**.[89]

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[83] EX1004, [0015].

[84] EX1004, [0015].

[85] EX1004, FIG. 1, [0015].

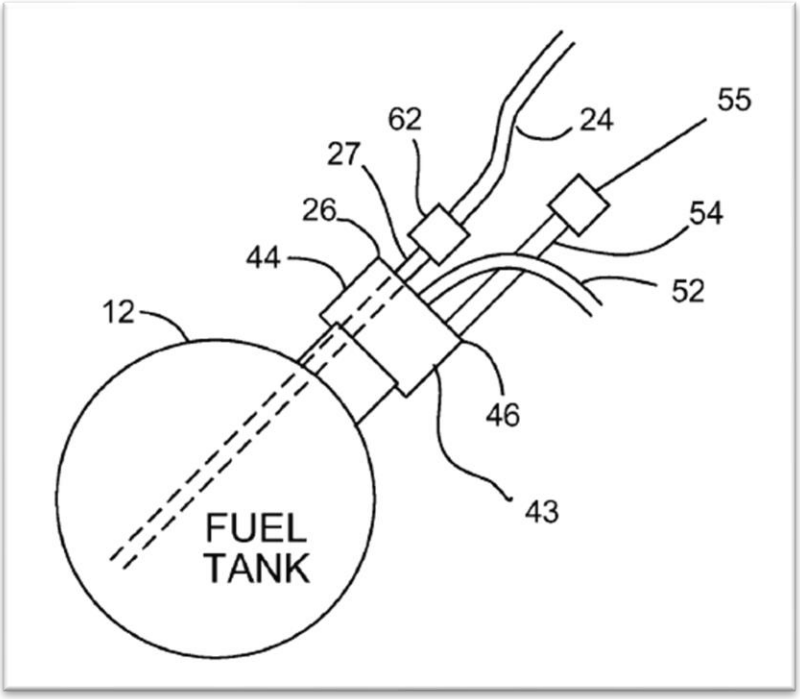
[86] EX1004, [0015].

[87] EX1004, [0017].

[88] EX1004, [0017].

[89] EX1004, [0020].

85. *Van Vliet* notes that "[t]he spatial orientation of the reels **30**, manifolds **36** and **38**, tanks **18** and **20**" and other equipment shown "is a matter of design choice for the manufacturer and will depend on space requirements."[90] The connection between a hose **24** and a fuel tank **12** is depicted in a preferred embodiment shown in more detail in FIG. 2 from *Van Vliet* duplicated below:[91]



86. As depicted above, hose **24** connects to fuel tank **12**, which is coupled to fuel level sensor **54**.[92] The fuel level sensor **52** detects a level of fuel within fuel

[90] EX1004, [0027].

[91] EX1004, FIG. 2.

[92] EX1004, FIG. 2.

tank **12** and communicates the fuel level to a controller **56** (not shown in the figure).[93] The controller **56** may be used to control pumps **32**, **34**, and automatically operable valves **58**, thereby allowing the fuel passing through hoses **24** to be responsive to fuel levels in fuel tanks **12**.[94]

B. *Coxreels* (EX1005)

1. Status of Coxreels

87. *Coxreels* is a website archived on April 8, 2014 describing the Coxreels 1125 Series hand crank and motorized hose reels.[95]

[93] *See* EX1004, FIG. 2, [0020].

[94] EX1004, [0020], [0021].

[95] EX1008.

88. Coxreels 1125 Series Hand Crank and Motorized Hose Reels ("*Coxreels*") was made available online at least as early as April 8, 2014, as explained in the affidavit of Nathaniel E Frank-White, a representative of the Internet Archive.[96] The public accessibility of *Coxreels* is established by the Internet Archive, Wayback Machine, which preserved Coxreels on April 8, 2014.[97] EX1009 is an affidavit of Nathaniel E. Frank-White ("Frank-White Affidavit I"), which attests to his role at the Internet Archive (which provides the Wayback Machine service) and the process used to archive webpages.[98, 99] The Frank-White Affidavit I explains the archiving process that preserves the date of archiving. The Internet Archive assigns a URL to archived files in the format of

[96] *See* EX1009.

[97] *See* EX1009.

[98] EX1009, 1-2.

[99] EX1009 includes a copy of EX1005 (*Coxreels*) as Exhibit A (as well as other archived pages from the archived Coxreels website). Where, I cite to EX1005, I incorporate by reference the corresponding disclosure of EX1009, Exhibit A and *vice versa*.

http://web.archive.org/web/[Year in yyyy][Month in mm][Day in dd][Time code in hh:mm:ss]/[Archived URL].[100] Accordingly, the URL of:

https://web.archive.org/web/20140408035634/http:/www.coxreels.com/products/hand-crank/1125-series

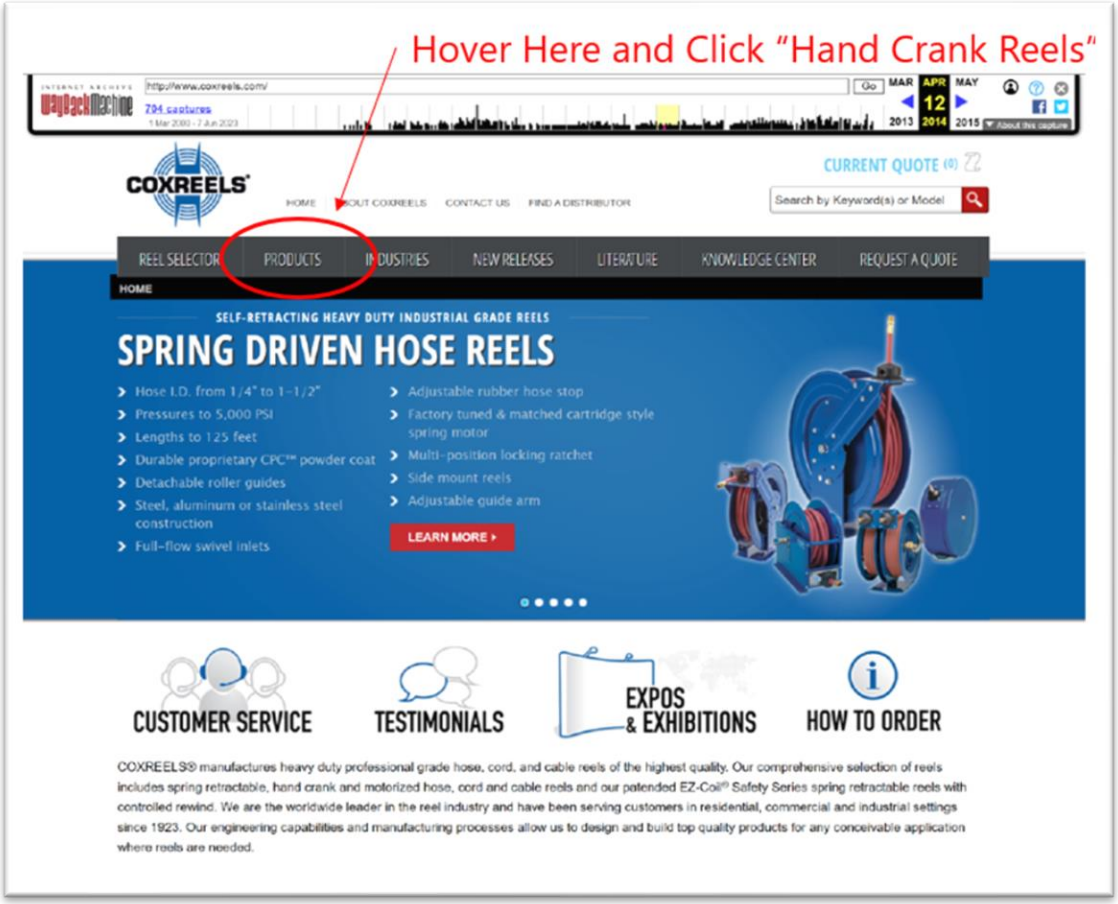
indicates that the page was archived on April 8, 2014 at 03:56:34 AM.[101] The foregoing demonstrates that AFD was publicly accessible no later than April 8, 2014.

89. A POSITA interested in the subject matter of *Coxreels* could have located *Coxreels* through the exercise of ordinary diligence. For example, a POSITA would have been aware of the Coxreels' website as a resource for products and information related to hoses and reels—including in the context of fueling. To get to *Coxreels*, a POSITA visiting the Coxreels' website would have hovered over the "Products" link and clicked on the "Hand Crank Reels" option that appears.[102]

[100] EX1009.

[101] *See* EX1009.

[102] EX1009, 14 (annotated).

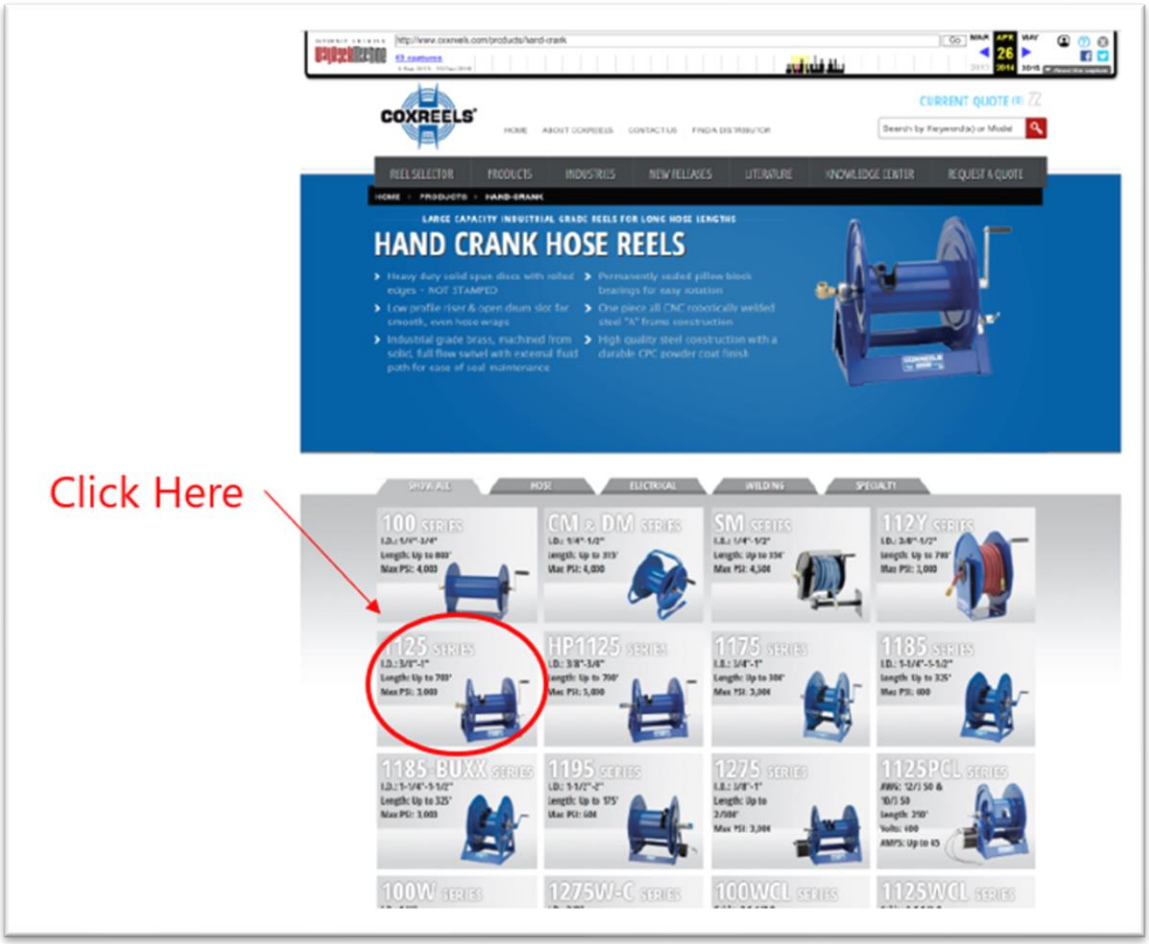


This would take the POSITA to the "Hand Crank Hose Reels" page.[103]

90. From the "Hand Crank Hose Reels" page, the POSITA would click on "1125 Series" as shown below:[104]

[103] *See* EX1009.

[104] EX1009, 11 (annotated).



This would take the POSITA to the *Coxreels* reference.[105] Thus, by following logically labeled hyperlinks starting at the Coxreels' home page, a POSITA was a mere two clicks from the *Coxreels* reference.

[105] EX1005.

2. Summary of *Coxreels*

91. Coxreels' 1125 series reels come in various heights and widths; the length/diameter of each reel is 17 and 5/8 inches.[106] A portion of the table from *Coxreels* showing an example of the sizes of reels available at the time of *Coxreels* is duplicated below.[107]

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
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

92. I am familiar with products such as those described in *Coxreels* for use as in various applications, including refueling. As an example, I have used fixed diesel fuel stations that had similar reels for the storage of fueling hoses to fuel company and personal vehicles being used in the oil field. Further, as a licensed

[106] *See* EX1005 (size index "L" column showing "17-5/8"" for all models).

[107] EX1008.

pilot, I am familiar with the use of reels, such as those used in *Coxreels* on mobile fueling trucks used to fuel aircraft. The use of such reels, for example for fuel distribution, was well known to me, and would have been well known to a POSITA, at the time of the ’118 Patent.

C. *Shoap* (EX 1006)

1. Status of *Shoap*

93. *Shoap* is U.S. Patent No. 7,819,345. *Shoap* is entitled “Method and System For Fluid Transmission Along Significant Distances.”[108] The application which led to *Shoap* was filed September 16, 2008, and the patent issued October 26, 2010.[109] Each of these dates is before the earliest possible priority date of all challenged claims of the ’118 Patent.[110] *Shoap* was not cited by the examiner during prosecution of the ’118 Patent, nor is it listed as one of the references considered by the examiner during prosecution of the ’118 Patent.[111]

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[108] EX1006, Cover.

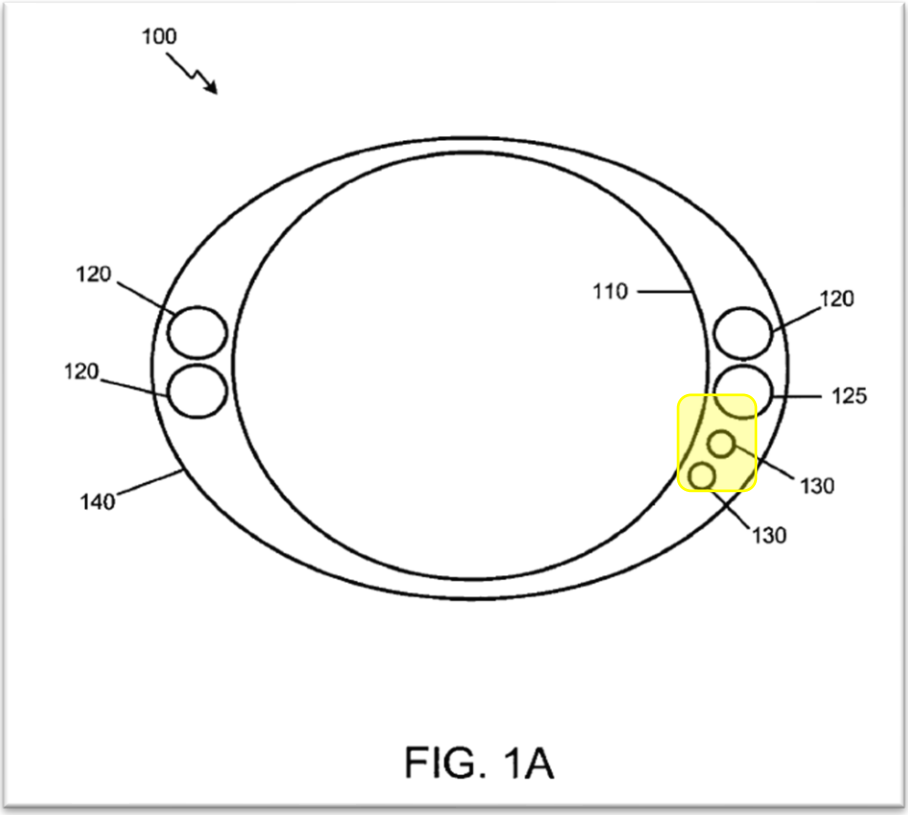
[109] EX1006, Cover.

[110] *See* EX1008 *generally*.

[111] *See* EX1001, Cover.

2. Summary of Shoap

94. *Shoap* is "in the field of electrical and fluid distribution."[112] More specifically, *Shoap* "describes the use of electrical wire associated with fluid conduit."[113] For example, *Shoap* discloses a hose having communication wires **130**:[114]

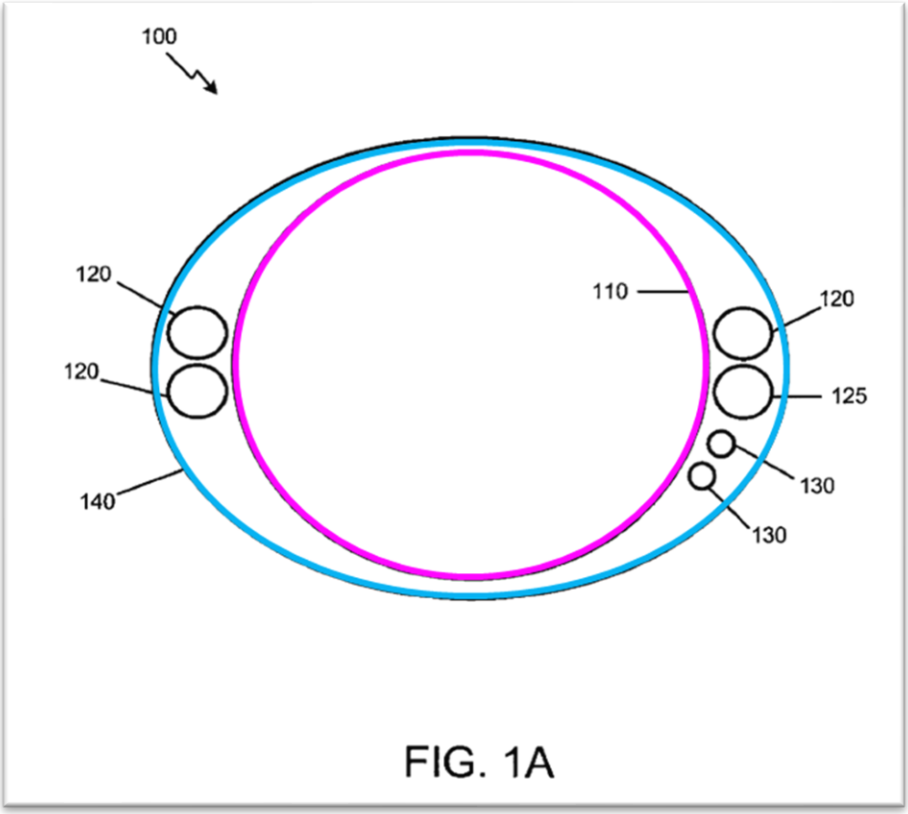


[112] EX1006, 1:18-20.

[113] EX1006, 1:18-20.

[114] EX1006, FIG. 1A (annotated showing communication wires in yellow), 4:55-57.

FIG. 1A of *Shoap* shows a cross section of an exemplary embodiment of *Shoap*'s conduit system **100**.[115] *Shoap*'s hose includes an inner conduit surface **110** (annotated purple) and an outer conduit surface **140** (annotated in light blue):[116]



[115] EX1006, 3:10-12.

[116] EX1006, FIG. 1A (annotated), 4:51-5:3.

95. The hose of *Shoap* functions to allow electricity and/or data to pass through wires between the inner conduit surface **110** and outer conduit surface **140** while fluid travels within the inner conduit surface **110**.[117]

D. *Hosecraft* (EX 1007)

1. Status of *Hosecraft*

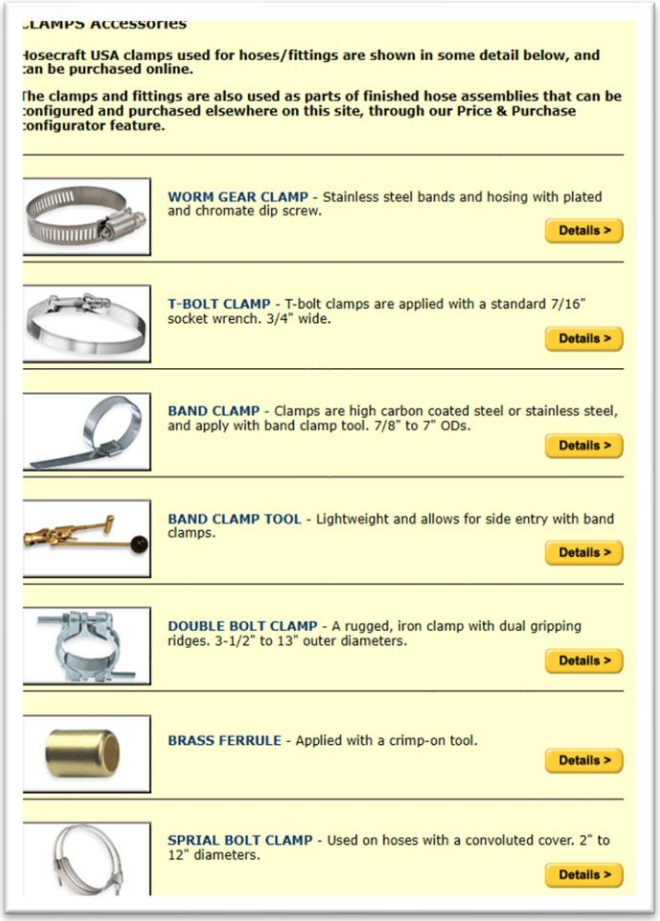
96. *Hosecraft* is an archived website from July 2, 2013 describing various clamps publicly available from Hosecraft USA prior to the ’118 Patent.[118] *Hosecraft* was not cited by the examiner nor is it shown on the face of the ’118 Patent.[119, 120]

[117] EX1006, 4:51-5:3.

[118] EX1007.

[119] EX1001, Cover.

[120] EX1007 (excerpted below).



97. *Hosecraft* was publicly available online at least as early as July 2, 2013, as explained in the affidavit of the Internet Archive representative.[121, 122] The public

[121] EX1010.

[122] EX1010 includes a copy of EX1007 (*Hosecraft*) as Exhibit A (as well as other archived pages from the archived Hosecraft USA website). Where, I cite to EX1007, I incorporate by reference the corresponding disclosure of EX1010, Exhibit A and *vice versa*.

accessibility of *Hosecraft* is established by the Internet Archive, Wayback Machine, which preserved *Hosecraft* on July 2, 2013.[123] Exhibit 1010 includes an affidavit of Nathaniel E. Frank-White ("Frank-White Affidavit II"), which attests to his role at the Internet Archive (which provides the Wayback Machine service) and the process used to archive webpages.[124] The Frank-White Affidavit II explains the archiving process that preserves the date of archiving. The Internet Archive assigns a URL to archived files in the format of http://web.archive.org/web/[Year in yyyy][Month in mm][Day in dd][Time code in hh:mm:ss]/[Archived URL].[125] Accordingly, the URL of:

https://web.archive.org/web/20130702084457/http:/www.hosecraftusa.com/accessory-category/Hose_Clamps

indicates that the page was archived on July 2, 2013 and 08:44:57.

98. The foregoing demonstrates that *Hosecraft* was publicly accessible no later than July 2, 2013.

99. A POSITA interested in the subject matter of *Hosecraft* could have located *Hosecraft* through the exercise of ordinary diligence. For example, a

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[123] *See* EX1010.

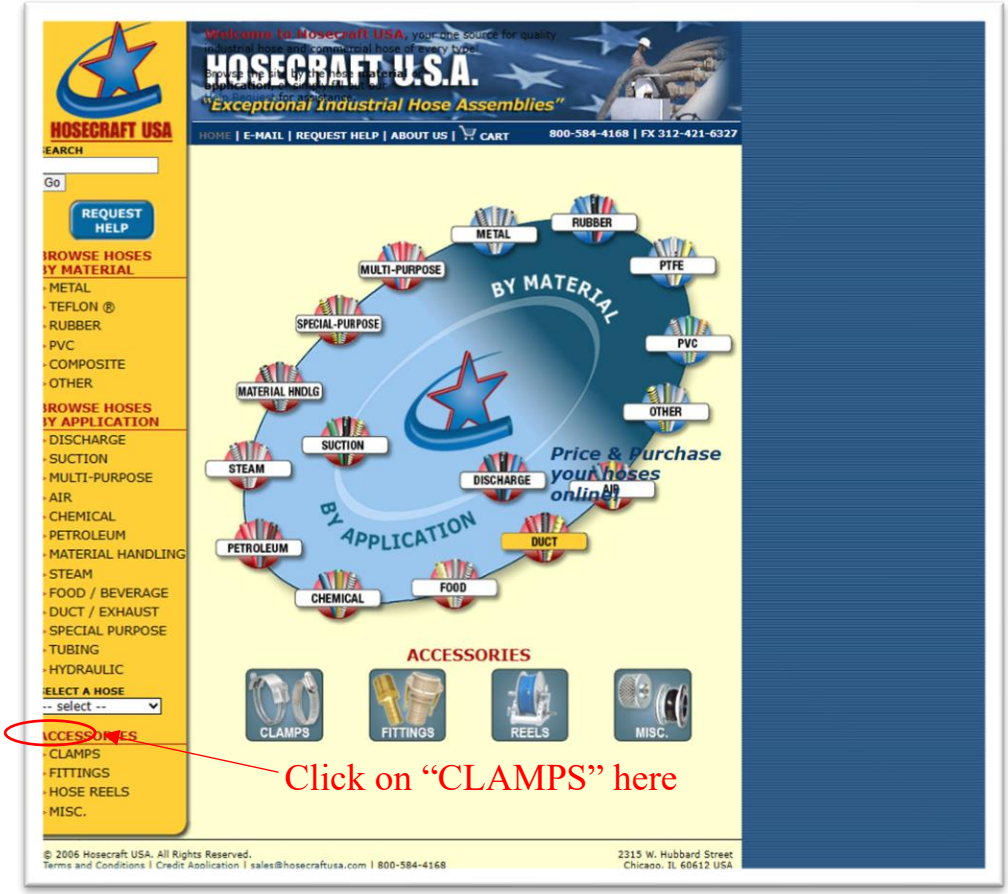
[124] EX1010, 1-2.

[125] EX1010.

POSITA would have been aware of the Hosecraft USA's website as a resource for products and information related to hoses and reels—including in the context of fueling. To get to *Hosecraft*, a POSITA visiting the Hosecraft USA's website would have clicked on the "CLAMPS" link under Accessories. This would take a POSITA to the "CLAMPS Accessories page, which is the *Hosecraft* reference.[126] Thus, by following logically labeled hyperlinks starting at the Hosecraft USA home page, a POSITA was a mere one click away from the *Hosecraft* reference.[127]

[126] *See* EX1010.

[127] EX1036.



2. Summary of *Hosecraft*

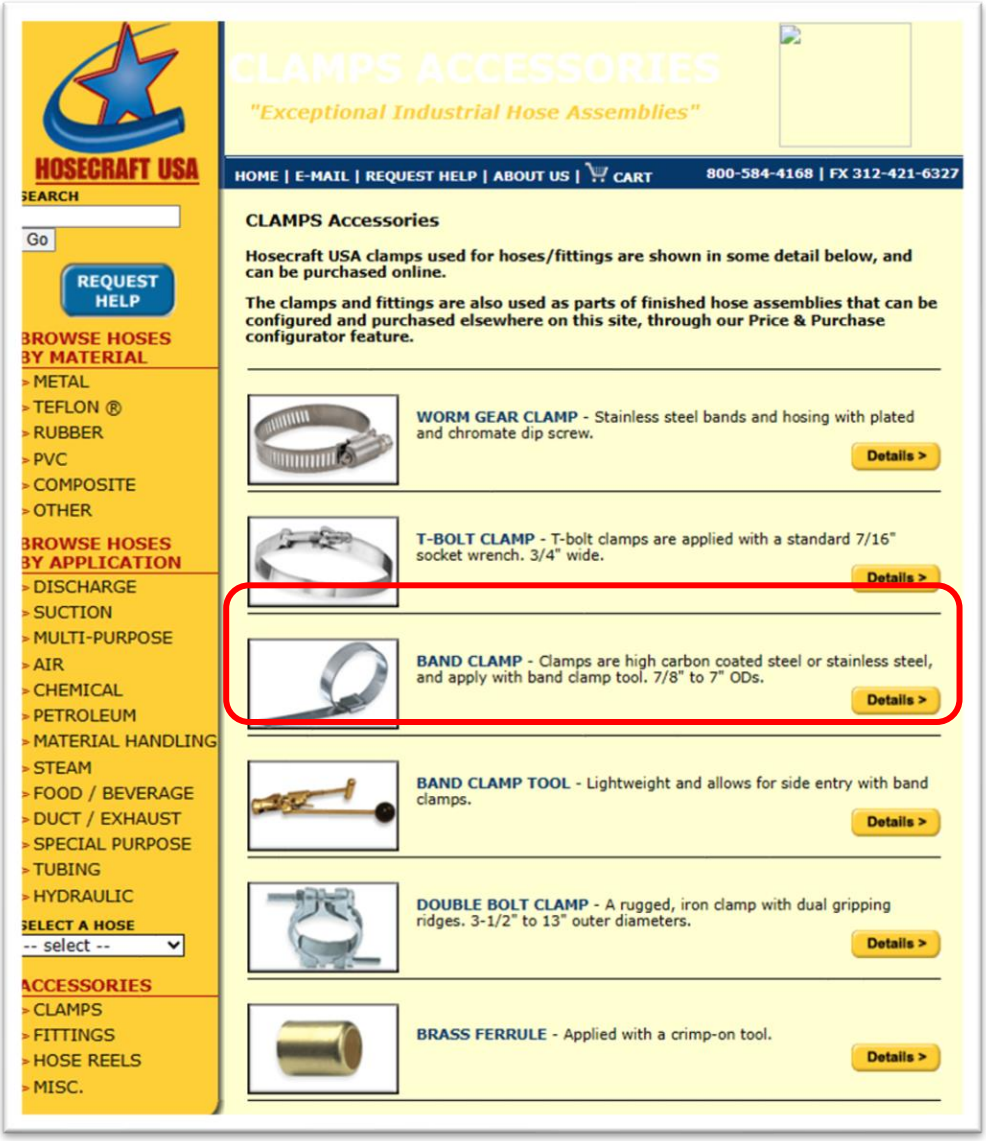
100. *Hosecraft* describes several "clamps used for hoses/fittings" *Hosecraft* discloses several clamps and fittings, including a band clamp.[128] [129]

[128] EX1007.

[129] EX1007 (excerpted image of band clamp).

101. *Hosecraft*'s clamps and fittings are all designed for hose assemblies and used to hold together hose assemblies, particularly when attaching hoses to fittings or connectors. *Hosecraft*'s band clamp is made of "high carbon coated steel" or "stainless steel."[130]

[130] EX1007 (annotated).



102. Clicking "Details" under the Band Clamp, a POSITA would obtain size and pricing details for the Band Clamp, including a link to "Add to Cart" the preferred size band clamp.

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BAND CLAMP

Can be center punched or rolled over. Apply with band clamp center punch tool. Clamps are high carbon coated steel, and are also available in stainless steel.

Product Illustration

NAME	MTL	DIA (in)	SIZE	NOTE	WT (lbs)	P/N	PRICE ($)	
BAND CLAMP	COATED C/S	7/8"	1	3/8" WIDTH	0.25	HCLBC1C1	$0.90	Add to Cart >
BAND CLAMP	COATED C/S	1 3/8"	2	3/8" WIDTH	0.25	HCLBC1C2	$0.90	Add to Cart >
BAND CLAMP	COATED C/S	1"	3	1/2" WIDTH	0.25	HCLBC1C3	$1.20	Add to Cart >
BAND CLAMP	COATED C/S	1 1/4"	4	1/2" WIDTH	0.25	HCLBC1C4	$1.30	Add to Cart >
BAND CLAMP	COATED C/S	1 1/2"	5	5/8" WIDTH	0.25	HCLBC1C5	$1.50	Add to Cart >
BAND CLAMP	COATED C/S	1 3/4"	6	5/8" WIDTH	0.25	HCLBC1C6	$1.70	Add to Cart >
BAND CLAMP	COATED C/S	2"	7	5/8" WIDTH	0.25	HCLBC1C7	$1.90	Add to Cart >
BAND CLAMP	COATED C/S	2 1/4"	8	5/8" WIDTH	0.25	HCLBC1C8	$2.00	Add to Cart >
BAND CLAMP	COATED C/S	2 1/2"	9	5/8" WIDTH	0.25	HCLBC1C9	$2.10	Add to Cart >
BAND CLAMP	COATED C/S	2 3/4"	10	3/4" WIDTH	0.5	HCLBC1C10	$2.60	Add to Cart >
BAND CLAMP	COATED C/S	3"	11	3/4" WIDTH	0.5	HCLBC1C11	$2.70	Add to Cart >
BAND CLAMP	COATED C/S	3 1/2"	12	3/4" WIDTH	0.5	HCLBC1C12	$2.90	Add to Cart >
BAND CLAMP	COATED C/S	4"	13	3/4" WIDTH	0.75	HCLBC1C13	$3.40	Add to Cart >
BAND CLAMP	COATED C/S	4 1/2"	14	3/4" WIDTH	0.75	HCLBC1C14	$3.60	Add to Cart >
BAND CLAMP	COATED C/S	5"	15	3/4" WIDTH	0.75	HCLBC1C15	$3.90	Add to Cart >
BAND CLAMP	COATED C/S	7"	18	3/4" WIDTH	0.75	HCLBC1C16	$5.30	Add to Cart >

XI. ASSERTED GROUNDS OF INVALIDITY

A. Ground 1: Claims 1–3 are Anticipated by and/or rendered Obvious by *Van Vliet*

1. Claim 1

103. *Van Vliet* discloses each and every element of Claim 1. To the extent that any element in Claim 1 is not explicitly disclosed by *Van Vliet*, the teachings of *Van Vliet* would have rendered such element obvious. It is my opinion that the

examiner erred in allowing the claims over *Van Vliet*.[131] Accordingly, *Van Vliet* anticipates, or at least renders obvious, Claim 1 of the ’118 Patent.

a. <u>Claim 1[p]: “A distribution station comprising:”</u>

104. To the extent the preamble is limiting, *Van Vliet* discloses “[a] distribution station.”[132, 133] *Van Vliet* discloses “a fuel delivery system [that] may be contained on a single trailer.”[134] A POSITA would have recognized that the “fuel delivery system” of *Van Vliet* to be a “distribution station” as the preamble claims. Accordingly, *Van Vliet* discloses a distribution station. To the extent that *Van Vliet* does not disclose a distribution station, the teachings of *Van Vliet* would render a distribution station obvious.

105. Accordingly, a POSITA would have recognized that *Van Vliet* discloses, or at least renders obvious, the preamble.[135]

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[131] *See*, for example, Section VII.C.

[132] I understand that the preambles may not be limiting. However, I include analyses of preambles for Claim 1 and Claim 17 out of an abundance of caution.

[133] EX1004, [0003], [0014].

[134] EX1004, [0014].

[135] *See* EX1004, [0003], [0014].

b. Claim 1[a]: "a mobile trailer;"

106. *Van Vliet* discloses "a mobile trailer."[136] More specifically, *Van Vliet* describes "a fuel delivery system 14" that "may be contained on a single trailer, or parts may be carried on several trailers or skids."[137] A POSITA would have recognized that *Van Vliet* discloses "a mobile trailer" as claimed in the '118 Patent.[138] To the extent that *Van Vliet* does not explicitly disclose a "mobile" trailer, the teachings of *Van Vliet* would render a mobile trailer obvious.

107. Accordingly, a POSITA would have recognized that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[a].

c. Claim 1[b]: "a pump on the mobile trailer;"

108. *Van Vliet* discloses "a pump on the mobile trailer." As discussed above, *Van Vliet* teaches that "the fuel delivery system **14** may be contained on a single trailer."[139] As shown in FIG. 1 of *Van Vliet*, the fuel delivery system **14** includes tanks **18** and **20** that are each "connected to respective ***pumps*** **32**, **34** and then to

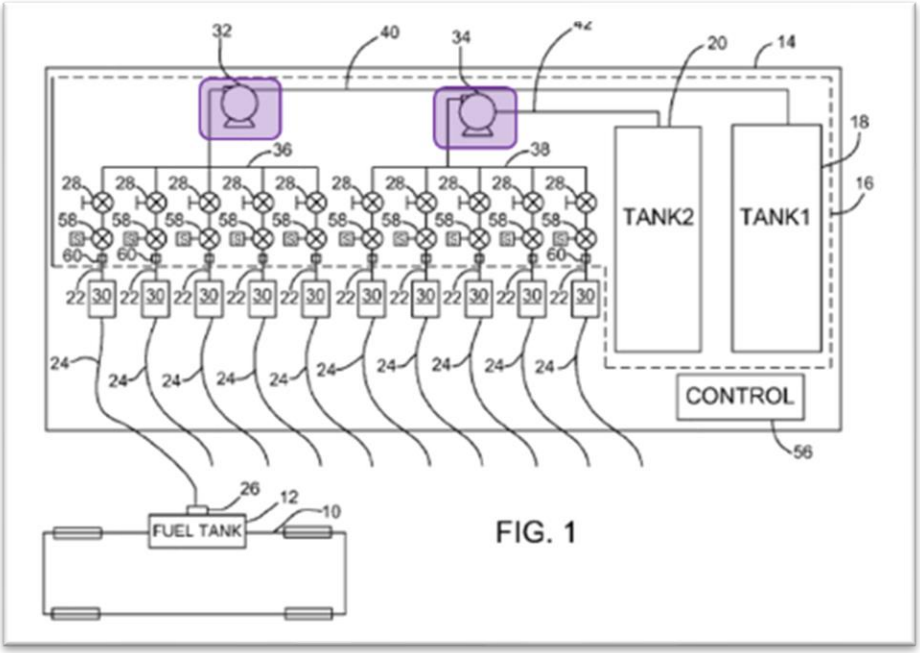
[136] EX1004, [0014].

[137] EX1004, [0014].

[138] *See* EX1004, [0003], [0014]; *see also* EX1005, 1:41-65.

[139] EX1004, [0014].

respective manifolds **36**, **38** via lines **40**, **42**. The fuel outlets **22** are located on the manifolds **36**, **38**."[140, 141]



109. Because pumps **32**, **34** are part of the "fuel delivery system **14**" that "may be contained on a single trailer," they are, either individually or together, "a pump on the mobile trailer."[142] A POSITA would have understood that the pumps in *Van Vliet* are mounted on the trailer and provide their normal function (*i.e.*, pumping fluids out of the tanks into the discharge lines). To the extent that *Van Vliet*

[140] EX1004, [0016].

[141] EX1004, FIG. 1 (annotated to show pumps highlighted in purple).

[142] EX1004, [0008], [0014], FIG. 1.

does not explicitly disclose a pump on the mobile trailer, the teachings of *Van Vliet* would render a pump on the mobile trailer obvious.

110. Accordingly, a POSITA would have recognized that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[b].

d. Claim 1[c]: "a manifold on the mobile trailer and connected with the pump;" [143]

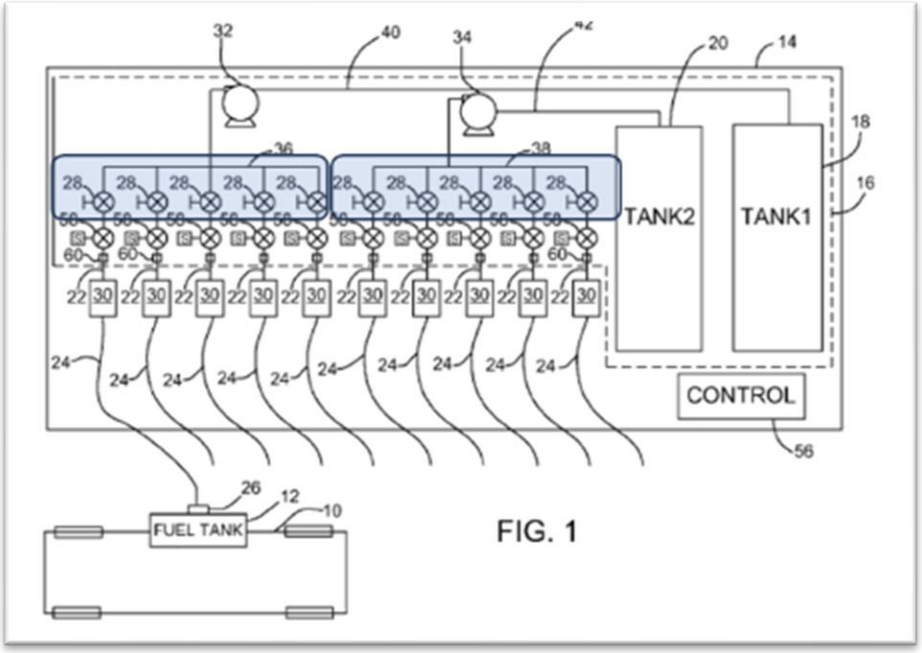
111. *Van Vliet* describes that the fuel delivery system 14 includes "one or more manifolds with associated pumps and fuel line or lines."[144] [145]

---

[143] I have applied *Van Vliet* to the claimed "*manifolds*" based on its use of the same terminology as the '118 Patent claims. I also understand that Patent Owner has alleged in a pending lawsuit against Petitioners that certain structures in the systems accused of infringing the '118 Patent constitute "manifolds." I have considered those allegations in my analysis applying the disclosures of *Van Vliet* to the claimed "manifolds." However, I do not concede that any other structure, even one having a schematic like that shown or described in *Van Vliet*, would be considered a "manifold" by a POSITA, absent the information described above.

[144] EX1004, [0003].

[145] EX1004, FIG. 1 (annotated to show manifolds in blue).



112. In the schematic shown in FIG. 1,[146] manifolds **36** and **38** are connected to pumps **32** and **34**.[147] Further, in describing Figure 1, *Van Vliet* discloses "each tank **18**, **20** is connected to respective pumps **32**, **34** and then to respective manifolds **36**, **38** via lines **40**, **42**."[148]A POSITA would have understood that the connection between *Van Vliet's* manifolds and the associated pumps would be a fluid connection

[146] A schematic in this context is a high-level representation and is not intended to depict the physical appearance or form. *See* EX1022 (describing the definition of schematic as "represented in simplified or symbolic form").

[147] EX1004, [0015], FIG. 1.

[148] EX1004, [0016].

because the pumps and manifold distribute liquid fuel (*i.e.*, a fluid). To the extent that *Van Vliet* does not explicitly disclose a manifold connected to the pump, the teachings of *Van Vliet* would render such a configuration obvious. The purpose of the system of *Van Vliet* is to distribute fuel from the tanks to the hoses via use of pumps and manifolds.

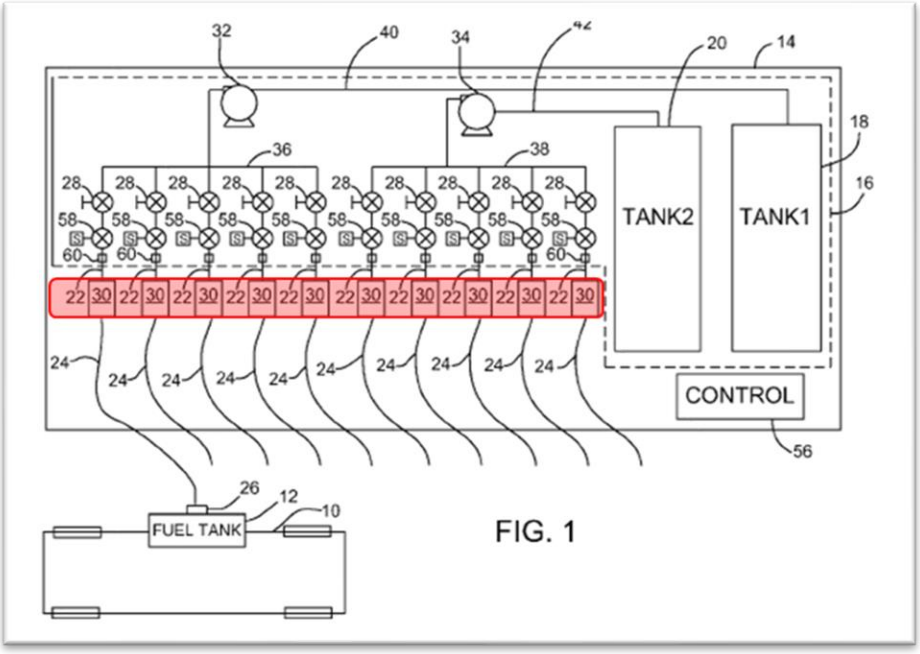
113. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[c].

e. Claim 1[d]: "a plurality of reels on the mobile trailer;"

114. *Van Vliet* discloses "a plurality of reels on the mobile trailer." In *Van Vliet*'s fuel delivery system "[t]he hoses **24** are preferably stored on reels **30**." [149]

[149] EX1004, [0015].

Figure 1 below shows at least ten "reels **30**" on the fuel delivery system **14**: [150]



To the extent that *Van Vliet* does not explicitly disclose plurality of reels on the mobile trailer, the teachings of *Van Vliet* would render such a configuration obvious.

115. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[d].

[150] *See* EX1004, [0008], [0014], FIG. 1 (below) (annotated to show reels 30 highlighted in red).

f. <u>Claim 1[e]: "a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels;"</u>

116. *Van Vliet* discloses "a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels." In *Van Vliet*'s FIG. 1 "each tank **18 20** is connected to pump **32**,**34** and then to respective manifolds **36**,**38** via lines **40**,**42**."[151] Each of hoses **24** is indirectly connected to manifold **36** or **38** via a fluid outlet **22** and stored on a reel **30**.[152] Fluid flows through the fluid outlet **22** to each hose **24** also may be controlled using valves **28** and/or **58**.[153] Therefore, *Van Vliet* discloses flow passages connected to the manifold that each include at least: line **40** or **42**; a fluid outlet **22**; and the connections between each set of an outlet **22**, valve **28**, valve **58**, and hose **24** shown in FIG. 1.[154]

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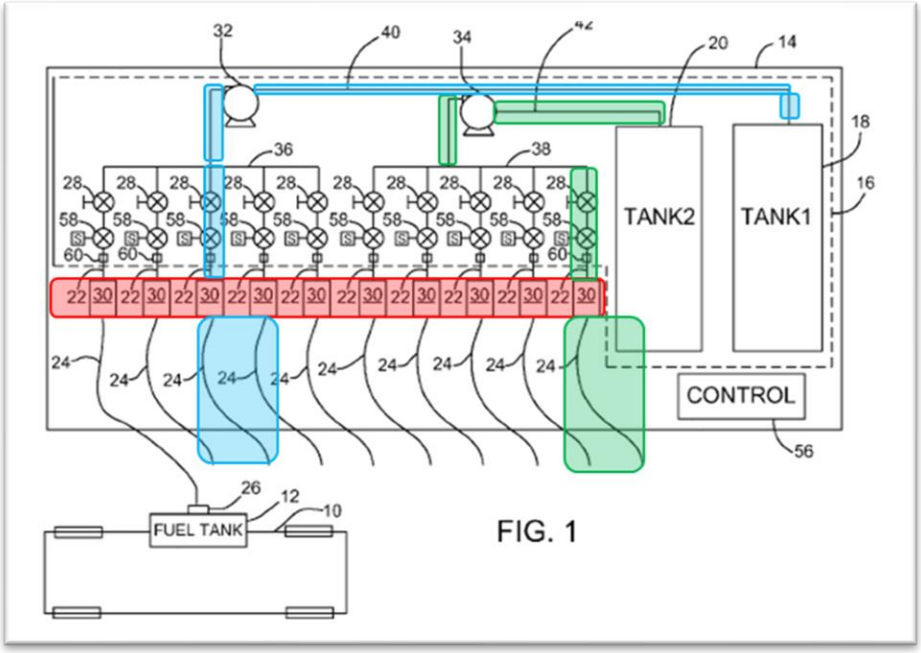
[151] EX1004, [0016].

[152] EX1004, [0015-0016].

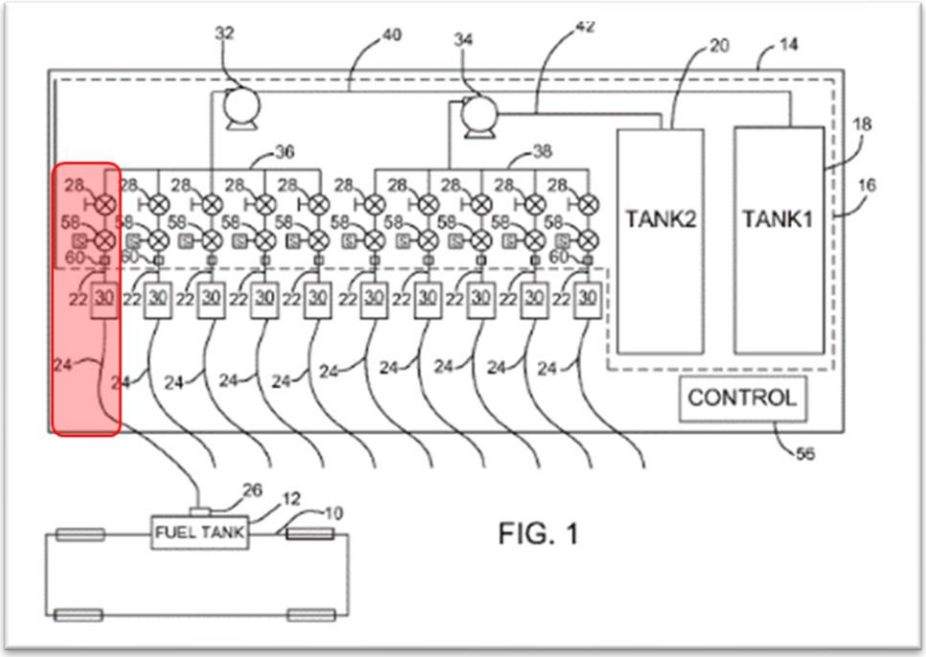
[153] EX1004, [0015].

[154] EX1004, FIG. 1 (annotated to show reels 30 highlighted in red and example flow paths highlighted in blue and green).

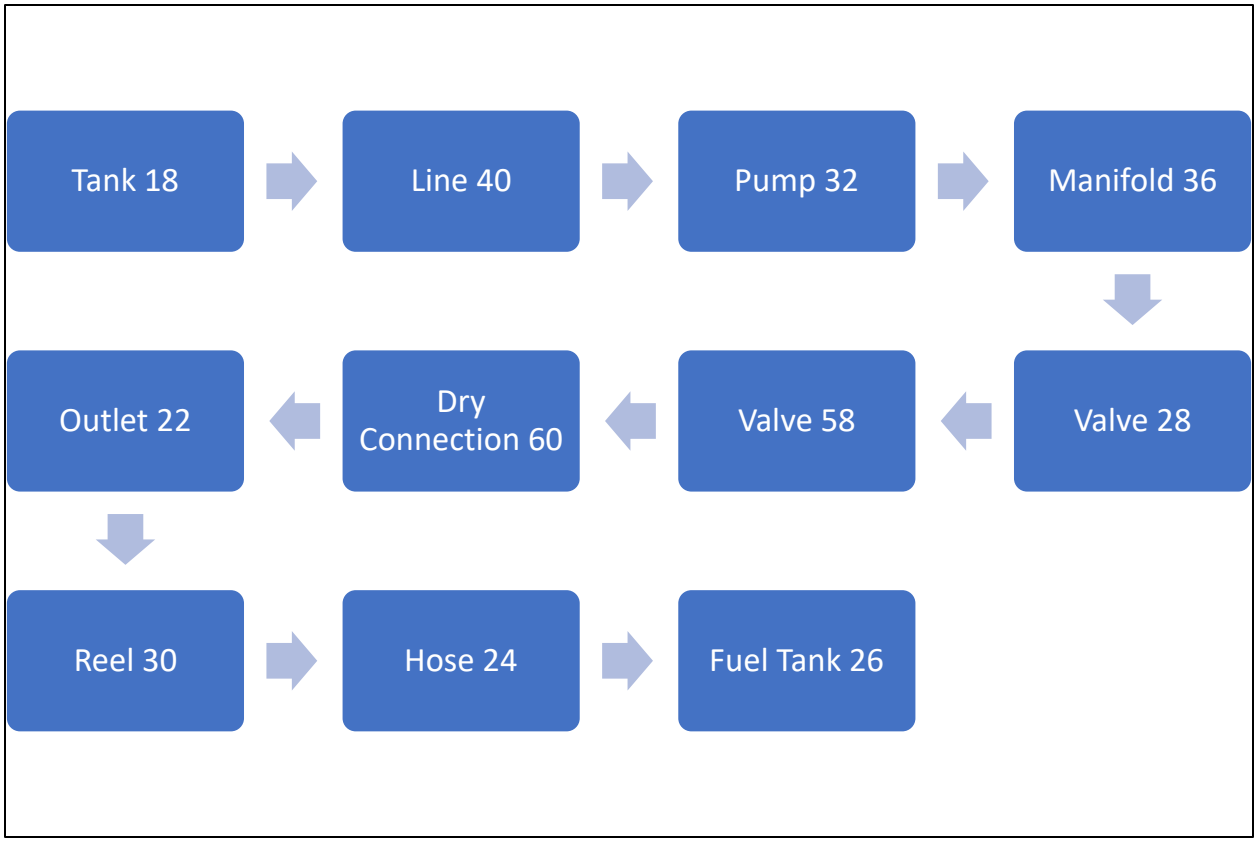


117. FIG. 1 of *Van Vliet* shows that the reels 30 are fluidly connected to the hoses and manifolds.[155]

[155] EX1004, FIG. 1 (annotated).



118. In the annotated FIG. 1 above, a single fluid stream is annotated in red. In this fluid stream, reel **30** is shown in series with the stream, in between outlet **22** and hose **24**. A POSITA would have understood, based on this diagram, that fluid flow is as follows:



119. Accordingly, a POSITA would have understood that the reel **30** is part of the fluid stream, and is, therefore, fluidly connected to both the manifold and the hose. The same is true for each of the streams identified in FIG. 1 (though the pump, line, tank and manifold numbers may change).

120. In the system shown in *Van Vliet's* FIG. 1, "each tank **18**,**20** is connected to pump **32**, **34** and then to respective manifolds **36**, **38** via lines **40**,**42**."[156] Further, each of hoses **24** is indirectly connected to either manifold **36** or **38** via a

[156] EX1004, [0016].

fluid outlet **22** and stored on a reel **30.**[157] Fluid flow through the fluid outlet **22** to each hose **24** also may be controlled using valves **28** and/or **58,** dependent on whether the operator uses manual valve operation or electrical valve operation by the controller. Accordingly, based on this disclosure, *Van Vliet* discloses a plurality flow passages connected to the manifold that each include at least: line **40** or **42**; a fluid outlet **22**; and the connections between each set of an outlet **22**, valve **28**, valve **58**, and hose **24** shown in FIG. 1 of *Van Vliet*.

121. Further, as shown above in FIG. 1, each of these flow passages passes through a reel **30**.[158] Indeed, *Van Vliet* states that the hose reels **30** may leak fluid, confirming that the reels include flow passages.[159] Thus, a POSITA would have understood that each of the flow passages of *Van Vliet* pass through the reels **30**.

122. The entire purpose of the systems of *Van Vliet* is to deliver fluid through the hoses to the delivery point (*i.e.*, external vehicle or equipment). Delivery of fluid through the hoses would require that the hoses be fluidly connected to the pumps and the manifolds. Further, based on the knowledge of a POSITA of what was

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[157] EX1004, [0015]-[0016].

[158] EX1004, FIG. 1.

[159] EX1004, [0022] ("The pan or pans may be positioned to catch fluids leaking from each or both manifolds, and hose reels 30.").

available on the market at the time of the ’118 Patent application, the reel is also fluidly connected to the manifold and the hoses.[160] For example, a reel typically used in the industry in this type of application at the time of the ’118 Patent was the reel supplied by Coxreels described in the *Coxreels* reference. *Coxreels* describes an “[e]xternal fluid path with machined from solid brass 90° full-flow NPT swivel inlet”:[161]

[160] *See supra* Sections VIII.B and VIII.D.

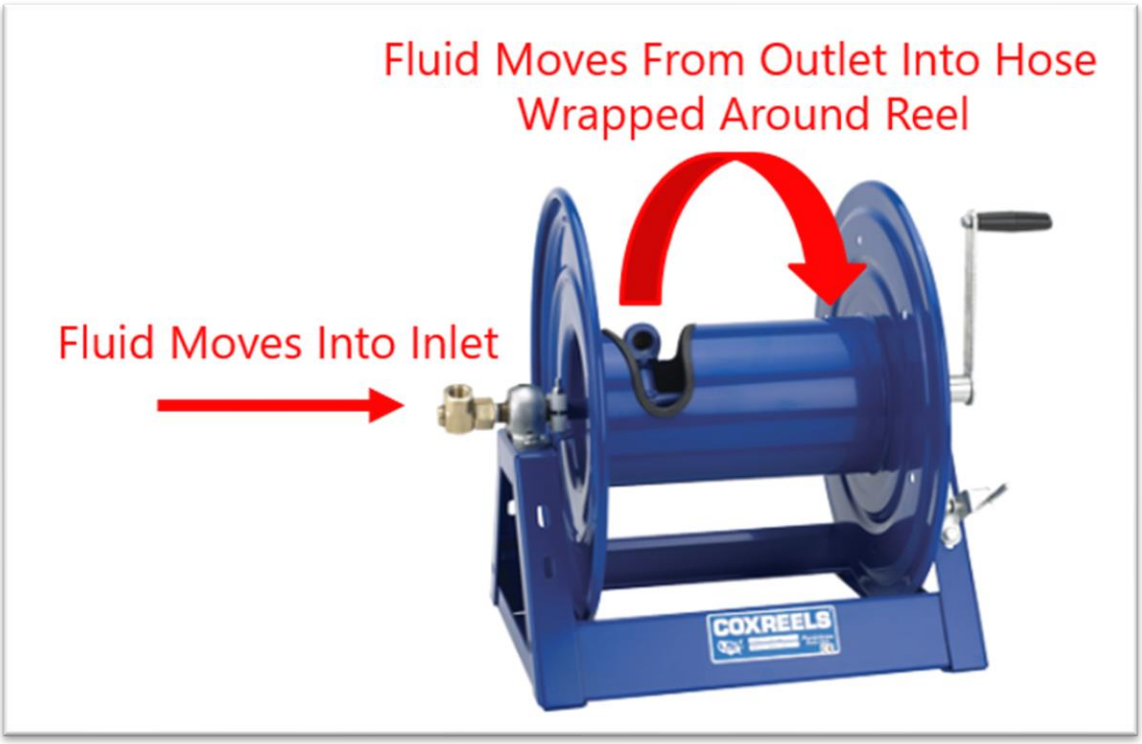
[161] EX1005 (excerpted and annotated to show “external fluid path” with brass “swivel inlet.”).

123. *Coxreels* also describes a "low profile outlet riser & open drum slot design for flat smooth hose wrap.":[162]

124. Accordingly, a POSITA would have recognized that fluid in a system using *Coxreels* would be fluidly connected to the "external fluid path" via the brass inlet, pass through the reel body, and exit into a hose from the outlet made accessible by the "low profile outlet riser & open drum slot design." This was a common and well-known arrangement of hoses and reels at the time of the '118 Patent.[163]

[162] EX1005 (excerpted and annotated to show "outlet" and "drum slot.").

[163] EX1005 (below) (excerpted and annotated to show path of fluid).



125. Thus, a POSITA would recognize as obvious *fluidly* connecting a manifold (upstream of the reel body) to hoses (downstream of the reel body) *through* the reel body.

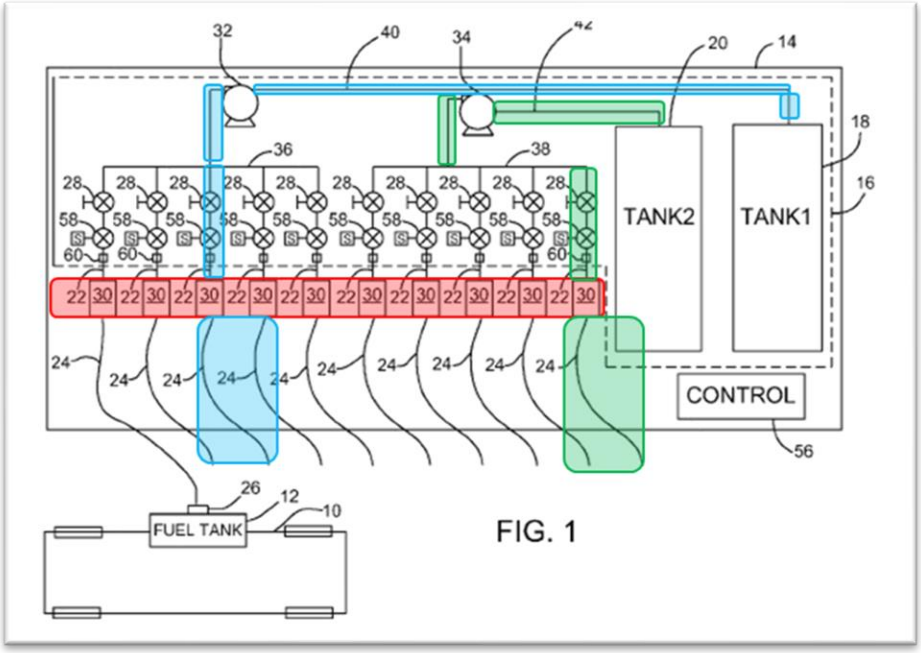


FIG. 1

126. As shown in FIG. 1 above, each of the flow passages passes through a reel **30**.[164] Indeed, *Van Vliet* states that the hose reels **30** may leak fluid, confirming that the reels include flow passages.[165] Thus, a POSITA would have understood that these flow passages of *Van Vliet* pass through the reels. To the extent that *Van Vliet* does not explicitly disclose flow passages being run through the reels on the mobile trailer, the teachings of *Van Vliet* would render such a configuration obvious.

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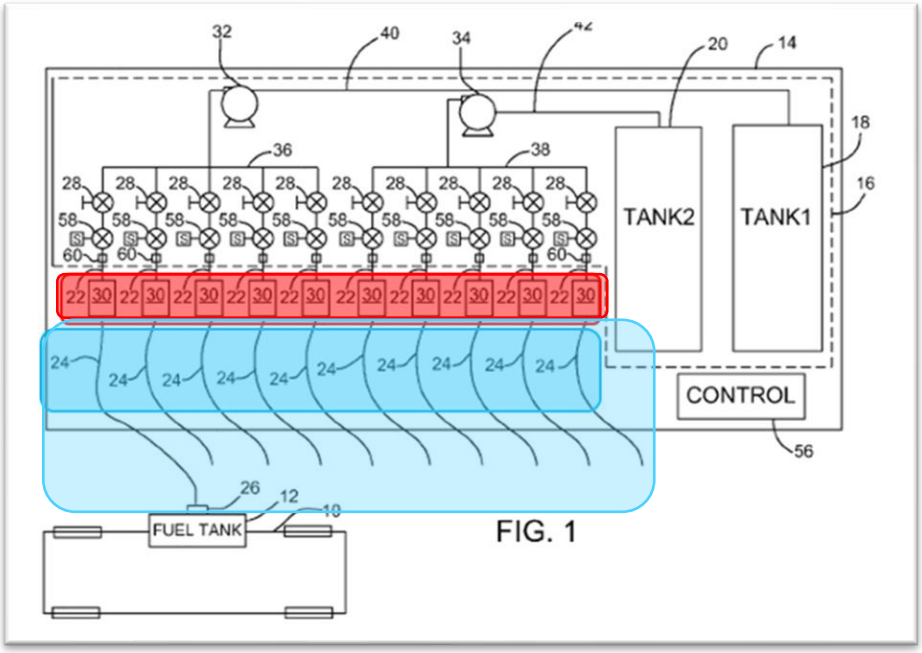
[164] EX1005, FIG. 1.

[165] EX1005, [0022] ("The pan or pans may be positioned to ***catch fluids leaking from*** each or both manifolds, and hose ***reels 30***.").

127. Accordingly, *Van Vliet* discloses, or at least renders obvious, the limitation of Claim 1[e].

g. <u>Claim 1[f]: "a plurality of hoses, each said hose being connected with a respective one of the flow passages via a respective one of the reels;"</u>

128. *Van Vliet* discloses "a plurality of hoses, each said hose being connected with a respective one of the flow passages via a respective one of the reels." For example, *Van Vliet* discloses a plurality of hoses, with one hose **24** stored on and extending from each reel **30**.[166]



[166] EX1004, [0015], FIG. 1. (annotated to show reels 30 highlighted in red and hoses 24 highlighted in blue).

129. Each of hoses **24** are connected to a fluid outlet **22**, which is part of the flow passage discussed in Section XI.A.1.f above.[167] As discussed above, each of these flow passages also flows through a reel **30**, and thus a POSITA would have understood that each hose is connected to the flow passage via a reel.[168] To the extent that *Van Vliet* does not explicitly disclose hoses connected with respective flow paths, the teachings of *Van Vliet* would render such a configuration obvious.

130. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[f].

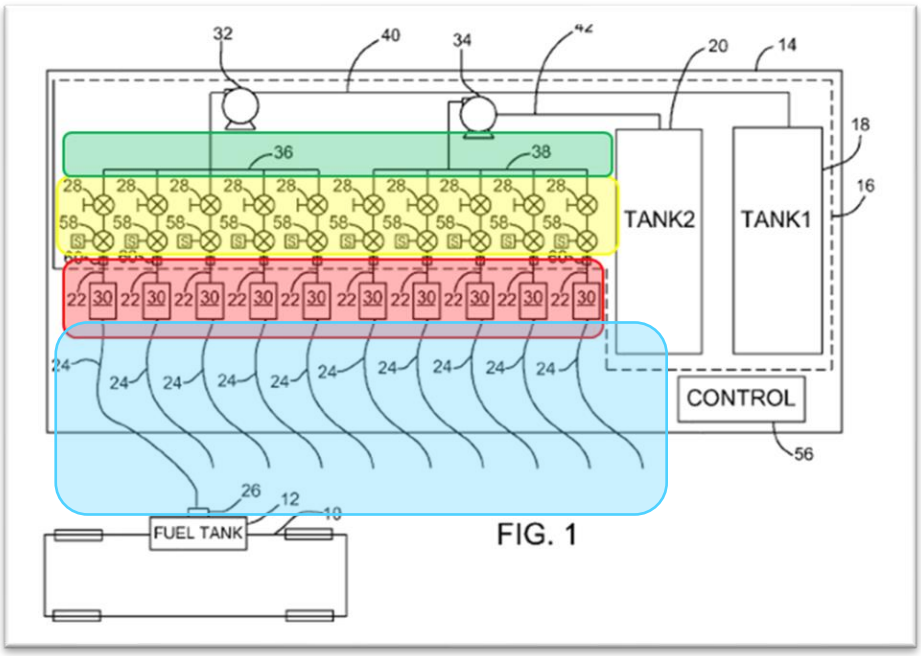
h. <u>Claim 1[g]: "a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the reels and being operable to control fluid flow through a respective one of the flow passages;"</u>

131. *Van Vliet* discloses "a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the reels and being operable to control fluid flow through a respective one of the flow passages." For example, as depicted below, *Van Vliet* discloses a plurality of valves **58** (yellow). As discussed above with respect to Claim 1[a], the fuel delivery system **14** of *Van*

[167] *See supra* Section XI.A.1.f.

[168] *See* EX1004, FIG. 1; *see also supra* Section XI.A.1.f.

Vliet (including valves **58**) is on a mobile trailer.[169] Each of the valves **58** (yellow) is illustrated schematically downstream of manifold **36** or **38** (green).[170] *Van Vliet* discloses "a plurality of valves on the mobile trailer, each of the valves situated between one of the first or second manifolds and a respective different one of the hoses." FIG. 1 of *Van Vliet* shows such an arrangement.[171]



[169] EX1004, [0008], [0014].

[170] EX1004, FIG. 1.

[171] EX1004, FIG. 1 (annotated to show hoses **24** highlighted in blue, reels **30** highlighted in red, valves **28** and **58** highlighted in yellow, and manifolds **36**, **38** highlighted in green).

132. As depicted above, *Van Vliet* discloses a plurality of valves **28** and **58** (yellow).[172] The fuel delivery system **14** (including valves **28** and **58** in yellow) is on a mobile trailer.[173] Each of the valves **28** / **58** (yellow) is situated downstream of one of manifold **36** and manifold **38** (green).[174] Furthermore, each of the valves **28** and **58** (yellow) is situated upstream of a respective different one of the hoses **24** (blue).[175] *Van Vliet* provides a description of the arrangement shown in FIG. 1: "Each tank **18**, **20** is connected to respective pumps **32**, **34** and then to respective manifolds **36**, **38** via lines **40**, **42**. The fuel outlets **22** are located on the manifolds **36**, **38** and fluid flow through the fuel outlets **22** is controlled preferably at least by the manual valves **28**."[176] *Van Vliet* further discloses "[a] valve arrangement, comprising for example valve **28** and/or valve **58**, is provided at each fuel outlet **22** to control fluid flow through the hose **24** connected to each respective fuel outlet **22** to permit independent operation of each hose **24**."[177] Furthermore, each of the valves **28**,**58**

[172] EX1004, FIG. 1.

[173] EX1004, [0008], [0014], *see also supra* Section XI.A.1.b.

[174] EX1004, FIG. 1.

[175] EX1004, FIG. 1.

[176] EX1004, [0016].

[177] EX1004, [0015].

(yellow) is illustrated schematically upstream of a respective different one of the reels **30** (red).[178]

133. Thus, a POSITA would have understood that at least *Van Vliet*'s valves **28**, **58** are each "situated between the manifold and a respective different one of the reels."[179] Valves **28, 58** "control fluid flow through the hose **24** . . . to permit independent operation of each hose **24**."[180] Reels **30** reside between valves **28, 58** and hoses **24**. Accordingly, for valves **28**, **58** to control fluid flow to and through the hose **24**, valves **28, 58** must be operable to control fluid flow through the flow passages that pass through reels **30**, as shown in FIG. 1.[181] To the extent that *Van Vliet* does not explicitly disclose the specific configuration of valves, manifolds, reels and flow passages claimed, the teachings of *Van Vliet* would render such a configuration obvious.

134. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[g].

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[178] EX1004, [0015].

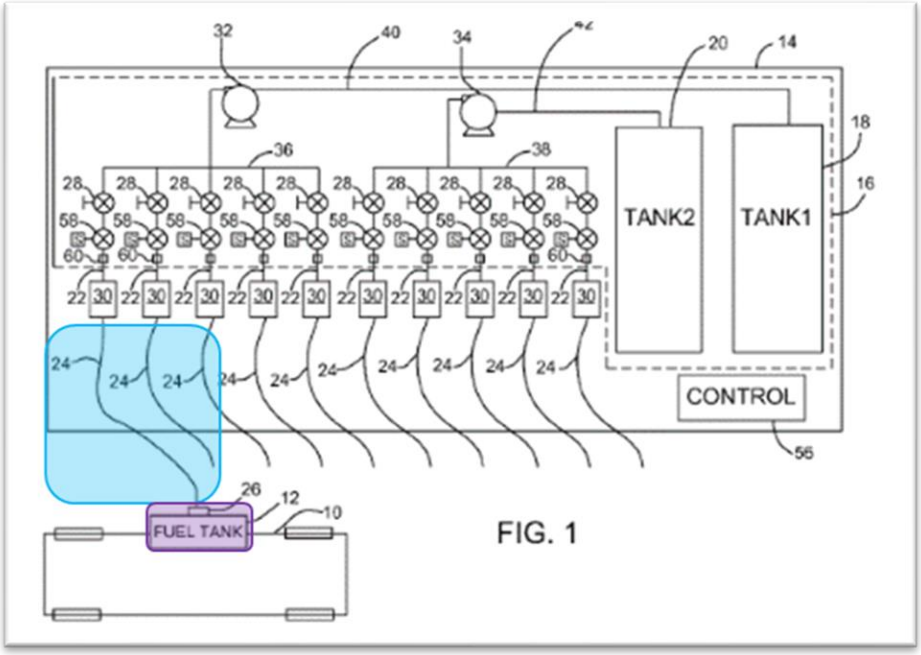
[179] EX1004, FIG. 1.

[180] EX1004, [0015].

[181] *See* EX1004, FIG. 1, [0015].

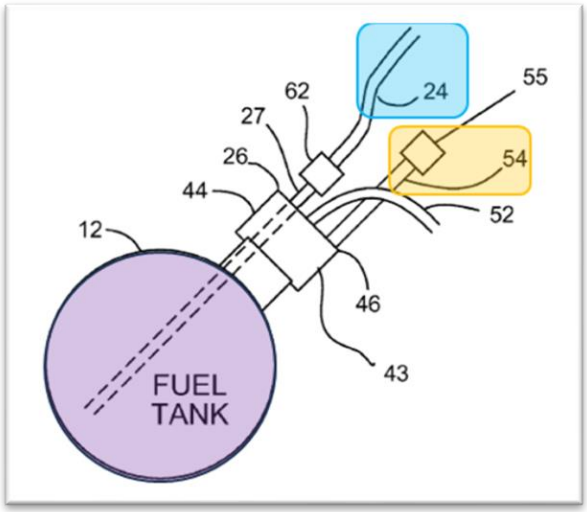
i. Claim 1[h]: "a plurality of fluid level sensors, each said fluid level sensor being connected or connectable with a respective different one of the hoses;"

135. *Van Vliet* discloses "each said fluid level sensor being connected or connectable with a respective different one of the hoses." For example, in *Van Vliet*, each hose leads to a fuel tank on a separate piece of equipment, as shown in FIG. 1:[182]



[182] EX1004, FIG. 1 (annotated to show hoses **24** highlighted in blue and fuel tank **12** highlighted in purple).

136. According to *Van Vliet*, each fuel tank **12** has a fuel cap **26** secured thereon that is connected to both one of the hoses **24** and a fuel level sensor **54**, as shown in FIG. 2 below:[183]



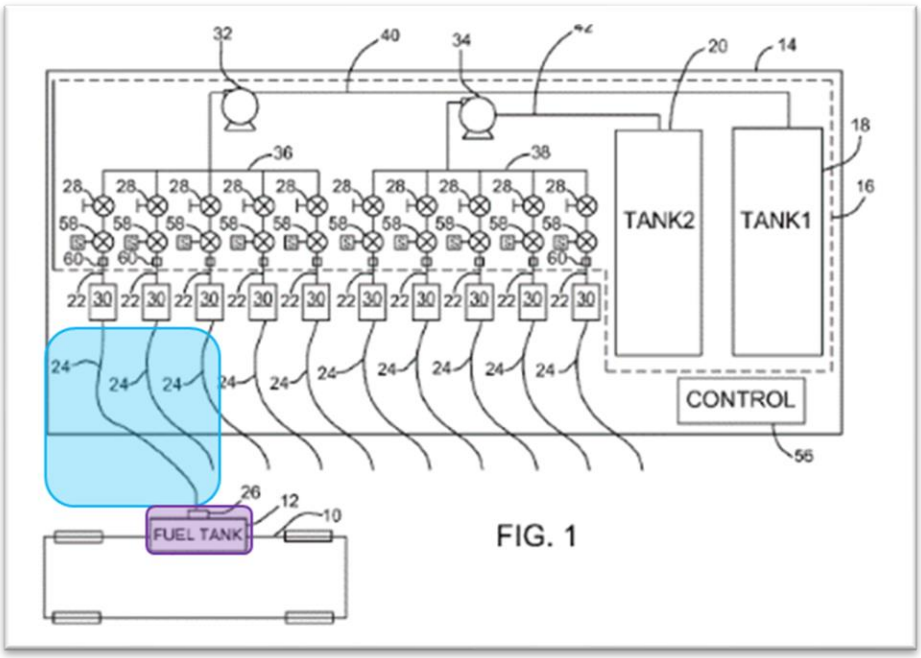
137. *Van Vliet* further describes the sensors: "[t]he fuel level sensor **54** may be any suitable sensor such as float sensor, vibrating level switch, or pressure transducer."[184] A POSITA would have understood that the float sensor and the vibrating level switch would each be used to obtain information about the level of fuel in the fuel tank and would accordingly be "fluid level sensors" as the term is used in the claims. The specification of the '118 Patent, when discussing an

[183] EX1004, FIG. 2 (annotated to show hose **24** highlighted in blue, fuel level sensor 54 highlighted in orange, and fuel tank **12** highlighted in purple).

[184] EX1004, [0017].

embodiment of the claims, states "[t]he sensor **50***d* may be any type of sensor that is capable of detecting fluid or fuel level in a tank."[185] Each of *Van Vliet's* hoses is associated with a respective fuel level sensor **52,** as claimed in 1[h].

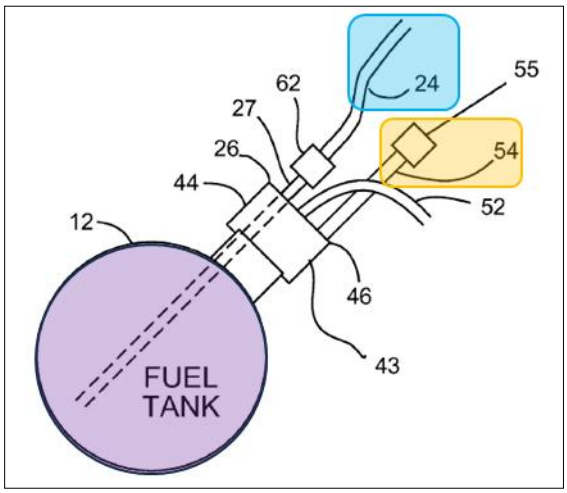
138. In using *Van Vliet*'s system, each hose **24** (shown in blue below) leads to a respective different fuel tank **12** (shown in purple below):[186]



[185] EX1001, 6:4-5.

[186] EX1004, FIG. 1 (annotated to show hoses **24** highlighted in blue and fuel tank **12** highlighted in purple).

139. Each fuel tank **12** has a fuel cap **26** secured thereon that is connected to both one of the hoses **24** and a fuel level sensor **54** (in orange below), as shown in Figure 2:[187]



140. According to *Van Vliet*, "[t]he fuel level sensor **54** may be any suitable sensor such as float sensor, vibrating level switch, or pressure transducer."[188] Thus, each fuel level sensor is connected with a respective different one of the hoses.[189] To the extent that *Van Vliet* does not explicitly disclose the specific configuration of level sensors connected or connectable to different hoses as claimed, claimed, the teachings of *Van Vliet* would render such a configuration obvious.

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[187] EX1004, FIG. 2 (annotated to show hose **24** highlighted in blue, fuel level sensor **54** highlighted in orange, and fuel tank **12** highlighted in purple).

[188] EX1004, [0017].

[189] EX1004, FIG. 1, FIG. 2.

141. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[h].

j. <u>Claim 1[i]: "and a controller configured to operate the valves responsive to fluid level thresholds to control fluid flow to the hoses."</u>

142. *Van Vliet* discloses "a controller configured to operate the valves responsive to fluid level thresholds to control fluid flow to the hoses." As discussed above with respect to Claim 1[h], *Van Vliet* discloses fuel level sensors for detecting fluid levels.[190] *Van Vliet further* discloses a controller in communications with a fluid level sensors: "[t]he sensor **54** preferably communicates with a control station **56** on the trailer **14** via a wireless communication channel, though a wired channel may also be used."[191] *Van Vliet's* "controller **56**" uses data from the sensor "to provide control signals to the respective automatically operable valves **58**"[192] to start or stop fuel flow through the hoses to each respective fuel tank. *Van Vliet* discloses the controller **56** "is responsive to is responsive to a low fuel level signal from each fuel tank **12** to start fuel flow to the fuel tank **12** independently of flow to other fuel tanks **12** and to a high level signal from each fuel tank **12** to stop fuel flow to the fuel tank

[190] EX1004, FIG. 2, [0017].

[191] EX1004, [0018].

[192] EX1004, [0020].

12 independently of flow to other fuel tanks **12**. That is, commencement of fuel delivery is initiated when fuel in a fuel tank is too low and stopped when the tank is full."[193] A POSITA would have understood that either the "low fuel level signal," or the "high level signal" corresponds to a "fluid level threshold" within the meaning of the '118 Patent. *Van Vliet's* controller **56** operates valve **58** in response to either of these fluid thresholds, *i.e.* to open the valve and start fuel flow when the fuel level in the tank is too low and to stop fuel delivery when the tank is "full" (when the high level signal is received). To the extent that *Van Vliet* does not explicitly disclose that the "low level signal" and "high level signal" are "fluid level thresholds" and that the controller responds to these thresholds in order to control fluid flow to the hoses, the teachings of *Van Vliet* would render such a configuration obvious.

143. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 1[i].

2. Claim 2: "The distribution station as recited in claim 1, wherein the controller is configured to determine fluid levels based on signals from the fluid level sensors and determine whether one or more of the fluid levels are below one or more of the fluid level thresholds."

144. For the same reasons discussed with respect to Claim 1[i] above, and incorporated herein by reference, *Van Vliet* discloses a "controller [that] is

[193] EX1004, [0020].

configured to determine fluid levels based on signals from the fluid level sensors" based on "fluid level thresholds."[194]

145. A POSITA would further have understood that, because the controller uses data from the sensor "to provide control signals to the respective automatically operable valves **58**" to start "start fuel flow to the fuel tank **12**" based on the "low fuel level signal," the controller must determine when fluid levels are *below* the fluid level threshold rather than above the fluid level threshold.[195] To the extent that *Van Vliet* does not explicitly disclose that the "low level signal" is a "fluid level thresholds" and that the controller determines the fluid level is below the threshold and opens the valve to start fuel flow to the hoses, the teachings of *Van Vliet* would render such a configuration obvious.

146. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, Claim 2.

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[194] *See supra* Section XI.A.1.j.

[195] EX1004, [0020].

3. Claim 3: "The distribution station as recited in claim 2, wherein the controller is configured to open the valves for which the fluid levels are below the fluid level thresholds."

147. For the same reasons discussing above regarding Claim 1[i], *Van Vliet* discloses Claim 3.[196] When *Van Vliet*'s controller receives a "low fuel level" signal, the controller "provide[s] control signals to the respective automatically operable valves **58**" to "start fuel flow to the fuel tank **12**."[197] *Van Vliet* discloses that valves **58** may be "operable via a solenoid S",[198] which allows fluid flow by opening in response to a low fuel level signal from the fuel tank. To the extent that *Van Vliet* does not explicitly disclose that the "low level signal" is a "fluid level thresholds" and that the controller opens the valve when fluid level is below the threshold to start fuel flow to the hoses, the teachings of *Van Vliet* would render such a configuration obvious.

148. Accordingly, a POSITA would have understood that *Van Vliet* discloses, or at least renders obvious, Claim 3.

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[196] *See supra* Section XI.A.1.j.

[197] EX1004, [0020].

[198] EX1004, [0020].

B. Ground 1A: Claims 1-3 are rendered obvious by *Van Vliet* in view of *Coxreels*

1. Rationale and Motivation for Combining *Van Vliet* with *Coxreels*

149. A POSITA would have been motivated to combine *Coxreels* with *Van Vliet*. *Coxreels* is in the same field of endeavor as *Van Vliet* (as well as the '118 Patent) and is directed to solving the same problem—using reels to support hoses for use in distributing hydrocarbon liquids.[199] *Coxreels* is therefore analogous art to *Van Vliet* as well as the challenged claims. A POSITA, based on the teachings of *Van Vliet* regarding storage of hoses on reels, would have been motivated to reference information on commercially available hose reels, such as the ones disclosed in *Coxreels* when designing the layout of the fuel distribution station. Information contained in *Coxreels*, such as dimensions and capacities of commercially available reels, would have been invaluable to the designer when evaluating the size, layout, location, and spatial orientation of equipment on the mobile distribution station.

150. It would have been obvious to a POSITA to use the specific reel described in *Coxreels*' in the system of *Van Vliet*. A POSITA would have been motivated to combine *Coxreels*' reel with the system of *Van Vliet*. *Van Vliet*

[199] EX1001, 1:28-37; *see also* EX1004, [0003], [0014], Abstract; EX1005, 1:40-65.

discloses the use of reels.[200] A POSITA designing a system of *Van Vliet* would have looked to commercially available reel components like those described in *Coxreels*, among other reasons, as a cost-effective and readily available option (*e.g.*, as compared to a custom-made reel) for the building of that system. At the time of the '118 Patent Coxreels were specifically market for use in the Oil industry.[201] According to an internet archive version of the Coxreels website, one application of the 1125 series was to the oil industry.[202]

151. Accordingly, a POSITA would have recognized the advantage of using *Coxreels*' reel in *Van Vliet*'s mobile fuel delivery system. This would have predictably resulted in enabling *Van Vliet*'s system to operate using a specified reel of a specified size.

152. *Coxreels* describes the "1125 Series hand crank and motorized hose reels have the features demanded by industry professionals."[203] *Coxreels* describes "industry preferred design features [such as] a sturdy one piece all welded 'A' frame base, low profile outlet riser and open drum slot design provides a non-crimping, flat

[200] EX1004, [0015].

[201] *See* EX1035.

[202] EX1035.

[203] EX1005.

smooth hose wrap."[204] A POSITA would have recognized the advantage of using *Coxreels*' reels with *Van Vliet*'s system, particularly to allow for easy design and construction of a hose reel distribution system with commercially available components.

153. A POSITA would have had a reasonable expectation of success in combining *Coxreels* with *Van Vliet*. To combine *Van Vliet* with *Coxreels*, a POSITA would have needed only to select *Coxreels*' reel when choosing which reel to implement. Incorporating *Coxreels*' reel into *Van Vliet*'s mobile fuel delivery system would merely involve combining a known prior art reel according to known methods, installing and using the reel in a conventional way. Therefore, a POSITA would have expected that the *Coxreels* reel would work successfully and according to its known functionality in combination with *Van Vliet*.

2. Claim 1

154. It is my opinion that *Van Vliet* discloses, or at least renders obvious, Claim 1 of the '118 Patent. To the extent that the board determines *Van Vliet* does not anticipate Claim 1 or render the entire Claim obvious, *Van Vliet* in view of *Coxreels* renders Claim 1 obvious.

[204] EX1005.

a. Claims 1[p]-1[d]

155. For the same reasons discussed with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses, or at the least renders obvious, claims 1[p]-1[d].[205] Nothing in *Coxreels* teaches against the disclosure and/or teaching of *Van Vliet*. Accordingly, the combination of *Van Vliet* with *Coxreels*, renders Claims 1[p]-1[d] obvious.

b. Claim 1[e]: "a plurality of flow passages, each said flow passage being connected to the manifold and running through a respective one of the reels;"

156. For the same reasons discussed with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses claim 1[e].[206] To the extent that the claims require (and to the extent *Van Vliet* does not explicitly disclose) that the reels themselves include flow passages separate from the hoses, *Coxreels* discloses a reel for storing hoses that has a built-in "fluid path." *Van Vliet* discloses a plurality of hoses, with one hose **24** stored on and extending from each reel **30**.[207] FIG. 1 of *Van Vliet* shows that the reels **30** are fluidly connected to the hoses and manifolds.[208]

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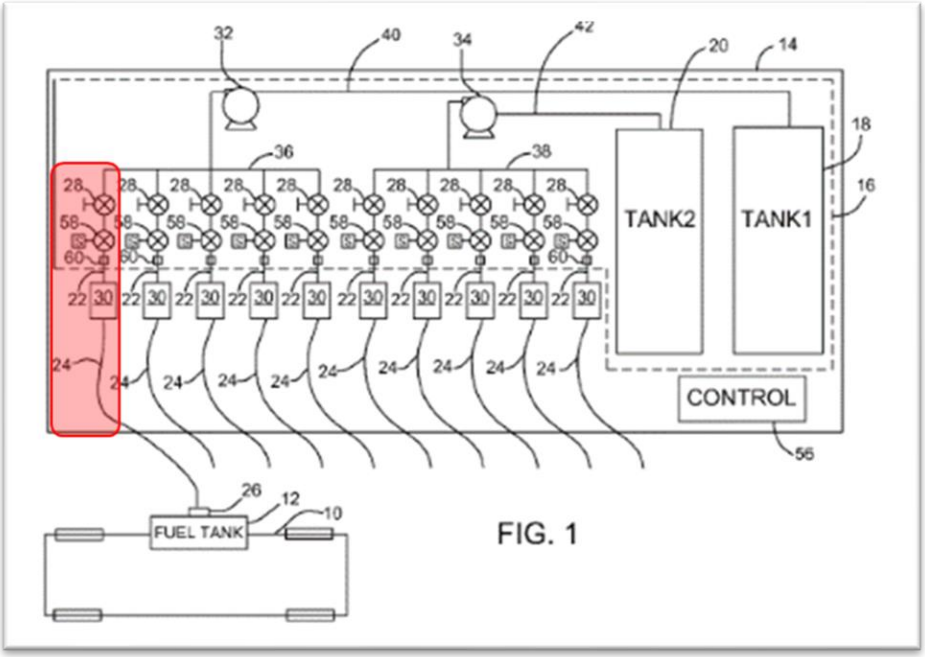
[205] *See supra* Section A.1.a-e.

[206] *See supra* Section XI.A.f.

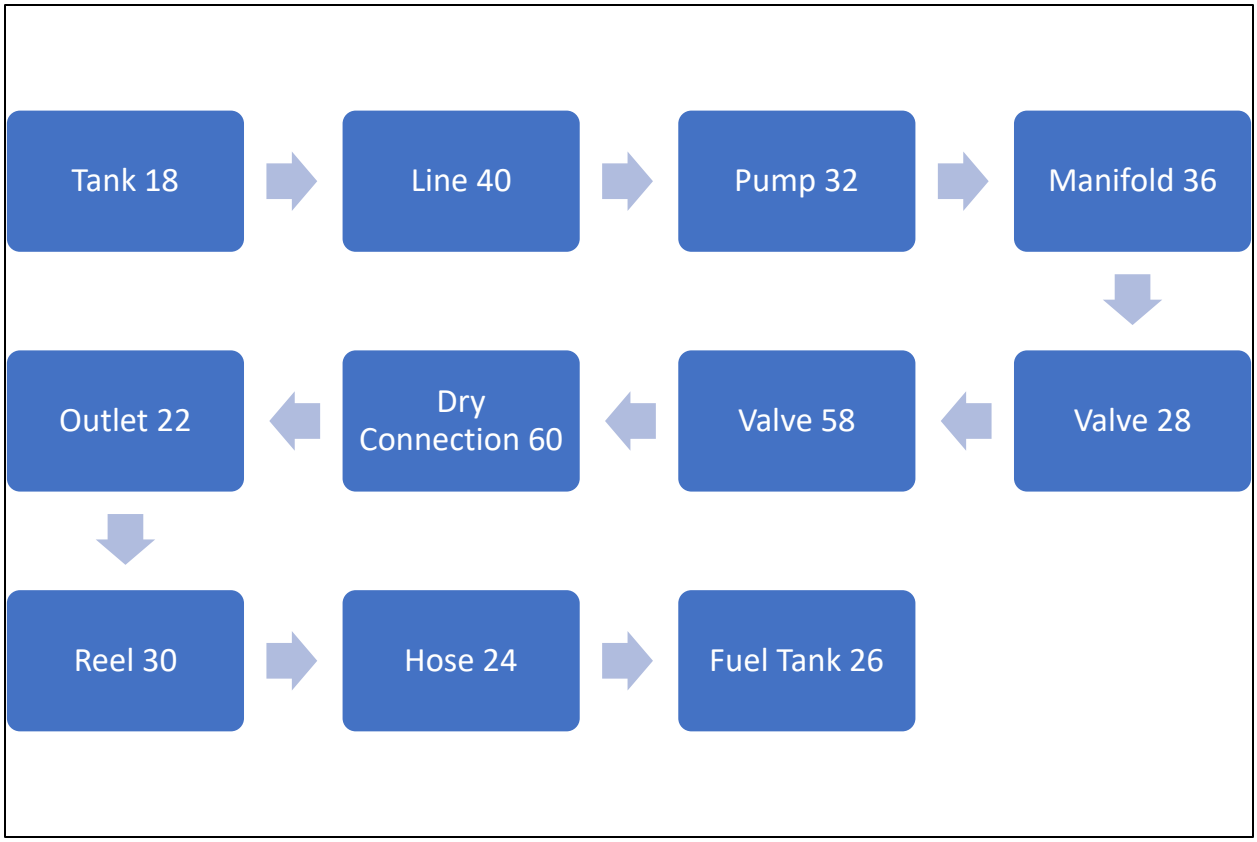
[207] *See* EX1004, [0015], FIG. 1.

[208] EX1004, FIG. 1 (annotated to show a single fluid stream).



157. In the annotated FIG. 1 above, a single fluid stream is annotated in red.[209] A POSITA would have understood, based on this diagram, that the fluid flows as follows:

[209] EX1004, FIG. 1.



158. Accordingly, a POSITA would have understood that the reel **30** is part of the fluid stream, and is, therefore, fluidly connected to both the manifold and the reel.[210] The same is true for each of the streams identified in FIG. 1 (though the pump, tank and manifold numbers may change). Delivery of fluid through the hoses would require that the flow passages be fluidly connected to the reels and the manifolds. For example, a reel typically used in the industry in this type of application at the time of the '118 Patent was the reel supplied by Coxreels described

[210] *See* EX1004, FIG. 1.

in the *Coxreels* reference. *Coxreels* describes an "[e]xternal fluid path with machined from solid brass 90° full-flow NPT swivel inlet":[211]

Coxreels also describes a "low profile outlet riser & open drum slot design for flat smooth hose wrap.":[212]

[211] EX1005 (excerpted and annotated to show "external fluid path" with brass "swivel inlet.").

[212] EX1005 (excerpted and annotated to show "outlet" and "drum slot.").

159. A POSITA would have recognized the "outlet riser" above, annotated in red, would have been the outlet, or discharge point, of fluid that flowed into the swivel inlet. A POSITA would have recognized that fluid in a system using *Coxreels* would be fluidly connected to the "external fluid path" via the brass inlet, pass through the reel body, and exit into a hose from the outlet made accessible by the "low profile outlet riser & open drum slot design."[213] This was a common and well-known arrangement of hoses and reels at the time of the '118 Patent.[214] [215]

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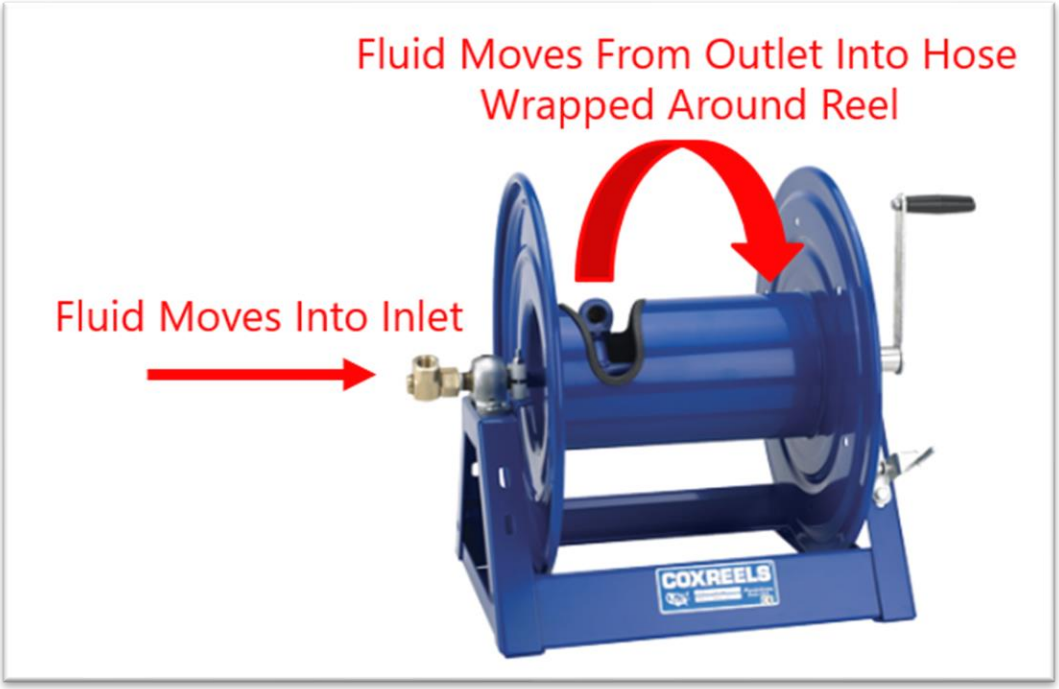
[213] *See* EX1005.

[214] *See supra* Section VIII.C.

[215] EX1005 (excerpted and annotated to show path of fluid).



160. Accordingly, a POSITA would have recognized as obvious fluidly connecting a manifold (upstream of the reel body) to hoses (downstream of the reel body) through a flow passage in the reel body.[216] Therefore, the combination of *Van Vliet* and *Coxreels* renders Claim 1[e] obvious.

c. <u>Claim 1[f]: "a plurality of hoses, each said hose being connected with a respective one of the flow passages via a respective one of the reels;"</u>

161. For the same reasons discussed with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses claim 1[f].[217]

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[216] EX1004, FIG. 1; *see also* EX1005, 1.

[217] *See supra* Section XI.A.1.g.

162. Alternatively, it would be obvious to combine *Van Vliet* with *Coxreels*, which describes a reel having a fluid path with connection ports.[218] In that combination, the hose **24** of *Van Vliet* would be connected to the below outlet port on the reel of *Coxreels*:[219]

163. *Coxreels*' reel also includes an inlet port: [220]

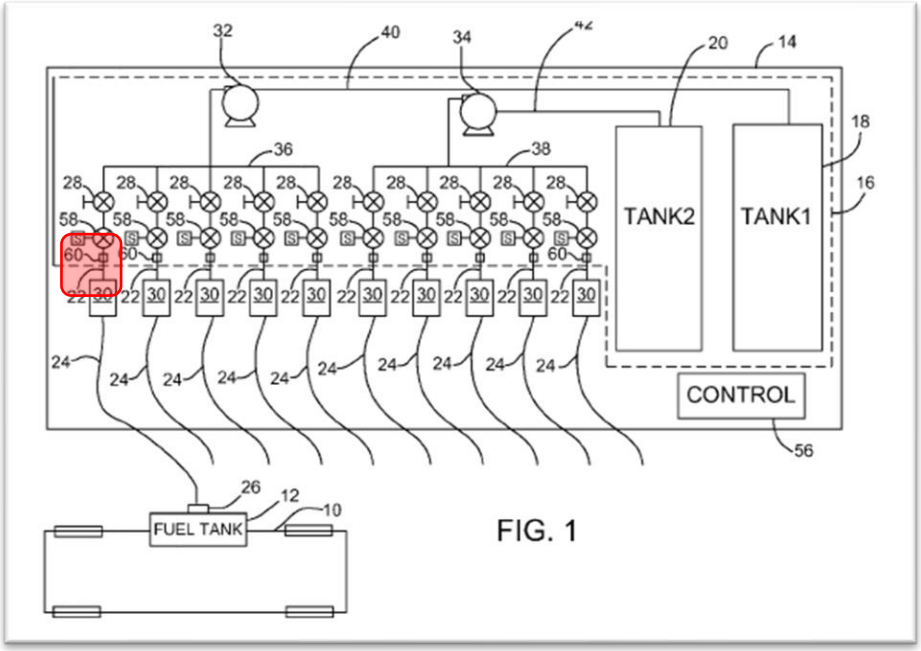
[218] EX1005.

[219] EX1005 (excerpted and annotated to show "outlet" and "drum slot.").

[220] EX1005 (excerpted and annotated to show "external fluid path" with brass "swivel inlet.").

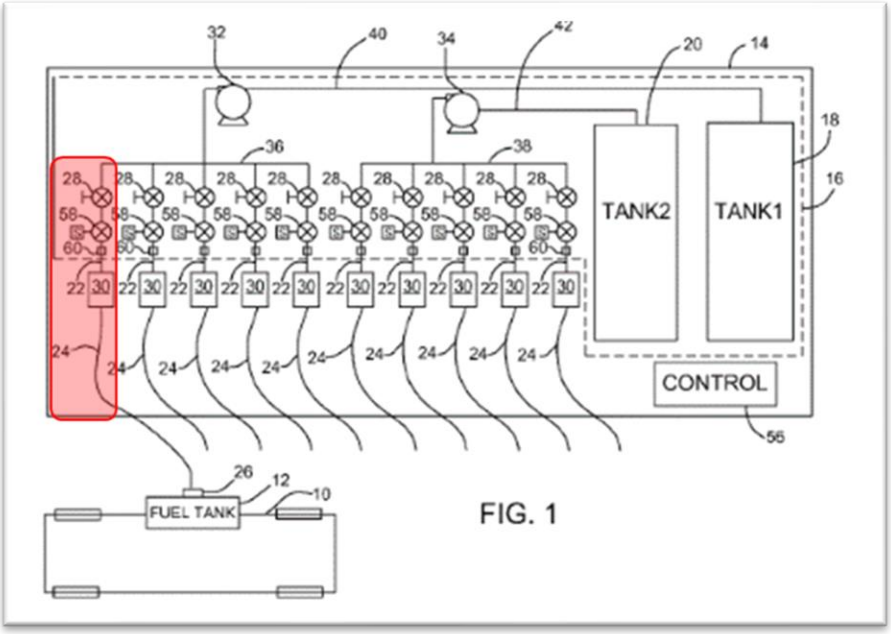
164. As taught by *Van Vliet*, the inlet port annotated above would be connected to fluid outlet 22 of *Van Vliet*:[221]

[221] EX1004, FIG. 1 (annotated).



165. *Van Vliet*'s FIG. 1 depicts a fluid communication system extending from manifolds **36**, **38** to reels **30**, to hoses **24**.[222]

[222] EX1004, FIG. 1 (annotated to show one of a plurality of flow paths).



166. Thus, a POSITA would have understood that, in the *Van Vliet* system combined with *Coxreels*, each of the hoses **24** are connected to the flow passages via a reel **30**. Accordingly, the combination of *Van Vliet* with *Coxreels*, renders Claim 1[f] obvious.

d. <u>Claims 1[g]-1[i]</u>

167. For the same reasons discussed with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, claim 1[g]-1[i].[223] Nothing in *Coxreels* teaches against the disclosure and/or teaching of *Van Vliet*. Accordingly, the combination of *Van Vliet* and *Coxreels* renders Claims 1[g]–1[i] obvious.

[223] *See supra* Section XI.A.1.h-j.

3. Claims 2-3

168. For the same reasons discussed with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious claims 2-3.[224] Nothing in *Coxreels* teaches against the disclosure and/or teaching of *Van Vliet*. Accordingly, the combination of *Van Vliet* and *Coxreels* renders Claims 2-3 obvious.

C. Ground 2: Claims 4-18 are rendered obvious by *Van Vliet* in view of *Shoap*

1. Rationale and Motivation for Combining *Van Vliet* and *Shoap*

169. A POSITA would have been motivated to combine *Shoap* with *Van Vliet*. *Shoap* is in the same field of endeavor as *Van Vliet* (as well as the challenged claims of the ’118 Patent) and is directed to solving the same problem—using hoses stored on reels to deliver fluids while simultaneously sending and/or receiving data.[225] *Shoap* is therefore analogous art to *Van Vliet* as well as the challenged claims of the ’118 Patent.

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[224] *See supra* Section XI.A.2-3.

[225] EX1001, 1:65-2:10, 5:32-51; *see also* EX1004, [0003], [0020], Abstract; *see also* EX1006, FIG. 1A, 4:50-5:3.

170. A POSITA would have been motivated to combine *Shoap*'s teaching of a wired hose with *Van Vliet*. *Van Vliet* discloses the use of hoses, sensors, reels and controllers.[226] *Shoap* discloses the use of a wired hose storable on a reel.[227] A POSITA would have been motivated to combing *Van Vliet* and *Shoap* at least because of their commonalities.

171. Further, *Van Vliet* contains an express motivation to combine. Though *Van Vliet* states a preference for wireless communication, it contemplates wired embodiments: *Van Vliet's* fuel level sensor "communicates with a control station **56** on the trailer **14** via a wireless communication channel, *though a wired channel may also be used*."[228] *Van Vliet,* while providing details regarding the wireless communication preferred, does not provide the same level of detail for wired communication, instead leaving such details to the designer. A POSITA designing a system of *Van Vliet* would, accordingly, have looked to existing hose designs that enable fluid flow to the tanks **12** (as taught by *Van Vliet*), along with compact and convenient wire placement to enable wired communications, such as *Shoap*. In fact, use of *Shoap*'s wired hose would enable a wired embodiment of *Van Vliet* that

[226] EX1004, [0015], [0020].

[227] EX1006, 5:39-51.

[228] EX1004, [0018] (emphasis added).

accomplishes one known benefit of traditional wireless embodiments (that is, avoiding unnecessary clutter from wires). A POSITA would have recognized the advantage of using *Shoap*'s wired hose in *Van Vliet*'s mobile fuel delivery system to connect the fluid level sensors **54** and controller **56** of *Van Vliet*.

172. It was also known in the art when the '118 Patent was filed that wired hoses could be used in fueling operations to connect sensors, controllers, and other components of the fueling system. For example, U.S. Patent No. 10,882,732 to Haile ("*Haile*") (EX1029) describes a mobile fueling platform for providing fuel to hydraulic fracturing equipment in which a "wired hose **811**" is connected to a fuel cap and to "a high sensor 813" and "a low sensor 815" on a saddle tank of fracturing equipment being refueled. Both sensors are connected through "electrical coupler 807" and through the wired hose 811 to communication to the controller of *Haile*. The fuel cap contains couplers for connecting sensors on the fuel cap to a controller through the wired hose. [229] Accordingly, based in part of the knowledge of a POSITA, it would have been obvious to a POSITA that a wired hose such as that of *Shoap* could be used in a fueling system for hydraulic fracturing operations as disclosed in *Van Vliet*.

[229] EX1029, 8:5-9:26, FIGs. 17, 18.

173. A POSITA would have had a reasonable expectation of success in combining *Shoap* with *Van Vliet*. To combine *Van Vliet* with *Shoap*, a POSITA would have needed only to: (1) select *Van Vliet*'s wired embodiment,[230] and (2) select *Shoap*'s hose, an obvious choice given the space-saving and reduced clutter advantages of *Shoap* and *Shoap*'s use of reels.[231] Incorporating *Shoap*'s wired hose into *Van Vliet*'s mobile fuel delivery system would merely involve combining prior art elements according to known methods to yield predictable results—*e.g.*, enabling *Van Vliet*'s system to operate using a hose stored on a reel with a communication channel running through the hose assembly.

2. Claim 4: "The distribution station as recited in claim 2, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors, and each said sensor communication line being routed with a respective different one of the hoses."

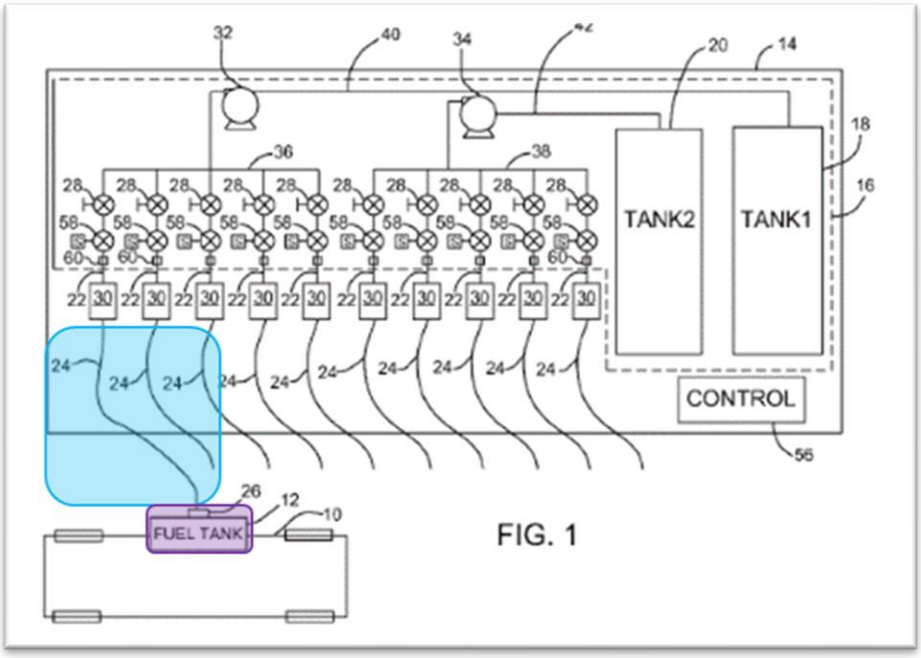
174. *Van Vliet* discloses a sensor **54** corresponding to each hose **24**.

175. *Van Vliet* further discloses multiple hoses having such sensors. *Van Vliet* discloses "the fuel delivery system comprising a fuel source having plural fuel outlets, a hose on each fuel outlet of the plural fuel outlets, each hose being

[230] *See* EX1004, [0018].

[231] EX1006, 5:39-51.

connected to a fuel cap on a respective one of the fuel tanks for delivery of fuel to the fuel tank." Further, FIG. 2 of *Van Vliet* shows hose **24** connected with fuel cap **26** and with sensor **54**:[232]



176. *Van Vliet* also discloses "Each cap **26** also preferably comprises a fuel level sensor **54** mounted in port **49**. The fuel level sensor **54** may be any suitable sensor such as a float sensor, vibrating level switch or pressure transducer."[233]

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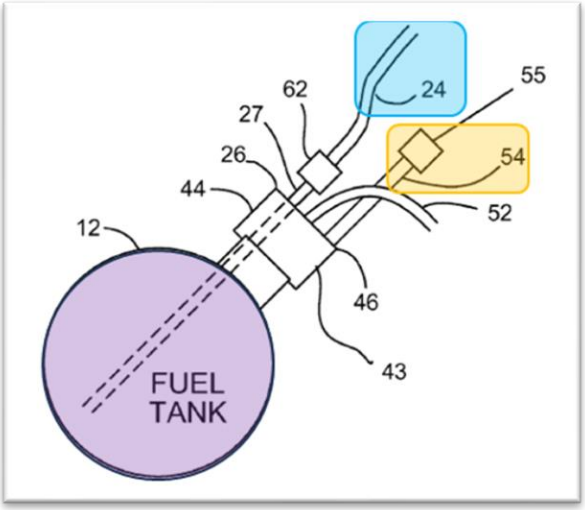
[232] EX1004, FIG. 1 (annotated to show hoses **24** highlighted in blue, fuel tank **12** with fuel cap **26** highlighted in purple).

[233] EX1004, [0017], *see also* FIG. 2 (annotated to show hose 24 in blue and sensor 54 in orange).

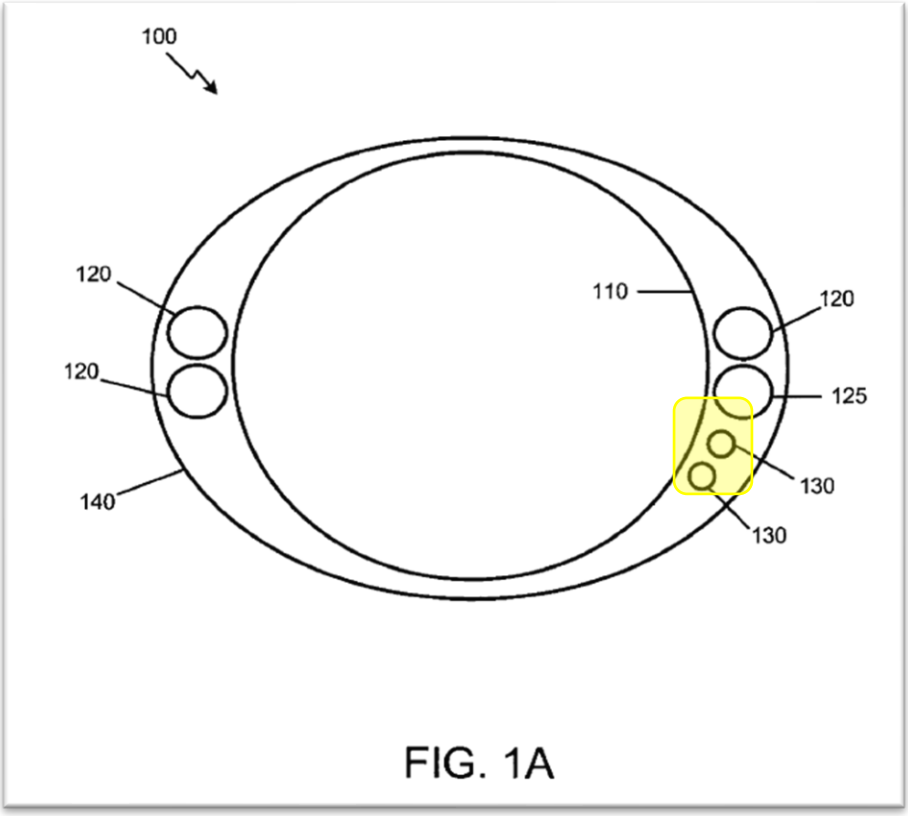


177. Accordingly, *Van Vliet* discloses a plurality of sensors, each associated with a different fuel tank, fuel cap and hose. This plurality of sensors communicate with the controller via "communication channels," which may be "wired or wireless."[234] In a wired communication system a POSITA would recognize that communication lines would be necessary, and would also recognize the benefits of routing the communication lines with each hose to, for example, reduce clutter or reduce the possibility of misconnecting a sensor.

178. To the extent that *Van Vliet* does not disclose "each said sensor communication line being routed with a respective different one of the hoses," *Shoap* teaches this claim limitation. *Shoap* describes a "wired fluid conduit **100**" that

[234] EX1004, [0020].

includes "a conduit, such as a fire hose or a rigid or semi-rigid pipe," "insulated electrical power wires **120**, a ground wire **125** and communication wires **130**".[235]



179. According to *Shoap*, the communication wires **130** may be connected to a sensor, *e.g.*, pressure sensor **1370**.[236] A POSITA would have understood that the communication lines **130** shown in FIG 1A of *Shoap* are diagrammatic, and do not

[235] EX1006, 4:50-57, FIG. 1A (annotated to show cross-section of conduit 100 with communication channels 130 highlighted in yellow).

[236] *See* EX1006, 15:16-26.

necessarily depict the specific number of conductors. For example, *Shoap* teaches "The communication wires **130** may be used to support an Ethernet type of data network and/or provide a low voltage system."[237] A POSITA would have understood that an Ethernet type data network would require a plurality of conductors, (*e.g.*, eight), while a low voltage network may only require two conductors, such as for a level switch. Accordingly, communication lines **130**, as shown in FIG 1A would be recognized by a POSITA as teaching any number of conductors necessary for the design.

180. Further, *Shoap* teaches the other end of the communication wires may connect to a communication element such as a network connector so that signals from those wires can be sent to a data network.[238] As discussed above, it would be obvious for a POSITA to use wired fluid conduits **100,** stored on reels, of *Shoap* for the hoses **24**, stored on reels, of *Van Vliet* and to connect *Shoap's* communication line **130** to the sensor **54** of *Van Vliet*. Thus, *Van Vliet* in view of *Shoap* teaches "each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors" and "being routed with a

[237] EX1006, 4:66-5:1.

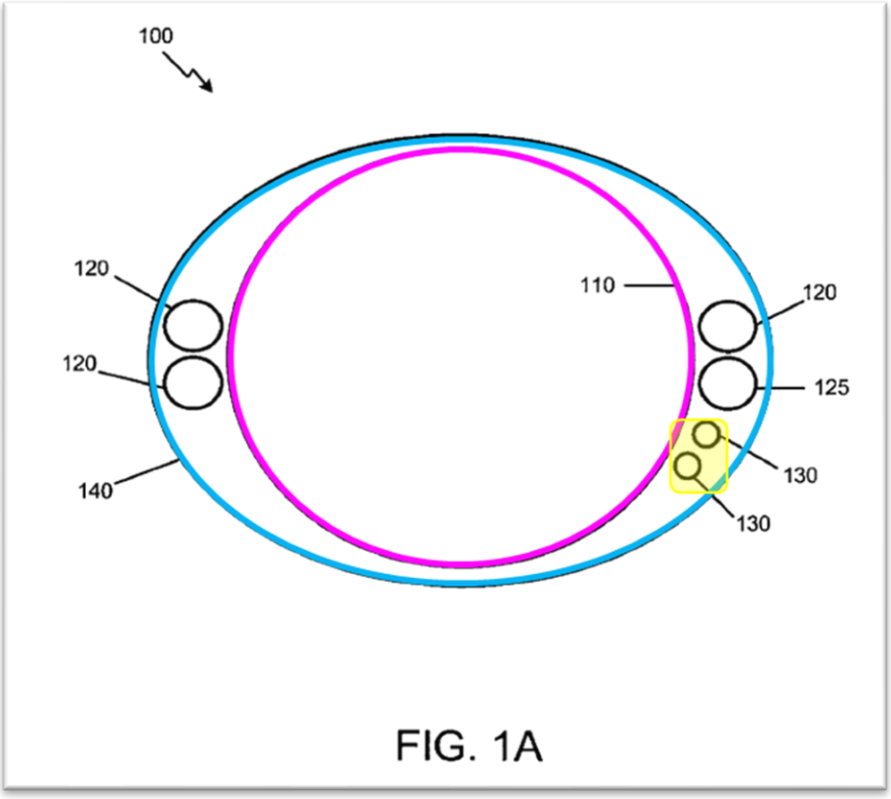
[238] EX1006, 5:52-67.

respective different one of the hoses." Accordingly, the combination of *Van Vliet* and *Shoap* renders Claim 4 obvious.

3. Claim 5: "The distribution station as recited in claim 4, wherein each of the hoses includes a tube and a sleeve that circumscribes the tube, and each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve."

181. *Shoap* discloses a hose having a communication line routed between a hose tube) and sleeve, as shown, for example, in FIG 1A of *Shoap*:[239]

[239] EX1006, FIG. 1A (annotated to show communication line in yellow, a fluid conduit (tube of hose) in purple and sleeve in light blue).



182. As depicted above, *Shoap*'s conduit (*i.e.*, hose) includes an inner conduit surface **110** (tube) and an outer conduit surface **140** (sleeve) that fully circumscribes the inner surface **110**, with communication lines **130** disposed in the cross-sectional space between those two surfaces.[240] Accordingly, *Shoap* discloses the limitations of Claim 5.

183. Alternatively, to the extent that *Shoap* discloses that the inner conduit surface **110** and outer conduit surface **140** shown in, for example, FIG 1A

[240] EX1006, FIG. 1A, 4:51-5:3.

are both surfaces of a single structure (for example a "thick" rubber hose), and to the extent that Claim 5 requires that the tube and the sleeve be physically separate structures, it would be obvious to a POSITA that conduit having a similar cross-sectional structure as shown in Fig. 1A of *Shoap* could be formed using separate structures. For example, it would be obvious to a POSITA that inner conduit surface **110** would represent an inner "tube". It would further be obvious to a POSITA that outer conduit surface **140** would represent an outer "sleeve". Accordingly, it would have been obvious to a POSITA using 2 thinner concentric conduits instead of a single thicker conduit having an inner surface and an outer surface with a thickness. For example, as discussed in Section VIII.C above, the use of protective sleeves to surround tubes was well known at the time of the '118 Patent. Commercially available products, such as RhinoSleeve marketed by SRM Industries, were commercially available and easily accessible by a POSITA.

184. Accordingly, the combination of *Van Vliet* and *Shoap* renders Claim 5 obvious.

4. Claim 6: "The distribution station as recited in claim 5, wherein each said sensor communication line is routed through a respective different one of the reels."

185. As discussed above regarding Claim 5, *Shoap* discloses a hose having a communication line routed between the inner layer and outer layer of the hose.[241] *Shoap* further discloses storing the wired hose on (*i.e.*, wound around) a storage reel **220**, and thus the communication wires **130** would be routed through the reel **220**.[242] Moreover, in using *Shoap*'s conduit as the hose **24** of *Van Vliet*, the communication wires 130 would be routed through a reel **30** of *Van Vliet*.

186. Further, *Shoap* discloses, or at least renders obvious such a configuration. FIG. 13G of Shoap displays a cross-sectional view of a reel assembly to which the wired hose would be stored. [243] Part of FIG. 13G is a "slip ring assembly **1372**" which is installed in the spindle (hollow reel cylinder **1360**) of the reel **1350**.[244]

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[241] EX1006, FIG. 1A, 4:50-57.

[242] EX1006, 5:39-51, FIG. 2A.

[243] EX1006, 14:23-26.

[244] EX1006, FIG.13G (annotated to show the "slip ring assembly" in red, the wfc connector in blue and the reinforced hose in yellow).

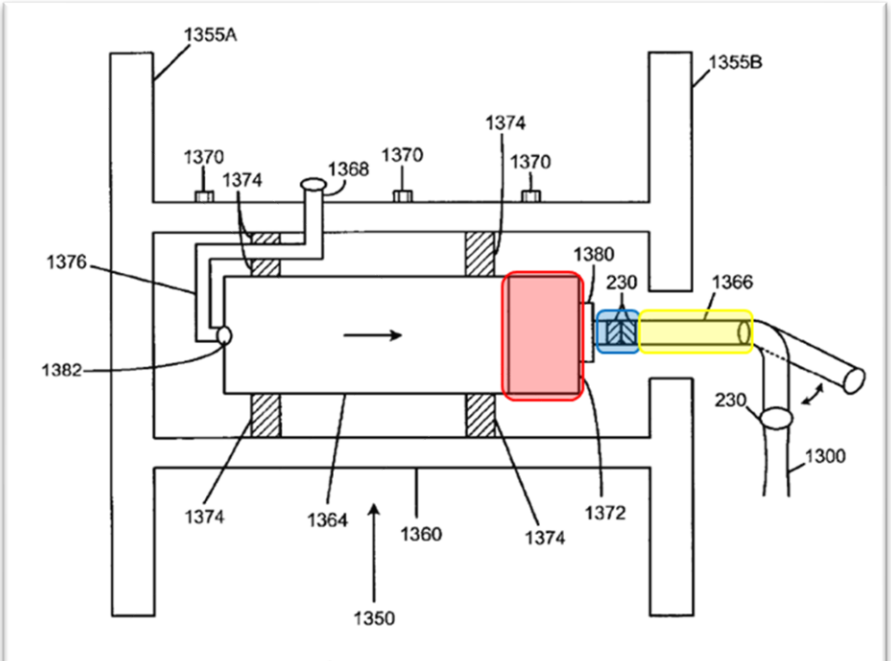
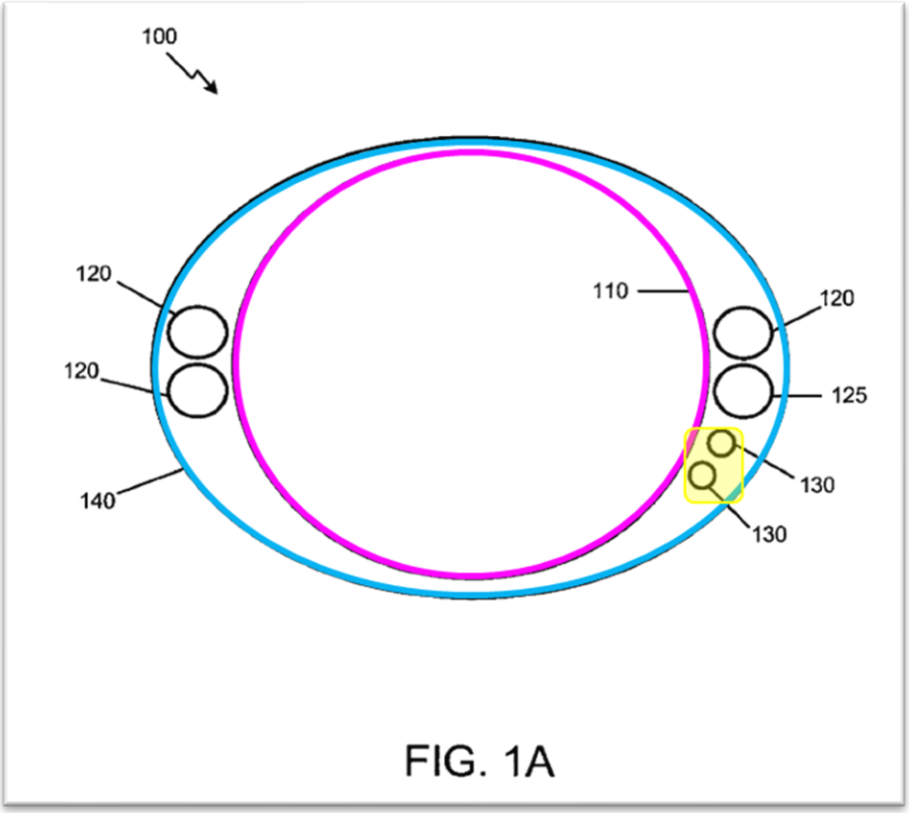


FIG. 13G

187. *Shoap* discloses "the slip ring assembly **1372** is attached to an WFC connector **230** that is attached to a reinforced hose **1366**. The reinforced hose **166** has wfc connectors **230** on each end that carry along all of the electric power wires 120 and the communication wires 130 (as shown in FIG. 1A)."[245] FIG. 1A shows the communication wires (annotated in yellow), as noted above.[246]

[245] EX1006, 14:26-30.

[246] EX1006, FIG. 1A (annotated to show communication lines in yellow).



188. Further, as described more fully below with regard to Claim 7, incorporated herein, the wfc connector contains pins for power, ground and communication wires that maintain continuity of those wires through the hose and to the attached equipment (*i.e.*, sensors and controller).[247]

[247] EX1006, FIG. 2B (wfc connector annotated to show power pins in yellow, ground pin in green and communication pins in purple).

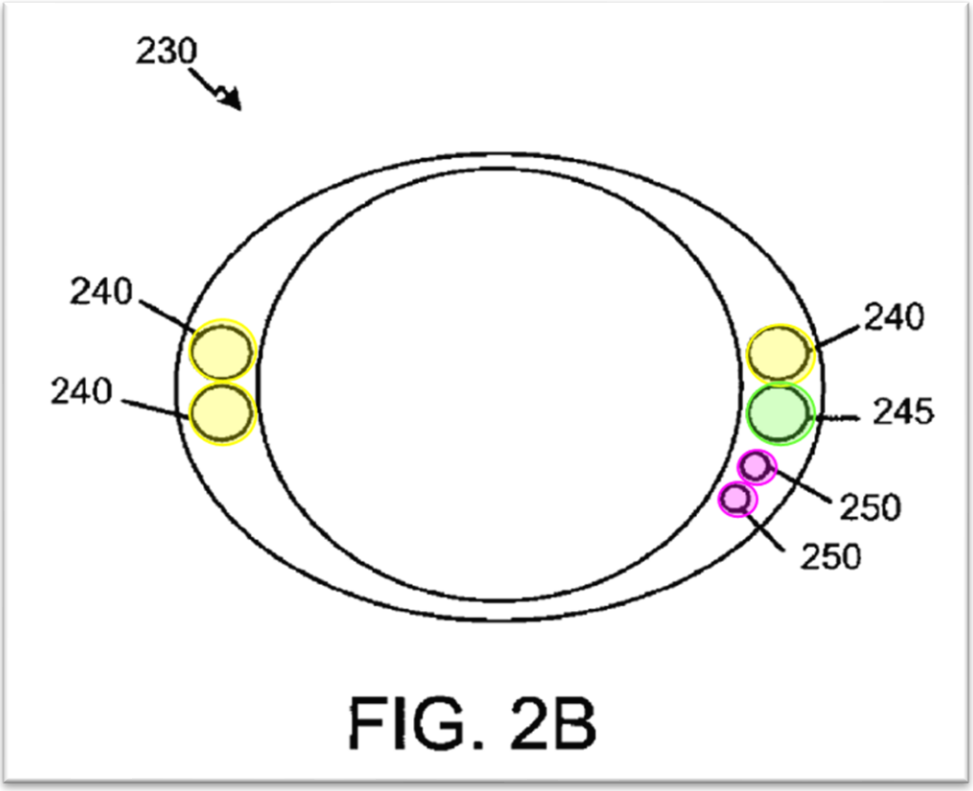


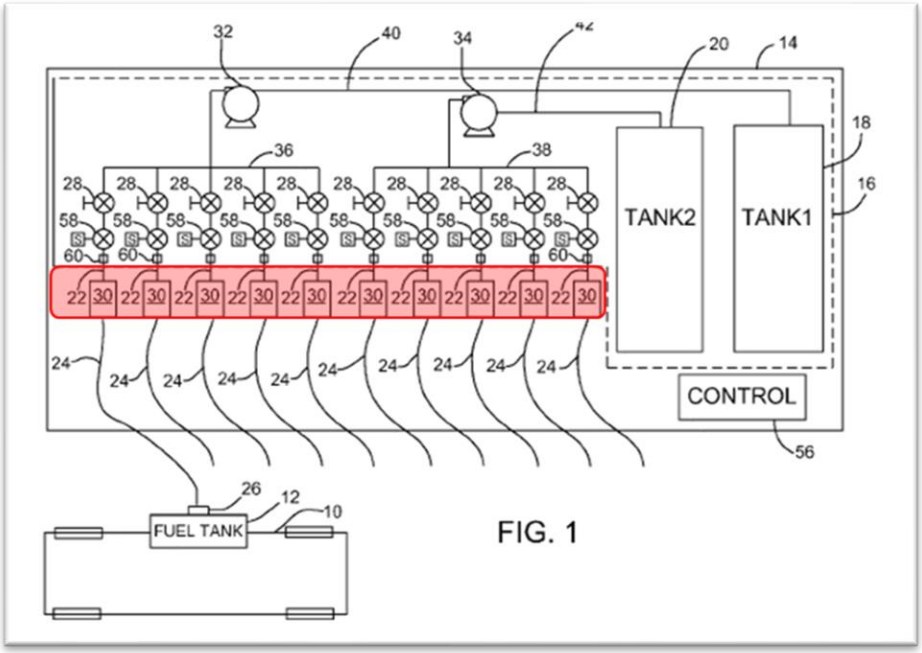
FIG. 2B

189. Thus, *Shoap*, either alone or in combination with *Van Vliet*, discloses the limitations of Claim 6. Accordingly, the combination of *Van Vliet* and *Shoap* renders Claim 6 obvious.

5. Claim 7: "The distribution station as recited in claim 6, further comprising a plurality of connectors, each of the connectors being mounted on a respective different one of the reels and each of the connectors receiving a respective different one of the sensor communication lines."

190. As explained with respect to Claim 6 above, and incorporated herein by reference, a POSITA would have understood that any system having communication lines routed through the bodies of reels would require respective connectors for each

communication line.[248] Further, both *Van Vliet* and *Shoap* disclose the use of connectors associated with hoses mounted on reels. *Van Vliet* discloses the use of connectors **22** with hoses **24** and reels **30**: "hose **24** connected to each respective fuel outlet **22** to permit independent operation of each hose **24**. [] The hoses **24** are preferably stored on reels **30**."[249] A POSITA would have recognized "fuel outlet **22**" to which hose **24** is connected to necessarily comprise a connector. Further, such an arrangement is shown in FIG. 1 of *Van Vliet*.[250]



[248] *See supra* Section XI.C.4.

[249] EX1004, [0015].

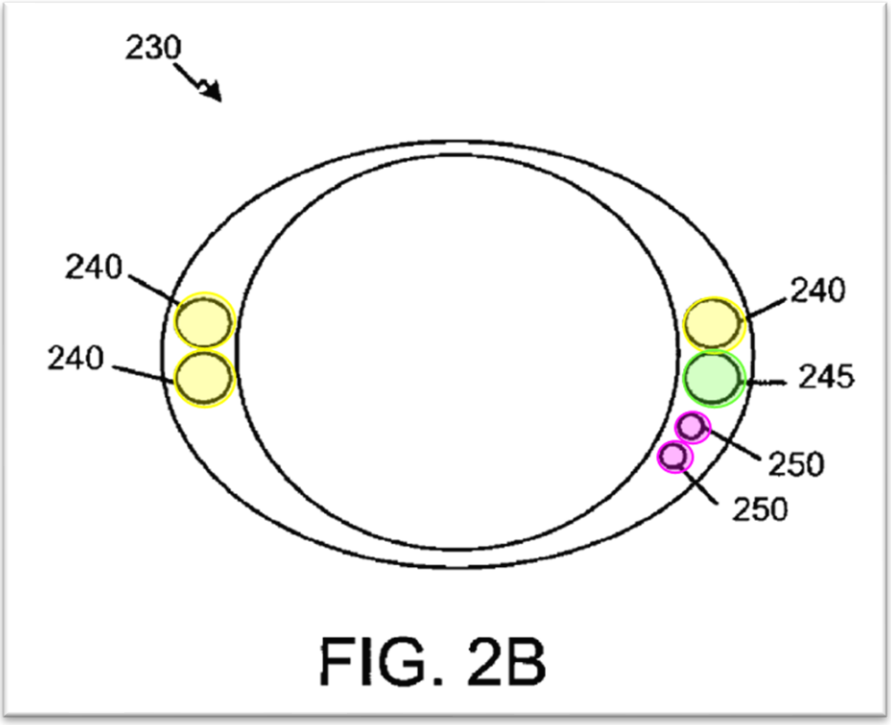
[250] EX1004, FIG.1 (fuel outlets **22** and reels **30** annotated in red).

191. *Shoap* teaches "[a]t least one electrical connector, within said conduit connectors, mates corresponding electric power wires between the conduit segments."[251] Further, *Shoap* teaches "[t]he wfc connector **230** may include a plurality of power pins **240** that connect to the ends of the power wires **120**, and a ground pin **245** that connects to the end of the ground wire **125**. There is at least one communication pin **250** that attaches to the communication wires **130** in the wired fluid conduit **100**."[252] *Shoap's* FIG. 2B illustrates an end of a wfc (wired fluid connector) **230**.[253]

[251] EX1006, 2:50-58.

[252] EX1006, 2:56-61.

[253] EX1006, FIG. 2B (annotated to show power pins in yellow, ground pin in green, and communication pins in purple).



192. A POSITA would have understood it was an obvious design choice to mount those connectors on the reel on which the hose is connected and/or stored, particularly in light of the teachings of *Shoap* with regard to a slip-ring assembly mounted on the spindle of the reel, as discussed above regarding Claim 6.[254] This would, for example, help reduce the chance of a misconnected line. Further, mounting the connector on the reel would allow for simple, straightforward mounting of the wfc on the reel, allowing both fluid and electrical connections to be made with a single action. Accordingly, *Van Vliet* in view of *Shoap* renders Claim 7 obvious.

[254] *See supra* Section XI.C.6.

6. Claim 8: "The distribution station as recited in claim 7, wherein each of the reels includes a respective spindle, and each of the sensor communication lines is routed through a respective different one of the spindles."

193. As explained with respect to Claim 6 above, and incorporated herein by reference, *Van Vliet* in view of *Shoap* renders obvious "sensor communication lines [] routed through a respective different one of the [reels]." As discussed above with respect to Claim 6, *Shoap* discloses a slip-ring assembly mounted on the spindle (cylinder **1360**) of a reel through which communication lines (and power lines) are routed.[255] *Shoap* discloses a reel **1350** having reel ends **1355A**, **1355B** connected by a hollow reel cylinder **1360**, which a POSITA would recognize as a spindle.[256] *Shoap* also describes equipment such as a pump **1364** installed within the cavity of the hollow reel cylinder **1360**, which is connected to conduit **1376** at its input **1382** and hose **1366** at slip ring assembly **1372**.[257] Conduit **1376** and hose **1366** both include connectors that carry communication wires **130** from the helicopter hose **1300**, which has the same structure has wired fluid conduit **100** or wired fluid hose

[255] *See supra* Section XI.C.4.

[256] EX1006, FIG. 13E, 13F, 14:1-5.

[257] EX1006, FIG. 13G, 14:12-21.

101.[258] Thus, the communication wires **130** are routed through the cylinder **1360** (spindle) of the reel **1350** in *Shoap*. To the extent that *Shoap* does not explicitly describe the slip ring assembly as mounted to the "spindle," it would be obvious to a POSITA, based on the teachings of FIG 13G and the associated description, that the slip ring assembly is mounted to the spindle.[259] Even aside from Shoap, it would have been an obvious design choice at the time of the '118 Patent to route the communication line through the spindle of the reel rather than through another aspect of the reel. Spindles were a common (if not necessary) feature of hose reels at the time of the '118 Patent, *e.g.*, as shown in the reels of *Coxreels*, and would have been a logical place to route communication lines in a system that includes reels. Accordingly, *Shoap* discloses, or at least renders obvious the limitations of Claim 8. Thus, *Van Vliet* in view of *Shoap* renders obvious claim 8.

7. Claim 9: "The distribution station as recited in claim 8, wherein controller is operable to open and close the plurality of valves responsive to a fuel level threshold."

194. As explained in Section XI.A.3, *supra*, with respect to Claim 3, which is incorporated herein by reference, *Van Vliet's* controller **56** is operable to open valves **58** responsive to fluid level thresholds. *Van Vliet's* controller **56** "provide[s]

[258] EX1006, FIG. 13G, 13:9-12, 14:25-34, 14:54-60.

[259] EX1006, FIG. 13G, 14:23-30.

control signals to the respective automatically operable valves **58**"[260] Further, *Van Vliet* discloses "The controller **56** is responsive to a low fuel level signal from each fuel tank **12** to start fuel flow to the fuel tank **12**" and the controller is also responsive "to a high level signal from each fuel tank **12** to stop fuel flow to the fuel tank **12**".[261] Accordingly, *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 9 and *Van Vliet* in view of *Shoap* renders Claim 9 obvious.

8. Claim 10

195. *Van Vliet*, in view of *Shoap*, along with the general knowledge of a POSITA, renders obvious each element of Claim 10. Accordingly, *Van Vliet* in view of *Shoap*¸ renders obvious Claim 10 of the '118 Patent.

a. Claim 10[p]: "A distribution station comprising:"

196. Claim 10[p] is identical to Claim 1[p]. As explained with respect to Ground 1, Claim 1[p] above, and incorporated herein by reference, *Van Vliet*

[260] EX1004, [0020].

[261] *See* EX1004, [0020]; *see also* EX1004, [0026] ("An automatic system may be used to close the valves 58 automatically in the case of a high fluid level detection").

discloses, or at least renders obvious, a distribution station.[262] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[p] obvious.

b. Claim 10[a]: "a mobile trailer;"

197. Claim 10[a] is identical to Claim 1[a]. As explained with respect to Ground 1, Claim 1[a] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, a mobile trailer.[263] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[a] obvious.

c. Claim 10[b]: "a pump on the mobile trailer;"

198. Claim 10[b] is identical to Claim 1[b]. As explained with respect to Ground 1, Claim 1[b] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, a pump on the mobile trailer.[264] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[b] obvious.

d. Claim 10[c]: "a manifold on the mobile trailer and connected with the pump;"

199. Claim 10[c] is identical to Claim 1[c]. As explained with respect to Ground 1, Claim 1[c] above, and incorporated herein by reference, *Van Vliet*

[262] *See supra* Section XI.A.1.a.

[263] *See supra* Section XI.A.1.b.

[264] *See supra* Section XI.A.1.c.

discloses, or at least renders obvious, a manifold connected to the pump on the mobile trailer.[265] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[c] obvious.

e. Claim 10[d]: "a plurality of reels on the mobile trailer;"

200. Claim 10[d] is identical to Claim 1[d]. As explained with respect to Ground 1, Claim 1[d] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, a plurality of reels on the mobile trailer.[266] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[d] obvious.

f. Claim 10[e]: "a plurality of hoses, each said hose being connected with the manifold and each said hose including a tube and a sleeve that circumscribes the tube;"

201. As explained with respect to Claim 1 above, and incorporated herein by reference, *Van Vliet* discloses a plurality of hoses connected with the manifold.[267] Further, as explained with respect to Claims 5 above, and incorporated herein by reference, *Shoap* discloses a hose comprising a tube and a sleeve that circumscribes the tube.[268] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[e] obvious.

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[265] *See supra* Section XI.A.1.d.

[266] *See supra* Section XI.A.1.e.

[267] *See supra* Section XI.A.d-f.

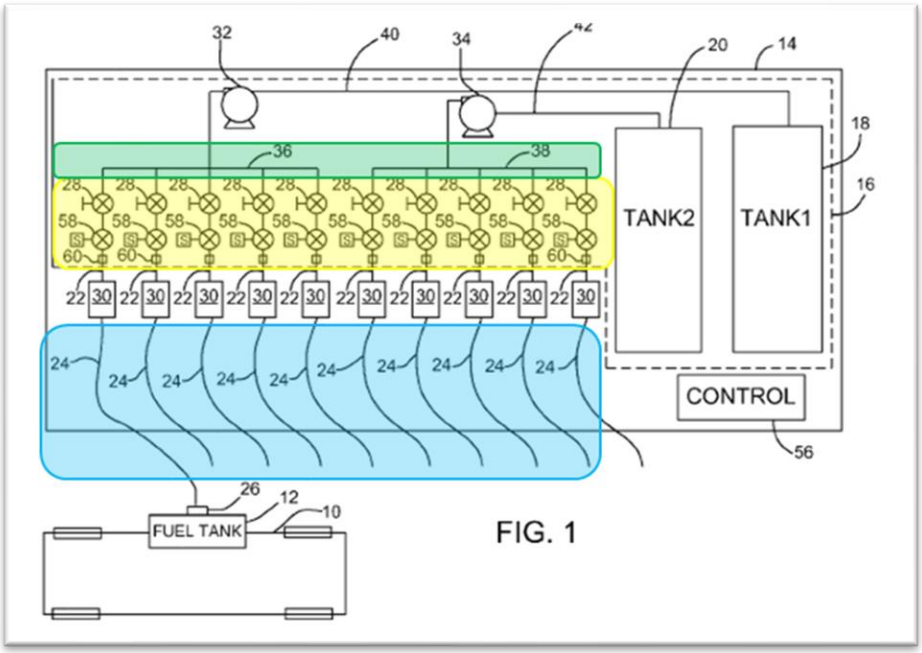
[268] *See supra* Section XI.C.3.

g. Claim 10[f]: "a plurality of valves on the mobile trailer, each said valve situated between the manifold and a respective different one of the hoses and being operable to control fluid flow from the manifold to the respective different one of the hoses;"

202. As discussed regarding Claim 1, and incorporated herein, *Van Vliet* discloses, or at least renders obvious this limitation. As depicted below, *Van Vliet* discloses a plurality of valves **58** (yellow). The fuel delivery system **14** (including valves **58**) is on a mobile trailer.[269] Each of the valves **58** (yellow) is illustrated schematically downstream of manifold **36** or manifold **38** (green). Furthermore, each of the valves **58** (yellow) is illustrated schematically upstream of a respective different one of the hoses **24** (blue). *Id*.[270]

[269] EX1004, [0008], [0014].

[270] EX1004, FIG. 1 (annotated to show hoses in blue, valves in yellow, reels in red and manifolds in green).



203. *Van Vliet* provides a description of the arrangement shown in FIG. 1: "Each tank **18**, **20** is connected to respective pumps **32**, **34** and then to respective manifolds **36**, **38** via lines **40**, **42**. The fuel outlets **22** are located on the manifolds **36**, **38** and fluid flow through the fuel outlets **22** is controlled preferably at least by the manual valves **28**."[271] Further, "[a] valve arrangement, comprising for example valve **28** and/or valve **58**, is provided at each fuel outlet **22** to control fluid flow through the hose **24** connected to each respective fuel outlet **22** to permit independent operation of each hose **24**."[272] Furthermore, each of the valves **28**,**58** (yellow) is

[271] EX1004, [0016].

[272] EX1004, [0015].

illustrated schematically upstream of a respective different one of the reels **30** (red), and a respective different hose **24** (blue).

204. According to *Van Vliet*, valves **58** "control fluid flow through the hose **24** . . . to permit independent operation of each hose **24**."[273] A POSITA would have understood that at least *Van Vliet*'s valves **58** are each "situated between the manifold and a respective different one of the hoses" and "control fluid flow from the manifold to the respective different one of the hoses". Accordingly, *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 10[f] and the combination of *Van Vliet* and *Shoap* renders Claim 10[f] obvious.

h. Claim 10[g]: "a plurality of fluid level sensors, each said fluid level sensor being connected or connectable with a respective different one of the hoses; and"

205. Claim 10[g] is identical to Claim 1[h]. As explained with respect to Ground 1, Claim 1[h] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the configuration of fluid level sensors and hoses contained in the claim.[274] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[g] obvious.

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[273] EX1004, [0015].

[274] *See supra* Section XI.A.1.g.

i. <u>Claim 10[h]: "a controller configured to operate the valves responsive to fluid level thresholds to control fluid flow to the hoses."</u>

206. Claim 10[h] is identical to Claim 1[i]. As explained with respect to Ground 1, Claim 1[i] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the operation of the controller, valves and sensors contained in the claim. Accordingly, *Van Vliet* in view of *Shoap* renders Claim 10[h] obvious.[275]

9. Claim 11: "The distribution station as recited in claim 10, wherein the sleeve is a fabric sleeve."

207. *Shoap* discloses a hose having a communication line (yellow) routed between a hose tube (purple) and sleeve (light blue):[276]

[275] *See supra* Section XI.A.1.j.

[276] EX1006, FIG. 1A (annotated).

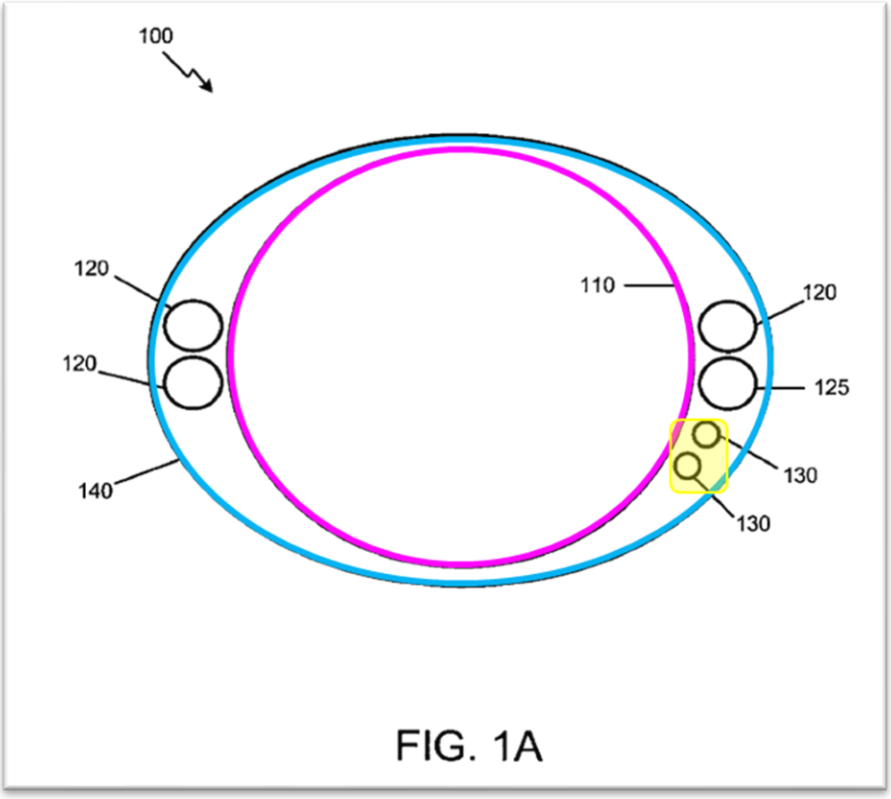

FIG. 1A

208. It would have been an obvious design choice at the time of the ’118 Patent to make outer surface 140 (sleeve) out of fabric. For example, many fabric covered hoses, or fabric protective hose sleeves were commercially available at the time of the ’118 Patent.[277] Therefore, it would have been obvious to a POSITA to use a fabric sleeve, such as a fabric protective sleeve or fabric covered hose, in the design and implementation of the system of *Van Vliet* (as modified by *Shoap*). Therefore, the combination of *Van Vliet* and *Shoap,* along with a POSITA’s

[277] *See supra* Section VIII.C.

knowledge of the hose accessories, including fabric protective sleeves available commercially, renders Claim 11 obvious.

10. Claim 12: "The distribution station as recited in claim 10, further comprising bands around the hoses, the bands securing the sleeve on the tube."

209. As explained with respect to Ground 2, Claim 5 above, and incorporated herein by reference, *Van Vliet* in view of *Shoap* renders obvious a hose comprising a sleeve around a tube.[278] A POSITA would have recognized that a protective sleeve, for example the fabric protective sleeve "RHINO Sleeve HT manufactured by SRM Industries" would need to be held in place on the hose in order to keep it from sliding off and exposing the hose, and other components such as communication lines, that it was designed to protect. A POSITA would also have recognized that some type of clamping mechanism, such as bands, would have been necessary to secure the internal components of *Shoap's* wired conduit in place, and keep them from being damaged or kinked by rolling around unconstrained inside the external conduit (sleeve). Further, a POSITA would have recognized the necessity of using a clamp of some type (including a band) to connect *Shoap* and *Van Vliet's* hoses to fitting used, for example, to connect the hose to *Van Vliet's* fuel cap or the discharge port on the reel. A POSITA would also have recognized that a common

[278] *See supra* Section XI.C.3.

type of clamp used in the construction of hoses and fittings were steel bands, such as those manufactured and marketed by Hosecraft USA. Hosecraft USA's clamp are "used for hoses/fitting", were available to a POSITA at least by July 2, 2013, as discussed in Section X.D.1 above.[279] One type of clamp available was a "high carbon coated steel, or stainless steel" band clamp.[280]

[279] *See supra* Section X.D.1.

[280] EX1007.

210. A POSITA would have been motivated to use commercially available bands, such as those sold by Hosecraft USA, to secure not only the sleeve to the hose, but also to secure the other components of *Shoap*'s wired hose in place, and to secure the hose to fittings. Accordingly, it would have been an obvious design choice at the time of the '118 Patent to include bands to secure the sleeve on the tube. Thus, the combination of *Van Vliet* and *Shoap*, along with a POSITA's knowledge of hose

components and materials, including band clamps available commercially, renders Claim 12 of the ’118 Patent obvious.

11. Claim 13: “The distribution station as recited in claim 12, wherein the bands are steel.”

211. It would have been an obvious design choice at the time of the ’118 Patent to use steel for the bands. As discussed above regarding Claim 12, one common type of band clamp construction was bands comprised of “high carbon steel or stainless steel.” Further, such bands were commercially available at the time of the ’118 Patent and were designed for use with “hoses / fittings” as well as finished hose assemblies. Accordingly, the combination of *Van Vliet* and *Shoap,* along with a POSITA’s knowledge of the hose materials, including band clamps, available commercially, renders Claim 12 of the ’118 Patent obvious.

12. Claim 14: “The distribution station as recited in claim 10, further comprising a communication line between the sleeve and the tube.”

212. As explained with respect to Claim 5 above, and incorporated herein by reference, *Van Vliet* in view of *Shoap* renders Claim 14 obvious.[281]

[281] *See supra* Section XI.C.3.

13. Claim 15

213. It is my opinion that the combination of *Van Vliet* and *Shoap*, discloses, or at least renders obvious, each element of Claim 15. Accordingly, the combination of *Van Vliet* and *Shoap* renders Claim 15 of the '118 Patent obvious.

a. Claim 15[p]: "A distribution station comprising:"

214. As explained with respect to Ground 1 Claim 1[p] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious a "distribution station." [282] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[p] obvious.

b. Claim 15[a]: "a mobile trailer including a pump,"

215. As explained with respect to Ground 1, claims 1[a] & 1[b] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious a mobile trailer including a pump. [283] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[a] obvious.

c. Claim 15[b]: "a manifold connected with the pump,"

216. As explained with respect to Ground 1 Claim 1[c] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious a

[282] *See supra* Section XI.A.1.a.

[283] *See supra* Sections XI.A.1.b-c.

manifold connected with the pump.[284] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[b] obvious.

d. Claim 15[c]: "reels,"

217. As explained with respect to Ground 1 Claim 1[d] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, "reels".[285] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[c] obvious.

e. Claim 15[d]: "flow passages connected to the manifold and running through the reels,"

218. As explained with respect to Ground 1 Claim 1[e] above, and Ground 1A Claim 1[e] above, each incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, "flow passages connected to the manifold and running through the reels".[286] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[d] obvious.

f. Claim 15[e]: "hoses connected with the flow passages via the reels"

219. As explained with respect to Ground 1 Claim 1[f] above, and Ground 1A Claim 1[f] above, each incorporated herein by reference, *Van Vliet* discloses, or

[284] *See supra* Section XI.A.1.d.

[285] *See supra* Section XI.A.1.e.

[286] *See supra* Section XI.A.1.f.

at least renders obvious, "hoses connected with the flow passages via the reels".[287] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[e] obvious.

g. Claim 15[f]: "and each of the hoses including a tube and a sleeve that circumscribes the tube,"

220. As explained with respect to Claim 10[e] above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious, "each of the hoses including a tube and a sleeve that circumscribes the tube."[288] Accordingly, *Van Vliet* in view of *Shoap* renders obvious Claim 15[f].

h. Claim 15[g]: "valves situated between the manifold and the reels and operable to control fluid flow through the flow passages,"

221. As explained with respect to Ground 1 claim 1[g] above, and further explained regarding Claim 10[f] above, each incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the claimed configuration of valves, manifolds, reels and flow passages.[289] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[g] obvious.

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[287] *See supra* Section XI.A.1.f.

[288] *See supra* Section XI.C.8.f.

[289] *See supra* Section XI.A.1.h.

i. Claim 15[h]: "fluid level sensors connected or connectable with the hoses,"

222. As explained with respect to Ground 1 Claim 1[h] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, fluid level sensors connected to the hoses.[290] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[h] obvious.

j. Claim 15[i]: "and a controller configured to operate the valves responsive fluid level thresholds to control fluid flow to the hoses."

223. As explained with respect to Ground 1 Claim 1[i] above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the operation of the controller, sensors and valves claimed.[291] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 15[i] obvious.

14. Claim 16: "The distribution station as recited in claim 15, wherein the controller is configured to determine fluid levels based on signals from the fluid level sensors, determine whether one or more of the fluid levels are below one or more of the fluid level thresholds, and open the valves for which the fluid levels are below the fluid level thresholds."

224. As explained with respect to Ground 1 Claim 2 above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the operation of

[290] *See supra* Section XI.A.1.i.

[291] *See supra* Section XI.A.1.j.

the controller, sensors and valves claimed.[292] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 16 obvious.

15. Claim 17: "The distribution station as recited in claim 16, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors."

225. As explained with respect to Claim 4 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious, the configuration of the controller, sensors and communication lines claimed.[293] Accordingly, *Van Vliet* in view of *Shoap* renders Claim 17 obvious.

16. Claim 18: "The distribution station as recited in claim 17, wherein each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve."

226. As explained with respect to Claim 5 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious, the configuration of the communication line, sensors, hoses, and sleeves claimed.[294] *Van Vliet* in view of *Shoap* renders Claim 18 obvious.

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[292] *See supra* Section XI.A.2.

[293] *See supra* Section XI.C.2

[294] *See supra* Section XI.C.3.

D. Ground 2A: Claims 4-9 and 15-18 are rendered obvious by *Van Vliet* in view of *Coxreels* and *Shoap*

1. Motivation to combine the references

227. The reasons to combine *Van Vliet* and *Shoap* are the same as those described in Section XI.C.1 above and incorporated herein. *See supra* Section XI.C.1. The motivation to combine *Van Vliet* and *Coxreels* are the same as those described in Section XI.B.1 above. *See supra* Section XI.B.1. There is nothing in *Coxreels* that teaches against the combination of *Van Vliet* and *Shoap*, nor is there anything in *Shoap* that teaches against the combination of *Van Vliet* and *Coxreels*. Accordingly, a POSITA would have been motivated to combine all three references to take advantage of each of the benefits of *Shoap* and *Coxreels* in the system of *Van Vliet.*

2. Claim 4: "The distribution station as recited in claim 2, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors, and each said sensor communication line being routed with a respective different one of the hoses."

228. For the same reasons discussed with respect to Ground 2 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious Claim 4.[295] There is nothing in *Coxreels* that teaches against the disclosure of *Shoap*.

[295] *See supra* Section XI.C.2.

Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders claim 4 obvious for the same reasons.

3. Claim 5: "The distribution station as recited in claim 4, wherein each of the hoses includes a tube and a sleeve that circumscribes the tube, and each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve."

229. For the same reasons discussed with respect to Ground 2 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious Claim 5.[296] There is nothing in *Coxreels* that teaches against the disclosure of *Shoap*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 5 obvious for the same reasons.

4. Claim 6: "The distribution station as recited in claim 5, wherein each said sensor communication line is routed through a respective different one of the reels."

230. For the same reasons discussed with respect to Ground 2 above, and incorporated herein by reference, *Van Vliet* in view of *Shoap* discloses claim 6.[297]

231. To the extent that "routed through" a reel in Claim 6 requires being routed through a passage in the body of a reel itself, the combination of *Van Vliet*, *Coxreels*, and *Shoap* renders obvious Claim 6. As explained above regarding Ground

[296] *See supra* Section XI.C.3.

[297] *See supra* Section XI.C.4.

2, *Van Vliet* discloses hoses located on reels and connected to sensors.[298] As explained above regarding Ground 1A, Claim 6, *Coxreels* discloses a reel having a fluid path with connection ports, wherein a hose and a fluid source may be connected to those ports.[299] As stated above, *Shoap* discloses a hose having a communication line routed between the inner and outer surface of a hose.[300] Both of *Shoap* and *Van Vliet* have a common goal of allowing communication between devices at opposite ends of a hose (*i.e.*, a sensor **54** of *Van Vliet* and a pressure sensor **1370** of *Shoap*).[301] A POSITA combining *Van* Vliet with *Shoap* and using a reel of *Coxreels* would have understood that the communication line **130** of *Shoap* must be connected to both devices to achieve that goal. It would have been an obvious design choice for a POSITA to extend and route the communication lines **130** of *Shoap* through *Coxreels*' spindle, *e.g.*, modify the fluid path and connection ports of *Coxreels* to include a connection for the communication wires of *Shoap*'s conduit to achieve that goal.

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[298] *See supra* Section XI.C.2-4; *see also* EX1004, FIGS. 1, 2.

[299] *See supra* Section XI.C.4; *see also* EX1005, 1.

[300] EX1006, FIG. 1A, 4:50-57.

[301] EX1004, FIGs. 1, 2; EX1006, 15:16-26.

232. Further, *Shoap* discloses, or at least renders obvious such a configuration. FIG. 13G of Shoap displays a cross-sectional view of a reel assembly to which the wired hose would be stored. [302] Part of FIG. 13G is a "slip ring assembly **1372**" which is attached to the spindle of the reel **1350**.[303]

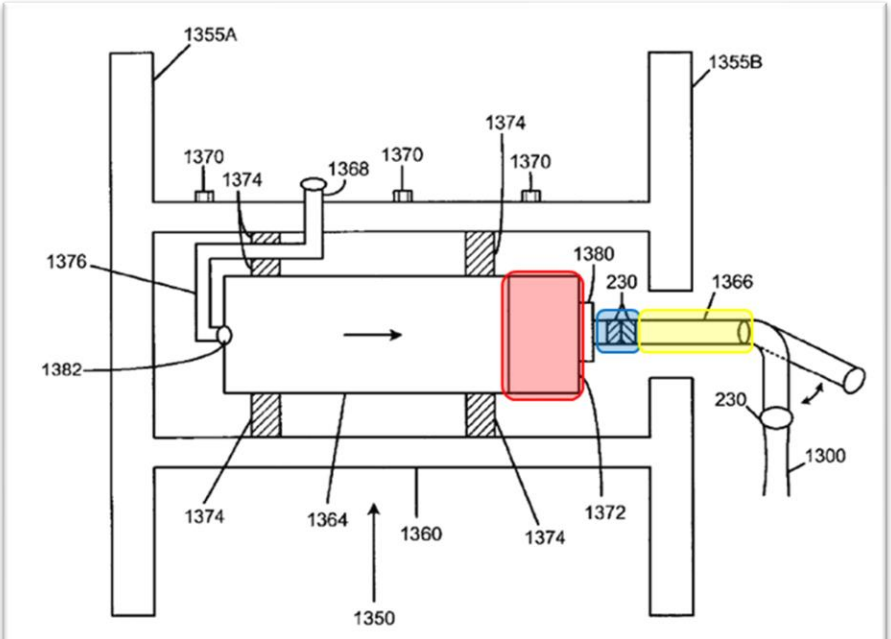


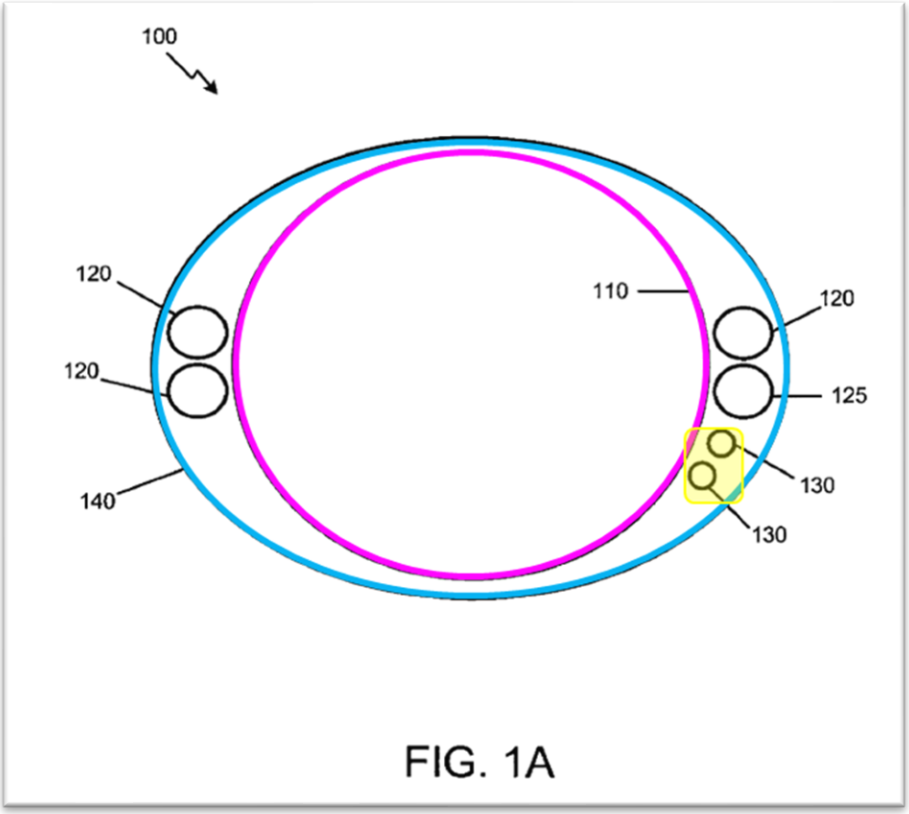
FIG. 13G

233. *Shoap* discloses "the slip ring assembly **1372** is attached to a WFC connector **230** that is attached to a reinforced hose **1366**. The reinforced hose **166**

[302] EX1006, 14:23-26.

[303] EX1006 (FIG. 13G annotated to show the "slip ring assembly" in red, the wfc connector in blue and the reinforced hose in yellow).

has wfc connectors **230** on each end that carry along all of the electric power wires **120** and the communication wires **130** (as shown in FIG. 1A)."[304] FIG. 1A shows the communication wires (annotated in yellow), as noted above.[305]

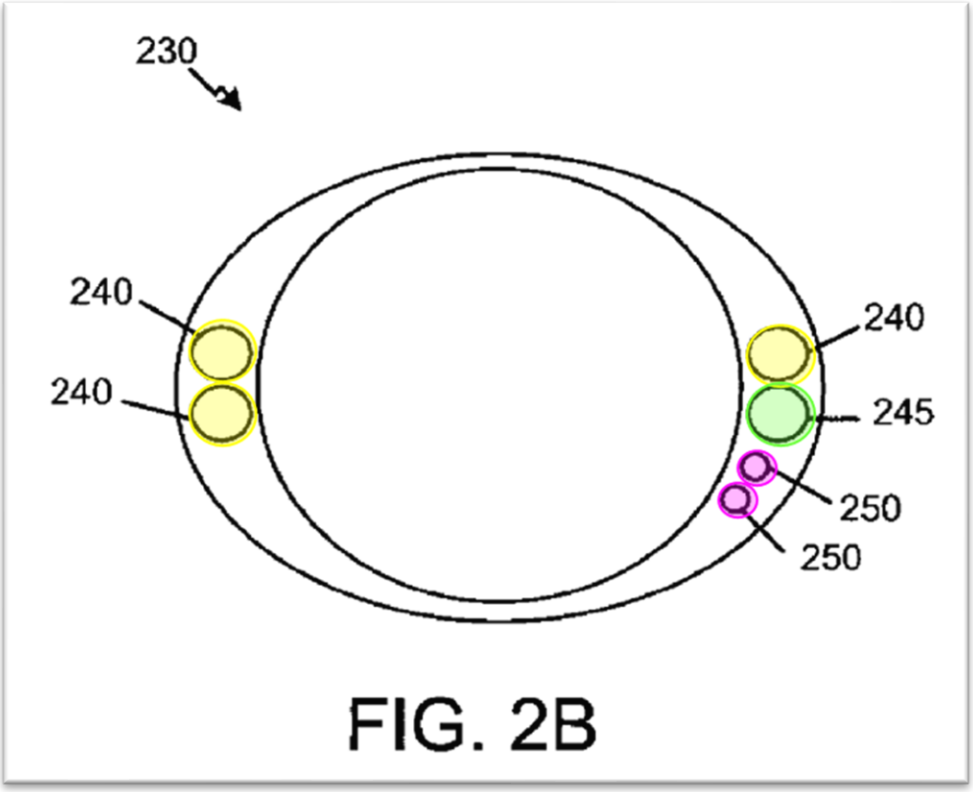


234. Further, as described above with regard to Ground 2 Claim 7, the wfc connector contains pins for power, ground and communication wires that maintain

[304] EX1006, 14:26-30.

[305] EX1006, FIG. 1A (annotated to show communication lines in yellow).

continuity of those wires through the hose and to the attached equipment (*i.e.*, sensors and controller).[306]



235. Accordingly, *Shoap* discloses, or at least render obvious "each said sensor communication line is routed through a respective different one of the reels." Thus, it would have been obvious to a POSITA combining *Van Vliet*, *Coxreels*, and *Shoap* to route *Shoap*'s sensor communication line through *Coxreels*' spindle on or near the fluid path, as disclosed by *Shoap*, to communicate between *Van Vliet*'s

[306] EX1006, FIG. 2B (wfc connector annotated to show power pins in yellow, ground pin in green and communication pins in purple).

sensors and controller.[307] Thus, *Shoap*, either alone or in combination with *Van Vliet*, discloses Claim 6. Accordingly, the combination of *Van Vliet*, *Shoap* and *Coxreels* renders Claim 6 obvious.

5. Claim 7: "The distribution station as recited in claim 6, further comprising a plurality of connectors, each of the connectors being mounted on a respective different one of the reels and each of the connectors receiving a respective different one of the sensor communication lines."

236. As explained with respect to Claim 6 above, and incorporated herein by reference, a POSITA would have understood that any system having communication lines routed through the bodies of reels would require respective connectors for each communication line. Based on the disclosure of *Shoap* regarding the slip ring assembly mounted on the spindle of the reel, as discussed above regarding Claim 6, it would be an obvious design choice to mount those connectors on the reel on which the hose is connected and/or stored. Thus, *Van Vliet* in view of *Coxreels* and *Shoap* renders Claim 7 obvious.[308]

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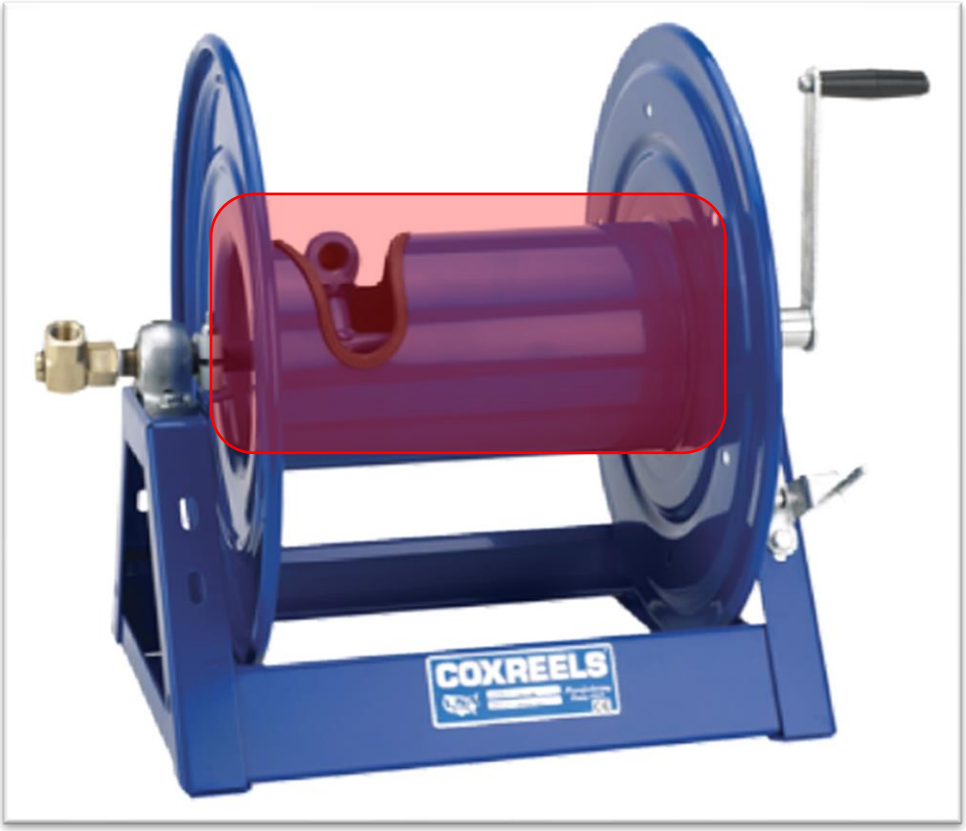
[307] *See* EX1006, FIG. 1A, 4:50-57, FIG. 2B, 2:50-58 , FIG 13G 14:23-30; *see also* EX1005, 1; *see also* EX1004, [0020].

[308] *See supra* Section XI.C.4-5; Section XI.D.3.

6. Claim 8: "The distribution station as recited in claim 7, wherein each of the reels includes a respective spindle, and each of the sensor communication lines is routed through a respective different one of the spindles."

237. *Coxreels* discloses a hose reel that includes a spindle (red):[309]



238. As explained with respect to Ground 2 Claim 6 above, and incorporated herein by reference, *Shoap* discloses a slip ring assembly mounted on the spindle of a reel through which communication lines (and power lines) are routed.[310] Further,

[309] EX1005, 1 (annotated).

[310] *See supra* Section XI.C.4.

as discussed regarding Ground 2 Claim 8, to the extent that a "spindle" is not explicitly disclosed in *Shoap*, it would be obvious to a POSITA to route the communication lines **130** of *Shoap* through the spindle of the reel, such as the reel in *Coxreels*.[311] Thus, *Van Vliet* in view of *Coxreels* and further in view of *Shoap* renders Claim 8 obvious.

7. Claim 9: "The distribution station as recited in claim 8, wherein controller is operable to open and close the plurality of valves responsive to a fuel level threshold."

239. As explained in Section XI.A.3, *supra*, with respect to Claim 3, which is incorporated herein by reference, *Van Vliet's* controller **56** is operable to open valves **58** responsive to fluid level thresholds.[312] The controller **56** is also operable to close valve **58** to stop fuel flow to the fuel tank in response to a high-level signal.[313] Accordingly, *Van Vliet* discloses, or at least renders obvious the limitations of Claim 9. Thus, *Van Vliet* in view of *Coxreels* and further in view of *Shoap* renders Claim 9 obvious.

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[311] *See supra* Section XI.C.6.

[312] *See supra* Section XI.A.3.

[313] EX1004, [0020]; *see also id.*, [0026] ("An automatic system may be used to close the valves 58 automatically in the case of a high fluid level detection.").

8. Claim 15

240. It is my opinion that the combination of *Van Vliet*, *Coxreels* and *Shoap*, discloses, or at least renders obvious, each element of Claim 15. Accordingly, the combination of *Van Vliet* and *Shoap* renders Claim 15 of the '118 Patent obvious.

a. Claim 15[p]: "A distribution station comprising:"

241. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[p].[314] There is nothing in *Coxreels* that teaches against the disclosure of *Van Vliet* and *Shoap*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[p] obvious.

b. Claim 15[a]: "a mobile trailer including a pump,"

242. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[a].[315] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[a] obvious.

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[314] *See supra* Section XI.B.2.a.

[315] *See supra* Section XI.B.2.a.

c. Claim 15[b]: "a manifold connected with the pump,"

243. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[b].[316] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[b] obvious.

d. Claim 15[c]: "reels,"

244. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[c].[317] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[c] obvious.

e. Claim 15[d]: "flow passages connected to the manifold and running through the reels,"

245. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim

[316] *See supra* Section XI.B.2.a.

[317] *See supra* Section XI.B.2.a.

15[d].[318] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[d] obvious.

f. Claim 15[e]: "hoses connected with the flow passages via the reels"

246. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[e].[319] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[e] obvious.

g. Claim 15[f]: "and each of the hoses including a tube and a sleeve that circumscribes the tube,"

247. As explained with respect to Claim 10 above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15 [f].[320] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[f] obvious.

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[318] *See supra* Section XI.B.2.a.

[319] *See supra* Section XI.B.2.b.

[320] *See supra* Section XI.B.2.c.

h. Claim 15[g]: "valves situated between the manifold and the reels and operable to control fluid flow through the flow passages,"

248. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[g].[321] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[g] obvious.

i. Claim 15[h]: "fluid level sensors connected or connectable with the hoses,"

249. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[h].[322] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[h] obvious.

[321] *See supra* Section XI.B.2.d.

[322] *See supra* Section XI.B.2.d.

j. <u>Claim 15[i]: "and a controller configured to operate the valves responsive fluid level thresholds to control fluid flow to the hoses."</u>

250. As explained with respect to Ground 1A above, and incorporated herein by reference, *Van Vliet* in view of *Coxreels* renders obvious the limitation of Claim 15[i].[323] There is nothing in *Shoap* that teaches against the disclosure of *Van Vliet* and *Coxreels*. Accordingly, *Van Vliet* in view of *Shoap*, further in view of *Coxreels* renders Claim 15[i] obvious.

9. Claim 16: "The distribution station as recited in claim 15, wherein the controller is configured to determine fluid levels based on signals from the fluid level sensors, determine whether one or more of the fluid levels are below one or more of the fluid level thresholds, and open the valves for which the fluid levels are below the fluid level thresholds."

251. As explained with respect to Ground 1 above, and incorporated herein by reference, *Van Vliet* discloses, or at least renders obvious, the limitations of Claim 16.[324] There is nothing in *Shoap* or *Coxreels* that teaches against the disclosure of *Van Vliet*. Accordingly, *Van Vliet* in view of *Coxreels* and *Shoap* renders Claim 16 obvious.

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[323] *See supra* Section XI.B.2.d.

[324] *See supra* Section XI.A.2.

10. Claim 17: "The distribution station as recited in claim 16, further comprising a plurality of sensor communication lines, each said sensor communication line being connected or connectable with a respective different one of the fluid level sensors."

252. As explained with respect to Claim 4 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious, the limitations of Claim 17.[325] Accordingly, *Van Vliet* in view of *Coxreels* and further in view of *Shoap* renders Claim 17 obvious.

11. Claim 18: "The distribution station as recited in claim 17, wherein each said sensor communication line is routed in the respective different one of the hoses between the tube and the sleeve."

253. As explained with respect to Claim 4 above, and incorporated herein by reference, *Shoap* discloses, or at least renders obvious, the limitations of Claim 18.[326] Accordingly, *Van Vliet* in view of *Coxreels* and further in view of *Shoap* renders Claim 18 obvious.

[325] *See supra* Section XI.D.1.

[326] *See supra* Section XI.D.2.

E. Ground 3: Claims 12-13 are rendered obvious by *Van Vliet* in view of *Shoap* and *Hosecraft*

1. Rationale and Motivation for Combining *Van Vliet* and *Shoap* with *Hosecraft*

254. A POSITA would have been motivated to combine *Hosecraft* with *Van Vliet* (as modified by *Shoap*). *Hosecraft* is in the same field of endeavor as *Van Vliet* and *Shoap* (as well as the '118 Patent) and is directed to solving the same problem—enabling the use of hoses in an industrial context.[327] *Hosecraft* is therefore analogous art to *Van Vliet*, *Shoap* and the challenged claims.[328]

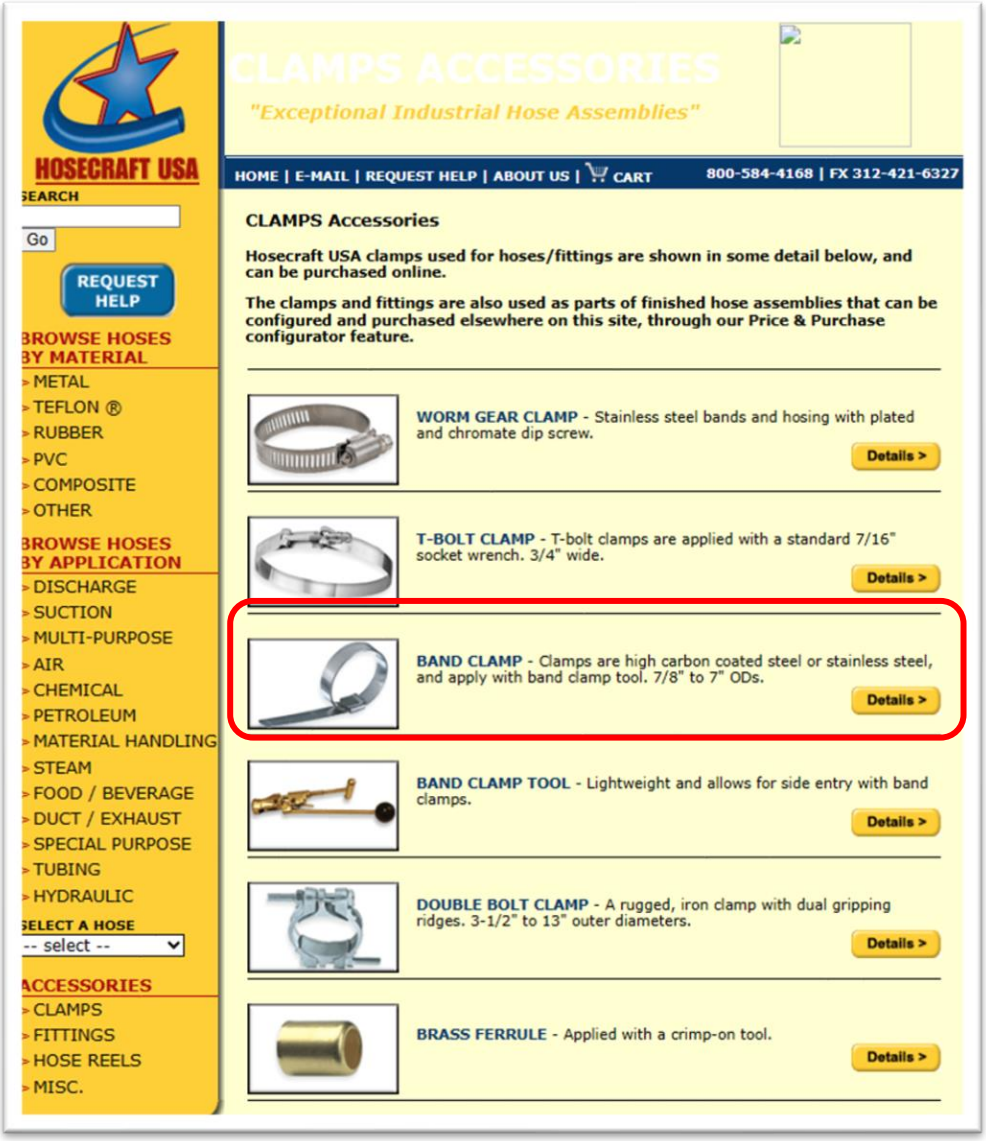
255. A POSITA would have recognized that a protective sleeve, for example the fabric protective sleeve "RHINO Sleeve HT manufactured by SRM Industries" would need to be held in place on the hose in order to keep it from sliding off and exposing the hose, and other components such as communication lines, that it was designed to protect. A POSITA would also have recognized that some type of clamping mechanism, such as bands, would have been necessary to secure the

[327] EX1001, 1:65-2:10; *see also* EX1004, [0003], [0020], Abstract; *see also* EX1007, 12; *see also* EX1006, 4:51-5:3.

[328] EX1001, 1:65-2:10; *see also* EX1004, [0003], [0020], Abstract; *see also* EX1007, 12; *see also* EX1006, 4:51-5:3.

internal components of *Shoap's* wired conduit in place, and keep them from being damaged or kinked by rolling around unconstrained inside the external conduit (sleeve). Further, a POSITA would have recognized the necessity of using a clamp of some type (including a band) to connect *Shoap* and *Van Vliet's* hoses to fittings used, for example, to connect the hose to *Van Vliet's* fuel cap or the discharge port on the reel. A POSITA would also have recognized that a common type of clamp used in the construction of hoses and fittings were steel bands, such as those manufactured and marketed by Hosecraft USA. Hosecraft USA's clamp are "used for hoses/fitting", were available to a POSITA at least by July 2, 2013, as discussed above. One type of clamp available was a "high carbon coated steel, or stainless steel" band clamp.[329]

[329] EX1007, 5, 12.



256. A POSITA would have been motivated to use commercially available bands, such as those sold by Hosecraft USA, to secure not only the sleeve to the hose, but also to secure the other components of *Shoap*'s wired hose in place, and to secure the hose to fittings. Accordingly, it would have been an obvious design choice at the time of the '118 Patent to include bands to secure the sleeve on the tube.

257. It would have been obvious to a POSITA to combine *Hosecraft*'s teaching of a specific band clamp with *Van Vliet* (as modified by *Shoap*). A POSITA designing a system of *Van Vliet* (as modified by *Shoap*) would have looked to commercially available hose accessories like those described in *Hosecraft*, among other reasons, as a cost-effective and readily available option (*e.g.*, as compared to a custom-made band clamp) for the building of that system. *Hosecraft* marketed its products for use in the same industry as *Van Vliet*'s system (*i.e.*, the petroleum industry).[330] A POSITA would have recognized the advantage of using *Hosecraft*'s band clamp in *Van Vliet*'s mobile fuel delivery system to secure *Van Vliet*'s hoses, particularly with the teachings of *Shoap* regarding communications lines constrained with an outer protective sleeve, in order to secure the sleeve to the hose, constrain the communication lines, and to clamp the hose to the fittings.

258. A POSITA would have had a reasonable expectation of success in combining *Hosecraft* with *Van Vliet*. To combine *Van Vliet* with *Hosecraft*, a POSITA would have needed only to select *Hosecraft*'s band clamp when choosing which clamp to implement with the hoses of *Van Vliet* and *Shoap*. This would have been an obvious choice because *Hosecraft*'s band clamp was a readily available alternative suitable for use in the fuel delivery industry at the time of the '118 Patent.

[330] *See* EX1036 (listing "PETROLEUM" as option on righthand menu).

Incorporating *Hosecraft*'s band clamp into *Van Vliet*'s mobile fuel delivery system would merely involve combining prior art elements according to known methods to yield predictable results.

2. Claim 12: "The distribution station as recited in claim 10, further comprising bands around the hoses, the bands securing the sleeve on the tube."

259. As explained with respect to Ground 2A above, and incorporated herein by reference, *Van Vliet* in view of *Shoap* discloses a hose comprising a sleeve around a tube.[331] *Hosecraft* discloses several clamps and fittings, including a band clamp.[332]

260. *Hosecraft*'s clamps and fittings are all designed specifically for hose assemblies and used to clamp the hose with any protective sleeve, constrain items inside a protective sleeve, and to clamp the hose to fittings in order to create hose

[331] *See supra* Section XI.D.2.

[332] EX1007, 5, 12.

assemblies.[333] In modifying the conduit of *Shoap* to consist of a separate tube and sleeve as discussed in Section XI.C.3, *supra*, with regard to claim 5, it would have been obvious to a POSITA to use *Hosecraft*'s band clamp to secure the sleeve to the tube, as well as constrain *Shoap*'s communication lines, and to clamp the hose to fittings. Accordingly, *Hosecraft* discloses the limitation of Claim 12. Thus, the combination of *Van Vliet*, *Shoap* and *Hosecraft* renders Claim 12 obvious.

3. Claim 13: "The distribution station as recited in claim 12, wherein the bands are steel."

261. *Hosecraft*'s band clamp is made of "high carbon coated steel" or "stainless steel."[334] Accordingly, *Hosecraft* discloses the limitation of Claim 12. Thus, the combination of *Van Vliet*, *Shoap* and *Hosecraft* renders Claim 12 obvious.

XII. SECONDARY CONSIDERATIONS

262. I am not aware of any secondary indicia applicable to the claimed invention. However, should the Patent Owner put forth any alleged evidence of secondary considerations in this proceeding or the related litigation, I reserve the right to consider such evidence, to consider whether any such evidence has a nexus to any claims of the Challenged Patent, and to update my analysis.

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[333] EX1007, 5, 12.

[334] EX1007.

XIII. CONCLUSION

263. In my opinion the ’118 Patent does not claim a novel or non-obvious invention. For all the reasons explained above, *the prior art* anticipates or renders obvious the challenged claims.

XIV. DECLARATION

264. I hereby declare that all the statements made in this Declaration are of my own knowledge and true; 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 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Executed in Tulsa, OK on August 7, 2023.

/*Robert A. Durham*/
Robert A. Durham