

Expert Declaration of Eric S. Winkel, Ph.D., P.E. In Support of Petitioner's Reply to Patent Owner's Revised and Conditional Motion to Amend - Case No. IPR2024-00004

Bazooka Farmstar, LLC v. Nuhn Industries, Ltd.

DRE Project Number: EW-241009

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December 23, 2024

Date

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BAZOOKA-FARMSTAR, LLC

Petitioner,

- vs. -

NUHN INDUSTRIES LTD.,

Patent Owner.

Case No: IPR2024-00004

U.S. Patent No. 11,491,835

EXPERT DECLARATION OF ERIC S. WINKEL, PH.D., P.E.
IN SUPPORT OF PETITIONER'S OPPOSITION TO THE REVISED MOTION
TO AMEND IN *INTER PARTES* REVIEW OF U.S. PATENT NO. 11,491,835

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TABLE OF ABBREVIATIONS

Abbreviation	Definition
Bazooka or Petitioner	Bazooka-Farmstar, LLC
Bennett	U.S. Patent Application Publication No. 2014/0288763
Bennett-II	U.S. Patent Application Publication No. 2021/0331752
Bradley	Great Britain Patent No. 2,366,218
Bryham	U.S. Patent No. 7,314,395
Carrier	U.S. Patent Application Publication No. 2012/0185129
Carrier-II	U.S. Patent No. 7,478,817
Challenged Claims	Claims 1-40 of U.S. Patent No. 11,491,835
CRU	The USPTO's Central Reexamination Unit
IPR	<i>Inter Partes</i> Review
Lyseng	Ron Lyseng, <i>Float your boat in a slurry moat</i> , THE WESTERN PRODUCER (August 29, 2013).
Melnikov	Russian Patent Application No. 2012137830/11 (EX1023-EX1024)
Manure-Manager	MANURE MANAGER, Jan./Feb. 2011 (EX1112)
Manure-Manager II	MANURE MANAGER, July/Aug. 2011 (EX1113)

Abbreviation	Definition
Nuhn Pump	Patent Owner's pump disclosed in Manure-Manager (EX1112, 27).
Patent Owner	Nuhn Industries Ltd.
POSA	Person of Ordinary Skill in the Art
Puck	U.S. Patent Application Publication No. 2014/0112093
Puck Boat	The Commercial Embodiment of Puck, as illustrated and described by EX1121-EX1126, EX1158, and EX1163-EX1166
PTAB	U.S. Patent Trials and Appeals Board
Respondent	Patent Owner or Nuhn Industries Ltd.
The '125 Application	U.S. Patent Application No. 17/590,125
The '133 Provisional	U.S. Provisional Patent Application No. 61/805,133
The '224 Patent	U.S. Patent No. 11,448,224
The '422 Patent	U.S. Patent No. 10,710,422
The '425 Patent	U.S. Patent No. 11,358,425
The '425 Prosecution	The Prosecution of U.S. Patent No. 11,358,425
The '425 Reexamination	The Reexamination of U.S. Patent No. 11,358,425
The '425 Reexamination Request	The Request for <i>Ex Parte</i> Reexamination of U.S. Patent No. 11,358,425

Abbreviation	Definition
The '557 Patent	U.S. Patent No. 10,974,557
The '557 Reexamination	The Reexamination of U.S. Patent No. 10,974,557
The '557 Reexamination Request	The Request for <i>Ex Parte</i> Reexamination of U.S. Patent No. 10,974,557
The '598 Provisional	U.S. Provisional Patent Application No. 61/867,598
The '636 Patent	U.S. Patent No. 9,694,636
The '638 Patent	U.S. Patent No. 10,124,638
The '758 Patent	U.S. Patent No. 8,944,758
The '789 PCT	PCT Application No. PCT/CA2014/050,789
The '835 Patent	U.S. Patent No. 11,491,835
The '015 Litigation	United States District Court for the Southern District of Iowa, Civil Action No. 3:22-cv-00015-SMR.
Truxor	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (EX1006)
Truxor-II	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (2013) (EX1020)
Truxor-III	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (2013) (EX1021)

Abbreviation	Definition
Truxor-IV	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (EX1022)
SenwaTec	SENWATEC-SCHRÖER UMWELT-& GEWÄSSERTechnologie GmbH & Co. KG, LIGHT AMPHIBIOUS BOAT/VEHICLE “AMPHI- KING®” SWT--AB380 (EX1012)
Sundstrom	The Sundstrom Stir Dredge (Shown and described in EX1120, EX1153, EX1154, and EX1128, 10:09-12:03)
USPTO	United States Patent and Trademark Office
Yoon	KR Publication No. 20130016490 (EX1010-EX1011)

I. INTRODUCTION

1. I have been retained by Merchant & Gould P.C. to serve as an independent expert on behalf of Bazooka in the above-referenced matter to provide my technical review, analysis, and opinions concerning the invalidity of the substitute claims proposed by the Patent Owner in IPR2024-00004 relating to the '835 Patent.

2. I previously executed declarations relating to the invalidity of the '835 Patent claims and the '835 Patent substitute claims, which I understand were filed as EX1004, EX1110, and EX1111. I am providing this declaration as a supplement to my prior declarations to address the additional substitute claims proposed in Patent Owner's Revised Motion to Amend.

3. My efforts on this case are being billed at a rate of \$275 per hour, with reimbursement for expenses incurred. I have no financial interest in the dispute between Bazooka and Nuhn Industries Ltd., and my compensation is not contingent upon the outcome of this IPR.

II. SUMMARY OF OPINIONS

4. It is my opinion that the proposed amended claims 41-80 of the '835 Patent are invalid as obvious over the prior art. Specifically, it is my opinion that Patent Owner's proposed amended claims 41-80 of the '835 Patent are unpatentable as obvious over Puck in view of the Puck Boat, Bryham, and Manure-Manager, which discloses the Nuhn Pump.

5. Puck discloses a remote-control agitation boat that must be manually launched from a trailer into a manure lagoon. Prior to the filing date of the '835 Patent, manure lagoons were known to be dangerous and unpleasant environments. Bryham teaches powered, steerable wheels for converting a boat into an amphibious vehicle and describes how by using the amphibious vehicle, operators do not need to get wet when launching and retrieving a watercraft. A POSA would have been motivated to combine the powered, steerable wheels of Bryham with the remote-control agitation boat of Puck to prevent operators from having to enter hazardous and unpleasant manure lagoons when launching the remote-controlled Puck boat.

6. Furthermore, a POSA would have been motivated to use the Nuhn Pump on the Puck vehicle to take advantage of the pump's improved efficiency and manure pumping capabilities. Using the efficient and robust Nuhn Pump would make the Puck vehicle less likely to be stuck in the manure lagoon due to breakdown or running out of fuel. A POSA would have understood that using a "submersible centrifugal unit that does not require priming," such as the Nuhn Pump, would remove the need to prime the pump of Puck, thereby removing a potential failure mode and an additional step required to operate the vehicle. EX1114, 2.

7. Finally, a POSA would have been motivated to position the Nuhn Pump intake forward of the rear yoke and fluid nozzles, as is taught by the Puck Boat, the commercial embodiment of Puck. The Puck Boat includes a bottom fluid inlet that

is positioned along the underside of the vehicle with submerged components located forward, rearward, left, and right of the bottom fluid inlet. A POSA would have been motivated to utilize this same arrangement when substituting the Puck pump for the Nuhn Pump.

III. LEGAL PRINCIPLES

8. I am not an attorney. My understanding of patent law and the applicable legal principles and standards comes from explanations provided to me by counsel.

A. Invalidity by Anticipation, Obviousness, and Interpreting Claims Before the Patent Office

9. My prior declarations, executed on October 13, 2023, and October 1, 2024 outline my understanding of various aspects of patent law, including invalidity by anticipation, obviousness, indefiniteness, interpreting claims before the USPTO, and compliance with the written description requirement. EX1004, Sections III.A-D.

IV. MATERIALS CONSIDERED IN FORMING MY OPINIONS

10. In forming the opinions expressed in this declaration, I have relied on my own knowledge, experience, and expertise, as well as the knowledge of a POSA in the relevant timeframe. In addition, I have reviewed and relied upon all documents and materials referenced in my declarations submitted in conjunction with IPR Nos. IPR2023-01161, IPR2024-00004, and IPR2024-00098. I have also reviewed and considered the declarations of Douglas Prairie submitted in conjunction with each of these IPRs, as well as the additional materials provided in Appendix A.

V. CLAIM ANALYSIS FRAMEWORK

11. For conciseness, I have broken out my analysis of the claims in the following sections according to the coloring convention cited in Nuhn's Motion to Amend Paper 42 at 12-16. I have reproduced that recitation of the claims, along with the associated font colors below.

Substitute Claim 41	Substitute Claim 57	Substitute Claim 79	Substitute Claim 80
41. An amphibious vehicle, comprising:	57. An amphibious vehicle, comprising:	79. An amphibious vehicle, comprising:	80. An amphibious vehicle, comprising:
a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;	a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;	a floatable vehicle body with a front, a rear, and an underside;	a floatable vehicle body with a front, a rear, and an underside;
a ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;	a ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;	a ground engaging propulsion structure comprising a set of four ground engaging wheels and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor;	a ground engaging propulsion structure comprising a front set of ground engaging wheels at the front of the floatable vehicle body and a rear set of ground engaging wheels at the rear of the floatable vehicle body and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor;

a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a pump housing and draws liquid manure in through a bottom fluid opening in the pump housing, the pump housing and the impeller of the immersible liquid manure pump are positioned along the underside of the floatable vehicle body at a location	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a pump housing, the immersible liquid manure pump including a bottom fluid opening in the pump housing, where the pump housing and the impeller are positioned along the underside of the floatable vehicle body at a location that is rearward of	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a pump housing and an impeller that is driven by a substantially vertical drive shaft, the immersible liquid manure pump including a bottom fluid opening in the pump housing, where the pump housing is mounted to the underside of the floatable vehicle body in a space collectively defined between the four ground	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a drive shaft powering an impeller that is positioned in a pump housing and draws liquid manure in through a bottom fluid opening in the pump housing, the pump housing is mounted to the underside of the floatable vehicle body at a location that is rearward of the front of the floatable vehicle body and forward
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that is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating; and has a constant angular orientation relative to the floatable vehicle body;	the front of the floatable vehicle body and forward of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating in a manure lagoon, and has a constant angular orientation relative to the floatable vehicle body;	engaging wheels such that the pump housing is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body and such that immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating and has a constant angular orientation relative to the floatable vehicle body;	of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating in a manure lagoon, where the drive shaft is substantially vertical and has a constant angular orientation relative to the floatable vehicle body;
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and	a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and	a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and	a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and
a wireless remote control configured to enable an operator who is remote from the vehicle to: (1)	a wireless remote control configured to enable an operator who is remote from the vehicle to: (1)	a wireless remote control configured to enable an operator who is remote from the vehicle to: (1)	a wireless remote control configured to enable an operator who is remote from the vehicle to: (1)

control the ground engaging propulsion structure; (2) control a flow of liquid manure from the immersible liquid manure pump; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and (4) control at least one of the speed and direction of the vehicle when the vehicle is floating,	control the ground engaging propulsion structure; (2) control the flow of liquid manure from the liquid manure mover back into the manure lagoon; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and (4) control at least one of the speed and direction of the vehicle when the vehicle is floating,	control the ground engaging propulsion structure; (2) control a flow of liquid manure from the liquid manure pump; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and (4) control at least one of the speed and direction of the vehicle when the vehicle is floating,	control the ground engaging propulsion structure; (2) control a flow of liquid manure from the liquid manure mover; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and (4) control at least one of the speed and direction of the vehicle when the vehicle is floating,
wherein components of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing along the longitudinal centerline of the floatable vehicle	wherein portions of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to the right and left of the pump housing and are spaced from and positioned forward of and rearward of the pump housing along the longitudinal centerline of the floatable vehicle to keep	wherein portions of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing to keep floating solid material away from the bottom fluid opening in the pump housing of	wherein components of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to the right and left of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing to keep floating solid material away from the bottom fluid

body to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.	floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.	the immersible liquid manure pump.	opening in the pump housing of the immersible liquid manure pump.
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VI. CLAIM CONSTRUCTION

12. I understand that claims should be given their ordinary and customary meaning as understood by a POSA at the time of the invention, viewing the claim terms in the context of the entire patent. I understand that the context of the patent includes the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art. I understand that if the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence may be considered.

A. “Along the Longitudinal Centerline”

13. It is my opinion that the term “along the longitudinal centerline” should be interpreted as “on or next to the longitudinal centerline.” The ’835 Patent analogizes this term with language of approximation: “substantially in the middle of the vehicle.” EX1001, 7:52-54. Furthermore, Merriam-Webster’s dictionary defines

the term “along” as “in a line matching the length or direction of.” EX1175, 1. Based on this definition, a POSA would have understood that the term “along” permits positionality “in a line matching the length or direction” of the longitudinal centerline (i.e. a line on or next to the longitudinal centerline). For example, POSAs would have understood the usage of the term “along” as used in the phrase “walking along the river” to have referred to one walking “next to” the river—not necessarily in it. Thus, POSAs would have understood that “along” means “on or next to.”

B. “Liquid Manure Pump”

14. The amended claims use the term “liquid manure pump.” While that term is included in the claims of the ’835 Patent, it is never used in the specification of the ’835 Patent nor the ’758 Patent.

15. I understand that the PTAB construed the term “liquid manure pump” in the institution decision. Paper 12 at 16-18. I understand that the PTAB found that the Patent Owner failed to provide any argument as to the specific structure required to pump liquid manure. Thus, since both parties agreed that liquid manure includes at least some suspended solids, the PTAB “construe[d] the term ‘liquid manure pump’ only to the extent that it requires a pump with a structure that is capable of pumping liquid with suspended solids.” *Id.* at 18. There is no specific or required structure to pump liquid manure, beyond the structure of a conventional centrifugal water or irrigation pump, which were known in the art for pumping liquid manure.

Therefore, it is my opinion that the term “liquid manure pump” should be interpreted consistently with the ’835 Patent institution decision as “a pump with a structure that is capable of pumping liquid with at least some suspended solids.” *Id.*

16. The PTAB’s construction of the term “liquid manure pump” properly tracks with the understanding of manure industry veterans, such as Ben Puck, the inventor of Puck. I understand that Mr. Puck testified that “as far as I’m concerned, there’s no such thing as ... a water or a manure pump. A pump is a pump that is—designed to deal with—with the attributes that you’re trying to overcome.” EX1158, 218: 13-17. I understand that Mr. Puck further testified that he is not aware of any “high-pressure, high-volume pumps that were available in 2012 that would not have been able to pump the most dilute form of liquid manure[.]” *Id.* at 27:6-9, 14-15. Mr. Puck’s testimony clarifies that any pump that is capable of pumping liquids with suspended solids is properly understood as a “liquid manure pump” and, given that suspended solids in liquid manure can be as low as .01 percent, any high-pressure, high-volume pumps that were available in 2012 would have been properly considered to be a “liquid manure pump.” *Id.* at 26:16-27:15.

17. The PTAB’s definition also covers any conventional water pump or irrigation pump that is capable of pumping water from a lake, stream, or other reservoir, which includes suspended solids. As is well documented throughout the literature, “liquid manure” is generally understood as a mixture of water and manure

with a total solid content of less than approximately 5%. EX1004, Section V.B.i-ii; *see also* EX1048, 76 (showing that concentrations in manure lagoons range from 2 percent to “less than ½” percent solids); *see also* EX1141, 5 (providing that the total solids content of lagoons is 1-3% for stage 1 lagoons and <1% for stage 2 lagoons).

18. Patent Owner has argued in the '425 IPR that the “liquid manure” should be construed to mean “animal manure contained in a farm lagoon, which includes suspended solids[,]” completely removing the term “liquid” from the definition. IPR2023-01161, Paper 27 at 15. However, Patent Owner does not dispute that its definition of “liquid manure” **would include** “a mixture of water and manure with a total solid content of less than about 5%.” *See* EX1110, ¶65. And the literature is clear that “[l]iquid manures with less than approximately 4% total solids can be pumped from earthen basins or lagoons using pumps designed for conventional water irrigation.” EX1004, ¶103 (citing EX1034, 64).

19. Additionally, Patent Owner has repeatedly cited Depeault in support of its position that water pumps are incapable of pumping liquid manure, specifically citing from a section of Depeault stating that “[t]he top crust in the reservoir is mostly cow manure. This upper or floating crust can become relatively hard and can reach six feet in thickness.” EX2003, 1:45-47. However, Patent Owner’s own cited literature demonstrates that crusts do not even form on hog lagoons, which are a prime focus of the '835 Patent. *See* EX2034, 6 (“Crusts do not occur on pig slurry

stores[.]”); *see also* EX1028, 1:14-16 (“Liquid manure from animal husbandry operations, particularly pig farming operations, is typically stored in a large manure reservoir or lagoon[.]”) (incorporated-by-reference into the ’835 Patent).

20. Other literature indicates that crust may form only for specific types of livestock manure, cattle, particularly if hay or silage is fed to the cattle or if bedding is collected with the manure. EX1058, 12-13. A POSA would have understood that a crust is not necessarily present and in many liquid manure storages there is no crust at all. One example of a liquid manure lagoon containing no crust is shown in the image below:



EX1142, 9.

21. Aside from the reference in Depeault to a possible six-foot thick crust that *may* form, neither Patent Owner nor Mr. Prairie provides any technical support for the solids concentration or particulate sizes found in a liquid manure lagoon. Their

reliance on Depeault to characterize and help define “liquid manure” is misleading and is incorrect. The crust, which Depeault describes as having “a consistency of dry peat moss” and “relatively hard,” is not liquid and it is not liquid manure, it is hard and it is a solid, as clearly stated in Depeault. EX2003, 1:27-29, 45-46. The crust is a solid material, which does not flow, and therefore a POSA would not understand it to be “liquid manure” as Nuhn asserts.

22. There are numerous technical references that characterize the typical solids concentrations found in manure lagoons and the typical size distribution of particles found in manure lagoons. I provided one such reference in my prior declaration related to the '835 Patent. EX1004, ¶¶92-93. Additionally, numerous other references provide similar information regarding the particle size distributions in liquid manures and in manure lagoons and the typical solids concentrations found in manure lagoons. For example, Jett reports particulate size distributions in swine manure particles as being smaller than approximately 3.36 mm. EX1144, 3. Marcato reports that most particles in raw and digested pig slurry are on the order of 1 mm (1000µm) or smaller. EX1145, 5. Meyer explains that “[r]egardless of animal class, the largest amount of TS were found to be smaller than 0.125 mm and the least amount of [total solids] were found to be <0.25 and >0.125 mm.” EX1146, 3. The various studies reporting particulate size distributions in liquid manure demonstrate that the particle sizes may depend on a variety of factors including source

animal, %TS, location (depth) in the storage/treatment system, and animal feed. However, studies generally report that average manure particles are typically less than 1 mm in size. The largest particles reported in liquid manures are on the order of a few mm (typically 3 to 6 mm). In sum, a POSA would have understood that the particles found in liquid manures are orders of magnitude smaller than the possible six-foot thick crust disclosed in Depeault and relied on by Patent Owner to (incorrectly) define “liquid manure.”

23. Other references describe that the “pump type recommended” for pumping from lagoons is a “closed impeller.” EX1141, 5. A POSA would have understood that a “closed impeller” centrifugal pump for pumping liquid manure from lagoons is the same type of pump used in high-pressure, high-volume water pumping applications. *See* EX1110, Section VI.B, ¶51.

24. Contrary to Patent Owner’s assertions otherwise, a POSA would have understood liquid manure, such as the liquid manure found in lagoons, to have a total solids content of a few percent or less. A POSA would have also understood that solids content of liquid manure is comprised of relatively small particles suspended in the liquid, which are typically on the order of a few millimeters or less in size. A POSA would have also understood that because of these characteristics, liquid manures found in lagoons were (and are) pumped with conventional water pumps and irrigation equipment. *See* EX1004, Section V.B.iii.a; EX1141, 4. While it is

possible that a crust may form under specific conditions and circumstances, this crust that may form does not define liquid manure nor does it define the requirements for pumping liquid manure.

VII. PRIOR ART USED IN ANTICIPATION AND OBVIOUS ANALYSIS

25. In addition to the prior art cited in my previous declaration (EX1004, Section VI.A-G), the following references support my opinion that the proposed amended claims of the '835 Patent are invalid as obvious over 35 U.S.C. §103.

A. Puck Boat

26. I understand that the Puck Boat is the commercial embodiment of the vehicle described in Puck (EX1014). EX1121, ¶¶4-11. I understand that the Puck Boat is prior art under at least 35 U.S.C. §102(a)(1) because the Puck Boat was publicly used and sold prior to the effective filing date of the '835 Patent. *Id.*; EX1158, 70:10-16; EX2083, ¶12.

27. The Puck Boat is depicted and described by EX1121-EX1126, EX1160-EX1161, EX1163-EX1167, and the testimony of Ben Puck (EX1158).



Puck Agitation Boat - 2012



Puck Enterprises, Inc.
542 subscribers

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2



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3,022 views Sep 19, 2012

Puck Agitation Boat on a dairy lagoon. Three underwater nozzles create vertical agitation to bring solids on the bottom of the lagoon into suspension for pump-out. A nozzle above the surface of the water is used to clean up banks and remove thick crusts.

EX1121, ¶¶7, 12.

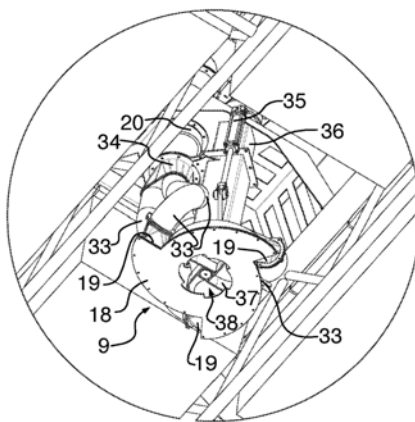
B. Manure-Manager

28. I understand that Manure-Manager (EX1112) is a printed publication that describes Patent Owner's Pump. I understand that Manure-Manager is prior art under at least 35 U.S.C. §102(a)(1) because Manure-Manager published and was publicly accessible before the effective filing date of the '835 Patent.

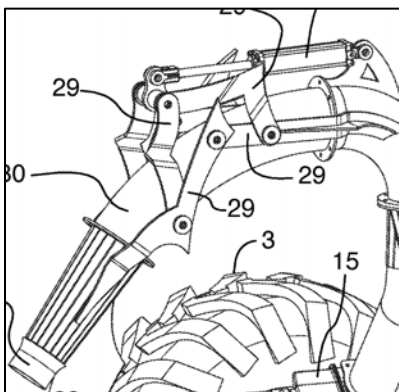
29. Manure-Manager describes Patent Owner's Nuhn Pump—which is similar to the pump described in the '835 Patent and the commercial embodiment of the '758 Patent (incorporated by reference into the '835 Patent).



EX1112, 27.



EX1001, FIG. 8; EX1112, 27.



EX1001, FIG. 5; EX1112, 27.

VIII. GROUND 1: AMENDED CLAIMS 41-80 ARE UNPATENTABLE AS OBVIOUS OVER PUCK IN VIEW OF THE PUCK BOAT, BRYHAM, AND MANURE-MANAGER

30. It is my opinion that proposed claims 41-80 would have been obvious to a POSA at the time of the invention in view of the teachings of Puck, the Puck Boat, Bryham, and Manure-Manager.

A. Motivation to Combine Puck, the Puck Boat, Bryham, and Manure-Manager

31. It would have been obvious to a POSA to add the steerable, hydraulically powered, all-terrain wheels of Bryham to the Puck manure boat, and extend the remote-control functions of Puck to the wheels of Bryham. EX1004, Section X.A.

32. Puck teaches a manure pumping agitator including a slurry pump in the form of a “Cornell Redi-Prime centrifugal pump[.]” EX1014, ¶[0025]. Puck describes a process that requires the user to prime the pump using a remote control prior to use. *Id.*, ¶[0031]. Puck relies on the manure pump to pump the manure and propel the vehicle about the liquid manure lagoon. *Id.*, ¶[0035].

33. Manure-Manager II (EX1113), an excerpt of which is shown below, is another printed publication describing various multi-outlet high efficiency pumps. Manure-Manager II describes a multi-outlet pump made by Patent Owner (above) and dual outlet (“double discharge”) pumps made by Fisher Pumps (below), another manufacturer of pumping equipment:

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EX1113, 23.

34. Manure-Manager II describes how dual outlet pump designs “equalize[] pressure” and “maximize[] horsepower.” *Id.* Fisher, a brochure distributed by Fisher Pumps,¹ further touts various benefits of dual tangential outlet pumps:

Double discharge impeller equalizes case pressure & allows impeller to center in the case. NO one sided thrust load!

Double discharge case does not require fluid to travel more than 180 degrees before discharging for better efficiency & less internal wear.

EX1114, 1 (“Double discharge impeller equalizes case pressure & allows impeller to center in the case. NO one sided thrust load! Double discharge case does not require fluid to travel more than 180 degrees before discharging for better efficiency & less internal wear.”).

35. Manure-Manager describes the Nuhn Pump as being dual outlet (“dual ported”), having a “hardened and balanced drive shaft,” and providing the “fastest load times in the industry.” EX1112, 27. Manure-Manager also shows the Nuhn Pump mounted on and powered by a vehicle.

¹ EX1114 is a prior art printed publication that describes the benefits of dual outlet pumps. EX1114 was published and was publicly accessible before the effective filing date of the ’835 Patent. EX1115, ¶¶7, 12.



EX1112, 27.

36. A POSA looking to select an improved pump for use on the Puck vehicle would have been motivated to use the Nuhn Pump, given the various teachings in the literature, often alongside Patent Owner's own pump advertisements, touting the efficiency and durability benefits of such dual outlet pumps. A POSA would have had a reasonable expectation of success in using the Nuhn Pump given that it is configured to be mounted on and powered by a vehicle.

37. Furthermore, a POSA would have been further motivated to use the Nuhn Pump on the Puck vehicle because of the pump's advertised manure pumping

capabilities, which would allow the Puck vehicle to more efficiently pump manure, saving fuel costs, time, and providing better agitation. As confirmed by the testimony of Mr. Puck, submersible impeller pumps, such as the Nuhn Pump, are generally understood to have enhanced solids handling capabilities when compared to other types of pumps, such as the Cornell Redi-Prime pump utilized in Puck and the Puck Boat. Thus, a POSA would have understood that the Nuhn Pump would have provided enhanced solids pumping capabilities, thereby minimizing instances of clogging the pump and reducing downtime. EX1158, 247:7-248:12.

38. In addition to the enhanced efficiency and durability and improved manure pumping capabilities of the Nuhn Pump, as confirmed by the testimony of Mr. Puck, a POSA would have understood that such “submersible centrifugal unit[s] do] not require priming, draining or sealing.” EX1114, 2; EX1158, 247:7-21. A POSA would have understood the Nuhn Pump, as described in Manure-Manager, to be a “submersible centrifugal unit.” EX1114, 2. A POSA would have understood that using a “submersible centrifugal unit that does not require priming,” such as the Nuhn Pump, would remove the need to prime the pump of Puck, thereby removing a potential failure mode and additional step required to operate the vehicle. EX1114, 2.

39. A POSA would have been motivated and had a reasonable expectation of success in combining the Nuhn Pump with the Puck vehicle to take advantage of the

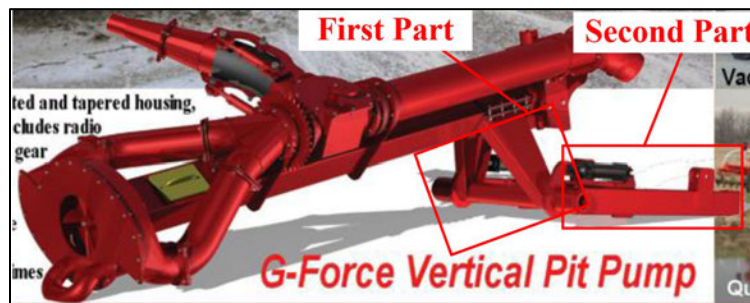
pump's improved efficiency and manure pumping capabilities. Both qualities are also beneficial for maneuvering the Puck vehicle, given that the Puck vehicle uses the pump to propel itself around the lagoon. Using the efficient and robust pump described in Manure-Manager, the Nuhn Pump would make the Puck vehicle more fuel efficient and less likely to become stuck given the improved propulsion efficiency. *See* EX1113, 23; EX1114, 2; EX1112, 27.

40. Certain submersible impeller pumps (like the Nuhn Pump) and closed impeller pumps (like the Puck pump) each offer different advantages and disadvantages. EX1158, 247:7-248:12. As noted above, certain submersible impeller pumps (such as the Nuhn Pump) provide advantages, such as obviating the need for priming the pump and providing enhanced solids pumping capabilities, thereby reducing instances of pump clogging. A POSA would have understood the substitution of the Puck pump for the Nuhn Pump to be a matter of design choice.

41. I understand that in its Reply to Bazooka's Opposition to the Motion to Amend in the '425 Patent IPR, Nuhn's arguments against the Puck, Bryham, and Manure-Manager combination focused on the location where a POSA would have been motivated to attach the Nuhn Pump to the vehicle. IPR2023-01161, Paper 40 at 9-12. It is my opinion that Nuhn's arguments are incorrect because they advocate, without basis, positioning the pump at the very rearward extent of Puck's vehicle. A POSA would have understood that positioning the pump in Nuhn's proposed

configuration is unnecessary and undesirable because it would result in a less stable configuration. In selecting such configuration, Nuhn disregards the teachings of Puck and its positioning of its pump and makes unsupported and improper assumptions about the size of the Puck vehicle. *Id.*

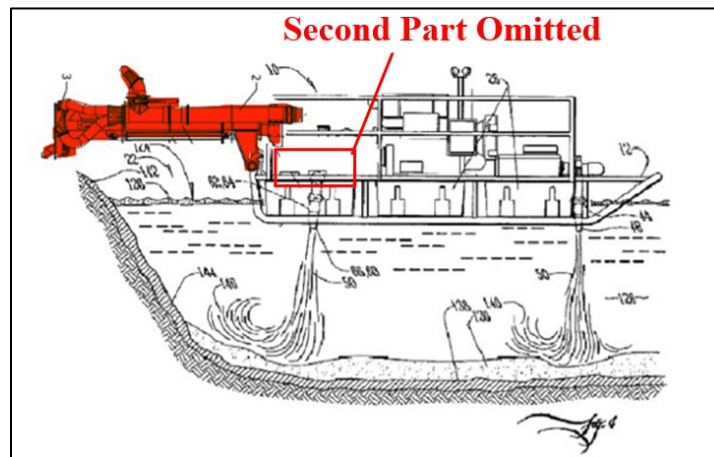
42. Nuhn and Mr. Prairie assert that because the Nuhn Pump includes a two-part pivotable frame, the only way to mount the Nuhn Pump on Puck would be to hang the Nuhn Pump off the rear of the vehicle. *Id.* They are wrong. An annotated image of the Nuhn Pump, labeling what Nuhn refers to as the first part and the second part of the Nuhn Pump is provided below.



EX1112, 27 (annotated).

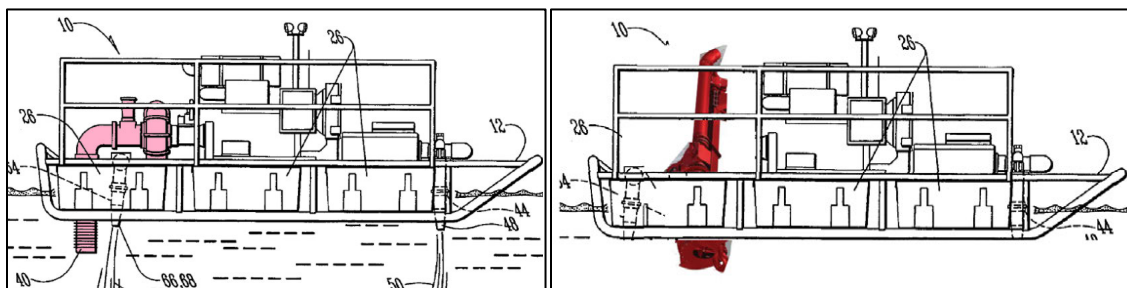
43. However, contrary to Nuhn's and Mr. Prairie's arguments, Manure-Manager does not describe that the second part of the frame of the Nuhn Pump is a mandatory component. Nor does Manure-Manager describe that the pivoting feature of the pump is required. Nuhn even omitted the second part of the Nuhn Pump frame in its own figure, reproduced and annotated below. Like Nuhn shows in its figure, it would have been trivial for a POSA to remove this second part of the frame when

attaching the first part of the Nuhn Pump frame to the Puck vehicle. A POSA would have appreciated that the pivoting feature may be beneficial for a tractor mounted application where the pump could be deployed from a horizontal orientation to a vertical orientation, for example, if it were to be deployed over the vertical wall of a slurry pit. However, a POSA would have similarly appreciated that the pivoting feature would be completely unnecessary for the pump to be used on a floating vehicle.



IPR2023-01161, Paper 40 at 11 (annotated).

44. A POSA would have understood that, when mounted to the Puck vehicle, the natural choice for the Nuhn Pump would be a vertical orientation in the same general area where Puck describes its pump and pump intake:



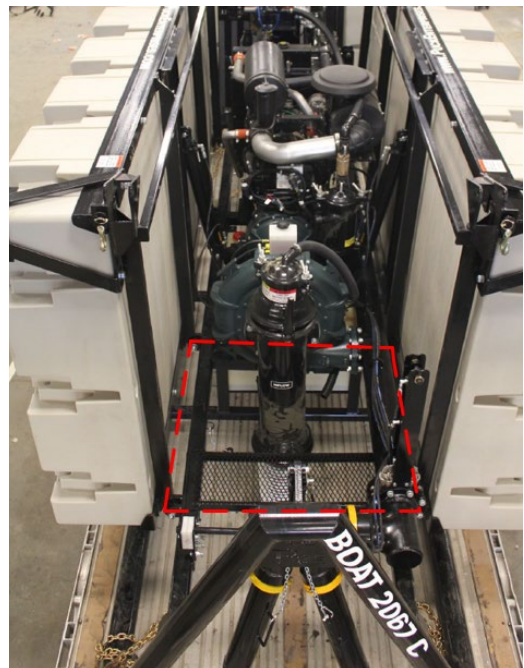
EX1014, FIG. 4; EX1112, 27 (modified and annotated).

45. I understand that Mr. Prairie suggests attaching the pump's boom arm to the rear of the Puck vehicle body to allow the pump to pivot up and down off the rear of the vehicle. IPR2023-01161, EX2099, ¶364. Mr. Prairie fails to consider that the pivoting feature is wholly unnecessary and overlooks the impact that such an arrangement would have on the vehicle's weight distribution and center of gravity. This is perhaps because Mr. Prairie is not a POSA and lacks the relevant education and experience in marine vehicle design that would be necessary to evaluate the vehicle's weight distribution and center of gravity. A POSA would have understood that shifting the significant weight of the pump to the very back extent of the vehicle and cantilevering it well beyond the end of the vehicle in its horizontal orientation, would adversely affect the stability of the vehicle while afloat. Indeed, the Progressive Dairyman video that Mr. Prairie cites shows that positioning the pump off the end of the vehicle causes it to be weighed down as the vehicle is launched so that manure flows over the vehicle deck.



EX2008, 10:45; *see also* IPR2023-01161, EX2099, ¶176.

46. A POSA would have understood that the far more logical location for the Nuhn pump would be to extend through the already defined space on the Puck Boat for the pump intake, as shown below. Puck even describes the importance of “increas[ing] the stability of the agitator (10).” EX1014, ¶[0041] Indeed, Mr. Puck testified that the logical location to place the Nuhn Pump on the Puck Boat would have been “directly behind the engine” in order to mitigate the negative effect of the reaction forces and to protect the pump from outlying solids. EX1158, 73:20-74:19.



EX1164, 17, 25 (annotated).

47. To the extent additional space for the pump was required, a POSA would have understood that the exact positioning of the pivot pipe 58, hydraulic cylinder 52, and the second and third slurry outputs (62, 64) could easily be modified to accommodate the Nuhn Pump extending through this opening. *See* EX1014, ¶¶[0027]-[0029].

48. A POSA would have understood that positioning heavier components, such a pumping system, towards the center of a floating vehicle, is beneficial. Weight distribution and center of gravity location are important considerations when designing a floating vehicle because off-centered weight distribution may cause a vessel to list and/or adversely affect its stability. For example, the textbook *Introduction to Naval Architecture* (“Tupper”) states that: “[a]s the position of the centre of gravity is so important for stability it must be established accurately for the ship as completed. During design it is determined by calculation by considering all weights making up the ship—steel, outfit, fittings, machinery and systems—and assessing their individual centres of gravity.” EX1147, 3.

49. Further, a POSA would have understood that positioning the pump in this centralized location would also minimize the effect of any reaction forces from the pump which may adversely affect the stability of the vehicle. I understand that Mr. Puck testified that these reaction forces played a key role in his determining where

to place the pump on the Puck Boat and its early prototypes. EX1158, 73:20-74:19, 60:12-61:10 (discussing the prototype vehicle of EX1159). A POSA would have understood that accelerating fluid while pumping will generate reaction forces, equal and opposite the momentum change of the fluid. The reaction forces are governed by the momentum equation, for a fluid volume, which is described in many fluid mechanics textbooks. *See, e.g.*, EX1148, 3-4.

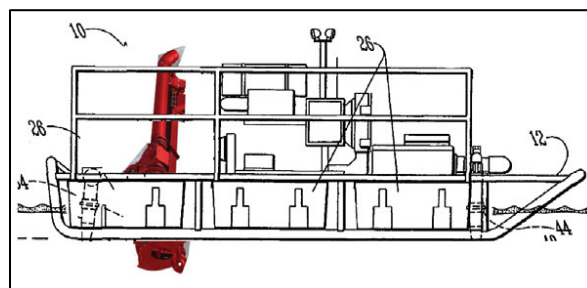
50. Initially the fluid in a manure lagoon or any reservoir is stationary and does not have any momentum, but when it is discharged from the pump, the pumping action has added momentum to the fluid system. A POSA would have understood that this change in momentum produces a reaction force, and that the magnitude of that force is equal to and opposite the time rate of change of the linear momentum of the system. *Id.* Therefore, a POSA would have understood locating the pump system near the center of the vehicle, between the front and rear tire spindles, would minimize the vessel's roll and pitch response to the forces generated while pumping. In general, if the reaction forces pass through the center of gravity of the floating vehicle, there will be no net moment causing the floating vehicle to pitch and/or roll. Whereas the further the force acts from the center of gravity the greater its effect on the vehicle's stability.

51. A more central pump location minimizes the negative effects of reaction forces and allows the pump mass to be more stably located over the buoyant

elements of the vehicle, rather than being extended from the rear of the vehicle, which would result in a less stable vehicle that would be more prone to capsizing.

52. I understand that Mr. Prairie argued that a POSA would not be motivated to use the Nuhn Pump on Puck in the proposed position, similar to where the Puck pump was located because “[t]he scale in [the] combination” is off and because it would not permit the pump to swing up and down so it would get in the way upon entry and exit of a manure lagoon. IPR2023-01161, EX2099, ¶361. I also understand that patent figures are not understood to be drawn to scale unless otherwise stated. Nowhere does Puck say that its drawings are to scale.

53. A POSA would have understood that the Puck vehicle could be scaled up or down in size while still performing its agitation functions. A POSA would have understood that scaling the Puck vehicle up in size could allow it to accommodate additional or substitute components, such as the Nuhn Pump. A POSA would have understood that the Puck vehicle could be scaled up in size to accommodate the Nuhn Pump in various alternate arrangements, such as in the arrangement shown in the figure below.



EX1014, FIG. 4; EX1112, 27 (modified and annotated).

54. Additionally, regarding Mr. Prairie's arguments about the Nuhn Pump getting in the way of the vehicle upon entry and exit of a manure lagoon (IPR2023-01161, EX2099, ¶361), I understand that Bryham also does not indicate that its figures are drawn to scale. A POSA would have recognized that to the extent ground clearance of the Nuhn Pump poses any issue, the Puck vehicle and Bryham wheels could be increased in size to provide sufficient ground clearance for the vehicle to enter and exit the lagoon. Similarly, as Puck recognizes, a POSA would have understood that the positioning of the Nuhn Pump on the vehicle could be adjusted such that the intake "may be extended or retracted to any desired depth" so as to provide any necessary ground clearance for the Puck vehicle to enter or exit the lagoon. EX1014, ¶[0026].

55. Furthermore, a POSA would have understood that another way to address this issue would be to shorten the length of the elongated body of the Nuhn Pump when implemented on the Puck vehicle. A POSA would have understood that the purpose of the elongated body of the pump disclosed in Manure-Manager (EX1112, 27) is to permit the pump to extend from an elevated shore surface down to a variable depth within a reservoir. A POSA would have understood that the length of the drive shaft and pump body could easily be varied, as was long done with prior art pumps used in the manure industry. *See* EX1149, 10-11 (noting various optional drive shaft

lengths (part numbers 28, 31, and 32) for powering the pump impeller); *see also* EX1014, [0026] (noting the variable length pump intake).

56. Another example of this is provided by referencing the pre-2013 modifications made to the Doda Super 150 Pump—which Mr. Lonnemann and Mr. Puck confirmed was same pump used on the SenwaTec Amphi-King and the Puck prototype manure agitation boat. EX1158, 63:14-64:16; EX1131, 69:21-71:8. As can be seen when comparing the image of the Doda Super 150 Pump on the Puck prototype manure agitation boat with the same pump on the SenwaTec Amphi-King vehicle, the length of the drive shaft and pump body are greatly reduced when implemented on the SenwaTec Amphi-King. A POSA would have therefore understood that this type of pump (and similar submersible impeller centrifugal pumps like the Nuhn Pump) could readily be modified to decrease the overall length of the pump to make it more suitable for its intended application.

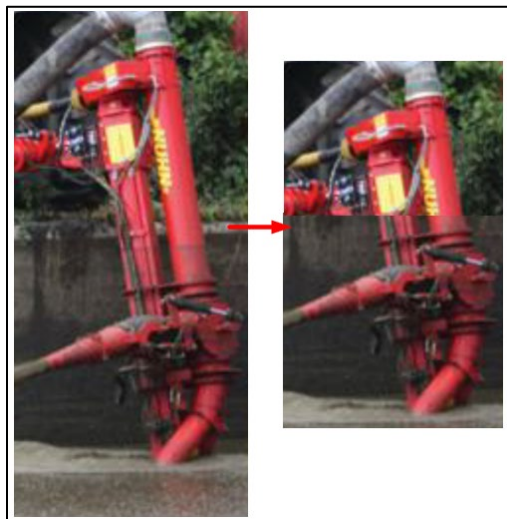


EX1159, 2; EX1012, 1.

57. This is confirmed by referencing the figure cited by Mr. Prairie (IPR2023-01161, EX2099, ¶363) and Manure-Manager (EX1112, 27), as it is apparent that the purpose of the elongated pump body and extended drive shaft 28 is to permit the pump to extend from an elevated shore surface down to a variable depth within a reservoir. The '758 Patent recognizes this, noting that the length of the pump body

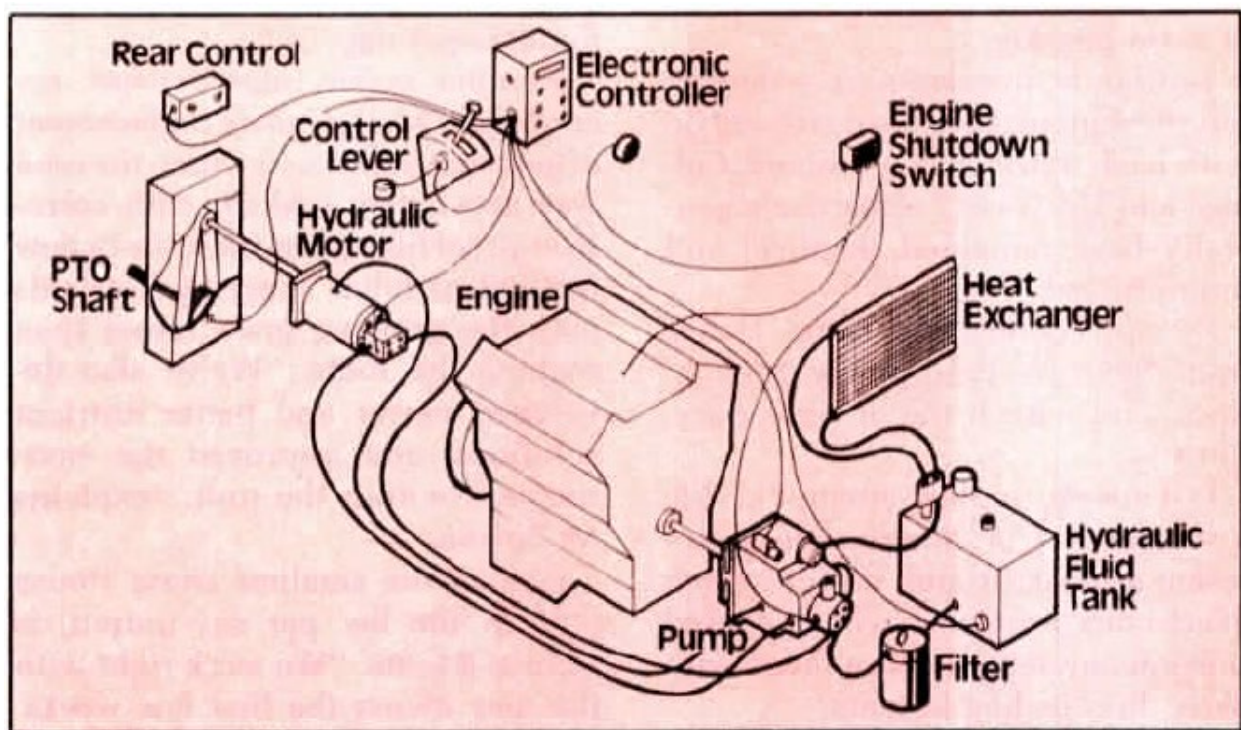
and shaft 28 is adjustable. EX1028, 6:14-16. A POSA would have understood that the extended driveshaft of the Nuhn Pump would be unnecessary when connecting the Nuhn Pump to Puck.

58. Puck shows the pump intake arranged immediately below the vehicle body, rather than extending to the bottom of the lagoon. *See* EX1014, FIG. 4. Indeed, a POSA would have understood that it would be beneficial to draw from this location, as opposed to pumping the thicker sludge layer from the bottom of the lagoon. EX1121, ¶14; EX1110, ¶22; EX1014, ¶¶[0035]-[0036]. Thus, even ignoring that the Puck vehicle and Bryham wheels could be scaled to accommodate the Nuhn Pump, as illustrated below, a POSA would have understood that the elongated body of the Nuhn Pump could be easily shortened to adapt the Nuhn Pump to the Puck vehicle.



EX1112, 27 (modified).

59. I also understand that Nuhn previously argued against the positioning of the Nuhn Pump on the Puck vehicle based on the relative locations of the power take off (PTO) input of the Nuhn Pump and the Puck engine output. However, as explained in my prior declaration (EX1004, ¶¶346-350) and my supplemental declaration in support of Bazooka's Reply to the Patent Owner Response (EX1110, Sections X.A.ii, X.A.iv), a POSA would have been motivated to power the Nuhn Pump from the Puck engine by utilizing the hydraulic transmission taught by Bryham. As Mr. Prairie acknowledged in his declaration submitted in conjunction with Nuhn's Patent Owner Response, such hydraulic transmissions were well known for powering PTO driven implements (such as the Nuhn Pump) since at least the 1970s. IPR2023-01161, EX2029, ¶172. One example, cited by Mr. Prairie, is provided below:



EX1129, 18.

60. As illustrated in the figure above, one advantage to this configuration is that the position of the hydraulic motor and its associated power output shaft can be easily adjusted to accommodate the relative positioning of the power input of whatever implement is being driven by the hydraulic transmission. *See* EX1129, 18.

61. This point is further evidenced by the testimony of Mr. Puck, who testified that he performed this same modification on the Doda Super 150 Pump when implementing that pump on his prototype manure agitation vehicle. EX1158, 49:10-52:7. Mr. Puck testified that this modification was “extremely easy” to perform and allowed the pump to be used on a vehicle when the PTO shaft of the engine did not align with the PTO input on the pump. *Id.*

62. A POSA would have understood the relative positioning of the Nuhn Pump PTO input with respect to the Puck engine output shaft to be irrelevant. A POSA would have understood that the hydraulic transmission of Bryham could easily be modified to accommodate any variation in this positioning.

63. Thus, instead of positioning the Nuhn Pump “several feet behind the rear of the floatable vehicle body[,]” as Mr. Prairie incorrectly asserts would be necessary (IPR2023-01161, EX2099, ¶368), POSAs would have understood that the more natural and stable location for the Nuhn Pump would be through the same opening where the Puck pump intake pipe is positioned. Any pivoting action of the pump would be completely unnecessary. A POSA would have understood that the pivoting feature would serve no purpose in this combination and would choose not to retain this feature. Mr. Prairie also incorrectly asserts that scale issues would render the combination of Puck, Bryham, and the Nuhn Pump unworkable. *See id.* at ¶361. In contrast, a POSA would have understood that the Puck vehicle (with the Bryham wheels) could be scaled up as needed to accommodate a larger/longer pump, or a POSA would have similarly understood that the pump body and drive shaft housing of the Nuhn Pump could be shortened to accommodate this position without any impact on performance using techniques known in the art.

64. Furthermore, a POSA would have understood it to have been trivial to implement the teachings of the Puck Boat arrangement of the pump intake and rear

yoke/nozzles into the Puck, Bryham, Manure-Manager combination, given that the Puck Boat is the commercial embodiment of Puck. The Puck Boat includes a yoke/nozzle structure at the rear of the Puck Boat which is designed to be submerged in certain modes of operation, in which case it functions to keep solid floating material away from the bottom fluid inlet of the pump. EX1158, 105:2-9 (discussing EX1164, 22); 105:17-108:20 (discussing EX1164, 1); 109:4-112:17 (discussing EX1165, 0:38).

65. A POSA would have recognized these advantages taught by the Puck Boat and would have been motivated to include the arrangement of the pump intake with respect to the rear yoke/nozzles into the Puck, Bryham, Manure-Manager combination to provide this same functionality.

B. Claim 41

[41.0] An amphibious vehicle, comprising:

[41.1] a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;

[41.2] a ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;

[41.5] a wireless remote control configured to enable an operator who is remote from the vehicle to: (1) control the ground engaging propulsion structure; (2) control a flow of liquid manure from [[a]] the immersible liquid manure pump; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and~~[[,]]~~ (4) control at least one of the speed and direction of the vehicle when the vehicle is floating,

66. Puck in view of Bryham would have rendered obvious Elements [41.0]-[41.2] and the remote control limitations of Element [41.5]. EX1004, ¶¶341-350. As explained below, Manure-Manager discloses the immersible liquid manure pump limitation of Element [41.5]. *Infra* Section VIII.B, Element [41.3].

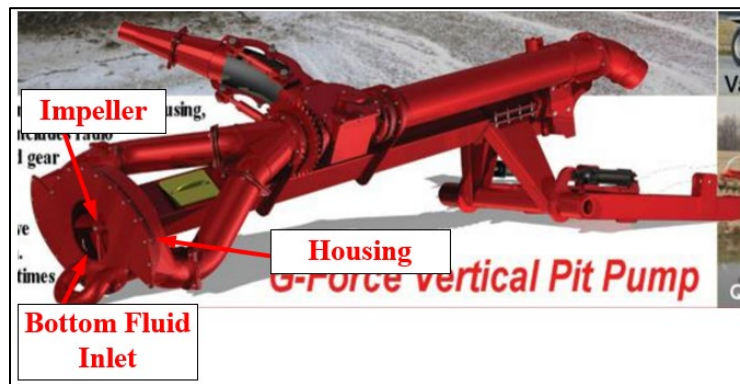
[41.3] a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a pump housing and draws liquid manure in through a bottom fluid opening in the pump housing, the pump housing and the impeller of the immersible liquid manure pump are positioned along the underside of the floatable vehicle body at a location that is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating and has a constant angular orientation relative to the floatable vehicle body;

67. Puck in view of the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Element 41.3.

68. Puck teaches a vehicle with a pump. A POSA would have been motivated to substitute the Puck pump with the Nuhn Pump, described in Manure-Manager, to take advantage of Nuhn's self-described improved efficiency and manure pumping capabilities, and to eliminate the need to prime the pump. A POSA would have understood that the Nuhn Pump is an immersible pump that includes a substantially

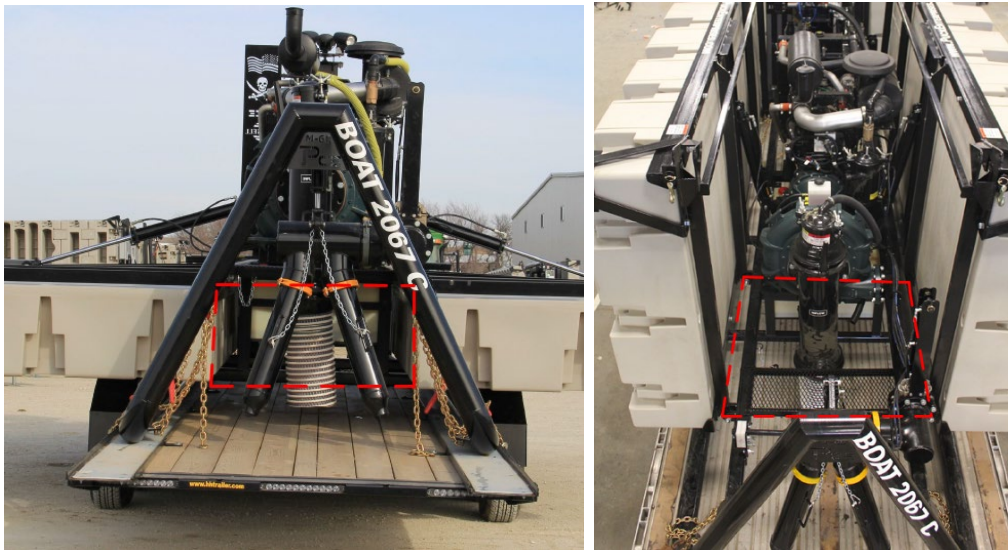
vertical drive shaft powering an impeller in a housing with a bottom fluid inlet.

EX1112, 27; EX1004, ¶¶48-57.

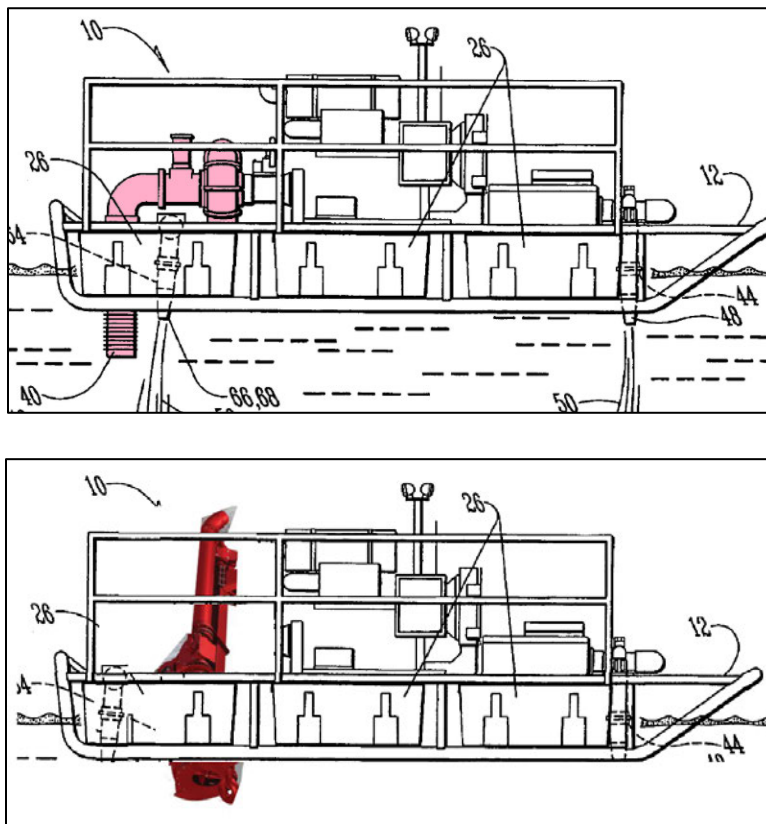


EX1112, 27 (annotated).

69. As illustrated below and detailed above, when substituting the Puck pump for the Nuhn Pump, a POSA would have been motivated to locate the Nuhn Pump adjacent to the power source, just as the Puck pump was. EX1158, 73:20-74:19. A POSA would have understood that the Nuhn Pump could be immersed into the fluid and could pass through the same opening through which the Puck Boat intake pipe extends, which provides access from the top of the vehicle to the fluid below. This arrangement would place the Nuhn Pump in the liquid manure when the vehicle is floating. Likewise, in this orientation, the Nuhn Pump housing and impeller would be positioned along the underside of the floatable vehicle body, rearward of the front of the vehicle and forward of the rear of the vehicle body. Attaching the Nuhn Pump to Puck in this way would result in the housing and drive shaft having a substantially vertical, angular orientation relative to the vehicle body.



EX1164, 17, 25 (annotated).



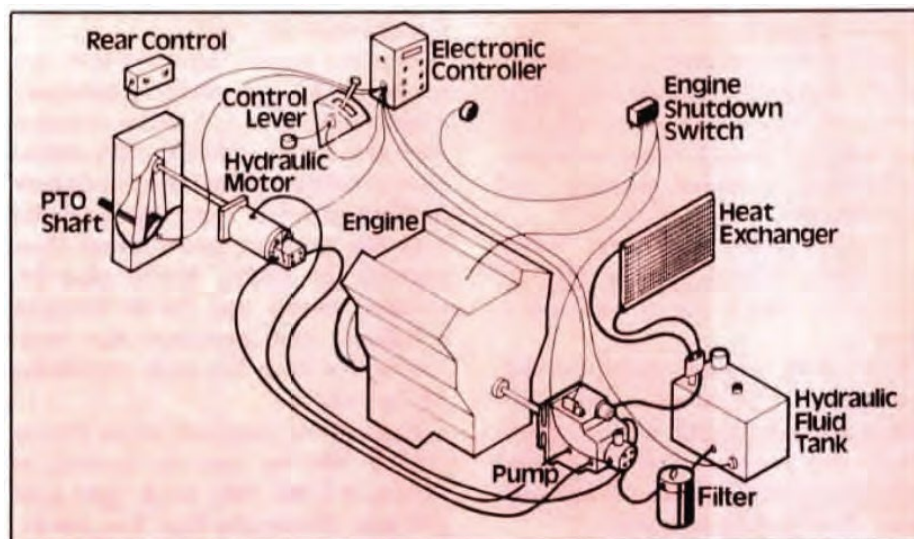
EX1014, FIG. 4; EX1112, 27 (modified and annotated).

70. Furthermore, a POSA would have understood that the Nuhn Pump would have a constant angular orientation relative to the floatable vehicle body. As outlined above, Nuhn and Mr. Prairie assert that because the Nuhn Pump includes a two-part pivotable frame, the only way to mount the Nuhn Pump on Puck is at the very end of the vehicle to retain this pivoting functionality. However, they are wrong. Nowhere does Manure-Manager describe that the pivoting feature of the pump is required. Rather, a POSA would have understood this to be an unnecessary feature when implementing the pump on the Nuhn vehicle. When mounted in a fixed orientation through the intake pipe opening on the Puck Boat (as a POSA would have understood to be the natural positioning of the Nuhn Pump on the Puck Boat), the Nuhn Pump would have a constant angular orientation relative to the floatable vehicle body. *See supra* Section VIII.A.

71. Even if the Nuhn Pump were pivotably mounted to the Puck Boat, a POSA would have understood that the Nuhn Pump would be vertically oriented at a constant angular orientation relative to the floatable vehicle body, at least while the Nuhn Pump is pumping liquid manure while the Puck Boat is floating.

72. As described in my prior declaration (EX1004, ¶¶346-350) and recognized in the institution decision (Paper 12 at 51, 56), a POSA would have been motivated to utilize the hydraulic drivetrain described in Bryham to power the slurry pump of Puck, as a hydraulic transmission is one of a finite number of options for

transmitting power on a moving vehicle and has a high likelihood of success, given its widespread use for this purpose. *See, e.g.*, EX1015; EX1017; EX1006; EX1012; EX1005. For the same reasons, a POSA would have been motivated to use the hydraulic drivetrain of Bryham to drive the input shaft to the Nuhn Pump. Indeed, Mr. Prairie has identified the following similar prior art hydraulic transmission system for driving a PTO. IPR2023-01161, EX2029, ¶172. A POSA would have understood that these hydraulic transmission concepts could be implemented to drive the input shaft of the Nuhn Pump using the Bryham hydraulic transmission system, as shown in the example transmission below.



EX1129, 18.

73. This point is further evidenced by the testimony of Mr. Puck, who testified that he performed this same modification (converting from a gearbox to a hydraulic “hydrostat” power transmission) on the Doda Super 150 Pump when implementing

that pump on his prototype manure agitation vehicle. EX1158, 49:10-52:7. Mr. Puck testified that this modification was “extremely easy” to perform and allowed the pump to be used on a vehicle when the PTO shaft of the engine did not align with the PTO input on the pump. *Id.*

74. It would have been obvious to a POSA to couple the Nuhn Pump to the fluid systems (conduits and nozzles) on the Puck vehicle in the same manner in which the Puck pump was coupled to the fluid systems on the Puck vehicle. Specifically, a POSA would have been motivated to connect the output of the Nuhn Pump to the transport pipe 42 to permit the pumped fluid to be discharged through the nozzles 48, 66, 68. *See* EX1014, ¶[0033]. A POSA would have been motivated to connect the Nuhn Pump in this manner to preserve the steering, propulsion, and agitation capabilities of the vehicle while it is floating in a liquid manure lagoon.

[41.4] a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and[.];

75. As described in my prior declaration (EX1004, ¶351; *see also* EX1110, ¶¶188-196) and recognized in the institution decision (Paper 12 at 54), rather than loading the vehicle with multiple engines, a POSA would have been motivated to use the high-powered internal combustion engine of Puck to power the Bryham hydraulic pump, and use the Bryham hydraulic system to power the ground engagement means of Bryham (as contemplated by Bryham) and the Nuhn Pump.

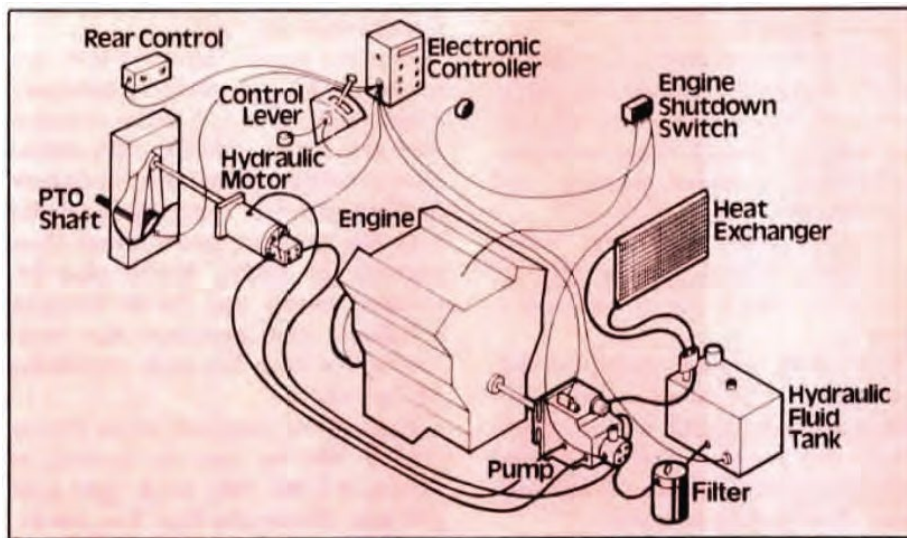
See supra Section VIII.B, Element [41.3]. A POSA would have understood that the high-powered engine of Puck (two-thousand horsepower, EX1014, ¶[0024]) would be more than sufficient to power all of these components, and doing so would be cheaper, lighter, and more efficient than providing separate engines for each component.

76. For example, Morrell provides that the “extra cost and complications of adding an engine to the implement prompted the re-introduction of the independent PTO.” EX1133, 5. Nelson provides that

Improvements in tractor design and performance continued at a swift pace. In the 1920s the major innovation was the power take-off shaft. It enabled tractor power to be applied directly to harvesting implements, eliminating the need for auxiliary engines. The power take-off shaft also allowed the development of a variety of tractor powered spreaders and sprayers that would later revolutionize fertilizer and pesticide application procedures.

EX1150, 71-72.

77. As to the weight and space requirements, a POSA would have understood that the cost of a hydraulically-powered PTO and the space required for such a PTO is typically less than a secondary engine and associated equipment. While a variety of PTO configurations exist, the relative size and relative cost between a hydraulically-powered PTO and a secondary engine would have been readily apparent to a POSA. An example of the relative size of a hydraulically-powered PTO unit compared to the engine is illustrated in the example image below.



EX1129, 18.

78. As noted above, the power source of Puck and the hydraulic transmission of Bryham could be readily implemented to provide hydraulic power to the PTO input shaft of the Nuhn Pump, thereby powering both the ground engaging propulsion structure of Bryham and the Nuhn Pump hydraulically using a single power source. *Supra* Section VIII.B, Element [41.3].

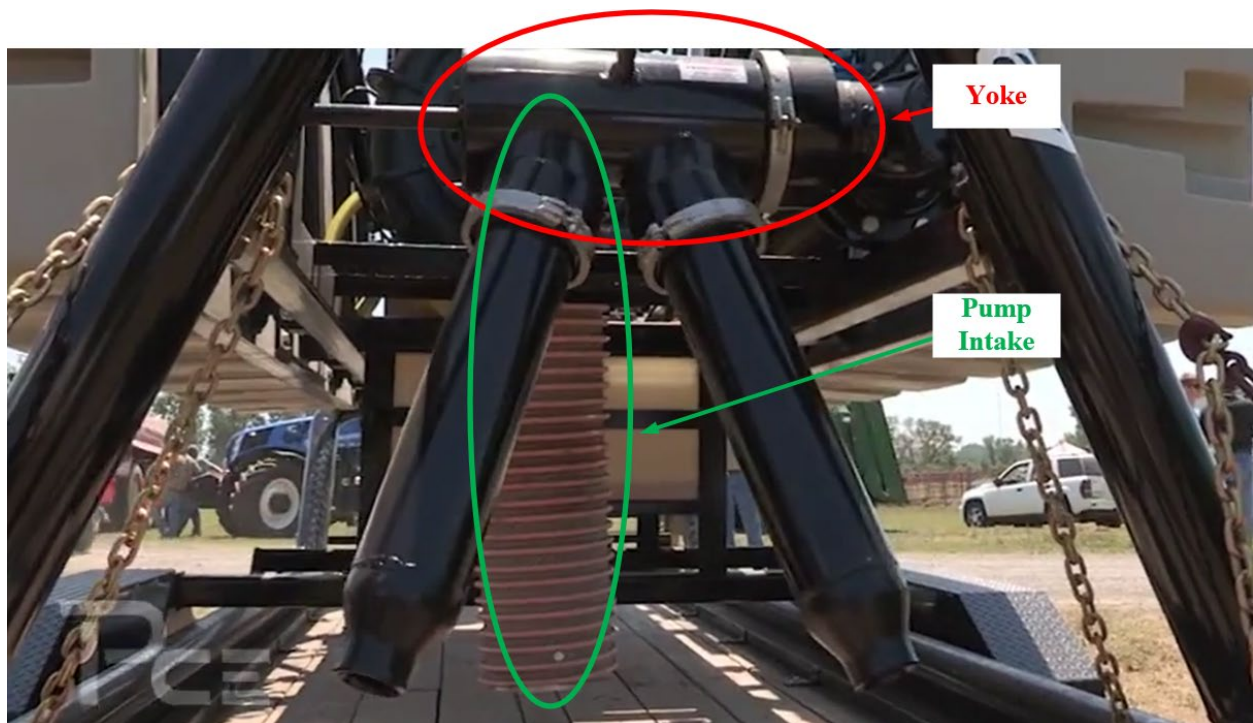
[41.6] wherein components of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing along the longitudinal centerline of the floatable vehicle body to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.

79. Puck discloses modular dock sections that are submerged when the vehicle is floating. EX1014, ¶¶[0022]-[0023]. These dock sections are arranged in front of and to each side of the intake pipe of the Puck pump. EX1014, FIGS. 1-2.

This arrangement of the dock sections being located in front of and to each side of the intake pipe of the Puck pump is also shown included in the Puck Boat. *See, e.g.*, EX1164, 16-19.

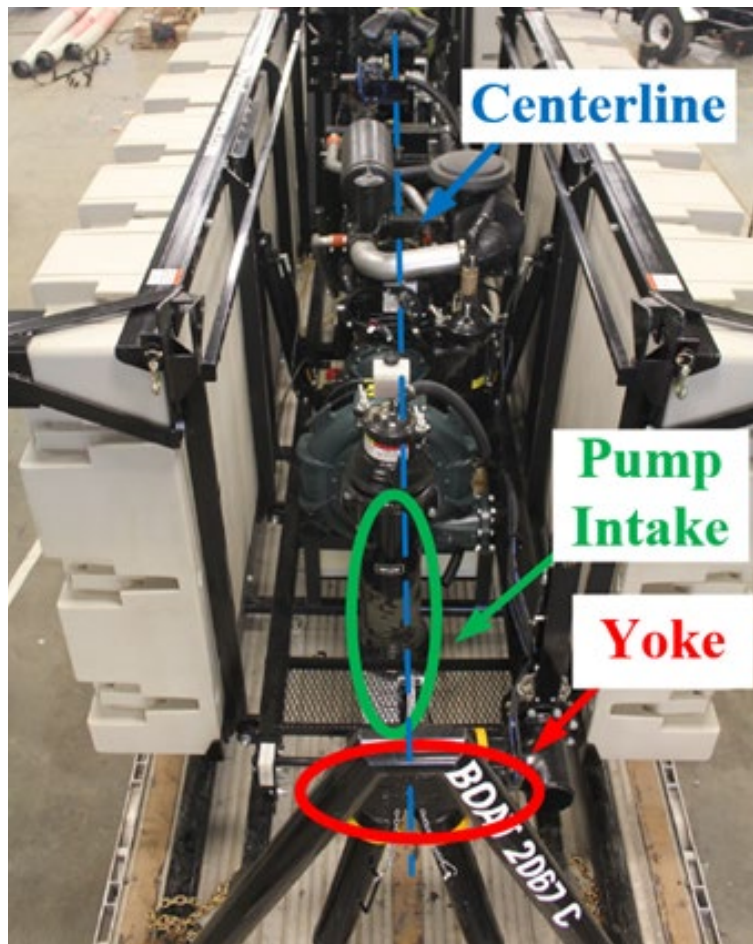
80. As described above, a POSA would have understood it to be obvious to have arranged the Nuhn Pump intake in the same location as Puck's intake pipe when substituting the Nuhn Pump for Puck's pump. *Supra* Sections VIII.A and VIII.B, Element [41.3].

81. As shown above (*supra* Section VIII.B, Element [41.3]) when substituting the Nuhn Pump for Puck's pump, a POSA would have understood it to be obvious to shift the rear nozzles and yoke rearward to provide space for the Nuhn Pump. This same arrangement is shown by the Puck Boat.



EX1125, 0:45 (annotated); *see also* EX1164, 22.

82. As annotated above, the yoke is shown rearward of Puck's pump intake, and the yoke and pump intake are positioned along the longitudinal centerline of the vehicle. A POSA would have understood that when the Puck pump is replaced with the Nuhn Pump, the yoke would be located directly rearward of the Nuhn Pump housing.



EX1164, 25 (annotated).

83. As shown below and confirmed by Mr. Puck, a POSA would have recognized from public demonstrations of the Puck Boat that when the Puck Boat is propelled by the front cannon blasting liquid manure, the rear end of the Puck Boat, including the yoke, becomes submerged under the surface of the liquid manure while the Puck Boat moves rearwardly. EX1158, 111:1-112:17. When submerged and moving rearwardly, the submerged yoke would create a barrier for solid material that is floating on the surface of the liquid manure lagoon. The barrier created by the submerged yoke would serve to prevent floating material from entering the central area of the Puck Boat surrounded by the floating dock sections and yoke. Thus, the yoke would function to keep floating solid material away from the center of the vehicle, and away from the bottom fluid opening of the pump. *Id.*

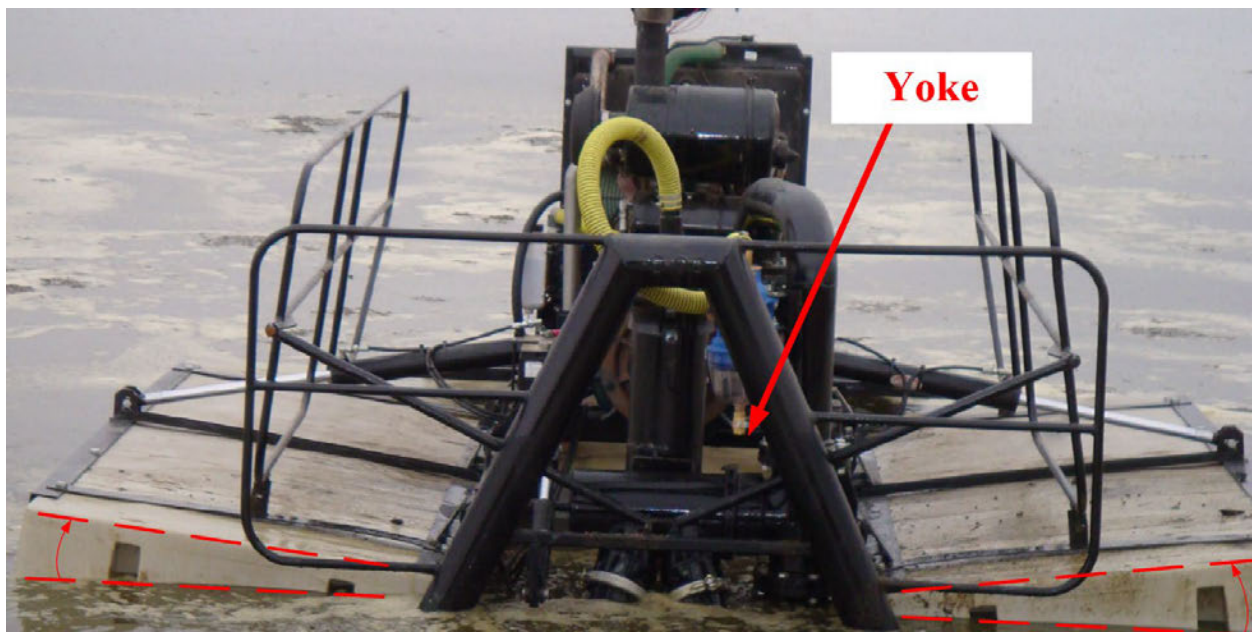


EX1165, 0:38 (annotated).

84. Additionally, this functionality would be achieved in instances where the Puck Boat is operated with the dock sections arranged in a partially raised orientation. The Puck Boat includes deployable dock sections on each side of the vehicle that are configured to be raised and lowered using hydraulic actuators. A POSA would have understood that the deployable floating dock sections can be positioned at any intermediary position between a horizontal orientation and a fully raised, vertical orientation. I understand that Mr. Puck also testified that the dock sections can be lifted to an angled, intermediary position, as shown in the annotated image below. EX1158, 107:1-108:25. Partially lifting the dock sections to such an intermediary position, while the Puck Boat is floating may also provide performance benefits for the Puck Boat. Raising the dock sections may minimize drag effects while the vehicle is floating and allow for better steering and handling of the vehicle. Specifically, a POSA would have understood that partially raising the dock sections may reduce draft, at least locally on the dock sections, and that removing drag-inducing structures far from the center of rotation of the vehicle can provide enhanced maneuvering capabilities.

85. While the image below shows the dock sections raised at an approximately eight-degree angle, I understand that Mr. Puck testified that the dock sections can be raised to an approximately thirty-degree angle while still providing adequate floatation for the Puck Boat. *Id.* A POSA would have understood that

raising the dock sections would cause the Puck Boat to sit lower in the fluid in which it is floating. A POSA would have understood that raising the dock sections to an approximately thirty-degree angle would result in the yoke, located behind the pump intake, to be submerged in the fluid while the vehicle is floating. As described above, this submerged yoke would function as a barrier to floating solid material, thereby keeping such material away from the pump intake while the vehicle is floating. I understand that Mr. Puck testified that he operated the Puck Boat in exactly this way prior to 2013. *Id.*



EX1164, 1 (annotated).

86. Alternatively, even if one ignores the yoke of Puck, it would have been obvious to a POSA to have arranged an additional buoyant element rearward of the pump intake of the Puck pump or the pump housing of the Nuhn Pump. Puck

describes the buoyant elements as “interlocking” and “modular dock sections” and notes that “additional dock sections” may be used to increase the “buoyancy of the vessel[.]” EX1014, ¶[0023]. As described by Puck, “connector pins (30) allow the modular dock sections (26) to connect to additional dock sections in a manner such as that known in the art.” *Id.*

87. As demonstrated by Mr. Puck’s testimony, the use of the buoyant elements surrounding the pump intake on the Puck vehicle “worked as blockage to limit” and “capture[] the solids and hold[] them away from the pump[.]” EX1158, 74:12-19. A POSA would have recognized and appreciated this functionality provided by the buoyant elements and would have understood that the inclusion of an additional buoyant element between the yoke and the Puck pump intake (i.e. directly behind the Nuhn Pump housing when the Puck pump is replaced with the Nuhn Pump) would be desirable to further limit the ability of solids in the lagoon to float towards the pump, thereby enhancing the efficiency of the pumping and agitation process.

88. While some modifications to the metal frame of Puck may be necessary to accommodate an additional dock section rearward of the pump intake, a POSA would have understood such modifications to be relatively simple to perform. The most significant modification that would likely be needed would be to simply extend the metal frame of the vehicle rearwardly to provide additional space to secure and

support the buoyant element. When compared to the level of skill needed to design and manufacture the Puck Boat, a POSA would have understood that modifying and extending the metal frame to accommodate another dock section would be trivial.

89. A POSA would have further understood that such floating elements could readily be arranged rearward of the pump when considering other prior art agitation boats, such as Mr. Puck's prototype agitation boat, which was publicly used as early as 2004 (EX1158, 46:12-47:3), and the Sundstrom Boat, which was publicly used as early as 2006 (EX1120, ¶¶7-9). Each of these prior art agitation boats utilized a pump housing located along the underside of the vehicle with a floatable element located directly rearward of the pump housing. Thus, a POSA would have understood that the inclusion of an additional modular dock section directly rearward of the pump housing to be obvious, and would have been motivated to do so to provide a barrier to keep floating solids away from the pump intake.

C. Claims 42, 44-46, 48

[42] The vehicle according to claim 41, wherein the ground engaging propulsion structure comprises a set of ground engaging wheels or ~~[[an]]~~ endless tracks.

[44] The vehicle of claim 43, wherein the ground engaging propulsion structure is operable at variable speed by the hydraulic motor.

[45] The vehicle according to claim 41, wherein the ~~vehicle comprises~~ at least one fluid-nozzle ~~that~~ is fluidly-connected to ~~[[a]]~~the at least one fluid conduit.

[46] The vehicle according to claim 45, wherein the at least one fluid nozzle comprises a plurality of fluid nozzles that are fluidly-connected to the at least one fluid conduit.

[48] The vehicle according to claim 41, wherein the location of the ground engaging propulsion structure, the power source, and the immersible liquid manure pump are selected to provide a desired location for a center of gravity of the vehicle.

90. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Claims 42, 44-46, 48. *Supra* Section VIII.B.; EX1004, ¶¶355, 357-358, 360-363.

D. Claim 43

[43] The vehicle according to claim 41, wherein the power source is configured to provide hydraulic fluid power to both the ground engaging propulsion structure and the liquid manure mover.

91. Bryham discloses a hydraulic pump and power transmission system for driving the wheels. EX1015, 2:66-67, 16:1-6; EX1004, ¶356. As noted above, a POSA would have been motivated to utilize this hydraulic pump and transmission system for driving the Nuhn Pump on the Puck vehicle due to efficiency benefits associated with using a single power source to power multiple components. *Supra* Section VIII.B, Element [41.4].

E. Claim 47, 49-56

[47] The vehicle according to claim 45, wherein the amount of fluid flow from the at least one fluid nozzle and/or the direction of the at least one fluid nozzle are remotely controllable by the operator remote from the vehicle when the vehicle is floating.

[49] The vehicle according to claim 41, further comprising an angle adjustment structure configured to adjust an angular orientation of the at least one fluid nozzle of the liquid manure mover.

[50] The vehicle according to claim 49, wherein the angle adjustment structure comprises a hydraulically powered articulation means.

[51] The vehicle according to claim 5010, wherein the hydraulically powered articulation means comprises a hydraulic cylinder.

[52] The vehicle according to claim 5010, wherein the angle adjustment structure comprises a four bar linkage connected to the hydraulically powered articulation means to extend the effective stroke length of the hydraulically powered articulation means.

[53] The vehicle according to claim 49, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a vertical plane.

[54] The vehicle according to claim 5010, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a vertical plane.

[55] The vehicle according to claim 49, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a horizontal plane.

[56] The vehicle according to claim 5010, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a horizontal plane.

92. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Claims 47 and 49-56. EX1004, ¶¶359, 364-367. A POSA would have understood that Puck teaches that the amount of fluid flow from the nozzles can be controlled remotely. Puck teaches a remote-control system that can throttle up and

throttle down the engine and can control the direction of the boat by adjusting the orientation of the nozzles. EX1014, ¶[0032]. A POSA would have understood that throttling up or down would control the speed of the engine and the fluid pump it is connected to, thus controlling the amount of fluid flow.

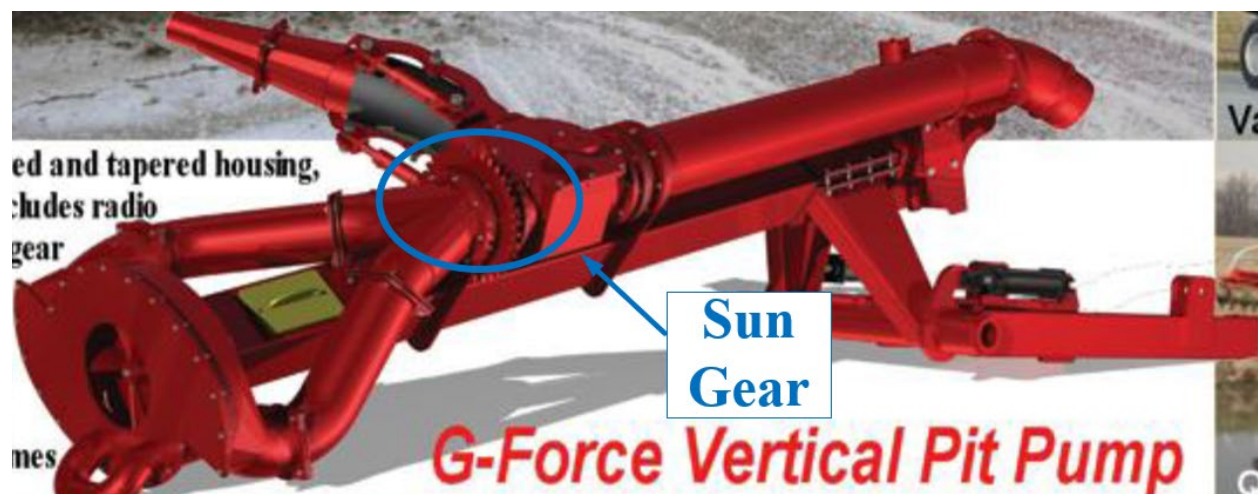
93. The Puck Boat also disclosed that that the amount of fluid flow through the nozzles can be remotely controlled. *See* EX1122, 0:26-0:28. Likewise, prior publications of the Puck Boat showed that the direction of the vehicle may be remotely controlled by changing the direction of the nozzles included on the boat. EX1125, 2:04-2:28.

94. Puck and Manure-Manager each disclose articulation cylinders that change the orientation of the fluid nozzles in a vertical plane. EX1014, ¶[0027], EX1112, 27. A POSA would have understood that these cylinders are hydraulic cylinders. A POSA would have understood it to be obvious to use this same articulation structure on the nozzles of Puck to better control the orientation of the nozzle discharge in a vertical or horizontal plane. *Id.*

95. Manure-Manager discloses that the articulation cylinder is coupled to a linkage. A POSA would have understood it to be obvious to couple the cylinder to a four-bar linkage, as such linkages were well known in the art for extending the stroke length of a cylinder. *See, e.g.,* EX1130, 52-58; EX1012, 1 (showing a vehicle

mounted crane utilizing a four-bar linkage); EX1006, 9 (showing a vehicle mounted crane utilizing a four-bar linkage).

96. Manure-Manager also discloses an angle adjustment structure that adjusts the angular orientation of the nozzle in a horizontal plane. Specifically, Manure-Manager discloses a sun gear arranged adjacent to the nozzle:



EX1112, 27 (annotated).

97. Screen captures of Nuhn’s webpage advertisements point to the nozzle, describing the nozzle as having “60° vertical movement” and “200° horizontal rotation[.]” EX1170, 5.

98. A POSA would have understood (as confirmed by the ’758 Patent), that this sun gear depicted in Manure-Manager would be used to adjust the angular orientation of the nozzle in a horizontal plane. EX1028, 4:63-5:6; *see also* EX1170, 5 (describing 200° horizontal rotation). As confirmed by the ’758 Patent, POSAs would have also understood that the sun gear would be driven by a corresponding

moon gear (powered by a hydraulic motor), as the Nuhn pump already included a hydraulically powered vertical articulation system, and hydraulically powered sun/moon gears were known for controlling the direction of nozzles on pumps used in manure lagoons since as early as 2006:



EX1169, 6-7, 15 (describing “[f]ingertip [h]ydraulic [c]ontrol [o]ption for the rotation of the nozzles”).

99. POSAs would have understood it to be obvious to retain these structures when substituting the Nuhn Pump for the Puck pump, as the Puck Boat marketing materials described the benefits of having such a fluid nozzle above the surface for disrupting crust and cleaning banks on lagoons. EX1121, ¶4 (video caption at bottom of photo). Retaining these structures would have allowed for better control of the direction of the fluid output of the fluid nozzle in a vertical or horizontal plane. *Id.*; *see also* EX2083, ¶12 (noting the importance of control of the fluid output).

F. Claim 57

[57.0] An amphibious vehicle, comprising:

[57.1] a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;

[57.2] a ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;

[57.4] a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and~~[[,]]~~

[57.5] a wireless remote control configured to enable an operator who is remote from the vehicle to: (1) control the ground engaging propulsion structure; (2) control ~~[[a]]~~ the flow of liquid manure from the liquid manure mover back into the manure lagoon; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and~~[[,]]~~ (4) control at least one of the speed and direction of the vehicle when the vehicle is floating;

[57.3] a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a pump housing, the immersible liquid manure pump including a bottom fluid opening in the pump housing, where the pump housing and the impeller are positioned along the underside of the floatable vehicle body at a location that is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating in a manure lagoon and has a constant angular orientation relative to the floatable vehicle body;

[57.6] wherein portions of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to the right and left of the pump

housing and are spaced from and positioned forward of and rearward of the pump housing along the longitudinal centerline of the floatable vehicle body to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.

100. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Claim 57. *Supra* Section VIII.B.

G. Claim 58-72

[58] *The vehicle according to claim ~~57~~¹⁷, wherein the ground engaging propulsion structure comprises a set of ground engaging wheels or ~~[[an]]~~ endless tracks.*

[59] *The vehicle according to claim ~~57~~¹⁷, wherein the power source is configured to provide hydraulic fluid power to both the ground engaging propulsion structure and the liquid manure mover.*

[60] *The vehicle according to claim ~~59~~¹⁹, wherein the ground engaging propulsion structure is operable at variable speed by the hydraulic motor.*

[61] *The vehicle according to claim ~~57~~¹⁷, wherein the ~~vehicle comprises~~ at least one fluid nozzle that is fluidly-connected to ~~[[a]]~~the at least one fluid conduit.*

[62] *The vehicle according to claim ~~61~~²¹, wherein the at least one fluid nozzle comprises a plurality of fluid nozzles that are fluidly-connected to the at least one fluid conduit.*

[63] *The vehicle according to claim ~~61~~²¹, wherein the amount of fluid flow from the at least one fluid nozzle and/or the direction of the at least one fluid nozzle are remotely controllable by the operator remote from the vehicle when the vehicle is floating.*

[64] *The vehicle according to claim ~~57~~¹⁷, wherein the location of the ground engaging propulsion structure, the power source, and the immersible liquid manure pump are selected to provide a desired location for a center of gravity of the vehicle.*

[65] The vehicle according to claim 5717, further comprising an angle adjustment structure configured to adjust an angular orientation of the at least one fluid nozzle of the liquid manure mover.

[66] The vehicle according to claim 6525, wherein the angle adjustment structure comprises a hydraulically powered articulation means.

[67] The vehicle according to claim 6626, wherein the hydraulically powered articulation means comprises a hydraulic cylinder.

[68] The vehicle according to claim 6626, wherein the angle adjustment structure comprises a four bar linkage connected to the hydraulically powered articulation means to extend the effective stroke length of the hydraulically powered articulation means.

[69] The vehicle according to claim 6525, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a vertical plane.

[70] The vehicle according to claim 6626, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a vertical plane.

[71] The vehicle according to claim 6525, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a horizontal plane.

[72] The vehicle according to claim 6626, wherein the angle adjustment structure adjusts the angular orientation of the at least one fluid nozzle of the liquid manure mover in a horizontal plane.

101. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Claims 58, 60-62, and 64 (*supra* Section VIII.C); Claim 59 (*supra* Section VIII.D); and Claims 63, 65-72 (*supra* Section VIII.E).

H. Claim 73-78

[73] The vehicle according to claim 41, wherein the plurality of ground engaging elements is powered by a separate hydraulic motor for each ground engaging element.

[74] The vehicle according to claim 41, wherein at least one hydraulic motor that is operable at variable speed is connected to each ground engaging element.

[75] The vehicle according to claim 42, wherein the ground engaging propulsion structure is the set of ground engaging wheels and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor.

[76] The vehicle according to claim 5717, wherein the plurality of ground engaging elements is powered by a separate hydraulic motor for each ground engaging element.

[77] The vehicle according to claim 5717, wherein at least one hydraulic motor that is operable at variable speed is connected to each ground engaging element.

[78] The vehicle according to claim 5818, wherein the ground engaging propulsion structure is the set of ground engaging wheels and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor.

102. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Claims 73-78. EX1004, ¶¶377-378.

I. Claim 79

[79.0] An amphibious vehicle, comprising:

[79.1] a floatable vehicle body with a front, a rear, and an underside;

[79.4] a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and[[],]

[79.5] a wireless remote control configured to enable an operator who is remote from the vehicle to: (1) control the ground engaging propulsion structure; (2) control a flow of liquid manure from [[a]] the liquid manure pump; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and[[],] (4) control at least one of the speed and direction of the vehicle when the vehicle is floating.;

[79.6] wherein portions of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.

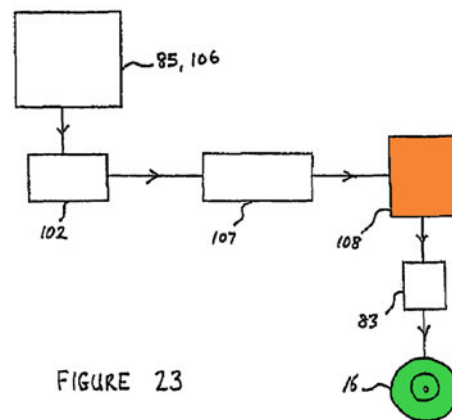
103. Puck, the Puck Video, Bryham, and Manure-Manager would have rendered obvious Elements [79.0]-[79.1] and [79.4]-[79.6]. *Supra* Section VIII.B, Elements [41.0]-[41.1] and [41.4]-[41.6]

[79.2] a ground engaging propulsion structure comprising a set of four ground engaging wheels and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor;

104. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Element [79.2]. EX1004, ¶345, 377-378.

105. Bryham describes a “ground engagement means” comprising a set of wheels and a “hydraulic motor 108 ... which can [] drive the ground engagement means.” EX1015, 2:66-67, 16:4-6. Bryham further describes that “one *or more* of the ground engaging means supported thereon is provided with motive power....

[T]he motive power is provided by ... hydraulic motors.” EX1015, 6:47-53 (emphasis added). Thus, Bryham discloses a plurality of ground engaging elements (i.e. wheels) that are powered by separate hydraulic motors. A POSA would have understood that each of the wheels could be independently powered for better traction using the separate, hydraulic motors taught by Bryham. *See id.*, FIG. 23 (showing a hydraulic motor 108 (orange) powering a single wheel 16 (green)); EX1004, ¶356.



EX1015, FIG. 23 (annotated).

106. A POSA would have also understood that the most logical location for attaching the wheels of Bryham would have been to place one wheel at each corner of the steel frame (EX1014, ¶[0022]) of the Puck vehicle. EX1110, ¶¶226-227. It would be a matter of design choice for a POSA to use four independently-powered wheels, especially given Puck’s rectangular shape, and Bryham teaches *at least* three independently powered wheels, including four powered wheels. EX1014, ¶[0022];

EX1015, 9:1-18. Such modification would not have provided unexpected results and would have amounted to an obvious variation consistent with the principles known in the art.

[79.3] a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a pump housing and an impeller that is driven by a substantially vertical drive shaft, the immersible liquid manure pump including a bottom fluid opening in the pump housing, where the pump housing is mounted to the underside of the floatable vehicle body in a space collectively defined between the four ground engaging wheels such that the pump housing is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body and such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating and has a constant angular orientation relative to the floatable vehicle body;

107. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious the black, yellow, green, red, blue, and brown limitations of Element 79.3. *Supra* Section VIII.B, Element [41.3].

108. A POSA would have further understood it to be obvious to have “the pump housing [] mounted to the underside of the floatable vehicle body” as recited in the red limitation of Element 79.3. A POSA would have understood that centrifugal pumps, like those used for pumping manure, often produce noise and vibration during operation. EX1171, 3. A POSA would have understood that vibration in pump systems can arise for a variety of reasons, including, vibration

from the power source, impeller vane/blade passage, rotational imbalance or misalignment, or hydrodynamic effects. EX1171, 3-13. A POSA would have understood that the pump, pump mounting structure, and fluid piping system will have one or more natural frequencies that, if matched by vibration and excitation frequencies, can lead to failures and increased wear. *Id.* A POSA would have understood that adding an additional mounting point between the pump housing and the underside of the vehicle could be used to better distribute loads from the pump and to mitigate vibration and reduce vibration transmission through the pump structure, thereby providing increased stability and longevity of the vehicle. *Id.*

109. Puck, the Puck Boat, Bryham, and Manure-Manager further render obvious the purple limitation of Element 79.3. When substituting the Puck pump for the Nuhn Pump, a POSA would have been motivated to locate the Nuhn Pump adjacent to the power source, just as the Puck pump was. A POSA would have understood that the Nuhn Pump could be immersed into the fluid and could pass through the same opening provided in the Puck Boat vehicle body to the fluid below. *Supra* Sections VIII.A and VIII.B, Element [41.3]. When positioned in this arrangement, the Nuhn Pump would be located rearward of the front of the vehicle body and forward of the rear of the vehicle body.

110. A POSA would have also understood that the most logical location for attaching the wheels of Bryham would have been to place one wheel at each corner of the steel frame (EX1014, ¶[0022]) of the Puck vehicle.

111. Specifically, the Puck vehicle is described as being constructed with a steel tubular frame. *Id.* A POSA would have understood that the normal and typical arrangement for four-sided vehicles would naturally result in attaching the wheels of Bryham to the Puck vehicle such that one wheel is located at each corner of the steel frame. A POSA would have understood that attaching the wheels to the steel frame in such an arrangement would have provided a stable and durable configuration for such a wheeled vehicle. *See* EX1110, ¶¶226-227. A POSA would have understood that when the wheels and pump were arranged on the vehicle in such a configuration, the impeller would be immersed, and the pump would be located between the wheels, when the vehicle is floating.

112. To the extent that the Nuhn Pump would not already be positioned between the four wheels when arranged within the vehicle of Puck, a POSA would have understood that positioning the pump in such a central location on the vehicle allows for a more centrally located center of gravity, a primary consideration when designing a floating vehicle. *Supra* Section VIII.A. Furthermore, a POSA would have understood that positioning the pump in this centralized location would

mitigate negative effects on the stability of the vehicle caused by reaction forces generated by the pump. *Supra* Section VIII.A.

J. Claim 80

[80.0] An amphibious vehicle, comprising:

[80.1] a floatable vehicle body with a front, a rear, and an underside;

[80.3] a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a drive shaft powering an impeller that is positioned in a pump housing and draws liquid manure in through a bottom fluid opening in the pump housing, the pump housing is mounted to the underside of the floatable vehicle body at a location that is rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating in a manure lagoon, where the drive shaft is substantially vertical and has a constant angular orientation relative to the floatable vehicle body;

[80.4] a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the liquid manure mover; and[.]]

[80.5] a wireless remote control configured to enable an operator who is remote from the vehicle to: (1) control the ground engaging propulsion structure; (2) control a flow of liquid manure from the liquid manure mover; (3) control at least one of the speed and direction of the vehicle when the vehicle is ground engaging; and[.]] (4) control at least one of the speed and direction of the vehicle when the vehicle is floating.

[80.6] wherein components of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to the right and left of the pump housing and are spaced from and positioned directly forward of and

directly rearward of the pump housing to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.

113. Puck, the Puck Video, Bryham, and Manure-Manager would have rendered obvious Elements [80.0]-[80.1] and [80.3]-[80.6]. *Supra* Section VIII.B, Elements [41.0]-[41.1] and [41.3]-[41.6] and Section VIII.I, Element [79.3].

[80.2] a ground engaging propulsion structure comprising a front set of ground engaging wheels at the front of the floatable vehicle body and a rear set of ground engaging wheels at the rear of the floatable vehicle body and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor;

114. Puck, the Puck Boat, Bryham, and Manure-Manager would have rendered obvious Element [80.2]. *Supra* Section VIII.I, Element [79.2]. A POSA would have understood that arranging one wheel at each corner of the vehicle frame of Puck would result in a front set of wheels at the front of the floatable vehicle body and a rear set of wheels at the rear of the floatable vehicle body. EX1014, ¶[0022].

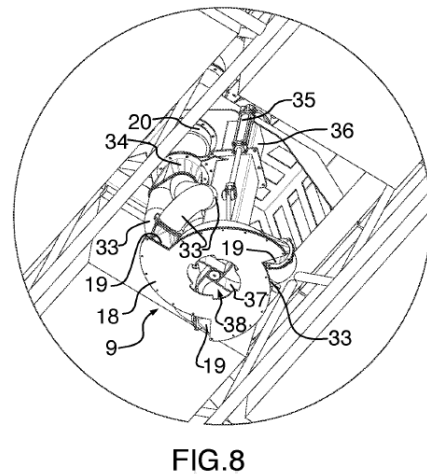
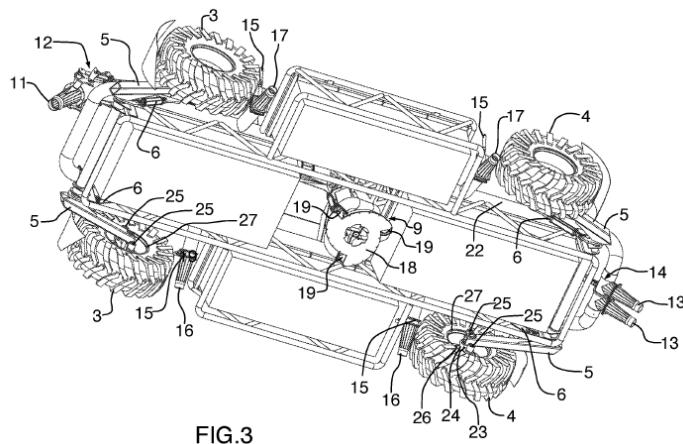
IX. THE AMENDED CLAIMS ARE INVALID UNDER §112

A. “The Pump Housing Is Mounted to the Underside of the Floatable Vehicle Body”

115. Patent Owner’s amended claims seek to add the phrase “the pump housing is mounted to the underside of the floatable vehicle body[.]” It is my opinion that this new term lacks written description support in the specification.

116. It is my understanding that aside from the proposed claims of the '835 Patent, this phrase is not used anywhere in the specification of the '835 Patent or the incorporated-by-reference '758 Patent.

117. Nowhere does the '835 Patent explain that the pump housing is mounted to the underside of the floatable vehicle body. The Motion to Amend cites various paragraphs of EX2081 for support, but none of these paragraphs describe the claimed mounting location. Paragraphs [0019] and [0024] refer to Figures 3 and 8. These figures only show the *positioning* of the fluid pump—not that it is *mounted to the underside* of the vehicle body.

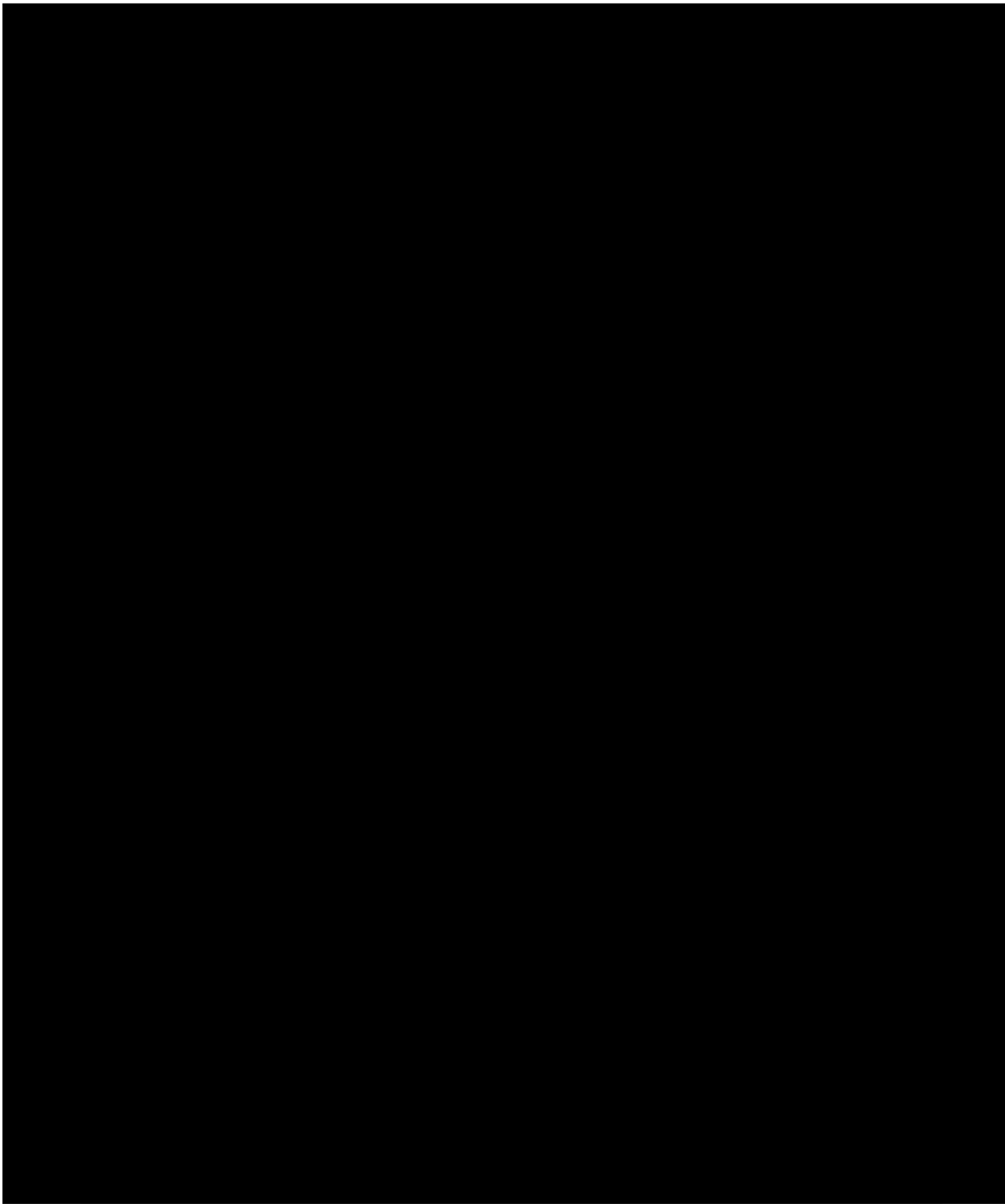


EX1001, FIGS. 3, 8.

118. As shown in Figures 3 and 8 above, neither of these figures show any connection between the fluid pump and the underside of the vehicle that would cause

a POSA to understand that the fluid pump is mounted to the underside of the floatable vehicle body.

119. Indeed, an examination of the CAD files, which Ian Nuhn testified that the '835 Patent figures were derived from (EX2083, 22; EX1178, 19:4-20:18), confirms that there is no mounting of the fluid pump housing to the underside of the vehicle body. EX1172; EX1173. Rather, the pump is attached to the frame at the top side of the vehicle body.



EX1172.

EX1173.

120. Nowhere does the '835 Patent explain that the pump is mounted to the underside of the vehicle body. As confirmed by the CAD drawings produced by Nuhn, a POSA looking to the '835 Patent would understand that the pump is not mounted to the underside of the vehicle, but rather the pump is mounted to the vehicle frame only on the top side. The '835 Patent provides no teachings related to mounting the fluid pump to the underside of the vehicle floating body. Therefore, it is my opinion that this new claim language lacks written description support in the specification of the '835 Patent.

B. “To Keep Floating Solid Material Away from the Bottom Fluid Opening in the Pump Housing of the Immersible Liquid Manure Pump”

121. Patent Owner's amended claims seek to add the phrase “to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.” It is my opinion that this new term lacks written description support in the specification.

122. It is my understanding that aside from the proposed claims of the '835 Patent, this phrase is not used anywhere in the specification of the '835 Patent or the incorporated-by-reference '758 Patent.

123. I understand that functional limitations recited in the negative may describe a capability or structural element in a patent claim. I understand that where the specification is itself silent regarding a negative limitation, testimony from a

skilled artisan as to possibilities or probabilities that the recited element would be excluded does not suffice for written description support.

124. Nowhere does the '835 Patent explain that the submerged components of the vehicle function “to keep floating solid material away from the bottom fluid opening.” Indeed, depending on the strength of the pump, the dimension and configuration of the submerged components, distance from the submerged components to the pump inlet, and the characteristics of the floating solids, solid material may be drawn below the submerged components and into the bottom fluid opening.

125. A POSA would have understood that the pumping action will create a flow field in the area surrounding the pump and floating vehicle body as fluid is drawn toward the pump inlet. A POSA would have understood that this flow field will generate forces that act on the fluid and any solids floating in or on the fluid. If the density of the floating materials is similar to that of the fluid, the forces required to submerge that solid material will be minimal (i.e. there is little or no reserve buoyancy to keep the solid material afloat) and the forces from the moving fluid may cause the solid material to become submerged and drawn into the pump.

126. In addition, a POSA would have understood that when the vehicle is driven through the fluid, this will also create flow patterns that may result in floating solid materials being drawn beneath these submerged components and into the pump

intake. Again, the '835 Patent is completely silent on the topic of keeping floating solids away from the pump inlet. More specifically, the '835 Patent does not disclose the dimensions and configuration of these submerged components required to keep solids away; nor does it disclose the dimensions, densities, or other properties of floating materials that these submerged objects can keep away from the pump. Similarly, the '835 Patent does not disclose a range of allowable vehicle speeds where these submerged components are likely to have success in keeping floating solids away from the pump inlet.

127. The '835 Patent is completely silent on the topic of preventing solid materials from being drawn into the pump by deploying a barrier of submerged components. More specifically, the '835 Patent does not disclose the dimensions (depth/width) or the configuration (i.e. distance from the pump inlet) of these submerged components necessary to keep floating solid materials away from the pump fluid inlet. Nor does the '835 Patent disclose the sizes, shapes, and densities of floating solids that would be kept away from the pump fluid inlet by this barrier of submerged components. The '835 Patent provides no teaching or rationale regarding for how this claimed function is achieved. Therefore, it is my opinion that this new claim language lacks written description support in the specification of the '835 Patent.

C. “Liquid Manure Pump”

128. Patent Owner’s amended claims seek to replace the term “fluid pump for pumping liquid manure” with “liquid manure pump.” It is my opinion that this new term lacks written description support in the specification.

129. It is my understanding that aside from the proposed amended claims of the ’835 Patent, neither the ’835 Patent, nor the incorporated-by-reference ’758 Patent, include any reference to the term “liquid manure pump.” Instead, the ’835 Patent generally describes a fluid pump that is used for pumping liquid manure.

130. The specification of the ’835 Patent does not describe any required structural features for a “liquid manure pump” in a way that would structurally distinguish a “liquid manure pump” from any other fluid pump that is used to pump liquid manure. As explained in detail above and in my earlier declaration, people in the manure management industry had long used a wide variety of pumps, including centrifugal water pumps and conventional irrigation pumps, for pumping liquid manure. EX1111, Section VI.B; *see also* EX1004, Section V.B.iii.a.

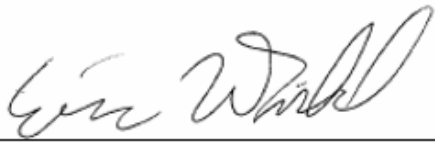
131. Therefore, to the extent that a “liquid manure pump” is understood to mean anything other than “a fluid pump,” it is my opinion that the proposed claims of the ’835 Patent are invalid under 35 U.S.C. §112(a) as failing to sufficiently describe the claimed invention.

X. CONCLUSION

132. It is my opinion that proposed substitute claims 41-80 are unpatentable as obvious over Puck in view of the Puck Boat, Bryham, and Manure-Manager, which discloses the Nuhn Pump. I reserve the right to supplement my opinions as appropriate.

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

Submitted by:

A handwritten signature in black ink, appearing to read "Eric Winkel", written over a horizontal line.

Eric S. Winkel, Ph.D., P.E., CFEI,
CVFI
Senior Engineering Consultant

December 23, 2024

Date

Appendix A

List of Materials Considered

Patents and Patent Applications

Declarations

- Affidavit of Nathaniel E. Frank-White Regarding the J. Houle & Fils Inc. webpage, Dated June 19, 2023
- Affidavit of Nathaniel E. Frank-White Regarding the Nuhn Header Series Vertical Pit Pump webpage, Dated Jul. 18, 2023

Non-Patent Literature

- *Agitation Boats*, PUCK CUSTOM ENTERPRISES, INC.
- *Along*, MERRIAM-WEBSTER.COM, <https://www.merriam-webster.com/dictionary/along>
- CAD Image Depicting Lagoon Crawler Bottom View, Produced as NUHN15000127402 in the '015 Litigation
- CAD Image Depicting Lagoon Crawler Top View, Produced as NUHN15000127407 in the '015 Litigation
- Deposition Transcript of Benny D. Puck, Taken on December 5, 2024
- Deposition Transcript of Maurice Bryham, Taken on October 29, 2024
- *Operators Manual*, PUCK CUSTOM ENTERPRISES, INC.
- Photographs Depicting the 2012 North American Manure Expo
- Photographs Depicting the Assembly Of Puck's Production Model Agitation Boats
- Photographs Depicting the Puck Early Prototype Manure Agitation Boat
- Photographs Depicting the Puck Later Prototype Manure Agitation Boat
- Photographs Depicting Puck's Production Model Agitation Boats
- USDA DAIRY FORAGE RESEARCH CENTER ET AL., NORTHAMERICAN MANUREXPO PROFESSIONAL MANURE MANAGEMENT (2012).
- VAL S. LOBANOFF & ROBERT R. ROSS, CENTRIFUGAL PUMPS: DESIGN & APPLICATION (2nd ed. 1992)
- Video Depicting Puck's Production Model Agitation Boat
- Video Depicting Puck's Production Model Agitation Boat