

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BAZOOKA-FARMSTAR, LLC,

Petitioner

v.

NUHN INDUSTRIES LTD.,

Patent Owner

Case No. IPR2024-00004

Patent No. 11,491,835

DECLARATION OF DOUGLAS S. PRAIRIE

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I. INTRODUCTION

I, Douglas S. Prairie, declare as follows:

1. I have been retained by Nuhn Industries Ltd. (“Patent Owner” or “Nuhn”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“USPTO”) regarding U.S. Patent No. 11,491,835 (“the ‘835 Patent”). I have been asked to consider whether certain references disclose or suggest the features recited in at least independent Substitute Claims 41, 57, 79, and 80 in Patent Owner’s Revised Motion to Amend the ‘835 Patent. My opinions are set forth below. I understand that Petitioner will have the opportunity to challenged Substitute Claims 41-80 of Patent Owner’s Revised Motion to Amend the ‘835 Patent and that I may be asked to provide my opinions on dependent Substitute Claims 42-56 and 58-78 at a later date.

2. I have also been retained by Nuhn as an independent expert consultant in IPR2023-01161, which Bazooka-Farmstar, LLC (“Petitioner” or “Bazooka”) filed against U.S. Patent No. 11,358,425 (“the ‘425 Patent”), and IPR2024-00098, which Petitioner filed against U.S. Patent No. 11,541,708 (“the ‘708 Patent”). I previously provided declarations in those proceedings. The ‘835 Patent, the ‘425 Patent, and the ‘708 Patent are continuations filed off of a common PCT application.

3. In my previous declarations filed in the IPRs challenging the ‘835 Patent, the ‘425 Patent, and the ‘708 Patent, I describe the general background of the art and the teachings of the ‘835 Patent. I have not included those sections here for brevity, but incorporate those statements herein by reference.

4. I am being compensated at my typical rate of \$325 per hour for the time I spend on this matter. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

5. I am an agricultural engineer with over 25 years of experience in machine design and product development solutions, specializing in off-highway and agriculture machinery systems.

6. I grew up on a family grain and livestock farm in southern Minnesota where I operated tractors, tillage equipment, skid steers, and manure handling and spreading equipment. My father was a professional mechanic, so we serviced and repaired most of the machinery on our family's operation. I have in-laws who own and operate an 800 head dairy farm near Sioux Falls, South Dakota. I have worked at their dairy farm many times over the past 25 years helping with feeding, equipment maintenance, harvest, tillage, and working with their manure systems. The lagoon on their dairy farm is typical of most lagoons of their herd size in the upper Midwest. It is an earthen style structure with steep side walls and a shallower concrete apron where the tractor and power take-off ("PTO") powered agitator can be backed into the lagoon to agitate prior to the manure being pumped out. The lagoon often crusts over and has a fence around it to minimize the chance for someone to inadvertently walk on a surface that could easily be mistaken for a weedy pasture. My father-in-law always makes sure to remind me of the hazards of the lagoon when my children might happen to be playing near that area of the farm. Fall harvest operations keep everyone busy with their operations, so they often hire a commercial manure applicator to pump the lagoon out and spread or knife in the manure on their harvested ground prior to fall tillage. The commercial manure applicator sometimes brings a floating manure agitator to speed up the lagoon agitation process and produce a more homogenous manure product. The lagoon is pumped out annually in the fall and quite often during the summer months after alfalfa harvest.

7. I am currently employed in Brookings, South Dakota as a lecturer at South Dakota State University ("SDSU") in the Agriculture and Biosystems Engineering ("ABE") Department. SDSU is a premier land grant research and teaching institution and is the first in the country to offer a four-year Precision Agriculture Degree. Courses I am responsible for involve every aspect

of the design, operation, service, and ownership of agriculture machinery systems, including livestock manure management technologies. My students include Agriculture and Biosystems Engineers, Mechanical Engineers, Electrical Engineers, Agriculture Technology students and Precision Agriculture students. These students enter the workforce into a wide variety of career paths including design of agriculture machinery systems, design of livestock structures, design of manure management systems, livestock farm owners and operators, plus many other agriculture careers such as commercial manure applicators.

8. Prior to joining SDSU in August of 2016, I was employed within the agriculture and construction equipment industry for 20 years in roles ranging from design engineering to product and sales management. My experience includes design of planting and seeding equipment, design of concrete placing and cutting equipment, construction project management, design of high horsepower trash pumps, product/sales management of precision agriculture control systems, and research on cellulosic ethanol production systems.

9. In December of 2004, I received a master's degree from Boise State University in Mechanical Engineering, and in May of 1997, I received a bachelor's degree from SDSU in Agricultural Engineering with a Power and Machinery Focus.

10. I am a registered Professional Engineer in the State of Idaho.

11. I have designed and developed a wide variety of agricultural and construction equipment including planting and seeding equipment, precision agriculture control systems, concrete power trowels, concrete saws, and high horsepower job site trash pumps. One of the courses I lead at SDSU is a two-semester Capstone Design course for our senior ABE students. Students that select the Natural Resource tract of the ABE program often work on projects related to the design of agriculture livestock structures and livestock waste management systems. These capstone projects are sponsored by regional livestock farmers, so the students obtain exposure to actual, modern-day livestock industry design challenges.

12. I am the named inventor on 8 patents and 1 pending patent application. These

patents are generally directed to seed delivery systems, agricultural implements, and concrete machinery.

13. I have consulted as an expert witness on previous intellectual property disputes involving patents. My work in this capacity has included, among other things, reviewing and analyzing accused products, reviewing and analyzing patents, writing expert reports, and providing deposition testimony.

14. A copy of my curriculum vitae, a list of my patents and patent applications, and a list of the cases I have worked on as an expert witness are attached as EX2005.

III. MATERIAL CONSIDERED AND SUMMARY OF OPINIONS

15. The opinions contained in this Declaration are based on the documents I reviewed, my professional judgment, as well as my education, experience, and knowledge regarding agricultural equipment, farming operations, and manure lagoons.

16. In reaching the opinions and conclusions discussed herein, I reviewed, considered, and/or relied upon the following materials:

<i>Exhibit #</i>	<i>Description</i>
--	Bazooka-Farmstar, LLC's Petition for IPR2024-00004
1001	U.S. Patent No. 11,491,835 ("the '835 Patent")
1002	Prosecution History of U.S. Patent No. 11,491,835
1003	Curriculum Vitae of Eric Winkel
1004	Declaration of Eric Winkel, dated October 13, 2023 ("Winkel Decl.")
1005	U.S. Patent Application Publication No. 2012/0185129 ("Carrier")
1006	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER ("Truxor")
1007	Declaration of Jan David Arnoldsson, dated February 26, 2023
1008	Declaration of Reidar Olofsson, dated February 27, 2023
1009	Declaration of Nathaniel E Frank-White, dated December 12, 2022
1010	KR Publication No. 20130016490 ("Yoon")

1011	English Translation of Yoon (EX1010) and Declaration of Taylor Liff, dated June 7, 2023
1012	SENWATEC-SCHRÖER UMWELT-& GEWÄSSERTECHNOLOGIE GMBH & CO. KG, LIGHT AMPHIBIOUS BOAT/VEHICLE “AMPHI-KING®” SWT--AB380 (“SenwaTec”)
1013	Declaration of Ansgar Lonnemann, dated June 15, 2023
1014	U.S. Patent Application Publication No. 2014/0112093 (“Puck”)
1015	U.S. Patent No. 7,314,395 (“Bryham”)
1016	U.S. Patent Application Publication No. 2014/0288763 (“Bennett”)
1017	U.S. Patent Application Publication No. 2021/0331752 (“Bennett-II”)
1018	U.S. Provisional Patent Application No. 61/805,133 (“the ‘133 Provisional”)
1019	U.S. Patent No. 7,478,817 (“Carrier-II”)
1020	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (2013) (“Truxor-II”)
1021	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (2013) (“Truxor-III”)
1022	DOROTEA MEKANISKA AB, TRUXOR AMPHIBIAN TOOL CARRIER (“Truxor-IV”)
1023	Russian Patent Application No. 2012137830/11 (“Melnikov”)
1024	English Translation of Melnikov (EX1023) and Declaration of Samuel Goldfarb, dated June 7, 2023
1025	Johanna Kaschik, Der Frosch als Vorbild, HNA (August 25, 2011), https://www.hna.de/lokales/rotenburg-bebra/frosch-vorbild-1376974.html
1026	English Translation of Der Frosch als Vorbild (EX1026) and Declaration of Beverly Santamaria, dated June 8, 2023
1027	Screenshots from UD Umwelt-Dienste GmbH Amphi-King Manure Pumping Video
1028	U.S. Patent No. 8,944,758 (“the ‘758 Patent”)
1029	U.S. Provisional Patent Application No. 61/867,598 (“the ‘598 Provisional”)
1030	Excerpts of Prosecution History of U.S. Patent No. 10,710,422
1031	Excerpts of Prosecution History of U.S. Patent No. 10,974,557
1032	Excerpts of Reexamination History of U.S. Patent No. 10,974,557
1033	Stipulation Regarding Invalidity Contentions Filed in the ‘015 Litigation

1034	NE. REG'L AGRIC. ENG'G SERV., LIQUID MANURE APPLICATION SYSTEMS DESIGN MANUAL (1998)
1035	DONALD L. PFOST & CHARLES D. FULHAGE, U. MO. EXTENSION, LAND APPLICATION EQUIPMENT FOR LIVESTOCK AND POULTRY MANURE MANAGEMENT (2001)
1036	DONALD L. PFOST & CHARLES D. FULHAGE, U. MO. EXTENSION, BEEF MANURE MANAGEMENT SYSTEMS IN MISSOURI (2000)
1037	William F. Wright, <i>Dairy Manure Particle Size Distribution, Properties, and Implications for Manure Handling and Treatment</i> , in 2005 ASAE ANN. INT'L MEETING (2005)
1038	EFFECTS OF LIQUID VISCOSITY ON ROTODYNAMIC (CENTRIFUGAL AND VERTICAL) PUMP PERFORMANCE (AM. NAT'L STANDARDS INST. 2010)
1039	Ole Thygesen et al., <i>Indicators of Physical Properties and Plant Nutrient Content of Animal Slurry and Separated Slurry</i> , 5(3) BIOLOGICAL ENG'G TRANSACTIONS 123 (2012)
1040	Randy L. Beaver, William E. Field, <i>Summary of Documented Fatalities in Livestock Manure Storage and handling Facilities—1975-2004</i> , 12 J. AGROMEDICINE 3 (2007)
1041	ROBBIN MARKS, NAT'L RES. DEF. COUNCIL AND THE CLEAN WATER NETWORK, CESSPOOLS OF SHAME (2001)
1042	Dwight D. Bowman & Jeffrey C. Burnham, <i>Manure Pathogens: Real Issues and Real Risks</i> , in PROCEEDINGS OF THE WATER ENV'T FED'N 694 (2000)
1043	U.S. Ctr. for Disease Control, <i>Fatalities Attributed to Entering Manure Waste Pits - Minnesota, 1992</i> , 42 MORBIDITY & MORTALITY WKLY REP. 325 (1993)
1044	U.S. CTR. FOR DISEASE CONTROL, NAT. INST. FOR OCCUPATIONAL SAFETY AND HEALTH, PREVENTING DEATHS OF FARM WORKERS IN MANURE PITS, Publ. No. 90-103 (1990)
1045	U.S. GOV'T ACCOUNTABILITY OFF., GAO-05-96, WORKPLACE SAFETY AND HEALTH: SAFETY IN THE MEAT AND POULTRY INDUSTRY, WHILE IMPROVING COULD BE FURTHER STRENGTHENED (2005)
1046	SIDUO ZHANG, NAT'L COLLABORATING CTR. FOR ENV'T HEALTH, AIR QUALITY AND COMMUNITY HEALTH IMPACT OF ANIMAL MANURE MANAGEMENT (2011)
1047	MANURE STORAGE SAFETY ASAE EP470 JAN1992 (AM. SOC'Y OF AGRIC. AND BIOLOGICAL ENG'GS 2005)
1048	MIDWEST PLAN SERV., LIVESTOCK WASTE FACILITIES HANDBOOK (3d ed. 1993)

1049	C.A. Loto & A.P.I Popoola, <i>Environmental Surface Degradation of Galvanised and Mild Steels in Cattle and Poultry Wastes and Urea Solution</i> , 6(13) INT'L J. PHYS. SCI. 3074-81 (2011)
1050	L.M. Safley, Jr. & P.W. Westerman, <i>Corrosion of Galvanized Steel in Animal Waste Environments</i> , 40 BIORESOURCE TECH. 53 (1992)
1051	FRANK YEAPLE, FLUID POWER DESIGN HANDBOOK (3d ed. 1995)
1052	Charles D. Fulhage, <i>Solids Removal from Livestock Manure Lagoons</i> , U. MO. EXTENSION (Nov. 1995), https://extension.missouri.edu/publications/wq324
1053	U.S. Patent No. 613,809
1054	ED ODGERS ET AL., MANURE GAS SAFETY: REVIEW OF PRACTICES AND RECOMMENDATIONS FOR WISCONSIN LIVESTOCK FARMS (2008)
1055	U.K. Patent App. No. 2,366,218
1056	U.S. DEP'T AGRIC., <i>Agricultural Waste Characteristics</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 4 (2008)
1057	U.S. DEP'T AGRIC., <i>Agricultural Waste Management System Component Design</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 10 (2009)
1058	U.S. DEP'T AGRIC., <i>Waste Utilization</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 11 (2013)
1059	U.S. DEP'T AGRIC., <i>Waste Utilization</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 11 (1996)
1060	U.S. DEP'T AGRIC., <i>Waste Management Equipment</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 12 (2011)
1061	U.S. DEP'T AGRIC., <i>Operation, Maintenance, and Safety</i> , in AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK ch. 13 (2011)
1062	Scheduling and trial Setting Order in the '015 Litigation (Dkt. 76)
1063	Certificate of Correction for U.S. Patent No. 10,124,638
1064	Declaration of Michael A. Erbele
1065	Order Granting in Part and Denying in Part Defendant's Motion to Modify Scheduling Order
1066	Complete copy of UD Umwelt-Dienste GmbH Amphi-King Manure Pumping Video (EX1027)
1067	English Translation of UD Umwelt-Dienste GmbH Amphi-King Manure Pumping Video (EX1066) and Declaration of Ute von Wietersheim, Dated January 31, 2024
1068	<i>Gequirlder Klärschlamm</i> , MAIN POST, https://www.mainpost.de/regional/main-spessart/gequirlder-klaerschlam-art-5778615 (last updated Oct. 15, 2010)

1069	English Translation of <i>Gequirlder Klärschlamm</i> (EX1068) and Declaration of Ute von Wietersheim, Dated January 27, 2024
1070	<i>Custom Applicator Uses Dredge to Pump Lagoons</i> , 33 FARM SHOW MAG., no. 4, 2009, at 9
1071	Don D. Jones et al., <i>Closure of Earthen Manure Structures (Including Basins, Holding Ponds and Lagoons)</i> , (Animal Agric. & Env't: Nat'l Ctr. Manure & Waste Management White Paper No. 11, 2006), https://elibrary.asabe.org/azdez.asp?JID=6&AID=20256&CID=aae2006&T=2&confid=aae2006&redirType=animal_agriculture.asp
1072	Declaration of Eckhard Funck, Dated March 8, 2024
1073	English Translation of Declaration of Eckhard Funck (EX1072) and Declaration of Ute von Wietersheim, Dated March 12, 2024
1074	Declaration of Reinhard Speerschneider, Dated April 24, 2024
1075	English Translation of Declaration of Reinhard Speerschneider (EX1074) and Declaration of Ute von Wietersheim, Dated May 9, 2024.
1076	Excerpts of the Transcript of the Parties' Meet and Confer in the '015 Litigation, dated June 26, 2024
1077	Excerpts of Email Correspondence between the Parties' Litigation Counsel in the '015 Litigation
1078	Petitioner's Proposed Amended Protective Order
1079	The Parties' Stipulated Proposed Protective Order
1080	The Parties' Redlined Stipulated Proposed Protective Order
1080- 1086	Intentionally Omitted
1087	USDA DAIRY FORAGE RESEARCH CENTER ET AL., NORTHAMERICAN MANUREXPO PROFESSIONAL MANURE MANAGEMENT (2012).
1088- 1109	Intentionally Omitted
1110	Declaration of Eric Winkel in Support of Petitioner's Reply to the Patent Owner's Response, Dated October 1, 2024
1111	Declaration of Eric Winkel in Support of Petitioner's Opposition to Patent Owner's Motion to Amend, Dated October 1, 2024
1112	MANURE MANAGER, Jan./Feb. 2011 (Manure-Manager)
1113	MANURE MANAGER, July/Aug. 2011 (Manure-Manager-II)
1114	Fisher Pumps, Inc., FISHER PUMPS
1115	Declaration of Royal Burrows, Dated June 21, 2023
1116	Deposition Transcript of Ian Nuhn, Taken on May 30, 2024
1117	Deposition Transcript of Douglas Prairie, Taken on June 25, 2024
1118	U.S. DEP'T AGRIC., WILDLAND FIRE ENGINE GUIDE (2000)

1119	Declaration of Benny D. Puck, Dated July 31, 2024
1120	Declaration of Ernie Sundstrom, Dated August 1, 2024
1121	Declaration of Benny D. Puck, Dated August 28, 2024
1122	Puck Enterprises, Inc., <i>Puck Agitation Boat - 2012</i> , YOUTUBE (Sept. 19, 2012), https://www.youtube.com/watch?v=1fRPrwGUyM0 (referred to as “Exhibit A” in EX1121)
1123	Puck Enterprises, Inc., <i>Puck Lagoon Agitation Boat and MobileStar Pump Control</i> , YOUTUBE (Dec. 28, 2011), https://www.youtube.com/watch?v=cMplzZ6lRYE (referred to as “Exhibit B” in EX1121)
1124	Puck Enterprises, Inc., <i>Puck Agitation Boat - Jeremy Puck</i> , YOUTUBE (Aug. 10, 2011), https://www.youtube.com/watch?v=1MqPldkqOq4 (referred to as “Exhibit C” in EX1121)
1125	Puck Enterprises, Inc., <i>Puck Agitation Boat - Ben Puck</i> , YOUTUBE (July 29, 2011), https://www.youtube.com/watch?v=gfNO0bi0uk0 (referred to as “Exhibit D” in EX1121)
1126	Puck Enterprises, Inc., <i>Puck Agitation Boat - Front Cannon 8.30.11</i> , YOUTUBE (Sept. 9, 2011), https://www.youtube.com/watch?v=4whiyZZ9N3s (referred to as “Exhibit E” in EX1121)
1127	<i>Between</i> , MERRIAM-WEBSTER.COM, http://web.archive.org/web/20130518001225/https://www.merriam-webster.com/dictionary/between
1128	Progressive Dairy, <i>Equipment demonstrations: Manure agitation boats</i> , YOUTUBE (July 9, 2014), https://www.youtube.com/watch?v=FXRS-9Ip1pE (referred to as “Exhibit C” in EX1120)
1129	<i>Hydrostatic Pto's Run in Reverse</i> , 1 FARM SHOW 1, 7 (1977)
1130	RICHARD S. HARTENBERG & JACQUES DENAVIT, KINEMATIC SYNTHESIS OF LINKAGES 38-39 (Robert M. Drake, Jr. & Stephen J. Kline, eds., 1964)
1131	Deposition Transcript of Ansgar Lonnemann, Taken on September 6, 2024
1132	Deposition Transcript of Reidar Olofsson, Taken on September 5, 2024
1133	T.H. MORRELL, SOC’Y OF AUTO. ENG’RS TECH. PAPER No. 800943, THE DEVELOPMENT OF AGRICULTURAL EQUIPMENT POWER TAKE- OFF MECHANISM (1980)
1134	<i>Sealegs Now Goes Even Further with All Wheel Drive</i> , SYDNEY BOATING (2010), http://www.sydneyboating.com.au/app/articles/articles/view/sealegs-now-goes-even-further-with-all-wheel-drive [https://web.archive.org/web/20110222062723/http://www.sydneyboating.com.au/app/articles/articles/view/sealegs-now-goes-even-further-with-all-wheel-drive]

1135	<i>Casappa Polaris Gear Pump</i> , ONEHYDRAULICS (Oct. 1, 2024), https://www.onehydraulics.com/products/plp20-9s0-03s1-loc-oc-n-el-casappa-polaris-gear-pump-9-17cc-3625psi-rated-3500rpm-ccw-9t-16-32dp-shaft-sae-a-2-bolt-flange-0-625-5-8-10-sae-inlet-0-625-5-8-10-sae-outlet-aluminum-body-flange?srsId=AfmBOopjmhYtBYy5xJF7u8DVhJf3cHsySDL9fFmys59ZKHW7e2sreRGC
1136	METALCRAFT MARINE INCORPORATED, FIRESTORM 30 WITH OUTBOARDS (2004)
1137	Deposition Transcript of Ian Nuhn, Taken on September 26, 2024
1138	FRANK YEAPLE, FLUID POWER DESIGN HANDBOOK (2d ed. 1990)
1139	ABYC, H-27 SEACOCKS, THRU-HULL FITTINGS, AND DRAIN PLUGS (2021)
1140	ABYC, CATHODIC PROTECTION (2021)
1141	Conrad B. Gilbertson et al., <i>Pumping Liquid Manure from Swine Lagoons and Holding Ponds</i> (Univ. of Minn. Agric. Extension Serv., Fact Sheet No. PIH-91, Nov. 1983), https://conservancy.umn.edu/server/api/core/bitstreams/6f9f723e-b75b-4f43-9b5e-415e1b6361ed/content
1142	William L. Kranz et al., <i>Application of Liquid Animal Manures Using Center Pivot Irrigation Systems</i> , U. NEB. EXTENSION (May 10, 2007)
1143	<i>Redi-Prime® and Venturi Prime</i> , CORNELL PUMP CO. (2013), http://www.cornellpump.com/lit/brochure/BR_REDIPRIME.pdf [https://web.archive.org/web/20150922061133/http://www.cornellpump.com/lit/brochure/BR_REDIPRIME.pdf]
1144	S. C. Jett et al., <i>Size Distribution and Nutritional Value of Swine Manure Separates</i> , 17(5) TRANSACTIONS OF THE ASAE 965 (1974)
1145	Claire E. Marcato et al., <i>Particle size and metal distributions in anaerobically digested pig slurry</i> , 99(7) BIORESOURCE TECHNOLOGY 2340 (2008)
1146	Deanne Meyer et al., <i>Particle Size and Nutrient Distribution in Fresh Dairy Manure</i> , 23(1) APPLIED ENGINEERING IN AGRICULTURE 113 (2007)
1147	ERIC C. TUPPER, INTRODUCTION TO NAVAL ARCHITECTURE 71 (5th ed. 2013)
1148	DONALD F. YOUNG ET AL., A BRIEF INTRODUCTION TO FLUID MECHANICS 141-142 (Penny Perrotto et al. eds., 2d ed. 2001)
1149	HUSKY FARM EQUIPMENT LIMITED, HUSKY LIQUID MANURE H 5000 PUMP PART MANUAL (1982)
1150	Philip Jeffrey Nelson, <i>A Pretension of Place: The Industrialization of Corn Belt Agriculture, 1940–1965</i> (May 1992) (M.A. dissertation, University of Northern Iowa) (on file with the Rod Library, University of Northern Iowa)
1151	M. Kumar et al., <i>Flow Properties of Animal Waste Slurries</i> , 15(4) TRANSACTIONS OF THE ASAE 718 (1972)
1152	A.R. Salehiyon et al., <i>Rheological Properties of Sand-Laden Dairy Manure: Modeling by Concentration and Temperature</i> , 17(1) AGRIC. ENG'G INT'L: CIGR J. 284 (Mar. 2015)

1153	Ernie Sundstrom, <i>Stir dredge</i> , YOUTUBE (Apr. 13, 2012), https://www.youtube.com/watch?v=RDyAyLgMETY (referred to as “Exhibit A” in EX1120)
1154	snapshotxx, <i>Sundstrom Pit Pumping stir boat</i> , YOUTUBE (Mar. 12, 2013), https://www.youtube.com/watch?v=tTtFx1AUQi0 (referred to as “Exhibit B” in EX1120)
1155	Screenshots from Nuhn Indus., Ltd., <i>Nuhn Lagoon Crawler X</i> , YOUTUBE (June 3, 2021), https://youtu.be/hzzEOqCRdh0
1156	SUNDSTROM'S PIT PUMPING, LLC., http://www.sundstrompitpumping.com/ (last visited Oct. 1, 2024).
1157	<i>Case Study: Fire Craft–Rescue and Response</i> , SEALEGS (Jan. 2, 2010), https://www.sealegs.com/blog/posts/2010/january/sealegs-firecraft-61m/ [https://web.archive.org/web/20240228182553/https://www.sealegs.com/blog/posts/2010/january/sealegs-firecraft-61m/]
2001	Petitioner’s <i>Ex Parte</i> Reexamination Requests for U.S. Patent No. 11,358,425 and U.S. Patent No. 10,974,557
2002	Decision Granting Patent Owner’s Petition for an Unintentionally Delayed Priority Claim in U.S. Patent. No. 10,124,638
2003	U.S. Patent No. 4,594,006 to Depeault (“Depeault”)
2004	January 17, 2024 Expert Declaration of Douglas S. Prairie (cited here for completeness)
2005	Curriculum Vitae of Douglas S. Prairie and Case List (cited here for completeness)
2006	Screenshots from Patent Owner’s YouTube Channel of Patented Product, retrieved on 10-2-23 from https://www.youtube.com/watch?v=fEgvvq9HZkk
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2008	Screenshots from Progressive Dairyman YouTube Channel of 2014 Manure Lagoon Agitation Boat Demonstration, published on 7-9-14 by Progressive Dairy, retrieved on 10-2-23 from https://www.youtube.com/watch?v=FXRS-9Ip1pE
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17. My opinions have also been guided by my appreciation of how a person of ordinary skill in the art, as defined below, would have understood the claims and the specification of the ‘835 Patent at the time of the alleged invention.

18. As I discuss in detail below, it is my opinion that the prior art of record fails to disclose or render obvious the Substitute Claims present in Patent Owner's Revised Motion to Amend, including at least independent Substitute Claims 41, 57, 79, and 80.

IV. APPLICABLE LEGAL STANDARDS AND PRINCIPLES

19. I am not an attorney and do not purport to offer legal opinions. In forming my opinions, however, I have been asked to apply certain standards pertaining to the patentability issues presented in this proceeding that I know from my experience as an inventor and expert witness or were provided to me by counsel for the Patent Owner.

20. I understand that for a patent to be valid, the invention claimed in the patent must be new, useful, and non-obvious. I understand that, in this *inter partes* review, the Petitioner has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence.

A. The Prior Art

21. I understand that applicable patent law provides categories of information that constitute prior art that may be used to "anticipate" patent claims or to render them "obvious." I understand that for a reference to qualify as "prior art" in an *inter partes* review, the reference must have been published, patented, or must have been the subject of a patent application by another person, before the priority date of the patent, and in this matter, must satisfy one of the standards of 35 U.S.C. § 102.

B. Anticipation

22. I understand that a claim of a patent is invalid if the claimed invention is not new. I understand that the scope of prior art is limited in *inter partes* reviews. It is my understanding that a claimed invention is not new if all the limitations of the claim are described in a single prior art reference, and as arranged in the claim.

23. I understand that the prior art reference does not have to use the same words as

those used in the claim, but that all the limitations must be present, either expressly or inherently, so that a person having ordinary skill in the art viewing the reference would have everything necessary to make and use the invention as claimed. I understand that something is inherent in a prior art reference if it necessarily exists in the prior art reference.

24. Therefore, it is my understanding that a single prior art reference that discloses each requirement of a claim, either expressly or inherently, invalidates the claim by anticipation.

C. Obviousness

25. I understand that a claim is unpatentable if the differences between the claim and the prior art are such that the claimed subject matter as a whole would have been obvious to a person having ordinary skill in the art. Obviousness may be shown by a single prior art reference or by a combination of prior art references.

26. Although I understand that a finding of obviousness may be based upon combining prior art references, I also understand that a patent claim may not be proved obvious merely by demonstrating that each of its limitations was independently known in the prior art. I further understand that there must be a motivation to combine elements of the prior art in the manner claimed. I also understand that a claim cannot be found obvious based on a hindsight combination of components selected from the prior art using the patent claims as a roadmap.

27. I further understand that in determining whether a prior art reference would have been combined with other prior art, a showing must be made that a person of ordinary skill in the art would have a reasonable expectation that the asserted combination could be made successful and would achieve the claimed invention.

28. In determining whether a claim would have been obvious, I understand that obviousness is determined from the perspective of a person having ordinary skill in the art in the field of the claimed invention. I understand that as part of my analysis of whether a given patent claim is obvious, I should consider: (1) the level of ordinary skill in the pertinent art; (2) the scope and content of the prior art; (3) the differences, if any, between the prior art as a whole and the

claim at issue; and (4) as appropriate, secondary considerations of non-obviousness.

V. PERSON OF ORDINARY SKILL IN THE ART

29. I understand that Petitioner asserts that a person of ordinary skill in the art (“POSITA”) for the technology underlying the ‘835 Patent would have had “a bachelor’s degree in mechanical engineering or similar field, and two years of professional experience in marine and off-road vehicles. A [POSITA] would have had a working knowledge of fluid pumps and livestock manure.” Petition, p. 31; EX1004, Winkel Decl. ¶82. Petitioner also states that a “[l]ack of work experience can be remedied by additional education, and vice versa.” *Id.*

30. I disagree with the Petitioner’s definition of a POSITA because it excludes those most familiar with manure agitation equipment – livestock farmers and commercial manure applicators. A commercial manure applicator is a person who is employed by a business entity engaged in the business of transporting, handling, storing, or applying manure for a fee. *See* EX2024. It is common place in the agricultural industry for end users of farm equipment to be highly knowledgeable of its design, operation, and limitations because they use, maintain, and modify it.

31. The Petitioner’s definition of a POSITA is overly generic and made without reference or regard to the sole application for the claimed vehicle – manure lagoon agitation/pumping. Moreover, “professional experience in marine and off-road vehicles”, general experience in “designing agricultural equipment”, or “working knowledge of . . . livestock manure”, does not equate to experience, generally, in a niche art—the care of agricultural lagoons and agitating and pumping of agricultural lagoons.

32. The ‘835 Patent repeatedly mentions “animal husbandry” (i.e., livestock farming operations) and the problems encountered when storing and pumping animal manure in farm lagoons or pits. EX1001, ‘835 Patent, col. 1, ln. 26-49; col. 3, ln. 14-21; col. 7, ln. 20-46; col. 8, ln. 5-25.

33. Moreover, the ‘835 Patent has been classified as being directed to “amphibious

vehicles specially adapted for particular purposes” and “manure” handling:

Classifications

- B60F3/0061 Amphibious vehicles specially adapted for particular purposes or of a particular type
- A01C23/045 Filling devices for liquid manure or slurry tanks
- A01C3/026 Storage places for manure, e.g. cisterns for liquid manure; Installations for fermenting manure with mixing or agitating devices

EX2009, p. 3.

34. The ‘835 Patent does not suggest that the claimed vehicle finds utility in doing anything other than operating in manure lagoons.

35. Based on this intrinsic evidence, it is my opinion that a POSITA is “a livestock farmer or commercial manure applicator familiar with manure agitation equipment or an engineer with at least 2 years of experience designing agricultural equipment and knowledge of manure agitation equipment.”

36. All of my opinions in this declaration are from the perspective of a POSITA, as I have defined it in the preceding paragraph, during the relevant timeframe of August 2013.

VI. CLAIM CONSTRUCTION

37. I understand that in an *inter partes* review proceeding, the claim terms are to be construed in accordance with the ordinary and customary meaning of such term as understood by a POSITA.

38. I understand that when interpreting the claims, the primary focus must be on the intrinsic evidence, which consists of the claim language, the specification, and the prosecution history. I further understand that extrinsic evidence, such as definitions found in dictionaries and handbooks, is less pertinent and persuasive than the intrinsic evidence. I also understand that express definitions of terms in the patent should govern the construction of the claims. I have followed these claim construction principles in my analysis.

39. I have given the claim terms set forth in the Substitute Claims presented with Patent Owner's Revised Motion to Amend the '835 Patent their plain and ordinary meaning for the purpose of this declaration. However, I reserve the right to rebut any claim construction arguments presented by Petitioner or its expert in opposition to Patent Owner's Revised Motion to Amend.

VII. SUPPORT FOR THE SUBSTITUTE CLAIMS

40. I have reviewed U.S. Provisional Application No. 61/867,598 (filed August 19, 2013) ("the '598 Application") (EX2081) and each of the Substitute Claims presented in the Patent Owner's Revised Motion to Amend, and it is my opinion that a POSITA would have understood that the inventors possessed the Substitute Claims as of the filing date of the '598 Application. Moreover, the information contained in the '598 Application was sufficient to inform those skill in the relevant art how to make and use the invention. In particular, it is my opinion that at least the following paragraphs of the '598 Application, when read in conjunction with Figures 1-8 of the '598 Application, provide support for each of the following elements of the Substitute Claims (EX2081, pp. 22-29):

Claim Limitation	Support
41. An amphibious vehicle, comprising:	EX2081, [0001].
a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;	EX2081, [0005], [0013], [0019], [0020], [0024], [0036].
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;	EX2081, [0006].
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	EX2081, [0001], [0009], [0010], [0012], [0013], [0019], [0020], [0021], [0024], [0028], [0034], [0038].

positioned within liquid manure when the vehicle is floating 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, the at least one fluid nozzle of the liquid manure mover positioned above the floatable vehicle body forward of the power source and the immersible liquid manure pump of the liquid manure mover positioned rearward of the power source; and	EX2081, [0008], [0013], [0021], [0023], [0028].
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,	EX2081, [0037].
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	EX2081, [0005], [0009], [0010], [0019], [0020], [0024], [0034], [0038].
42. The vehicle according to claim 41, wherein the ground engaging propulsion structure comprises a set of ground engaging wheels or endless tracks.	EX2081, [0006].
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.	EX2081, [0008], [0023], [0033].
44. The vehicle according to claim 43, wherein the ground engaging propulsion structure is operable at variable speed by the hydraulic motor.	EX2081, [0006], [0030].
45. The vehicle according to claim 41, wherein the least one fluid nozzle is fluidly-connected to the at least one fluid conduit.	EX2081, [0010].
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.	EX2081, [0010], [0028].
47. The vehicle according to claim 45, wherein the amount of fluid flow from the at least one fluid nozzle and the direction of the at least one fluid nozzle are remotely controllable by the operator remote from the vehicle when the vehicle is floating.	EX2081, [0037].
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.	EX2081, [0013].

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.	EX2081, [0012], [0028].
50. The vehicle according to claim 49, wherein the angle adjustment structure comprises a hydraulically powered articulation means.	EX2081, [0028].
51. The vehicle according to claim 50, wherein the hydraulically powered articulation means comprises a hydraulic cylinder.	EX2081, [0031], [0032], [0037].
52. The vehicle according to claim 50, 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.	EX2081, [0031].
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.	EX2081, [0012], [0028].
54. The vehicle according to claim 50, 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.	EX2081, [0012], [0028].
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.	EX2081, [0012], [0028].
56. The vehicle according to claim 50, 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.	EX2081, [0012], [0028].
57. An amphibious vehicle, comprising:	EX2081, [0001].
a floatable vehicle body with a front, a rear, an underside and a longitudinal centerline;	EX2081, [0005], [0013], [0019], [0020], [0024], [0036].
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by at least one hydraulic motor;	EX2081, [0006].
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	EX2081, [0001], [0009], [0010], [0012], [0013], [0019], [0020], [0021], [0024], [0028], [0034], [0038].

when the vehicle is floating in a manure lagoon 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	EX2081, [0008].
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 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,	EX2081, [0037], [0038].
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.	EX2081, [0005], [0009], [0010], [0019], [0020], [0024], [0034], [0038].
58. The vehicle according to claim 57, wherein the ground engaging propulsion structure comprises a set of ground engaging wheels or endless tracks.	EX2081, [0006].
59. The vehicle according to claim 57, wherein the power source is configured to provide hydraulic fluid power to both the ground engaging propulsion structure and the liquid manure mover.	EX2081, [0008], [0023], [0033].
60. The vehicle according to claim 59, wherein the ground engaging propulsion structure is operable at variable speed by the hydraulic motor.	EX2081, [0006], [0030].
61. The vehicle according to claim 57, wherein the vehicle comprises at least one fluid nozzle that is fluidly-connected to the at least one fluid conduit.	EX2081, [0010].
62. The vehicle according to claim 61, wherein the at least one fluid nozzle comprises a plurality of fluid nozzles that are fluidly-connected to the at least one fluid conduit.	EX2081, [0010], [0028].
63. The vehicle according to claim 61, 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.	EX2081, [0037].
64. The vehicle according to claim 57, 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.	EX2081, [0013].
65. The vehicle according to claim 57, further comprising an angle adjustment structure configured to adjust an angular	EX2081, [0012], [0028].

orientation of the at least one fluid nozzle of the liquid manure mover.	
66. The vehicle according to claim 65, wherein the angle adjustment structure comprises a hydraulically powered articulation means.	EX2081, [0028].
67. The vehicle according to claim 66, wherein the hydraulically powered articulation means comprises a hydraulic cylinder.	EX2081, [0031], [0032], [0037].
68. The vehicle according to claim 66, 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.	EX2081, [0031].
69. The vehicle according to claim 65, 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.	EX2081, [0012], [0028].
70. The vehicle according to claim 66, 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.	EX2081, [0012], [0028].
71. The vehicle according to claim 65, 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.	EX2081, [0012], [0028].
72. The vehicle according to claim 66, 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.	EX2081, [0012], [0028].
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.	EX2081, [0030].
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.	EX2081, [0006], [0030].
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.	EX2081, [0006], [0030].
76. The vehicle according to claim 57, wherein the plurality of ground engaging elements is powered by a separate hydraulic motor for each ground engaging element.	EX2081, [0030].
77. The vehicle according to claim 57, wherein at least one hydraulic motor that is operable at variable speed is connected to each ground engaging element.	EX2081, [0006], [0030].
78. The vehicle according to claim 58, 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.	EX2081, [0006], [0030].
79. An amphibious vehicle, comprising:	EX2081, [0001].

a floatable vehicle body with a front, a rear, and an underside;	EX2081, [0005], [0019], [0020], [0024], [0028].
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;	EX2081, [0006].
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;	EX2081, [0001], [0009], [0010], [0012], [0013], [0019], [0020], [0021], [0024], [0028], [0034], [0038].
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	EX2081, [0008].
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 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,	EX2081, [0037].
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.	EX2081, [0005], [0009], [0010], [0019], [0020], [0024], [0034], [0038].
80. An amphibious vehicle, comprising:	EX2081, [0001].
a floatable vehicle body with a front, a rear, and an underside;	EX2081, [0005], [0019], [0020], [0024], [0028].
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	EX2081, [0006], [0026], [0030].

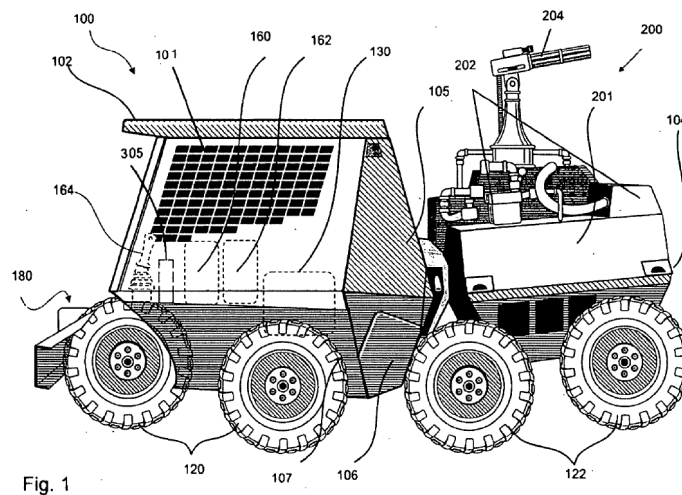
vehicle body and wherein each ground engaging wheel is powered by its own variable speed hydraulic motor;	
a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, the liquid manure mover including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle, the immersible liquid manure pump of the liquid manure mover including a 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;	EX2081, [0001], [0009], [0010], [0012], [0013], [0019], [0020], [0021], [0024], [0028], [0034], [0038].
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, the at least one fluid nozzle of the liquid manure mover positioned at the front of the floatable vehicle body forward of the power source and the immersible liquid manure pump of the liquid manure mover positioned rearward of the power source; and	EX2081, [0008], [0013], [0021], [0023], [0028].
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,	EX2081, [0037].
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.	EX2081, [0005], [0009], [0010], [0019], [0020], [0024], [0034], [0038].

VIII. OVERVIEW OF THE CITED ART

41. In this section I describe the references relied upon by Petitioner in the Petitioner (Paper 1) and Petitioner's Opposition (Paper 36) to Patent Owner's original Motion to Amend the '835 Patent (Paper 21).

A. Carrier [EX1005]

42. Carrier teaches a general-purpose amphibious vehicle having various objectives, none of which are in nature. For example, Carrier describes one “objective is to provide a multi-purpose vehicle for National Security issues such as Sneek [sic] and Peek operations and Silent Search and Destroy Missions.” EX1005, Carrier, ¶ [0015]. “Another objective is to provide a multi-purpose vehicle for Military and National Security issues such as Explosive Energy Defeat and Ballistic Armor Capabilities.” EX1005, Carrier, ¶ [0016]. Carrier goes on to describe that its general-purpose amphibious vehicle can optionally be equipped with a water pump and water cannon for firefighting. EX1005, Carrier, ¶¶ [0060]-[0061]. In particular, Carrier states that an important feature of its vehicle is that “the tank, hoses, and pump may be readily removed from the vehicle through the use of quick-release devices.” EX1005, Carrier, ¶ [0060].



43. Carrier describes that its vehicle has an “ability to transport a pump or other device to direct the water, foam and dry chemicals at the fire, as well as decontamination solutions for decon missions.” See EX1005, Carrier, ¶ [0059]. The optional pump in Carrier is further described as “capable of pumping water from a lake or stream,” not liquid manure from a farm lagoon. See EX1005, Carrier, ¶ [0061]. Carrier does not include any description that the pump has any capabilities beyond pumping water, foam, dry chemicals at a fire, or decontamination solutions. Carrier does not state that its pump is capable of pumping liquid manure. And Carrier includes no

description of the structure of its optional pump. Carrier makes no reference to manure, farm lagoons, or animal husbandry (livestock farming).

B. Truxor [EX1006]

44. Truxor describes an amphibious vehicle that is designed to carry an onboard operator and a number of different tool attachments. EX1006, Truxor, pp. 6-15. In particular, the tool attachments of Truxor includes aquatic weed cutters (EX1006, Truxor, pp. 6-7), rakes (EX1006, Truxor, pp. 8-9), buckets and log grabbers (EX1006, Truxor, p. 9), dredge pumps (EX1006, Truxor, pp. 10-11), excavators (EX1006, Truxor, p. 12), cultivators (EX1006, Truxor, p. 13), and oil decontamination tools (EX1006, Truxor, pp. 14-15). Truxor does not describe that its vehicle or its dredge pumps are used to pump manure or are even capable of pumping manure. In fact, Truxor employs a “wheel or screw feeding” in addition to the dredging pump such that the wheel or screw feeding “gives a greater flow of sediment to the pump inlet when the sediment is soft”. EX1006, 10.



Truxor may also employ a dredge pump that “is mounted on to the lift arm which can be pressed into the sediment.” Paper 12, 25; EX1006, 11. In other words, the dredge pumps disclosed in Truxor requires that larger sized or harder suspended solids be fed through a wheel or screw feed prior to entering an inlet of the dredge pumps or be sufficiently soft, light and small in size so as to allow the “sediment to be transported long distances”. Paper 12, 25.

45. The vehicle in Truxor is advertised as being designed for weed removal and

dredging. EX1006, Truxor, p. 1. Additionally, Truxor states: “Driven with care and with its minimal ground pressure, damage to river banks and sensitive areas can be minimised [, sic] making the *Truxor* ideal for working on golf courses, nature reserves and public parks where larger, heavier machines have difficulty operating.” EX1006, Truxor, p. 2. Truxor makes no reference to manure, farm lagoons, or animal husbandry (livestock farming). Truxor also does not describe that any of its onboard controls can be operated by remote control.

C. SenwaTec [EX1012]

46. Like Truxor, SenwaTec discloses an amphibious vehicle that is designed to carry an onboard operator and a number of different tool attachments. EX1012, SenwaTec, p. 2. For example, SenwaTec’s tool attachments include hydraulic augers, tree cutters, clearing and collecting rakes, t-cutter bars, mowing buckets, excavating buckets, suction augers, and centrifugal pumps. EX1012, SenwaTec, pp. 2-3. SenwaTec’s marketing material does not describe that its vehicle or its centrifugal pumps are used to pump manure or are even capable of pumping manure.



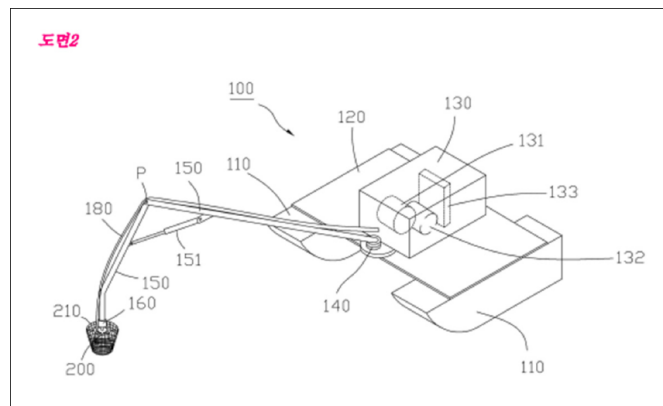
EX1012, SenwaTec, p. 2.

47. The vehicle in SenwaTec is advertised as being designed for weed removal and dredging. EX1012, SenwaTec, p. 1. SenwaTec shows that it has at least 8 different control interfaces. EX1012, SenwaTec, p. 1. However, SenwaTec does not describe that any of its onboard control interfaces can be operated by remote control. Instead, SenwaTec describes that its cockpit

has: “Conveniently and comfortably arranged operational control levers for easy operator’s reach as well as monitoring instruments in clear view to the operator’s position.” EX1012, SenwaTec, p. 3. SenwaTec makes no reference to manure, farm lagoons, or animal husbandry (livestock farming).

D. Yoon [EX1010 and EX1011]

48. A POSITA would understand Yoon for generally disclosing a remote control vehicle with a water pump. Yoon describes a remote-controlled vehicle with an onboard water pump pump 131:

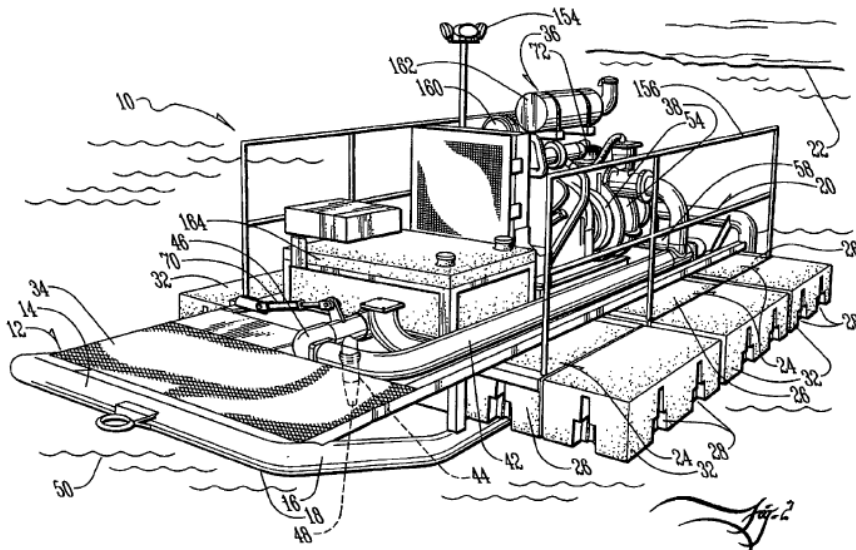


49. Yoon describes that its “invention is about an amphibious water treatment device that is installed at streams or on storage tanks, reservoirs, and so on, into which waste materials are dumped in order to treat industrial waste materials.” EX1011, Yoon, ¶ [0001]. Yoon includes a main body 130 in which a water pump 131 is installed. EX1011, Yoon, ¶ [0047]. The water pump 131 of Yoon is not immersed in the storage tank or reservoir. Yoon’s water pump 131 pumps wastewater and sludge from the storage tank or reservoir and into a water collection device 300, where it is “separated into wastewater and sludge.” EX1011, Yoon, ¶ [0070]. Then, “the sludge separated from the stored water is collected by a sludge transportation car, which is not illustrated, and then treated.” EX1011, Yoon, ¶ [0077]. Yoon only includes a generalized statement that “a remote receptor (not illustrated) is installed on the controller (133) installed on the main body (130) in order for the operator to control work using a remote controller from the land.” EX1011,

Yoon, ¶ [0048]. However, other than this generalized statement, Yoon provides no details as to how its remote control is designed or implemented. A POSITA would understand from Yoon that its water pump would clog if used to pump liquid manure, which is also consistent with Bazooka's public statements that "most pumps cannot operate" in liquid manure. Accordingly, a POSITA would also understand from Yoon that a pump requiring a "sludge filtering device" is not a pump that pumps liquid manure because the "sludge filtering device" would filter out suspended solids contained in liquid manure.

E. Puck [EX1014]

50. Puck teaches a traditional manure agitation boat that must be launched and retrieved using a trailer:



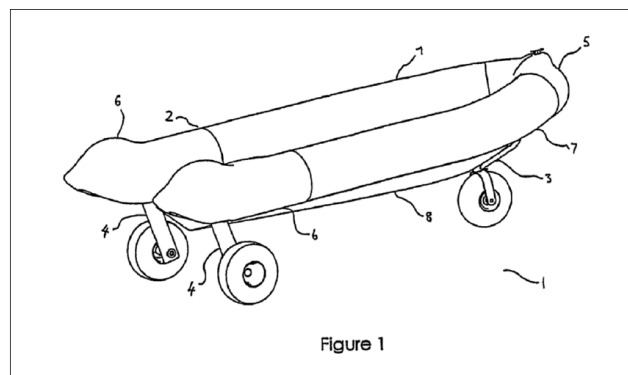
EX1014, Puck, p. 3, FIG. 2.

51. Puck describes that its vessel 12 includes modular dock sections 26. EX1014, Puck, Paras. [0022]-[0023]. Puck describes that it includes a slurry pump 38, which is a Cornell Redi-Prime centrifugal pump. EX1014, Puck, ¶ [0025]. Puck describes that the "slurry pump (38) is coupled to a liquid manure intake, such as a slurry intake, which is a downwardly directed intake pipe (40)" and that the "intake pipe (40) is constructed to extend about twenty-four inches below

the surface of the lagoon (22).” EX1014, Puck, ¶ [0026]. Figures 1, 2, 6, and 8 of Puck show the slurry pump 38 with only a single inlet and a single outlet. EX1014, Puck, pp. 2, 3, 7, and 9. Figure 4 of Puck shows the slurry pump 38 above the manure lagoon 22 and above the crust 126. EX1014, Puck, p. 5. Puck does not include any ground engaging propulsion structure. Instead, Puck’s agitation boat is “transported to the manure lagoon (22) using a trailer (132) and pulling vehicle (134).” EX1014, Puck, ¶ [0034]. Puck includes a remote control system 64, but because Puck lacks a ground engaging propulsion structure, Puck does not include any description that its remote control system 64 can control a ground engaging propulsion structure.

F. Bryham [EX1015]

52. Bryham describes a three-wheeled land propulsion and steering system that retracts into and extends out from a boat hull:



EX1015, Bryham, p. 2.

53. Bryham describes a vee-boat hull with three wheels (one at the bow and two at the stern). In one embodiment, Bryham describes its boat as an “inflatable craft 2, fitted with a single nose undercarriage assembly 3 and two aft undercarriage assemblies 4, providing means for the craft to travel over land.” EX1015, Bryham, p. 22, col. 11, ln. 56-59. Bryham also states that its craft includes fiberglass cowlings “towards the front of the craft and towards the rear 6,” that the “cowlings are shaped to conform to the lines of the inflatable tubes 7,” and that the undercarriage assemblies 3 and 4 can be “retracted and stowed within the cowlings 5 & 6.” EX1015, Bryham, p.

22, col. 11, ln. 59 – col. 12, ln. 4. Bryham does not describe any sort of remote control. Nor does Bryham make any reference to manure, farm lagoons, or animal husbandry (livestock farming).

G. Bennett-II [EX1017]

54. Bennett-II describes a general-purpose amphibious vehicle that has a pair of tracks:

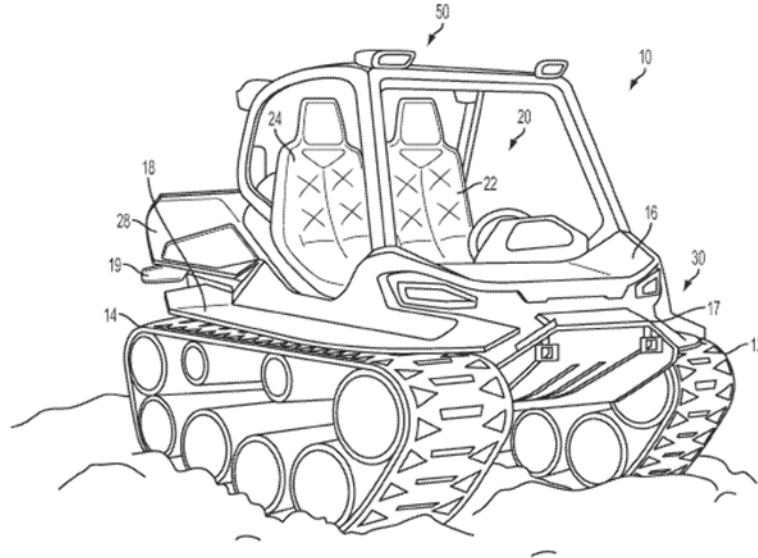


FIG. 1

EX1017, Bennett-II, p. 2.

55. Bennett-II describes that its vehicle 10 has a pair of tracks 12, 14 that are driven by two drive units 590, 592 through a transmission 550 that is powered by an engine 502:

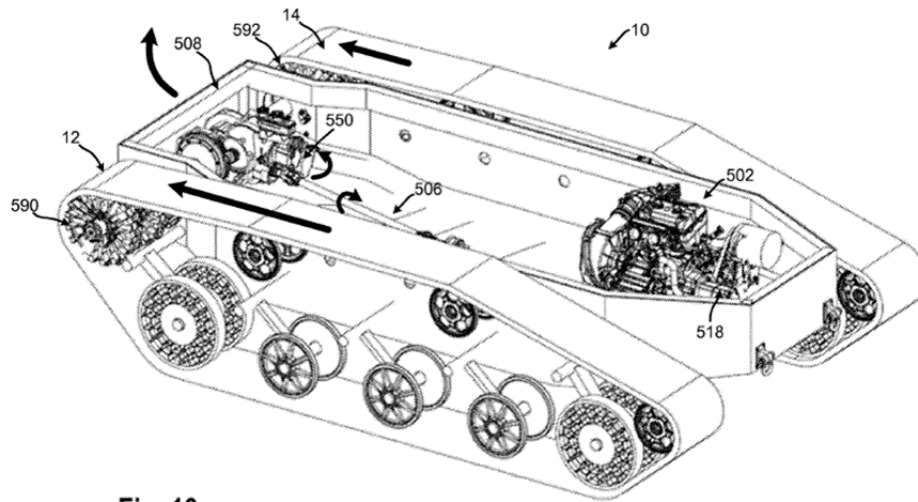


Fig. 16

EX1017, Bennett-II, p. 22, Paras. [0048], [0077]. Bennett-II only includes generalized statements that its “vehicle 10 may be operated by remote control” and in “one embodiment, vehicle 10 is adapted to be remotely controlled. For example, a remote control electronic device may be used to control vehicle 10 wirelessly without an operator being positioned in the vehicle 10.” EX1017, Bennett-II, Paras. [0043], [0121]. Other than these generalized statements, Bennett-II provides no details as to how its remote control is designed or implemented. Additionally, Bennett-II makes no reference to manure, farm lagoons, or animal husbandry (livestock farming).

H. Manure-Manager [EX1112]

56. Manure-Manager (EX1112) is an industry publication (i.e., a trade magazine) from January/February 2011 that includes an advertisement for Nuhn’s “G-Force” a tractor mounted / tractor powered manure lagoon agitation pump assembly, which includes an impeller and pump housing located on the far end of the boom arm while the other end of the boom arm is connected to the rear hitch of a farm tractor. This boom arm is about 10 feet in length and the pump impeller is driven by the PTO of the tractor through a gearbox assembly in the boom arm:



EX1112, p. 27.

I. Sundstrom [EX1120]

57. Sundstrom [EX1120] discusses a floating manure agitator that is designed to be pulled across a manure lagoon using one or more cables and winches, which can be seen along the top of the vehicle in the images reproduced below:



Sundstrom Pit Pumping stir boat

EX1120, Sunstrom, p. 10.

58. The Sundstrom manure agitator includes a liquid manure pump and nozzle/cannon assembly that are mounted on the far end of a boom arm that can tilt up and down to a limited degree. In accordance with this arrangement, the liquid manure pump on the end of this boom arm hangs off the front of Sunstrom's barge:



Equipment demonstrations: Manure agitation boats

EX1120, Sunstrom, p. 11.

IX. A POSITA WOULD NOT HAVE BEEN MOTIVATED TO ARRIVE AT THE COMBINATION OF REFERENCES PETITIONER ASSERTS

59. The '835 Patent describes that during storage of liquid manure “a crust can develop on the surface of the pit or lagoon that must be disrupted prior to or during removal of the manure.” EX1001, 1:35-36. The '835 Patent describes that “[p]umps are employed for this purpose with jets that return a percentage of the manure back to the pit or lagoon in the form of a high volume spray to disrupt the crust and recirculate the manure.” *Id.* at 1:37-40. Additionally, the '835 Patent acknowledges that “[p]umps for use in recirculating manure from *smaller* pits are known.” *Id.* at 1:40-41 (emphasis added). But it recognizes that there are problems with these pumps. Namely, “these pumps are typically suitable for accessing the pit or lagoon from its edge and are connected to a tractor or similar land vehicle for operational power.” *Id.* at 1:42-44. Because such pumps are only at the edge of the pit or lagoon, “[t]hey are therefore limited in their ability to recirculate manure to the middle of *large* lagoons, which are becoming increasingly common as the size of animal husbandry operations increases.” *Id.* at 1:44-48 (emphasis added). The '835 Patent therefore identifies that “there is a need for improved pumps and vehicles equipped for pumping, particularly pumps and vehicles suitable for use with large manure lagoons.” *Id.* at 1:49-51.

60. Thus, it is my opinion, that a POSITA would have understood from the teachings of the '835 Patent that there are shortcomings with pumps for recirculating larger pits and that such pumps have difficulties in breaking up the crust suspended on liquid manure and recirculating and agitating the liquid manure of large manure lagoons or pits. Moreover, as described herein, a POSITA would have known that the crust suspended in the liquid manure can be hard, thick, and pose clogging problems if fluid pumps that are not for pumping liquid manure are attempted to be used to for agitating the liquid manure.

61. Therefore, it is my opinion that a POSITA who would have been attempting to

solve the same problems at the same time of the invention of the '835 Patent would have never looked to Carrier, Truxor or SenwaTec in the first instance and therefore would have never modified Truxor or SenwaTec as suggested by Petitioner and Dr. Winkel. Carrier touts its vehicle as having “very low ground pressure.” EX1005, ¶53. Similarly, Truxor describes a vehicle with “minimal ground pressure” that can be “driven with care” to minimize “damages to river banks and sensitive areas.” EX1006 at 2. Truxor goes so far to state that its vehicle is “ideal for working on golf courses, nature reserves and public parks where larger, heavier machines have difficulty operating.” *Id.* A POSITA that was particularly interested in breaking up, agitating and recirculating the hard, thick crusts in liquid manure of large manure lagoons would have never looked to a Truxor’s lightweight vehicle with “minimal ground pressure” that is “sensitive” to the ground on which it is drive. The same goes for SenwaTec, which describes a “light” vehicle with “low ground pressure.” EX1012 at 1. This is the exact opposite of what a POSITA would have been looking for. A POSITA would have been keenly aware that the vehicles described in Carrier, Truxor, and SenwaTec, with their low power, light weight, and low flow rate pumps would be insufficient and outright incapable of solving the problem that they faced.

62. A POSITA would have recognized that minimal ground pressure and lightweight vehicles described in Carrier, Truxor, and SenwaTec would have difficulties breaking through the crust in the liquid manure and that their small pumps would be unable to pump the liquid manure considering the total solids content, the size of the solids, the viscosity of the liquid manure, and the hard, thick crust that it must also pump. A POSITA would have known that the thick solid crust “can become relatively hard and can reach six feet in thickness” and can have a “consistency of dry peat moss.” EX2003, col. 1, ln. 46-47; *id.* at col. 1, ln. 26-30. Thus, when presented with the problem attempted to be solved by the '835 Patent, a POSITA would have sought out a heavy weight vehicle with a high-powered engine and high output fluid pump for pumping liquid manure that could run for hours at a time as is often required to fully agitate a liquid manure lagoon.

63. Moreover, as asserted by Petitioner and Dr. Winkel, a POSITA would have

understood that liquid manure lagoon is highly corrosive. *See* EX1004, Winkel Decl. ¶ 120. Dr. Winkel asserts that “[a] POSA would have been motivated to avoid exposing certain types of metal equipment, such as vehicle trailers, to corrosive lagoon liquids.” *Id.* He’s entirely correct on this point, and for that very reason a POSITA would have never looked to using an amphibious vehicle in a liquid manure lagoon. Thus, a POSITA would not have utilized an amphibious vehicle with wheels or tracks that would be in the liquid manure during long periods of agitation and recirculation as they would have believed that such equipment would have been damaged by the corrosive environment. The POSITA would have understood that the ground engaging propulsion structure of the amphibious vehicle would be immersed and remain in the corrosive manure lagoon for the entire period of time during regular agitation sessions, which often take multiple hours. The repeated and prolonged exposure to the corrosive liquid manure would have quickly corroded the costly components of the ground engaging propulsion structure, such as hydraulic motors, spindles, hydraulic fittings, wheels, etc. A POSITA would have understood that this would lead to significant downtime and costly repairs of the manure lagoon agitator.

64. Additionally, it is my opinion that a POSITA would **not** have modified Truxor or SenwaTec, both of which describe the use of quick-connect attachments, to incorporate remote control systems because a POSITA would have needed a direct line of sight of the terrain ahead of and around the vehicle to avoid getting stuck, rolling, or tipping and to use the particular tool that was attached to the vehicle.

65. For these reasons, a POSITA would have never looked to Carrier, Truxor, or SenwaTec and despite knowing of the existence of amphibious vehicles they would have never thought to modify or use one for agitation and recirculation of liquid manure. If it was so obvious as Dr. Winkel asserts, for a POSITA to have created an amphibious manure lagoon agitation vehicle, then why did a POSITA never do it before Nuhn. The reasons I give are why. Rather than an amphibious vehicle, Puck and Sunstrom exemplify the state of the manure lagoon agitation art at the time of Nuhn’s invention. Rather than subject an amphibious vehicle with its complex and

costly components to the corrosive environment of liquid manure, Puck and Sundstrom provided manure agitation boats/barges where the components of their respective propulsion structures (i.e., the motor, pump, and hydraulics of Puck and the cable winches of Sundstrom) were positioned above the surface of the manure lagoon and therefore away from the high corrosive liquid manure. That is because a POSITA would have understood, and did understand, that one would want to keep complex, costly components out of the liquid manure.

66. In summary, it is my opinion that no POSITA would have ever looked to the general-purpose amphibious vehicles described in Carrier, Truxor, or SenwaTec as a starting point for a manure lagoon agitation vehicle, nor would a POSITA have looked to modify Puck or Sundstrom to be amphibious. As such, it is my opinion that Petitioner’s combinations of references fail to show that the Substitute Claims of the ‘835 Patent are obvious.

X. SUBSTITUTE CLAIMS 41-80 ARE PATENTABLE OVER THE CITED ART

67. I have reviewed the Substitute Claims submitted with Patent Owner’s Revised Motion to Amend, the prior art cited in this IPR, the prior art considered during prosecution of the ‘835 Patent, and the prior art cited in the IPRs Petitioner filed against Nuhn’s ‘425 Patent (IPR2023-01161) and Nuhn’s ‘708 Patent (IPR2024-00098). After reviewing the Substitute Claims, it is my opinion that the prior art I have reviewed, and have personal knowledge of, does not anticipate or render obvious the Substitute Claims.

68. There are a total of forty (40) Substitute Claims with Claims 41, 57, 79, and 80 being written in independent form. My analysis below focuses on the four Substitute Claims that are independent, which are shown in the comparison chart presented 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	a floatable vehicle body with a front, a	a floatable vehicle body with a front, a	a floatable vehicle body with a front, a

rear, an underside and a longitudinal centerline;	rear, an underside and a longitudinal centerline;	rear, and an underside;	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, [I] 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, [II] the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, [I] 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, [II] the immersible liquid manure pump of the liquid manure mover including a substantially vertical drive shaft powering an impeller that is positioned in a	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, [I] 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, [II] 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,	a hydraulically powered liquid manure mover separate from the ground engaging propulsion structure, [I] 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, [II] 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

pump housing and draws liquid manure in through a bottom fluid opening in the pump housing, [V] 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 [III] such that the immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating [IV] and has a constant angular orientation relative to the floatable vehicle body;	pump housing, the immersible liquid manure pump including a bottom fluid opening in the pump housing, [V] 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 [III] 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 [IV] and has a constant angular orientation relative to the floatable vehicle body;	the immersible liquid manure pump including a bottom fluid opening in the pump housing, [V] where the pump housing is mounted to the underside of the floatable vehicle body [VI] 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 [III] and such that immersible liquid manure pump of the liquid manure mover is positioned within liquid manure when the vehicle is floating [IV] and has a constant angular orientation relative to the floatable vehicle body;	draws liquid manure in through a bottom fluid opening in the pump housing, [V] 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 [III] 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, [II] where the drive shaft is substantially vertical [IV] 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) 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,	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 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,	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 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,	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,
[VII] 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	[VII] 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	[VII] 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	[VII] 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

material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.	the bottom fluid opening in the pump housing of the immersible liquid manure pump.	immersible liquid manure pump.	immersible liquid manure pump.
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69. I have annotated various limitations / elements of the above claims using color coding and bracketed Roman Numerals to identify Distinguishable Elements [I] – [VII], which I reference in my discussion below.

70. Distinguishable Element [I], which is present in Substitute Claims 41, 57, 79, and 80, explicitly defines the “liquid manure mover” as “including an immersible liquid manure pump that is hydraulically powered, at least one fluid conduit, and at least one fluid nozzle.”

71. Distinguishable Element [II], which is present in Substitute Claims 41, 57, 79, and 80, specifies that the immersible liquid manure pump includes “a substantially vertical drive shaft powering an impeller” and “a bottom fluid opening in the pump housing.”

72. Distinguishable Element [III], which is present in Substitute Claims 41, 57, 79, and 80, specifies that “the immersible liquid manure pump is positioned within liquid manure when the vehicle is floating.”

73. Distinguishable Element [IV], which is present in Substitute Claims 41, 57, 79, and 80, specifies that the immersible liquid manure pump / the drive shaft of the immersible liquid manure pump “has a constant angular orientation relative to the floatable vehicle body.”

74. Distinguishable Element [V], which is present in Substitute Claims 41, 57, 79, and 80, specifies that the immersible liquid manure pump includes a housing that is positioned along or 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.”

75. Distinguishable Element [VI], which is present in Substitute Claim 79, further specifies that the pump housing is mounted to the underside of the floatable vehicle body “in a space collectively defined between the four ground engaging wheels.”

76. Distinguishable Element [VII], which is present in Substitute Claims 41, 57, 79, and 80, specifies that “components/portion of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side / 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.”

77. In my opinion, the prior art fails to disclose each and every limitation of Substitute Claims 41, 57, 79, and 80 (listed above) because, the prior art, whether considered alone or in combination, fails to disclose the claimed combinations of Distinguishable Elements [I] – [VII].

78. Substitute Claims 42-56 depend from Substitute Claim 41 and are patentable at least due to their dependency from Substitute Claim 41. Substitute Claims 58-77 depend from Substitute Claim 57 and are patentable at least due to their dependency from Substitute Claim 57.

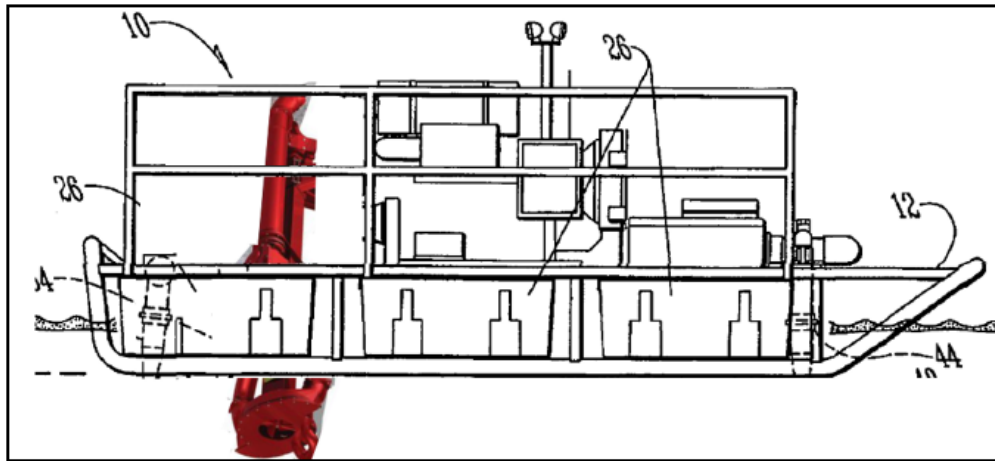
79. The prior art does not teach an amphibious vehicle for agitating / mixing manure lagoons that combines a floatable vehicle body, hydraulically powered wheels, a hydraulically powered immersible liquid manure pump that is connected to a nozzle by a conduit (Distinguishable Element [I]), where the liquid manure pump is mounted in the position and orientation recited in Distinguishable Elements [II] – [VII].

80. I disagree that a POSITA would patch the prior art together in the manner Petitioner suggests without using the ‘835 Patent claims as a blueprint. But even if a POSITA were to combine the prior art as the Petitioner suggests, the resulting combinations would still not yield a machine with the liquid manure pump placement and orientation described in the Substitute Claims (i.e., where (1) the immersible liquid manure pump is hydraulically powered, has a bottom fluid opening in the pump housing, is 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, is immersed in the liquid manure when the vehicle is floating, has a substantially vertically oriented drive shaft, and has a constant angular orientation relative to the

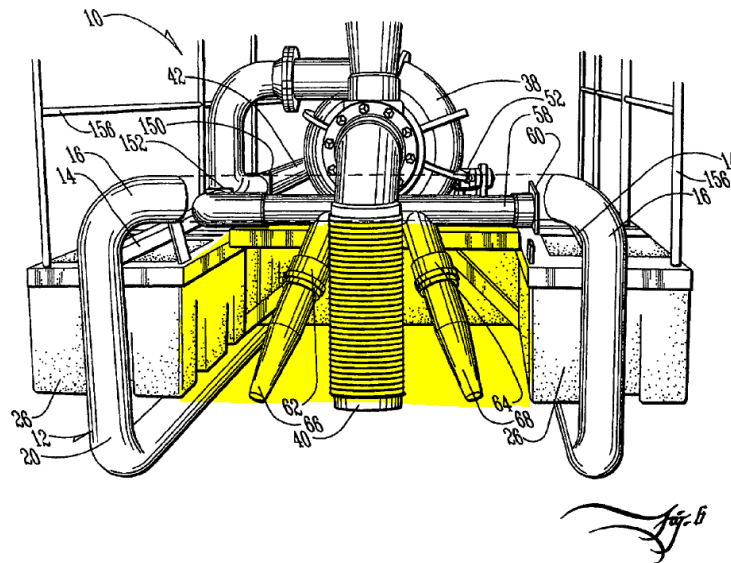
floatable vehicle body, and (2) components/portion of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side / to the right and left of the pump housing and are spaced from and positioned directly forward of and directly rearward of the pump housing to keep floating solid material away from the bottom fluid opening in the pump housing of the immersible liquid manure pump.

81. The ubiquitous teachings of the prior art suggest locating the pump high and dry inside or on top of the vehicle body (like in Carrier, Yoon, and Puck) or placing a submersible pump at the front or rear of the vehicle on the end of a boom arm (like in Truxor, SenwaTec, Cheramie, Sundstrom, Manure-Manager, Houle, and Depault). The prior art does not teach or suggest the claimed arrangement where the immersible liquid manure pump has a pump housing that is positioned along / 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. Nor does the prior art teach or suggest a vehicle where the immersible liquid manure pump has a substantially vertical drive shaft, a bottom fluid opening in the pump housing, and a constant angular orientation relative to the floatable vehicle body. Indeed, the submersible pumps disclosed in Truxor, SenwaTec, Cheramie, Sundstrom, Manure-Manager, Houle, and Depault are all boom mounted and therefore do not have a constant angular orientation relative to the floatable vehicle body. Any combination of these references with Puck and/or Bryham by a POSITA would have resulted in a vehicle with a boom mounted pump that could swing up and down, which is precisely what Sundstrom discloses. Absent impermissible hindsight bias, a POSITA would not mount any of these boom-mounted, submersible pumps in a central location (i.e., rearward of the front and forward of the rear of the vehicle) along the underside of Puck's boat, with a vertical drive shaft, and a constant angular orientation, as required by the Substitute Claims.

82. Even if, for argument's sake, a combination were made where the Nuhn G-Force Vertical Pit Pump advertised in Manure Manager were fitted in the manner Petitioner suggests, as shown below, the resulting vehicle still lacks the claimed configuration.



EX1111, ¶82. Distinguishable Element [VII] states that components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump. As shown in Fig. 6 of Puck (reproduced below), placement of Nuhn's G-Force Vertical Pit Pump in this U-shaped opening at the rear of Puck's boat, between the floating dock sections 26, would still result in a vehicle where no submerged component or portion of the vehicle is spaced from and positioned directly rearward of the pump housing, as required by Distinguishable Element [VII].



EX1014, Fig. 6, p. 7. In other words, even if a POSITA made the Puck, Bryham, Manure-Manager combination in the manner in which Petitioner suggests, there would be no submerged structure directly behind the pump housing that would keep/block floating solid material (i.e., crust) from floating into the U-shaped opening in the rear of Puck's boat, where it could clog the immersible liquid manure pump.

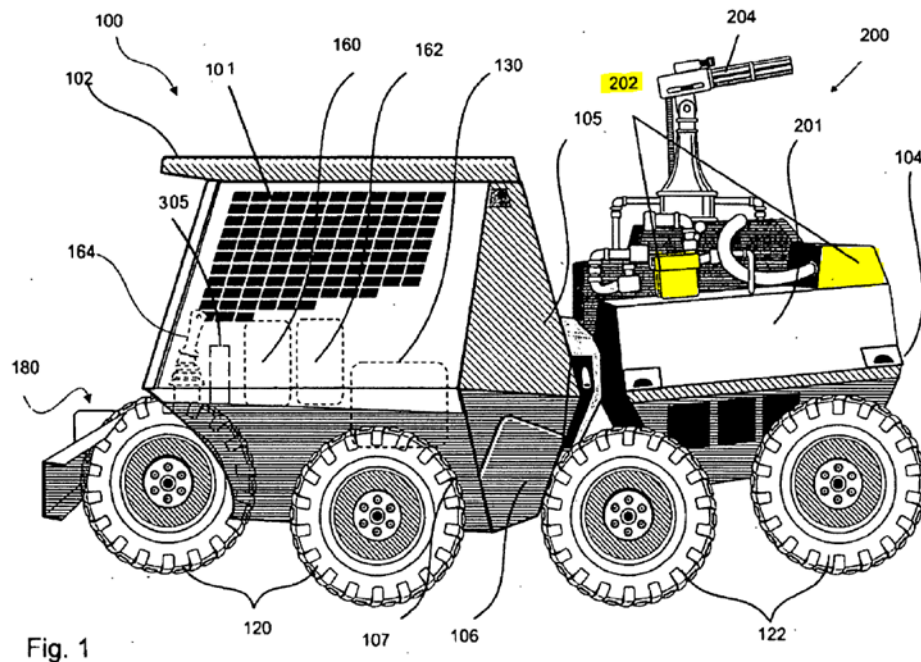
83. The differences between the prior art and Distinguishable Elements [I] – [VII] are not immaterial. The particular arrangements claimed (where (1) the immersible liquid manure pump is hydraulically powered, has a bottom fluid opening in the pump housing, is positioned along the underside of the floatable 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, is immersed in the liquid manure when the vehicle is floating, has a substantially vertically oriented drive shaft, and has a constant angular orientation relative to the floatable vehicle body, and (2) components/portion of the vehicle that are submerged when the vehicle is floating are spaced from and positioned to each side / 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) directly contribute to the new and unexpected results and commercial success experienced by Nuhn's invention. The particular arrangement of the elements recited in the Substitute Claims results in an amphibious vehicle where the position of the liquid manure pump along the underside of the floatable vehicle body and the churning action of the ground engaging elements work together in synergy to breakup thick crust around the vehicle, generating a working pocket or opening within which the liquid manure pump can operate without clogging. Placing the claimed elements elsewhere would destroy this synergy, which depends on the specific location of the liquid manure pump as claimed.

84. The relevant art can be grouped into four general categories or groups: Group 1 –

Amphibious Water Pumping Vehicles (Carrier, Yoon, and Bryham), Group 2 – Manned Amphibious Dredging Vehicles (Truxor, SenwaTec, and Cheramie), Group 3 – Floating Manure Agitators (Puck and Sundstrom), and Group 4 – Tractor Mounted/Powered Manure Agitation Pumps (Manure-Manager, Houle, and Depault). Of note, only Groups 3 and 4 deal with the problem of manure lagoon agitation. Furthermore, the claimed invention (an unmanned amphibious manure agitation vehicle) does not fall within any of these groups, it started its own category.

85. Group 1 – Amphibious Water Pumping Vehicles (Carrier, Yoon, and Bryham) teach a POSITA to locate a non-submersible water pump high and dry inside the vehicle body or on top of the vehicle body.

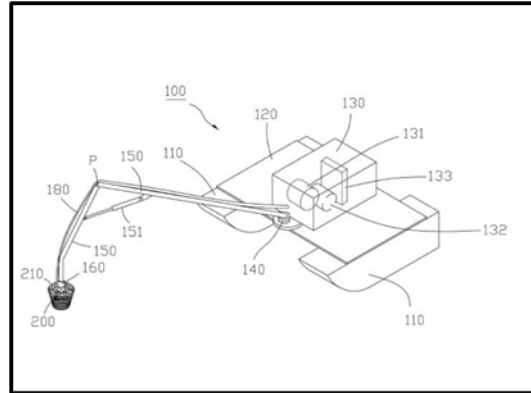
86. The **water pumps** 202 of Carrier are illustrated as being located at the top of the vehicle where it would be high and dry and not immersible when the vehicle is floating:



EX1005, at 2.

87. Yoon discloses “an amphibious water treatment device that is installed at streams or on storage tanks, reservoirs.” EX1011, Yoon, ¶ [0001]. Yoon includes a main body 130 in which

a water pump 131 is installed. EX1011, Yoon, ¶ [0047]. Thus, the water pump 131 of Yoon is not immersed in the storage tank or reservoir.



EX1011, at 2.

88. Like Carrier, it also appears that the commercial embodiment of Bryham, made by Sealegs, included a firefighting pump at some point in time.



Modular Components

Sealegs understands that the firepump may not be the only rescue option required on the rescue boat, and that the boat's amphibious technology must not be impeded by the fire-fighting technology. All of this is taken into consideration when designing and building the boat.



Fight More Fires

Sealegs amphibious boats allow operatives to fight fires in more locations than traditional fireboats. Expand the range of fire protection in your jurisdiction by employing Sealegs technology. Negotiate flooded areas, coastlines and shallow rivers with Sealegs amphibious fire-fighting boat.

EX1157, at 1.

89. It is my opinion that a POSITA would not have even looked to the teachings of the Group 1 prior art (Carrier, Yoon, and Bryham) when attempting to design a manure lagoon agitation vehicle because these references relate to water pumping vehicles as opposed to manure lagoon agitation equipment. Even if the Group 1 prior art were considered relevant to a POSITA, the logical result of following these teachings would be to place a non-submersible pump high and

dry on top of the vehicle body (like in Carrier) or inside the vehicle body / hull (like in Yoon and Bryham). The Group 1 prior art does not teach or suggest a hydraulically powered, immersible liquid manure pump with a bottom fluid opening in the pump housing, let alone the claimed arrangements where the pump housing is positioned along / mounted to the underside of the floatable vehicle body, is immersed in the liquid manure when the vehicle is floating, has a substantially vertically oriented drive shaft, and/or is located in the space between the four ground engaging wheels, or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from a bottom fluid opening in the pump housing of the immersible liquid manure pump.

90. Group 2 – Manned Amphibious Dredging Vehicles (Truxor, SenwaTec, and Cheramie) teach a POSITA to locate a submersible dredge pump at the front of the vehicle on the end of a boom arm that is configured to lower the submersible dredge pump to the lake bottom for dredging operations.

91. Truxor is a multi-role, manned, light duty (i.e., “low ground pressure”) amphibious vehicle with various *quick-connect* attachments. The Truxor amphibious vehicle includes a boom arm configured to accommodate quick-connect aquatic weed cutters [EX1006, at 6-7], rakes [EX1006, at 8-9], buckets and log grabbers [EX1006, at 9], dredge pumps [EX1006, at 10-11], excavators [EX1006, at 12], cultivators [EX1006, at 13], and oil decontamination tools [EX1006, at 14-15].

92. As noted above, one of the *quick-connect* attachments is disclosed as being a *pump* and the *pump* is designed to be a quick-connect pump for dredging a lake or stream, ***not for pumping liquid manure*** (or animal manure contained in a farm lagoon, which includes suspended solids) ***within and out of an agricultural manure lagoon***. The pump of Truxor is located forward of the front end of the vehicle at the end of a boom arm:



EX1006, at 11.

Like Truxor, SenwaTec is a multi-role, manned, light duty (i.e., “low ground pressure”) amphibious vehicle with various *quick-connect* attachments. The SenwaTec amphibious vehicle includes a boom arm configured to accommodate *quick-connect* aquatic weed cutters, rakes, buckets tree cutter and dredge pumps. EX1012, at 2.

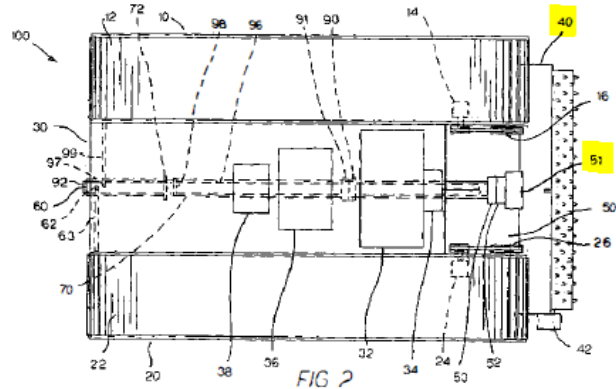
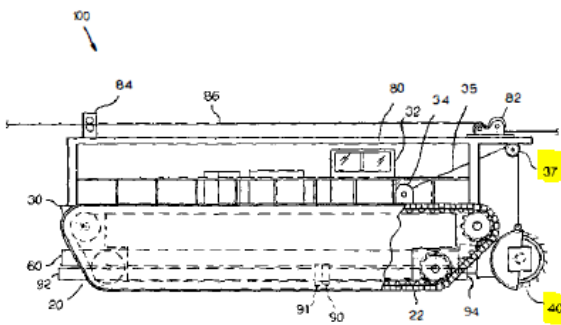
93. As noted above, one of the *quick-connect* attachments is disclosed as being a *pump* and the *pump* is designed to be a quick-connect pump for dredging a lake or stream, ***not for pumping liquid manure*** (or animal manure contained in a farm lagoon, which includes suspended solids) ***within and out of an agricultural manure lagoon***. The pump of SenwaTec is located

forward of the front end of the vehicle at the end of a boom arm:



EX1012, at 1.

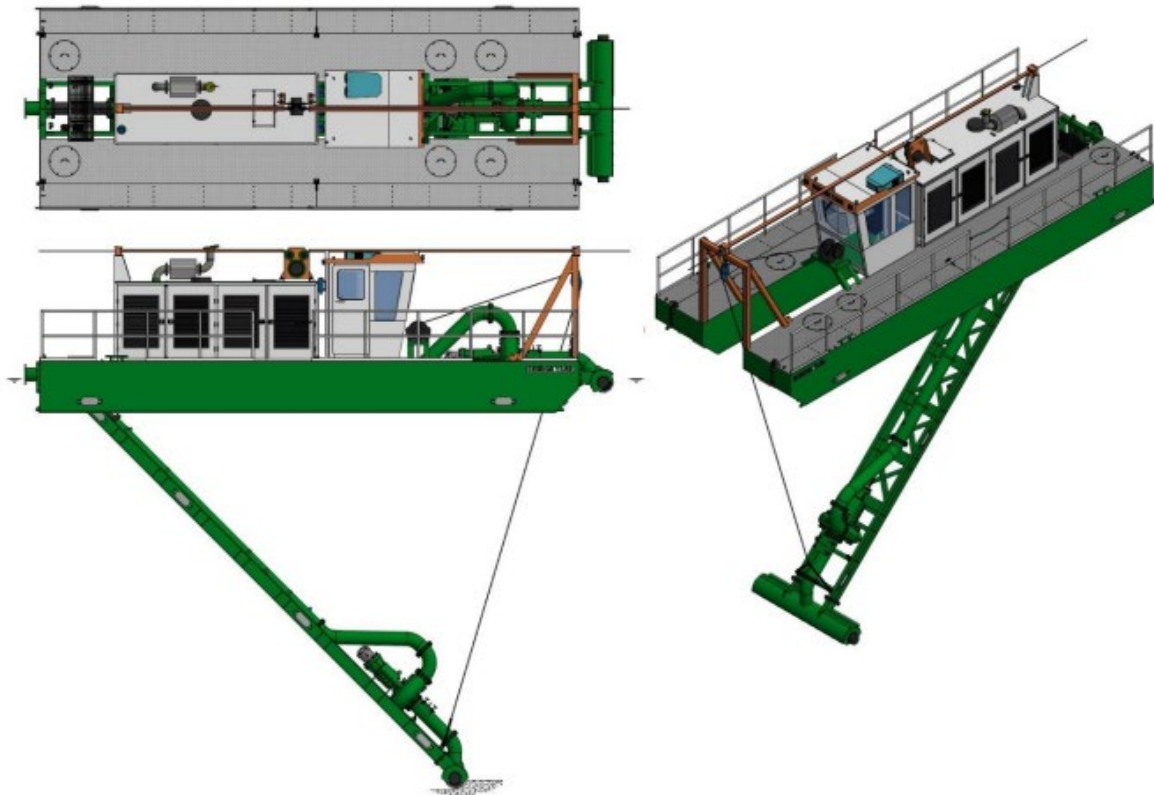
94. U.S. Patent No. 6,922,922 to Cheramie (EX2090) discloses a large, manned amphibious dredging vehicle. The vehicle has a “cutterhead dredge system,” which includes an impeller housing (51) that is positioned immediately behind the cutterhead (40):



EX2090 at 1.

95. The impeller housing (51) and cutterhead (40) in Cheramie are positioned at the forward end of a long boom arm that is lowered to the lake bottom on a cable using an overhead crane/winch (37). The Figures of Cheramie only illustrate the boom arm in the fully raised position (i.e., the transport position, not the operating position), but a POSITA would have understood the crane (37), impeller housing (51), and cutterhead (40) structure in Cheramie to be consistent with other “cutterhead” / “auger” dredge vehicles of this type.

96. For example, in the deployed position, the crane (37), impeller housing (51), and cutterhead (40) in Cheramie would look something like that shown below, which depicts the pump, cutterhead, and boom arm of another “cutterhead” / “auger” dredge vehicle in the operating position:



EX2091 at 4; *see also* EX2092 at 1. The above photograph was taken from the Dredge Yard Auger Dredger ECO200 Brochure, which I downloaded from <https://dredgeyard.com/wp-content/uploads/2021/01/ECO200-A8-brochure.pdf> (EX2091). It illustrates a typical horizontal auger (i.e., cutterhead) dredge and shows how the cutterhead is at the end of a long boom arm that is lowered to the lake bottom using an overhead crane/winch. The construction illustrated above shows the standard layout that has been utilized for horizontal auger/cutterhead dredges of this type for over 20 years. For example, I located a number of used horizontal auger/cutterhead dredges on Dredge Brokers LLC (<https://dredgebrokers.com/equipment/hydraulic-dredgers/dt->

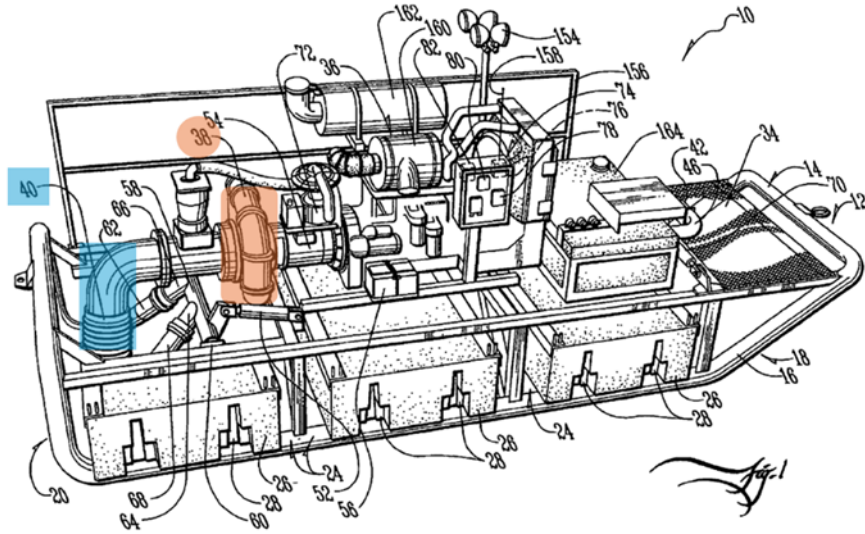
[horizontal-cutter/](#)) (EX2092) that were manufactured well before the August 2013 priority date of the '835 Patent. They all have this same basic design layout (i.e., a horizontal auger/cutterhead at the front end of a long boom arm that is lowered to the lake bottom using an overhead crane/winch). Thus, a POSITA would have understood the “cutterhead” dredge disclosed in Cheramie to have this same basic design layout.

97. It is my opinion that a POSITA would not have even looked to the teachings of the Group 2 prior art (Truxor, SenwaTec, and Cheramie) when attempting to design a manure lagoon agitation vehicle because these references relate to weed clearing and dredging vehicles as opposed to manure lagoon agitation equipment, but even they were considered relevant to a POSITA, the logical result of following these teachings would be to place a submersible pump on the forward end of a long boom arm. The Group 2 prior art does not teach or suggest the claimed arrangements where the liquid manure pump is positioned along the underside of the floatable vehicle body, is immersed in the liquid manure when the vehicle is floating, has a substantially vertically oriented drive shaft, a constant angular orientation relative to the floatable vehicle body, and/or is located in the space between the four ground engaging wheels, or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump.

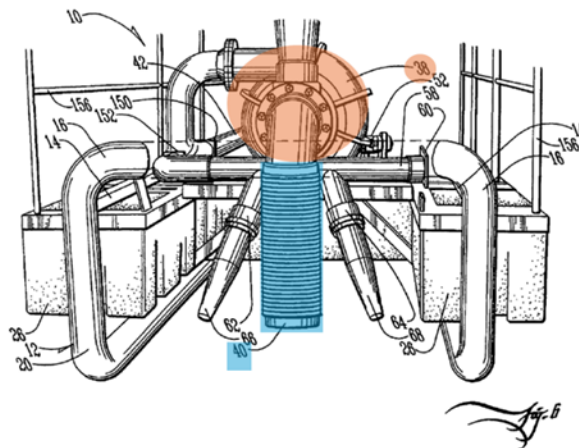
98. Group 3 – Floating Manure Agitators (Puck and Sundstrom) teach a POSITA to either locate a non-submersible liquid manure pump high and dry on top of the floatable vehicle body above the surface of the manure lagoon (as described in Puck) or to located a submersible liquid manure pump at the forward end of a boom arm that can swing up and down into the manure lagoon (as described in Sundstrom).

99. Puck discloses a manure agitation boat including a slurry pump (38) that is located well above the floating dock sections (26) and thus the surface (126) of the manure lagoon (22)

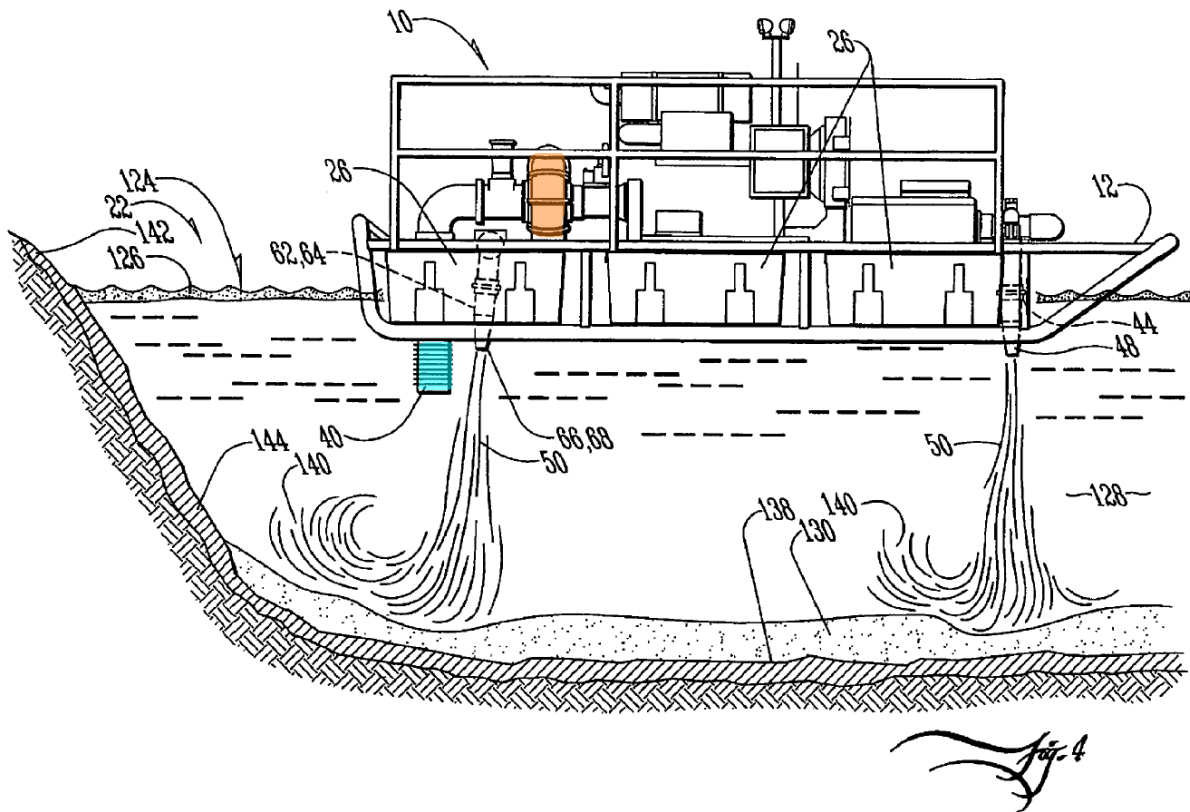
and a number of nozzles 48, 66, 68 that are positioned below the surface (126) of the manure lagoon (22):



EX1014 at 2 (annotated).



EX1014 at 7 (annotated).



EX1014 at 5 (annotated).

100. A liquid manure intake (40) extends towards a reward end of the boat, with a ninety-degree bend downward towards the bottom of the boat. The housing and impeller of the pump (38) are separate and distinct from the intake pipe (40) and are not located on the underside of the boat. Non-immersible liquid manure pumps (like the one disclosed in Puck), require different inlet/housing configurations with pump priming structures compared to submersible pumps. EX1014 at [0031].

101. Sundstrom [EX1120] teaches a floating manure agitator that is designed to be pulled across a manure lagoon using one or more cables and winches:



EX1120, Sundstrom, p. 10.

102. The Sundstrom manure agitator includes a liquid manure pump and nozzle/cannon assembly that are mounted on the far end of a boom arm that can tilt up and down to a limited degree. In accordance with this arrangement, the liquid manure pump on the end of this boom arm hangs off the front of Sundstrom's barge.

103. A POSITA looking to the teachings of the Group 3 prior art (Puck and Sundstrom) when attempting to design a new manure lagoon agitation vehicle would logically follow either the disclosure in Puck, which teaches placing a non-submersible liquid manure pump high and dry on top of the floatable vehicle body with a horizontally oriented drive shaft, or the disclosure in Sundstrom, which teaches hang a submersible liquid manure pump of the front of the vehicle on the end of a boom arm that can tilt up and down to a limited degree from a substantially horizontal orientation. The Group 3 prior art does not teach or suggest a hydraulically powered, immersible liquid manure pump with a bottom fluid opening in the pump housing, let alone the claimed arrangements where the liquid manure pump is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body, is immersed in the liquid manure when the vehicle is floating, has a

substantially vertical drive shaft and a constant angular orientation relative to the floatable vehicle body, and/or is located in the space between the four ground engaging wheels, or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump.

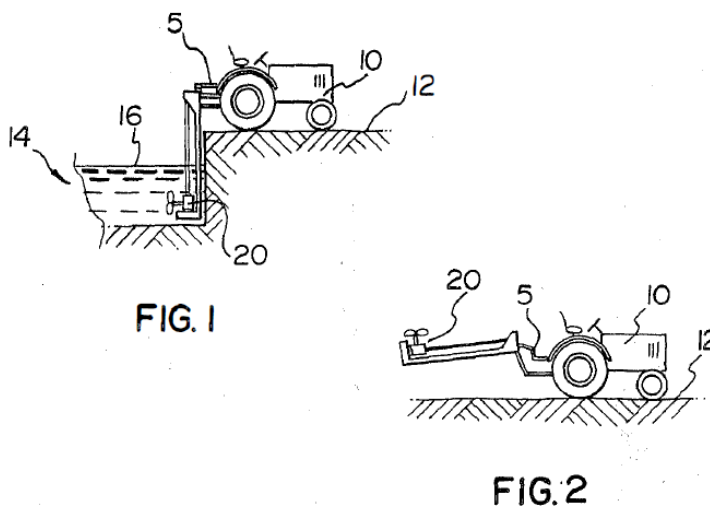
104. Group 4 – Manure Agitation Pumps (Manure-Manager, Houle, and Depault) teach a POSITA to locate a submersible manure pump at the lower end of a boom arm. The upper end of the boom arm opposite the manure pump is configured to be attached to the three-point mount on a tractor and the manure pump is powered/driven by the power-take-off (PTO) of the tractor.

105. Manure-Manager (EX1112) discloses Nuhn's "G-Force" a tractor mounted / tractor powered manure lagoon agitation pump assembly, which includes one of Nuhn's manure agitation pumps located on the far end of the boom arm while the other end of the boom arm is connected to the rear hitch of a farm tractor. The manure agitation pump is driven by the PTO of the tractor through a gearbox assembly in the boom arm:



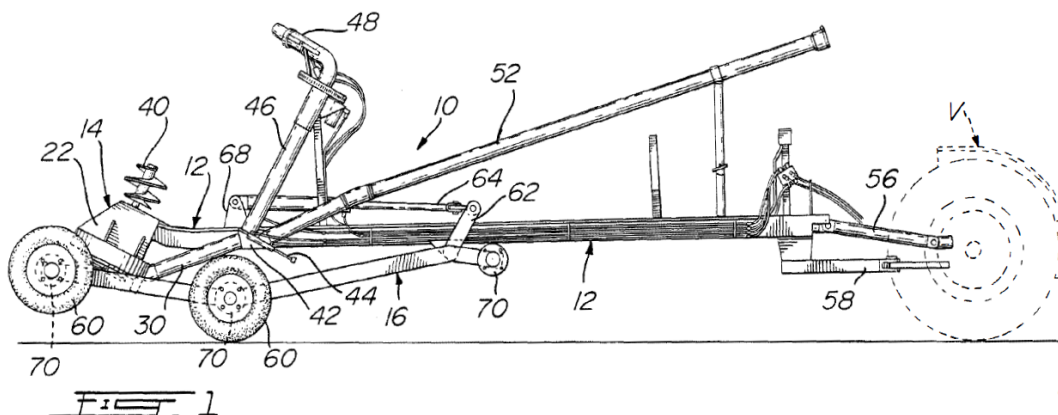
EX1112, p. 27.

106. US 4,406,413 to Houle (EX2010) discloses a tractor mounted / tractor powered manure lagoon agitation pump 20 that is mounted on the end of a boom arm. The manure agitation pump 20 is located on the far end of the boom arm while the other end of the boom arm is connected to the rear hitch 5 of a farm tractor 10:



EX2010, FIGS. 1-2.

107. CA2002619A1 to Depault (EX2017) discloses a tractor mounted / tractor powered manure lagoon agitation pump 14 that is mounted on the end of a boom arm 12. The manure agitation pump 14 is located on the far end of the boom arm 12 while the other end of the boom arm is connected to the rear hitch of a tractor V:



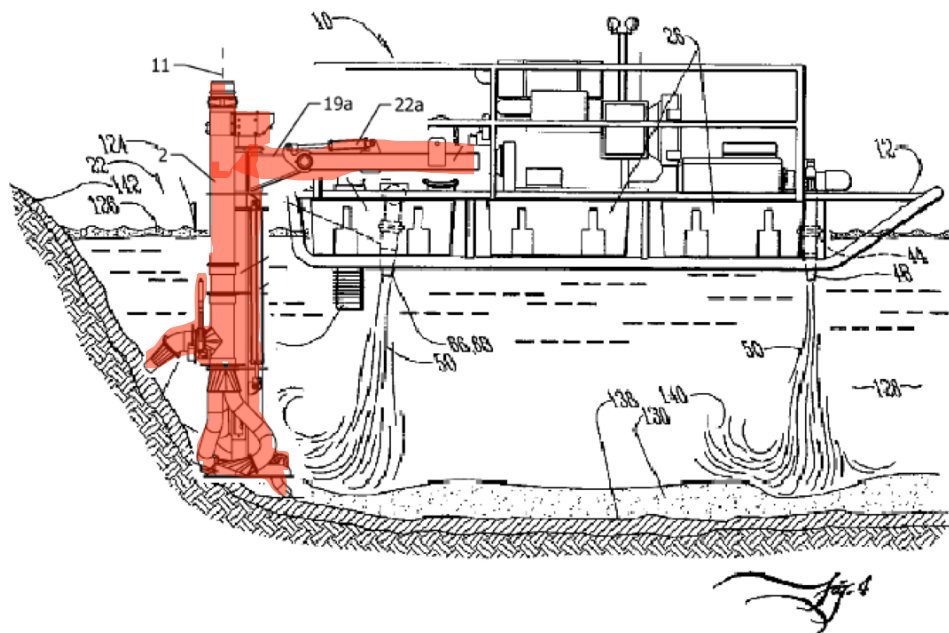
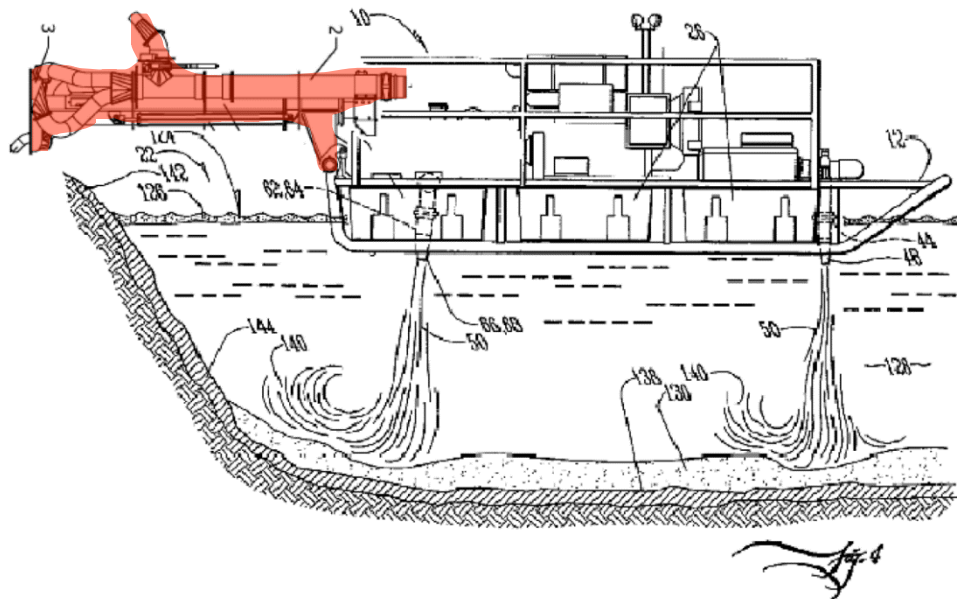
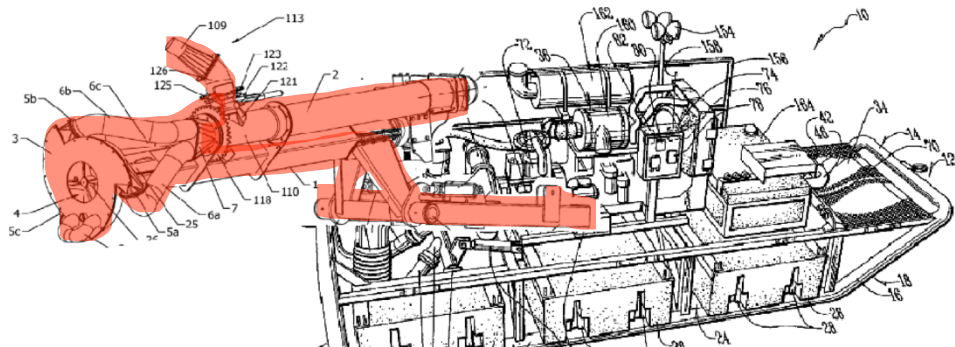
EX2017, FIG. 1.

108. A POSITA looking to the teachings of the Group 4 prior art (Manure-Manager, Houle, and Depault) when attempting to design a manure lagoon agitation vehicle would logically follow the disclosure in these references, which teaches placing a submersible manure pump on the end of a long boom arm that mounts to the rear of a vehicle body. The Group 4 prior art does not teach or suggest a hydraulically powered, immersible liquid manure pump, let alone the claimed arrangements where the liquid manure pump is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body, is immersed in the liquid manure when the vehicle is floating, has a substantially vertical drive shaft and a constant angular orientation relative to the floatable vehicle body, and/or is located in the space between the four ground engaging wheels, or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump.

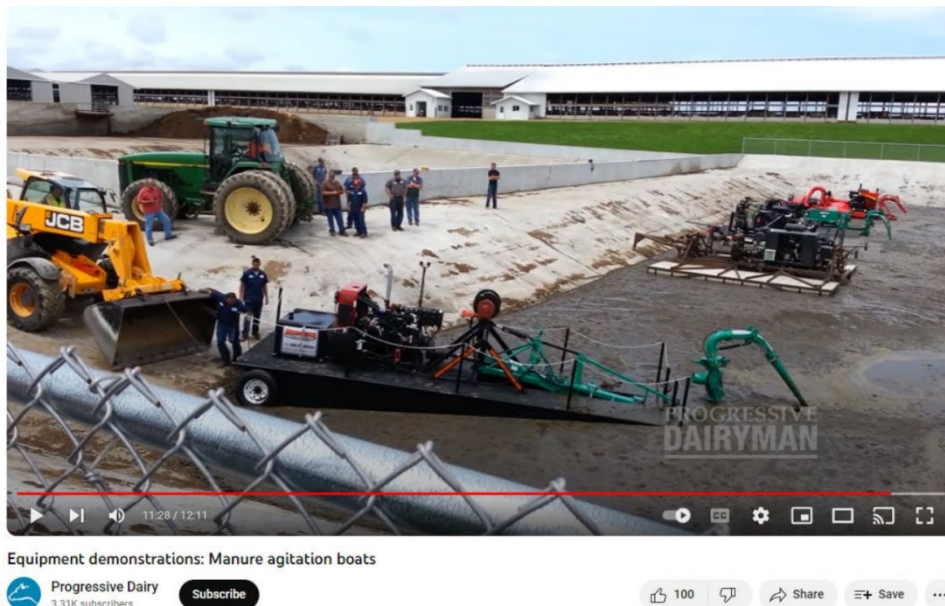
109. I disagree that a POSITA would look to the Group 1 references when designing a manure lagoon agitation vehicle, but regardless of that dispute, neither the Group 1 references (Carrier, Yoon, and Bryham) nor the Group 3 references (Puck and Sundstrom) teach a hydraulically powered, immersible liquid manure pump with a pump housing and that is positioned along or 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 front of the floatable vehicle body, as required by Substitute Claims 41, 57, 79, and 80. The only references that disclose an immersible liquid manure pump are Sundstrom and the Group 4 references (Manure Manager, Houle, and Depault). All of these references teach placing the liquid manure pump at the far end of a boom arm. The only other prior art that teaches immersible pumps are the Group 2 references (Truxor, SenwaTec, and Cheramie), which disclose dredge pumps on the far end of a boom arm. I disagree that a POSITA would look to the Group 2 references when designing a manure lagoon agitation

vehicle, but regardless of that dispute, if a POSITA were motivated to select an immersible pump, the prior art teaches placing the immersible pump at the far end of a boom arm rather than along the underside of the floatable vehicle at a location that is rearward of the front of the floatable vehicle body and forward of the front of the floatable vehicle body, as required by Substitute Claims 41, 57, 79, and 80. The submersible pump arrangements disclosed in the prior art (i.e., submersible pumps on the end of a boom arm) would also result in a vehicle where the pump can be tilted up and down relative to the floatable vehicle body, like the pumps disclosed in Truxor, SenwaTec, Cheramie, and Sunstrom, which fails the requirement in Substitute Claims 41, 57, 79, and 80 for the immersible liquid manure pump to have a constant angular orientation relative to the floatable vehicle body. Finally, none of the prior art teaches or suggests an arrangement where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump. As a result, it is my opinion that the prior art does not anticipate the subject matter of Substitute Claims 41, 57, 79, and 80 or render them obvious.

110. I disagree that a POSITA would add Bryham's wheels to Puck or a combination of Puck and Manure-Manager for the reasons discussed in my previous Declarations (EX2004, EX2029), but if a POSITA were to make the Petitioner's combination where the pump 34 in Puck were replaced by Nuhn's G-Force Vertical Pit Pump (which is advertised in Manaure-Manager), then the resulting combination would look like this:



111. My opinion in this regard is not based on speculation, but rather evidence of what others in the industry actually did in June of 2014, less than a year after the '835 Patent's August 19, 2013 priority date. For example, in June of 2014 Sundstrom Bros. Custom Fabrication LLC hung a manure pump that was designed to be mounted to and powered by a tractor off the end of a floating barge such that it could be tilted up and down.



EX2008, 8-9.

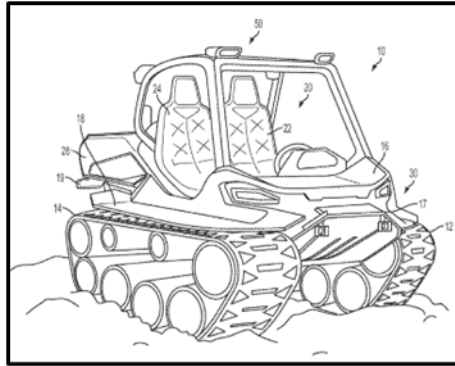
112. In view of the above analysis, if a POSITA were to add Nuhn's G-Force Vertical

Pit Pump to Puck's boat, that combination would result in a pump at the far end of an articulating boom arm hanging off the rear of Puck's boat so that it could swing up and down in the same manner as when Nuhn's G-Force Vertical Pit Pump is attached to a tractor. Thus, the combination of Manure-Manager with Puck and Bryham would not result in a vehicle where the liquid manure pump has a constant angular orientation relative to the floatable vehicle body or where the pump housing of the liquid manure pump is positioned along the underside of the floatable vehicle body at a location that is rearward of the front of the vehicle body and forward of the rear of the floatable vehicle body, as required by Substitute Claims 41, 57, 79, and 80. This same deficiency is present in Petitioner's combination of Sundstrom and Bryham.

113. Finally, neither the Puck-Bryham-Manure Manager Combination or the Sundstrom-Bryham Combination would result in an arrangement where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump. In the Puck-Bryham-Manure Manager Combination, there would be no submerged components or portions of the vehicle that are spaced from and positioned directly rearward of the pump housing. In the Sundstrom-Bryham Combination, there would be no submerged components or portions of the vehicle that are spaced from and positioned directly forward of the pump housing. As a result, it is my opinion that the prior art does not anticipate the subject matter of Substitute Claims 41, 57, 79, and 80 or render them obvious.

114. I have also considered a number of other prior art references that have been cited by the Petitioner and/or were cited during prosecution of the '835 Patent. These include Bennett-II, Carier II, and Bennett.

115. Bennett-II (EX1017) discloses the general-purpose manned amphibious vehicle pictured below:



EX1017, at 2. Bennett-II however does not disclose a pump, let alone an immersible liquid manure pump as required by the Challenged Claims.

116. U.S. Patent No. 7,478,817 to Carrier II (EX1020) discloses a similar vehicle to Carrier and shares some common portions of the specification with Carrier. Carrier II therefore does not remedy any of the failings of Carrier.

117. U.S. Patent Application Publication No. 2014/0288763 to Bennett (EX1016) is the parent application of and shares the same specification as Bennett-II, and therefore does not remedy any of the failings of Bennett-II, as described above.

118. Putting this all together, if a POSITA set out to design a new amphibious manure agitation vehicle utilizing a fluid pump, and had the knowledge and motivation to combine the art identified above (for arguments sake), they would have placed the pump either high and drying in the floatable vehicle body based on the teachings of the Group 1 prior art (Carrier, Yoon, and Bryham) and Puck or they would have placed the pump on the end of a boom arm at the front or back of the vehicle based on the teachings of Sundstrom, the Group 2 prior art (Truxor, SenwaTec, and Cheramie), and the Group 4 prior art (Manure-Manager, Houle, and Depault). The prior art does not teach or suggest a hydraulically powered, immersible liquid manure pump, where the liquid manure pump is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body, is immersed in the liquid manure when the vehicle is floating, has a substantially vertical drive shaft and a constant angular orientation relative to the floatable vehicle body, and/or is located in the

space between the four ground engaging wheels, or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump.

A. SUBSTITUTE CLAIMS 41-80 ARE PATENTABLE OVER CARRIER

119. It is my opinion that Substitute Claims 41, 57, 79, and 80 are patentable over Carrier. As noted above, Carrier discloses optional water pumps 202 for pumping water from a lake or stream onto a fire, not liquid animal manure contained in a farm lagoon, which includes suspended solids, is highly corrosive, and behaves as a non-Newtonian fluid when pumped. (EX1020 at Col. 10, ll. 51-56; EX2094, ¶¶93-119 and 144). Furthermore, the water pumps 202 and water cannon 204 of Carrier are illustrated as being located at the top of the vehicle above the water tank 201 as opposed to in the locations recited in the Substitute Claims (i.e., an immersible liquid manure pump (Distinguishable Elements [I] and [III]) that is positioned along the underside of the floatable vehicle body (Distinguishable Element [V]) and/or is located in the space between the four ground engaging wheels (Distinguishable Element [VI])). (EX1005 at p. 2). Carrier's pumps 202 are not described at component level detail so Carrier also fails to disclose a pump with a substantially vertical drive shaft and a bottom fluid opening in the pump housing (Distinguishable Element [II]) as recited in the Substitute Claims. Finally, Carrier fails to disclose the claimed arrangement where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to form a protective perimeter that functions to keep floating solid material away from the immersible liquid manure pump (Distinguishable Element [VII]).

**B. SUBSTITUTE CLAIMS 41-80 ARE PATENTABLE OVER
TRUXOR IN VIEW OF CARRIER OR YOON**

120. It is my opinion that Substitute Claims 41, 57, 79, and 80 are patentable over Truxor in view of Yoon or Carrier. As discussed above, Truxor discloses a quick-connect dredge pump attachment for dredging a lake or stream, not for pumping liquid animal manure contained in a farm lagoon, which includes suspended solids, is highly corrosive, and behaves as a non-Newtonian fluid when pumped. (EX1006; EX2094, ¶¶93-119 and 144). The pump of Truxor is forward of the front of vehicle at the end of a boom arm that is configured to accommodate quick-connect aquatic weed cutters (EX1006, pp. 6-7), rakes (EX1006, pp. 8-9), buckets and log grabbers (EX1006, p. 9), dredge pumps (EX1006, pp. 10-11), excavators (EX1006, p. 12), cultivators (EX1006, p. 13), and oil decontamination tools (EX1006, pp. 14-15). Yoon discloses a vehicle for use in waste-water treatment. (EX1011). The water pump 131 in Yoon is not designed to pump liquid manure out of a farm lagoon, which includes suspended solids, is highly corrosive, and behaves as a non-Newtonian fluid when pumped. (EX1011 at p. 8, ¶¶[0026] and [0150]; EX2094, ¶¶93-119 and 144). Furthermore, the water pump 131 of Yoon is located inside the main body 130 of the vehicle and is positioned high above the waterline (EX1011, p. 2). A combination of Truxor with Carrier or Yoon would therefore not result in a liquid manure pump where the pump housing is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body (Distinguishable Element [V]), is immersed in the liquid manure when the vehicle is floating (Distinguishable Element [III]), has a substantially vertical drive shaft (Distinguishable Element [II]) and a constant angular orientation relative to the floatable vehicle body (Distinguishable Element [IV]), and/or is located in the space between the four ground engaging wheels (Distinguishable Element [VI]), or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to keep floating solid material away from the immersible liquid manure pump (Distinguishable Element [VII]), as required by the Substitute

Claims.

**C. SUBSTITUTE CLAIMS 41-80 ARE PATENTABLE OVER
SENWATEC IN VIEW OF CARRIER OR YOON**

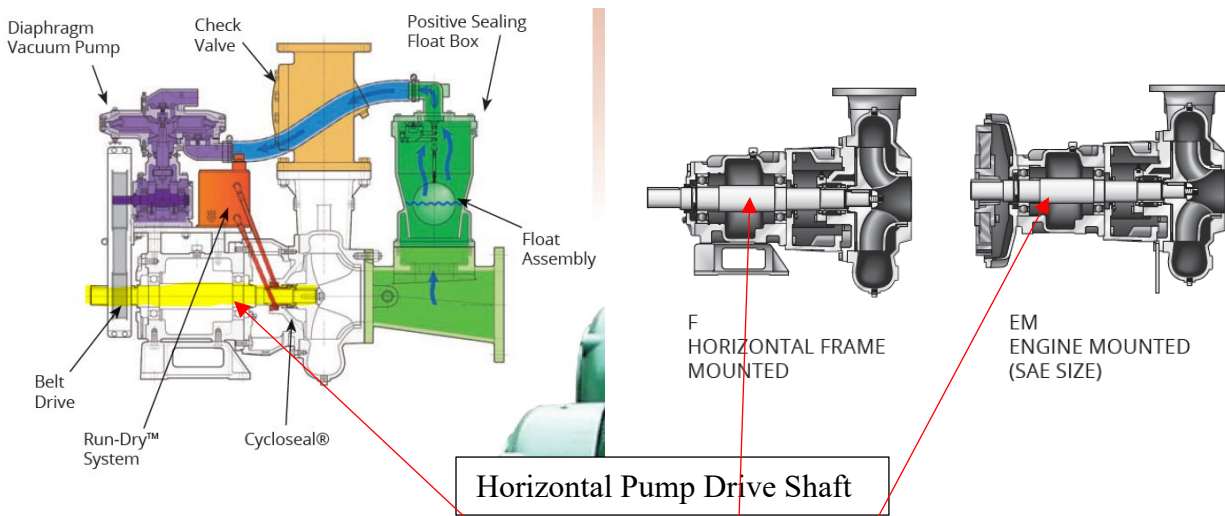
121. It is my opinion that Substitute Claims 41, 57, 79, and 80 are patentable over SenwaTec in view of Yoon or Carrier. As discussed above, SenwaTec discloses a quick-connect dredge pump attachment for dredging a lake or stream, not for pumping liquid animal manure contained in a farm lagoon, which includes suspended solids, is highly corrosive, and behaves as a non-Newtonian fluid when pumped. (EX1006; EX2094, ¶¶93-119 and 144). The pump of Truxor is forward of the front of the vehicle at the end of a boom arm that is configured to accommodate quick-connect aquatic weed cutters, rakes, buckets tree cutter and dredge pumps. (EX1012, p. 2). Yoon discloses a vehicle for use in waste-water treatment. (EX1011). The water pump 131 in Yoon is not designed to pump liquid manure out of a farm lagoon, which includes suspended solids, is highly corrosive, and behaves as a non-Newtonian fluid when pumped. (EX1011 at p. 8, ¶¶[0026] and [0150]; EX2094, ¶¶93-119 and 144). Furthermore, the water pump 131 of Yoon is located inside the main body 130 of the vehicle and is positioned high above the waterline (EX1011, p. 2). A combination of SenwaTec with Carrier or Yoon would therefore not result in a liquid manure pump where the pump housing is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body (Distinguishable Element [V]), is immersed in the liquid manure when the vehicle is floating (Distinguishable Element [III]), has a substantially vertical drive shaft (Distinguishable Element [II]) and a constant angular orientation relative to the floatable vehicle body (Distinguishable Element [IV]), and/or is located in the space between the four ground engaging wheels (Distinguishable Element [VI]), or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) spaced from and positioned directly forward of and directly rearward of the pump housing, to keep floating solid material away from the immersible liquid manure pump (Distinguishable

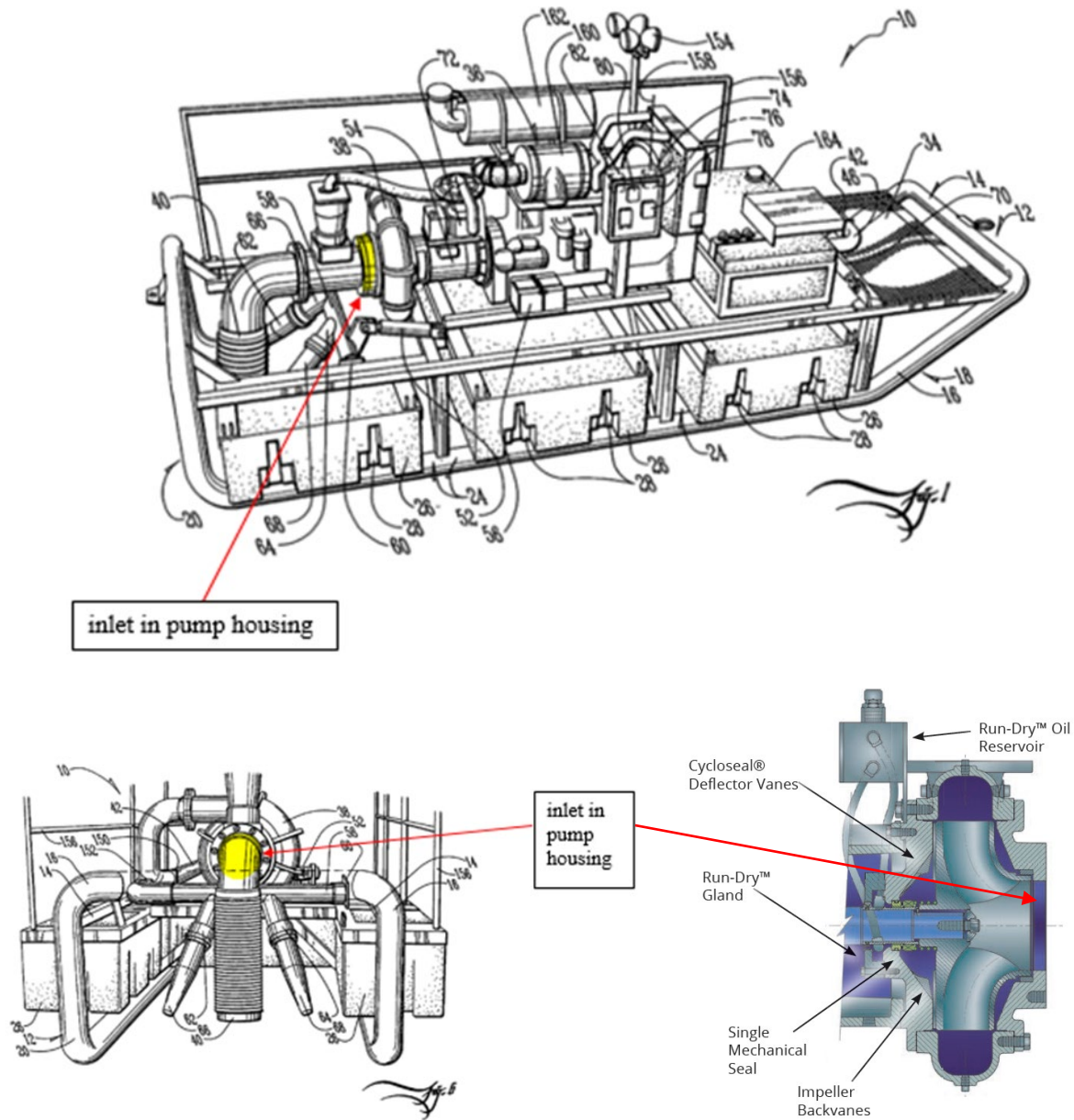
Element [VII]), as required by the Substitute Claims.

D. SUBSTITUTE CLAIMS 41-80 ARE PATENTABLE OVER PUCK IN VIEW OF BRYHAM (AND IN FURTHER VIEW OF BENNETT-II)

122. It is my opinion that Substitute Claims 41, 57, 79, and 80 are patentable over Puck in view of Bryham or Puck in view of Bryham and Bennett-II. As discussed above, Puck discloses an agitation boat including a slurry pump (38) that is illustrated inside the boat hull at a location that is high above the “waterline.” (EX1014). A liquid manure intake pipe (40) is positioned at the rear of the boat, with a ninety-degree bend so that the intake pipe extends down into the manure lagoon. (EX1014, FIGS. 1 and 8). The slurry pump (38) in Puck is mechanically powered by a horizontal drive shaft and has a rear-facing fluid opening in the back of the pump housing.

EX1143 at 2, 7.





[EX1014], Puck, pp. 2, 7, FIGS. 1 and 6 (pump housing annotations added); EX1143 at 7. The impeller and the pump housing of the slurry pump (38) in Puck are not located on the underside of the boat (Distinguishable Element [V]) and Puck's pump (38) is not immersed in the manure lagoon when the boat is floating (Distinguishable Element [III]). (EX1014, FIGS. 1 and 8). Bryham discloses a boat with amphibious wheels. (EX1015, Bryham, 2). A combination of Puck with Bryham would therefore not result in vehicle with a hydraulically powered, immersible liquid manure pump (Distinguishable Element [I]), much less an arrangement where the pump housing

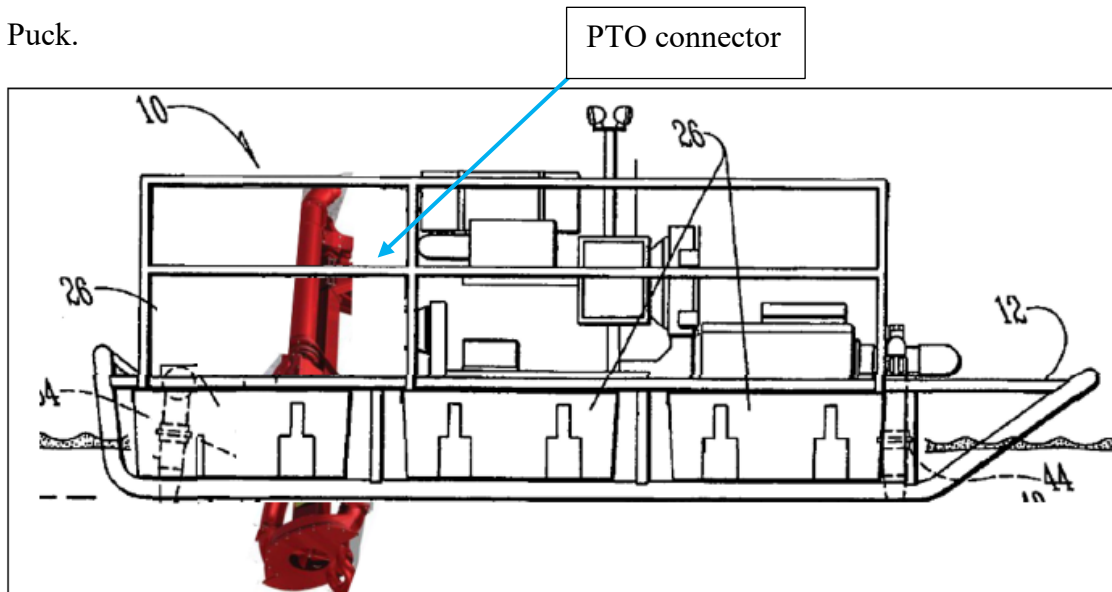
is positioned along the underside of the floatable vehicle body rearward of the front of the floatable vehicle body and forward of the rear of the floatable vehicle body (Distinguishable Element [V]), is immersed in the liquid manure when the vehicle is floating (Distinguishable Element [III]), has a substantially vertical drive shaft (Distinguishable Element [II]), and/or is located in the space between the four ground engaging wheels (Distinguishable Element [VI]), or where components / portions of the vehicle that are submerged when the vehicle is floating are: (1) spaced from and positioned to each side of the pump housing, and (2) 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(Distinguishable Element [V]), as required by the Substitute Claims.

123. In view of the discussion above, it is my opinion that a POSITA would not understand the prior art references cited by Petitioner in the invalidity Grounds of its IPR Petition to teach all the limitations of the Substitute Claims.

**E. SUBSTITUTE CLAIMS 41-80 ARE NOT OBVIOUS BASED ON
PUCK IN VIEW OF BRYHAM AND MANURE-MANAGER**

124. In the following section, I examine various elements of the ‘835 Patent and explain why at least Substitute Claims 41, 57, 79, and 80 are not rendered obvious by Puck in view of Bryham and Manure-Manager (“the Puck-Bryham-Manure-Manager Combination”), which is the first prior art combination that was asserted by Petitioner in its Opposition (Paper 36) to Patent Owner’s original Motion to Amend (Paper 21). Substitute Claims 42-56 depend from Substitute Claim 41 and Substitute Claims 58-78 depend from Substitute Claim 57 and are not rendered obvious by the Puck-Bryham-Manure-Manager Combination for at least the same reasons.

125. I disagree with Dr. Winkel's combination of Manure-Manager with Puck and Bryham because, as shown below, Dr. Winkel advocates mounting Nuhn's G-Force Vertical Pit Pump in a location that would be illogical to a POSITA based on the teachings of Manure-Manager and Puck.



EX1109, p. 82. The boom arm of Nuhn's G-Force Vertical Pit pump is approximately 10 feet long. Petitioner's arrangement is illogical because it would not permit Nuhn's G-Force Vertical Pit Pump to pivot/swing up and down so it would get in the way upon entry and exit of a manure lagoon. Petitioner's arrangement also places the PTO connector at the upper end of the boom arm high up far away from the crankshaft of Puck's power source. A POSITA would not think to make such an arrangement. Nor does Manure-Manager or Puck teach or suggest an arrangement where the pump housing and/or impeller of a liquid manure pump is positioned along the underside of the floatable vehicle body.

126. Manure-Manager teaches a POSITA to locate a submersible manure pump at the lower end of a boom arm. The upper end of the boom arm opposite the manure pump is configured to be attached to the three-point mount on a tractor and the manure pump is powered/driven by the power-take-off (PTO) of the tractor, which couples to a driveshaft located at the upper end of the

boom arm:

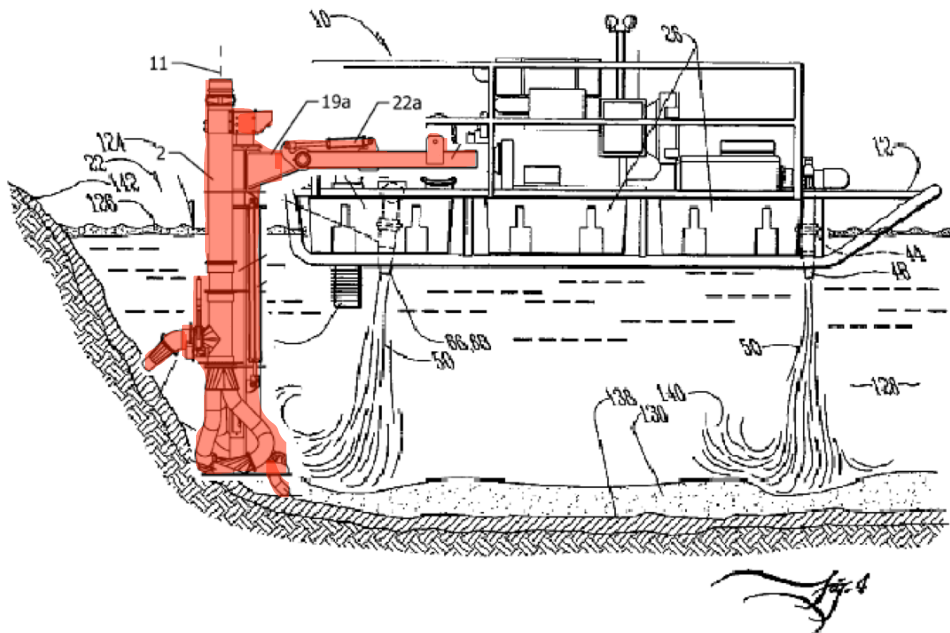
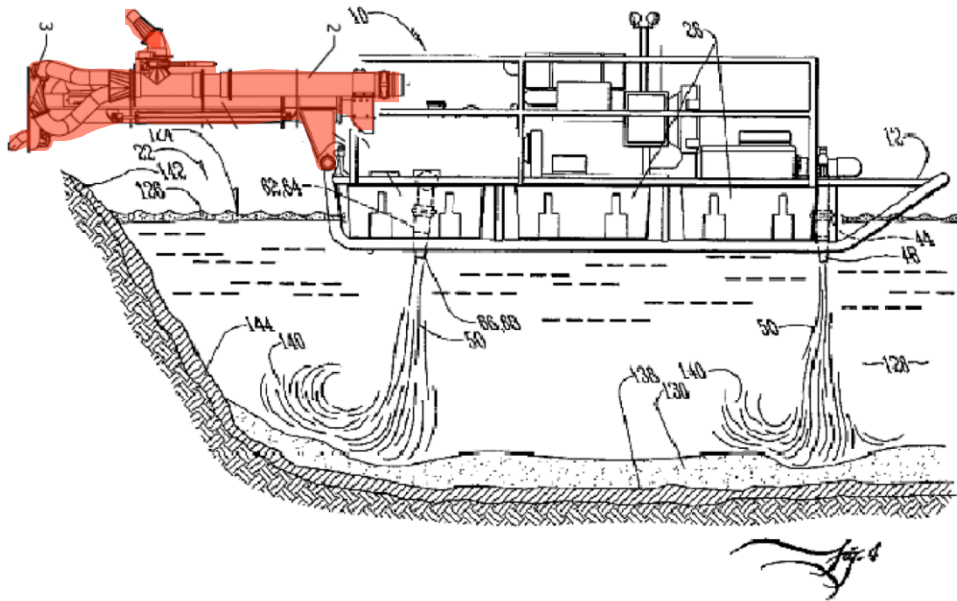
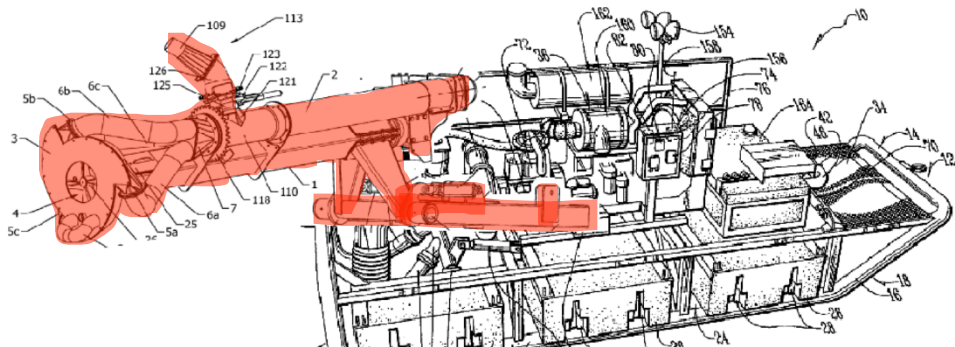


EX1088, p. 27.

127. A POSITA looking to the teachings Manure-Manager when attempting to design a manure lagoon agitation vehicle would logically attach the boom arm to the rear of a vehicle body in such a way that the boom arm could pivot so the lower end is immersed in the manure and the upper end can mate with a drive shaft to receive power. As will be shown below, what would have been logical to a POSITA is to attach the pivot of arm 19a to the rear crossbar 16, 20 in Puck so that Nuhn's G-Force Vertical Pit Pump could pivot up and down in a similar manner to the way it operates when attached to the rear hitch of a tractor and so that the PTO connector 29 on the upper end of the boom arm 1 of Nuhn's G-Force Vertical Pit Pump would be in near horizontal alignment

with the crankshaft of Nuhn's power source.

128. I disagree that a POSITA would add Bryham's wheels to Puck or a combination of Puck and Manure-Manager for the reasons discussed in my previous Declarations (EX2004, EX2094), but if a POSITA were to make the Petitioner's combination where the pump 34 in Puck were replaced by Nuhn's G-Force Vertical Pit Pump (which is advertised in Manaure-Manager), then the resulting combination would look like this:



129. In view of the above analysis, if a POSITA were to add Nuhn's G-Force Vertical Pit Pump to Puck's boat, that combination would result in a pump at the far end of an articulating boom arm hanging off the rear of Puck's boat so that it could swing up and down in the same manner as when Nuhn's G-Force Vertical Pit Pump is attached to a tractor. Thus, the combination of Manure-Manager and Puck would not result in a vehicle where the liquid manure pump "has a constant angular orientation relative to the floatable vehicle body" (Distinguishable Element [IV]) or a pump housing and impeller "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" (Distinguishable Element [V]), as required by the Substitute Claims.

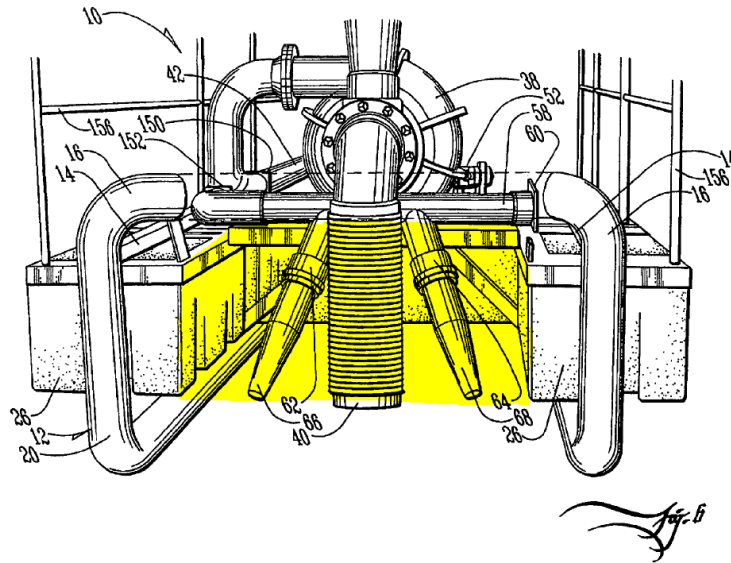
130. Petitioner's proposed combination is flawed because it assumes that a POSITA would skip past the most logical combination, as described above, which would be easier to implement and which is actually suggested by Sundstrom, where the liquid manure pump is mounted on the end of a pivoting boom arm, in favor of a more complicated and undisclosed arrangement that would require a substantial amount of re-design work to mount and power a vertically oriented manure pump positioned close to the bottom of Puck's boat. Such an arrangement is not suggested by the prior art and is purely hindsight based.

131. To implement Petitioner's proposed arrangement of Nuhn's G-Force Vertical Pit Pump on Puck's boat, a POSITA would be required to: (1) design a new mounting structure for the liquid manure pump and discard the mounting structure disclosed in Manure-Manager, (2) design a new drivetrain to power the liquid manure pump, since the drive shaft of the Nuhn pump would not be aligned with or at the same orientation as the output shaft of Puck's engine, and (3) design a new conduit system for carrying liquid manure from Nuhn's pump to Puck's nozzles. In my opinion, a POSITA would not have selected Petitioner's proposed arrangement in view of these obstacles (i.e., the extra design work involved to implement Petitioner's proposed arrangement) when a much simpler and easier to implement arrangement was available and was actually suggested by the art (e.g., Sundstrom). That simpler and easier to implement arrangement is the

one I have described and illustrated above, where the mounting structure, drivetrain, and pivoting boom arm of Nuhn's G-Force Vertical Pit Pump are retained.

132. I also disagree with Dr. Winkel that a POSITA would have been motivated to select Petitioner's proposed arrangement. According to Dr. Winkel, a POSITA would have been motivated to position Nuhn's G-Force Vertical Pit Pump near the center of Puck's boat to allow for a more centrally located center of gravity. EX1111, ¶112. But a POSITA would have understood that a vehicle's center of gravity depends on the combined weight and location of each component of the vehicle, so mounting Nuhn's G-Force Vertical Pit Pump to the rear of Puck's boat, as illustrated above, does not necessarily result in a center of gravity that is not near the center of the vehicle. Indeed, a POSITA would have understood that the weight of Nuhn's G-Force Vertical Pit Pump at the rear of Puck's boat would be offset by the weight of the power source (i.e., its John Deere Tier 3 diesel engine that is "preferably between one hundred fifty and two hundred fifty horsepower") (EX1014, ¶0024) at the front of Puck's boat.

133. Finally, even if Petitioner's combination were made, the resulting vehicle still fails to satisfy the limitations of the Substitute Claims. The rear of Puck's boat has a U-shaped cut-out between the floating dock sections (26) where the liquid manure intake pipe (40) is positioned, with a ninety-degree bend so that the intake pipe extends down into the manure lagoon.



EX1014, Fig. 6. Even if a POSITA positioned Nuhn's G-Force Vertical Pit Pump in this space, as Petitioner suggests, there would be no submerged components that "are spaced from and positioned ... directly rearward of the pump housing ... to keep floating solid material away from the bottom fluid opening in the pump housing" (Distinguishable Element [VII]), as required by the language of the Substitute Claims.

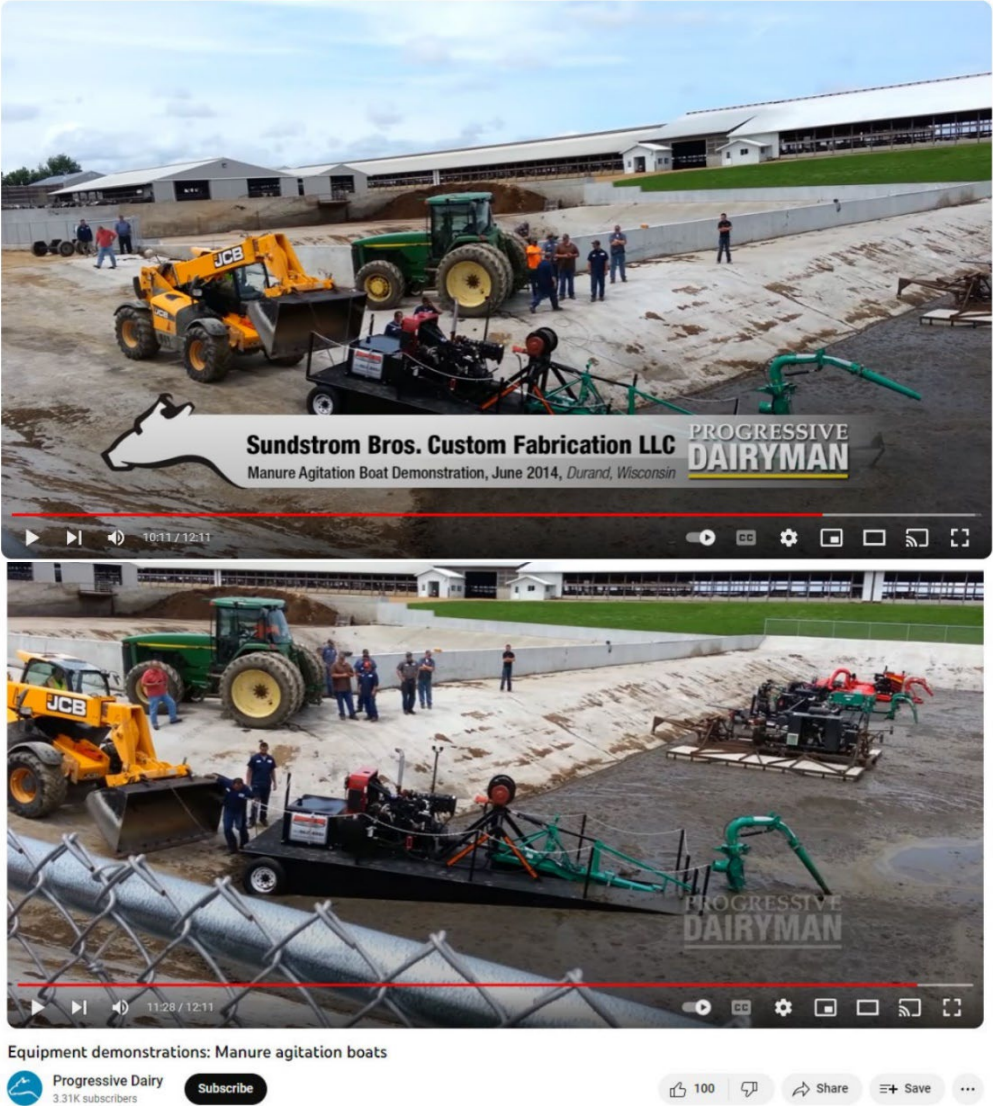
134. Additionally, because Puck and Manure-Manure both disclose mechanically driven pumps, Petitioner's combination would still fail to comprise a "hydraulically powered" liquid manure pump (Distinguishable Element [I]), as required by the Substitute Claims.

F. SUBSTITUTE CLAIMS 41-80 ARE NOT OBVIOUS BASED ON SUNDSTROM IN VIEW OF BRYHAM

135. In the following section, I examine various elements of the '835 Patent and explain why at least Substitute Claims 41, 57, 79, and 80 are not rendered obvious by Sundstrom in view of Bryham ("the Sundstrom-Bryham Combination"), which is the second prior art combination that was asserted by Petitioner in its Opposition (Paper 36) to Patent Owner's original Motion to Amend (Paper 21). Substitute Claims 42-56 depend from Substitute Claim 41 and Substitute Claims 58-78 depend from Substitute Claim 57 and are not rendered obvious by the Puck-Bryham-

Manure Manager Combination for at least the same reasons.

136. Sundstrom discloses a floating manure agitator with a liquid manure pump that is mounted on the front end of a boom arm and mechanically powered by a drive shaft. The boom arm extends forward at an angle that can be adjusted up and down to a limited degree.



EX2008, 8-9.



EX1156, at 1.

137. I disagree that a POSITA would add Bryham's wheels to Sundstrom in the first place because doing so would place complex and expensive drivetrain components in a submerged location in the liquid manure, where they would be prone to corrosion, damage, and leaks, but if such a combination were made, the result would still not satisfy the language of the Substitute Claims.

138. Sundstrom's liquid manure pump is mechanically powered by a drive shaft, that is substantially horizontal, and the boom arm supporting Sundstrom's liquid manure pump can tilt up and down to a limited degree. Therefore, Sundstrom's liquid manure pump is not "hydraulically powered" (Distinguishable Element [I]), does not have a "substantially vertical drive shaft" (Distinguishable Element [II]), and does not have "a constant angular orientation relative to the floatable vehicle body" (Distinguishable Element [IV]), as required by the Substitute Claims. Nor are the pump housing and impeller in Sundstrom "positioned along the underside of the floatable vehicle body at a location that is rearward of the front of the floatable vehicle body" (Distinguishable Element [V]), as required by the Substitute Claims. Also, because the pump

housing in Sundstrom hangs off the front of the barge, there are no submerged components of the vehicle that “are spaced from and positioned directly forward of ... the pump housing ... to keep floating solid material away from the bottom fluid opening in the pump housing” (Distinguishable Element [VII]), as required by the language of the Substitute Claims.

XI. CONCLUSION

139. Based on my analysis, it is my opinion that the cited art does not anticipate or render obvious any of the Substitute Claims presented in Patent Owner’s Revised Motion to Amend the ‘835 Patent.

140. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

Dated: November 12, 2024


Douglas S. Prairie