

Bazooka-Farmstar, LLC v. Nuhn Industries Ltd.

Case No.: IPR2023-01161
U.S. Patent No. 11,358,425



PETITIONER'S DEMONSTRATIVES
PTAB ORAL ARGUMENT
October 11, 2024

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

US011359425B1

(12) **United States Patent**
Nuhn

(16) **Patent No.** **US 11,358,425 B1**
(45) **Date of Patent:** ***Jun. 14, 2022**

(54) **AMPHIBIOUS PUMPING VEHICLE**

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(72) Inventor: **Ian Nuhn, Segringville (CA)**

(73) Assignee: **Nuhn Industries Ltd., Segringville (CA)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(d) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **17/890,125**

(22) Filed: **Feb. 1, 2022**

(58) **Field of Classification Search**

CPC B60F 3/00(1); B60F 3/00; B60F 2/01;00;
B60H 2/00; B60H 2/00S08; F04D
13/02; A61C 3/02; A61C 23/04S
See application file for complete search history.

(56) **References Cited**

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(57)

ABSTRACT

An amphibious vehicle has a double vehicle body; ground engaging propulsion structure having a plurality of ground engaging elements powered by a hydraulic motor; a fluid pump for pumping liquid medium; a power source connected to hydraulic pump and configured to provide power to both the ground engaging propulsion structure and the fluid pump; and remote control structure for controlling the ground engaging propulsion structure and a flow of fluid from the fluid pump. The speed and/or direction of the vehicle is remotely controllable by an operator remote from the vehicle when the vehicle is ground engaging and when the vehicle is floating.

21 Claims, 7 Drawing Sheets

Related U.S. Application Data

(63) Continuation of application No. 17/261,100, filed on Mar. 15, 2021, which is a continuation of application (Continued)

(51) **Int. Cl.**

B60F 3/00 (2006.01)

A61C 23/01 (2006.01)

A61C 3/02 (2006.01)

B60M 25/02 (2006.01)

F04D 13/02 (2006.01)

(52) **U.S. CL.**

CPC **B60F 3/0061** (2013.01); **A61C 3/025**

2013.01; **A61C 23/045** (2013.01); **B60F**

3/003 (2013.01); **B60F 3/0097** (2013.01);

B60F 3/0038 (2013.01); **B60M 25/02**

2013.01;

(Continued)

(58) **Field of Classification Search**
CPC B60F 3/0061; B60F 3/00; B60F 2301/00;
B63H 25/02; B63H 2025/028; F04D
13/02; A01C 3/026; A01C 23/045
See application file for complete search history.

(56) **References Cited**

The invention claimed is:

1. An amphibious vehicle comprising:

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inlet openings may be used. It is desirable that a single inlet opening is used with a large enough diameter to permit debris to pass through the pump without plugging the inlet. The inlet diameter is desirably at least one-half of the diameter of the pump housing, more desirably at least half of the diameter of the pump housing. By locating the inlet in the bottom of the housing, a relative shallower amount of fluid is required for pumping, permitting more complete drainage of the reservoir being pumped.

The combiner desirably directs fluid from the outlets upwardly along the body and towards a bottom end of the fluid conduit. The combiner desirably uses gradual bends to reduce the likelihood of pressure loss of the fluid, thereby improving overall pump efficiency. The combiner is desirably located between the housing and the bottom end of the fluid conduit, but can also be located elsewhere, for example near a top of the pump. In this case, it is desirable that flexible fluid conduits are employed in order to accommodate length variation of the pump body.

The pump may further comprise an agitator nozzle for directing a portion of the fluid passing through the pump outwardly from the pump and back towards a surface of the fluid reservoir. This desirably permits disruption of cake, blanket or foam formation on the surface of the reservoir. The agitator nozzle is desirably in fluid communication with the fluid conduit. The agitator nozzle may be connected to the fluid conduit by a rotatable nozzle body that permits rotation of the nozzle about the longitudinal axis. The pump may further comprise a nozzle orientation means for adjusting an angular relationship between the longitudinal axis and the nozzle. The nozzle orientation means may be mounted to the rotatable nozzle body. By permitting rotation and angular adjustment relative to the longitudinal axis, fluid exiting the nozzle can be directed towards any desired location on the surface of the reservoir, simplifying the task of disrupting cakes, blankets or foam on the surface. A flexible connection may be provided between the nozzle and the rotatable nozzle body.

According to another aspect of the invention, there is provided a pump for immersion within a fluid reservoir, the pump comprising: a frame; a telescoping pump body connected to the frame, the body comprising a telescoping fluid conduit, the body and conduit extendable along a longitudinal axis; a frame adjustment means for pivoting the telescoping pump body from a substantially horizontal transport position to a substantially vertical working position; a housing located at a bottom of the pump body comprising a bottom fluid inlet and at least two upwardly oriented tangential fluid outlets located on opposite sides of the body; a combiner for creating a fluid connection between the outlets and the telescoping fluid conduit, the combiner directing fluid from the outlets upwardly along the body and towards a bottom end of the fluid conduit; an impeller located within the housing having vanes shaped to direct the fluid tangentially and upwardly within the housing; a drive means for providing power to the impeller, the drive means extendible with the telescoping pump body; an agitator nozzle for directing a portion of the fluid upwardly from the pump back to a surface of the fluid reservoir; the agitator nozzle rotatable about the longitudinal axis; and, a nozzle orientation means for adjusting an exit trajectory of the nozzle.

According to yet another aspect of the present invention, there is provided a pump comprising an elongated fluid conduit aligned with the longitudinal axis of the pump, a housing at a bottom of the conduit containing an impeller for directing fluid through the conduit; an agitator nozzle in fluid communication with the conduit; and a nozzle orientation means for adjusting an exit trajectory of the nozzle.

Although described herein with reference to the pumping of liquid manure, the pump according to the present invention can be employed in any fluid pumping situation, particularly where reservoir with variable height are encountered, such as when pumping fluid from rivers, ponds, lakes, rain water storage reservoirs, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

Having summarized the invention, preferred embodiments thereof will now be described with reference to the accompanying figures, in which:

FIG. 1 shows a perspective view of a pump according to the invention in a transport position;

FIG. 2 shows a right side cut-away view of the pump of FIG. 1 in a working position;

FIG. 3a shows a left side cut-away view of the pump of FIG. 1 in a working position;

FIG. 3b shows a left side cut-away view of the pump of FIG. 1 in an extended working position;

FIG. 4a shows a side view of a pump housing according to the invention;

FIG. 4b shows a sectional view of the pump housing of FIG. 4a;

FIG. 5 shows an impeller of a pump according to the invention;

FIG. 6 shows an embodiment of a nozzle orientation means according to the invention in a first position;

FIG. 7 shows the nozzle orientation means of FIG. 6 in a second position;

FIG. 8 shows the nozzle orientation means of FIG. 6 in a third position;

FIG. 9 shows a perspective view of another embodiment of a pump according to the invention having two fluid outlets;

FIG. 10 shows a perspective view of yet another embodiment of a pump according to the invention having four fluid outlets; and

FIG. 11 shows a perspective view of yet another embodiment of a pump according to the invention, having an alternative nozzle orientation means.

DETAILED DESCRIPTION

Referring to FIG. 1, an embodiment of a pump according to the present invention is shown comprising a pump body 1 and an elongated fluid conduit 2 with a centrally located longitudinal axis 11. A pump housing 3 is mounted to a bottom end of the pump body and comprises a fluid inlet 4 located on a bottom thereof and three upwardly oriented tangential fluid outlets 5a, 5b, 5c evenly spaced about the circumference of the housing 3 for directing fluid upwardly along the body 1. The outlets 5a, 5b, 5c are connected to outlet conduits 6a, 6b, 6c that are in turn connected to a fluid combiner 7. The combiner 7 directs the flow from the outlet conduits 6a, 6b into the elongated fluid conduit 2, where it moves upwardly towards the conduit outlet 8. A flow control valve 10, comprising a hydraulically actuated gate valve, is flange mounted at the outlet 8. Fluid exiting the outlet 8 can be delivered to rigid or flexible conduit, depending on what is best suited to the application, attached to the pump via outlet connector 17.

Turning additionally to FIGS. 6 through 8, the fluid conduit 2 comprises a nozzle body 110 that is connected via an agitator nozzle 109, both of which are movable via a nozzle orientation means 113. The nozzle body 110 comprises a section of the fluid conduit 2 that is rotatable about a longitudinal axis 11

Although described herein with reference to the pumping of liquid manure, the pump according to the present invention can be employed in any fluid pumping situation, particularly where reservoirs with variable height are encountered, such as when pumping fluid from rivers, ponds, lakes, rain water storage reservoirs, etc.

“Claims must be read in light of the specification. That includes any patents incorporated by reference. ***Patents that are incorporated by reference are effectively part of the host patents as if they were explicitly contained therein.***”

Finjan LLC v. ESET, LLC, 51 F.4th 1377, 1382 (Fed. Cir. 2022) (cleaned up) (emphasis added)

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7 section 32 is such that the nozzles 13 may be rotated fully downwardly and then upwardly towards the front of the vehicle. This allows an operator to change the amount of forward movement to slow or even reverse forward movement of the vehicle. When operated in conjunction with the valves 15, the nozzles 13 and second articulation structure 14 provide a high degree of control over forward and reverse movement of the vehicle.

Referring to FIG. 7, the power source 7 comprises an internal combustion engine connected to a mechanical drive 8 that delivers power to the pump 9 (not shown in FIG. 7) and also to the hydraulic pump 10 that is used to provide hydraulic fluid pressure to the vehicle's hydraulic systems. A transmission is provided within the mechanical drive 8 that allows the rotational speed of the fluid pump 9 to be adjusted independently of the rotational speed of the hydraulic pump 10. The power source 7 is thus mechanically connected to both the fluid pump 9 and the hydraulic pump 10.

Referring to FIG. 8, the fluid pump 9 comprises a pump housing 18 comprising three tangential fluid outlets 19 that are connected via flexible pump outlet conduits 33 to a combiner 34 that is used to combine the fluid output of the tangential fluid outlets 19 into the single conduit 26. A pump actuation cylinder 25 is provided to cause raising and lowering of the pump 9 and especially the pump housing 18 relative to the vehicle body 1. A telescoping pump support structure 36 is provided for use in combination with the pump actuation cylinder 25. A mechanical drive shaft (not shown) runs through the telescoping pump support structure 36 to provide power to the pump impeller 37. When powered, the impeller 37 draws the fluid to be pumped through an enlarged bottom fluid opening 38 of the pump housing 18. By immersing the pump housing 18 in the fluid, fluid is allowed to enter the pump housing, thereby obviating the need for priming the pump. Raising the pump 9 via the pump actuation cylinder 25 and telescoping pump support structure 36 allows the vehicle to exit the lagoon (or similar fluid reservoir) without damaging the pump. Thus, these structures cooperate with the ground engaging propulsion structure to allow the vehicle to operate on land.

As an example of a pump 9 suitable for use with the vehicle is disclosed in co-pending U.S. patent application Ser. No. 13/038,189 filed Mar. 1, 2011, entitled Pump for Lagoon/Water/Flood Reservoir, which is incorporated herein by reference.

The location of at least the ground engaging propulsion structure, the power source and the fluid pump are selected to provide a desired location for a center of gravity of the vehicle. The desired location for the center of gravity of the vehicle is selected to improve handling characteristics of the vehicle while floating. The center of gravity is located along the longitudinal centerline of the vehicle, substantially in the middle of the vehicle.

A remote control structure 40 comprises an antenna configured to cause the vehicle to be remotely controllable by an operator remote from the vehicle. The remote control structure comprises a wireless transmitter used by the operator and a wireless receiver on the vehicle. The wireless receiver interfaces with a hydraulic control center on the vehicle to permit control of hydraulically operated components, such as hydraulic cylinders, valves, motors, etc. This allows the operator to control vehicle speed and direction on land or when floating, to raise the wheels and to change the angular orientation of the first and second fluid nozzles. A wireless engine starter is provided to control operation of the internal combustion engine used as a power source. A set of

8 hydraulic controls is optionally provided to modulate engine speed and/or fluid pump rotational speed. Thus, a variety of functions may be controlled remotely that allow the vehicle to operate on land or when floating.

In operation, an operator uses the remote controls to maneuver the vehicle to the lagoon entrance, drive the vehicle into the lagoon, raise the ground engaging propulsion structure (wheels), lower the fluid pump, begin pumping fluid with the fluid pump through the fluid conduits and selectively open at least the second fluid nozzles to cause the vehicle to move out on to the surface of the lagoon. The valves associated with the side fluid nozzles may also be opened or closed to provide directional control of the vehicle on the lagoon. Once the vehicle is in the desired position, the valves associated with the first fluid nozzle are opened and the first articulation structure is used to position the first fluid nozzle at a desired angular orientation relative to the vehicle body. This is generally an upward orientation so that the fluid is sprayed widely to break crumb of material floating on the surface of the lagoon. In this manner, fluid is recirculated and directed to desired locations in the lagoon. As fluid is emptied from the lagoon, the floating vehicle is permitted to lower with the fluid level. When the lagoon has been sufficiently emptied, the operator is able to reverse the foregoing process in order to maneuver the vehicle to the lagoon exit, lower the wheels, and drive the vehicle up the muddy bank out of the lagoon.

The novel features will become apparent to those of skill in the art upon examination of the description. It should be understood, however, that the scope of the claims should not be limited by the embodiments, but are intended by the inventor to be given the broadest interpretation consistent with the wording of the claims and the specification as a whole.

The invention claimed is:

1. An amphibious vehicle comprising: a floatable vehicle body; ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor; a fluid pump for pumping liquid nature; a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; 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 nature from the fluid 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.
2. The vehicle of claim 1, wherein the vehicle further comprises a conduit fluidly connected to the fluid pump.
3. The vehicle of claim 2, wherein the conduit comprises an opening at an end thereof.
4. The vehicle of claim 3, wherein the wireless remote control is configured to control an orientation of the opening.
5. The vehicle of claim 4, wherein the vehicle further comprises a nozzle at the end of the conduit.
6. The vehicle of claim 2, wherein the vehicle further comprises a nozzle at the end of the conduit.
7. The vehicle of claim 4, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid motor.
8. The vehicle of claim 1, further comprising a plurality of fluid nozzles fluidly connected to the fluid pump.

Claim 1: Amphibious Vehicle comprising:

- Floatable vehicle body
- Ground engaging propulsion structure
- Fluid pump
- Power source
- Wireless remote control

Dependent claims add common elements, well-known in the prior art, such as fluid conduits, nozzles, and wheels.

Amphibious/Pumping Vehicles Were Not New



Truxor (2012)

Amphibious/Pumping Vehicles Were Not New



SenwaTec (2012)



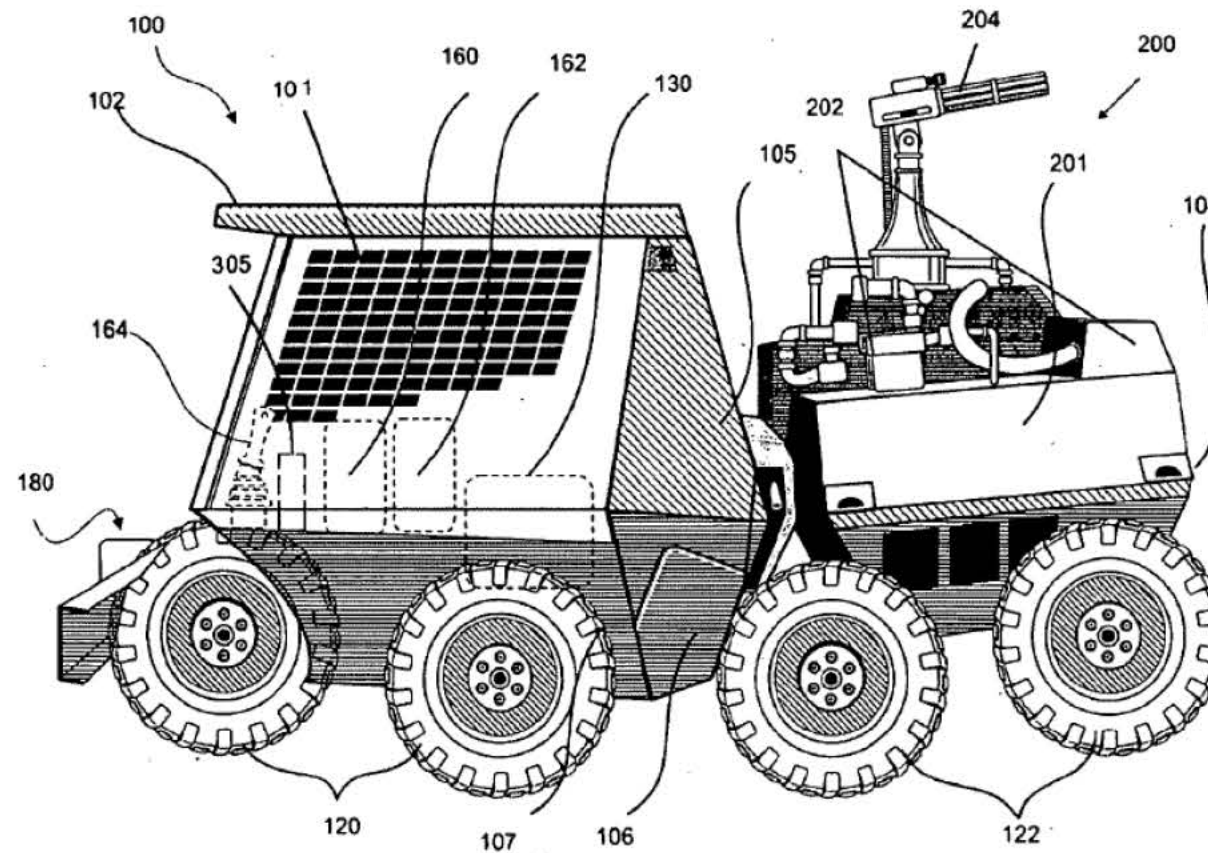
EX1012, 2; EX1081

Amphibious/Pumping Vehicles Were Not New



Sundstrom (2006)

Amphibious/Pumping Vehicles Were Not New



Carrier (2012)

EX1005, FIG. 1

Amphibious/Pumping Vehicles Were Not New



Sealegs/Bryham (2008)

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&G
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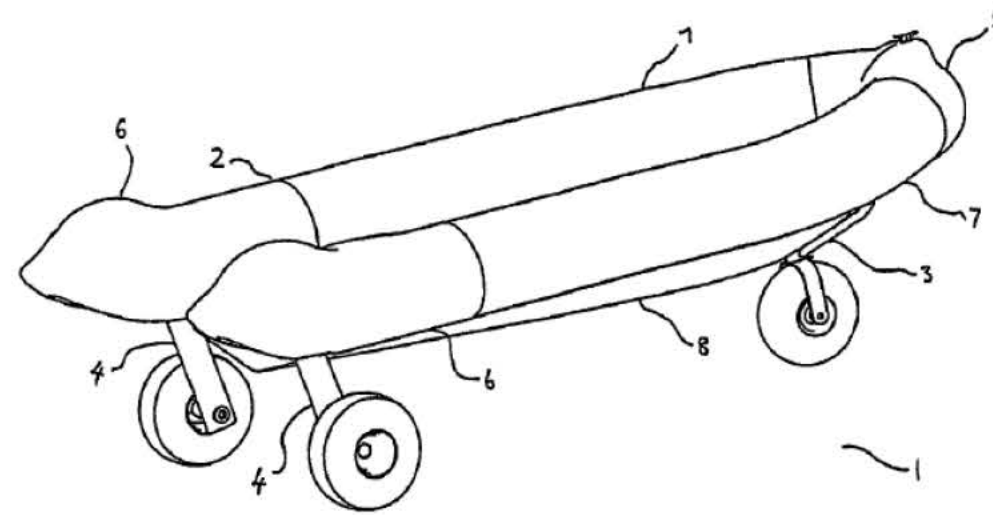
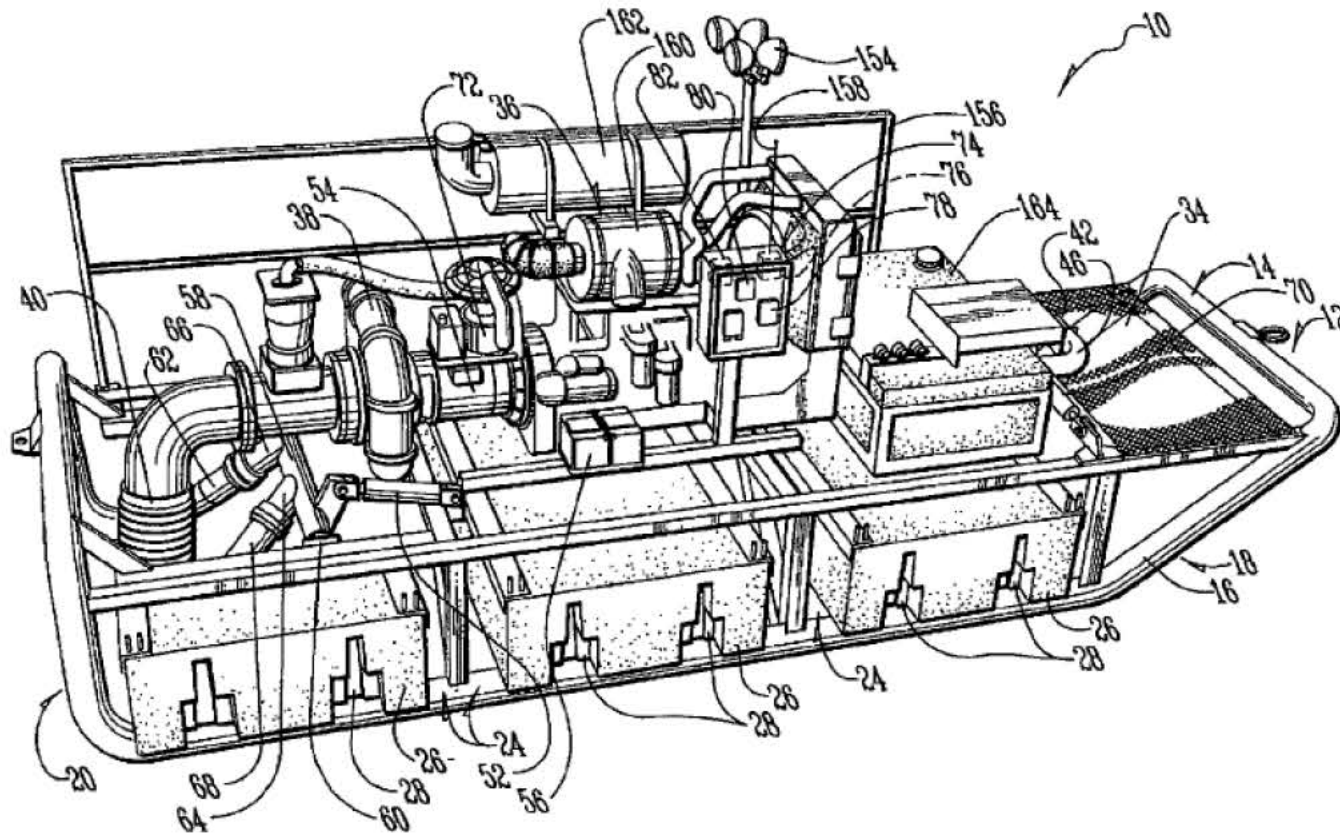


Figure 1

EX1015, FIG. 1
EX1120

Amphibious/Pumping Vehicles Were Not New

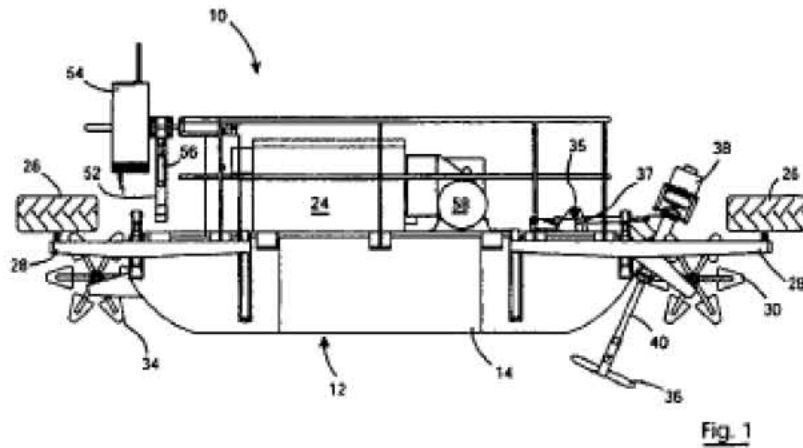


Puck (2011)

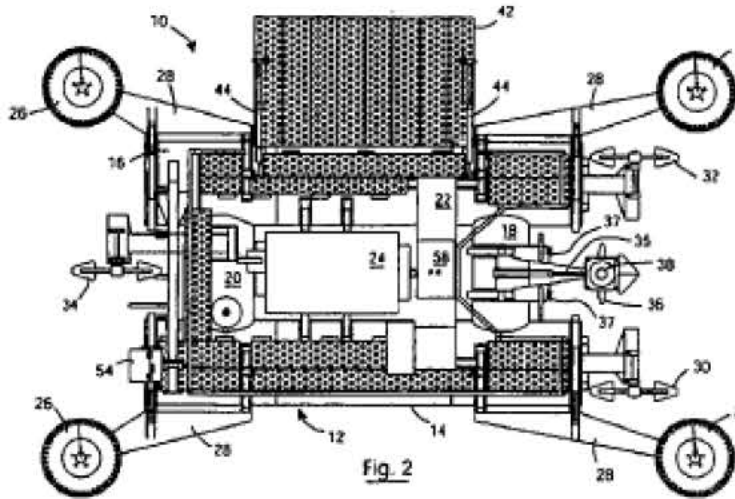


EX1014, FIG. 1
EX1119

Amphibious/Pumping Vehicles Were Not New



Bradley (2000)



- Remote control
- Amphibious vehicle (hovercraft)
- Pumps / jets



Forms of Manure

- Industry uses different terminology to refer to manure based on solid content:
 - Solid
 - Semisolid
 - Slurry
 - Liquid



Solid Manure



- Solid manure has high solid contents and cannot be pumped.

Figure 12-24 Moveable gutter cleaner conveyor stacker
(Photo courtesy of Patz Corp.)



- Usually applied to land with box-type spreader.



Figure 2. This box-type spreader is equipped with a chain-driven conveyor to move solid manure to the beaters for rear discharge.

EX1066, 34
EX1041, 2

Liquid Manure



- Lowest solid content manure.
- Diluted by washing manure into lagoons with water.



Figure 9. To prevent intake of floating debris, suspend an irrigation pump intake about 2 feet below the surface of a lagoon.



Liquid Manure Land Application

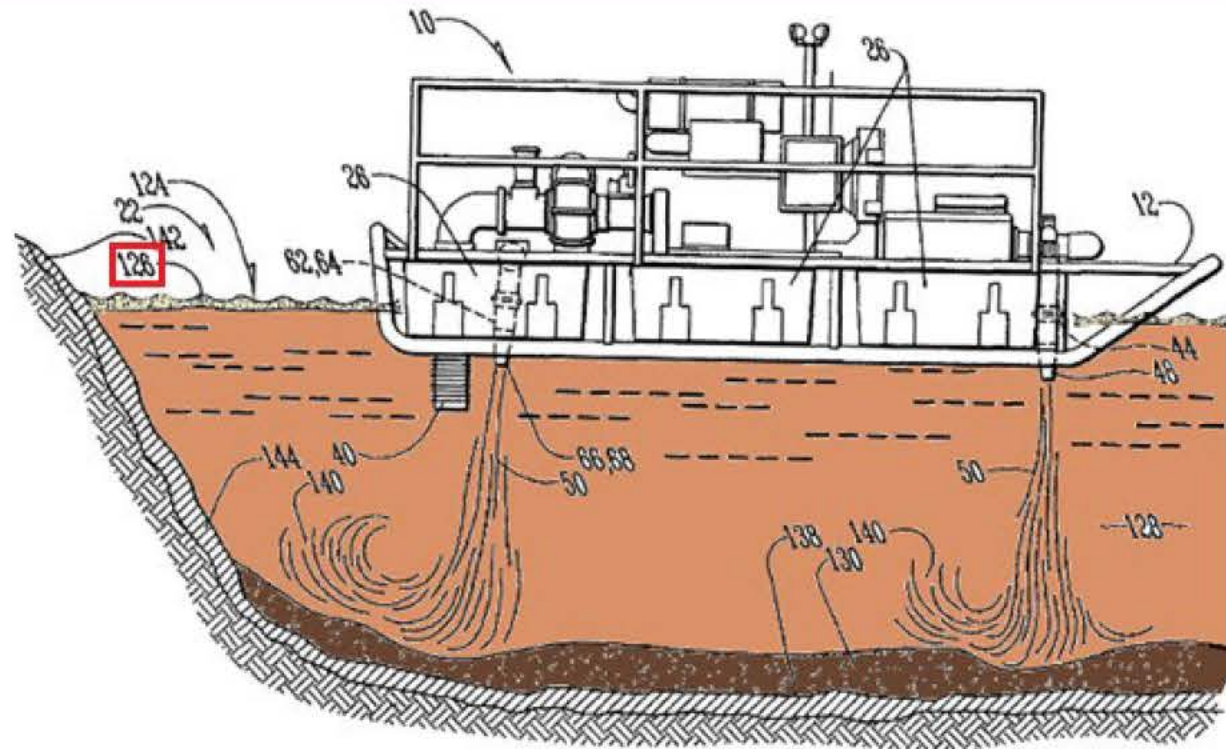
- Pumped with standard irrigation equipment due to low solid content.

Liquid manure from animal husbandry operations, particularly pig farming operations, is typically stored in a large manure reservoir or lagoon until there is a sufficient quantity available to spread or irrigate onto farm land for disposal. In The '758 Patent (incorporated-by-reference into the '425 Patent)



Figure 5. Traveling guns are a common means of irrigating lagoon effluent onto fields.

Stratification in Liquid Manure Lagoons



- Manure in lagoons stratifies into layers.
- Broken down by bacteria.
- Sludge layer at the bottom (dark brown).
- Watery liquid manure layer above the sludge layer (light brown).
- Occasionally, fiber materials excreted by some animals form crust on the top.
- Agitation used to break crust and stir up sludge layer into a uniform liquid manure mixture.
- Crusts do not occur on pig manure.

EX1112, ¶¶21-23
EX1014, ¶¶[0003]-[0004], [0034], FIG. 4
EX1115, ¶6



Early Agitation – Tractor Mounted Pumps and Propellers

- Early on, manure lagoons were agitated using tractor mounted agitation pumps and nozzles operated from lagoon banks.
- Ineffective for agitating larger lagoons.



Figure 11. This PTO-powered, high-capacity pump can either fill tankers or bypass effluent to agitate a lagoon, or both.



EX1001, 1:41-49
EX1026, 6



Fluid Pumps Used to Pump Liquid Manure



Figure 5. Traveling guns are a common means of irrigating lagoon effluent onto fields.



Figure 9. To prevent intake of floating debris, suspend an irrigation pump intake about 2 feet below the surface of a lagoon.

Fluid Pumps Used To Pump Liquid Manure



FISHER PUMPS

IRRIGATION.....MANURE HANDLING.....FLOOD CONTROL.....AERATION

**Fisher Pumps is a low maintenance, submersible centrifugal
with a variety of pump styles to meet your needs!**

Some design features are:

Double discharge design equalizes pressure & maximizes horsepower!

All bearings above water level...No oilers to fill daily!

Constructed of 1/4" & 3/8" steel with heavy walled tubing

On site test pit to insure performance prior to shipment!

No Priming....Self Draining....No Seals

Visit us at World Dairy Expo
Booths #EH-S07 & S08

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Fisher Pumps
2024 E. 8th St.
Greeley, CO. 80631
PH# 970-353-6962 Fax# 970-353-0839
Web Site : www.fisherpumps.com



Vertical Set Belt Drive Pumps



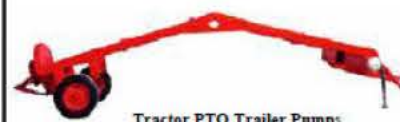
Vertical Set Direct Drive Pumps



Electric Drive Aeration Pumps



Electric Drive Floater Pumps



Tractor PTO Trailer Pumps



Portable Hydraulic Driven Pumps

“Due to the design and efficiency of Fisher Pumps, they are considered **high volume/low pressure** units requiring low horsepower requirements. Fisher Pumps can pump any fluid that will flow and are used for irrigation, flush tank filling, manure/sewage lagoons, dewatering and other such applications.”

EX1089, 23
EX1090, 2

Fluid Pumps Used To Pump Liquid Manure



Table 3.2 Liquid manure handling pumps

Pump type	Maximum solids content (%)	Agitation ability	Agitation range (ft)	Available pumping rate (gpm)	Available pumping head (ft of water) ^a	Power requirements (hp)	Applications
Centrifugal Open & semi-open impeller: Vertical shaft chopper	10–12	excellent	50–75	1,000–3,000	25–75	65+	gravity irrigation, tanker filling, pit agitation, transfer to storage
Centrifugal Inclined shaft chopper	10–12	excellent	75–100	3,000–5,000	30–35	60+	earthen storage agitation, gravity irrigation, tanker filling
Centrifugal Submersible transfer pump	10–12	fair	25–50	200–1,000	10–30	3–10	agitation, transfer to storage
Centrifugal Closed impeller	4–6+	fair	50–75	500+	200+	50+	recirculation, sprinkler irrigation, transfer to distant storage ^b
Elevator	6–8	none	0	500–1,000	10–15	5+	transfer to storage
Helical screw	4–6	fair	30–40	200–300	200+	40+	agitation, sprinkler irrigation, transfer to storage, holding pond and lagoon pumping, tanker filling, no foreign objects
Piston Hollow piston	16–18	none	0	100–150	30–40	5–10	transfer cattle manure without long fibrous bedding
Piston Solid piston	16–18	none	0	100–150	30–40	5–10	transfer cattle manure with unchopped bedding
Air-driven Self-loading vacuum tanker	8–10	poor	20–25	200–300+	N/A	50+	tanker loading
Air-driven Pneumatic	12–15	none	0	100–150	30–40	—	transfer to storage

Table 3.2 Liquid manure handling pumps

Centrifugal Closed impeller	4–6+
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Helical screw	4–6
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Piston Solid piston	16–18
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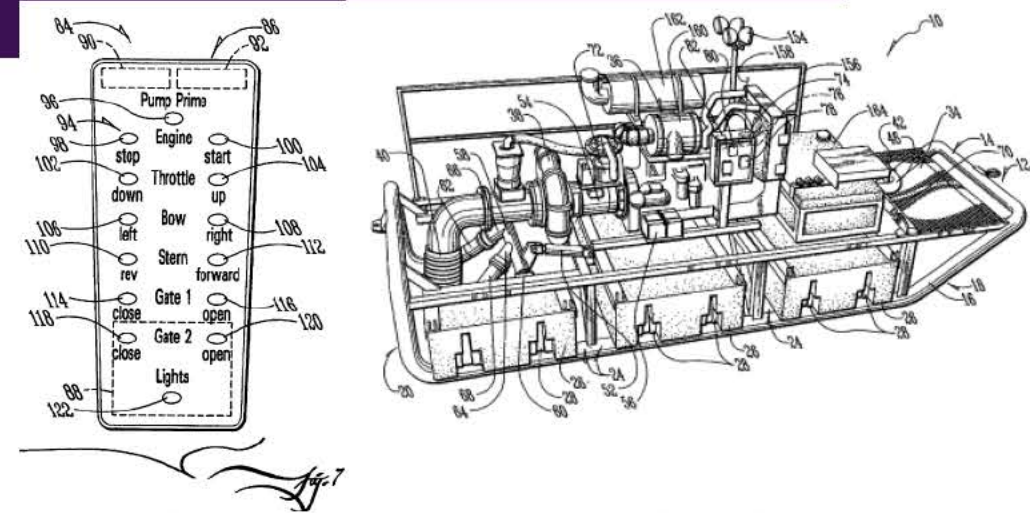
DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

EX1040, 52

Agitation – Remote Control Pumping Vehicles



- Puck (EX1014) and Sundstrom (EX1115).
- Floating vehicles for agitating large lagoons.
- Remote control.
- Nozzle agitation.



EX1014, FIGS. 1, 6, and 7
EX1115, 3

Agitation – Amphibious Pumping Vehicles



- SenwaTec (EX1012).
- Amphibious pumping vehicle.
- Used to agitate manure lagoons. *See* EX1027; EX1081-EX1084; EX1093-EX1096.



U.S. Patent No. 11,358,425



1. An amphibious vehicle comprising:
 - a **floatable vehicle body**;
 - a **ground engaging propulsion** structure comprising a plurality of ground engaging elements powered by a hydraulic motor;
 - a **fluid pump** for pumping liquid manure;
 - a **power source** connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump;
 - 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 fluid 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.



Level of Ordinary Skill in the Art (POSA)

- PTAB found Petitioner's POSA definition "most closely aligning with the problems and solutions in the '425 Patent and prior art of record."
- Claims are directed to an ***amphibious vehicle***.
- "Claims are not limited to manure lagoons."



Level of Ordinary Skill in the Art (POSA)

- A POSA 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 POSA would have had a working knowledge of fluid pumps and livestock manure. Lack of work experience can be remedied by additional education, and vice versa.



Patent Owner's Expert Is Not a POSA

- Nuhn admits Mr. Prairie has no professional experience with marine vehicles. Paper 58 at 4.
- Yet he offers extensive opinions on marine vehicle concepts.
 - EX2029, ¶¶157-165, 168, 170, 180, 182, 207-208, 220-224, 235-240, 267, 274-280, 291-295, 312-317, 320, 365-370, 373; EX2099, ¶¶110-115, 155-178, 187-231, 257-272, 288-304, 316-317, 331-335, 350-355, 356-368.



Patent Owner's Expert Is Not a POSA

- Mr. Prairie's opinions are incorrect and irrelevant:
 - Intent-based pump definition is wrong.
 - Could not (or would not) identify what pump structure is required to pump liquids with suspended solids.
 - Could not interpret the prior art.
 - Could not identify the components of a centrifugal pump.



Claim Construction

- "A fluid pump *for pumping liquid manure*"
- "Fluid mover"



"For Pumping Liquid Manure" Is a Statement of Intended Use

- ***"Patent Owner does not provide argument at this stage as to what specific structure is required to pump a liquid which includes suspended solids. . . . We encourage the parties to further develop this argument[.]" Paper 12 at 12.***
- Statements of intended use are ***non-limiting unless tied to specific structure.***
 - *Textron Innovations Inc. v. Am. Eurocopter Corp.*, 498 F. App'x 23, 28 (Fed. Cir. 2012).



"For Pumping Liquid Manure" Is a Statement of Intended Use

- Pump with a structure that is capable of pumping liquid manure (i.e. liquid with suspended solids):
 - Nuhn offers no structure to meet this limitation
 - Nuhn and its expert focus on intended function, not structure:

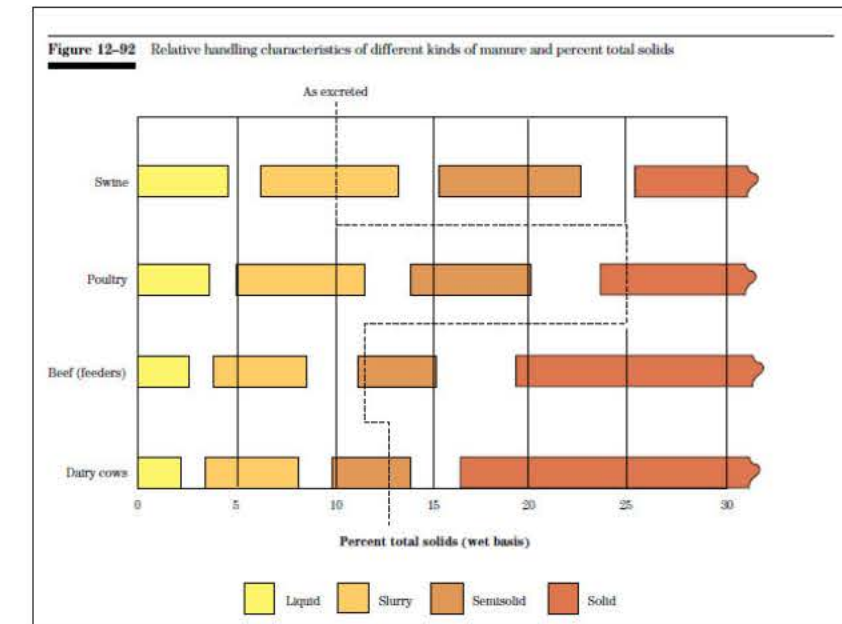
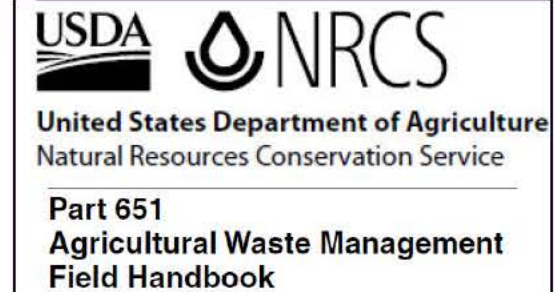
Q. Can you name a difference between a pump that pumps liquid manure and a pump that pumps water in terms of the pump's structure?

A. The pump has to be capable of handling -- a liquid manure pump has to be capable of handling liquid, solids, a slurry mixture that comes from an animal livestock waste facility. That is what is from the capabilities of a liquid manure pump needs to be capable of doing.

High Volume Water Pumps Pump Dilute Manure Embodiments



- Bazooka's liquid manure construction:
 - "Mixture of water and animal waste with a solid content of about less than 5%."
- Nuhn's liquid manure construction:
 - Nuhn concedes its construction of "liquid manure" includes embodiments with less than 5% solid.
 - Instead focuses on upper limit.



EX1020, 89
 EX1108, 256:2-15
 EX1111, 186:3-24



High Volume Water Pumps Pump at Least Dilute Liquid Manure Embodiments

- “Inherency ***does not require*** the prior art’s disclosure be ***coextensive with*** and mirror [***the claim’s***] ***full scope***[.]”
- Instead, “the [prior art] must have sufficiently described and enabled ***at least one embodiment that necessarily featured or resulted in the subject matter embraced by the claim***[.]”
 - *Reactive Surfaces Ltd. LLP v. LG Chem Ltd.*, IPR2018-01520, Paper 44 at 50 (PTAB Feb. 24, 2020) (emphasis added).



High Volume Water Pumps Pump at Least Dilute Liquid Manure Embodiments

- High-volume water pumps pump low solid content liquid manure and meet this limitation.
- Carrier, Truxor, and SenwaTec include structures capable of pumping liquid manure.



"Fluid Mover" Means "Pump, Conduit, and Nozzle"

- "Fluid Mover"
 - Function = Moving Fluid.
 - "Corresponding structure ... must include all structure that actually performs the recited function."
 - *Default Proof Credit Sys. v. Home Depot USA, Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005).
 - "Valves and nozzles" lacks any structure (i.e. a pump) to move fluid.



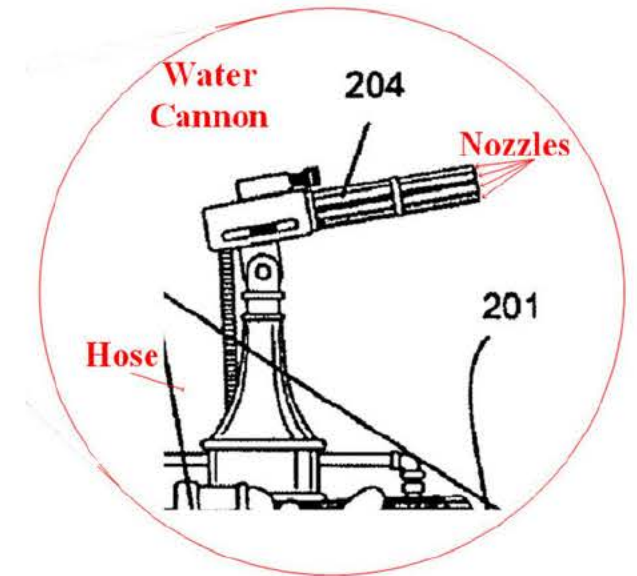
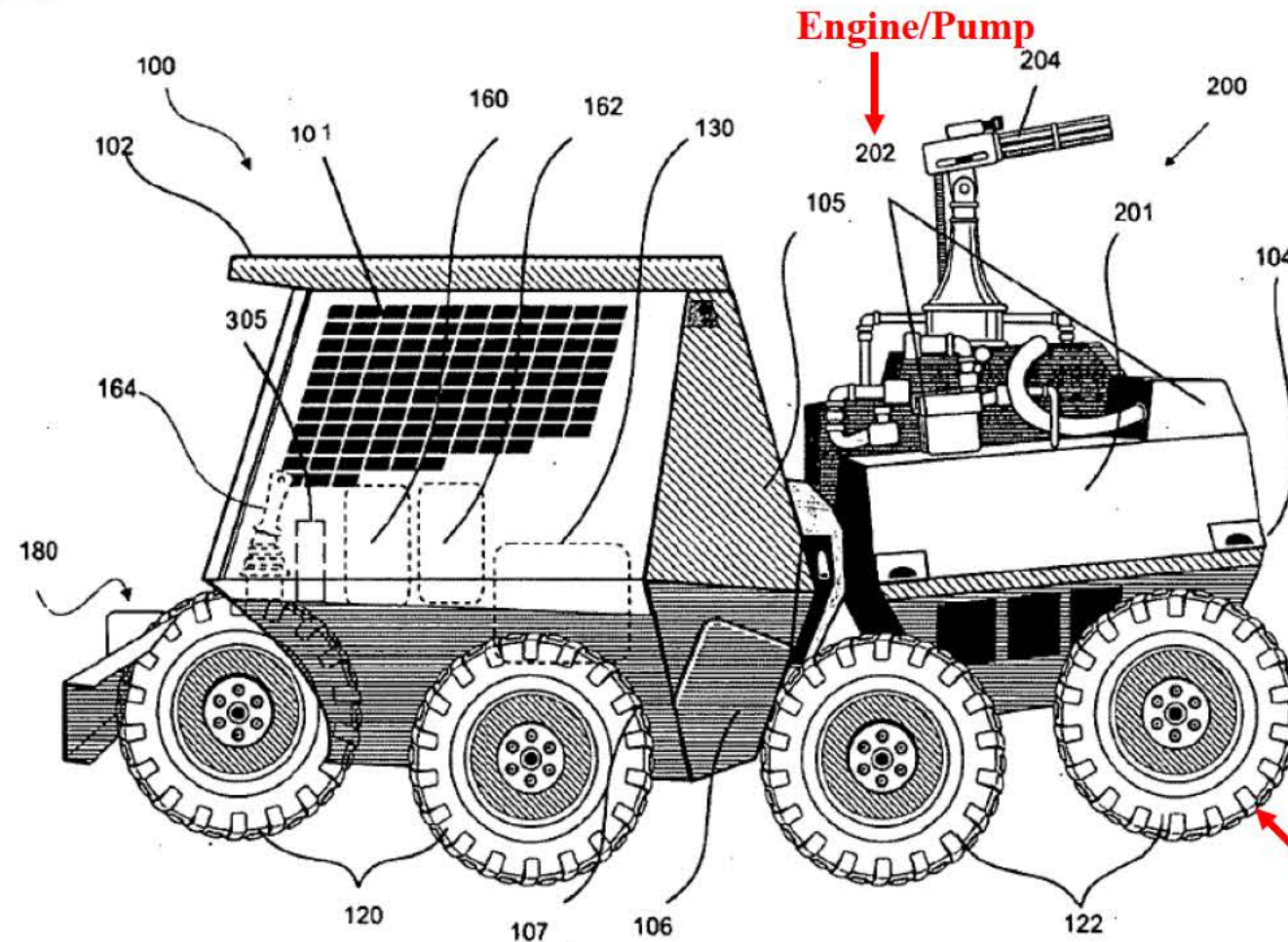
“Fluid Mover” Means “Pump, Conduit, and Nozzle”

- Pump moves fluid through the conduit and nozzles.
- The `425 Patent: “The flow rate of ***the fluid pump*** 9 may also be adjusted to ***enhance directional and speed control via the plurality of nozzles while floating.***” EX1001, 6:16-18.

Ground 1: Carrier



Amphibious vehicle



Ground engaging propulsion structure

EX1005, FIG. 1

Carrier Discloses "a Fluid Pump Capable of Pumping Liquid Manure"



- Carrier discloses a high-volume fluid pump for pumping fluid from lakes and streams.
- Nuhn's expert admits that fluid from lakes or streams includes suspended solids.
- Puck confirmed that firefighting pumps pump liquid manure.
- Pump disclosed in the '425 Patent is a multi-purpose centrifugal pump.

EX1005, ¶¶[0051], [0061]
EX1111, 247:3-251:14
EX1114, ¶6
EX1108, 260:24-261:18
EX1029, 4:3-8

Carrier Discloses “a Fluid Pump Capable of Pumping Liquid Manure”



- A POSA would have understood that Carrier’s high-volume firefighting pump for pumping fluid from lakes and streams is a centrifugal or positive displacement pump.
- Centrifugal and positive displacement pumps pump liquid manure.



Carrier Discloses Claimed Remote Control

- Carrier discloses remote control wheels, i.e. speed. EX1005, ¶¶[0064]-[0065].
- Carrier discloses remote control of the fluid pump. EX1005, ¶¶[0059], [0064].
- Carrier discloses remote control of “one of” speed and direction on the ground. EX1005, ¶¶[0064]-[0065].
- Carrier discloses remote control of “one of” speed and direction while floating. EX1005, ¶¶[0058], [0064]-[0065], [0079].



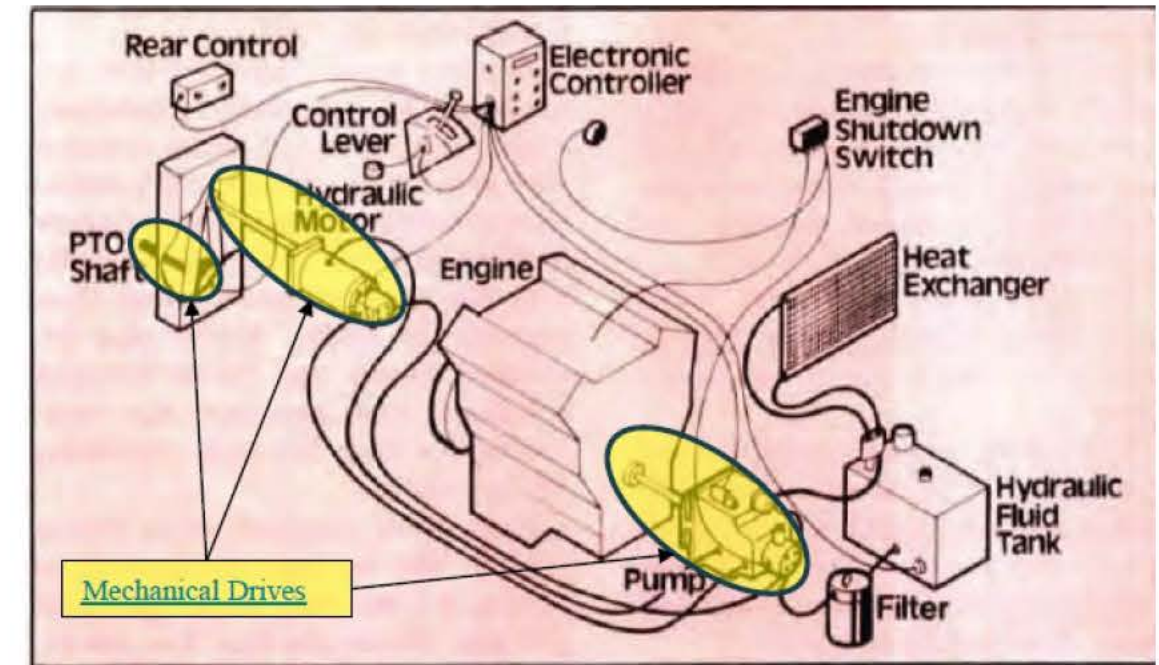
Carrier Discloses a “Fluid Mover”

- Claims 7 and 19
- Carrier discloses a pump, conduit, and nozzles.
 - Capable of controlling the vehicle’s speed and direction while floating.
 - Valves control the pump’s flow, thereby controlling the vehicle’s speed and direction when floating.

Carrier Discloses a Mechanical Drive



- Claim 12
- POSAs would have understood Carrier's power source is connected to the hydraulic pump by a mechanical drive and connected to the fluid pump by the mechanical drive.



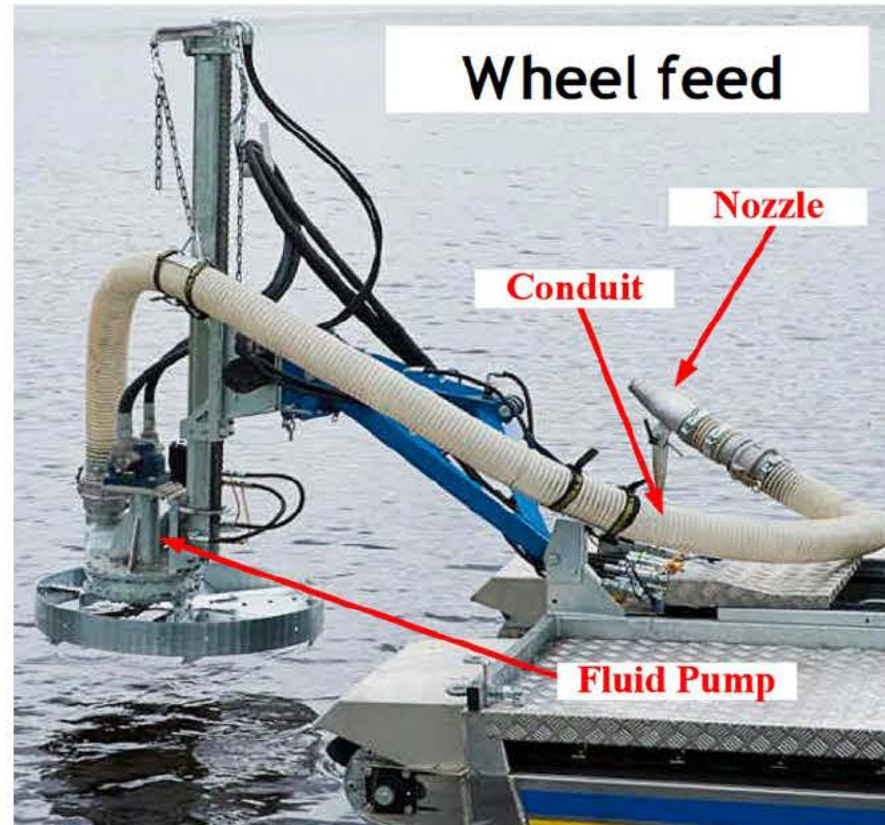


Ground 1: Carrier, Claim 1

Claim Element	Prior Art	Expert Testimony
1. An amphibious vehicle comprising:	EX1005, ¶[0079]	EX1004, ¶¶141, 212
a floatable vehicle body;	EX1005, ¶[0026]	EX1004, ¶¶142-143, 213
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1005, ¶¶[0045], [0054]	EX1004, ¶¶142-143, 214-215
a fluid pump for pumping liquid manure;	EX1005, ¶¶[0050]-[0051], [0061], [0063]	EX1004, ¶¶144-147, 210-211, 216-224; EX1112, ¶¶60-71
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1005, ¶¶[0039], [0051]	EX1004, ¶¶148-150, 225
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 fluid 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.	EX1005, ¶¶[0058]-[0059], [0064]-[0065], [0079]	EX1004, ¶¶151, 226; EX1112, ¶¶72-77



Ground 2: Truxor in view of Yoon or Carrier





Truxor and Yoon or Carrier Disclose the Remote-Control Limitations

- Nuhn does not challenge the motivation to combine Truxor and Yoon or Carrier, which teach remote control.
 - Melnikov explicitly taught adding remote control to Truxor. EX1025, 4.
 - Mr. Olofsson testified that remote-control was added to Truxor before 2013. EX2102, 104:18-107:1.



Truxor Discloses "a Fluid Pump for Pumping Liquid Manure"

- Dredge pumps such as the Doro Pump were capable of pumping higher solid content forms of manure in addition to dilute liquid manure.
- Dr. Winkel testified that Truxor discloses a pump for pumping liquid manure, i.e. the Doro Pump.
- Mr. Olofsson testified that the Doro Pump could pump up to 30% total solids.

EX1004, ¶¶156-157
EX1112, ¶¶113-129, 118
EX2102, 104:18-105:7

Yoon and Carrier Disclose Claimed Remote Control

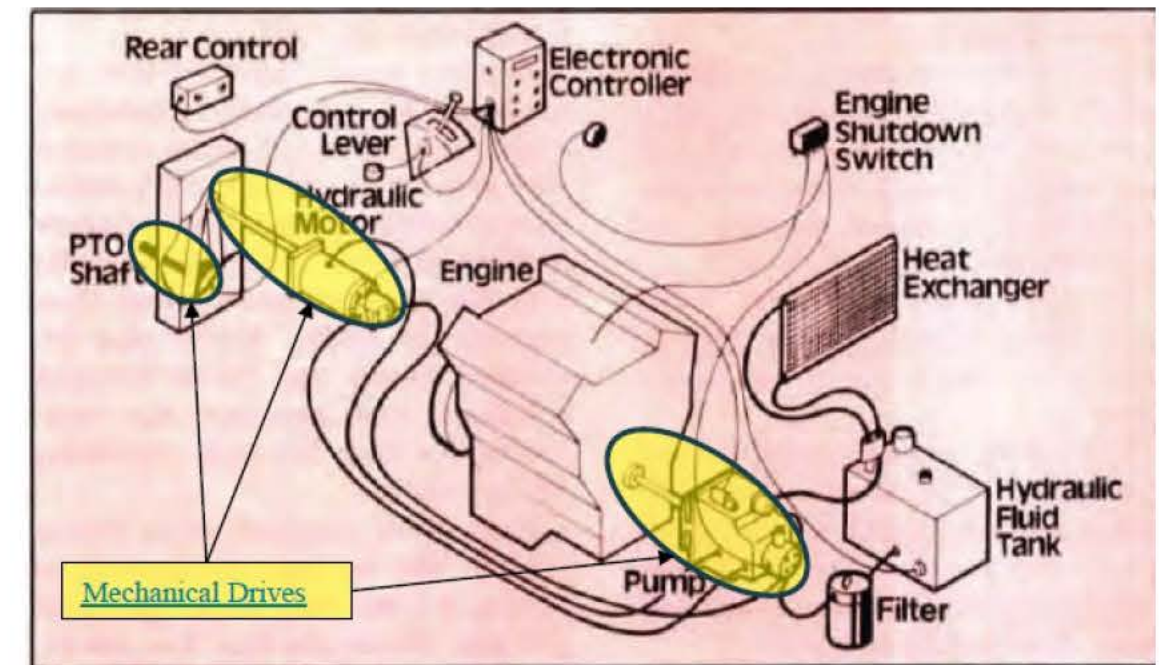


- Both disclose remote control wheels, i.e. speed. EX1005, ¶¶[0064]-[0065]; EX1011, ¶[0048].
- Both disclose remote control of the fluid pump. EX1005, ¶¶[0059], [0064]; EX1011, ¶[0048].
- Both disclose remote control of “one of” speed and direction on the ground. EX1005, ¶¶[0064]-[0065]; EX1011, ¶[0048].
- Both disclose remote control of “one of” speed and direction while floating. EX1005, ¶¶[0058], [0064]-[0065], [0079]; EX1011, ¶[0048].

Truxor Teaches Mechanical Drives



- Claim 12
 - It would have been obvious to POSAs that Truxor's engine would mechanically drive both hydraulic pump and fluid pump.



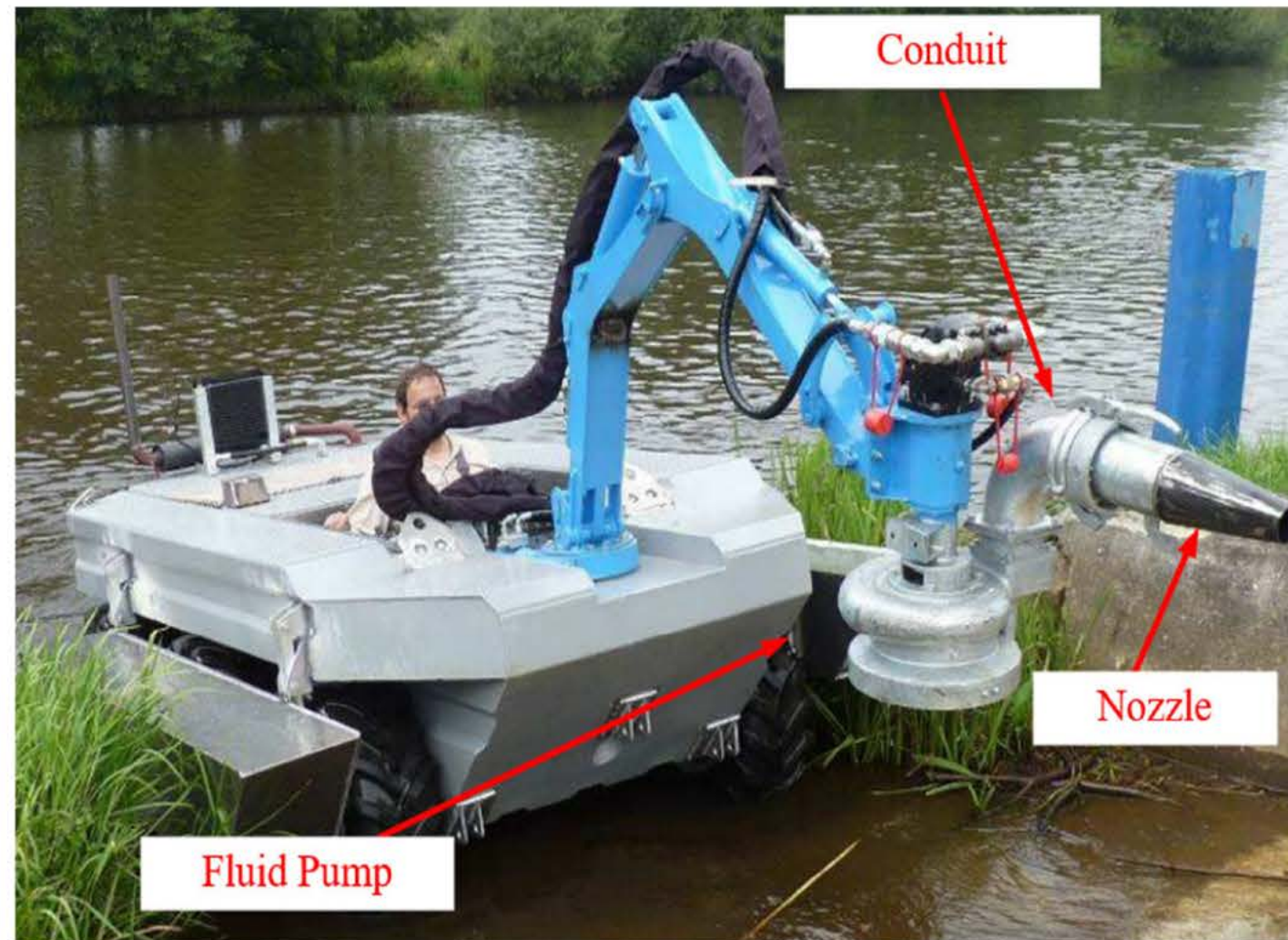
Ground 2: Truxor in View of Yoon or Carrier, Claim 1



Claim Element	Prior Art	Expert Testimony
1. An amphibious vehicle comprising:	EX1006	EX1004, ¶¶153, 196, 264
a floatable vehicle body;	EX1006, 3	EX1004, ¶¶154, 197-198, 265
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1006, 2-3	EX1004, ¶¶155, 199, 266
a fluid pump for pumping liquid manure;	EX1006, 2, 5, 10	EX1004, ¶¶156-157, 200-201, 267-268; EX1112, ¶¶113-129
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1006, 3-4	EX1004, ¶¶158-159, 269
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 fluid 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.	EX1006, 2-5, 10; EX1011, ¶¶[0048], EX1005, ¶¶[0059], [0064], [0065].	EX1004, ¶¶202, 270-271; EX1112, ¶¶130-133



Ground 3: SenwaTec in View of Yoon or Carrier



SenwaTec and Yoon or Carrier Disclose the Remote-Control Limitations



- Nuhn does not challenge the motivation to combine Truxor and Yoon or Carrier.
- Melnikov explicitly taught adding remote control to amphibious vehicles. EX1025, 4.

SenwaTec Discloses “a Fluid Pump for Pumping Liquid Manure”



- Nuhn baselessly argues that centrifugal pumps do not pump liquid manure. Paper 27 at 53.
- Centrifugal pumps **do** pump liquid manure. EX1040, 52; EX1089, 23.
- Ian Nuhn confirmed that the '425 Patent discloses a centrifugal pump used for pumping liquid manure. EX1108, 260:24-261:18; EX1001, 7:42-46; EX1029.

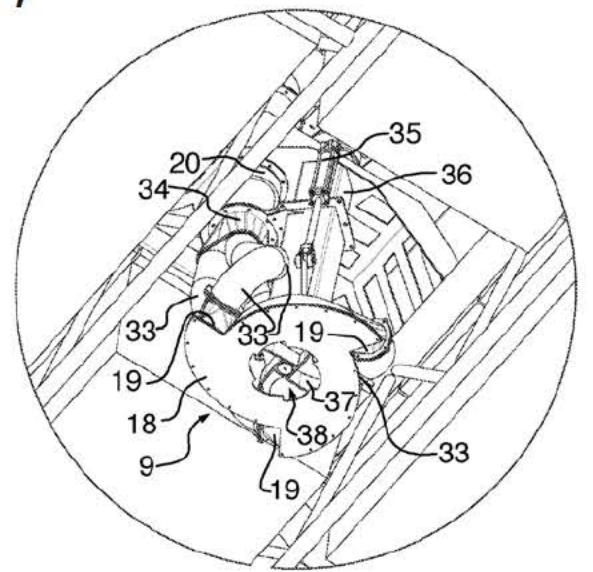


FIG. 8

EX1001, FIG. 8



SenwaTec Discloses “a Fluid Pump for Pumping Liquid Manure”

- Dredge pumps such as SenwaTec Pump were capable of pumping higher solid content forms of manure in addition to dilute liquid manure. EX1112, ¶160.
- EX1081-EX1084, EX1093-EX1096 show the Amphi-King’s manure pumping capabilities.
- Nuhn’s distinction between human manure and livestock manure is irrelevant. EX1094, ¶32; EX1115, ¶14; EX1112, ¶¶164-167.



SenwaTec Discloses “a Fluid Pump for Pumping Liquid Manure”

- “The sewage slurry I pumped often **contained human feces as well as debris**. For example, the sewage slurry often contained debris **such as condoms, tampons or toilet paper, which I pumped** from the lagoon together with the sewage slurry. This waste also included other natural waste such as **reeds, branches or leaves** from the areas around the lagoon, **which I pumped as well.**”
 - – Eckhard Funck (the operator of the vehicle in EX1081).



UD Umweltdienste Video



Yoon & Carrier Disclose Claimed Remote Control



- Both disclose remote control wheels, i.e. speed. EX1005, ¶¶[0064]-[0065]; EX1011, ¶[0048].
- Both disclose remote control of the fluid pump. EX1005, ¶¶[0059], [0064]; EX1011, ¶[0048].
- Both disclose remote control of “one of” speed and direction on the ground. EX1005, ¶¶[0064]-[0065]; EX1011, ¶[0048].
- Both disclose remote control of “one of” speed and direction while floating. EX1005, ¶¶[0058], [0064]-[0065], [0079]; EX1011, ¶[0048].



Ground 3: SenwaTec in View of Yoon or Carrier, Claim 1

Claim Element	Prior Art	Expert Testimony
1. An amphibious vehicle comprising:	EX1012, 1	EX1004, ¶¶161, 196, 299
a floatable vehicle body;	EX1012, 3	EX1004, ¶¶162-165, 197-198, 300
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1012, 2-3	EX1004, ¶¶162-165, 199, 301
a fluid pump for pumping liquid manure;	EX1012, 1	EX1004, ¶¶166, 200-201, 302-303; EX1112, ¶¶155-171
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1012, 1, 3	EX1004, ¶¶167, 304
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 fluid 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.	EX1012, 1-3; EX1011, ¶[0048]; EX1005, ¶¶[0059], [0064], [0065]	EX1004, ¶¶202, 305-307; EX1112, ¶172



Ground 4: Puck in View of Bryham

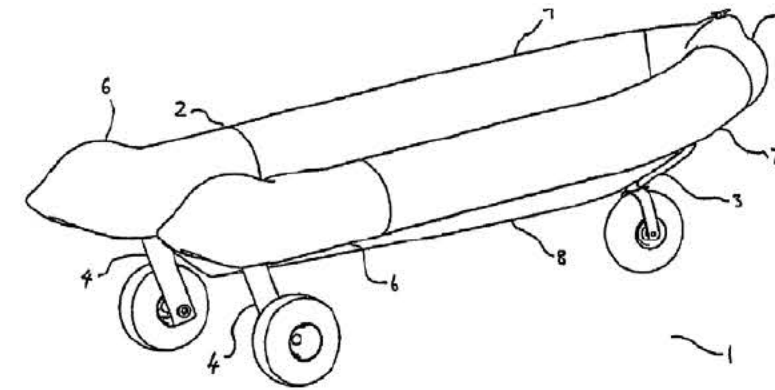
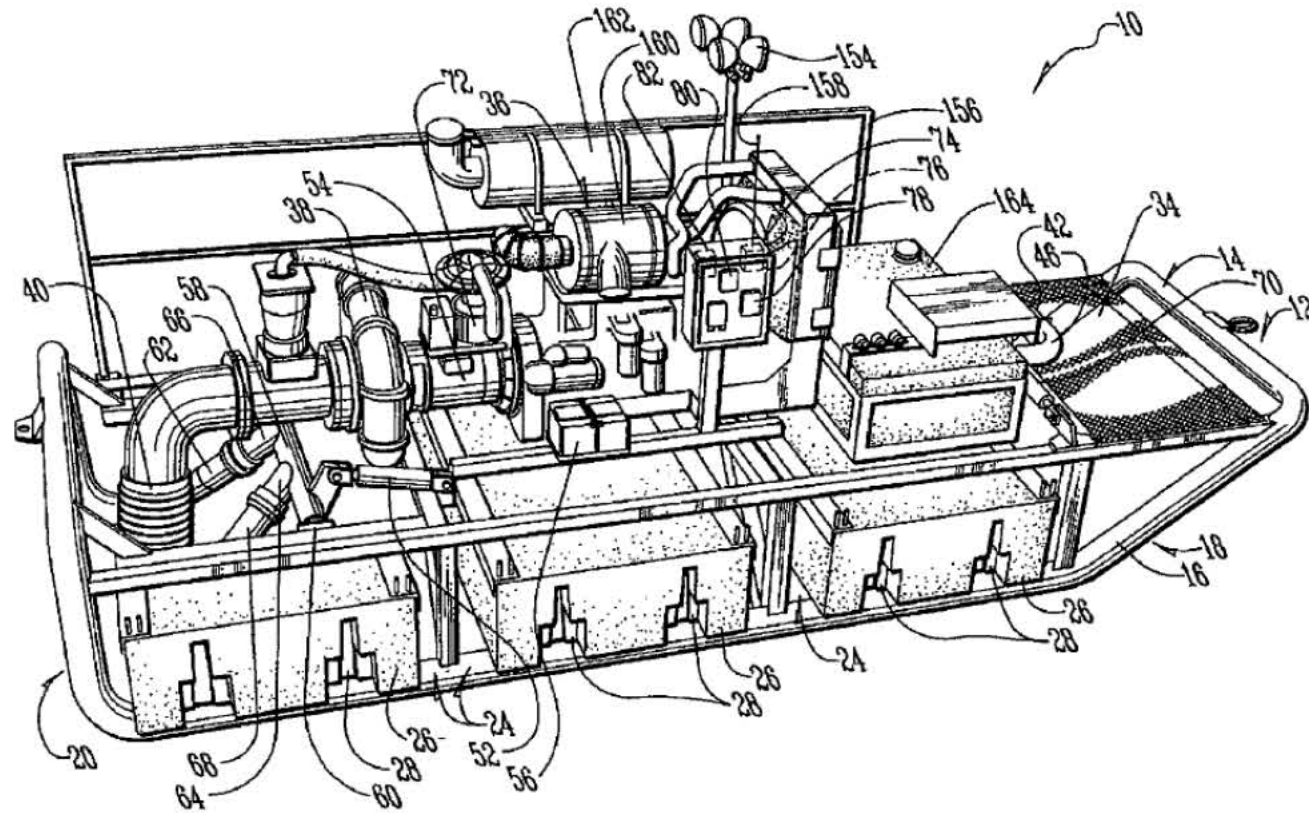


Figure 1



EX1014, FIG. 1
EX1015, FIG. 1
EX1120



Bryham Provides Strong Motivation to Combine With Puck

- Bryham identifies the problem of launching a boat, especially without proper boat ramp.
 - An individual usually would get feet wet. EX1015, 1:18-23.
 - Maneuvering a tow vehicle and trailer on unpaved terrain. EX1015, 1:55-58.
- Bryham's solution was to add corrosion-resistant all terrain wheels. EX1015, 1:25-27, 1:39-60, 2:19-27.



Puck Is Capable of Modification With Bryham's Wheels

- The logical location for the Bryham wheels is at each corner of the steel frame of Puck. EX1112, ¶¶218-219, 222.
- Dock sections can be modified to accommodate wheels. EX1112, ¶¶221-222.
- Puck and Bryham teach compatibility with alternative hull designs. EX1014, ¶[0022]; EX1015, 2:43-45; EX1112, ¶¶218-225.



Puck's Engine Would Power Bryham's Hydraulic Transmission

- POSAs understood the benefits of a central power source
- POSAs understood that adding extra engines were heavier, costlier, took up extra space, and were therefore undesirable. EX1112, ¶¶204-207 (citing EX1116, 5; EX1117, 71-72; EX1125, 6-7).

The extra cost and complications of adding an engine to the implement prompted the re-introduction of the independent PTO.



Puck and Bryham Use the Same Remote-Control Principles

- Puck teaches remote control valves. EX1014, ¶¶[0031], [0033]; EX1112, ¶¶212-213.
- Bryham's hydraulic wheels are operated using valves. EX1015, 16:1-12; EX1112, ¶¶208-215, 214-246.



Ground 4: Puck in View of Bryham, Claim 1

Claim Element	Prior Art	Expert Testimony
1. An amphibious vehicle comprising:	EX1015, 2:19-45; EX1014	EX1004, ¶¶169-171, 190, 342
a floatable vehicle body;	EX1014, ¶[0011]	EX1004, ¶¶172, 183, 343, 380
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1015, 2:66-67, 16:4-6	EX1004, ¶¶184-185, 344
a fluid pump for pumping liquid manure;	EX1014, ¶[0025]	EX1004, ¶¶173, 345
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1015, 16:1-6; EX1014, ¶¶[0011], [0024]	EX1004, ¶¶174-176, 186-187, 346-348; EX1112, ¶¶200-207
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 fluid 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.	EX1014, ¶¶[0009], [0011], [0027], [0035], [0037], Claim 9; EX1015, 5:60-62, 5:32-37;	EX1004, ¶¶177, 349-350; EX1112, ¶¶208-215

Ground 5: Puck in View of Bryham in View of Bennett-II



- Bennett-II explicitly teaches remote control of an amphibious vehicle on land and in water. EX1017, ¶¶[0043], [0121].
- Bennett-II utilizes valves to control the hydraulically powered tracks. EX1112, ¶¶241-246.
- Same remote-control principles as Puck.



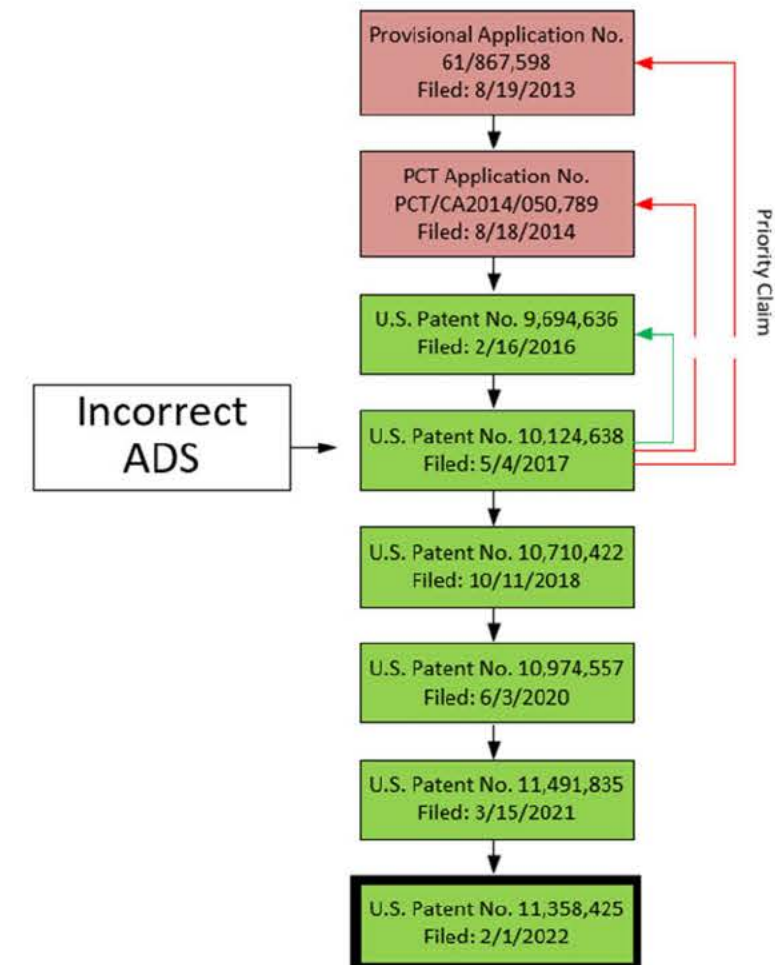
Ground 5: Puck in View of Bryham in View of Bennett-II, Claim 1

Claim Element	Prior Art	Expert Testimony
1. An amphibious vehicle comprising:	EX1015, 2:19-45; EX1014	EX1004, ¶¶169-171, 190, 380
a floatable vehicle body;	EX1014, ¶[0011]	EX1004, ¶¶172, 183, 191-192, 380
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1015, 2:66-67, 16:4-6	EX1004, ¶¶184-185, 193, 380
a fluid pump for pumping liquid manure;	EX1014, ¶[0025]	EX1004, ¶¶173, 380
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1015, 16:1-6; EX1014, ¶¶[0011], [0024]	EX1004, ¶¶174-176, 186-187, 380; EX1112, ¶¶200-207, 247-249
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 fluid 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.	EX1014, ¶¶[0009], [0011], [0027], [0035], [0037], Claim 9; EX1015, 5:60-62, 5:32-37; EX1017, ¶[0043]	EX1004, ¶¶177, 194, 381-383; EX1112, ¶¶208-215, 241-246

Ground 6: Lyseng



- Priority claim to the '425 Patent is defective
- Certificate of correction is only effective ***in causes of action thereafter arising***. 35 U.S.C. § 255.
- Such "'transcription errors' doom[] the [] patent's priority claim, as the Application Data Sheet controls domestic benefit." *Bausch & Lomb Inc. v. Zeavision, LLC*, IPR2022-00089, Paper 34 at 24 (PTAB Apr. 10, 2023).
- ***Nuhn never sought permission from the PTAB to file its request for certificate of correction.*** 37 C.F.R. §1.323.



Ground 6: Lyseng



- Without the benefit of certificate of correction, Nuhn's own disclosures in Lyseng anticipates Claims 1-21. EX1019, 1-2; EX1004, ¶¶204-208, 389-395.





Ground 6: Lyseng, Claim 1

Claim Element	Prior Art	Expert Analysis
1. An amphibious vehicle comprising:	EX1019, 1	EX1004, ¶389
a floatable vehicle body;	EX1019, 2	EX1004, ¶¶204, 390
ground engaging propulsion structure comprising a plurality of ground engaging elements powered by a hydraulic motor;	EX1019, 1	EX1004, ¶¶205, 391
a fluid pump for pumping liquid manure;	EX1019, 2	EX1004, ¶¶206, 392
a power source connected to a hydraulic pump, the power source configured to provide power to both the ground engaging propulsion structure and the fluid pump; and,	EX1019, 2	EX1004, ¶¶207, 393
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 fluid 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.	EX1019, 1	EX1004, ¶¶208, 394-395



Secondary Considerations: No Nexus

- Nexus may only be presumed if product is coextensive with claims. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019).
- Patent owner's assertions about significance of unclaimed features shows not coextensive. *Id.* at 1375.

These differences between the prior art and the claimed arrangements of components are material. The particular claimed arrangements of components directly contribute to the new and unexpected results and commercial success experienced by Nuhn's invention. EX2094, ¶369. These particular claimed

Secondary Considerations: Commercial Success Not Driven By Patented Features



- Ian Nuhn: *"I think because we made it look the way it does people are proud to fork over that kind of change and they are proud to own it."* EX2068, 30.

Nuhn's Lagoon Crawler



Truxor



EX1006, 5.

SenwaTec



EX1012, 2.

Puck



EX1119, 1.

Sundstrom



EX1115, ¶7.

SEBRINGVILLE — A kick-ass amphibious lagoon crawler is making waves in farming circles.

It looks like something out of a Transformers movie, a futuristic cross between a dune buggy, boat and F1 racer.

The bright red, knobby-tired vehicle might just be the coolest piece of farm equipment ever made.



Secondary Considerations: Commercial Success Not Supported by Credible Data

- Nuhn's "market share analysis" disregards other competitive products and is based on Ian Nuhn's speculation.
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
- Nuhn's sales data is gross revenue—no evidence of commercial success. EX2055-EX2059.



Secondary Considerations: "Long Felt Need" Already Solved

- Nuhn says its need was: "breaking a crust formed on a lagoon to . . . [mix] the solids and [form] a slurry" Paper 27 at 35.
- But the '425 Patent says the need is "recirculate[ing] manure to the middle of large lagoons[.]" EX1001, 1:45-47.
- Puck and Sundstrom already did all this:

[0036] As the agitator (10) moves across the lagoon (22), the agitator (10) breaks up the crust (126) as it draws supernatant (128) into the intake pipe (40). The agitator (10) then draws the supernatant (128) downward into the lagoon (22) with sufficient force to cause the sludge (130) at the bottom (138) of the lagoon (22) to mix with the supernatant (128) and to form the slurry (50). The angle of the slurry outputs (62)

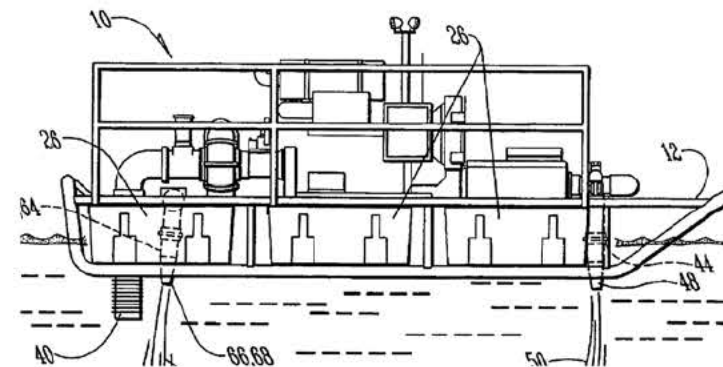


EX1014, ¶[0036]
EX1119, 1
EX1115, ¶7

Secondary Considerations: Results Were Not “Unexpected”



- Others used hydraulically-driven wheels to agitate corrosive manure lagoons. EX1081, 0:14-23; EX1093-EX1096.
- POSAs would have understood that amphibious vehicles are heavy enough to break through crust. EX1112, ¶330.
- Puck already used a bottom fluid inlet with nozzles. EX1014, EX1114.



Secondary Considerations: Dennis Nuhn Is Not “Industry Skepticism”



- Nuhn’s only “industry skepticism” evidence comes from Ian Nuhn’s declaration. Paper 27 at 33-34.
- When deposed about who was skeptical, Ian Nuhn only identified his father, Dennis Nuhn—no one else. EX1108, 249:12-250:10.



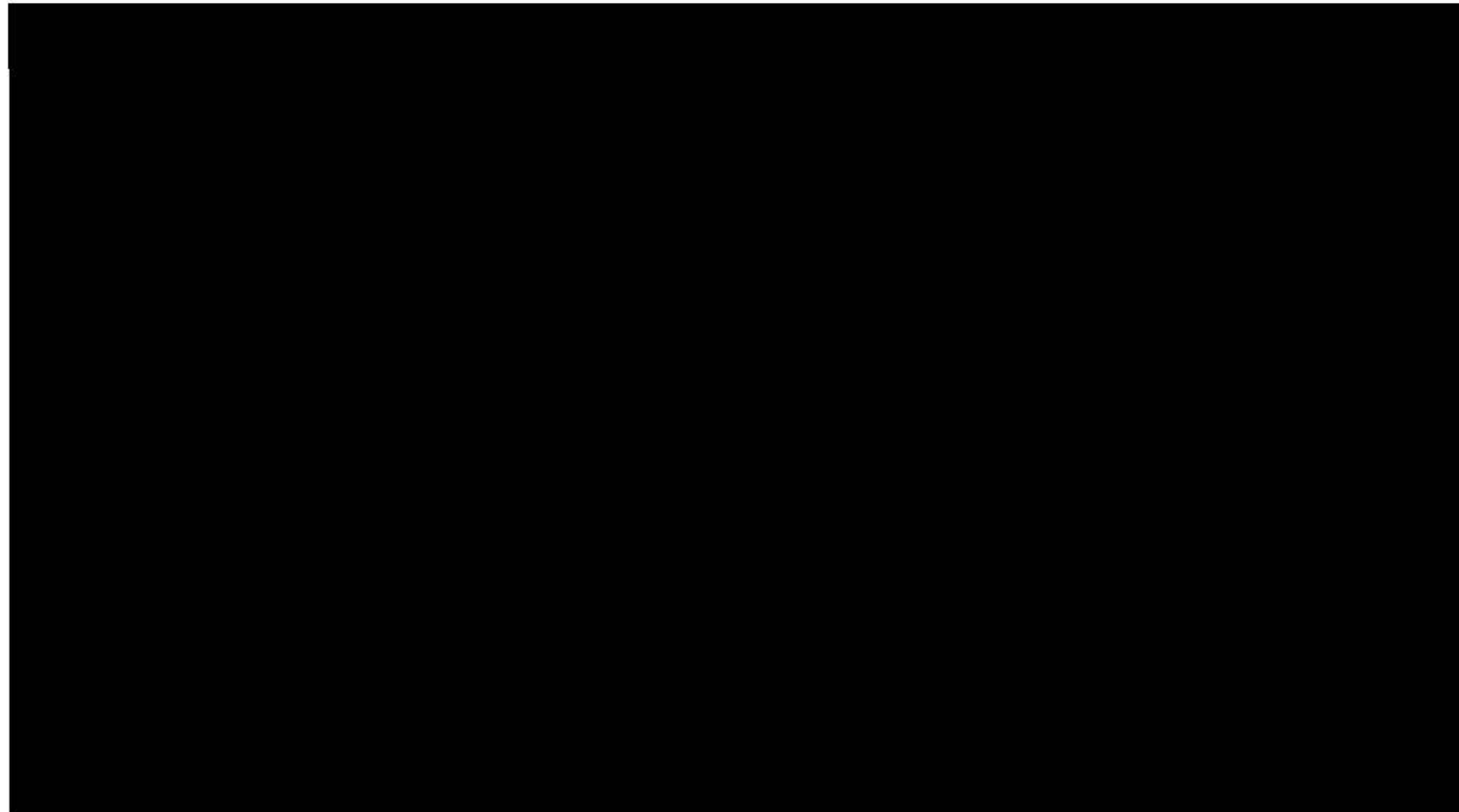
Secondary Considerations: Puck Email is Irrelevant

- Single email (EX2075) (i.e. not a patent license) from Puck is insufficient to show "commercial acquiescence."
 - *Cisco Sys. Inc., v. SSL Servs. LLC*, IPR2015-01754, Paper 58 at 36 (PTAB Feb. 22, 2017).

Secondary Considerations: Puck Email Is Irrelevant



- Puck's email (EX2075) is directed at Nuhn's pump patents.





Secondary Considerations: No Copying

- Bazooka's Wolverine is not a copy:
 - Wheels do not go up and down.
 - Uses propellers for propulsion, steering, and agitation.
 - No nozzle propulsion.
 - No fluid conduit network.
 - No valves between pump and outlet.

