



BAZOOKA-FARMSTAR, LLC (PETITIONER)
v. NUHN INDUSTRIES LTD. (PATENT OWNER)

Case No. IPR2023-01161

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

PATENT OWNER'S HEARING DEMONSTRATIVES

October 11, 2024

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



FUNDAMENTAL QUESTIONS

2

1. Who is a POSITA?
2. What makes liquid manure different than water?
3. What makes a pump a liquid manure pump?
4. Would a POSITA understand Carrier, Truxor, and SenwaTec as teaching a liquid manure pumping vehicle with a liquid manure pump?
5. Would a POSITA have modified Truxor, SenwaTec, and Puck in ways that have never been done, before or since Nuhn's patent?

FUNDAMENTAL QUESTIONS:

Who is a POSITA?

3

Petitioner's Definition

82. As of August 19, 2013, 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 livestock manure handling, fluid pumps, and selecting pumps for various applications, including livestock manure. Lack of work experience can be remedied by additional education, and vice versa.

EX1004, ¶82.

Patent Owner's Definition

63. 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."

EX2029, ¶63.



FUNDAMENTAL QUESTIONS:

Who is a POSITA?

What Petitioner said about Ben Puck and Ernie Sundstrom:

supported by the testimony of multiple long-time manure agitation equipment veterans.

Paper 41, 1.
See also, Paper 41, 7, 9, 25.

Background of actual POSITAs:

4. Sundstrom has been providing professional manure services since 1994. At different points during that time, the company has offered a variety of services and products, such as manure agitation, manure pumping, manure application, septic pumping and portable toilet rentals, custom fabrication, and the construction of manure equipment, including manure hose reels and manure agitation boats.

EX1015, ¶4.

I, Benny D. Puck, do hereby declare as follows:

1. I am over the age of 18. I currently reside in Manning, Iowa.
2. I am the Founder of Puck Custom Enterprises, Inc. ("Puck"). I started Puck in 1979. Since then, Puck has been designing and manufacturing pumps and pumping equipment for various industries, including firefighting, fuel transport, and agricultural industries. I have been working with pumps for 45 years.

EX1014, ¶2.

FUNDAMENTAL QUESTIONS:

What makes liquid manure different than water?

5

Highly Corrosive:



Paper 1,10.

FUNDAMENTAL QUESTIONS:

What makes liquid manure different than water?

Highly Corrosive - Experts Agree

Petitioner's Expert

120. Animal waste is also known to exhibit corrosive characteristics and metal exposed to liquid animal wastes, such as those in manure lagoons, can result in significant material loss. One study reports that as much as several millimeters of material could be lost from a metallic plate in a year's time. EX1055, 5. Other studies describe some metal samples losing the entirety of their metal mass in less than 30 months of exposure to the lagoon surface. EX1056, 8. A POSA would have been motivated to avoid exposing certain types of metal equipment, such as vehicle trailers, to corrosive lagoon liquids.

EX1004, ¶120.

Patent Owner's Expert

141. 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

EX2029, ¶141.



FUNDAMENTAL QUESTIONS:

What makes liquid manure different than water?

A Non-Newtonian Fluid With Suspended Solids

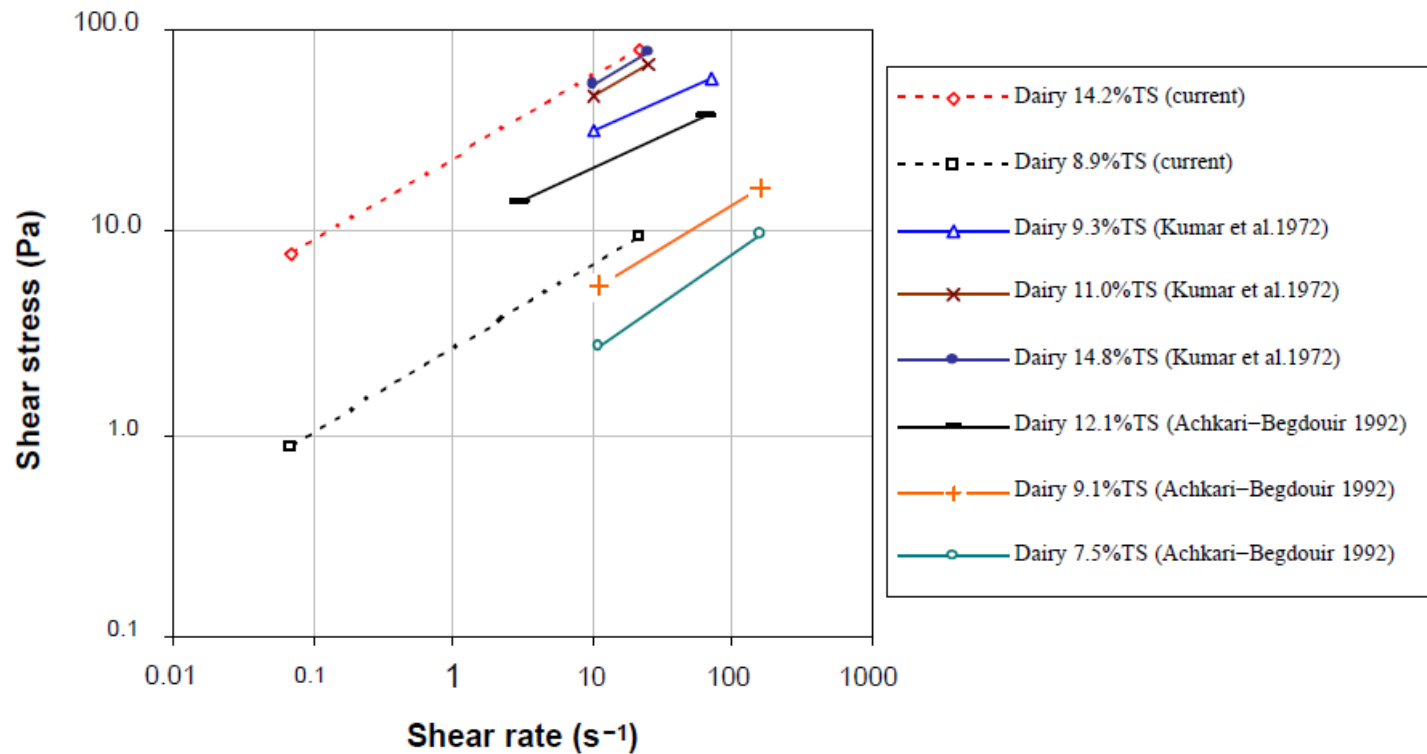


Figure 6. Shear stress – shear rate curves for dairy cattle manure (current study and other published results).

EX2033, 9.

FUNDAMENTAL QUESTIONS:

What makes liquid manure different than water?

8

A Non-Newtonian Fluid - Experts Agree (at least above 5 %TS)

Patent Owner's Expert

particular characteristics of the liquids.” EX1044 at 12 (emphasis added). Dr. Winkel entirely ignores that cattle manure—even at 1 to 2% total solids content—has been found to act as a **non-Newtonian fluid**. See, e.g., EX2033 at 2, H. Landry et al., *Physical and Rheological Properties of Manure Products*, APPLIED ENGINEERING IN AGRICULTURE, at 278 (2004) (discussing study by Chen (1982) that “included rheological properties for TS ranging from 1% to 14%. Beef cattle slurries were described as non-Newtonian pseudoplastic fluids, the deviation from Newtonian behavior increasing with TS”); *id.* at 2 (“Achkari-Begdouri and Goodrich (1992) studied the rheological properties of Moroccan dairy cattle manure with total solids concentrations ranging from 2.5% to 12% at temperatures between 20°C and 60°C. Their results showed that in the ranges of total solids and temperature of the study, Moroccan dairy cattle manure behaved as a pseudoplastic fluid.”); see also *id.* at 11 (“The animal manures studied were non-Newtonian pseudoplastic fluids and the power law could be used to relate shear stress and shear rate. The value of the consistency coefficient increased with the total solids concentration. The apparent

Petitioner's Expert

125. A POSA would have understood that some higher concentrations of manure exhibit non-Newtonian behaviors, specifically shear-thinning characteristics. See, e.g., EX2033, 8. A POSA would have understood that non-Newtonian behavior begins to manifest at higher solids concentrations, higher than the few percent or less solids that are typically found in liquid manures contained in manure lagoons. For example, in a study involving manure from lactating cows and samples taken from a manure storage tank containing bedding, urine, fresh and old manure, and water, Kumar reports that “[w]hen the slurry was below five percent

EX1112, ¶125.

EX2029, ¶91.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



FUNDAMENTAL QUESTIONS:

What makes a pump a liquid manure pump?

9

The Pump must be designed for or proven in liquid manure pumping applications

Patent Owner's Expert:

97. The Institution Decision suggested that the Parties need to further develop “what specific structure is required to pump liquid manure,” but in my opinion that attempts to apply a bright-line rule to a question that is not clear cut. For example, the “Liquid Manure Application Systems Design Manual” (EX1034 at pp. 51-52) cited by Petitioner identifies a number of different types of pumps including closed impeller, semi-open impeller, open impeller, elevator, helical screw, piston, and air-driven pumps. There is no bright line rule delineating these various pump types where one type is universally considered a liquid manure pump and another type is not. Most likely any one of these types of pumps could be designed to pump liquid manure if provided with an appropriate size, tolerances/clearances, flow rate, pump head, power requirements, and appropriate housing, impeller, inlet, outlet, and bearing design.

EX2099, ¶97.

FUNDAMENTAL QUESTIONS:

What makes a pump a liquid manure pump?

10

The Pump must be designed for or proven in liquid manure pumping applications

Patent Owner's Expert:

98. Because there are no bright-line rules, a POSITA would look at the following pieces of evidence to understand if a pump is a “liquid manure pump” (i.e., a “pump that pumps liquid manure” or a “pump with a structure that is capable of pumping liquid manure with suspended solids”):

(1) was the pump designed to pump liquid manure;

(2) was the pump marketed as a liquid manure pump;

(3) has the pump been tested and validated (i.e., proven) for liquid manure pumping applications; and

(4) does the pump have structure that would become clogged and/or damaged by pumping liquid manure.

EX2099, ¶98.



FUNDAMENTAL QUESTIONS

11

1. Who is a POSITA?
2. What makes liquid manure different than water?
3. What makes a pump a liquid manure pump?
4. **Would a POSITA understand Carrier, Truxor, and SenwaTec as teaching a liquid manure pumping vehicle with a liquid manure pump?**
5. **Would a POSITA have modified Truxor, SenwaTec, and Puck in ways that have never been done, before or since Nuhn's patent?**

Claim Construction

12

1. “liquid manure” (independent claim 1, et. seq.)
2. “a fluid pump for pumping liquid manure” (independent claim 1)
3. “fluid mover” (dependent claims 7 and 19)

Claim Construction

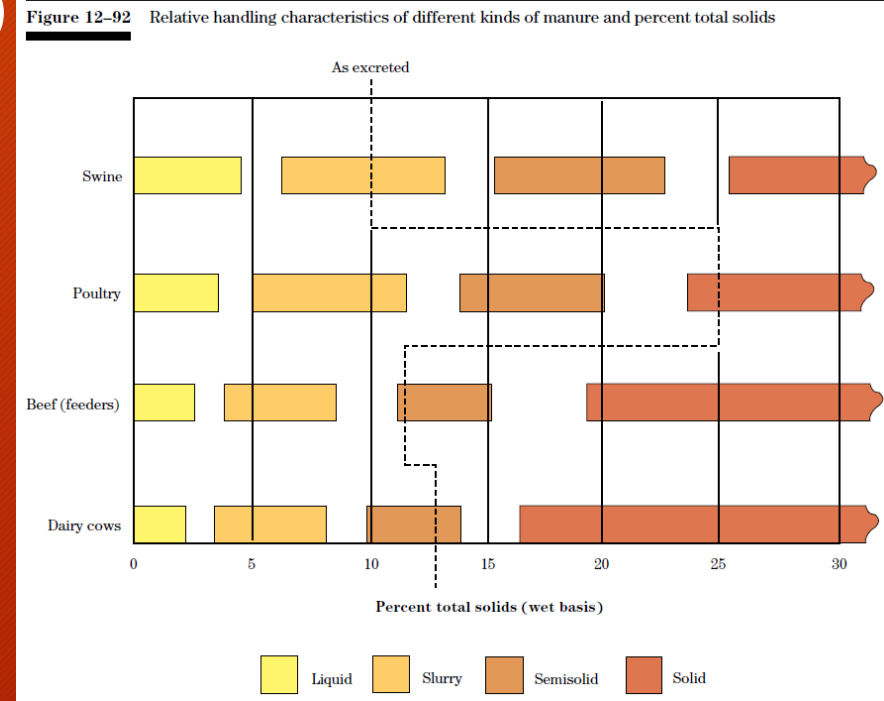
13

1. “liquid manure” (independent claim 1, et. seq.)

Petitioner’s Expert

40. “Liquid manure” is understood in the literature as a mixture of water and manure with a total solid content of less than about 5%. EX1066, 89; 1064, 11-14 (“The solids content of slurry ranges from about 5 to 15 percent ... Liquid manure has solids content of 5 percent or less. This consistency generally is produced where manure is diluted by wash water....”); EX1062, 13 (“Wastes that have a moisture content of 95% or more [(%TS of 5% or less)] exhibit qualities very much like water are called liquid waste or liquid manure.”); 1041, 2; 1042, 2. While Nuhn and its

EX1112, ¶40.



EX1066, 89.

Claim Construction

14

1. “liquid manure” (independent claim 1, et. seq.)

%TS does not account for particle size or composition:

etc., even if the moisture/ solids contents of the two manures are identical.” *Id.* at 18. Therefore, a POSITA would have understood that liquid manure—in addition to the crust—often includes solid bedding materials, that greatly impact the size and composition of solids in the liquid manure as well as the equipment needed to pump the liquid manure. Dr. Winkel does not take any of this into consideration.

86. Accordingly, Dr. Winkel’s categorical statement that liquid manure solids are between 1 and 6 mm in size is entirely at odds with what a POSITA would have understood.

EX2029, ¶¶ 85-86.

Claim Construction

15

1. “liquid manure” (independent claim 1, et. seq.)

Patent Owner’s Expert:

93. Accordingly, in my opinion, a POSITA would not apply the Petitioner’s narrow definition of “liquid manure” to the ‘425 Patent, but instead would interpret the references to “liquid manure” in the ‘425 Patent claims as the “animal manure contained in a farm lagoon, which includes suspended solids.” It is my opinion that the suspended solids of liquid manure includes the hard, thick crust, solid chunks of the crust, bedding material, any vegetation growing in the crust, and any sludge that has been stirred up from the bottom of the lagoon.

EX2029, ¶93.

TECHNICAL FIELD

The invention relates to pumps and vehicles equipped for pumping. In particular, the invention relates to manure pumps and amphibious vehicles equipped for pumping liquid manure, such as animal manure contained in a farm lagoon.

EX1001, 1:25-29.

Claim Construction

16

2. “a fluid pump for pumping liquid manure” (independent claim 1)

Petitioner’s Expert:

35. It is my opinion that the claim terms “for pumping liquid manure” and “to control a flow of liquid manure” are **merely statements of intended use** for the fluid pump recited in the claims. This is because the specification does not provide

EX1112, ¶35.

Board:

At this stage, and given that both parties agree that liquid manure includes suspended solids, **we construe these terms only to the extent that pumping liquid manure requires a pump with a structure that is capable of pumping liquid with suspended solids**. We encourage the parties to further

Paper 12, 12.

Patent Owner’s Expert:

99. To the contrary, it is my opinion that, after reviewing the prosecution history, **a POSITA would interpret the claim limitation requiring “a fluid pump for pumping liquid manure” as “a fluid pump that pumps manure.”** This is opposed to a pump that is merely capable of pumping liquid manure in the theoretical sense if someone attempted to put a pump to that use. In particular,

EX1112, ¶35.



Claim Construction

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3. “fluid mover” (dependent claims 7 and 19)

Petitioner’s Expert:

50. Regarding the second question, “what structure is disclosed in the specification for performing the claimed function,” a POSA would have understood that the term “fluid mover” has a single function: moving fluid. A POSA would have

EX1112, ¶50.

57. Instead, as explained above, a POSA would have understood that the pump, conduit, and nozzle described in the ’425 Patent would perform the function of moving the fluid and would be capable of controlling the speed and direction of the vehicle while floating. Therefore, if the term “fluid mover” is construed as a

EX1112, ¶57.

Claim Construction

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3. “fluid mover” (dependent claims 7 and 19)

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 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.

2. The vehicle of claim 1, wherein the vehicle further comprises a conduit fluidly connected to the fluid pump.

7. The vehicle of claim 1, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.

19. The vehicle of claim 17, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.

Claim Construction

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3. “fluid mover” (claims 7 and 19)

Patent Owner’s Expert:

117. With respect to point (2), it is my opinion that a POSITA would consider the “valve(s) and fluid nozzle(s)” as the corresponding structure for performing the claimed function of moving fluid to control at least one of the speed and direction of the vehicle when the vehicle is floating. In particular, the ‘425 Patent describes that “[c]ooperation between the valves 15 and the plurality of fluid nozzles is used to provide directional control and motive power for the vehicle while floating”:

EX2029, ¶117.

Valve structure comprising a valve 15 corresponding to each fluid nozzle 11, 13, 16, 17 is also provided. The valves 15 are powered and operable to open or close. The valves 15 may be opened fully or partially to proportion flow between the plurality of fluid nozzles. Cooperation between the valves 15 and the plurality of fluid nozzles is used to provide directional control and motive power for the vehicle while floating. For example, proportioning fluid flow from the right side fluid nozzles 17 to the left side fluid nozzles 16 causes the vehicle to turn to the right while floating. Similarly, fluid flow may be proportioned between the first fluid nozzle 11 and the second fluid nozzles 13 to cause the vehicle to move forward or backward. By rotating the second fluid

EX1001, 5:63-6:8.

GROUND 1 - Claims 1-21 Are Not Anticipated by Carrier [EX1005]

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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 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.

GROUND 1 - Claims 1-21 Are Not Anticipated by Carrier [EX1005]

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[0050] The chassis 104 can include functional engines fire-fighting equipment 200 including a water tank, 201, dual engine pumps 202 and hoses with nozzles 204 all of which are operatively interconnected. Additionally, foam systems, dry

[0061] The use of a pump mounted to the all terrain vehicle which is capable of pumping water from a lake or stream onto a fire is another feature of the present invention. This feature

[0063] The tank 201 can preferably have a recessed top for storage of hoses, multiple 100-foot hoses, and a large fill orifice, a screen to filter debris that would otherwise clog hoses, pump 202 to refill the tank 201 from lakes, ponds, or streams. Additionally, the tank 201 includes a master drain for

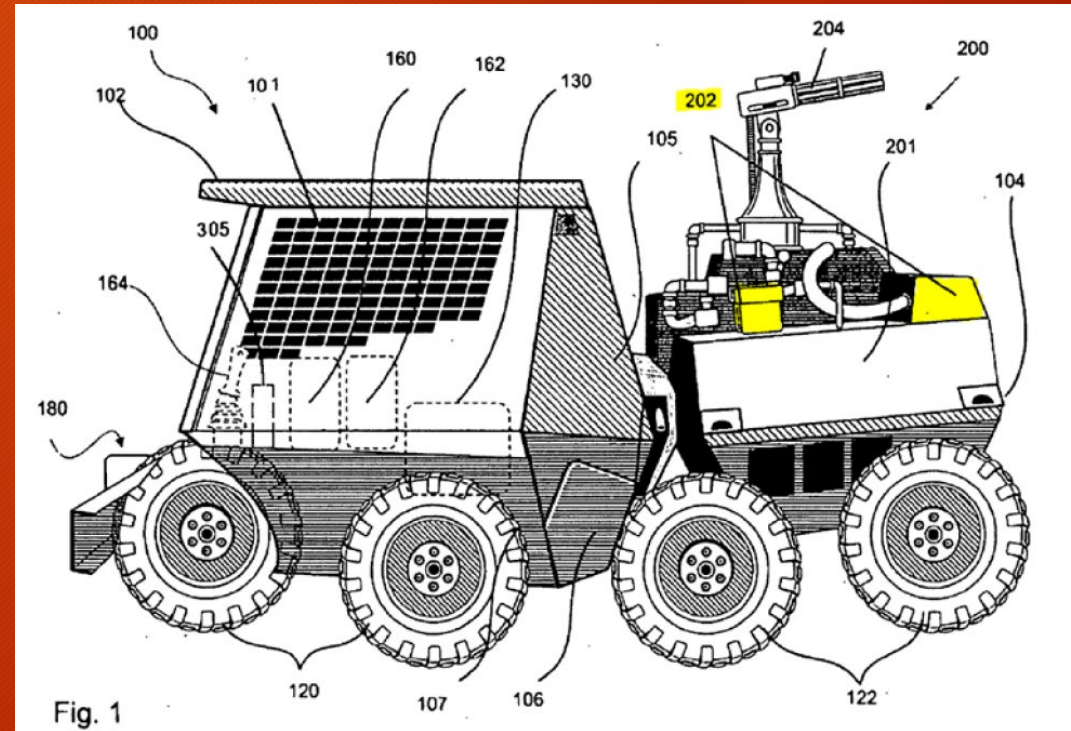


Fig. 1
EX1005, 2.

EX1005, ¶¶50, 61, 63.

FUNDAMENTAL QUESTION:

What makes a pump a liquid manure pump?

The Pump must be designed for or proven in liquid manure pumping applications
Patent Owner's Expert:

98. Because there are no bright-line rules, a POSITA would look at the following pieces of evidence to understand if a pump is a “liquid manure pump” (i.e., a “pump that pumps liquid manure” or a “pump with a structure that is capable of pumping liquid manure with suspended solids”):

- (1) was the pump designed to pump liquid manure;
- (2) was the pump marketed as a liquid manure pump;
- (3) has the pump been tested and validated (i.e., proven) for liquid manure pumping applications; and
- (4) does the pump have structure that would become clogged and/or damaged by pumping liquid manure.

EX2099, ¶98.



FUNDAMENTAL QUESTION:

What makes liquid manure different than water?

23

Highly Corrosive:



Non-Newtonian Fluid LARGE Suspended Solids:



EX2006, 2.

Paper 1,10.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



GROUND 1 - Claims 7 and 19 Are Not Anticipated by Carrier [EX1005]

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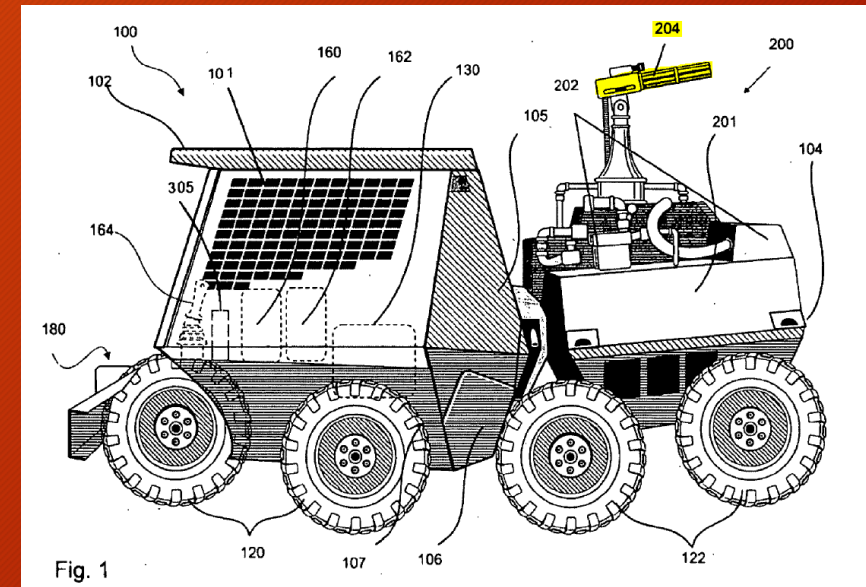
7. The vehicle of claim 1, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.



19. The vehicle of claim 17, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.

Petitioner's Expert:

232. The water cannon disclosed in Carrier could be used to propel the vehicle and control the speed or direction when floating. Carrier describes a



EX1005, 2.

EX1112, ¶232.

GROUND 1 - Claims 12-21 Are Not Anticipated by Carrier [EX1005]

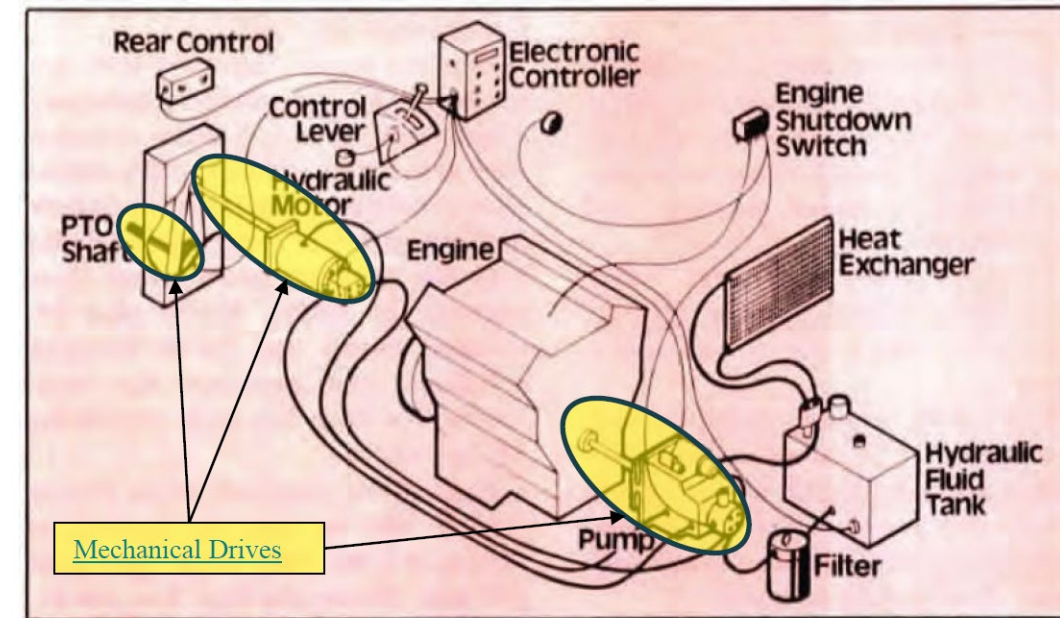
25

✖ 12. The vehicle of claim 4, wherein the power source is connected to the hydraulic pump by a mechanical drive and connected to the fluid pump by the mechanical drive.

vehicle. The power source may be connected to the fluid pump hydraulically, electrically, or via a mechanical drive. A single power source may be used to provide power to all vehicle systems, including the fluid pump. In one embodiment, the power source is an internal combustion engine that is connected to the fluid pump and a hydraulic pump via a mechanical drive. The mechanical drive may comprise a gearbox to provide an appropriate rotational speed for the fluid pump. The mechanical drive may comprise a gearbox

EX1112, 2:54-61.

Petitioner's Expert:



EX2029, ¶172 (annotated).

EX1112, ¶95.

GROUND 2 and 3 - Claims 1-7 and 12-19 Are Not Obvious based on Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

26

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 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.

GROUND 2 and 3 - Claims 1-7 and 12-19 Are Not Obvious based on Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

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Truxor:

The Doro pump is designed for pumping light sediments and volatile sand. The Doro pump is supplied with a screw feed. The intake can be equipped with a suction nozzle when pumping sand or light floating sediments.

EX1007, 123.

Petitioner's Expert:

268. The disclosed Doro Pump is capable of pumping liquids, including liquid manure. The capabilities of the Doro Pump of Truxor are far greater than those necessary for pumping liquid manure. The Doro Pump would be capable of pumping slurry and semisolid manure with considerably higher solids content and different (more solid) physical properties than liquid manure, as dredging pumps have long been used for this purpose. EX1058, 2. A POSA would have understood that similar



EX1006, 10.

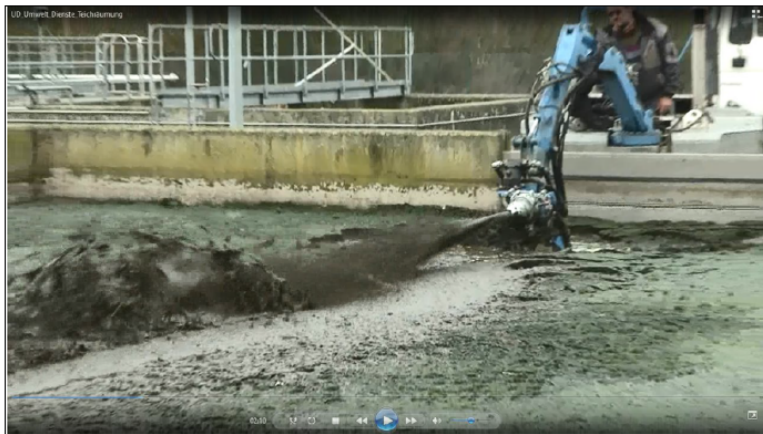
EX1004, ¶268.

GROUND 2 and 3 - Claims 1-7 and 12-19 Are Not Obvious based on Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

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Petitioner's Expert on SenwaTec:

302. SenwaTec discloses the limitations of Element [1.3]. SenwaTec discloses “a powerful centrifugal pump with 8” suction- and 6” discharge ports, hydraulically driven, delivering 40 kW of pumping power.” *Id.*, 1. A POSA would also have understood that the pump described by SenwaTec would be capable of pumping liquid manure, as the Amphi-King was shown pumping liquid manure in various pre-2013 publications and advertisements. EX1013, ¶¶5-7, 12-19; EX1027, 2; EX1028, 3.



EX1012, 2.

EX1004, ¶302.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUND 2 and 3 - Claims 1-7 and 12-19 Are Not Obvious based on Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

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BUT SenwaTec's use in municipal (i.e., human) wastewater ponds $\neq$ liquid manure:



With the movements of an amphibian: Eckhard Funck cleans the sewage pond in Mecklar with a new and environmentally friendly technology while sailing and swimming. His frog-like device produces 60 horsepower. Photo: Kaschik

Ludwigsau. He doesn't mind his smelly job. With an amphibious vehicle, Eckhard Funck drives through the sewage pond near Mecklar and removes the sludge that has accumulated there within the past years.

This idea is not that far off: "After all, it's not fecal matter that's in the sewage sludge," explains the vehicle operator of the frog-like machine, "it's just dead bacteria that previously ate the fecal matter." Thus, what floats in the pond is anything but toilet waste.

EX1027, 3.

EX1027, 2.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

FUNDAMENTAL QUESTION:

What makes a pump a liquid manure pump?

The Pump must be designed for or proven in liquid manure pumping applications

Patent Owner's Expert:

98. Because there are no bright-line rules, a POSITA would look at the following pieces of evidence to understand if a pump is a “liquid manure pump” (i.e., a “pump that pumps liquid manure” or a “pump with a structure that is capable of pumping liquid manure with suspended solids”):

(1) was the pump designed to pump liquid manure;

(2) was the pump marketed as a liquid manure pump;

(3) has the pump been tested and validated (i.e., proven) for liquid manure pumping applications; and

(4) does the pump have structure that would become clogged and/or damaged by pumping liquid manure.

EX2099, ¶98.



FUNDAMENTAL QUESTION:

What makes liquid manure different than water?

31

Highly Corrosive:



Non-Newtonian Fluid LARGE Suspended Solids:



EX2006, 2.

Paper 1,10.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



GROUND 2 and 3 - Claims 7 and 19 Are Not Rendered Obvious by Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

32



7. The vehicle of claim 1, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.

Petitioner's Expert on Truxor:

not meet claims 7 and 19. EX2029, ¶222. Mr. Prairie fails to consider other methods that could be used to control the speed of the Truxor vehicle by varying the flow rate from the pump and nozzle, and control the speed or direction of the vehicle, including varying the engine speed, and the flow-rate of hydraulic fluid to the Doro Pump.

EX1112, ¶145.



19. The vehicle of claim 17, wherein the at least one of speed and direction of the vehicle when the vehicle is floating is controlled by a fluid mover.

Petitioner's Expert on SenwaTec:

Thus, the vehicle of SenwaTec could be propelled and steered (and thus the speed or direction of the vehicle could be controlled) by using the "powerful centrifugal pump" to spray jets of fluid in the opposite direction. EX1012, 1. SenwaTec

EX1112, ¶183.

GROUND 2 and 3 - Claims 7 and 19 Are Not Rendered Obvious by Truxor [EX1006]/SenwaTec [EX1012] in view of Yoon [EX1011] or Carrier [EX1005]

33

✗ 12. The vehicle of claim 4, wherein the power source is connected to the hydraulic pump by a mechanical drive and connected to the fluid pump by the mechanical drive.

Petitioner's Expert on Truxor:

below. EX1006, 10; *see also* EX1021-EX1022, 13; EX1023, 11. Describing the Doro Pump, Truxor states: “The Doro Pump is operated by a hydraulic motor and has a capacity of 10-40 m³/h. The Doro Pump is available with two types of feeds to the pump inlet: wheel feeding and screw feeding.” EX1006, 10; *see also* EX1021-

EX1004, ¶156.

Petitioner's Expert on SenwaTec:

302. SenwaTec discloses the limitations of Element [1.3]. SenwaTec discloses “a powerful centrifugal pump with 8” suction- and 6” discharge ports, hydraulically driven, delivering 40 kW of pumping power.” *Id.*, 1. A POSA would

EX1004, ¶302.

GROUND 2 and 3 - No Motivation to Combine Truxor [EX1006]/SenwaTec [EX1012] with Yoon [EX1011] or Carrier [EX1005] with A Reasonable Expectation of Success

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Truxor:



make it the ideal choice for working in and around water. Driven with care and with its minimal ground pressure, damage to river banks and sensitive areas can be minimised making the Truxor ideal for working on golf courses, nature reserves and public parks where larger, heavier machines have difficulty operating.

EX1006, 2.

Reed cutting & Gathering - Excavation - Dredging

EX1006, 1.

GROUND 2 and 3 - No Motivation to Combine Truxor [EX1006]/SenwaTec [EX1012] with Yoon [EX1011] or Carrier [EX1005] with A Reasonable Expectation of Success

35

SenwaTec:

Low ground pressure and good clearance on terrain, **marches and swamps** during on-land drives

EX1012, 1.



40 YEARS OF EXPERIENCE IN THE DEVELOPMENT OF:

- *DITCH CLEANER AND SLOPE MOWERS*
- *MOWING AND CLEARING BOATS*
- *WEED HARVESTERS*
- *AMPHIBIOUS VEHICLES*
- *CUTTER SUCTION AND EXCAVATING DREDGES*

EX1012, 1.

EX1012, 1.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUND 2 and 3 - No Motivation to Combine Truxor [EX1006]/SenwaTec [EX1012] with Yoon [EX1011] or Carrier [EX1005] with A Reasonable Expectation of Success

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Patent Owner's Expert on adding remote control:

208. Manure lagoons typically have steep embankments that can be covered in manure, mud, sand, and/or ice and are therefore extremely slippery. EX1004, Winkel Decl., ¶¶334, 336. A POSITA would recognize that Truxor's known instability issues would be exacerbated by remote control. As a result, a POSITA would not have had a reasonable expectation that adding remote control functionality to Truxor would be successful in producing an amphibious remote-controlled vehicle that could operate in a manure lagoon environment without tipping.

EX2029, ¶208.



The digging arm may only be moved laterally when the outriggers touch the bottom. The lateral scope of the digging arm with a mounted Doro pump is 4 metres but for safety reasons only a 2-metre range can be used. This means that the permissible working width from the centre is 2 metres in each direction.

Warning! There is a tilting risk if the maximum range is used.

EX1007, 128.

Potential Rollover Risk

EX1006, 5; *see also* EX1021-EX1022, 1; EX1023, 8.



EX1004, 142.

GROUND 2 and 3 - No Motivation to Combine Truxor [EX1006]/SenwaTec [EX1012] with Yoon [EX1011] or Carrier [EX1005] with A Reasonable Expectation of Success

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Patent Owner's Expert on adding remote control:

263. It is also my opinion, that a POSITA would not reasonably expect success in operating the SenwaTec vehicle from a remote location where the positioning and operation of the submerged pump would be difficult to observe.

EX2029, ¶263.



EX1012, 2.

GROUND 4 and 5 - Claims 1-21 Are Not Obvious based on Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017]

38

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 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.



GROUND 4 and 5 - Claims 1-21 Are Not Obvious based on Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017]

39

Petitioner's Expert:

348. A POSA would have been motivated to use the same internal combustion engine of Puck to power the land-based propulsion system of Bryham because it would be less expensive, more efficient, take up less space, and weigh less than providing two separate engines, one for the fluid pump and one for the hydraulic pump for land-propulsion. Further, the diesel engine of Puck would be more than sufficient to power the land-based propulsion, which Puck teaches could be as high as 2000 HP. EX1014, ¶[0024].

EX1004, ¶348.

Puck:

The hydraulic cylinder (52) is coupled to a hydraulic pump (54) that, in turn, is coupled to a 12-volt battery (56). (FIGS. 1 and 5).

EX1014, ¶27.

GROUND 4 and 5 - Claims 1-21 Are Not Obvious based on Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017]

40

Petitioner's Expert:

propulsion structure. The remote-control system of Puck is already equipped to control and regulate the flow of hydraulic fluid to multiple actuators for controlling the vessel on water. The same remote-control system and same types of hydraulic valves could be utilized to regulate the flow of hydraulic fluid (power) to the land-based propulsion system of Bryham, to provide steering and speed control with the land-based propulsion system.

EX1004, ¶349.

Patent Owner's Expert:

Simply, Bennett-II lacks any express teaching of how a POSITA would have actually implemented radio control of it Bennett-II's tracked drive system. Bennett-II also lacks any teaching of how a POSITA would modify Puck's remotely-controlled liquid manure flow system to also control a tracked drive system. Bryham entirely lacks a remote control, and Bennett-II also lacks any teaching of how a POSITA would be taught modify Puck's remotely-controlled liquid manure flow system to also control a 3-wheeled ground engagement system. In summary, the Puck-

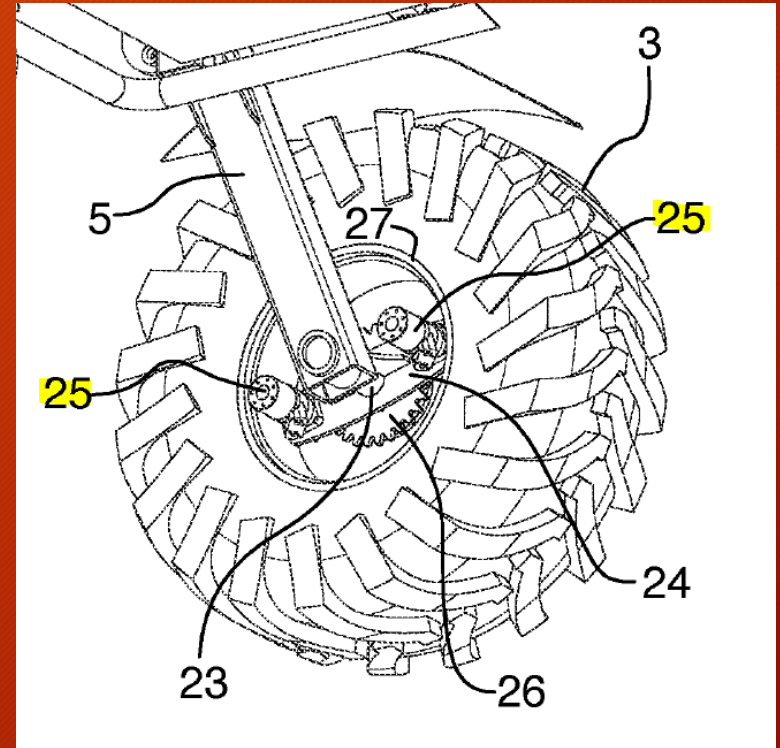
EX1014, ¶127.

GROUND 4 and 5 - Claims 1-21 Are Not Obvious based on Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017]

41

Hydraulic Drive Motors in '425 Patent:

lever 5 by a spindle 23. Fixedly mounted to lever 5 is a bracket 24 supporting a pair of hydraulic motors 25. Each hydraulic motor 25 has an output gear (not shown) that is engaged with a drive gear 26. The drive gear 26 is fixedly attached to a rim 27 of each wheel 3 concentric with the spindle 23. Referring to the right side wheel of the set of wheels 3 (showing an interior of the rim 27), operation of the hydraulic motors 25 in a clockwise direction causes the drive gear 26 to rotate in a counterclockwise direction, moving the vehicle forward. Reversing the direction of operation of the hydraulic motors 25 causes the vehicle to move rearward. By increasing the rotational speed of the hydraulic motors 25 on the right side relative to the motors 25 on the left side, the vehicle is caused to turn to the left.



EX1001, 6.

EX1001, 6:21-34.

GROUND 4 and 5 - No Motivation to Combine Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017] with A Reasonable Expectation of Success

42

Petitioner's Expert on underlying motivation:

vapors and disease-causing pathogens. *Supra* Section V.B.iv. A POSA would have been motivated to add the powered, steerable wheels to the Puck boat to make the process of launching and retrieving the Puck boat from the manure lagoon safer and easier without having to place a trailer or one's feet into the hazardous and corrosive manure lagoon.

EX1004, ¶331.

corrosive to the vehicle and trailer.” EX1015, 1:55-58. A POSA would have understood that like the sea, manure lagoons are highly corrosive environments, with the potential to damage equipment such as towing vehicles and trailers. *Supra* Section V.B.iv. The powered, steerable wheels of Bryham present a solution to the problem of exposing towing vehicles and trailers to corrosive environments by eliminating the need for these types of equipment when launching a boat. EX1015,

EX1004, ¶335.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



GROUND 4 and 5 - No Motivation to Combine Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017] with A Reasonable Expectation of Success

43

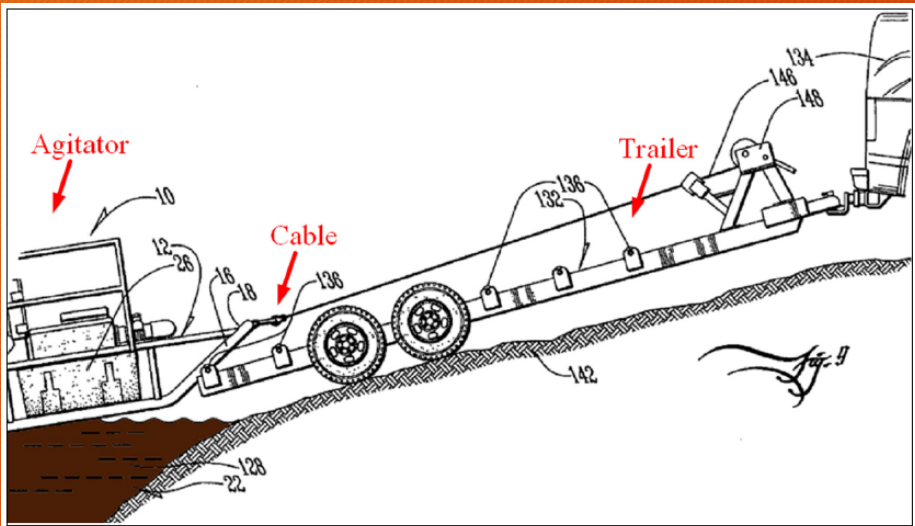
Puck's trailer:

sections (26) and the trailer is backed toward the lagoon (22). (FIGS. 1, 4, 8 and 9). Depending upon the angle of the trailer (132), the agitator (10) may roll off the trailer (132) by the force of gravity or may be manually pushed from the trailer (132) into the lagoon (22). If desired, the trailer (132) may be

EX1004, ¶332; EX1014, 10.

EX2029, ¶305; EX2008, 7.

EX1014, ¶34.



GROUND 4 and 5 - No Motivation to Combine Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017] with A Reasonable Expectation of Success

44

Therefore, the problems attempted to be solved by Bryham do not exist for Puck's boat. As such, without such problems existing for Puck, no POSITA would have combined Bryham with Puck.

308. Furthermore, if a POSITA were concerned about "exposing a towing vehicle and trailer to highly corrosive environments" as Dr. Winkel argues (*see* EX1004, Winkel Decl., ¶335), they certainly would not have looked to substitute Puck's trailer, which did not need to be submersed in a manure lagoon, for a ground engaging propulsion structure that would be submersed in a manure lagoon the entire time the manure agitation vehicle was operating in the lagoon. In other words, if a POSITA were concerned that the "corrosive" environment of a manure lagoon might damage Puck's trailer and trailer wheels/bearings, that concern would lead them away from adding Bryham's wheels to Puck's manure lagoon agitation boat because the wheels, bearings, etc. of Bryham's ground engaging propulsion structure 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. It is entirely illogical to believe that a POSITA that would be concerned about corrosion to trailers and components of trailers such as wheels, would then put those components on the vehicle that would be in the corrosive environment.

Patent Owner's Expert:

EX2029, ¶¶ 307-308.

GROUND 4 and 5 - No Motivation to Combine Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017] with A Reasonable Expectation of Success

45

Evidence of Skepticism RE: Feasibility of Hydraulically Powered Wheels

- a. the Lagoon Crawler's ground engaging structure (the wheels) were going to get stuck and become inoperative on solids in manure lagoons, impeding our ability to retrieve the Crawler;
- b. the Lagoon Crawler's ground engaging structure (the wheels) are going to leak inside of the liquid manure lagoon and cause the Crawler's hydraulic system to fill with manure thereby rendering the Crawler inoperable;
- c. the Lagoon Crawler's ground engaging structure (the wheels) will not have enough traction to be wireless remote controlled to drive out of the liquid manure lagoon; and

- a. the Lagoon Crawler's hydraulic system fittings are going to corrode, causing the Crawler to lose its oil;
- b. the structure of the Lagoon Crawler is going to be destroyed by the gases in the manure lagoon;

EX2083, ¶¶ 55-56.



GROUND 4 and 5 - No Motivation to Combine Puck [EX1014] in view of Bryham [EX1015] or in further view of Bennett-II [EX1017] with A Reasonable Expectation of Success

46

318. Finally, Dr. Winkel readily acknowledges that **manure lagoons – the environment in which Puck’s vessel operates – often have steep and slippery embankments:**

A POSA would have understood that manure lagoons often do not have a designated paved ramp for launching and retrieving vehicles and that **the embankments surrounding lagoons are often steep and may be muddy or covered in vegetation.** EX1040, 55. The Northeast Regional Agricultural Engineering Service notes that **outside bank slopes may be as steep as 3:1.**

EX1004, Winkel Decl., ¶¶ 334, 336. But Dr. Winkel does not explain why a POSITA would have expected the 3-wheel design disclosed in Bryham to provide Puck’s vessel with the capability of traversing these steep and slippery embankments.

319. In my opinion, a POSITA would not reasonably expect that Puck’s vessel could successfully drive into and out of manure lagoons even if Bryham’s wheels could be added. **A POSITA would expect Bryham’s 3-wheel design to be inherently unstable, i.e., prone to tipping if used on steep and uneven terrain.** A POSITA would also expect the one **small steerable front wheel** in Bryham to be **prone to sliding** in this operating environment and would be **ineffective in turning** the vehicle. Finally, **a POSITA would not expect Bryham’s 3-wheel design, with only two powered wheels at the stern, to provide sufficient traction** through mud and manure. As a result,

Patent Owner’s Expert:

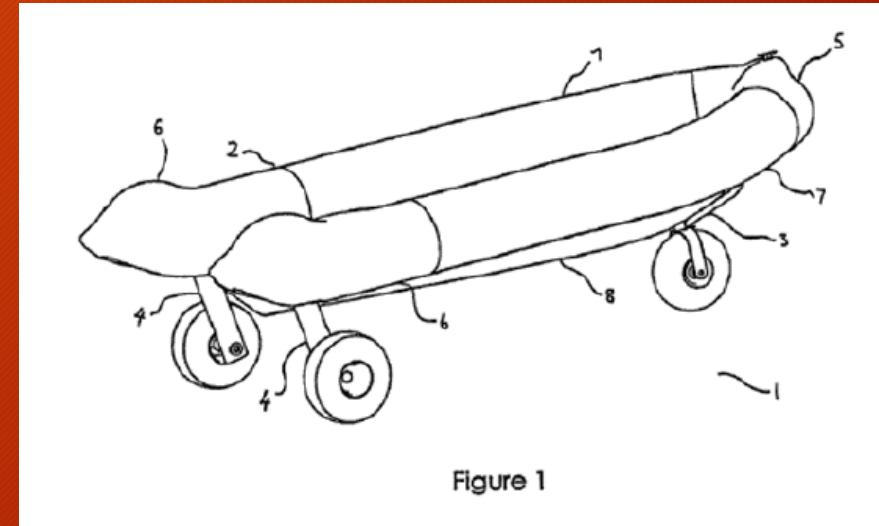


Figure 1

EX1015, 2.

EX2029, ¶¶ 318-319.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Commercial Success

47

- Evidence of Commercial Success = Nuhn Declaration [EX2083], ¶¶23-28; Nuhn Sales Reports [EX2055-2059].
- Over 450 Lagoon Crawlers sold, Millions of Dollars in Revenue.
- Quickly Surpassed Puck - prior market share leader:

Prototype at the 2013 North American Manure Expo. Fast forward to today, my market research indicates that the market share for Nuhn's Lagoon Crawler has totally eclipsed the market share for Puck's pumping boat. Based on my

EX2083, ¶27.

GROUNDS 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Long Felt Need

48

Evidence of Long Felt Need = Prairie Declaration [EX2029], ¶¶18-19, 507-509; [EX1001].

further processing. During storage, a crust can develop on the surface of the pit or lagoon that must be disrupted prior to or during removal of the manure. Pumps 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. Pumps for use in recirculating manure from smaller pits are known; however, 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. They 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.

Accordingly, there is a need for improved pumps and vehicles equipped for pumping, particularly pumps and vehicles suitable for use with large manure lagoons.

18. A typical lagoon has a berm that requires navigation both up and then back down, whereas Puck's design required a trailer to launch the boat.

Compounding this difficulty was the fact that the terrain around a lagoon is often muddy and wet. A typical problem with Puck's boat was that it would get stuck on the bank or enter the lagoon too quickly and nosedive under the liquid.

19. Relatedly, Puck's boat was often ineffective in exiting the lagoon, either because they got stuck in the mud at the bottom of the lagoon or got stuck on "islands" of solid buildup in the lagoon.

EX2029, ¶¶ 18-19.

EX1001, 1:36-52.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Unexpected Results

49

Evidence of Unexpected Results = Prairie Declaration [EX2029], ¶¶510-513; Nuhn Declaration [EX2083], ¶¶29-32; Product Videos [EX2006; EX2007].



EX2007, 3.

EX2006, 2.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

GROUPS 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Praise

50



Angle Iron

A WEEKLY LOOK AT **MACHINERY INNOVATIONS**

Agitator has reclaimed manure lagoons around the world



BY BOB REID

The writer lives near Bright
farmhouse@cwisp.ca

Sebringville – With a dramatic entrance usually reserved for rock stars, the unveiling of a revolutionary piece of farming technology occurred here recently.

To the accompanying sound track of Space Odyssey, from concealment under a slowly rising tarpaulin, emerged blindingly bright head lights through the mist surrounding a self propelled liquid manure agitator.

Not just any self-propelled manure agitator but the 100th unit rolling off the assembly line at Nuhn Industries Limited



The majority of the lagoon crawlers have been sold in Wisconsin but some have been sold as far away as China and

Evidence of Industry Praise =
Nuhn Declaration [EX2083],
¶¶33-51; News Publications
[EX2061-EX2074]; Discovery
Channel Segment [EX2080].

EX2070, 52.



GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Skepticism

51

Evidence of Skepticism and Surprise = Nuhn Declaration [EX2083], ¶¶52-59; Discovery Channel Segment [EX2080].

59. Mr. Koscamp—the dairy farmer whose manure lagoon was pumped by the Lagoon Crawler in the Discovery Channel segment during Extreme Machines week—also skeptically “need[ed] to be sold on this” because he “never thought it could be done” (see around 3m:40s and 4m:40s). See EX2080.

EX2083, ¶59.

Early on, one of the biggest challenges was that “a lot of the suppliers didn’t take us seriously,” Nuhn said. “It felt like this project quickly went to the back of their minds because they

EX2068 32.

GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Licensing

52

- Evidence of Licensing = Nuhn Declaration [EX2083], ¶¶60-63; Puck Email [EX2075].
- Prior Market Leader Puck Custom Enterprises sought to license Nuhn's Lagoon Crawler Patents

60. My Lagoon Crawler invention proved so successful that Puck—the prior market leader in agitation boats that Nuhn has since eclipsed with the Crawler—has sought a license to the Lagoon Crawler technology which includes the '425 Patent and the family of related patents.

EX2083, ¶60.

GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Copying

53

Evidence of Copying = Prairie Declaration [EX2029], ¶¶514-542; Nuhn Declaration [EX2083], ¶¶64-72; Bazooka Patent Apps. [EX2048-EX2050]; Stutsman Invoices [EX2076-EX2078].

Nuhn's Lagoon Crawler



EX2043, NUHN15000007242

Bazooka's Wolverine Agitation Boat



EX2031 at 17

EX2029, ¶525.



GROUPS 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Copying

54

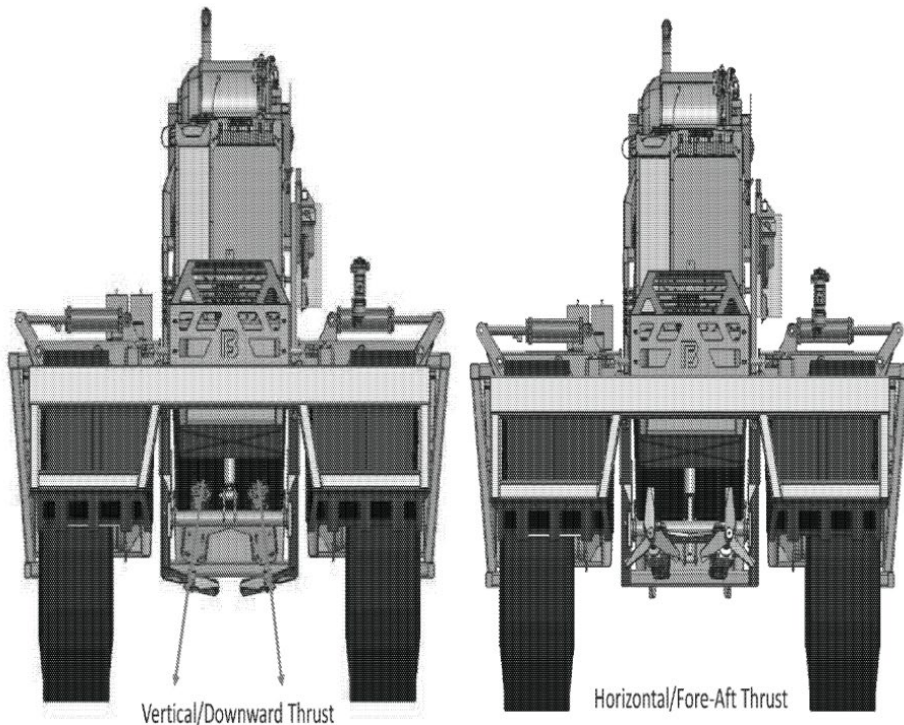


Figure 3A

Figure 3B

EX2048, 18.

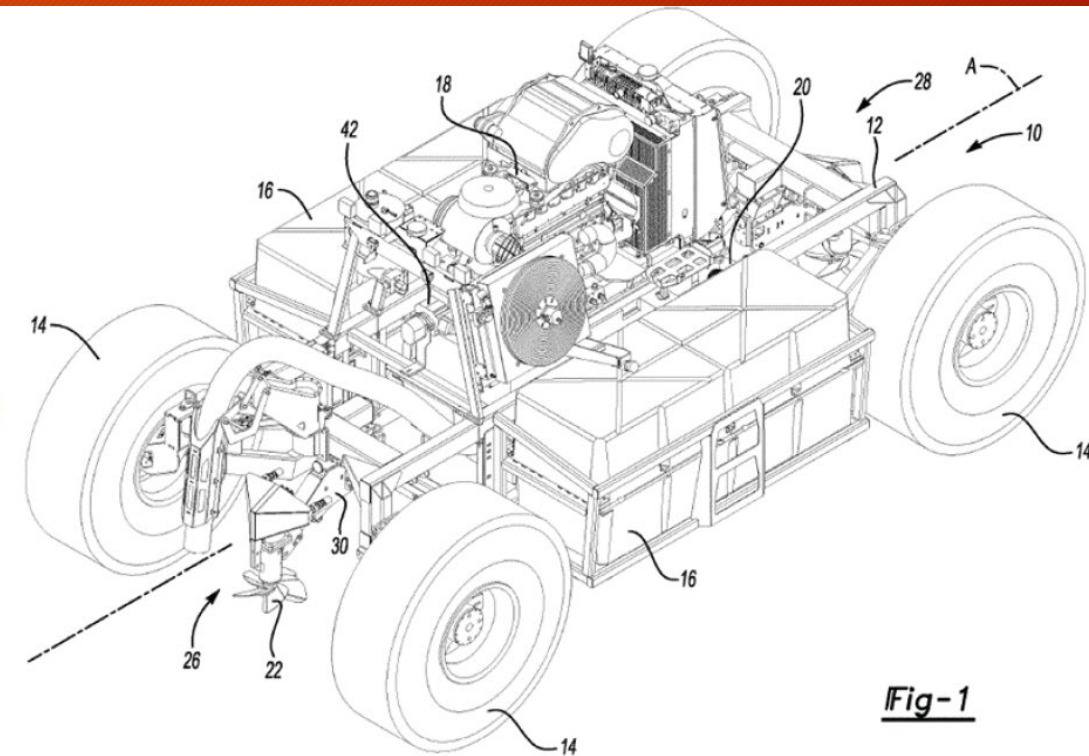


Fig-1

EX2050, 2.

GROUND 2-5 - Secondary Considerations of Non-Obviousness Support Patentability - Nexus

55

Evidence of Nexus = Prairie Declaration [EX2029], ¶¶400-506; EX2035-EX2047.

Gen 1

405. It is my opinion that the claims of the '425 Patent cover Nuhn's Gen 1 Lagoon Crawler and that Nuhn's Gen 1 Lagoon Crawler is commensurate with the scope of the claims of the '425 Patent.

Gen 2

433. It is my opinion that the claims of the '425 Patent cover Nuhn's Gen 2 Lagoon Crawler and that Nuhn's Gen 2 Lagoon Crawler is commensurate with the scope of the claims of the '425 Patent.

Gen 3

460. It is my opinion that the claims of the '425 Patent cover Nuhn's Gen 3 Lagoon Crawler and that Nuhn's Gen 3 Lagoon Crawler is commensurate with the scope of the claims of the '425 Patent.

Gen X

486. It is my opinion that the claims of the '425 Patent cover Nuhn's Crawler X and that Nuhn's Gen 3 Lagoon Crawler is commensurate with the scope of the claims of the '425 Patent.

EX2029, ¶¶ 405, 433, 460, 486.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE



GROUND 6 - Claims 1-21 Are Not Anticipated by Lyseng [EX1019]

56

Lyseng is NOT PRIOR ART

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 17/201,100 filed Mar. 15, 2021, which is a continuation of U.S. patent application Ser. No. 16/891,627 filed Jun. 3, 2020, which is a continuation of U.S. patent application Ser. No. 16/157,950, filed Oct. 11, 2018 now issued under U.S. Pat. No. 10,710,422 on Jul. 14, 2020, which is a continuation of U.S. Ser. No. 15/586,493 filed May 4, 2017, now issued under U.S. Pat. No. 10,124,638 on Nov. 13, 2018, which is a continuation of U.S. patent application Ser. No. 15/044,905 filed Feb. 16, 2016 now issued under U.S. Pat. No. 9,694,636 on Jul. 4, 2017, which is a continuation of international patent application PCT/CA2014/050789, filed Aug. 18, 2014, which **claims the benefit of U.S. patent application 61/867,598 filed Aug. 19, 2013**, the entire contents of which are herein incorporated by reference.

Float your boat in a slurry moat

By Ron Lyseng

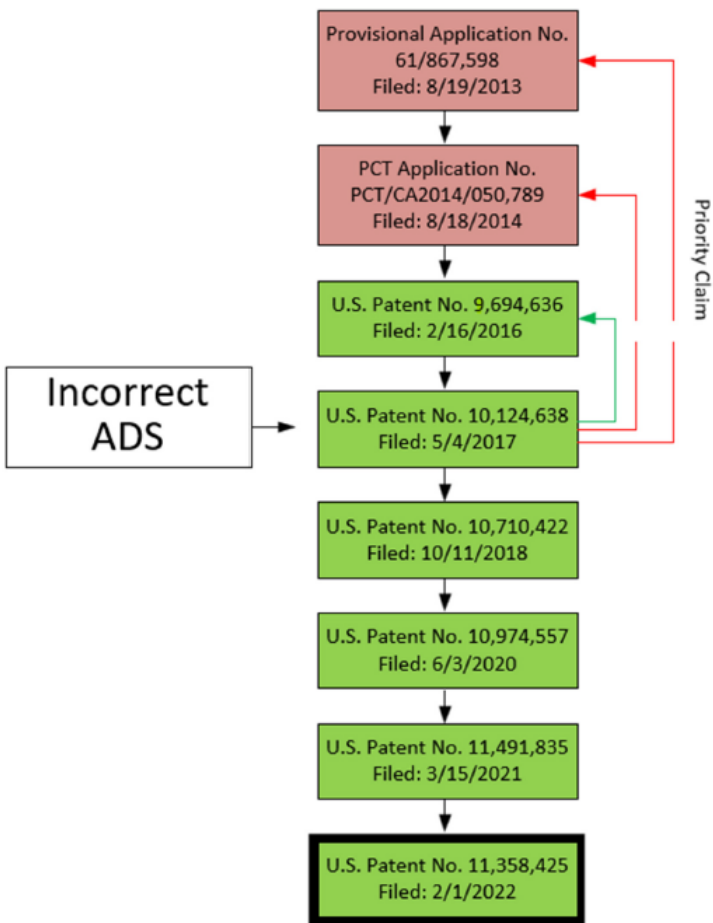
Published: August 29, 2013

EX1019, 1.

EX1001, 1:6-21.

GROUND 6 - Claims 1-21 Are Not Anticipated by Lyseng [EX1019]

57



USPTO GRANT PO's Petition:

In re **Patent 10,124,638**
Nuhn Industries Ltd.
Application No.: 15/586,493
Filing Date: 04 May 2017
Attorney Docket No.: NUN-0007-US2
For: AMPHIBIOUS PUMPING VEHICLE

DECISION

With regard to item (iii), **the petition contains a proper statement of unintentional delay.** Applicant also provided an explanation for the extended delay in filing this petition. Applicant's explanation is accepted.

For the reasons above, **the petition under 37 CFR 1.78(c) and (e) is GRANTED.**

EX2002, 2-3.

Paper 1, 29.