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Mortimer

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[54] **MOBILE IRRIGATION SYSTEM**

[75] Inventor: **John A. Mortimer,** San Jose, Calif.

[73] Assignee: **Shur-Rane Corporation,** San Jose, Calif.

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[52] **U.S. Cl.** **239/212;** 137/344; 239/73

[51] **Int. Cl.**[2] **B05B 3/02;** B67D 5/08

[58] **Field of Search** 239/71, 73, 146, 147, 177, 239/178, 212, 213; 137/344

[56] **References Cited**

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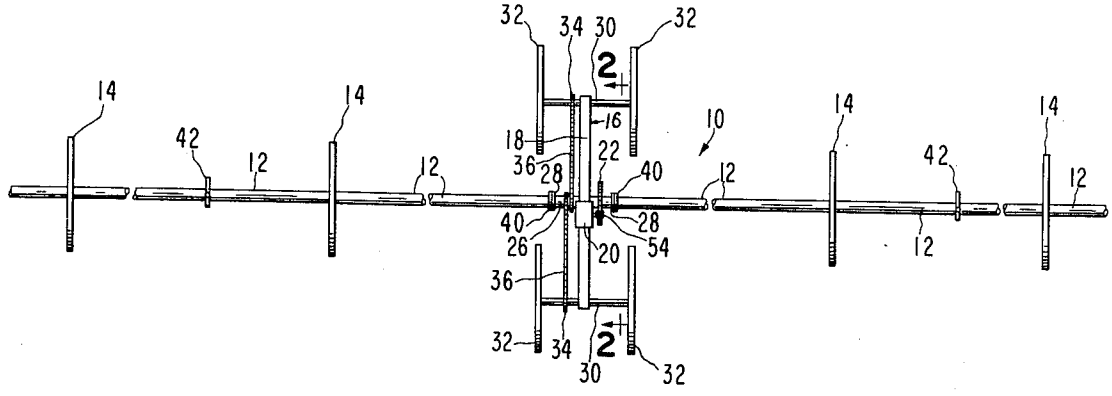
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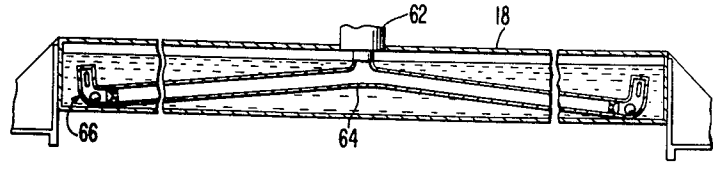
Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Andres Kashnikow
Attorney, Agent, or Firm—Limbach, Limbach & Sutton

[57] **ABSTRACT**

In a mobile irrigating system having a plurality of wheel mounted irrigating pipes coupled together in a line to a central internal combustion engine powered driving unit, a hollow cross support for the axles stores a season's supply of fuel and indicating panels mounted on the wheels show the alignment of sprinkler heads mounted on the pipes.

6 Claims, 3 Drawing Figures





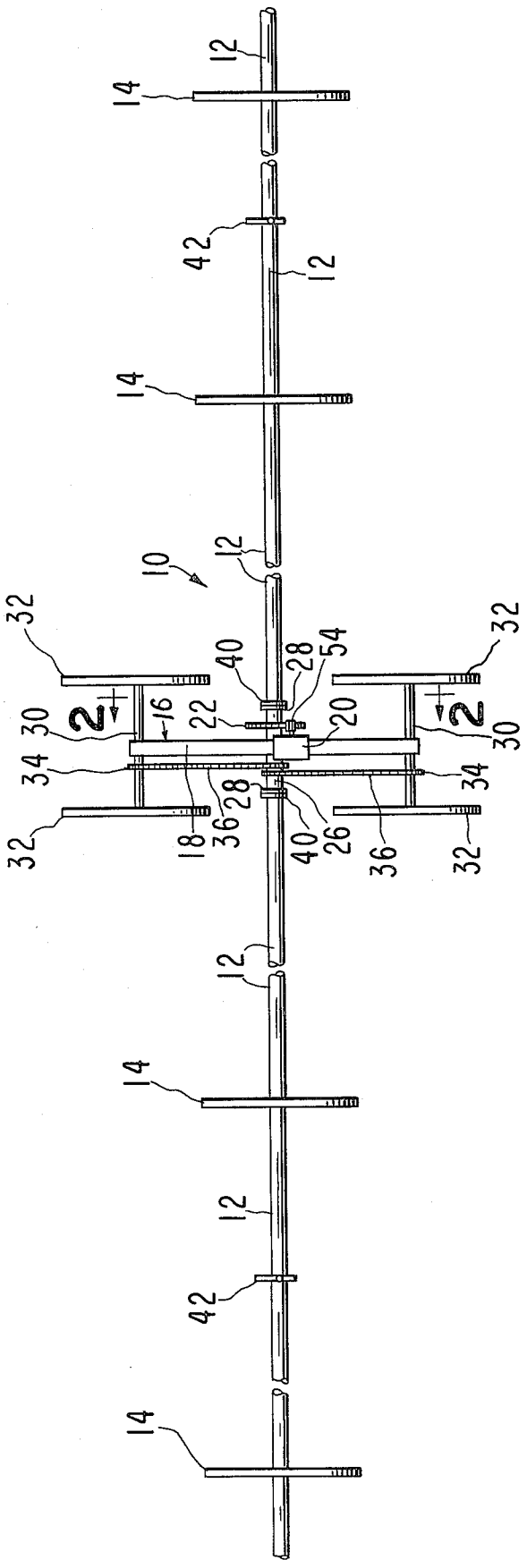

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FIG. 1

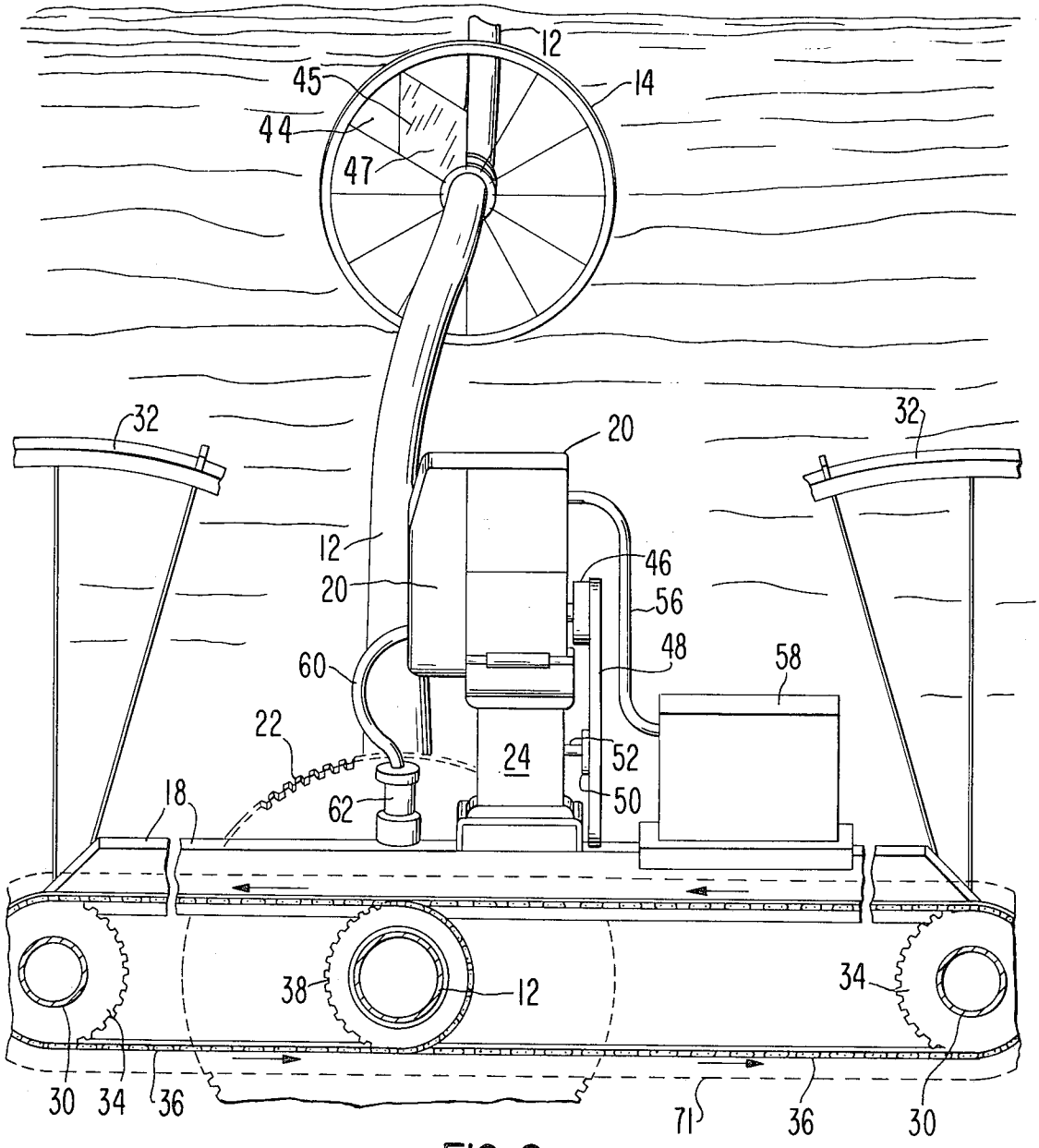
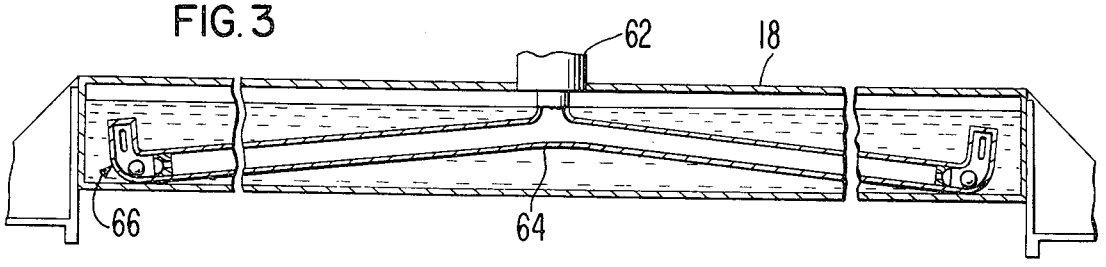

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FIG. 2

FIG. 3


62
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MOBILE IRRIGATION SYSTEM

BACKGROUND OF THE INVENTION

The invention relates to an internal combustion engine powered mover for use in a mobile irrigating system and more particularly to an improved power mover connected in the center of a line of coupled, wheel-mounted irrigating pipes.

The centralized power unit applies a torque to the wheel-mounted pipes through a motor-driven bull gear which is mounted on a wheeled carriage which straddles the pipe. Driving power is usually also provided to the wheels of the carriage as well as to the bull gear. In many mobile irrigation systems, since the sprinkler heads are attached directly to the lengths of rotating pipe, alignment can be a critical problem since the entire line of coupled pipes must be rotated to the new position and stopped at exactly the point where the sprinkler heads are pointed in the proper direction so that they will properly irrigate the field. This sometimes requires a certain amount of jockeying of the power mover. In application Ser. No. **544,208,** filed Jan. **7, 1975,** and entitled METHOD AND APPARATUS FOR REVERSIBLY POWERING A MOBILE IRRIGATION SYSTEM, and assigned to the assignee of the present application, a power mover with a reversible, internal combustion engine is described. The reversible engine in that system easily allows such maneuvering of the pipes to properly align them; however, there is still the problem of providing an adequate visual indication of the alignment for the operator.

It is necessary for all these systems to operate over an entire season with a minimal amount of maintenance. In some systems, keeping the unit powered throughout an entire season can be vexing since fuel must usually be carried out to the middle of the field.

SUMMARY OF THE INVENTION

The above and other disadvantages are overcome by the present invention of an improved, mobile irrigating system of the type having a plurality of wheel-mounted irrigating pipes coupled in line to a central, internal combustion engine powered unit which turns the irrigating pipe wheels by turning the line of coupled pipes wherein the improvement comprises a sealed, hollow cross support structure for the central power unit, the hollow space of the cross support constituting a fuel tank for the engine, and indicator means mounted on selected ones of the wheels and aligned with each other to indicate the rotational orientations of the pipes about their longitudinal axes.

In the preferred embodiment, a hollow, T-shaped pipe is mounted within the hollow cross support and a hollow fitting passes into the hollow of the cross support and is sealed to the midpoint of the T-shaped pipe to establish fluid communication therebetween. The fitting is connected by a pipe to the engine and the distal ends of the T-shaped pipe are positioned within the ends of the hollow cross support. Check valve means are mounted within the distal ends of the T-shaped pipe so that fuel within the hollow cross support may be sucked through the T-shaped pipe by the engine regardless of the attitude of the cross support with respect to gravitational forces which might cause the fuel within the cross support to accumulate at one end.

The central power unit includes a pair of opposed, parallel axles and the cross support is elongated and

rigidly connected between the pair of axles. The hollow of the cross support is sufficiently large to accommodate a season's supply of fuel for a two cycle, reversible, internal combustion engine.

The indicator means comprise a plurality of sector shaped panels, each panel being attached to a separate wheel and laying flat in the plane of the wheel and each panel having a figure graphically depicted thereon. The figure has a major point extending radially outwardly from the longitudinal axis of the pipe and is aligned with sprinkler heads mounted on the pipes.

It is therefore an object of the invention to provide an integral fuel supply for a power mover;

It is another object of the invention to provide an integral fuel supply for a power mover which is capable of holding a season's supply of fuel; and

It is still another object of the invention to provide sprinkler alignment indicating means for a mobile irrigation system.

The foregoing and other objectives, features and advantages of the invention will be more readily understood upon consideration of the following detailed description of certain preferred embodiments of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a mobile irrigating system according to the invention;

FIG. **2** is an enlarged view, with portions broken away, taken generally along the line **2—2** of FIG. **1** after the unit has been moved to a new position; and

FIG. **3** is an enlarged vertical view, in section, and with portions broken away of the center support structure of the centralized power unit of the invention.

DETAILED DESCRIPTION OF CERTAIN PREFERRED EMBODIMENTS

Referring now more particularly to FIGS. **1, 2** and **3,** a mobile irrigation system **10** according to the invention is depicted in which a plurality of hollow irrigating pipes **12** are mounted through the center hubs of individual wheels **14** and are coupled together in a line to each side of a central power mover **16.** The power mover **16** has a cross support structure **18** on which is mounted a reversible internal combustion engine **20.** The engine **20** drives a bull gear **22** through a reducing gear assembly **24** (FIG. **2**). The bull gear **22** resides in a plane which is substantially parallel to the longitudinal axis of the cross support **18** and is perpendicular to the line of pipes **12.** A short length of pipe **26** passes beneath the cross support **18** and through the bull gear **22.** The pipe **26** is integrally connected with the bull gear **22** and is provided with a pair of flanges **28** at either end. It is rotatably mounted to the support **18** by means of a bracket (not shown). The sections of pipe **12** closest to the power mover **16** are provded with corresponding flanges **40** which bolt to the flanges **28** to make a fluid-tight coupling which is capable of transmitting torque from the bull gear **22** to the line of pipes **12.**

At the distal ends of the cross support **18** are a pair of axles **30** on the ends of which are mounted wheels **32.** The axles **30** are each provided with sprocket gears **34** which are connected by driving chains **36** to separate secondary sprocket gears **38** mounted integrally with the pipe **26** to the bull gear **22.**

Each irrigating pipe **12** is provided with one or more sprinkler heads **42** and when the pipes **12** are assembled together they are aligned such that all the sprinkler heads **42** are also aligned with each other along the length of coupled pipes. As can be seen by the exaggerated bend in the line of pipes **12** in FIG. **2**, a certain amount of jokeying in the position of the power mover **16** is sometimes required to straighten out the line. It is for this purpose that the engine **20** is preferably of the reversible type. An indicator panel **44** is mounted between the spokes of the wheels **14** at periodic intervals to visually display when the sprinkler heads **42** are pointing upwardly. The indicator panel **44** is sector shaped and is attached to the wheel **14** so as to lay flat in the plane of the wheel. The panel **44** is graphically marked with a diamond shaped figure **45** having a major point **47** extending radially outwardly from the longitudinal axis of the pipe **12**. The major point **47** is also aligned with the sprinkler heads **42** so that when all of the diamond shaped figures are pointing upwardly the operator knows that the sprinkler heads **42** are properly oriented for irrigation.

In operation, the engine **20** is started in a particular direction and this drives the bull gear **22** and the secondary sprocket gears **38** so that the pipes **12** and the wheels **32** are caused to rotate in the same direction, thereby turning the wheels **14** of the wheel-mounted irrigating pipes **12** so that the whole assembly moves along the field. It is sometimes necessary to reverse the direction of the assembly **10** in order to align, for example, the sprinkler heads **42** so that they are properly directed over the field. In such case the engine **20** is stopped and re-started in the opposite direction so that the whole assembly is moved in the rearward direction until proper alignment is obtained, as is visually indicated to the operator by the panels **44** and the figures **45**.

The engine **20** which is utilized is a two-cycle, eight horsepower, internal combustion, gas powered engine. The engine **20** is constructed in such a manner that it can run in either of two directions, depending on the direction in which it is started. The particular engine utilized in the preferred embodiment of the invention is known in the trade as Fujiheavy's Robbin Engine, Model E.C. **17DS** and is manufactured in Tokyo, Japan.

Referring now more particularly to FIG. **2**, it can be seen that the engine **20** includes an output drive shaft pulley **46** which turns a driving belt **48** connected to a larger pulley **50** on the end of the drive shaft **52** of the reduction gear assembly **24**. The reduction gear assembly **24** has a low speed, output pinion gear **54** which engages with and drives the bull gear **22**.

The motor **20** is connected by means of a cable **56** to a control case **58**, mounted on the cross support **18**, which houses a battery. The engine receives fuel through a line **60** to a hollow coupling **62** mounted in the cross support **18**.

As is more clearly depicted in FIG. **3**, the cross support **18** is hollow and is used to store a growing season's supply of gasoline fuel for the engine **20**. The coupling **62** passes through the upper surface of the cross support **18** and is attached to the midpoint of a hollow, T-shaped pipe **64** which extends the length of the hollow interior of the cross support **18**. The distal ends of the T-shaped pipe **64** are equipped with ball-check valves **66** which serve the purpose of closing off either open end of the T-shaped member **64** whenever the corresponding end of the cross support **18** is tilted upwardly so that the fuel drains to the opposite end of the cross support **18**. This prevents air from being sucked into the fuel line **60**.

The terms and expressions which have been employed here are used as terms of description and not of limitations, and there is no intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described, or portions thereof, it being recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. An improved, mobile irrigating system of the type having a plurality of wheel mounted irrigating pipes coupled in line to a central, internal combustion engine powered unit which turns the irrigating pipe wheels by turning the line of coupled pipes wherein the improvement comprises a sealed, hollow cross support structure for the central power unit, the hollow space of the cross support constituting a fuel tank for the engine, and indicator means mounted on selected ones of the wheels and aligned with each other to indicate the rotational orientations of the pipes about their longitudinal axes.

2. An improved, mobile irrigating system as recited in claim **1** wherein a hollow, T-shaped pipe is mounted within the hollow cross support, a hollow fitting passes into the hollow of the cross support and is sealed to the midpoint of the T-shaped pipe to establish fluid communication therebetween, the distal ends of the T-shaped pipe being positioned within the ends of the hollow cross support, and check valve means mounted within the distal ends of the T-shaped pipe, whereby fuel within the hollow cross support may be sucked through the T-shaped pipe by the engine regardless of the attitude of the cross support with respect to gravitational forces which might cause the fuel within the cross support to accumulate at one end.

3. An improved, mobile irrigating system as recited in claim **2** wherein the central power unit comprises a pair of opposed, parallel axles and the cross support is elongated and rigidly connected between the pair of axles.

4. An improved, mobile irrigating system as recited in claim **2** wherein the hollow of the cross support is sufficiently large to accommodate a season's supply of fuel for an internal combustion engine.

5. An improved, mobile irrigating system as recited in claim **1** wherein the indicator means comprise a plurality of sector shaped panels, each panel being attached to a separate wheel and laying flat in the plane of the wheel and each panel having a figure graphically depicted thereon, the figure having a major point extending radially outwardly from the longitudinal axes of the pipe.

6. An improved, mobile irrigating system as recited in claim **5** wherein at least one pipe has at least one sprinkler head mounted thereon and an indicating panel is attached to the wheel mounted on the one pipe with the major point of the figure being aligned with the sprinkler head.

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