Jan. 20, 1970 R. J. BECKETT 3,490,380

PORTABLE WATER PUMP

Filed June 26, 1968 3 Sheets-Sheet 1

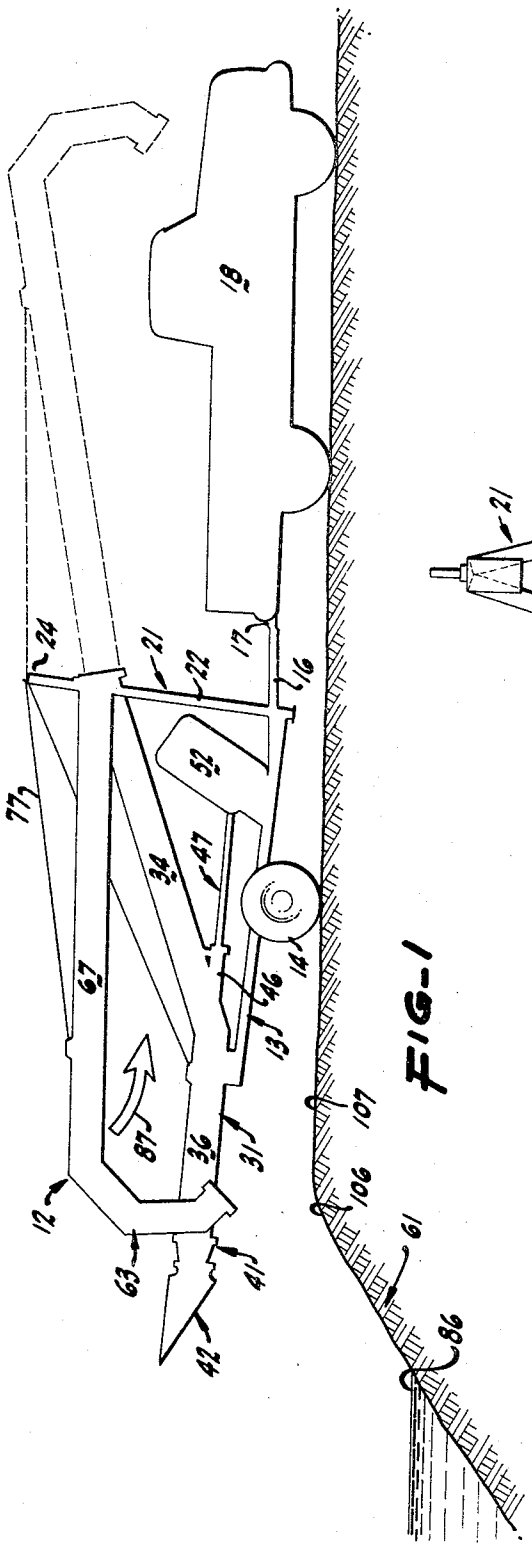


FIG. 1

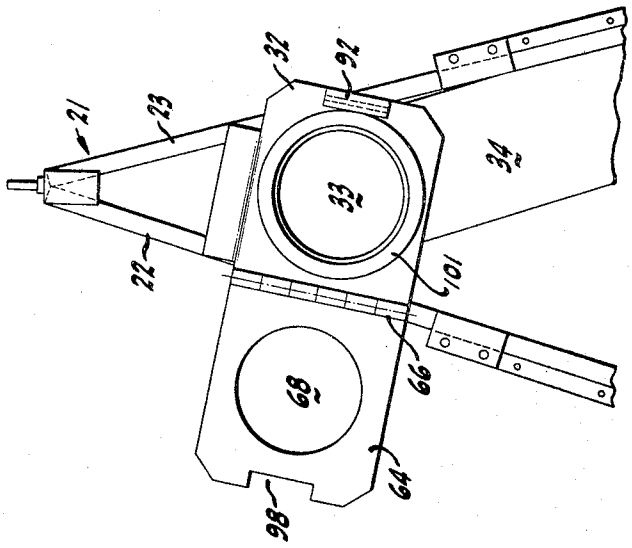


FIG. 4

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PORTABLE WATER PUMP

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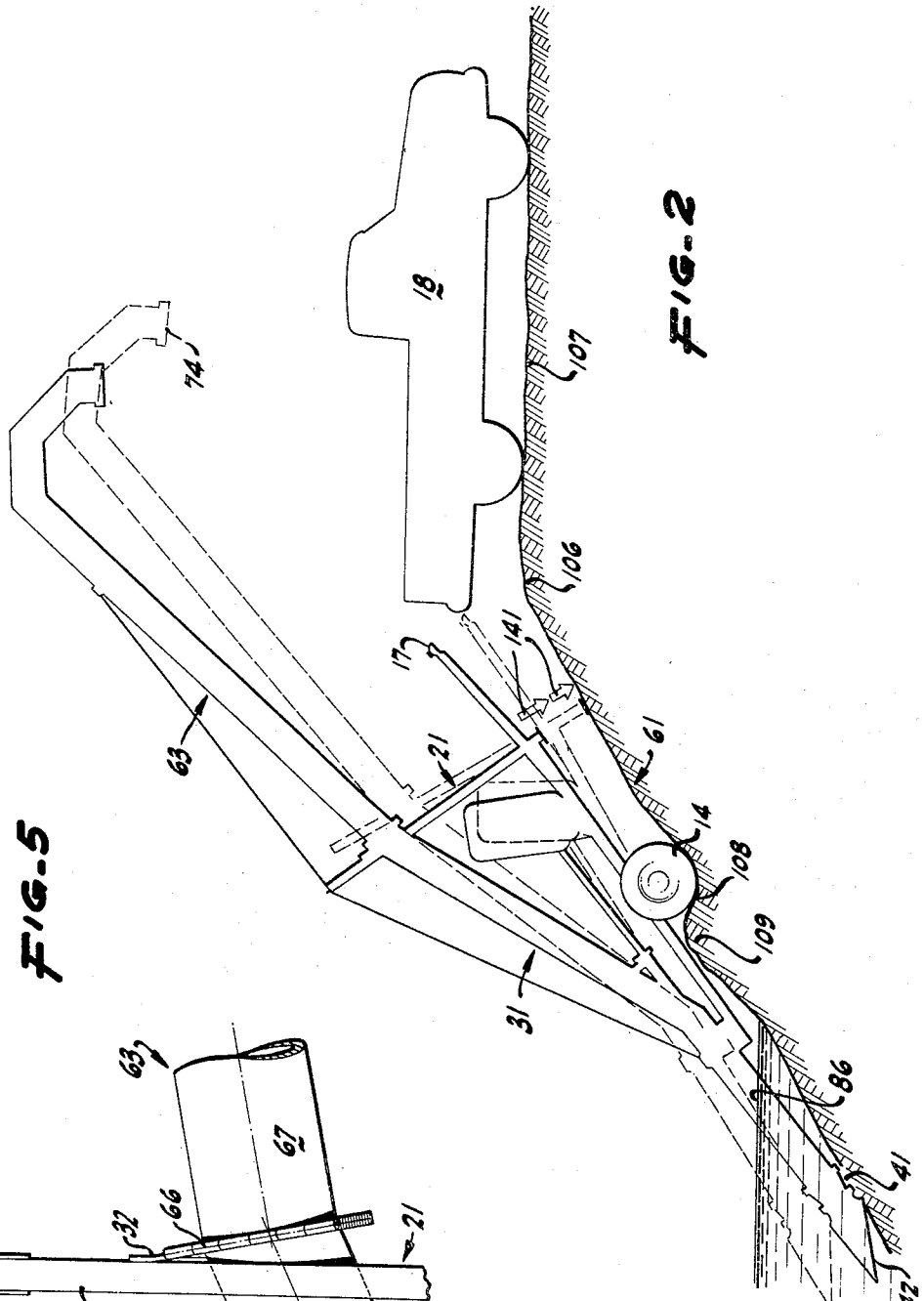


FIG. 2

FIG. 5

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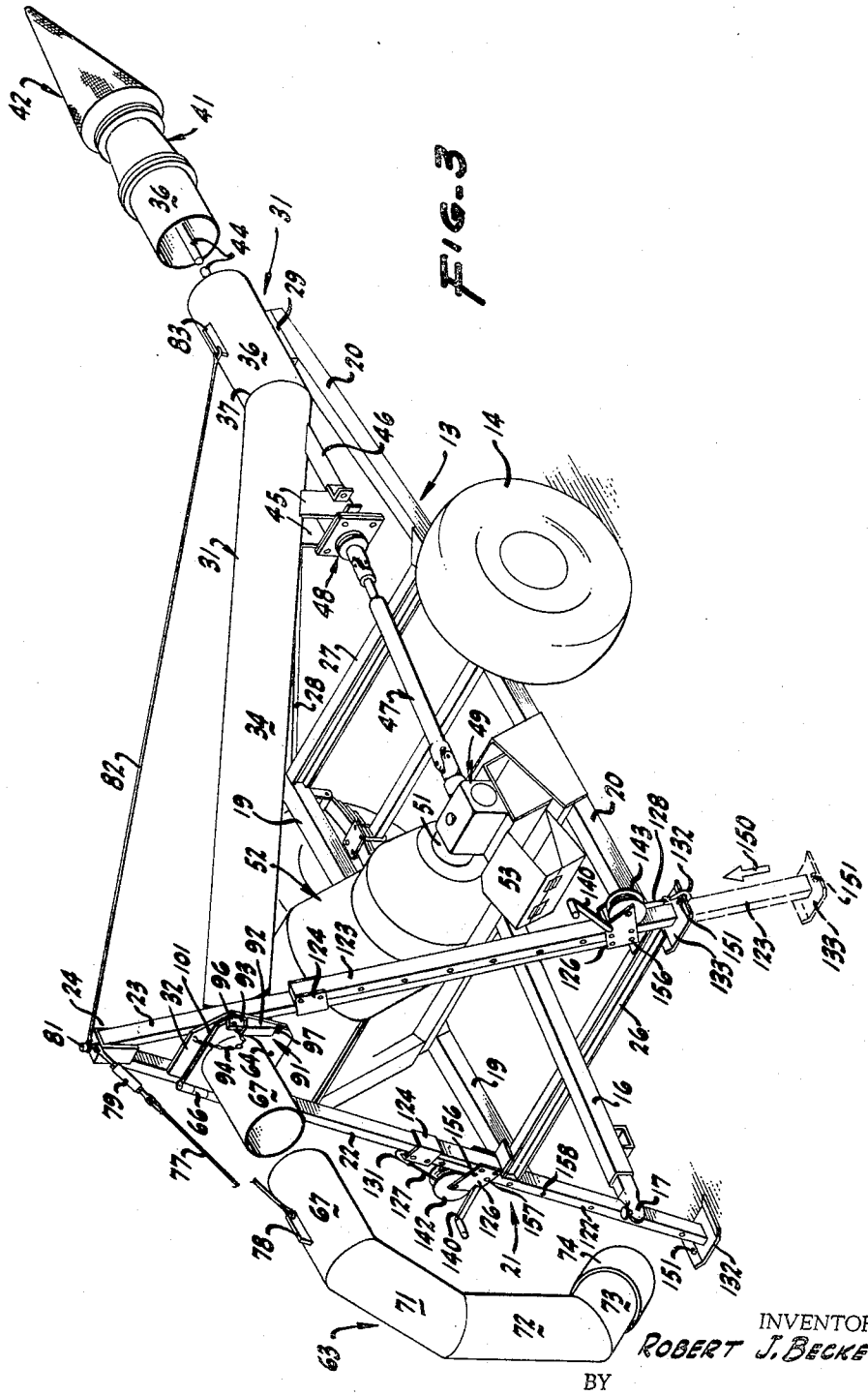
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FIG. 3



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PORTABLE WATER PUMP

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9 Claims

ABSTRACT OF THE DISCLOSURE

A trailer frame carries an adjustable supporting structure arranged to incline the rear end of the frame downwardly after the trailer is backed up onto the banks of a water source, such as a canal, stream or lake. An elongated pipe mounted on the frame extends from a water intake end to an elevated water delivery end, and an internal combustion engines drives a water pump located on the intake end. The pipe is foldable into two parallel segments for convenience in transporting the apparatus.

The invention relates to improvements in portable water pumps.

It is frequently desirable to pump water from one location to another in a situation where a permanent pump installation is not feasible. For example, in flood conditions, temporary, high volume pump capabilities are often urgently needed. Other applications are construction jobs, such as highway building, wherein tank trucks are constantly on the move and which require large quantities of water for sprinkling and other purposes as the highway construction proceeds.

Still other situations are encountered, or exist, wherein it is desired to take water from a lake, pond, canal, stream, river or other watercourse and pump the water to another location. In substantially all of these situations the banks of the waterway are inclined at an angle, thereby rendering the usual portable pump unsuitable for flexible, high volume use.

It is therefore an object of the invention to provide a portable water pump which particularly lends itself to use in conjunction with the inclined banks of a water source.

It is another object of the invention to provide a portable water pump which can readily be towed on the highway and which can, with facility, be placed in operating condition at the desired pump site.

It is still another object of the invention to provide a portable water pump which is extraordinarily versatile and flexible in that it lends itself to installation with a wide variety of terrains, streambed contours and other conditions.

It is a further object of the invention to provide a portable water pump which is not only relatively inexpensive with respect to acquisition cost, but which is very economical as to upkeep and repair owing to the rugged nature of its construction.

It is another object of the invention to provide a generally improved portable water pump.

Other objects, together with the foregoing, are attained in the embodiment described in the following description and illustrated in the accompanying drawings in which:

FIGURE 1 is a side elevational view in outline, showing in full line the arrangement of the parts during towing and as the trailer is being backed up on the bank of the waterway, the broken line indicating the discharge pipe segment swung into and locked in operating position;

FIGURE 2 is a view comparable to FIGURE 1 but with the apparatus in fully installed condition, perparatory for the pickup truck to leave the site;

FIGURE 3 is a perspective view, to an enlarged scale, showing the device in assembled condition, portions of the elements being broken away to reduce the extent of the figure;

FIGURE 4 is a fragmentary, front elevational view of the folding pipe joint, with the two pipe flanges in open position; and,

FIGURE 5 is a fragmentary, side elevational view of the pipe joint structure showing the two pipe segments in closed position.

While the portable water pump of the invention is susceptible of numerous physical embodiments, depending upon the environment and requirements of use, substantial numbers of the herein shown and described embodiment have been made, tested and used under a wide variety of field conditions and all have performed in an eminently satisfactory manner.

The portable water pump of the invention, generally designated by the reference numeral **12**, comprises a trailer **13** supported on ground engaging wheels **14**. The trailer has a forwardly extending draw bar **16** carrying a towing hitch **17** engageable with the after end of a towing vehicle **18**, such as a pickup truck.

Mounted adjacent the forward end of the parallel fore and aft members **19** and **20** of the trailer frame, and substantially perpendicular to the plane of the trailer frame, is a generally vertical framework **21** triangular in front elevation (see FIGURE 3) and including a pair of legs **22** and **23** terminating in an apex **24** and spanned adjacent their lower ends by a horizontal brace **26** connecting the forward ends of the fore and aft frame members **19** and **20**. A cross brace **27** connects the after ends of members **19** and **20**.

The fore and aft frame member **20** is elongated rearwardly and at its after end is joined to a diagonal member **28** extending from the after end of the frame member **19**, the junction of the members **20** and **28** carrying a platform **29**.

Mounted on the trailer **13** and on the vertical framework **21** is a stationary pipe segment, generally designated by the reference numeral **31**. The forward end of the pipe segment **31** is welded to a centrally apertured steel plate **32** mounted on the forward side of the "tripod" legs **22** and **23** and rather high up, near the apex **24** (see FIGURE 3).

The pipe **31** is in registry with the central opening **33** in the plate **32** and from the plate **32** the pipe extends rearwardly and downwardly as well as somewhat diagonally. This is to say, the forward end of the pipe section **34** of the stationary pipe segment **31** is centered on the median, vertical, longitudinal plane of the trailer **13**. However, as appears most clearly in FIGURE 3, the platform **29** supporting the pipe section **36** is laterally offset and is, in fact, superposed over and parallel to the longitudinal frame rail **20**. Thus, in extending between the tripod plate **32** and the forward end **37** of the after pipe section **36**, the pipe section **34** is inclined diagonally as well as rearwardly and downwardly.

The rearwardly extending pipe section **36** has mounted thereon a pump bowl assembly, generally designated by the reference numeral **41** and a strongly constructed, rust resisting strainer **42** of substantially conical configuration. While forming an important part of the operation of the device, the pump and strainer assemblies do not lie at the core of the present invention and are therefore neither shown nor described in detail.

The pump assembly **41** can be of any suitable variety, such as a propeller or other axial flow type, and is driven, for example, by a propeller drive shaft **44** extending through a packing gland **46** on the lower after wall of the inclined pipe section **34**, the gland being supported by struts **45**.

A drive shaft assembly **47** and bearing assembly **48**, both of conventional make, connect the drive shaft **44** to a standard right-angled gear assembly **49** connected, in turn, through a flexible coupling **51** to a prime mover **52**, such as an internal combustion engine. The engine **52**, the gear **49** and accessories, such as a battery box **53**, are mounted on appropriate structural members secured to the trailer frame **13**.

An important feature of the invention is the forward tilt or angular disposition of the engine. As appears most clearly in FIGURES 1–3, the median, vertical, longitudinal plane through the engine is forwardly inclined relative to the perpendicular to the general plane of the trailer frame and is transverse to the longitudinal axis of the trailer. As a result, when the trailer is positioned in its inclined, operative attitude, as in FIGURE 2, the engine is substantially in a normal, upright attitude. The angle of inclination of the engine can be established at a given angular amount, in dependence upon the angular inclination of the average bank **61**, or levee, to be encountered.

It is also possible, although not shown herein, to mount the engine on angularly adjustable blocks affording, within limits, any desired degree of angular attitude.

The foregoing descriptive material relates for the most part to the stationary pipe segment assembly, which also includes the engine and pump and which can therefore be conveniently characterized as the water intake members.

Water delivery is effected through a discharge member comprising a movable pipe segment **63** including a centrally apertured base plate **64**, or flange, hingeably mounted on an inclined hinge **66** located along the inclined nether margin (see FIGURE 3) of the fixed plate **32**.

The swingable pipe segment **63** conveniently includes a base section **67** welded substantially perpendicularly to the base flange **64** and in registry with the flange opening. Depending upon the desired elevation and direction of water discharge, auxiliary connected pipe sections can be utilized such as sections **71**, **72** and **73**. For discharge into a tank trunk, for example, a collar **74** can also be utilized to serve as an anchor for a flexible sleeve or hose (not shown).

The weight of the swingable pipe segment **63** is borne, for the most part, by a wire cable **77** secured to an anchor **78** and connected through a turnbuckle **79** to a post **81** at the apex of the tripod frame **21**. A countervailing force is provided by a wire cable **82** extending from the post **81** to an anchor pad **83** on the fixed pipe section **36**.

As will be appreciated, the swingable pipe segment **63** during transit is folded back into a fore and aft relation approximately parallel to and slightly higher than the fixed pipe segment **36** (see FIGURE 1). This compact arrangement of parts enables the apparatus to be towed readily and to be conveniently backed onto the bank **61**, or levee, at the desired location relative to the body of water **86**.

Upon arrival at the site, the truck driver can, without the help of anyone else, take hold of and swing the pipe segment **63** forwardly in the direction generally indicated by the arrow **87** and into the operative location shown in broken line in FIGURE 1.

At this juncture, the two pipe segments are firmly locked into position by a wedge type of latch **91**. A wedge shaped pocket **92** on one edge of the fixed plate **32** and a wedge member **93** (secured by a retention chain **94**) is inserted downwardly into the pocket **92** and, if necessary, lightly tapped with a hammer. The upper end **96** and the lower end **97** of the wedge project from the pocket **92** and overlie the underlying areas of the swingable plate **64**. A recess **98** in the plate **64** prevents interference with the pocket **92** as the movable plate **64** is moved into engagement with the fixed plate **32**.

A gasket **101** is interposed between the faces of the movable plate **64** and the fixed plate **32** and as the wedging action takes place, an effective, water-tight seal is afforded.

As a matter of importance, in that it enables only one man to place the pipes in operative condition, the two plates **32** and **64** are inclined at a slight angle in side elevation relative to the vertical (see FIGURE 5) and the hinge **66** is also inclined at a slight angle in front elevation relative to the vertical (see FIGURE 4). The effect of this compound angular relationship is to cause the two interfaces (with interposed gasket) to seal very tightly under the gravitational force exerted by the swingable pipe. At the same time, however, the compound angles are not so great as to require undue effort in swinging the movable pipe in opposition to the gravity component.

With the discharge pipe located and locked forwardly in the position shown in broken line in FIGURE 1, the pickup truck is slowly backed up, the trailer passing over the curve **106** of the berm **107**, thence downwardly on the bank until the wheels **14** are lodged in a pre-dug pit **108** and stopped by a corresponding mound **109** formed from the material removed from the pit. As an alternative to the pit and mound construction, wedges, blocks or timber crossties can be placed behind the wheels **14** for security.

With the wheels firmly positioned, the trailer is unhitched from the truck and the front end of the trailer is located so that the frame assumes the proper angle of inclination relative to the bank and the body of water.

In order to effect this result, there is provided a pair of leg extensions **122** and **123** located alongside the corresponding tripod legs **22** and **23** and slidable relative thereto.

A bracket **124** is mounted on each of the upper ends of the leg extensions and loosely encompasses the underlying leg to allow of relative sliding motion therebetween. A somewhat similar type of guide bracket **126** is carried on each of the lower ends of the two tripod legs **22** and **23**, the lower guide brackets **126** cooperating with the upper guide brackets **124** so that the leg extensions **122** and **123** can be lengthened to whatever extent is necessary to implant a corresponding pair of foot plates **132** and **133** firmly on the ground and with the frame at the desired angular inclination.

In the usual case the leg extensions will have to be forcibly lengthened, or jacked, so as to elevate the forward end of the trailer, as shown by the arrows **141** in FIGURE 2.

Jacking is accomplished by actuating a crank **140** on each of a pair of winches **142** and **143** mounted on the lower guide brackets **126**. Wire cables **127** and **128** terminate in hooks **131** and **132**, respectively.

When it is desired to lengthen the leg extension, for example, the left-hand leg extension **122** shown in FIGURE 3, the hook **131** is hooked over the edge of the upper guide bracket **124** secured to the leg extension **122** and the winch is cranked so that the upper bracket **124** and the attached leg section **122** are urged downwardly so that the foot plate **132** not only engages the ground but presses downwardly with such force as to lift the forward end of the trailer. This procedure is then repeated on the near leg **123**.

In reversing this procedure at the conclusion of the job, the leg extensions are lifted in the direction of the arrow **150** by inserting the hooks through openings **151** in the foot plates. See the position of the hook **132** in the near foot plate **133** in FIGURE 3, for example, which also illustrates the position of the hooks during transit.

For further security, one or more through bolts **156** would ordinarily be placed through openings **157** in the lower guide bracket **126** and registering openings **158** in the slidable leg extensions **122** and **123**.

With the jacking mechanism having elevated the forward end of the frame to the inclination shown in FIGURE 2, the strainer **42** and the pump are both appropri-

ately submerged in the waterway and the apparatus is ready for operation.

The pickup truck can thereupon be moved so as to make way for tank trucks, for example. As the tank truck drives up and the tank opening in brought into registry with the water discharge section **74**, the engine is started. The high capacity pump **41** submerged in the water is extremely effective to deliver within seconds a flow measured in terms of thousands of gallons per minute. For some installations a remotely controlled start-stop mechanism is provided, although not shown herein, enabling the tank truck driver to control the operation of the pump without leaving his cab.

The unit is versatile in that it operates efficiently regardless of the angle of the bank, within limits. Furthermore, one man, in a relatively short time, and using only simple hand tools, can set up the installation, and in an even shorter time return the apparatus to its transit condition.

Remote areas requiring temporary, high volume pump installations can therefore be serviced in an economical fashion and with a maximum of flexibility in adapting to widely variant field conditions.

What is claimed is:

1. A portable water pump comprising:

(a) a trailer member including an elongated frame supported on ground engaging wheels;

(b) adjustable support means on the leading end of said trailer for controlling the angle of inclination of said frame with said wheels located on the banks of a body of water;

(c) a water pipe carried on said adjustable support means, one end of said pipe extending downwardly into the body of water, the other end of said pipe projecting upwardly to deliver water at an elevated location;

(d) a water pump located in said pipe; and,

(e) means carried on said frame for driving said pump.

2. A portable water pump as in claim **1** wherein said pump is located adjacent said one end of said pipe, and said pump driving means is an internal combustion engine operatively connected to said pump.

3. A portable water pump as in claim **2** wherein said water pipe comprises two segments hingeably joined, one of said segments being foldable relative to the other between a first position substantially parallel to said other segment and a second position substantially co-linear therewith.

4. A portable water pump as in claim **3** wherein the longitudinal axis of said engine is transverse to the longitudinal axis of said frame, and wherein the median vertical plane of said engine is inclined relative to the plane of said frame, said engine being substantially upright in inclined attitude of said frame with said trailer located on the banks of the body of water.

5. A portable water pump as in claim **4** wherein said one of said water pipe segments is stationary and said other of said water pipe segments is movable, the axis of the hinge joining said segments being inclined relative to the vertical and being substantially normal to a line connecting the axes of said pipe segments and passing through said hinge.

6. A portable water pump as in claim **5** further including means for clamping said segments into water tight relation.

7. A device as in claim **6** wherein said clamping means is a wedge pocket on said one segment and a mating wedge on said other segment.

8. A device as in claim **1** including hitch means for connecting said trailer member to a towing vehicle.

9. A device as in claim **8** wherein said water pump is of the axial flow variety.

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U.S. Cl. X.R.

103—218; 239—179