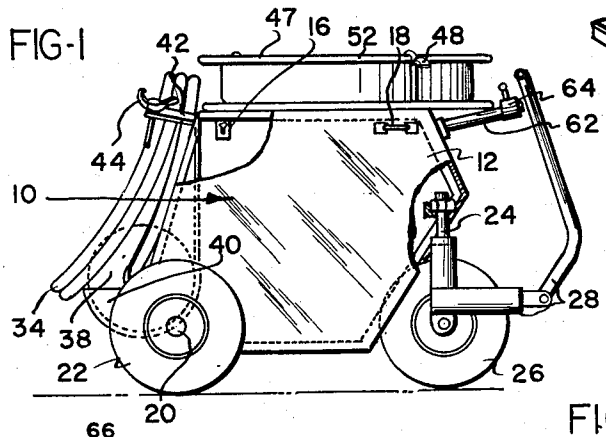
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APPARATUS FOR PUMPING LIQUIDS

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FIG-1



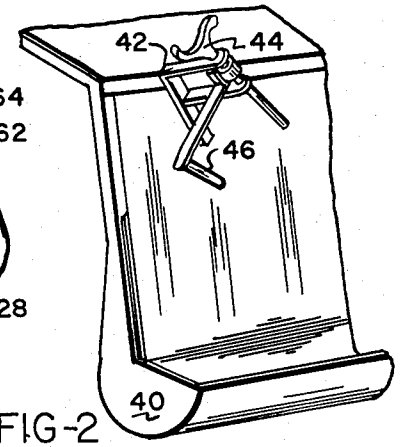


FIG-2

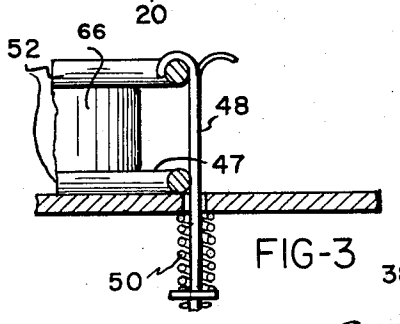


FIG-3

FIG-4

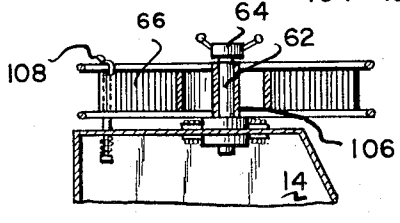


FIG-9

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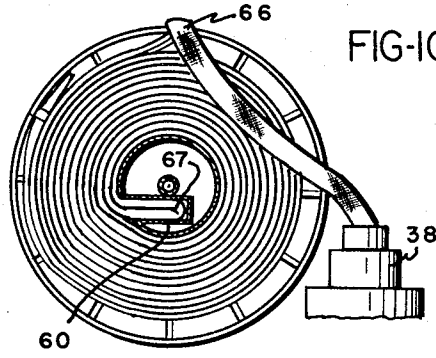
ATTORNEYS

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FIG-10



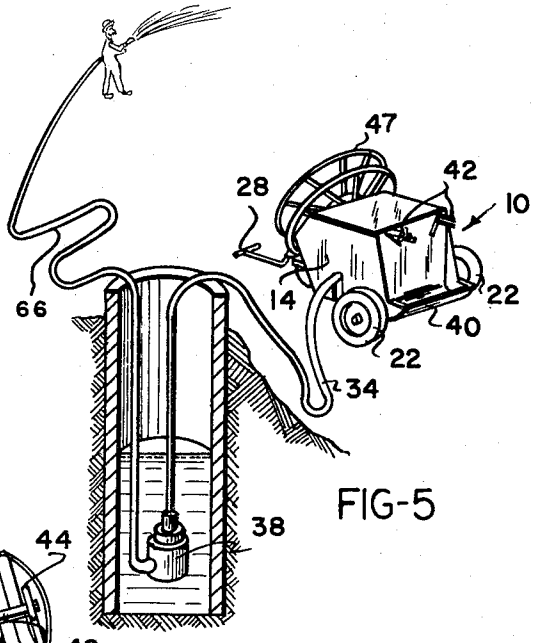


FIG-5

FIG-6

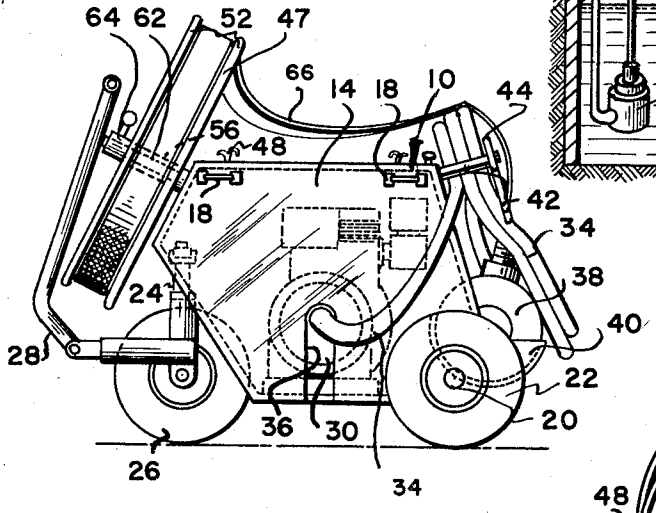


FIG-8

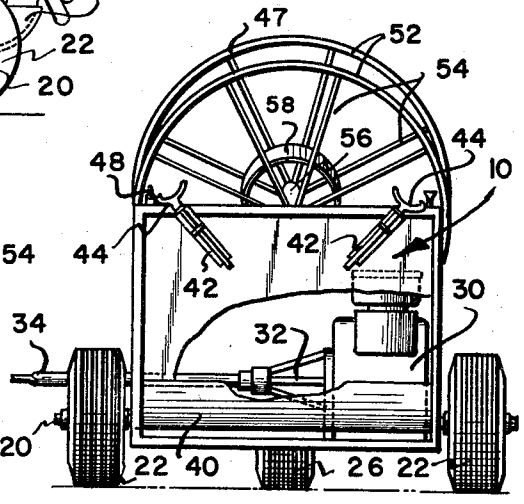
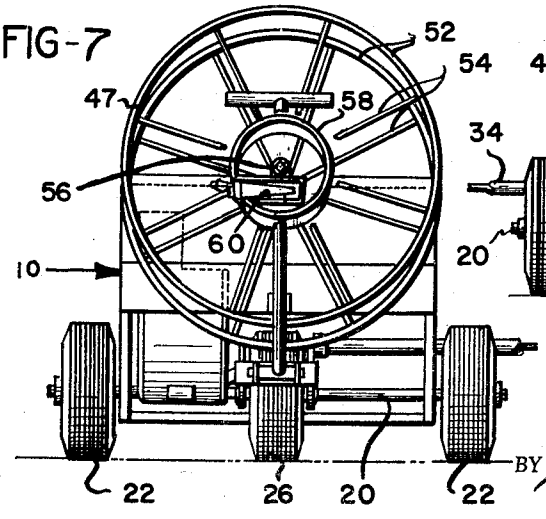


FIG-7



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2,918,975

APPARATUS FOR PUMPING LIQUIDS

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Application January 22, 1958, Serial No. 710,513

2 Claims. (Cl. 169—24)

This invention relates to pumping equipment, and particularly to mobile pumping equipment, and more particularly still to apparatus for pumping having particular benefit as mobile fire fighting equipment.

A particular object of the present invention is the provision of a mobile fire fighting apparatus which is self powered and which is adapted for drawing water from a well or stream or any other available source of water and for delivering the water under pressure to a hose.

Another object of this invention is the provision of a readily mobile pumping device that can be used for draining ditches, for irrigation, or for other purposes where it is required to move or supply water and which situations, of course, include the fighting of fires.

Another object of this invention is the provision of a mobile pumping arrangement characterized in that the pump can be readily placed in the source of water to be pumped, even though the source cannot be closely approached by the mobile apparatus.

A still further object of this invention is the provision of a mobile pumping apparatus which is extremely compact and which is relatively inexpensive to construct and maintain.

It is a still further object of this invention to provide, in a mobile pumping arrangement, an engine carried by the mobile device, and a pump adapted for being remotely operated by the engine, and in which the drive between the pump and the motor can remain connected at all times.

These and other objects and advantages will become more apparent upon reference to the accompanying drawings, in which:

Figure 1 is an elevational view showing the mobile equipment, according to the present invention, in completely assembled relation as it appears when it is not in use,

Figure 2 is a fragmentary perspective view showing a trough provided at one end of the equipment for receiving the pump,

Figure 3 is a fragmentary view showing a spring clamp for detachably retaining the hose reel on top of the frame of the device,

Figure 4 is a longitudinal sectional view through the special pump that is employed with the apparatus of the present invention,

Figure 5 is a rather diagrammatic perspective view showing the device in operation pumping water from a well,

Figure 6 is a side view of the device showing the hose reel removed from the top and mounted on a spindle provided therefor at the end of the frame of the device opposite the trough which carries the pump,

Figure 7 is an end view of the device looking in from the left side of Figure 6,

Figure 8 is an end view of the device looking in from the right side of Figure 6,

Figure 9 is a diagrammatic view showing an arrangement for rotatably supporting the hose reel on top of the frame of the device, and

Figure 10 illustrates a somewhat different manner of mounting the hose on the hose reel for extremely rapid unreeling thereof.

Referring to the drawings more in detail, the general construction of the device will be best seen in Figures 1, 2, 3, and 6, 7, and 8. In these views it will be seen that there is a boxlike frame or enclosure 10, which may consist of angle irons or the like having sheet metal walls attached thereto as by welding and with the side walls 12 and 14 being detachable by virtue of being attached to the frame by the clips 16 having keyhole slots therein. Handles 18 may be provided for lifting the side panels from the frame of the device.

The frame has a rear axle 20 with spaced rear wheels 22, and in the front of the frame there is a central vertical spindle element 24 that carries a single wheel 26 that can be turned by the handle mechanism 28 and by means of which handle the device is also pulled about to the desired location.

Located within the frame, as by being secured to frame members extending across the bottom theroef, is a gasoline engine 30 which is adapted for being serviced, including the starting thereof, by removing the panels 12 and 14. The motor has an output shaft 32 extending from one side thereof and this is connected with an elongated flexible drive shaft 34 that extends through a slot 36 in side wall 14. The elongated drive shaft 34 extends to a pump 38 which rests in a trough 40 provided across the back end of the device when the pump is not in use. The elongated drive shaft, when the pump is so disposed in the trough, is wound about through a pair of U-shaped brackets 42, the open sides of which are adapted for being closed by the pins 44 inserted through apertures in the outer ends of the legs thereof.

One of the pins 44 may be availed of, as indicated in Figure 2, for supporting crank 46 for the engine.

Resting on top of the frame is a hose reel 47 detachably retained in place by hooks 48 that are pulled downwardly by springs 50. The hose reel consists of rim parts 52 and radial spokes 54 that extend inwardly to a sleevelike hub portion 56. Surrounding the hub portion is a cylindrical part 58 having a recess 60 therein adapted for receiving the nozzle of a length of hose wound on the reel.

The sleevelike central hub 56 of the hose reel is adapted for being received on a spindle 62 extending upwardly and outwardly from the front end of the frame of the device and with there being a retaining nut 64 threaded on the end of the spindle.

Reference to Figure 4 will show that the hose 66 wound on the hose reel has a coupling 68 adapted for making detachable connection with the discharge 70 of the pump.

Figure 4 will also show that the elongated flexible drive member 34 leading from the pump has its housing part 72 swivelly secured to the housing of the pump as by the bearing 74 and the snap rings 76 and 78 while the rotatable inner part of the flexible drive shaft 80 is connected by a coupling 82 with shaft 84 that drives the pump. An antifriction bearing 86 supports one end of shaft 84, and this bearing is sealed from the inside of the pump by rotary seal 88. The opposite end of the drive shaft is supported in a sleeve bearing 90 at the opposite end of the pump casing.

The pump itself consists of a main casing section 92 in which the outlet 70 is located and within which said main casing section there is disposed a plurality of pumping stages in stacked relation, each consisting of a rotary impeller 94 mounted on shaft 84 to be driven thereby and a housing part 96 in surrounding relation thereto. The housing portions will comprise the discharge volutes

for the rotary impellers and on their undersides may also comprise the guide vanes by means of which the discharge from each stage is guided inwardly to the eye of the next stage.

The inlet for the first stage of the pump is provided in a casing member **98** that is bolted to casing part **92** as by cap screws **100** and which casing part **98** has inlet openings **102** having screens **104**.

The arrangement is such that the hose **66** can readily be attached and detached from the pump but the pump need never be disconnected from the flexible drive shaft because of the swiveling connection between the housing of the drive shaft and the pump body. The unreeling of the flexible drive shaft can be accompanied by turning of the housing thereof relative to the pump thereby making it quite simple to remove the pump from the frame of the device and quite rapidly carry it to and place it in a source of water.

Similarly, the hose reel can be mounted on spindle **62** and the hose rapidly unreeled therefrom either before or after the pump end of the hose is connected therewith. After the mechanism has been used, the hose can be stretched out and drained and then readily wound up on the hose reel and thereafter the hose reel replaced on top of the frame and fixed in place by clamps **48**.

It is also possible, as indicated in Figure 9, to mount the hose reel on a spindle **106** permanently on top of the frame of the device and utilize one or more spring hold-down clamps **108** that can be released for withdrawing the hose from the reel.

The hose has been illustrated in Figure 7 as being reeled up with the nozzle located in the recess **60** formed in the hub or spindle of the reel. However, it may be preferred to place the hose on the reel in the manner illustrated in Figure 10, wherein the hose **66** is folded at the middle thereof so that about 6 feet of the end of the hose that is connected with the pump **38** projects beyond the nozzle end thereof. With the hose so folded, the fold portion **67** thereof is placed in the recess **60** and the hose is then wound up on the reel as illustrated in Figure 10.

When the reel is mounted on top of the cabinet the hooks **48** will serve to retain the hose in position. However, at any time it is desired to unreel the hose, it is mounted on spindle **62** and the nozzle end of the hose can immediately be grasped and the hose rapidly pulled off from the reel while simultaneously the pump can be conveyed to and placed in a source of water. This provides for the most rapid possible unreeling of the hose, with obvious beneficial results in connection with the fighting of fires.

The described device is inexpensive to manufacture and is compact and convenient to use and has wide utility in being useful not only as a piece of fire fighting equipment but also for drainage, irrigation, and movement of water for any other purpose.

The device is sufficiently light to permit it to be moved even in muddy locations while the length of the flexible drive shaft is sufficient to permit the pump to be dropped into a fairly deep well or tossed out into a stream or ditch to which access would otherwise not be had, while the discharge hose is sufficiently long that even though the device cannot be brought close to the point of application of the water, as might be the case with a fire, the water can still be delivered to the desired place.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions; and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

We claim:

1. In a portable pumping apparatus especially adapted as fire fighting equipment; a housing having supporting wheels for ready movement of the housing from place to place, an internal combustion engine in the housing, an elongated flexible drive shaft leading from the internal combustion engine through one wall of the housing having an outer casing part and an inner drive element therein, a pump at the end of the drive shaft opposite the engine co-axial with the drive shaft having a casing swivelly connected with the casing part of the drive shaft and a rotary impeller drivingly connected with the said drive element of the drive shaft, said drive shaft and pump being co-axial, said pump comprising a screened inlet opening adjacent the drive shaft end thereof and outlet means adapted for detachably receiving a hose at the opposite end thereof, a trough on one end of the housing for receiving the pump and means on the said one end of the housing for receiving and supporting the flexible drive shaft in coiled relation when not in use, a hose adapted for detachable connection with the pump outlet, a hose reel for receiving the hose in reeled up relation, means detachably supporting the hose reel on top of the housing, and a spindle on the end of the housing opposite the said one end for rotatably supporting the reel for paying out and taking up the hose, said reel comprising a cylindrical portion in the center having a recess for receiving the nozzle of the hose.

2. In a portable pumping apparatus especially adapted as fire fighting equipment; a housing having supporting wheels for ready movement of the housing from place to place, an internal combustion engine in the housing, an elongated flexible drive shaft leading from the internal combustion engine through one wall of the housing having an outer casing part and an inner drive element therein, a pump at the end of the drive shaft opposite the engine co-axial with the drive shaft having a casing swivelly connected with the casing part of the drive shaft and a rotary impeller drivingly conected with the said drive element of the drive shaft, said drive shaft and pump being co-axial, said pump comprising a screened inlet opening adjacent the drive shaft end thereof and outlet means adapted for detachably receiving a hose at the opposite end thereof, a trough on one end of the housing for receiving the pump and means on the said one end of the housing for receiving and supporting the flexible drive shaft in coiled relation when not in use, a hose adapted for detachable connection with the pump outlet, a hose reel for receiving the hose in reeled up relation, means detachably supporting the hose reel on top of the housing, and a spindle on the end of the housing opposite the said one end for rotatably supporting the reel for paying out and taking up the hose, said reel comprising a cylindrical portion in the center having a recess extending angularly therein adapted for receiving the folded end of the hose when the hose is folded double so both the pump end and nozzle end of the hose are accessible when the hose is folded and coiled on the reel.

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