

Feb. 14, 1950

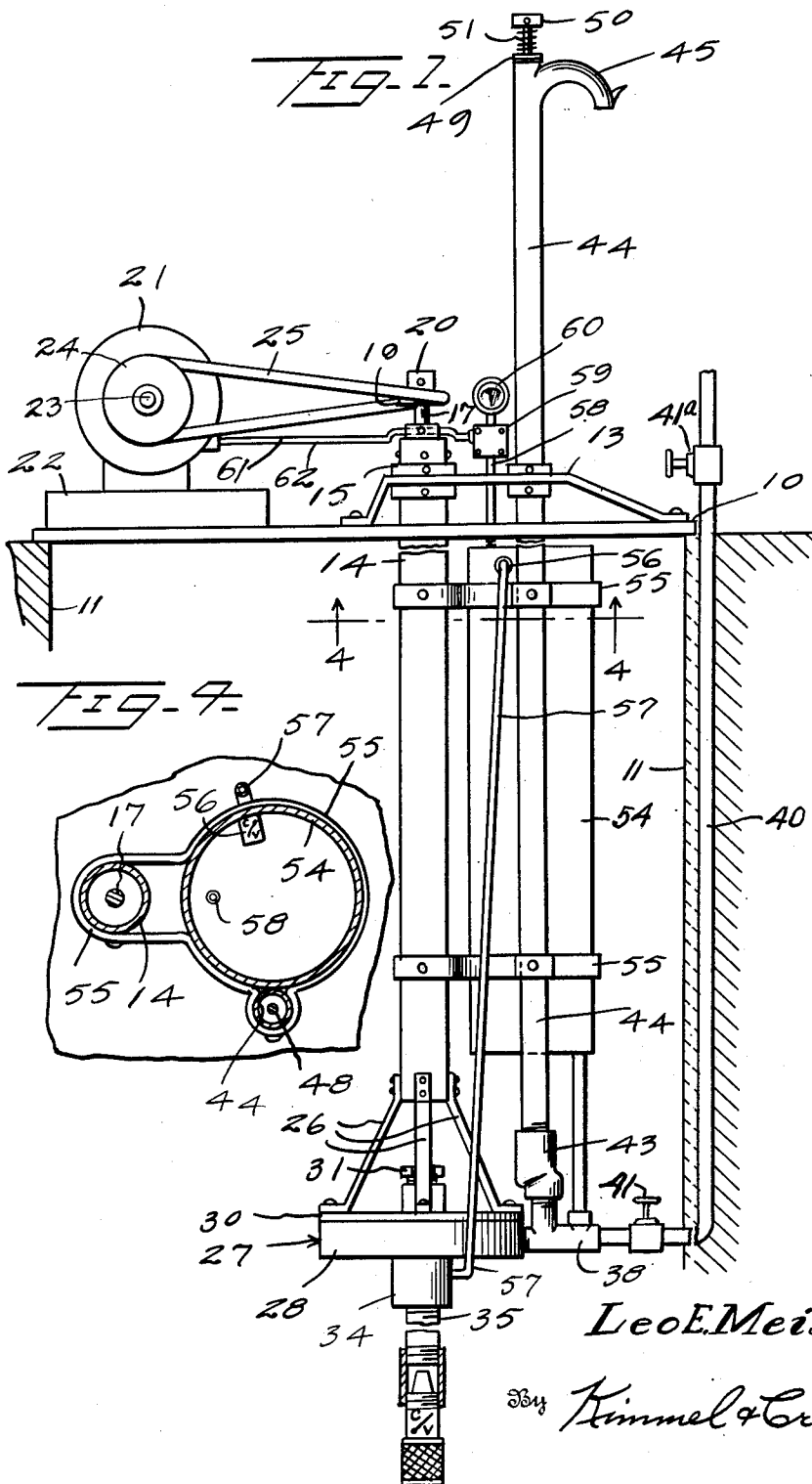
L. E. MEISNER

2,497,179

PUMP

Filed Feb. 16, 1948

2 Sheets-Sheet 1



Inventor

Leo E. Meisner

By *Kimmel & Crowell*
Attys.

Feb. 14, 1950

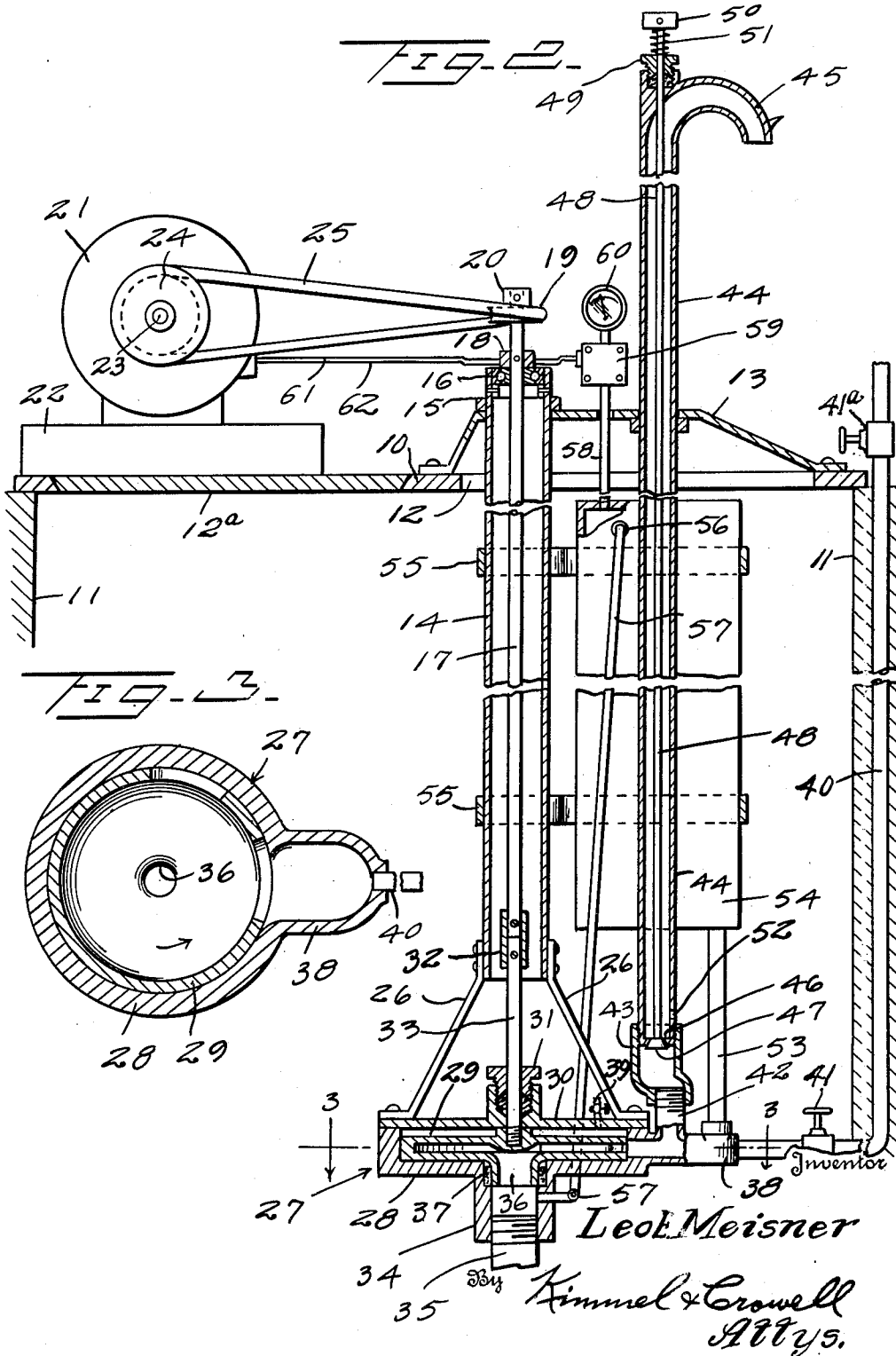
L. E. MEISNER

2,497,179

PUMP

Filed Feb. 16, 1948

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,497,179

PUMP

Leo E. Meisner, Raymond, Ill.

Application February 16, 1948, Serial No. 8,620

5 Claims. (Cl. 103—103)

1

My invention relates to pumps and more particularly to a non-freezing automatic electrically driven centrifugal water pump and supply system.

Heretofore, pumps were either located outside to freeze in cold weather or it has been necessary to locate them in non-freezing places such as a waterproof pit protected against freezing from outside cold weather; in cellars or basements, or to provide a heated building to house same.

An object of the invention is to provide a water supply system having an electrically driven centrifugal water pump, a pressure storage tank receiving the water raised and delivered under pressure by the pump through the suction pipe extending down into the water in the well and having a discharge pipe leading to the tank for storing and placing water therein under pressure to lift the water to various outlets or faucets and to distant points as needed, and to a hydrant at the well, said parts extending down into the well so that the pump and connections are located below the frost line or low enough so that the water will not freeze therein.

Another object is to provide a pressure actuated switch in communication with the air pressure in the top of the tank to start an electric motor for driving the pump when the air pressure is low and for stopping the motor and pump when a predetermined high pressure of air pressure in the tank is reached, thus economizing on the use of electrical current, the device being supported by a base resting on the well platform over a manhole therein to permit the pump, tank and connections therebetween to be lowered into the well, and to permit underground connection of the discharge side of the pump to an underground pipe to carry the water to distant points as needed.

A further object is to provide means to prevent the water from draining back into the pump and well from the tank, hydrant or distributing pipe connected to the pump discharge; to control the discharge into and from the hydrant by means positioned near the bottom of the hydrant adjacent the connection thereof to the pump discharge but operable near the top or spout of the hydrant, and means to prevent water from standing and freezing in the hydrant in cold weather by permitting such water to drain back into the well.

A still further object is to provide an air valve connection between the compressed air space at the top of the tank and the suction pipe or suction side of the pump or impeller housing to provide and maintain air pressure in the tank.

2

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawing and specification, and then more particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a side elevation of the water supply system and pump constituting my invention,

Figure 2 is an enlarged vertical sectional elevation of the device as shown in Figure 1,

Figure 3 is a horizontal section of the pump taken on the line 3—3 of Figure 2; and

Figure 4 is a horizontal section taken on the line 4—4 of Figure 1.

Referring to the drawings, 10 indicates a well platform or cover over a well 11, having a hole 12 for lowering the pump assembly into the well or to lift the pump out for repairs or replacements, and a covered manhole 12a to allow a man to get into the well to connect or disconnect underground pipes and repair pump parts, connections or packing glands, to be later explained. A base 13 is supported on and secured to the well platform 10 over the hole 12 or otherwise, to support the entire weight of the pump including a vertical pipe or tubular housing 14 extending through and slightly above the base 13 and down into the well 11 above the water therein. Housing 14 may be supported or hung in any suitable way, as by a flange or collar 15 thereon and resting on the base 13.

A ball bearing 16 is secured in or on the upper end of the housing 14 to receive a central vertical shaft 17 supported for rotation at the bearing 16 as by a collar 18 fixed to the shaft and resting on the rotating part or ring of the bearing 16 which latter takes care of lateral as well as vertical or end thrust. The shaft 17 may be driven in any suitable manner, as by a vertical or horizontal motor as is common in the art, but as shown, the upper end of shaft 17 bears a V-pulley 19 fixed to the shaft by its hub or collar 20. A horizontal type electric motor 21 is supported by its base 22 on the platform 10 and its shaft 23 has a V-pulley 24 fixed thereon and an endless drive belt 25 is trained around pulleys 19 and 24 to drive shaft 17.

At its lower end, housing 14 carries any suitable number of legs or braces 26 which support the pump 27 comprising a circular impeller housing or casing 28 in which an impeller 29 preferably of bronze fixed to the lower end of shaft 17 rotates. While the pump 27 may be of any suitable type, it is shown and described as of the centrifugal type, with the legs 26 secured to the

3

removable top plate 30 thereof. Shaft 17 passes through a packing gland 31 at the top plate above the impeller and forming a lower bearing for the shaft as well as preventing water passing out of the pump at this point. Packing gland 31 may have a felt grease seal to prevent moisture entering the shaft housing and upper bearing 16. The legs 26 provide large openings to allow easy access to the packing gland 31 for renewing the packing or adjusting the nut. Shaft 17 may be in two sections, the long upper section being preferably of steel and terminating adjacent the lower end of the housing 14 where it is coupled at 32 in any suitable manner to a lower short shaft section 33 which may be of brass or stainless steel below the coupling 32 and through the packing gland to prevent rust from roughing the shaft and leakage.

The pump casing 28 has a central nippler 34 to which a suction pipe 35 is connected to extend down into the water in the well with the usual foot valve or check valve in the suction pipe above the strainer, inlet or nozzle, to maintain the pressure in the system, including pipe 35, pump 27 and all other parts thereabove and with or without a jet as is customary, depending on the distance from the impeller to the water. The impeller 29 is of the well known centrifugal type having a central inlet nipple 36 extending down into the casing nipple 34 with an interposed packing ring 37. Water is raised in the suction pipe 35 by rotation of the impeller 29 and forced out by centrifugal pressure through a reduced radial outlet 38 with or without a small plug, pet-cock or check valve 39 in the top of the impeller housing 28 to let air out and to permit back-flow or draining of the water for priming the pump for automatic operation when the pressure drops as will be later explained, or when initially starting the pump and well. Outlet 38 has several discharge connections through which water may be diverted as needed, including one or more underground pipes 40 to carry water to distant points as needed, such as to a barn, watering trough or otherwise, and controlled by a valve 41 at the bottom to cut off the supply in cold weather or when freezing thereabove is possible, but avoided by draining back into the pump and well when pressure is off, and a valve 41a at the top above ground where the water is drawn off when freezing is not likely to occur and valve 41 is open.

Outlet 38 is also provided with an upwardly extending branch outlet 42 connected by an offset fitting or nipple 43 to the lower end of a hydrant 44 to support the latter with its spout 45 at a suitable elevation. A valve seat 46 is provided in the connection of the hydrant 44 with the fitting 43 at the lower end of the hydrant, with which an upwardly seating valve 47 carried by the lower end of a valve rod 48 in the stand pipe of the hydrant 44 cooperates. The valve rod 48 extends through a packing gland 49 at the top of the hydrant and is provided with a suitable operating handle or knob 50 at its upper end between which and the packing gland 49 a spring 51 may be interposed on the valve rod to normally hold the latter raised and the valve 47 closed against its seat 46, so that water may be drawn from the hydrant when needed. A small drain hole 52 is provided in the lower end portion of the hydrant 44 to allow water therein to drain back into the well to prevent freezing thereof in cold weather.

A pipe connection 53 extends up from the out-

4

let 38 to a pressure storage tank 54 disposed below the frost line in the well and suitably suspended or supported and held in place as by means of brackets 55 to the shaft housing 14. Air is forced into the tank 54 with the water and is compressed in the top of the tank to maintain the water under pressure for discharge to the various outlets or faucets. An air inlet valve 56 is provided near the upper end of the tank and is connected by a tube 57 to the suction side of the pump 27 below the impeller 29 as at connection or nipple 34 to provide air as needed in the tank for compression above the water therein.

In order to automatically control the operation of the pump 27 to maintain the water supply and air pressure in the tank 54, an air pressure conduit or tube 58 leads from the top of the tank to a pressure actuated switch 59 of well known type, the pressure in which is indicated by a gage 60. The switch 59 is connected by conductor wires 61 and 62 to the motor 21 and when the pressure is low and the water supply short, the switch 59 is closed to close the supply circuit to the motor to start and cause operation thereof to drive the pump and replenish the water in the tank and raise the pressure. The switch 59 may have an operating pressure range as desired, such as to close at a pressure of from 5 to 20 lbs. and to open the circuit at a pressure of 40 lbs. or otherwise, according to the needs of the particular pump or water supply system so as to maintain the desired pressure automatically at all times. The electrical connections are simple and all above the well platform 10 and all pump parts that contain and maintain water therein are below the frost line in the well with all parts therein conveniently accessible for repair or replacement after easy installation.

From the foregoing description, it is thought that the operation of the pump will be readily understood, but it may be pointed out that any desired number of connections may be provided at the discharge side of the pump through which the water may be diverted to a house or other points as needed. When the connections are closed such as represented by the hydrant valve 47 and valved pipe 48, the water will be forced up through the pipe 53 to the pressure or storage tank 54 and maintained under the desired pressure controlled by the well known pressure operated switch 59 which opens and closes the circuit to the motor 21 to stop the motor and pump when the pressure is at a set high and start the motor and drive the pump when the pressure is at a set low according to the pressures or pressure range at which the pressure switch 59 is set to operate. All parts are properly and rigidly supported for operation of the pump without undue strain or vibration.

I do not mean to confine myself to the exact details of construction herein disclosed but claim all variations falling within the purview of the appended claims.

What I claim is:

1. In a water supply system for wells, a platform over the well having a manhole therein, a base on the platform, an elongated tubular housing depending from said base and extending into the well, a centrifugal pump carried by the lower end of said housing below the frost line in the well and having a suction inlet pipe extending down into the water in the well and a valved outlet, a shaft extending through the housing and journaled at the upper end thereof, said pump

5

including a casing and a rotatable impeller therein having a water-tight connection with the lower end of the shaft through the casing, distributing connections leading from the outlet, a vertically disposed cylindrical pressure storage tank communicating with one connection and supported from said tubular housing below the frost line in the well, a motor for driving the shaft, and means operated by the pressure in the tank to start and stop the motor.

2. In a water supply system for wells, a platform over the well having a manhole therein, a base on the platform, an elongated tubular housing depending from said base and extending into the well, a centrifugal pump carried by the lower end of said housing below the frost line in the well and having a suction inlet pipe extending down into the water in the well and a valved outlet, a shaft extending through the housing and journaled at the upper end thereof, said pump including a casing and a rotatable impeller therein having a water-tight connection with the lower end of the shaft through the casing, distributing connections leading from the outlet, a vertically disposed cylindrical pressure storage tank communicating with one connection and supported from the housing below the frost line in the well, an electrical motor operatively connected to the upper end of the shaft for driving the latter, and a pressure actuated switch operatively connected to the tank and in circuit with the motor to open and close the circuit to the motor between predetermined high and low pressures respectively.

3. In a water supply system for wells, a platform over the well having a manhole therein, a base on the platform, an elongated tubular housing depending from said base and extending into the well, a centrifugal pump carried by the lower end of said housing below the frost line in the well and having a suction inlet pipe extending down into the water in the well and a valved outlet, a shaft extending through the housing and journaled at the upper end thereof, said pump including a casing and a rotatable impeller therein having a water-tight connection with the lower end of the shaft through the casing, distributing connections leading from the outlet, a pressure storage tank communicating with one connection and supported from the housing and closely adjacent thereto below the frost line in the well, a motor for driving the shaft, means operated by the pressure in the tank to start and stop the motor, another connection including a hydrant extending up through the platform and base, a valve rod extending up through the hydrant and having an upwardly seated valve near the connection of the hydrant to the pump outlet, and means on the upper end of the rod for seating and unseating the valve.

4. In a water supply system for wells, a platform over the well having a manhole therein, a

6

base on the platform, an elongated tubular housing depending from said base and extending into the well, a centrifugal pump carried by the lower end of said housing below the frost line in the well and having a suction inlet pipe extending down into the water in the well and a valved outlet, a shaft extending through the housing and journaled at the upper end thereof, said pump including a casing and a rotatable impeller therein having a water-tight connection with the lower end of the shaft through the casing, distributing connections leading from the outlet, a vertically disposed cylindrical pressure storage tank communicating with one connection and bracket means supported from the housing below the frost line in the well and engaging above said tank, an electrical motor operatively connected to the upper end of the shaft for driving the latter, a pressure actuated switch operatively connected to the tank and in circuit with the motor to open and close the circuit to the motor between predetermined high and low pressures respectively, and air supply means connecting the tank to the suction side of the pump.

5. In a water supply system for wells, a platform over the well having a manhole therein, a base on the platform, an elongated tubular housing depending from said base and extending into the well, a centrifugal pump carried by the lower end of said housing below the frost line in the well and having a suction inlet pipe extending down into the water in the well and a valved outlet, a shaft extending through the housing and journaled at the upper end thereof, said pump including a casing and a rotatable impeller therein having a water-tight connection with the lower end of the shaft through the casing, distributing connections leading from the outlet, a vertically disposed cylindrical pressure storage tank communicating with one connection and disposed adjacent to said housing below the frost line in the well, means supporting said tank on said housing, an electrical motor operatively connected to the upper end of the shaft for driving the latter, a pressure actuated switch operatively connected to the tank and in circuit with the motor to open and close the circuit to the motor between predetermined high and low pressures respectively, an air inlet valve connected to the tank near the top and a tube connecting the latter valve to the suction pipe.

LEO E. MEISNER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
381,808	Neff	Apr. 24, 1888
617,848	Zell	Jan. 17, 1899
1,585,378	Denison	May 18, 1926