Dec. 11, 1951 W. SHALLENBERG 2,578,322

PUMP

Filed Oct. 2, 1946 3 Sheets-Sheet 1

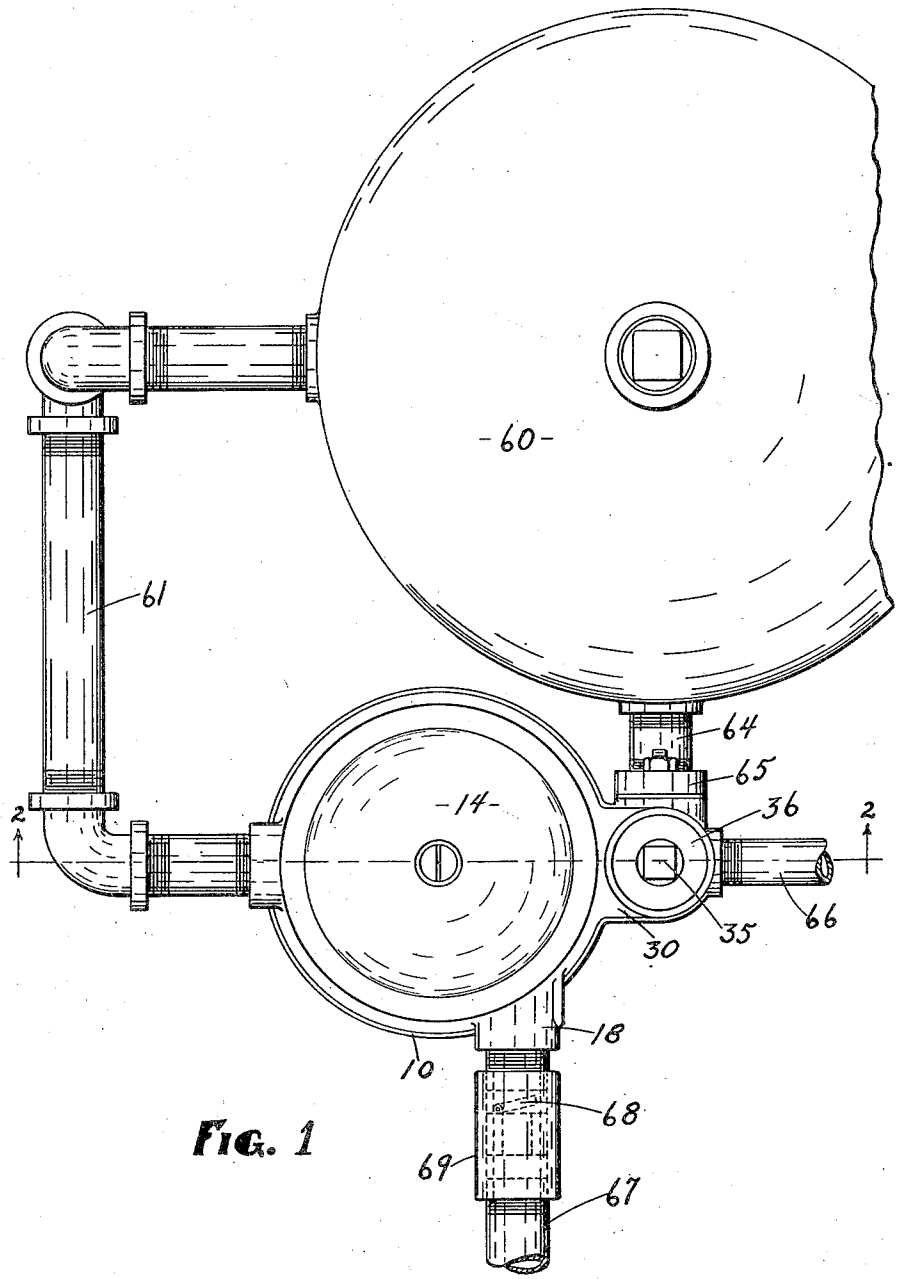


FIG. 1

INVENTOR
Walter Shallenberg,
BY
Bates, Tearse & McCrea,
ATTORNEYS.

Dec. 11, 1951 W. SHALLENBERG 2,578,322

PUMP

Filed Oct. 2, 1946 3 Sheets-Sheet 2

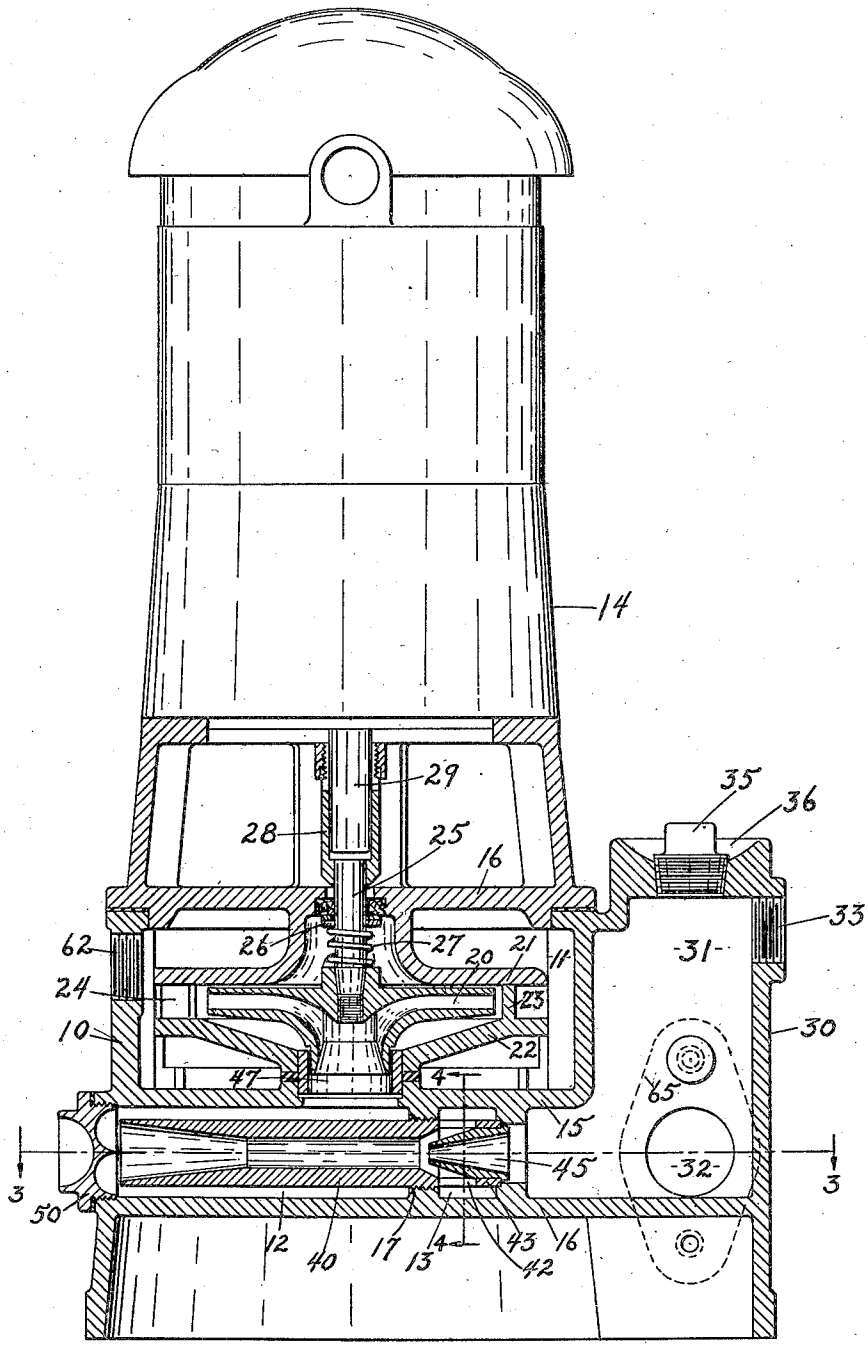


FIG. 2

INVENTOR
Hallie Shallenberg
BY
Bates, Pearce & McBean,
ATTORNEYS.

Dec. 11, 1951 W. SHALLENBERG 2,578,322

PUMP

Filed Oct. 2, 1946 3 Sheets-Sheet 3

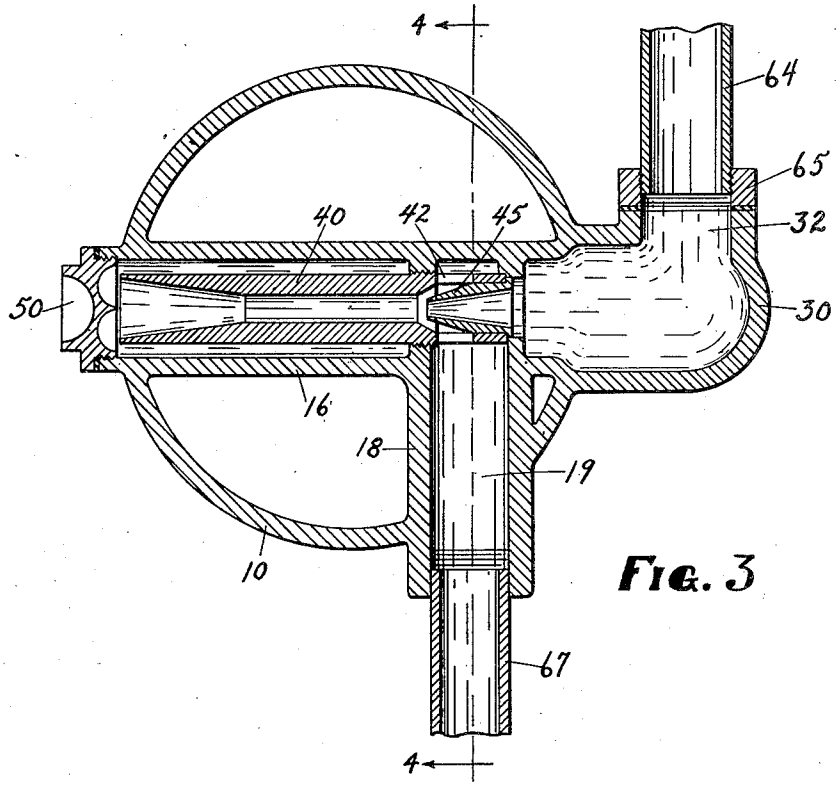


FIG. 3

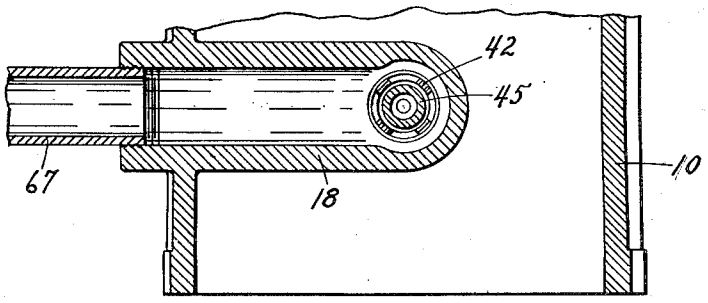


FIG. 4

INVENTOR
Walter Shallenberg,
BY
Baker, Peaco & McPeak,
ATTORNEYS.

Patented Dec. 11, 1951

2,578,322

UNITED STATES PATENT OFFICE

2,578,322

PUMP

Walter Shallenberg, Salem, Ohio, assignor to The Deming Company, Salem, Ohio, a corporation of Ohio

Application October 2, 1946, Serial No. 700,678

6 Claims. (Cl. 103—5)

1

This invention relates to a shallow well pump for a water system having a pressure tank. The pump is of the type employing a jet to boost the suction supply to the pump. An object of the invention is to provide such a pump in a simple and at the same time efficient form which shall be self-contained and ready for coupling to the suction line and pressure tank in conjunction with the service line leading from such tank.

Other objects and advantages of the present invention will become more apparent from the following description reference being had to a preferred embodiment of the invention illustrated in the accompanying drawings. The essential features of the invention will be summarized in the claims.

In the drawings, Fig. 1 is a plan of my pump coupled to a pressure tank and a service line and to a suction intake pipe; Fig. 2 is a vertical section of the pump, as indicated by the line 2—2 on Fig. 1, the external piping of Fig. 1 being omitted; Fig. 3 is a horizontal section through the jet within the pump casing, in a plane indicated by the line 3—3 on Fig. 2; Fig. 4 is a vertical section through the nozzle of the jet and the suction line in a plane indicated by the lines 4—4 on Figs. 2 and 3.

In the drawings, 10 indicates the base casing of my pump, which has a chamber 11 containing the pressure pump itself and chambers 12 and 13 containing the jet pump, and 14 indicates a surmounting casing adapted to contain a motor (not shown) with a depending shaft for driving the pressure pump.

The pressure pump, as illustrated, is of the rotary or centrifugal type, and comprises an impeller 20 mounted in an impeller housing 21, 22 in the chamber 11. This housing is provided with one or more diffusion vanes or wall portions 23 leading to peripheral discharge passages 24 to the chamber 11. I have shown the upper portion 21 of the housing as carried by the surmounting casing 14 and the lower portion 22 as making a water-tight connection with an internal horizontal partition 15 providing the bottom of the chamber 11.

The impeller 20 is carried by a shaft 25 which extends upward through a suitable stuffing box (indicated conventionally by a washer 26 pressed upward by a spring 27) within the housing portion 21. This shaft 25 is drivingly connected by a suitable coupling 28 with the armature shaft 29 of a motor within the casing 14.

The base casing 10, below the partition 15, is formed with a transverse trough-like portion 16 leading diametrically from one side of the casing

2

to the other, and for the most of its length merging at its top with the partition 15, providing a horizontal tubular passage divided by the septum 17 into the two chambers 12 and 13. Thus, the partition 15 and trough portion form an integral tubular passageway which carries the jet as hereinafter described. Extending into the trough portion 16 at right angles thereto is a tubular portion 18 which also merges at the top with the partition 15 and provides the suction passageway 19 to the pressure pump.

The pump casing 10 is formed with a vertical bonnet 30 providing a chamber 31 leading upwardly from the entrance to the jet and provided with a lower opening 32 near the bottom of the chamber and an opening 33 near the top of such chamber. The bonnet is closed at the upper end by a removable plug 35 which allows the chamber to be filled with water for priming purposes. The top wall of the chamber is preferably dished as at 36 to provide in effect a funnel for filling the chamber when the plug is removed.

The jet heretofore mentioned comprises a jet tube 40 and a nozzle 45 discharging thereinto. The jet tube has the usual form of an intermediate portion which is substantially cylindrical, a flaring intake portion, and a flaring discharge portion. In back of the intake portion the jet tube is provided with several spaced extension arms 42 which carry at their far ends a ring 43. The nozzle 45 is tightly fitted in this ring and preferably has an annular shoulder to abut the outer end of the ring. The nozzle extends slightly within the jet tube while leaving an annular space about the point of the nozzle within the flaring intake to the tube, as shown in Fig. 2.

The space about the nozzle and the arms of the jet tube which carry the nozzle, constituting the chamber 13, communicates with the intake passageway 19. Accordingly, water received in the intake passageway 19 passes to the chamber 13 about the nozzle and thence into the jet tube and from the jet tube to the intake 47 of the impeller pump.

There is a diverting wall beyond the end of the jet tube to direct the liquid backwardly about the jet tube to the intake of the pump. This diverting wall is conveniently supplied by a threaded plug 50 which screws into the base casing, directly beyond the end of the jet tube, and makes a tight connection with the casing.

While the plug 50 is stationary in practice, and acts as if it were an integral part of the base casing, nevertheless by making it removable, I provide for the more ready installation of the jet tube and nozzle. As shown, the nozzle is carried

by the jet tube and the jet tube is provided adjacent its intake end with external threads which screw into the septum 17 of the base casing. Accordingly in the manufacture of the pump the seat for the jet tube ring 43 and the internal threads in the septum 17 may be machined through the open end of the chamber 12. Then after the nozzle is mounted tightly in the end of the jet tube, the jet tube may be inserted through the open end and turned with its threads engaging those of the septum until the ring 43 tightly abuts the seat provided by the casing at the far end of the chamber 13. Then the plug 50 may be turned tightly into place.

Referring now more particularly to Fig. 1, 60 indicates a suitable pressure tank adapted to contain a quantity of water; for instance, such a tank as used in a household water system. Suitable piping 61 leads from the discharge opening 62 (Fig. 2) of the pump to the tank. A pipe 64 leads from the tank, preferably from a portion lower than the intake via the pipe 61. This discharge pipe 64 terminates in a head 65 which is bolted to the exterior of the bonnet 30 through an intermediate gasket to connect the bore of the pipe 64 with the opening 32 to the bonnet chamber. The service or household line 66 leads from the upper portion of the bonnet chamber, this pipe 66 being mounted in the opening 33 at the top of the bonnet wall.

A suction line 67 is attached to the outer end of the transverse conduit 18 of the pump casing. This suction line carries a suitable check valve, opening toward the pump. The same may be of any suitable form, but is conveniently illustrated by the flap valve 68 in a sleeve 69, Fig. 1, on the suction line.

In the operation of my pump at the start the chamber 31 is filled with water, either from a previous operation or by priming water inserted by the removal of the plug 35. Such water necessarily floods the entire impeller. When the impeller starts, therefore, it applies suction through its intake opening 47, through the jet tube and the passageways 13 and 19 to the suction pipe, thus drawing in water past the check valve 68. Such water is delivered by the impeller to the chamber 11 and passing through the opening 62 and the pipe 61 to the pressure tank 60.

A portion of the water from the pressure tank returns by the passageway 64 to the lower portion of the chamber 31, passes through the nozzle 45 into the jet tube and thus boosts the flow through the suction pipe. The service line 66 leading from the upper portion of the chamber 31 is always full of water and available for use at the respective faucets on the line. Such use cannot disturb the water conditions in the chamber 31 as the intake 32 to the chamber is larger than the exit 33, and the chamber is thus always maintained full of water.

It will be seen that the base walls and partitions, forming the suction chamber surrounding the nozzle and the pressure chamber supplied by the tank and communicating with the nozzle, constitute a water-carrying manifold having three orifices, respectively from the suction line, from the tank, and to the service line, all cooperating to enhance the suction flow to the pressure pump without disturbing the continuous flow to the service line. In addition, by extending the pressure chamber to a height above the impeller and connecting the service line to the top region of such chamber, this chamber becomes an effective priming chamber, rendering the pump self-priming at all times.

In systems of this type, the pump usually operates intermittently to supply water to the tank until a proper pressure is obtained therein; then, by means of a float or suitable pressure mechanism and electric switch, known in this art, the pump is shut off until more water is needed. In such intermittent operation it is important to maintain the impeller chamber flooded at all times so that the pump will be self-priming. My chamber 31 is always full of water and by extending higher than the impeller chamber insures the self-priming of the pump during such intermittent operation. The check valve in the suction line is close enough to the pump so that when the pressure pump stops, no draining down the suction pipe can disturb the water condition in the pump or tank. At the start of the operation, at the original installation of the pump or after it has been shut down for some time, it may be initially primed by removing the plug 35 and inserting water through the opening normally closed by this plug.

I claim:

1. In a shallow well pumping system, the combination of a casing, a pressure pump therein having a discharge chamber, a pressure tank, a discharge passageway from the discharge chamber of the pump to the pressure tank, a jet pump mounted in the base of the casing below the pressure pump and discharging into the suction inlet of the pressure pump, a chamber in the casing extending as low as the jet pump and as high as the top of the pressure pump, said last-mentioned chamber communicating with the nozzle of the jet pump and out of other communication in the casing with the discharge chamber of the pressure pump, a passageway from the pressure tank to the lower portion of the last-mentioned chamber, a service line, a passageway from the upper portion of the last-mentioned chamber to the service line, a suction line leading to the jet jump, and a check valve in the suction line closely adjacent to the jet pump.

2. The combination of a pressure tank, a casing, a rotary impeller pump therein discharging into the pressure tank, said pump having a bottom inlet, a jet pump in the casing adapted to discharge into the inlet of the pressure pump, provision for attaching a suction line to the jet pump, and means providing a chamber communicating with the jet pump and rising higher than the pressure pump, a conduit connecting the lower portion of said chamber with the pressure tank, a service line, and means for attaching said service line to and in direct communication with the upper portion of said chamber.

3. The combination with a pressure tank of a pressure pump having a base casing with internal partitions to provide a discharge chamber, a jet tube chamber, a jet nozzle chamber and a priming chamber, a pressure pump in the discharge chamber having its intake communicating with the jet tube chamber, a jet tube in the jet tube chamber, a jet nozzle in the jet nozzle chamber, passageways in the base from the exterior to the jet nozzle chamber and from the priming chamber to the jet nozzle, there being apertures respectively in the lower portion of the priming chamber, the upper portion of the priming chamber and the discharge chamber, a conduit connecting the discharge chamber with the pressure tank and a conduit connecting the pres-

sure tank with the lower aperture in the priming chamber.

4. In a shallow well pumping system, the combination of a casing, a pressure pump therein provided with a suction inlet, a pressure tank, a discharge passageway from the pressure pump to the pressure tank, a jet pump mounted in the casing discharging into the suction inlet of the pressure pump, means providing a chamber extending as low as the jet pump and as high as the top of the pressure pump, said last mentioned chamber communicating with the nozzle of the jet pump, a passageway from the pressure tank to the last mentioned chamber whereby fluid discharged by the pressure pump must pass through the tank and chamber to reach the jet pump, and a service line, the last named chamber having an aperture higher than said pressure pump and connected with said service line.

5. In a well pumping system, the combination of a casing, a pressure pump therein having a suction inlet, a pressure tank, a discharge passageway from the pressure pump to the pressure tank, a jet pump having a nozzle and mounted in the casing below said pressure pump and discharging into the suction inlet thereof, means providing a chamber having a surrounding wall, a top and a bottom, said chamber extending as low as the jet pump and higher than the top of the pressure pump, the wall of said chamber having an aperture adjacent its lower end, said casing having a passageway leading from said aperture to the nozzle of the jet pump, said chamber having a second aperture in its wall and positioned above said pressure pump and said first named aperture, a service line connected with said second aperture, said chamber wall having a third aperture positioned below said second aperture and below said pressure pump, and a passageway connecting the pressure tank with the third aperture whereby fluid discharged by the pressure pump passes through the tank and said chamber to reach the jet pump and said service line, and wherein all fluid passing through the service line passes through said chamber.

6. In a shallow well pumping system having a casing, a pressure pump provided with a suction inlet, a pump discharge chamber in said casing in which said pump is mounted, a pressure storage tank, a conduit extending between said casing and said tank and providing a fluid passageway from said discharge chamber to said tank, a jet pump mounted in the casing below and discharging into the pressure pump, said casing having a priming chamber formed integral therewith and provided with a surrounding wall, a top and a bottom, said priming chamber extending as low as the jet pump and higher than the top of the pressure pump and as high as the top of the discharge chamber, said priming chamber having an aperture in its wall adjacent the extreme lower end thereof and below said pressure pump, a passageway leading from said aperture to the jet pump, said priming chamber having a second aperture formed in its wall and positioned above said pressure pump at the extreme upper end of said wall, a service line connected with said second aperture, said chamber wall having a third aperture positioned below said second aperture and below said pressure pump, a passageway connecting the pressure tank to the third aperture, said priming chamber having a priming aperture in its top, means normally closing said last named aperture, an intake conduit communicating with said jet pump, and a check valve in said intake conduit to prevent flow through such conduit away from said jet pump.

WALTER SHALLENBERG.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,137,406	Johnson	Nov. 22, 1938
2,257,507	Mann	Sept. 30, 1941
2,274,987	Lung	Mar. 3, 1942
2 335,109	Conery	Nov. 23, 1943
2,341,517	Wieland	Feb. 15, 1944
2,380,924	Carpenter	Aug. 7, 1945
2,452,874	Shallenberg	Nov. 2, 1948