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COMBINATION PRESSURE TANK AND PUMP

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2 Sheets-Sheet 1

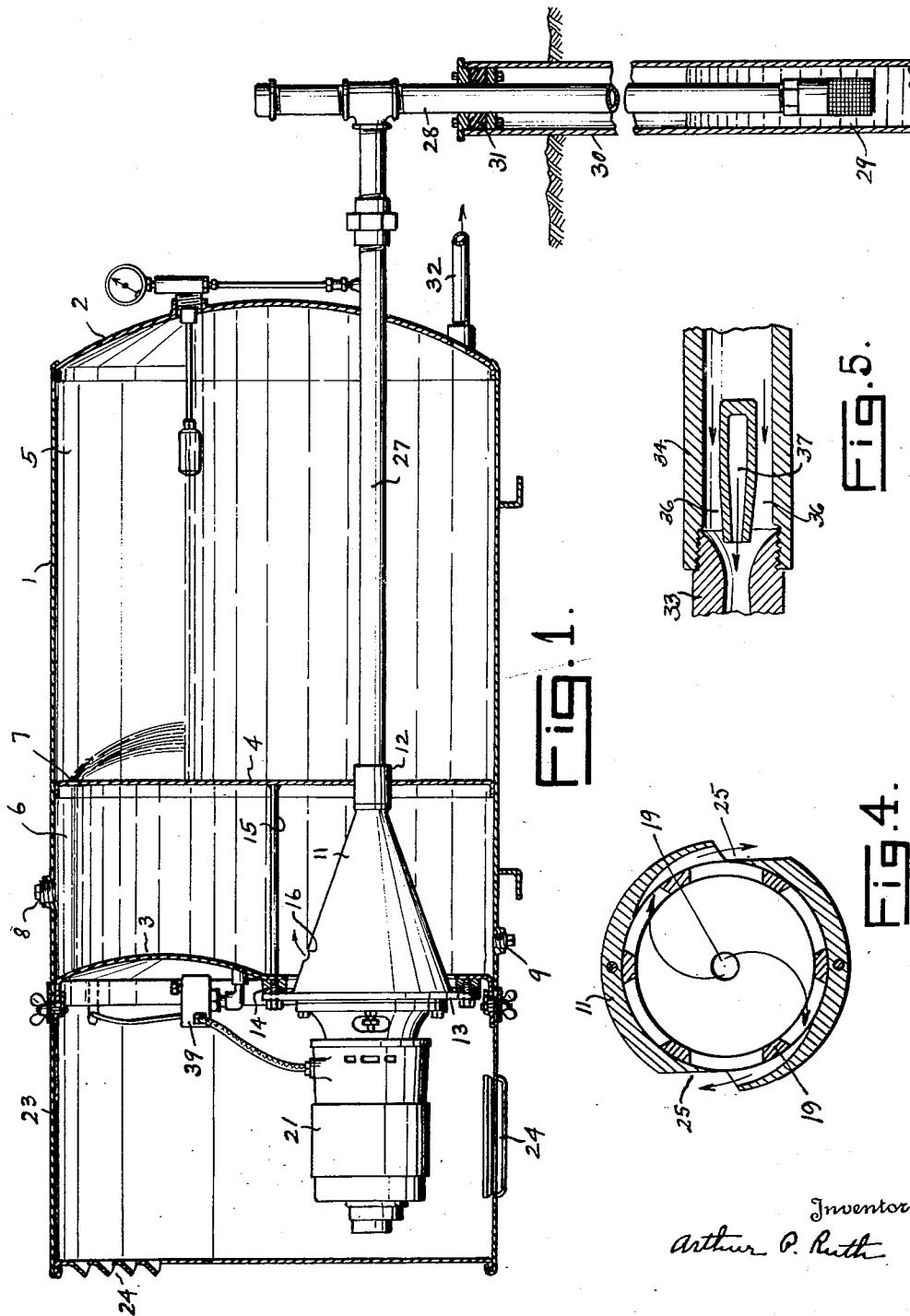


FIG. 1.

FIG. 5.

FIG. 4.

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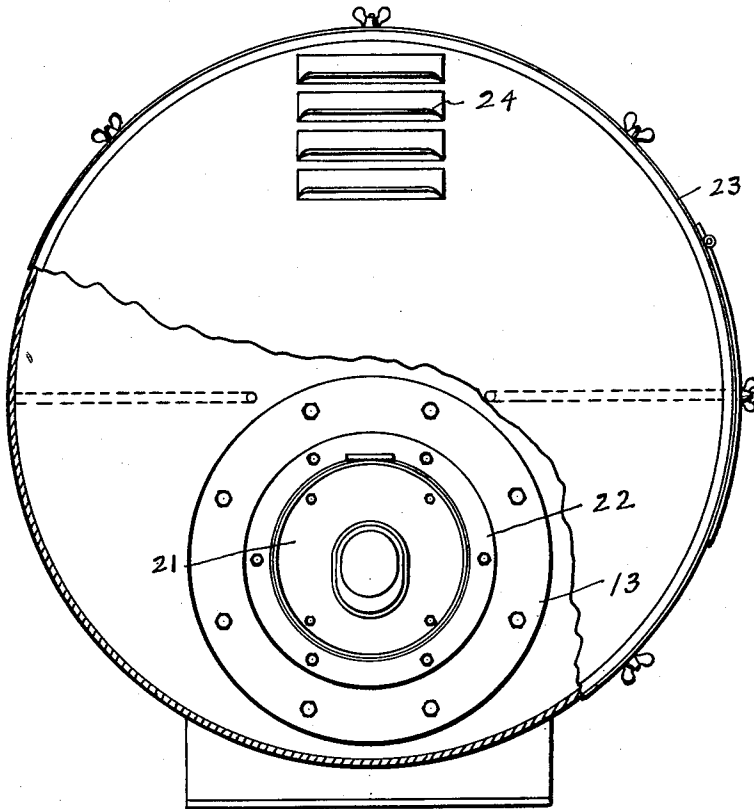


Fig. 2.

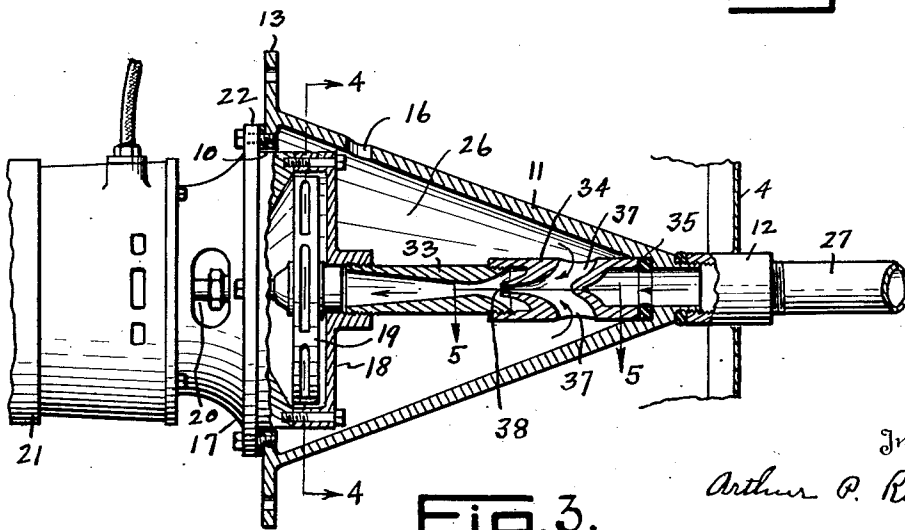


Fig. 3.

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COMBINATION PRESSURE TANK AND PUMP

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10 Claims. (Cl. 103—5)

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This invention relates to a combination pressure tank and pump.

An object of the invention is to provide a combined pressure tank and pump adapted to be used in automatic water supply systems and wherein the pump will, at all times, be submerged in water so that it will never be necessary to prime the pump.

Another object of the invention is to provide a construction of the character described which is very compact and wherein the tank and pump form a single unit.

A still further object of the invention is to provide, in a water supply system, a housing forming a pressure chamber therein having an outlet, a pump associated with the housing and arranged to discharge water therein under pressure with an inlet leading from a source of supply and connected into the pump inlet said housing being so shaped that air or gas entering the same will not become entrapped therein but will readily find its way to said outlet.

With the above and other objects in view the invention has particular relation to certain novel features of construction, arrangement of parts and use, an example of which is given in this specification and illustrated in the accompanying drawings wherein—

Figure 1 shows a vertical, sectional view.

Figure 2 shows an end view partly in section.

Figure 3 shows an enlarged, sectional view of the pump and pump casing.

Figure 4 shows a transverse, sectional view taken on the line 4—4 of Figure 3; and

Figure 5 shows a fragmentary longitudinal, sectional view taken on the line 5—5 of Figure 3.

Referring now more particularly to the drawings wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates the pressure tank which is closed at its ends by the end plates 2 and 3. The tank is divided by a vertical partition 4 into the main water chamber 5 and the water reservoir 6.

The top of the partition 4 has an overflow opening 7 through which the water may flow from the reservoir 6 into the water chamber 5.

The top of the reservoir 6 is provided with a plug 8 which may be removed for initially filling the reservoir with water. Thereafter said reservoir will remain filled sufficiently to keep the pump, at all times, submerged. The reservoir 6 may also have a drain plug 9 for cleaning purposes.

The end plate 3 has a circular opening 10 near

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the bottom thereof and fitted through said opening there is a conical shaped housing 11 whose inner, or small, end is screwed into a coupling 12. This coupling extends through and is welded to the partition 4.

The large end of the housing 11 has an external annular flange 13 which is fitted against and bolted to the end plate 3 with a suitable gasket 14 between them to form a fluid tight joint. One of the bolts connecting the flange 13 to the end plate 3 extends across the reservoir 6 and its end is welded to the partition 4. This bolt is indicated by the numeral 15. The pump housing 11 has an outlet opening 16 in its upper side.

The numeral 17 designates a centrifugal pump which embodies a pump casing 18 and an impeller 19. The impeller is fastened to the shaft 20 of an electric motor 21.

The casing of the pump 17 is formed with an external annular flange 22 which may be bolted to the outer end of the housing 11. The motor and pump are preferably constructed as a unit which is enclosed by a surrounding housing 23 connected to the end of the tank 1 and provided with louvres 24 for the circulation of air about the motor.

The pump casing 18 is provided with side outlets 25, 25 through which the water may be discharged into the pressure chamber 26 within the housing 11 and in which the pump is located.

A suction line 27 is connected into the coupling 12 as shown in Figures 1 and 3 and this suction line is also connected into the well tubing 28 which extends down into the well and is provided with a suitable screen 29. This line 27 forms the intake pipe of the pump.

The well tubing 28 is sealed with the top of the well casing 30 by a suitable casing head 31.

Leading from the bottom of the chamber 5 is the discharge, or service, line 32 which leads to the point of consumption.

A Venturi tube 33 is located within the pressure chamber in the housing 11 and one end thereof is connected into the intake of the pump, as shown in Figure 3 and there is a nozzle 34 one end of which is connected to the other end of the Venturi tube 33 and whose other end is sealed with the small end of the housing means of a seal ring 35. This nozzle has the passageways 36, 36 through which water can flow from the intake pipe 27 into the Venturi passageway through the tube 33 and the nozzle 34 has the side inlet passageways 37, 37 through which water under pressure may pass and be discharged

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through the nozzle opening 38 inso said Venturi passageway.

It is to be understood that the water in the housing 11 will be, at all times, under pressure from the pump and this water under pressure flowing in through the passageways 37 and the nozzle opening 38 into the Venturi passageway through the tube 33 will create a suction therein thus drawing in the water from the well. This water will be constantly discharged through the opening 16 into the reservoir 6 keeping the same filled to the level of the opening 7.

The electric motor 21 is equipped with a conventional pressure switch 39. As the chamber 5 is filled with water the air therein will be placed under pressure which will eventually operate to open the switch and stop the pump. As the water is drawn off from the chamber 5 the pressure will decrease and the switch will be closed, in the usual manner, and the pump will be started thus discharging water into the reservoir 6 which will overflow into the chamber 5 until sufficient pressure is built up to again open the switch and stop the pump.

However, the pump will always be submerged in water contained in the reservoir 6 and should the supply of water from the well become exhausted or for any reason air should be drawn in through the intake pipe 27 it will not necessitate the priming of the pump since the pump, under those conditions, will remain submerged in the water in the reservoir 6.

In some instances the service line 32 may be connected directly into the outlet opening 16 of the housing 11. In such case water chamber 5 and reservoir 6 would not be used but the water would be drawn in by the pump through the intake line 27, as hereinabove explained, and discharged by the pump into the pressure chamber of the housing 11 and thence out through the opening 16 and the service line connected thereto to any desired point.

The drawings and description are illustrative merely while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. In combination, a pressure tank having a main water chamber and a reservoir outside of said chamber provided with an overflow opening, adjacent its top, into the chamber, a pump in the reservoir having an intake pipe leading from outside of the tank and having a discharge into the reservoir.

2. In combination, a pressure tank having a main water chamber and a reservoir which has an overflow opening into the chamber, a housing in the reservoir, said housing containing a pressure chamber and having an outlet port into the reservoir, a pump in said housing having a discharge outlet into the pressure chamber and an intake line leading from without the tank and connected into the pump intake.

3. In pumping equipment of the character described, a tank having a main water chamber and a reservoir which has a discharge opening into the chamber, a housing in the reservoir beneath said opening enclosing a pressure chamber and having an outlet port into the reservoir, a pump within the housing adapted to discharge water into the pressure chamber, under pressure, an intake line leading from without the tank and connected into the pump inlet and a nozzle arranged to discharge water, under pressure, from the pressure chamber into the intake line.

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4. In pumping equipment of the character described, a tank having a main water chamber and a reservoir which has a discharge opening into the chamber, a housing in the reservoir beneath said opening enclosing a pressure chamber and having an outlet port into the reservoir, a pump within the housing adapted to discharge water into the pressure chamber, under pressure, a Venturi tube connected into the intake of the pump, an intake line leading from without the tank and connected to said Venturi tube and a nozzle at the outer end of said tube adapted to project water, under pressure, from said pressure chamber into the stream flowing through said tube.

5. In pumping equipment of the character described, a tank having a main water chamber and a reservoir which has a discharge opening into the chamber, a housing in the reservoir beneath said opening enclosing a pressure chamber and having an outlet port into the reservoir, a pump within the housing adapted to discharge water into the pressure chamber, under pressure, a Venturi tube connected into the intake of the pump, a suction line connected into said tube, a nozzle having an inlet from the pressure chamber and a nozzle opening through which water in the pressure chamber is discharged into the oncoming stream through said tube.

6. In pumping equipment of the character described, a tank having a main water chamber and a reservoir which has a discharge opening into the chamber, a housing in the reservoir beneath said opening enclosing a pressure chamber and having an outlet port into the reservoir, a pump within the housing adapted to discharge water into the pressure chamber, under pressure, a tube in the pressure chamber connected into the pump intake, a suction line connected to said tube and providing for the inflow of water from a source of supply to the pump, through said tube, and a nozzle having an inlet communicating with the pressure chamber and a nozzle outlet in the tube directed in the direction of flow of the stream of water flowing through the tube.

7. In pumping equipment for a water distribution system, a tank having a main water chamber and also having a reservoir which has an overflow opening into the chamber, a housing positioned in the reservoir so as to be constantly submerged in the water in the reservoir, said housing enclosing a pressure chamber and having an outlet port into the reservoir, a pump associated with the housing and arranged to discharge water into the pressure chamber, under pressure, a tube in the housing connected into the intake of the pump, a suction line connected into the tube and providing for the inflow of water from a source of supply to the pump, through said tube, a nozzle having an inlet communicating with the pressure chamber and having a nozzle outlet in the tube directed toward the pump and a service line leading from the main water chamber.

8. In a water supply system, a reservoir, a housing in the reservoir having an outlet opening into the reservoir, said housing enclosing a pressure chamber, a pump associated with the housing and adapted to discharge water into said pressure chamber, under pressure, a tube in the pressure chamber connected into the pump intake, a suction line connected to said tube and providing for the inflow of water from a source of supply to the pump, through said tube, and a nozzle having an inlet communicating with the pressure chamber and a nozzle outlet in the tube directed

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in the direction of the flow of the stream of water flowing through the tube.

9. In a water supply system, a reservoir, a conical shaped housing in the reservoir having an opening near its large end into the reservoir, said housing enclosing a pressure chamber, a pump associated with the housing and arranged to discharge water into the pressure chamber, under pressure, a tube in the pressure chamber connected into the pump intake, a suction line connected to said tube and providing for the inflow of water from a source of supply to the pump, through said tube, a nozzle having an inlet communicating with the pressure chamber and also having a nozzle outlet in the tube through which water in the pressure chamber is discharged into the stream of water flowing through the tube.

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10. A pump assembly comprising, a conical shaped housing containing a pressure chamber and having a discharge outlet adjacent its large end, a pump within said chamber having an intake opening and having a discharge opening into said chamber, a suction line leading from without the housing through the apex thereof and entering the intake opening of the pump, a Venturi tube incorporated into the suction line within said chamber and a nozzle having an inlet communicating with the pressure chamber and a nozzle outlet within the suction line and directed in the direction of the flow of the stream flowing through said tube.

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