June 4, 1968 G. A. HANDELAND 3,386,808

WATER TREATING APPARATUS

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Fig. 1

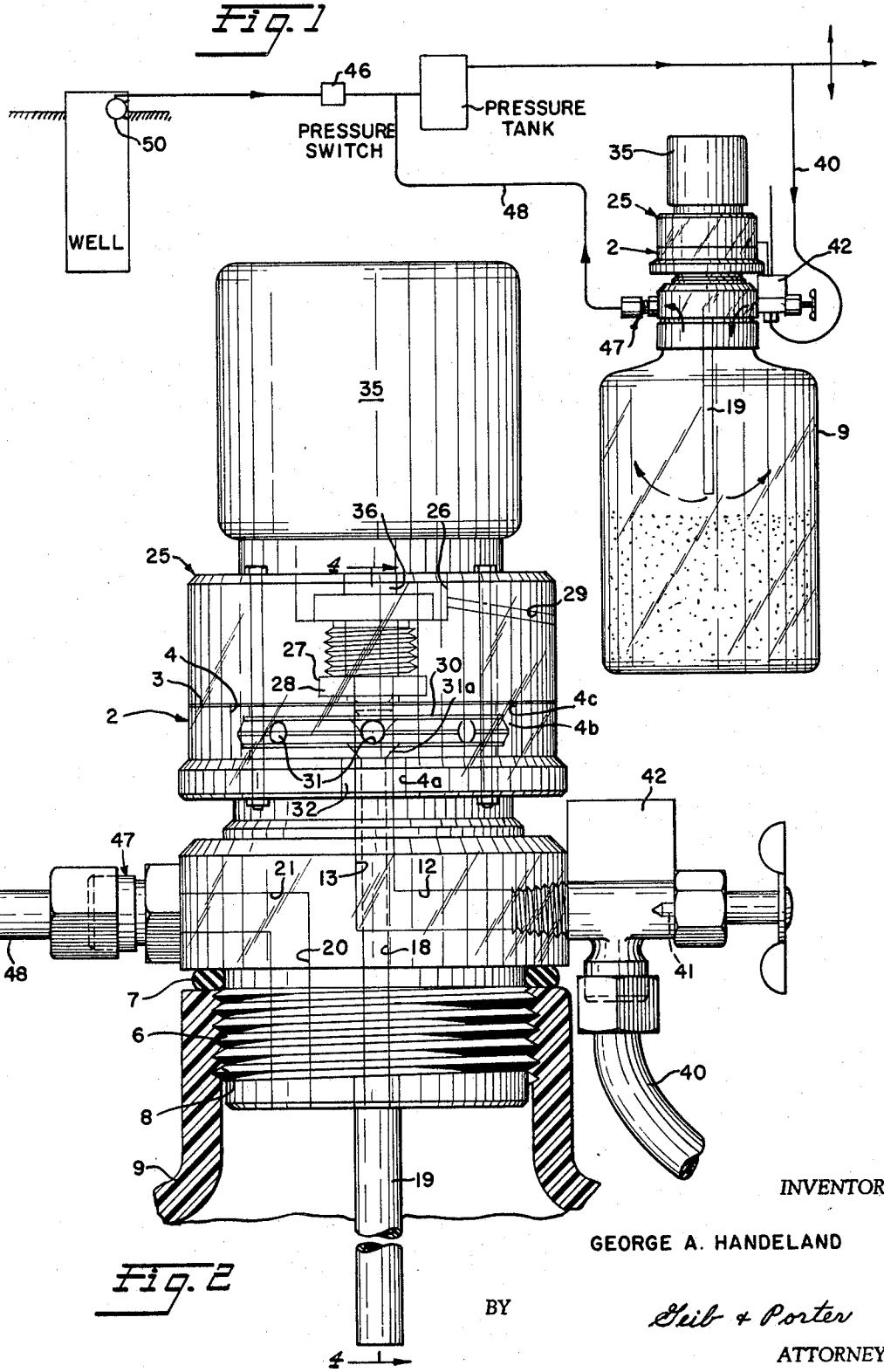


Fig. 2

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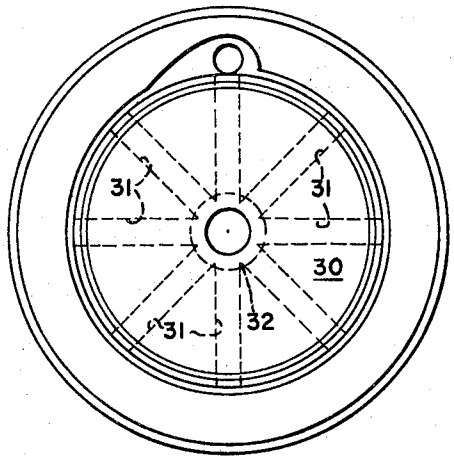
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Fig. 3



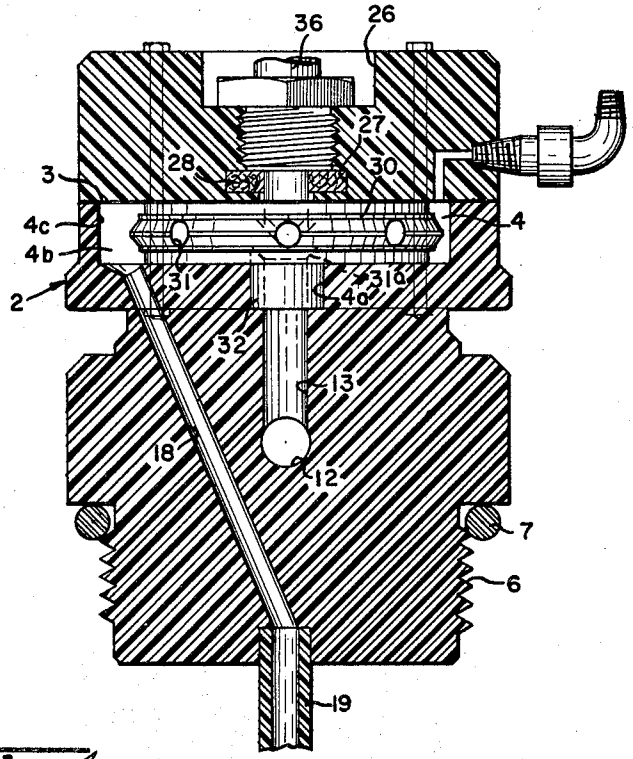


Fig. 4

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WATER TREATING APPARATUS

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4 Claims. (Cl. 23—272.7)

This invention relates to water treatment and particularly to feeding sterilizing materials into a water supply line or system.

It is among the objects of the present invention to provide an efficient, relatively inexpensive and compact apparatus of the type described which is particularly adapted for chlorination, although not limited thereto.

Another object is the attainment of the foregoing advantages while utilizing a chemical treating agent in the solid state.

Another object is the provision of an apparatus which may be effectively utilized in connection with a water supply system employing a well pump as are prevalent in rural and certain suburban areas.

Still another object is to provide a relatively simple and inexpensive apparatus of the type described which may be quickly and easily installed by persons who are possessed of average technical skill.

Still another object is the provision of an apparatus possessing the advantages recited which is also characterized by durability and ease of adjustment while in service.

The foregoing, together with other objects and advantages of the invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description when taken in connection with the accompanying drawings wherein:

FIGURE 1 is a schematic view of the apparatus of the invention as applied to a conventional household water supply system.

FIGURE 2 is an elevational view of the distributor head which forms part of the apparatus;

FIGURE 3 is a plan view of the impeller pump of the novel apparatus; and

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 2.

Referring more particularly to the drawings, the numeral 2 designates the intermediate portion of a substantially cylindrical distributor member, the same being provided with a substantially flat top portion 3 having a centrally disposed substantially cylindrical recess 4.

The lower end of the recess 4 of the distributor member 2 is of reduced diameter, as shown at 4*a*, and provided with a downwardly depending externally screw-threaded portion 6 which carries a gasket 7 and which is adapted to be received in, and be engaged by, the internally screw-threaded opening 8 in the top of a pressure vessel 9 which receives the solid water treating agent; for example calcium hypochlorite.

The chemical containing pressure vessel 9 may be made of fiberglass or other suitable material; and it may be sufficiently transparent or translucent in whole or in part to enable an observer to determine the approximate amount of the contents thereof.

As shown, the periphery of the intermediate portion 2 of the substantially cylindrical distributor member is provided with a passageway 12 which extends inwardly to the axis thereof to communicate with a right-angular passageway 13 which extends upwardly to the center of the bottom of the substantially cylindrical recess 4 in the top of the intermediate portion of said distributor member.

As indicated earlier herein, the apparatus of the present invention is primarily intended for association with the pressure tank of a conventional water supply system to which chlorine in suitable quantity has been added.

The passageway 12 of the distributor member communicates with the outlet side of the pressure tank of the water supply system; and due to its having previously been oxidized, the water flowing therethrough is less corrosive, and accordingly, no oxidizing takes place in the pressure vessel 9.

The interior of the substantially cylindrical distributor 2 is also provided with a passageway 18 which extends from the center of the downwardly depending externally screw-thread portion 6 diagonally upwardly to communicate with the substantially flat upper portion 3, and, as will be described more fully hereinafter, with the periphery of centrally disposed cylindrical recess 4.

The lower end of the diagonally extending passageway 18 communicates with the upper end of a distribution tube 19 which extends downwardly into the chemical tank 9 and which is secured to, and carried by, the downwardly depending externally screw-threaded portion 6.

The side of the distributor member 2 which is opposite the diagonally extending passageway 18 is provided with a vertical passageway 20 which communicates with the bottom of the lower screw threaded portion 6; and a right-angular extension 21 provides communication between the upper end of the vertical passageway 20 and the exterior of the distributor member.

The lower end of the distribution tube 19 does not necessarily extend into the solids at the bottom of the tank 9 but must be sufficiently spaced from the outlet passageways 20 and 21 so that the water coming in will have sufficient time, that it, too, will become saturated to the limit, with the chemical at the bottom of the tank before it is forced out to treat new, untreated water, coming from the well and going to the pressure tank.

Detachably secured to the top of the distributor 2 is a cap 25 having a centrally disposed aperture 26 and a planar bottom surface.

As shown in the drawings the central aperture 26 in the cap 25 is provided with a larger and concentric recess 27 for receiving a shaft seal 28. A downwardly diverted drain conduit 29 provides communication between the upper portion of the concentric recess 27 and the periphery of the distributor cap 25.

Disposed within the central recesses 4 and 4*a* in the top of the distributor member 2 is a substantially cylindrical pump impeller 30 which comprises a disc-like main body portion having a series of equally spaced radial ports 31 which extend from the center to the periphery thereof. The inner end of each of the radial ports 31 is directed downwardly, as shown at 31*a*, and communicates with the interior of a collar 32 on the underside of the disc-like main body portion of the substantially cylindrical pump impeller 30.

As shown, the interior of the collar 32 communicates with the vertical extension 13 of the passageway 12 of the distributor 2.

It will be understood that while eight radial ports 31 are shown in the drawings, any number from two upwardly may be employed provided, of course, they are equally spaced.

An electric motor 35 is mounted atop the cap 25 with its drive shaft 36 extending downwardly through the shaft seal 28 and projecting from the bottom of the cap and into connecting engagement with the top of the substantially cylindrical pump impeller 30.

The side wall of the substantially cylindrical recess 4 of the distributor member 2 is provided with a concave pocket 4*b* which curves outwardly and terminates in a small inward extending concave end wall 4*c*.

The concave pocket 4*b* of the substantially cylindrical recess 4 communicates at its point of greatest width with the upper end of the diagonal passageway 18. The lower end of the diagonal passageway 18 connects with the

upper end of the distribution tube **19**, as previously described.

As will be described more fully hereinafter, the electric motor **35** is connected to the well pump in such manner that it will commence to operate whenever the well pump starts to operate; and it should be capable of building-up, through the rotation of the cylindrical pump impeller **30**, a pressure of approximately five to approximately fifteen pounds per square inch or more without causing excessive heat.

According to the foregoing construction and arrangement, the rotation of the cylindrical pump impeller **30** will draw water from the upper end of the right-angular extension **13** of the passageway **12** and force the same outwardly through the radial ports **13** into the concave pocket **4***b* of the substantially cylindrical recess **4**, then downwardly through the diagonal passageway **18** and distribution tube **19** and into the bottom of the pressure vessel **9** which contains the water treating agent, i.e., calcium hypochlorite.

Water from the outlet side of the pressure tank of the water supply system is supplied through a water line **40** to the radially extending passageway **12**; and this water line is preferably provided with a manually adjustable needle valve **41** and an electric solenoid valve **42** which is disposed between it and the outer end of the passageway **12**.

The solenoid valve **42** and the electric motor **35** are wired together, and in turn connected to a pressure switch **46** in the existing water system, the pressure switch **46** being also connected to the well pump motor **50**. Accordingly, all of these elements start and stop in direct relationship with the pressure of the water. When the well pressure system stops, the solenoid valve **42** completely isolates the distributor member **2** and its associated elements.

After the previously oxidized water passes through the solid chemical treating agent in the pressure vessel **9**, it is caused to flow through the passageways **20** and **21**, a pressure relief valve **47**, and a water line **48** which communicates with the water inlet line between the well pump and the pressure tank of the conventional water supply system.

The simple adjustment, from time to time, of the needle valve **41** serves to maintain the residual chlorine at the desired level.

The solid, or semi-solid, chemical treating agent remains at the bottom of the chemical containing pressure vessel **9** to continue to saturate the incoming water until only the carriers of the chemical are left therewithin. At this time, the pressure container vessel **9** is easily removed, flushed, and refilled.

From the foregoing, it will be perceived that the motor **35**, impeller **30**, etc., are always ready to supply whatever amount of water is needed to replace the water which is used in the chemical tank **9**. Also due to the foregoing construction and arrangement, the pump and impeller will rotate with no water moving, yet holding the pressure increase steady on any given pressure: thus, no pressure by-pass or relief is needed for the pump.

Having thus disclosed my invention, what I claim as new and desire to secure by Letters Patent is:

I claim:

1. A bypass water treating apparatus comprising a pressure vessel containing the treating agent;

a distributor member having top, bottom and intermediate portions;

the bottom portion of said distributor member being adapted for removable sealing attachment to the top of said pressure vessel;

the top portion of said distributor having a circular cylindrical pump chamber;

the bottom of said pump chamber being defined by the top surface of said top portion;

said distributor member having a water inlet passage extending from the outside of the intermediate portion thereof to the approximate center of the upper surface of said top portion;

a water inlet line connecting said water inlet passage with a water service conduit;

a water distribution tube attached to and depending downwardly into said pressure vessel from the approximate center of the under surface of said bottom portion;

a water passage extending downwardly from the periphery of the top surface of the upper portion of said distributor member and communicating with the top end of said distribution tube;

a liquid outlet passage extending from the under surface of said bottom portion to the outside of said intermediate portion;

a liquid outlet line connecting said liquid outlet passage with the water service conduit upstream of the connection of the water inlet line with said water service conduit;

a valve for controlling the amount of liquid flowing from said liquid outlet passage;

a cap for the top of said distributor member, the top of said distributor member and the bottom of said cap providing between them a pump chamber;

a cylindrical pump impeller mounted for rotation in said pump chamber;

shaft means attached to said impeller and extending through the top of said cap for enabling the driving of said rotary pump;

motor means mounted on the top of said cap and attached to said shaft means for driving said rotary pump;

a relief line establishing communication between the interior of said pump chamber and the atmosphere and a relief valve in said relief line.

2. The combination of claim **1** wherein the valve for controlling the amount of liquid flowing from the liquid outlet passage is a needle valve in the water inlet line.

3. The combination of claim **1** wherein the valve for controlling the amount of liquid flowing from the liquid outlet passage is a needle valve in the liquid outlet passage.

4. The combination of claim **1** wherein at least one check valve is provided in each of said liquid inlet line and said liquid outlet line.

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