

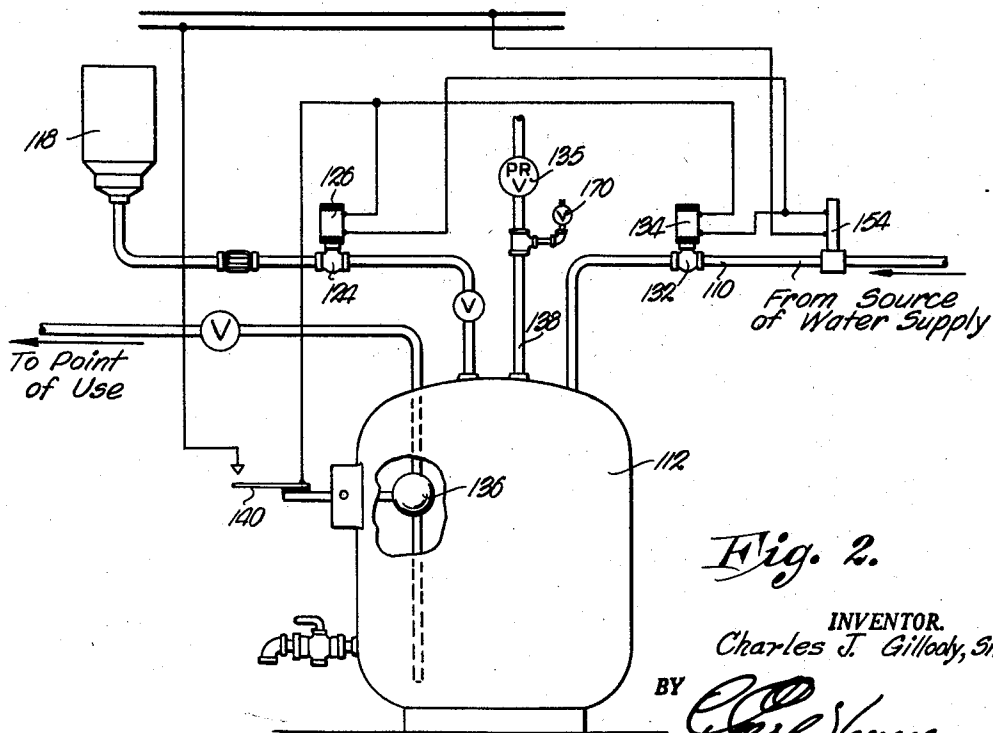
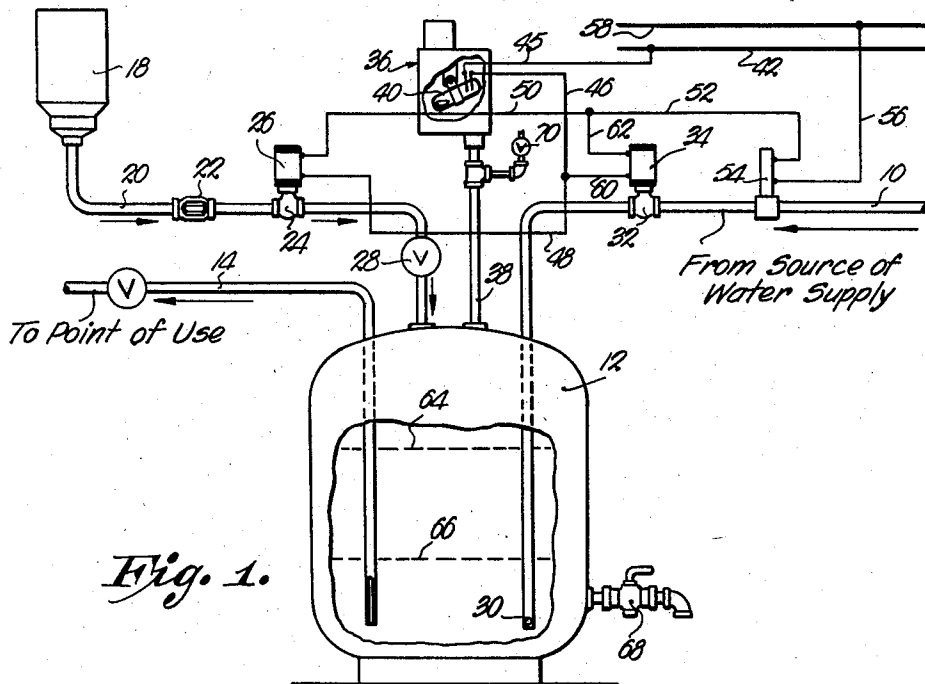
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APPARATUS FOR FEEDING MATERIAL TO WATER SYSTEMS

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APPARATUS FOR FEEDING MATERIAL TO WATER SYSTEMS

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to a system of introducing chemicals in a water line particularly where the water is to be utilized for drinking purposes, the primary object being to provide means for automatic injection and even distribution of the chemicals in the water prior to ultimate use thereof by the consumer.

It has been found in recent years that certain chemicals such as sodium fluoride are beneficial when introduced into the drinking water. This particular ingredient is especially useful in building of strong teeth and has been highly recommended under certain circumstances by the dental profession. Its greatest benefit is during teeth development by children and while some success has been determined through mere application of the chemical to the teeth, it is to be preferred that the sodium fluoride be taken internally and absorbed into the body for effective aid in development of strong tooth structure.

Many cities, particularly in the larger metropolitan areas, have today introduced systems of such nature in the water supply system, but no effective, simple and inexpensive apparatus has heretofore reached the market for use by smaller water systems such as those used on the farm.

It is the most important object of the present invention, therefore, to provide apparatus of the aforementioned type adapted for use in any water system, particularly that part thereof normally utilized for drinking purposes and having as a part thereof an interchangeable container for the chemical solution whereby the owner of the system may replenish the same with the sodium fluoride as needed.

Another important object of this invention is to provide apparatus for injecting sodium fluoride into drinking water that includes means responsive to drop in pressure within the water line for causing the solution to flow from the aforesaid container into the pressure line at periodic intervals.

Other important objects include the provision of apparatus of the aforementioned character operating entirely upon a maintained pressure to inject material into the fluid automatically on drop in pressure; the provision of safety means for rendering the entire system inoperable upon a predetermined drop in pressure within the fluid supply line; and the inclusion of structure causing forced flow of the material into the fluid pressure tank whenever the pressure in the latter falls below a predetermined limit such as caused by use of the fluid from the outlet of the pressure tank.

Other objects include many important details of construction all of which will be made clear as the following specification progresses.

In the drawings:

Figure 1 is a side elevational view partially schematic showing apparatus for feeding material to water systems

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made pursuant to one form of the present invention, parts being broken away for clearness; and

Fig. 2 is a view similar to Fig. 1 showing a modified form of apparatus.

In Figure 1 of the drawing there is illustrated a pipe, broadly designated by the numeral 10, adapted for connection with any suitable source of drinking water supply under pressure. Pipe 10 extends into a pressure tank 12 which may well be a part of the water system and from which drinking water is tapped by means of an outlet pipe 14.

In accordance with the present invention there is provided a replaceable container 18 for the pressurized solution such as sodium fluoride to be introduced into the water system.

The can or other container 18 for containing the pressurized fluid, may be of conventional character in that the same employs a valve (not shown) that is opened automatically when mounted on one end of a pipe 20 communicating with the tank 12. A sight tube 22 in the pipe 20 provides a visual indication of the presence of the solution in the pipe 20 between can 18 and a normally closed solenoid valve 24 whose normally deenergized solenoid is designated by the numeral 26. A metering valve 28 in the pipe 20 may be pre-set to determine the rate of flow of the pressurized solution from can 18 to the tank 12 whenever the valve 24 is open.

The flow of water in pipe 10 to the tank 12 by way of one or more outlets 30 adjacent the bottom of the tank 12, is also regulated by a normally closed solenoid valve 32 having a normally deenergized solenoid 34 for controlling the same.

A control unit broadly designated by the numeral 36 is coupled with the tank 12 through a line 38 and is dependent in its operation upon the pressure in tank 12. Units 36 are readily available on the open market and may be manually set to operate automatically within a predetermined range of high and low pressures in tank 12. It includes a normally open mercury switch 40. Upon opening of any valve within the pipe 14 to drain water from the tank 12, the pressure in the latter will manifestly drop and when such pressure is below a predetermined limit as determined by the setting of the unit 36, the mercury switch 40 will close, thereby energizing the solenoid 26 through the following circuit:

From main supply line 42, through wire 45, closed switch 40, wires 46 and 48, solenoid 26, wires 50 and 52, normally closed safety switch 54 and wire 56 to supply line 58.

The safety switch 54 within the main supply pipe 10 for water, is also of conventional character and dependent upon the pressure in line 10 for its operation. A predetermined pressure maintains the switch 54 closed, but when such pressure drops below a predetermined limit, switch 54 opens automatically, thereby deenergizing the entire system. Simultaneously with the energization of solenoid 26, solenoid 34 is energized by the closing of switch 40 through the following circuit:

From line 42, through wire 45, closed switch 40, wires 46 and 60, solenoid 34, wires 62 and 52, switch 54 and wire 56 to line 58.

Accordingly, as water flows into the tank 12, past the open valve 32, solution from the pressurized container 18 will also flow past open valve 24 and into the tank 12 at a rate determined by the setting of valve 28. Such flow continues until the pressure in the tank 12 raises to a predetermined limit, whereupon control 36 is actuated to re-open the switch 40 as shown in Fig. 1. The liquid level in the tank 12 may fluctuate between points 64 and 66, switch 40 opening when the level is at 64 and closing when the level drops to the line 66.

In the event the system becomes waterlogged, i.e., the

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water in tank 12 being so saturated with air as to adversely affect the proper operation of the system, it is but necessary to open valve 68 of the tank 12, thereby draining a few quarts of the water therefrom and simultaneously opening a bleeder valve 70 to admit air into the tank 12.

Accordingly, in actual practice, it may be desirable to enclose virtually all parts with the exception of container 18 and valve 70 within a suitable housing (not shown) properly mounted on the tank 12, the control 36, valve 28 and safety means 54, all being pre-set at the factory in accordance with the normal or average pressure in line 10 and the pressure of the solution in the replaceable cans 18.

In the embodiment of my invention shown by Fig. 2, line 138 having bleeder valve 170 therein, is provided with a pressure release valve 135 in lieu of the control 36 shown in Fig. 1, valve 135 being pre-set according to the pressure limits normally found in water supply pipe 110 and the pressure of the solution in container 112. Solenoids 126 and 134 are energized simultaneously, provided safety switch 154 is closed, upon the closing of a switch 140 that is controlled by a float 136 within tank 112, which float 136 is in turn controlled by the level of water.

As in the form of the invention shown in Fig. 1, water and chemical flow into the tank 112 simultaneously whenever solenoid valves 124 and 132 are open, and such flow continues until the level of water in the tank 112 rises to a point opening the switch 140.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for introducing a chemical such as sodium fluoride into a drinking water system comprising an air pressure tank having an outlet line provided with a manual valve; a valved water line communicating with said tank and adapted for connection with a source of water under variable pressure; a valved chemical line communicating with said tank; a chemical container coupled with said chemical line and maintained under pressure independently of said source of water; control means

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connected with the tank and coupled with the valves of said water and chemical lines for opening the latter to admit water and chemical into the tank upon a predetermined drop in air pressure in the tank as water and chemical are used by opening the manual valve, said control means being operable to open and close the valves of said lines independently of the opening and closing of said manual valve; and safety means within said water line, responsive to water pressure therein, and coupled with said control means for rendering the same incapable of opening the valves of said lines upon a predetermined drop of pressure in said water line.

2. Apparatus for introducing a chemical such as sodium fluoride into a drinking water system comprising an air pressure tank having an outlet line provided with a manual valve; a valved water line communicating with said tank and adapted for connection with a source of water under variable pressure; a valved chemical line communicating with said tank; a chemical container coupled with said chemical line and maintained under pressure independently of said source of water; and control means connected with the tank and coupled with the valves of said water and chemical lines for opening the latter to admit water and chemical into the tank upon a predetermined drop in air pressure in the tank as water and chemical are used by opening the manual valve, said control means being operable to open and close the valves of said lines independently of the opening and closing of said manual valve, said tank having a drain and an air inlet valve adapted to be opened to admit air thereinto upon opening of said drain.

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