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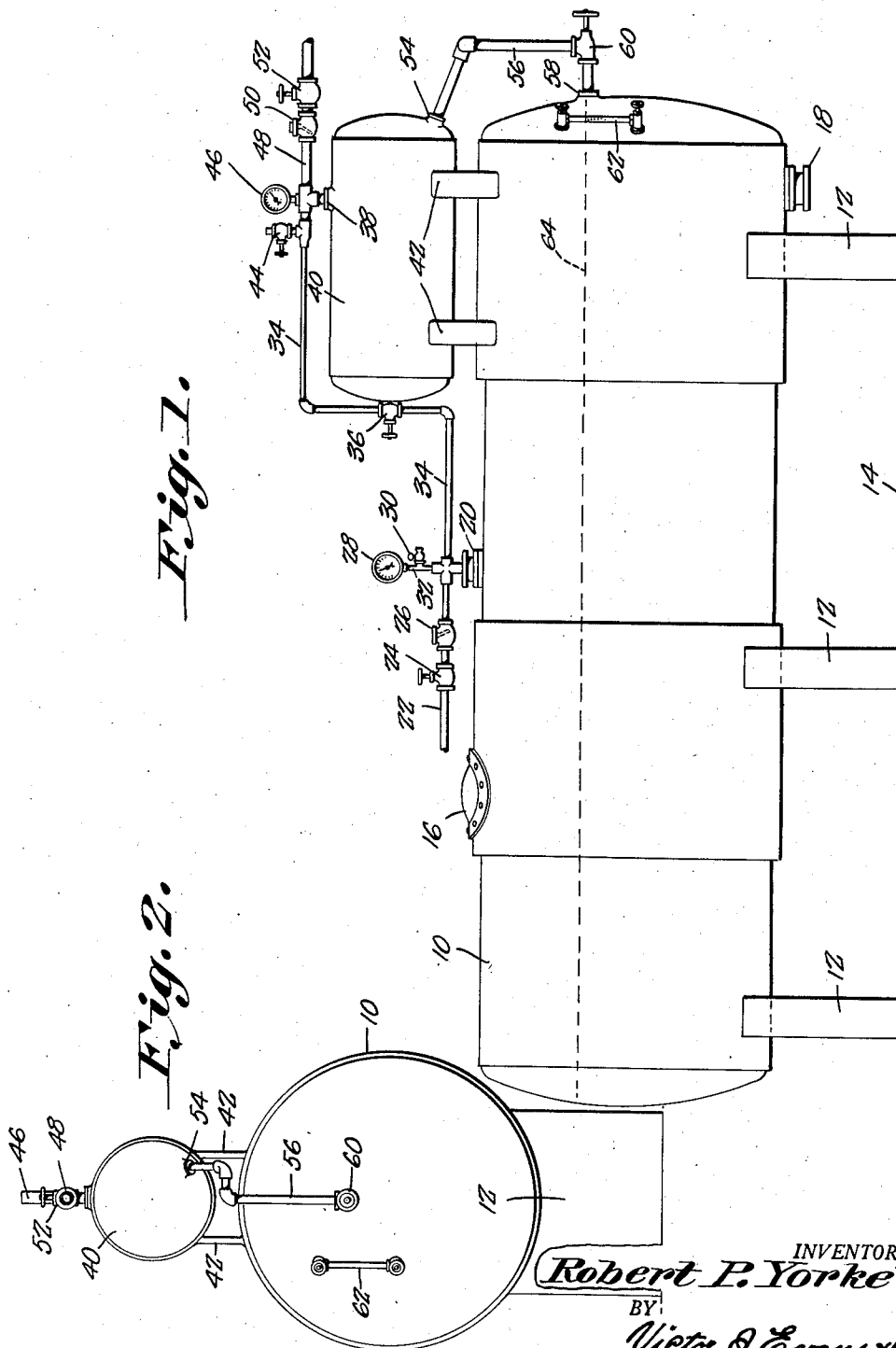
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AUTOMATIC WATER LEVEL CONTROL

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Fig. 1.

Fig. 2.



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AUTOMATIC WATER LEVEL CONTROL

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1 Claim. (Cl. 137—68)

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My invention relates to water supply systems as applied to fire extinguishing systems, and has among its objects and advantages the provision of an improved pressure system.

In the accompanying drawings:

Figure 1 is a schematic view in side elevation of a pressure tank structure in accordance with my invention, and

Figure 2 is an end view.

Pressure tanks in fire protection systems are required to maintain a predetermined volume of water at a predetermined pressure. The water supply tank should be filled to two-thirds of its cubic capacity and maintained under a given pressure through the medium of a compressed air system connected with the tank. This pressure may vary from 75 to 125 pounds depending upon operating conditions. Conventional systems employ a hydraulic pump for tank supplying purposes.

After the tank and piping system has been in use for a few years, small leaks develop and, by the use of water for testing purposes, the water level drops proportionately. After several hundred gallons of water have been used, it is then necessary to replenish the water in the tank to the correct level. The prescribed method of refilling is by the use of a hydraulic pump capable of delivering sixty-five gallons per minute at 125 pounds' pressure. Ordinarily such a hydraulic pump costs in the neighborhood of \$800.00 to \$1,000.00 when installed. The tank should be refilled without releasing the air pressure, which pressure would, if released, render the tank useless in case of fire for the period required for refilling and restoring air pressure, a period running from two to four hours. Under present conditions, an air compressor may be used in combination with the hydraulic pump or separately.

Accordingly an object of my invention is to provide a novel water replenishing device designed to eliminate the necessity of a hydraulic pump, wherein the device is of such construction as to prevent the release of tank pressure when restoring the water to the correct water level in cases where ordinary pressure is used in the water supply line. The device operates to maintain the correct water level by an automatic gravity feed without serious disturbance of the correct proportion of air and water, namely, one-third and two-thirds, respectively, with respect to volumetric capacity of the water tank.

In the embodiment of the invention selected for illustration, I make use of a supply tank 10 which may have a volumetric capacity varying

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from three thousand to nine thousand gallons. This tank is mounted on saddles 12 anchored to a floor or supporting structure 14. A standard manhole cover 16 is provided at the top of the tank 10, the latter being preferably of cylindrical contour and arranged with its axis longitudinally. A standard discharge fitting 18 communicates with the bottom of the tank.

To the top of the tank 10 is connected an air inlet fitting 20 having communication with a compressed air line 22 leading to an air compressor not shown. A globe valve 24 is interposed in the line 22. A check valve 26 is also interposed in this line, both valves being located in advance of the fitting 20 and the air pressure gauge and safety valve 28. A pet cock 30 is supplied in the pipe 32 between the gauge 28 and the fitting 20.

Communicating with the tank 10 is a pipe 34 provided with a valve 36 and communicating with an air inlet fitting 38 of an auxiliary tank 40 mounted on the supply tank 10, as through the medium of saddles 42. The auxiliary tank has a capacity of from two hundred to five hundred gallons. An exhaust globe valve 44 is interposed in the pipe 34 in advance of the fitting 38 and the pressure gauge 46 communicating with the tank 40.

A water supply pipe 48 has communication with the fitting 38 and is provided with a check valve 50 and a globe valve 52. A standard discharge fitting 54 is provided for the tank 40 near its bottom and connects with a pipe 56 having communication with a standard inlet fitting 58 attached to one end of the tank 10. An angle globe valve 60 is interposed in the pipe 56. A glass sight tube 62 is provided for the supply tank 10.

Figure 1 illustrates the correct water level at 64, the inlet fitting 58 being located at this level. This water level is equal to $.63 \times$ the diameter of the tank 10. The tank 40 must be elevated above the water line 64. When the tank 40 is attached in the manner shown and the valves 60 and 36 are closed, with the valve 44 opened, the water supply valve 52 is opened until water exhausts through the valve 44. This valve is then closed. The water supply valve 52 is closed and the filling valve 60 opened. After this procedure has been followed and the water in the tank 10 is at the proper level, the water reserve in the tank 10 will remain in the tank even with the valve 60 opened; but, if the water in the tank 10 drops below the level indicated, and with the tank 40 full and the valve 60 open, the water in the tank 40 will, by a series of gurgles, admit air into the

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pipe 56 which will rise through the tank 40 back to the fitting 20 and displace water which will flow into the tank 10 through the pipe 56, and the process will continue until the small tank 40 is empty or until the water line 64 is at its correct level.

Should the water level 64 be considerably lower than its normal level corresponding to the fitting 58 and rapid filling of the tank 10 be desired, the valve 36 is opened. This will change the route of the air from the pipe 56 to the pipe 34 so that the water in the tank 40 will flow into the tank 10 through the line 56 by gravity without interruption from gurgles of air passing in the opposite direction. When the tank 10 is correctly filled with water and compressed air, and the valves 36, 44 and 52 are closed and the tank 40 full of water, the valve 60 may be opened and no additional water from the tank 40 will flow into the tank 10. As water from the tank 10 is used through the tank outlet 18, or small leaks lower the water level, to a point below the inlet fitting 58, the tank 40 will automatically feed water into the tank 10 and without any loss of pressure in either tank.

The tank 40 maintains a reservoir of water to be supplied to the automatic sprinkler system for extinguishing fires anywhere in the building. The air pressure is determined by the level at which the tank is located, which may be either in the basement or on the roof. The height of the building to the tank 10 is also considered. The air pressure should be sufficient to force all the water in the tank 10 through its outlet opening 18 and into the sprinkler piping at a minimum pressure of fifteen pounds at the highest level of the sprinkler opening until the water in the tank is exhausted, the last of which still having a fifteen pound pressure.

In sprinkle systems supplied by pressure tanks, it is necessary to employ the hydraulic filling pump approximately once a month. This requires the services of a mechanic at each refilling. My invention eliminates the necessity of a monthly inspection or the use of a hydraulic pump, and operates to automatically keep the correct water level in the tank 10 at all times until the water in the tank 40 is all used.

Without further elaboration, the foregoing will so fully explain my invention, that others may,

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by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

In a water pressure system of the type described the combination of a water supply tank, having a discharge outlet on the bottom of and adjacent one end thereof, an air inlet fitting on the top thereof having communication with said supply tank, a line connecting said fitting to a source of pressure, a globe valve interposed in said line, remote from said fitting a check valve interposed in said line intermediate said fitting and said globe valve, both valves being located in the line in advance of said fitting, a pressure gauge connected to said fitting, a petcock located intermediate said gauge and said fitting an auxiliary water feed tank mounted on said water supply tank above the normal level of the water supply tank, an air inlet fitting on the top of said auxiliary tank, a line connecting the fitting on the water supply tank with the fitting on the auxiliary tank, a valve interposed in said line between the fitting on the water supply tank and exhaust valve interposed in the line adjacent the fitting on the auxiliary feed tank, a pressure gauge mounted on the fitting on the auxiliary feed tank, a water supply line connected to the fitting on the auxiliary feed tank, a check valve and globe valve interposed in said supply line in advance of said fitting a conduit placing said auxiliary water feed tank in communication with said water supply tank at a point located at the normal water level to be maintained in the water supply tank and a valve interposed in said conduit intermediate said tanks.

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