April 28, 1942. T. E. BART ET AL 2,280,780

ANTIFREEZE, ANTIPOLLUTION DRINKING FOUNTAIN

Filed March 20, 1939 2 Sheets-Sheet 1

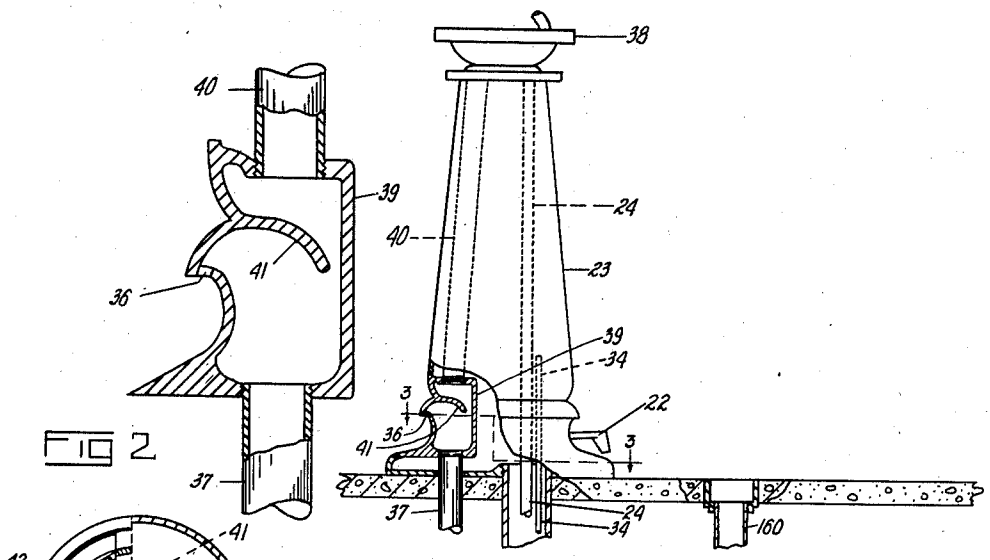


FIG 2

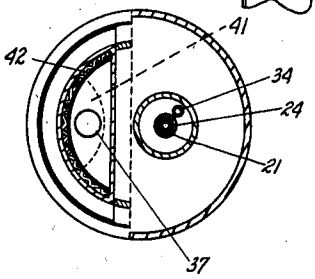


FIG 3

FIG 1

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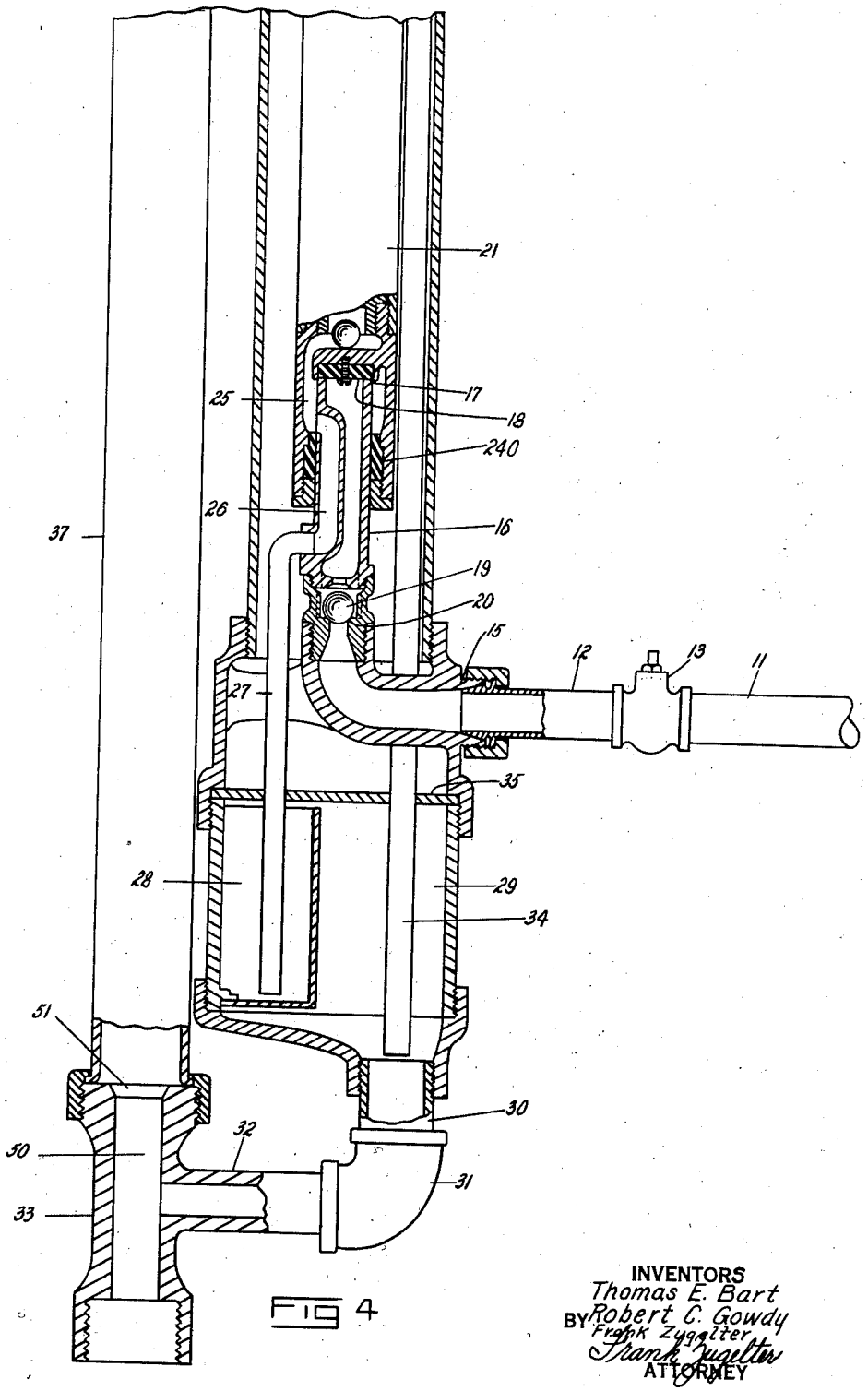


FIG 4

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ANTIFREEZE ANTIPOLLUTION DRINKING FOUNTAIN

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Application March 20, 1939, Serial No. 262,926

11 Claims. (Cl. 299—13)

This invention is concerned with water service fixtures that are normally drained to a depth below ground level to avoid freezing thereof. In devices of this type, it is necessary to provide some arrangement for draining the unused water from the device, after each operation thereof. Such unused water may obviously be disposed of by dissipation thereof by the adjoining soil or by drain packs provided in the ground. Such drainage arrangements are objectionable in some communities for various reasons. Under such circumstances it is necessary to connect the fixture to sewers.

Sewer connections for the indicated purpose are particularly objectionable in that the water flow control valves, buried in the ground, may be exposed to polluted water from stopped up or plugged sewers. Where that occurs the polluted water about the main flow control valve may become admixed with the water discharged from the device, whenever the device is operated.

An object of this invention is to provide a fixture and installation means therefor whereby all unused water from such a device is drained to a sewer and in connection with which there is afforded protection against the return of sewage to the main flow control valve.

Another object is to provide an anti-freeze fixture and sewer drainage connections therefor, adapted to protect the potable water supply thereof against both low pressure and high pressure back sewage in the sewer system into which the device normally drains.

These and other objects are attained by the means described herein and illustrated in the accompanying drawings, in which:

Fig. 1 is a diagrammatic elevational view of a drinking fountain, parts shown in section, and parts being broken away and modified in relative size of parts thereof for convenience in illustration, and disclosing various features of the invention.

Fig. 2 is a fragmental sectional view, on enlarged scale, of parts forming details of the invention.

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

Fig. 4 is an enlarged sectional view of parts shown in Fig. 1 and forming details of the invention.

The safe water supply line 10 is connected by suitable conduits 11 and 12 through a suitable ground key stop cock 13 to the end 15 of the various parts which together constitute the water supply nozzle or main water supply valve member 16. The ground key stop cock 13 is intended to be available to manipulation from ground level in accordance with common practice and for example, a suitable casing 100 may be provided for providing the indicated accessibility of the valve 13.

The upper end 17 of the water supply pipe or nozzle member 16 serves as a valve seat for which the main valve 18 is provided. Intermediate the valve seat 17 and the connection of the end 15 to the water supply line 12, there is provided a water column support valve 19 which for purpose of operation and explanation may be likened to a check valve adapted to permit flow of water under pressure from the water supply line 12 to the valve and valve seat 18—17, respectively. Normally, the valve 19 rests upon its seat 20, under the influence of gravity, and prevents return flow of fluid to the pipe 12. Inasmuch as valves, particularly check valves of the type referred to and which is shown herein as a ball check valve, are well known, no further detailed explanation thereof appears necessary.

The valve 18 is connected with a vertically reciprocating actuating casing or pipe 21 which in construction and operation corresponds with common practice. The casing or pipe 21 is adapted to be raised and lowered by means of a suitable foot pedal 22 associated with a pedestal 23 and contains a water supply line pipe 24 corresponding in structure, operation, and function with the water supply line pipes in similar prior art devices.

The lower end of the actuating casing 21 is provided with suitable packing 240 and a by-pass 25 adapted to provide drainage for the water supply pipe 24 by way of the channel 26 formed in the member 16 and all of which parts function as do corresponding parts in similar prior art devices.

The channel 26 is connected by means of drain pipe 27, with water reservoir 28. The reservoir 28 is adapted to overflow into the air cell or chamber 29.

The chamber 29 is adapted to drain through a suitable nipple or coupling 30, elbow 31, and the arm 32 of an ejector fitting 33 into a suitable sewer or connection thereto indicated generally at 34'.

It has been found that by providing an ejector fitting that is efficient for preventing any building of back pressure in the chamber 29 during periods of high pressure, same tends to lower the air pressure within the chamber 29. As a result thereof, the fresh water content of the water reservoir 28 may be agitated or dis-

turbed by reason of the relief of the lower pressure condition in the chamber 29 by way of the drain pipe 27, and a substantial portion of the contents of reservoir 28 may be discharged into the chamber 29. In order to relieve the low pressure condition in the chamber 29, there is provided a low pressure relief tube 34 which extends upwardly through the diaphragm 35 and has its upper end disposed in the pedestal 23 at an elevation above the vent opening 36 provided at approximately ground level for the combined vent and drain 37. Thus, during periods of flow of back water or sewage under pressure conditions such as causes the ejector fitting 33 to reduce the air pressure within the chamber 29, the air supplied by way of tube 34 obviates any disturbance of the contents of the water reservoir 28. Preferably, the lower end of the relief tube 34 is disposed in alignment with and at approximately the lower end of the chamber 29 and in approximate alignment with the passage through the drain coupling or nipple. This arrangement is preferred so as to minimize possible disturbance of the content of the water reservoir 28.

In order to protect the basin or bowl 38 of the pedestal 23 against sewage that might be projected upwardly through the drain and vent 37 under conditions of high back pressures in the sewer system, there is provided a drain box or casing 39 in association with the pedestal 23 and with which the upper end of the drain 37 and the lower end of the drain 40 communicate. A baffle or interceptor 41 is provided within the casing 39 in such position as will permit drainage from pipe 40 and basin 38 into the pipe 37 but which will intercept any upward flow of back water under pressure from the pipe 37 and direct or divert same into the adjacent portions of the casing 39 and from which such waste material may drain through a suitable grille 42 or the like provided as part of the casing or housing 39. Such waste or sewage would discharge at the base of the pedestal and would serve as an indicator of a plugged sewer condition.

Under conditions wherein the sewer is plugged and waste water and sewage would back up into and through the ejector fitting 33 under conditions that might be termed low pressure, some of the sewage or waste water will enter the chamber 29, and would effect the building up of a column of fresh water in the tube 27, channel 26 and the water supply pipe 24.

It might happen that during a period when the sewer would be plugged up under low pressure conditions, there might also be a break in the water supply line 11—12 by reason of which there would be a fall of pressure in the water supply line. At such a time there would be a column of safe water extending up through the tube 27, channel 26, by-pass 25, and water supply pipe 24 so that if a person should actuate the foot lever 22, seeking to obtain a drink from the device, the said water column disposed above the valve 17 might drain back into the water supply line 11—12. There could be no such return drain of water except in the absence of a sustaining water column within the water supply line 11—12 or the member 16 associated therewith. At such a time that the indicated and very remote conditions might co-exist in the sewer system and water supply system, and coincident to which the valve 18 might be lifted from its seat, the water column valve 19 functions to prevent return flow of water from the compensating column having its base in the reservoir 28. Inasmuch as the operation of the foot pedal is but momentary and the failure of the drinking fountain to supply drinking water almost coincident with operation of the foot lever would promptly notify the operator that the device was inoperative, the water column above the water column support valve 19 is but momentarily supported by the ball valve 19. Because of this situation, it is obvious that even though there might be a slight leak at or about the valve 19, the efficiency and utility of the device would not be substantially impaired under the almost never occurring conditions that have been related herein and against which provision has been made.

In connection with the indicated remote condition because of which the water column supporting valve 19 is provided, it must be remembered that if there is a break in the water supply line 11—12, there probably would still be a water column extending to the valve 18 although the pressure in that water column would necessarily be considerably diminished from normal. During those times that repairs would be required in the water supply line or in the drinking fountain itself, the ground key stop cock would be actuated for the cutting off of the water supply to the fixture, and consequently a water column would be maintained.

The ejector fitting 33 and the various passages therein have been illustrated herein in scaled relationship for attaining an ejector that is efficient at high sewage pressures. In connection therewith, it will be observed that the passageway in the arm 32 thereof is somewhat smaller in diameter than is the vertical passage 50 provided through the member 33. Attention is directed to the flared upper end 51 of the passage 50 which is provided for high efficiency operation of the ejector fitting. It will also be noted that the diameter of the drain 37 is much greater than the diameter of the passage 50 in the ejector 33. The drain 37 is substantially scaled to the ejector 33 for attaining a relationship of parts that has been found, under extreme tests, to be highly efficient for the purposes indicated.

The use of the check or water column supporting valve 19, 20 is optional and is preferably employed as a safety factor against a situation which probably would never happen.

Another arrangement which may be alternate, additional or optional for meeting a possible but improbable situation, is the provision of a relief arrangement for slow rise of sewage in a stopped up sewer, for protecting the water column sustained by reservoir 28, in the event of absence of pressure or adequate fresh water supply in the water supply system 10, 11, 12. Such relief arrangement may comprise a relatively small tube 200 extending from the vent and drain pipe 37, to a ground absorption pack or cell 201 that may be provided in the soil adjacent to the installation, for example, as seen in Fig. 1. The pack or cell may comprise an area filled with broken rock and into which the tube 200 may divert sewage from pipe 37. The pack 201 would function to substantially the same end as do drain caps in prior art devices.

The tube 200 is preferably connected to the pipe 37 at a place below the air cell or chamber 29. Thus, a very slowly rising flow of sewage into the air cell or chamber 29 is avoided. Consequently there is no occasion to build up a com-

pensating water column based in the water reservoir 28. The slow trickle of sewage water from pipe 37 into the cell or pack 201 would ordinarily be dissipated through the soil around the pack or cell 201. If under such conditions the water supply in the fresh water system should fail, operation of the main supply valve 17, 18 would not effect dissipation of the fresh water supply in the reservoir 28.

If there should be a faster rise of sewage in pipe 37, than can be accommodated by the pack 201, yet being insufficient to render the ejector fitting effective as would occur in the event of high pressure back flow of sewage through the ejector fitting 33, the sewage column built up in the pipe 37 and in chamber 29 would develop or elevate the safe water column, based in reservoir 28, through the tube 27 and passages 26 and 25 to a height dependent upon the pressure exerted by the sewage on the air in the air cell 29. If at such time the fresh water supply should fail, the water column supporting valve 19, 20, would sustain the fresh water column above main operating valve 18, 19, should the valve 18, 19 be opened.

What is claimed is:

1. The combination with a fixture having a fresh water supply outlet, means for opening and closing said outlet and a connection for draining said fixture of any water remaining therein after closing of said outlet, of means for sealing said connection against return passage of any waste fluid matter to said water supply outlet by way of said drain connection, said means having a fluid entrance opening and a fluid discharge opening and means having communication at said fluid discharge opening with the atmosphere and said fluid discharge opening for relieving tendency toward low pressure conditions in said fixture beyond said sealing means.

2. A device of the class described comprising a water supply nozzle, a chambered valve carrying supply line for receiving water at its lower end from said nozzle and for discharging water at its upper end at an elevation above ground level, and comprising a valve for cooperation with said nozzle for controlling flow of water from said nozzle to the upper end of said water supply line, means for actuating said valve to open and closed positions, means for draining the chamber and water supply line when the valve is closed and comprising a conduit connected with said chamber, a water trap in said conduit having an overflow wall and means for providing an air pocket having connection with the overflow wall for escape of fluid over said overflow wall and sealing said overflow wall against movement of water over said overflow wall from said air pocket, and means for relieving tendency toward low pressure conditions in the lower portion only of said air pocket.

3. In a device of the class described the combination of a water supply nozzle, a chambered valve carrying water supply line for receiving water from said nozzle and comprising a valve for cooperation with said nozzle for controlling flow of water from the nozzle, means for operating said valve relative to said nozzle and means for draining the chamber in said water supply line when the valve is operative with said nozzle for preventing flow of water from said nozzle, said last mentioned means comprising a reservoir, a connection for draining said chamber into said reservoir and discharging into said reservoir near the bottom of said reservoir, said reservoir having a capacity as large as the volume of said chamber and said connection therefrom to said reservoir, said reservoir being sealed except for an overflow port located near its upper end and except for said drain connection to said chamber, means for providing an air pocket communicating with the overflow port of the reservoir, said pocket being of a cubic content larger than said reservoir and having connection with the overflow port of said reservoir, a drain connection at the lower end of said air pocket, means for connecting said drain to a sewer and comprising a relief vent and an ejector fitting adapted to discharge high pressure back sewage through said relief vent, and a low pressure relief tube connected with said air pocket at the lower portion thereof, said tube adapted to be entered by back sewage that may enter said air pocket for sealing the air pocket against the atmosphere.

4. In a device of the class described the combination of a water supply nozzle, a chambered valve carrying water supply line for receiving water from said nozzle and comprising a valve for cooperation with said nozzle for controlling flow of water from the nozzle, means for operating said valve relative to said nozzle and means for draining the chamber in said water supply line when the valve is operative with said nozzle for preventing flow of water from said nozzle, said last mentioned means comprising a reservoir, a connection for draining said chamber into said reservoir and discharging into said reservoir near the bottom of said reservoir, said reservoir having a capacity as large as the volume of said chamber and said connection therefrom to said reservoir, said reservoir being sealed except for an overflow port located near its upper end and except for said drain connection to said chamber, means for providing an air pocket communicating with the overflow port of the reservoir, said pocket being of a cubic content larger than said reservoir and having connection with the overflow port of said reservoir, a drain connection at the lower end of said air pocket, means for connecting said drain to a sewer and comprising a relief vent and an ejector fitting adapted to discharge high pressure back sewage through said relief vent, a low pressure relief tube connected with said air pocket at the lower portion thereof, said tube adapted to be entered by back sewage that may enter said air pocket for sealing the air pocket against the atmosphere, and including a water column sustaining device associated with said water supply nozzle and adapted to permit flow of fresh water under pressure from said nozzle and substantially precluding return flow of water through said nozzle.

5. In a device of the class described the combination of a water supply nozzle, a chambered valve carrying water supply line for receiving water from said nozzle and comprising a valve for cooperation with said nozzle for controlling flow of water from the nozzle, means for operating said valve relative to said nozzle and means for draining the chamber in said water supply line when the valve is operative with said nozzle for preventing flow of water from said nozzle, said last mentioned means comprising a reservoir, a connection for draining said chamber into said reservoir and discharging into said reservoir near the bottom of said reservoir, said reservoir having a capacity as large as the volume of said chamber and said connection therefrom to said reservoir, said reservoir being sealed except for an overflow port located near its upper end and except for said drain connection to said chamber,

means for providing an air pocket communicating with the overflow port of the reservoir, said pocket being of a cubic content larger than said reservoir and having connection with the overflow port of said reservoir, a drain connection at the lower end of said air pocket, means for connecting said drain to a sewer and comprising a relief vent and an ejector fitting adapted to discharge high pressure back sewage through said relief vent, a low pressure relief tube connected with said air pocket at the lower portion thereof, said tube adapted to be entered by back sewage that may enter said air pocket for sealing the air pocket against the atmosphere, and a sub-soil sewage dissipating pack having relatively restricted communication with said relief vent.

6. In a device of the class described the combination of a water supply nozzle, a chambered valve carrying water supply line for receiving water from said nozzle and comprising a valve for cooperation with said nozzle for controlling flow of water from the nozzle, means for operating said valve relative to said nozzle and means for draining the chamber in said water supply line when the valve is operative with said nozzle for preventing flow of water from said nozzle, said last mentioned means comprising a reservoir, a connection for draining said chamber into said reservoir and discharging into said reservoir near the bottom of said reservoir, said reservoir having a capacity as large as the volume of said chamber and said connection therefrom to said reservoir, said reservoir being sealed except for an overflow port located near its upper end and except for said drain connection to said chamber, means for providing an air pocket communicating with the overflow port of the reservoir, said pocket being of a cubic content larger than said reservoir and having connection with the overflow port of said reservoir, a drain connection at the lower end of said air pocket, means for connecting said drain to a sewer and comprising a relief vent and an ejector fitting adapted to discharge high pressure back sewage through said relief vent, a low pressure relief tube connected with said air pocket at the lower portion thereof, said tube adapted to be entered, by back sewage that may enter said air pocket for sealing the air pocket against the atmosphere, a water column sustaining check valve associated with the nozzle adapted to restrain return flow of water through said nozzle, and a sub-soil sewage dissipating pack having relatively restricted communication with said relief vent.

7. The combination of a drinking water fountain comprising a pedestal for mounting at ground level, a drain basin at the top of the pedestal, a bubbler head discharging into said basin, manually operable valve control means for controlling flow of water from the bubbler head and comprising sub-soil mechanism for supplying water under pressure to said bubbler head and for normally draining the water contents of said bubbler head into a sewer, a drain connection having its upper end disposed at said basin for draining the basin and having its lower end connected with the sub-soil connection to a sewer and having a vent to the atmosphere in said pedestal at approximately ground level, and a baffle in said drain connection at said ground level vent for laterally deflecting at approximately ground level, any surge of back sewage in said drain connection exceeding an elevation of ground level.

8. The combination with a fixture having a fresh water supply outlet, means for opening and closing said outlet and a connection for draining said fixture of any water remaining therein after closing of said outlet, of means for sealing said connection against return passage of any waste fluid matter to said water supply outlet by way of said drain connection said means having a fluid entrance opening and a fluid discharge opening and including an air pocket or cell disposed intermediate said fluid entrance opening and said fluid discharge opening, said air cell being closed at its top and discharging at its lower end by way of said fluid discharge opening and through which drainage flows after passing said sealing means, said air cell having connection at its lower end with a sewer connection, and means for venting the lower portion of the air cell to the atmosphere otherwise than by way of said sewer connection.

9. A device of the class described comprising a water supply nozzle, a chambered valve carrying supply line for receiving water at its lower end from said nozzle and for discharging water at its upper end at an elevation above ground level, and comprising a valve for cooperation with said nozzle for controlling flow of water from said nozzle to the upper end of said water supply line, means for actuating said valve to open and closed positions, means for draining the chamber and water supply line when the valve is closed and comprising a conduit connected with said chamber, a water trap in said conduit having an overflow wall and means for providing an air pocket having connection with the overflow wall for escape of fluid over said overflow wall and sealing said overflow wall against movement of water over said overflow wall from said air pocket, means having connection with the lower portion of the air pocket for relieving tendency toward low pressure conditions in said air pocket and means for connecting the lower portion of the air pocket with a sewer and having a relief vent to the atmosphere at ground level.

10. A device of the class described comprising a water supply nozzle, a chambered valve carrying supply line for receiving water at its lower end from said nozzle and for discharging water at its upper end at an elevation above ground level, and comprising a valve for cooperation with said nozzle for controlling flow of water from said nozzle to the upper end of said water supply line, means for actuating said valve to open and closed positions, means for draining the chamber and water supply line when the valve is closed and comprising a conduit connected with said chamber, a water trap in said conduit having an overflow wall and means for providing an air pocket having connection with the overflow wall for escape of fluid over said overflow wall and sealing said overflow wall against movement of water over said overflow wall from said air pocket, means having connection with the lower portion of the air pocket for relieving tendency toward low pressure conditions in said air pocket and means for connecting the lower portion of the air pocket with a sewer and having a relief vent to the atmosphere at ground level and a sub-soil sewage dissipating pack having communication with said relief vent.

11. A device of the class described comprising a water supply nozzle, a chambered valve carrying supply line for receiving water at its lower end from said nozzle and for discharging water at its upper end at an elevation above ground

level, and comprising a valve for cooperation with said nozzle for controlling flow of water from said nozzle to the upper end of said water supply line, means for actuating said valve to open and closed positions, means for draining the chamber and water supply line when the valve is closed and comprising a conduit connected with said chamber, a water trap in said conduit having an overflow wall and means for providing an air pocket having connection with the overflow wall for escape of fluid over said overflow wall and sealing said overflow wall against movement of water over said overflow wall from said air pocket, means having connection with the lower portion of the air pocket for relieving tendency toward low pressure conditions in said air pocket, and a sub-soil sewage dissipating pack having communication with the lower portion of the air pocket.

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