April 28, 1942. R. J. MURDOCK ET AL 2,280,838

ANTIFREEZE DRINKING FOUNTAIN

Filed Dec. 13, 1938 2 Sheets-Sheet 1

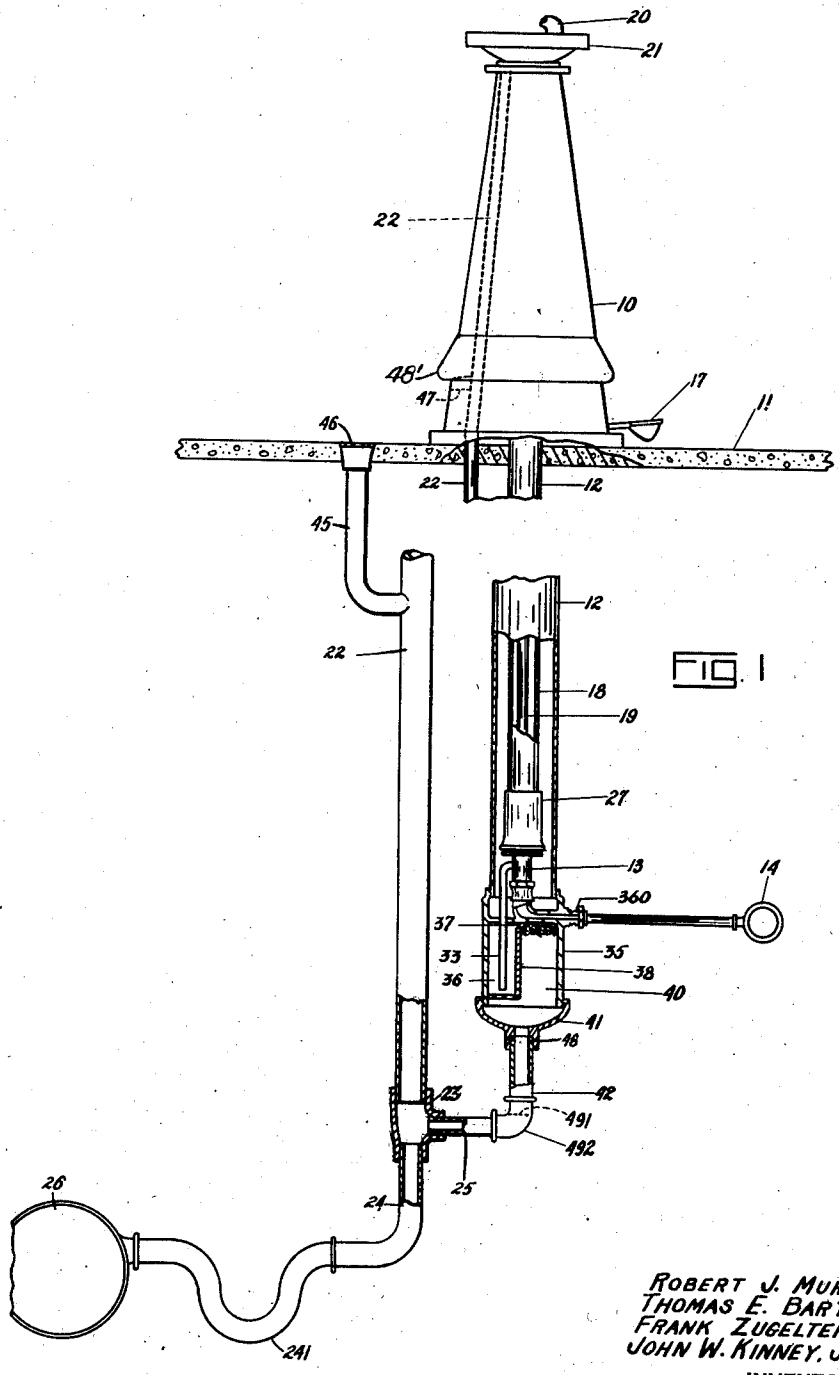



FIG. 1

ROBERT J. MURDOCK
THOMAS E. BART
FRANK ZUGELTER
JOHN W. KINNEY, JR.
INVENTORS.

BY Frank Zugelter
ATTORNEY

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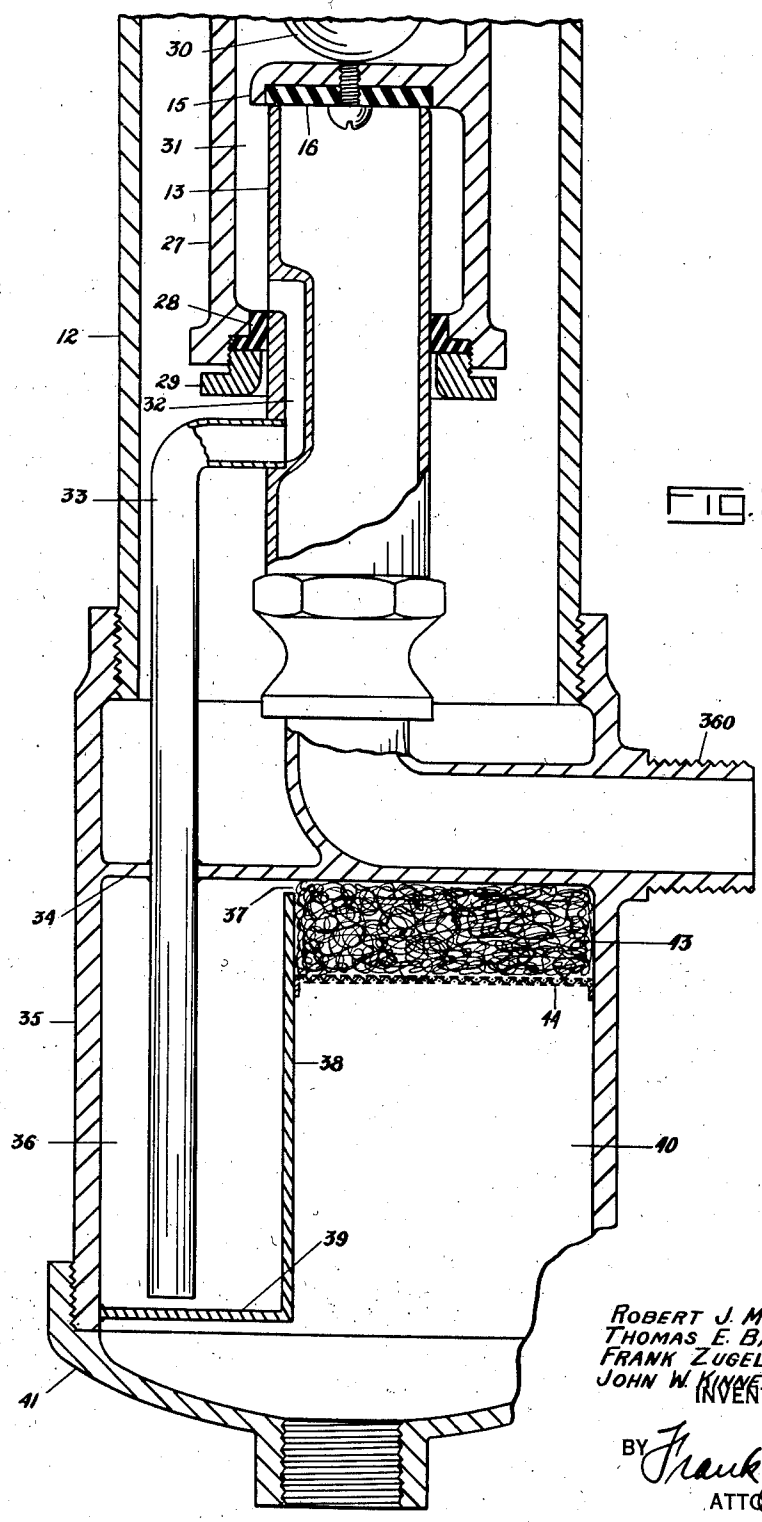



FIG. 2

ROBERT J. MURDOCK
THOMAS E. BART
FRANK ZUGELTER
JOHN W. KINNEY JR.
INVENTORS.

BY Frank Zugelter
ATTORNEY

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# UNITED STATES PATENT OFFICE

2,280,838

## ANTIFREEZE DRINKING FOUNTAIN

Robert J. Murdock, Thomas E. Bart, Frank Zugelter, and John W. Kinney, Jr., Cincinnati, Ohio, assignors to The Murdock Manufacturing & Supply Company, Cincinnati, Ohio, a corporation of Ohio

Application December 13, 1938, Serial No. 245,438

12 Claims. (Cl. 299—13)

This invention is concerned with improvements in connection with anti-freeze drinking fountains of the general character shown in Murdock Patents 164,864, 1,146,946 and 1,419,292. In such devices, the main valve controlling flow of potable water from the fresh water supply system or pipes, is buried in the ground at a depth greater than the depth to which frost, during the winter season, penetrates the earth. Suitable valve operating means are available at ground level together with a water supply pipe adapted to receive fresh water after the water passes the main valve, and leads or directs the water to an accessible position at or above the frost line or ground level. In such devices, arrangements or means are necessarily provided to drain the water supply pipe on closing of the main valve, so that no water may freeze in the water supply pipe. Such devices are generally old, and reference is made to the indicated patents for showing the related state of the art. Except as specifically distinguished herein, it is to be understood that devices embodying the within invention, conform with and embody the structures of said Murdock patents, wherefore the indicated patents are to be considered as part of the disclosure herein.

An object of the instant invention is to provide a device of the character indicated, which comprises such an arrangement of parts, that it is impossible for any water lines thereof, intended for conveying clean or pure drinking water, to be contaminated, except in such extraordinary circumstances as floods or the like and incident to which the contaminating material submerges the entire fixture.

Another object is to provide a device, the clean water conveying parts of which are protected against contamination from such sources as ground water, clogged sewers, etc.

Another object is to provide a device that is safe, as previously mentioned, but which is nevertheless adapted to drain its waste water into a sewer or similar system.

These and other objects are attained by means of the device 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 broken away and modified in relative size of parts thereof for convenience in illustration, and disclosing the features of the invention.

Fig. 2 is an enlarged vertical sectional view of parts shown in Fig. 1.

The pedestal 10 of the drinking fountain is positioned upon a suitable surface 11, such as the top of a slab of concrete. The pedestal houses substantially the same elements shown in Fig. 1 of said Murdock Patent 1,146,946. The extension 12 of the pedestal supports the water supply nozzle 13, from which nozzle flow of water from the fresh water supply lines 14 is controlled by a manually operable valve 15 provided with a suitable washer 16. The valve is raised and lowered from its seat by means of foot lever 17, pivoted on the base of pedestal 10. The foot lever is used to raise and lower the tubular casing or pipe 18 in the manner in which drain pipe K is actuated in said Murdock Patent 1,146,946. Within the casing 18 is a water supply pipe 19 which functions as does the supply pipe G in said Murdock Patent 1,146,946. The discharge nozzle, connected with the water supply line comprising pipe 19, is shown at 20. In the instant device, the unused water, discharged from nozzle 20 into the basin 21 at the top of the pedestal, is drained from the basin by waste pipe 22, which has connection at 23 with pipe 24. Pipe 24 is connected with a sewer or other appropriate drain 26. Pipe 24 also has drainage connection by way of pipe 25 with the structure mounted at the lower end of the extension or pipe 12. For reasons that will be explained more fully hereafter, the connection 25 should have a cross section that is no greater than the drain pipe 24 and the drain pipe 22 should have a cross-section that is at least as great or large as that of the drain pipe 24. There should be no constriction in any part of the drain pipe 22 that will vary from the indicated relationship.

The casing or pipe 18 may be termed an actuating or valve operating standard in that its movement controls opening and closing of main water supply valve 15. At the lower end of the said pipe or standard 18 is secured a housing 27, of which the valve 15 forms a part. The housing fits about and has sliding connection with the water supply nozzle 13. Suitable packing 28 and packing nut or gland 29 provide a watertight joint. The housing and the water supply pipe 19 are preferably of such sizes and shapes, that a minimum of fresh water is required to fill them, when the valve 15 is opened. Of course, the indicated parts should be sufficiently sturdy to withstand damage regardless of the abuse to which such devices are subjected.

A flow control or volume control valve is shown at 30 and serves the same function as do similar valves H' and F in said Murdock Patents 1,146,946 and 1,419,292, respectively.

At such times that the valve 15 is on its seat, it is intended that all of the water within the supply pipe 19 and chamber 31 in housing 27, shall drain therefrom, in order to render the device antifreezing. It is to be understood that the valve 15 is buried in the ground at a depth below the freezing line in the particular community in which the device is installed.

Drainage from supply pipe 19 and chamber 31 is effected through by-pass or channel 32 formed in the wall of the water supply nozzle 13, at such a place, that the upper end of the channel is closed by the packing 28, when the valve is unseated, thus preventing discharge or waste of any of the fresh water supply when the valve 15 is unseated. Normally, or at all other times the upper end of the channel is open and the contents of the pipe 19 and chamber 31 may drain into the pipe 33 having communication with the lower end of the channel 32. The pipe 33 extends through the diaphragm 34 formed in the base or foot member 35. The base or foot member comprises the supply nozzle 13 and a suitable spud connection 360 for connection of the nozzle 13 with fresh water supply lines such as 14. The diaphragm 34 and the connection of pipe 33 thereto should be such as will prevent any fluid from passing between opposite sides of the diaphragm, except by way of the pipe 33. The pipe 33 discharges in a reservoir 36 formed beneath the diaphragm 34 in any suitable manner. The reservoir is so constructed that it must be substantially filled before it will discharge or overflow by way of port or opening 37 in and at the top of side wall 38 of the reservoir. The lower end of the pipe 33 is adjacent or close to the bottom wall 39 of the reservoir. The structure so provided is a form of trap.

The size or volume of the reservoir is a matter of importance. It should be large enough to hold sufficient water to more than fill the water column extending through the pipe 33, chamber 31 and water supply pipe 19. In order to provide an adequate margin of safety in that regard, the volume or cubic content of the reservoir may be arbitrarily established as one and one-half times the volume of the indicated water column. The purpose of this supply of water is to permit the building up of a water column of clean water in the chamber 31 and pipe 19 and around the main water supply valve 15, in the event that the sewer 26 should become clogged or stopped up, and because of which sewage might back up into the pipes 24, 25 and 22. In case of such backing up of waste or sewage, the air within the chamber 40 as well as that air which was in the connection or couplings 41 and 42, is compressed to some degree and the water in the reservoir is forced upwardly in the pipe 33 and the water column so created will compensate or balance the water column of waste fluid that is built up in the drain pipe 22.

The volume or cubic content of the chamber 40 is an important factor. The chamber 40 together with the cubic content of the fittings or couplings 41 and 42 should be adequate to prevent the rise of the waste or foul water in chamber 40 to an extent such that same would overflow the side wall 38 of the reservoir. Here likewise an adequate margin of safety should be provided. In order to provide an adequate margin of safety in that regard, the cubic content of the chamber 40 may be arbitrarily established as one and one-half times the volume or cubic content of the reservoir 36.

Preferably the chamber 40 is made large enough that under extreme conditions, the top level of any water that might back up into that chamber, will be a few inches beneath the overflow port 37 in the partition or reservoir wall 38.

As an added precaution or protection against possible floating foreign matter or water borne forms of life from reaching any relatively high positions in the chamber 40 and from possible access to the reservoir by way of overflow port 37, a screen or other similar device may be placed in the upper part of the chamber 40. One form of device having particular adaptability in this connection comprises metal shavings or the like in the nature of steel wool, but preferably made of some noncorrodible or nonferrous material such as copper, bronze, lead, etc. Such material in a pad-like or wad-like form will provide adequate drainage and yet will provide such a labyrinth of small passages, as to make the device safe against any vermin or bugs that might enter the chamber 40 from passing to the reservoir 36. A wad or pad of such material is indicated at 43, it being understood that a suitable grid or reticulated supporting device or means 44 is to be secured in the chamber 40 for the material 43. For the purpose of description, the material 43 may be arbitrarily referred to as a screen or foraminous gate controlling access to the port 37.

Attention was previously called to the fact that the pipe 24 should serve as a constricted passage way leading to the pipes 22 and 25. The purpose thereof is to protect or guard the device against any great flow of sewage to the chamber 40 and thus prevent blowing out of the water content of the reservoir and the water column supported by the reservoir. Accordingly, if fluid cannot flow through the pipe 24 in greater volume than such fluid may flow into and along the drain pipe 22, the chamber 40 and the said water column will be protected against a blow out as noted.

It is to be understood that the relationship between the reservoir 36 and the chamber 40 and the reservoir 36 and water column supported by the reservoir shall be such that before any waste within chamber 40 reaches the overflow port 37 and before the reservoir 36 has been exhausted of water to a level slightly above the lower end of pipe 33, the waste water will have reached the upper limit of the drain pipe 22. The pipe 22 is vented at ground level as indicated at 45 and 46. So vented, the limit of the waste water column that could be backed up in the pipe 22 would be determined by the overflow level of the vent 46.

For practical reasons, it may be found desirable to provide the vent 47 through the wall of the pedestal 10, in lieu of or additional to the ground level vent 46. The opening of vent 47 through the pedestal wall is preferably concealed, for example by an overhanging bead or the like 48', so as to minimize insertion of foreign articles into the vent by mischievous persons, especially children.

Ordinarily it is unnecessary to provide a vent such as is indicated at 46 or 47, however, as a manufacturing proposition, it is preferred to provide every device with the protective features disclosed herein, so that regardless of the peculiarities incident to any given installation, each and every device will be adapted to meet the exigencies of any and every location where such a device may be installed. In order to provide the maximum degree of safety, it is therefore

preferable that a vent such as 46 or 47 be provided at some appreciable distance, for example two or three feet, below the outlet of the nozzle 20. Thus there is assurance that the compensating column of clear water supported by the reservoir 36, will never rise to its possible upper limit, viz., overflow thereof from the nozzle 20, regardless of static head or friction within the drain pipe 22 and because of which there might develop a slight inequality of water levels in the pipes 19 and 22.

Preferably the drain pipe 22 is connected at its lower end, to the base member 35 by couplings 41 and 42, at a place such that trapping does not begin too soon. In other words, the air trapped about the reservoir 36 should not be of such volume that any of the water in the reservoir will be discharged from the nozzle 20, in the proper and intended functioning of the apparatus. By reference to the assembly of parts shown at the lower part of Fig. 1 it will be obvious that trapping begins as soon as the back water reaches a height indicated by dotted line 491 in the elbow 492. A difference of a few inches in elevation at which trapping will begin is inconsequential, however, it is evident that in some installations, a workman conceivably might create a trapping condition which, in an emergency might otherwise disturb the balance of pressures and columns necessary for proper, effective and intended functioning of the device.

In the disclosed form of the invention, the water extending from the main water supply valve 15 to the bubbler head 20, drains by gravity, upon closing of that valve at the water supply nozzle 13. There remains after the first operation of the device, a quantity of fresh clean water in the reservoir 36 the excess water passing beyond the overflow port or face 37 as previously explained. With each operation of the main supply valve 15 there is a substantial change of the reservoir contents, thereby keeping the reservoir filled with clean water at all times.

Should any of the sewer or drain connections become clogged or prevented from performing their proper and intended functions, because of which back water or sewage should accumulate about the bottom of the fixtures, the seal provided by means of the reservoirs of water, the compensating columns of fresh water and various cooperating parts provided in or for cooperation with the drain connections leading from the main valve chamber 31, will prevent entry of any polluted water or other material into the chamber 31, thus assuring at all times, an uncontaminated flow of water from the bubbler head 20 whenever the main valve 15 is opened.

Preferably the connection of the bottom of the air cell or chamber members 35 and 41 to the sewer or drain members should be such that any surge of back water from the sewer should not go directly into the air chamber 40. The object in making the sewer connections should be to so relate the parts, that the trap provided in the members 35, 40 will be relieved to the maximum, as concerns any pressure head that might be effected in any way, shape or form in the sewer system. As an additional precaution to the constricting function previously mentioned in connection with the parts 22, 23 and 24, the vent 22 may be, and preferably is, of greater diameter than the pipe 24 or the smallest channel within the coupling 23 and through which channel constriction any back water would be obliged to pass before reaching the pipe 25.

The sewer connection from the lower end of air chamber 40 should be such that fluid under pressure will flow past the opening into the lower end of the member 41, as such fluid passes to the vent 22. Thus there is a tendency toward reduction of pressure in the air chamber 40, rather than a building up of pressure in that chamber as would occur if the fluid under pressure should flow directly into that chamber.

The related sizes of the communicating passages between the vent 22, sewer drain 24 and the lower end of the air cell, together with the fact that any substantial back flow of sewage to the vent 22 is in a straight line past the T coupling 23, effects a form of venturi or ejector action. Use of such ejector arrangement or principle, protects the air cell against surges of back sewage that might accompany unusual conditions in a sewer system.

Relief tubing 22 of a transverse diameter as large as or larger than the diameter of pipe 24, serves or functions as a guard means for protecting the fixture.

An ordinary trap is shown at 241. Use thereof is optional.

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 and including a water trap and an air pocket or cell closed at its top and through which drainage flows after passing said water trap, said air cell having communication at its lower end with said drain connection, said water trap being interposed between the air cell and the fresh water supply outlet and being in the path of flow of water from said fresh water supply outlet to said air cell.

2. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and said water supply line when the valve is operative with said nozzle for preventing flow of water from said nozzle and said last mentioned means comprising a reservoir, a connection between the chamber and the reservoir 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 from 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 and a drain connection at the lower end of said air pocket.

3. 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 enclosing the upper end of said overflow wall, said air cell being closed at its top and having an opening at its bottom, said air cell having communication with the trap over the overflow wall for gravitational escape of fluid over said overflow wall, the water in the trap and the air in the pocket sealing said overflow wall against movement of water over said overflow wall from said air pocket.

4. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and 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 and a connection between the chamber and the reservoir 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 from 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, and a fluid pervious, vermin impervious gate controlling access to said overflow port of the reservoir.

5. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and 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 and a connection between the chamber and the reservoir 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 from 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, and a vent connection to the atmosphere communicating with the drain connection at the lower end of the air pocket.

6. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and 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 and a connection between the chamber and the reservoir 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 from 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, and a vent connection to the atmosphere communicating with the drain connection at the lower portion of the air pocket, said vent having a cross section as great as the cross section of the drain connection at the lower end of the air pocket, said vent having communication with the atmosphere at a lower elevation than the upper end of the water supply line.

7. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and said water supply line when the valve is opertive with said nozzle for preventing flow of water from said nozzle, said last mentioned means comprising a reservoir and a connection between the chamber and the reservoir 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 from 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, a vent connection to the atmosphere communicating with the drain connection at the lower portion of the air pocket, said vent having a cross section as great as the cross-section of the drain connection at the lower end of the air pocket, said vent having communication with the atmosphere at a lower elevation than the upper end of the water supply line, and a fluid pervious, vermin impervious gate controlling access to said overflow portion of the reservoir.

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 and including a water trap and an air pocket or cell closed at its top and through which drainage flows after passing said water trap, said air cell having communication at its lower end with said drain connection, said water trap being interposed between the air cell and the fresh water supply outlet and being in the path of flow of water from said fresh water supply outlet to said air cell, and a vent connection to the atmosphere communicating with the lower end of the air cell.

9. 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 and including a water trap and an air pocket or cell closed at its top and through which drainage flows after passing said water trap, said air cell having communication at its lower end with said drain connection, said water trap being interposed between the air cell and the fresh water supply outlet and being in the path of flow of water from said fresh water supply outlet to said air cell, and a vent connection to the atmosphere having communication with the lower end of the air cell and with the drain connection, said communication passages having a relationship such as will effect an ejector action for protecting the air cell against surges of back sewage from the drain connection into the vent connection.

10. 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 and including a water trap and an air pocket or cell closed at its top and through which drainage flows after passing said water trap, said air cell having communication at its lower end with said drain connection, said water trap being interposed between the air cell and the fresh water supply outlet and being in the path of flow of water from said fresh water supply outlet to said air cell, and characterized by the cubic content of the water trap exceeding the cubic content or volume of the maximum quantity of water that may extend between the fresh water supply outlet and the water trap.

11. 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 and including a water trap and an air pocket or cell closed at its top and through which drainage flows after passing said water trap, said air cell having communication at its lower end with said drain connection, said water trap being interposed between the air cell and the fresh water supply outlet and being in the path of flow of water from said fresh water supply outlet to said air cell, and characterized by the cubic content of the water trap exceeding the cubic content or volume of the maximum quantity of water that may extend between the fresh water supply outlet and the water trap, and the air cell being of a cubic volume exceeding the cubic volume or content of the water trap.

12. In a device of the class described the combination of a water supply nozzle, a water supply line having a chamber at its lower end 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 gravitationally draining the chamber and 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 and a connection between the chamber and the reservoir 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 from 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, and a vent connection to the atmosphere having communication with the lower end of the air cell and with the drain connection, said communication passages having relationship such as will effect an ejector action for protecting the air cell against surges of back sewage from the drain connection into the vent connection.

ROBERT J. MURDOCK.
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