June 16, 1936. O. W. OTT 2,044,443

MEANS FOR PREVENTING SIPHONIC ACTION

Filed May 12, 1933 3 Sheets-Sheet 1

Fig. 1.

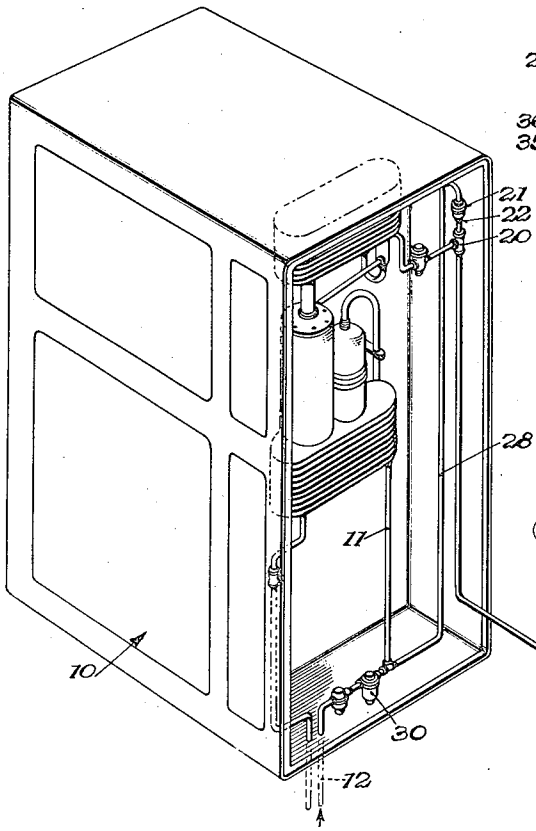
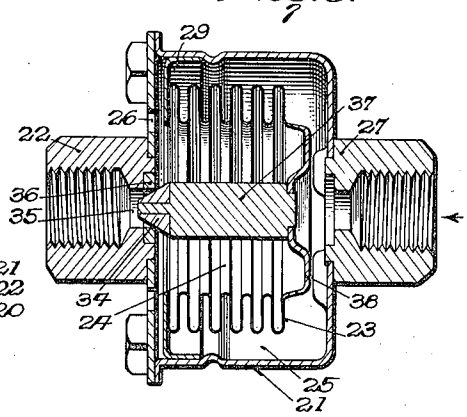


Fig. 3.



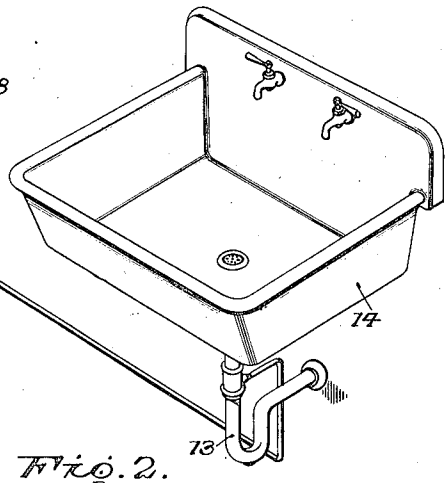
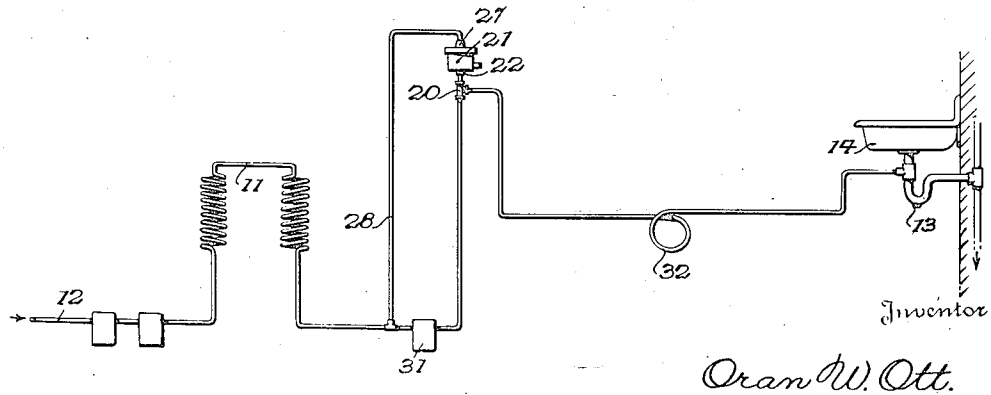


Fig. 2.



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FIG. 4.

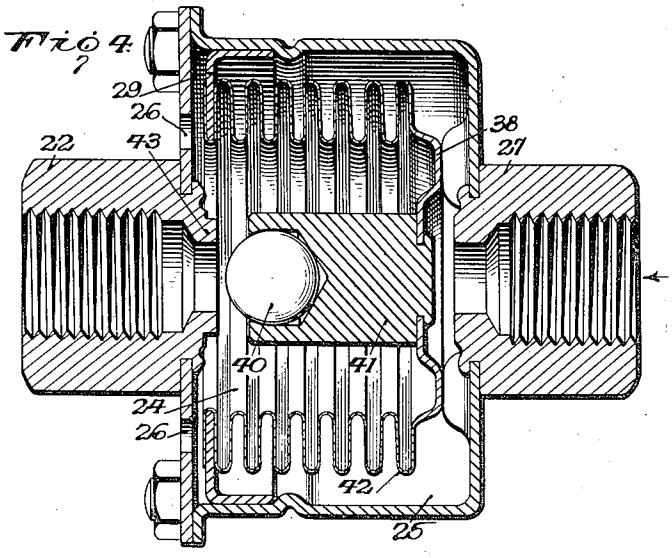


FIG. 5.

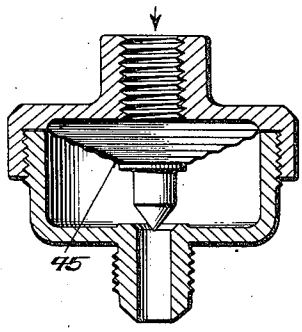


FIG. 6.

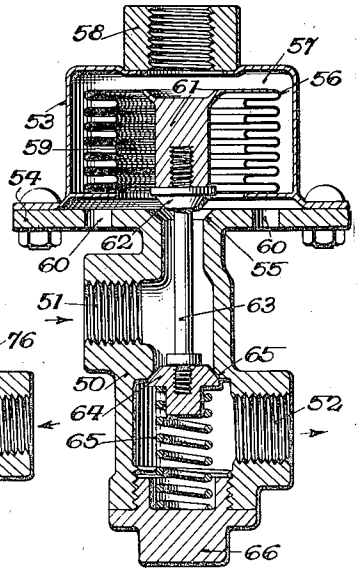
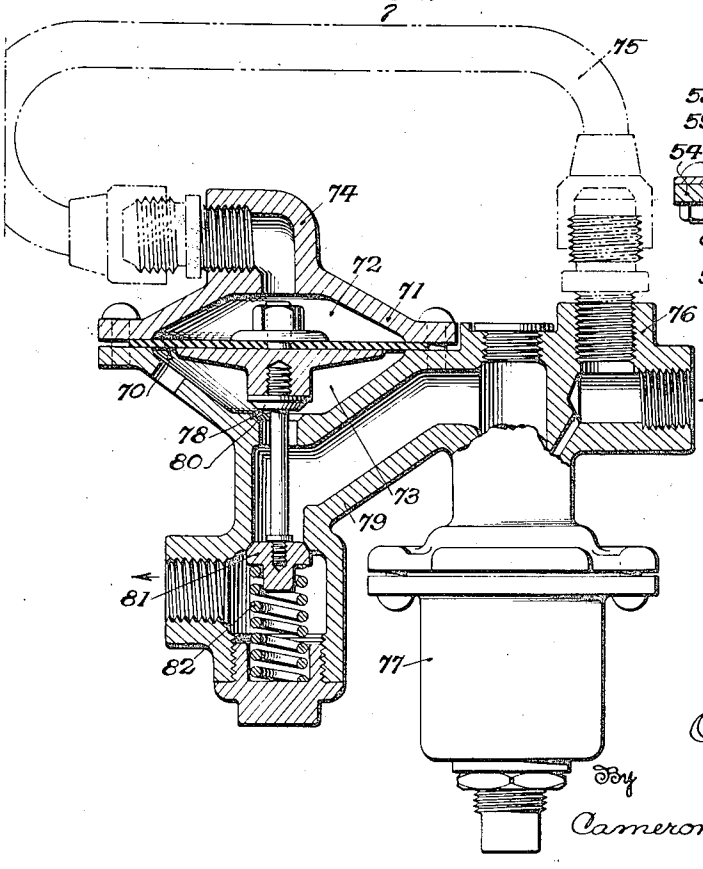


FIG. 7.



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MEANS FOR PREVENTING SIPHONIC ACTION

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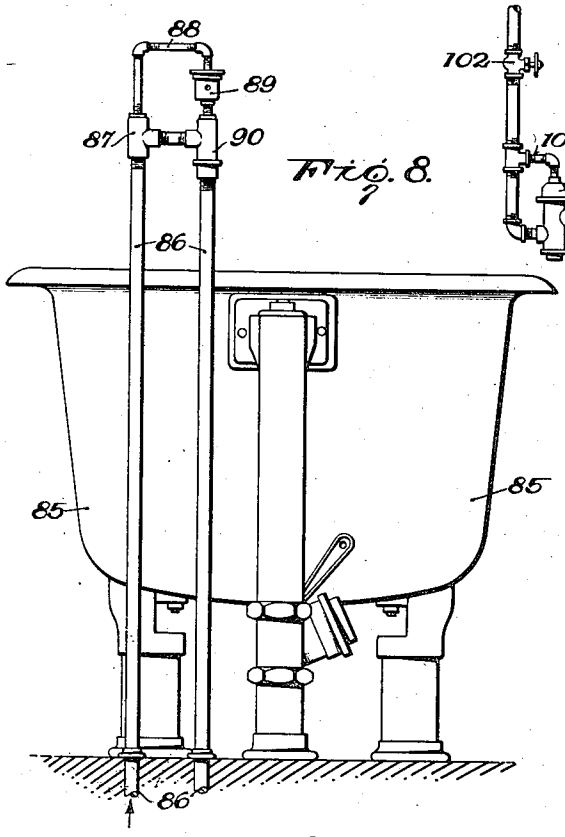
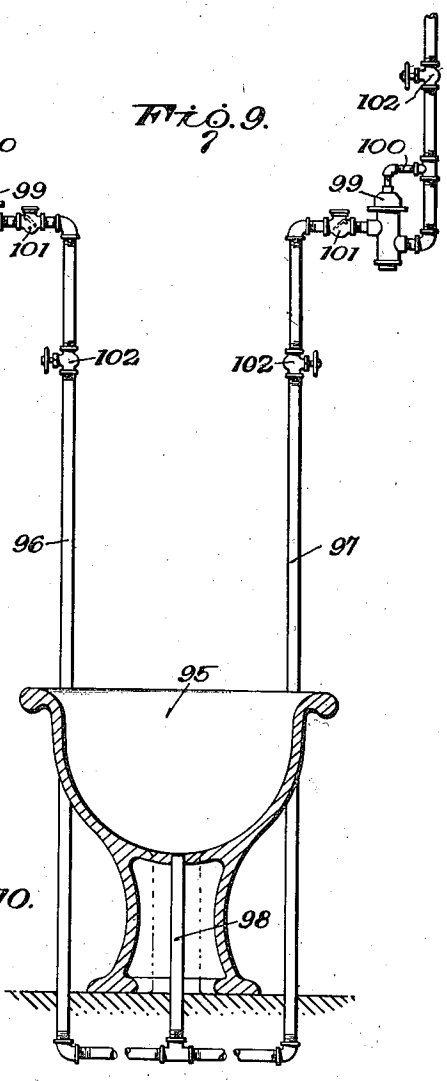


FIG. 8.

FIG. 9.



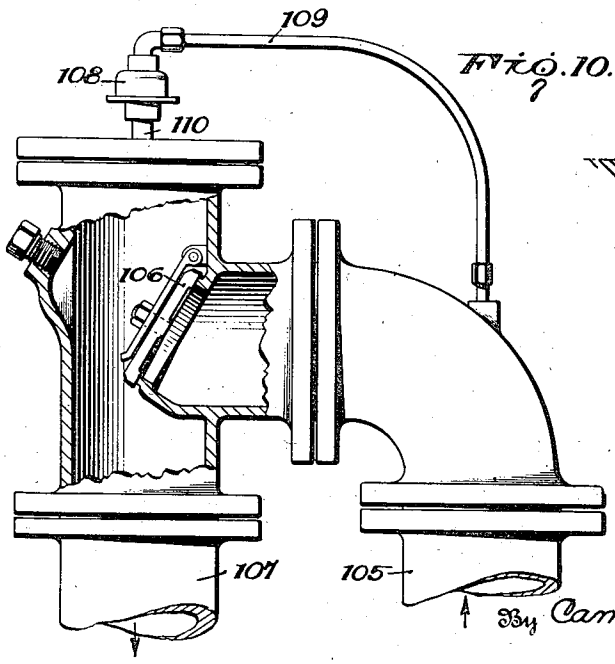


FIG. 10.

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MEANS FOR PREVENTING SIPHONIC ACTION

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Application May 12, 1933, Serial No. 670,808

8 Claims. (Cl. 137—78)

This invention relates to means for preventing the setting up of a siphonic action when the pressure in a line for conveying liquid falls below a predetermined minimum, and particularly to means for preventing the siphoning of impure water into a water supply system when the pressure in some part of the system, as for example in a cross-connection between a supply line and a sewerage or drainage line, falls below a safe minimum.

There are various forms of household and institution equipment, plumbing fixtures, etc., which employ a water line between a supply line for pure water and a sewerage or drainage line. Considering a gas refrigerator for purposes of illustration, it is customary to connect the inlet of a cooling water conduit for the refrigerator with some portion of the water supply system containing pure water and the outlet of said conduit with some suitable portion of the sewerage or drainage system of the building. During normal operation cooling water is taken from the pure water system and flows through the cooling system of the refrigerator, discharging into the sewerage or drainage system of the building. If the water supply to the refrigerator is cut off or falls below a predetermined minimum, however, there is danger that the column of water existing in the cooling system will reverse its direction of flow and siphon water from the sewerage or drainage system back into the pure water system.

Because of this danger it is common practice to require the installation, in the cross-connection between the pure water and drainage systems, of means which will prevent back siphoning of contaminated water. This provision is conventionally supplied by placing in the cross connection at a point to which the contaminated water in the drainage system will not rise, a casing provided with one or more apertures opening into the outside air and into which the cross connection discharges through a pendent end below the level of the apertures. Devices of this character prevent the back siphoning action because the cross connection at said casing is always subjected to atmospheric pressure, but devices of this character possess certain serious disadvantages among which may be particularly noted the tendency for algae to develop in the casing through which the water is flowing in open communication with the atmosphere, so that the passage may become constricted or even closed, and the noisiness that may result where air is admitted to a flowing column of water, with the tendency of the column to break, the consequent dripping from the pendent end of the pipe into the casing, etc.

It is an object of this invention to provide a novel device which will prevent back siphoning of liquid and which at the same time is not open to the objections found to inhere in devices of the type above described.

Another object of this invention is to provide a novel device of the type characterized which is simple and compact in construction, certain in operation, inexpensive to manufacture and install, and capable of use with a wide variety of apparatus.

Another object of the invention is to provide a novel device of the type characterized which will act to prevent back siphoning of liquid whenever the pressure in the supply line falls below a predetermined safe minimum.

Another object of this invention is to provide a device of the type characterized which also incorporates means for closing the line in which back siphoning is prevented.

Other objects will appear as the description of the invention proceeds.

Stated generally the present invention includes a pressure-responsive device which is in communication with the supply line at a suitable point therein, and to which pressure-responsive device is attached a valve that may open or close a connection admitting atmospheric pressure to the line through which back siphoning may occur. Said pressure-responsive device preferably includes a casing which is divided into two chambers by a flexible wall. The chamber at one side of said wall is subjected to atmospheric pressure, while the chamber at the opposite side of said wall is connected by a conduit to a suitable point in said supply line, whereby the normal pressure existing in said supply line is thereby transmitted to said flexible wall to hold the valve associated therewith in its closed position. Upon a predetermined fall in the pressure of said supply line below a safe minimum, or the occurrence of a vacuum therein, the drop in pressure is communicated to the flexible wall, and the latter, either by reason of its inherent resiliency or by reason of a suitable spring associated therewith, opens said valve and admits atmospheric pressure to the line through which back siphoning might otherwise occur. By suitably predetermining the resilient tendency of said flexible wall to open said valve, the latter may be actuated whenever the pressure in the supply line falls

below what is considered a safe minimum pressure.

In the accompanying drawings, several embodiments and uses of the invention have been illustrated, but it is to be expressly understood that these embodiments have been selected for purposes of illustration only, as the invention is capable of a wide variety of uses where a connection from a supply line opens into sewerage or drainage line under conditions that might produce a back siphoning of liquid from the latter to the former if the pressure in the supply line drops unduly. Reference is therefore to be had to the appended claims for a definition of the invention.

Referring in detail to the drawings, wherein the same reference characters are employed to designate corresponding parts in the several figures,

Fig. 1 is a diagrammatic view of a gas refrigerator illustrating the present invention applied to the cooling water system thereof;

Fig. 2 is a diagram of a somewhat different system with the present invention applied thereto;

Fig. 3 is an enlarged sectional view of a pressure-responsive device embodying the present invention for admitting atmospheric pressure to a cross-connection;

Fig. 4 is a view corresponding to Fig. 3 but illustrating another form of pressure-responsive device;

Fig. 5 is a view corresponding to Fig. 3 but illustrating yet another form of pressure-responsive device;

Fig. 6 illustrates yet another embodiment of the invention;

Fig. 7 illustrates a further embodiment of the present invention;

Fig. 8 illustrates the invention applied to apparatus for washing or sterilizing dishes, instruments or the like;

Fig. 9 illustrates the invention applied to another form of washing or flushing apparatus; and

Fig. 10 illustrates the invention applied to the water supply system of a swimming pool.

In Fig. 1, 10 indicates diagrammatically a gas refrigerator of any suitable construction provided with a cooling water line 11 constituting a cross-connection between a water supply line 12 and a drainage or sewerage line 13, here shown as a drain from a sink 14. Under normal operation the cooling water for the refrigerator is taken from the supply line 12, led through the cooling coils of the refrigerator, and then discharged into the drain or sewerage line 13, and as long as normal pressure exists on the water in the supply line 12 or the cross-connection 11, the cooling water will flow in the intended and proper direction. If, however, the pressure should be cut off of the water in the supply line or in the cross-connection, or if a vacuum should be created therein, a reverse siphonic action may be set up in the line 11 with the result that impure water may flow from the drain line back into the supply line. Such an occurrence is prevented by the present invention.

As shown in Figs. 1 and 2, a suitable fitting 20 is installed in the line 11 at a point above the highest level to which impure water may rise under its own head in the cross-connection—the top edge of the sink in the particular arrangement illustrated—and communicating with said fitting 20 is a casing 21, shown as provided with a nipple 22 for connection with the fitting 20, either directly or through an interposed section of piping of any suitable length.

Referring first to the embodiment illustrated in Fig. 3, casing 21 is divided interiorly, by a suitable flexible wall 23, into two chambers 24 and 25, respectively. Chamber 24 is maintained under atmospheric pressure in any suitable way, one or more openings 26 being shown in the wall of said casing, but if preferred one or more air vent pipes may lead into the casing 21 from any suitable point outside of the same. Chamber 25, one the other hand, is in communication through a suitable nipple 27 and pipe 28 with the cross-connection or the line supplying the same. In the form shown in Fig. 3, flexible wall 23 is in the form of a bellows mounted in position by having a flange 29 thereon suitably secured as by soldering to the body of the casing 21. Line 28 may lead to any suitable point either in the cross-connection, as when the cross-connection may be cut off from the main supply line, or in the main supply line when the pressure therein is to be controlling. In Fig. 1 pipe 28 is connected into the line 11 at the outlet side of the pressure-regulating valve 30, while in Fig. 2 said line 28 is connected into the cross-connection at the inlet side of the temperature-regulating valve 31, but it is to be understood that said pipe 28 may be connected into the cross-connection 11 or its supply line 12 at any other suitable point of pressure. Fig. 2 also shows a trap coil 32 in the cross-connection.

Mounted on or suitably connected to the flexible wall 23 is a valve 34 of any suitable form and construction, said valve cooperating with a port 35 suitably formed in or carried by the casing 21, and shown in Fig. 3 as in the form of a valve seat 36 mounted at the inlet to the nipple 22. As here illustrated, the valve has a conical seating portion carried by stem 37 projecting from the inner face of the end wall of the bellows 23 but any other suitable form of valve may be used if preferred. While the flexible wall 23 preferably takes the form of a tubular, deeply-corrugated, bellows-like member having a closed end wall 38 to which the valve member is attached, as shown in Fig. 3, a flexible wall of any other suitable construction and configuration may be used as illustrated in other embodiments to be described. A diaphragm may be used in which event it may be given a dished conformation, or a plane diaphragm may sometimes be used, and the flexibility of the diaphragm may be increased by giving it circumferential corrugations, as shown in Fig. 5, or an uncorrugated diaphragm may sometimes be used, as shown in Fig. 7. In any event, the flexible wall, either by reason of its inherent resiliency or by reason of a suitable spring associated therewith as shown in some of the embodiments, tends to assume a position, when the pressure in chamber 25 is below a predetermined minimum, such that the valve 34 has opened port 35, and at this time the area of the opening at the port should be sufficient to admit air to the cross-connection 11 with sufficient freedom to immediately break any tendency for siphonic action being set up.

When the cooling water is flowing under normal pressure from the supply line into the drain line, during normal operation of the refrigerator cooling system, water flows from the line 11 through the pipe 28 into chamber 25, whereby

the flexible member 23 is subjected to the pressure existing in the line 11. This pressure is sufficient to flex the wall 23 and hold the valve member 34 against its seat 36, so that the cross-connection from the supply line to the drain line is maintained closed and air tight. If the pressure in the supply line or in the cross-line 11 becomes reduced below a safe minimum, as when the pressure is cut off, or if a vacuum should exist therein, the pressure on the flexible wall 23 in chamber 25 is released, and the wall 23, either by reason of its own resiliency or the resiliency of the spring cooperating therewith, returns to its normal position and opens the valve 34. As the chamber 24 is under atmospheric pressure as heretofore described, atmospheric pressure is therefore admitted to the fitting 20, and hence to the line 11 at a point therein which will prevent any reverse siphonic flow, so that impure water cannot be siphoned back through the cross-connection 11 into the supply line.

By suitably predetermining the resiliency of the wall 23, or the spring cooperating therewith when one is employed, said wall 23 can be made to open the valve 34 whenever the pressure in the cross-connection 11 or its supply line 12 falls below what is considered a safe predetermined pressure.

It will be observed that in this construction the valve 34 is not in the cross-connection itself, and that the said valve normally acts to maintain the cross-connection closed against the admission of air thereto, so that normally there is no breakage of the column of water flowing through the cross-connection and no opportunity for algae to enter and grow within the cross-connection. Only in the event that the pressure in the cross-connection drops below the predetermined minimum is atmospheric pressure admitted to the cross-connection, and then the air is admitted to the cross-connection from a valve-controlled port outside of, although with any desired degree of adjacency to, the cross-connection.

In the embodiment of Fig. 4 the valve member 40 takes the form of a ball suitably retained in an aperture in a stem 41 attached to the inner face of the end wall of a bellows 42, and the nipple 22 is provided with an annular rib 43 which constitutes a seat for said valve member 40. Otherwise the construction is, or may be, the same as that heretofore described in conjunction with Fig. 3. In both Figs. 3 and 4 the pressure of the supply line is applied to the exterior of the bellows, while the interior of the bellows is open to atmospheric pressure. This is the construction preferred, but it is not essential, as it is apparent that the bellows may be reversed in the casing, with the pressure of the supply line admitted to the interior of the bellows and the chamber at the outside of the bellows open to atmospheric pressure.

Fig. 5 illustrates another embodiment of the invention wherein the flexible wall takes the form of a dished diaphragm 45 provided with a plurality of concentric corrugations to increase the flexibility of said wall. In this construction the pressure of the supply line is applied to the concave side of the diaphragm, and atmospheric pressure is admitted to the convex side of the diaphragm, but it is apparent that this may be reversed. The provision of corrugations in the diaphragm is not essential, and it is apparent that, as in a subsequent embodiment to be described, a plane diaphragm, with or without corrugations, may be used in place of a dished diaphragm where the necessary range of movement of the valve member is within the flexibility available for that type of diaphragm under the limits of the pressure to be used.

Fig. 6 illustrates an embodiment of the invention wherein the passage through the cross-connection is positively closed at the same time that atmospheric pressure is admitted thereto. This embodiment also illustrates the use of a spring to supplement the resiliency of the diaphragm, and it is apparent that the spring for aiding the resiliency of the flexible wall may be employed in conjunction with any of the other embodiments herein described. As here shown, the housing 50 is provided with an inlet connection 51 and an outlet connection 52. Also communicating with said housing 50 is a casing 53 which may be formed integrally therewith but is shown as separate from and bolted to a flange 54 on said housing. Housing 50 is in communication with casing 53 through port 55, here shown as in the form of a bevelled valve seat. As in other embodiments described the interior of housing 53 is divided into two chambers by a flexible wall 56, shown as in the form of a bellows although as will be apparent a plane, dished or any other suitable form of diaphragm may be used. Chamber 57 has the pressure of the supply line admitted through nipple 58 and chamber 59 is open to atmospheric pressure in any suitable way as by means of one or more apertures 60. Attached to the end wall of bellows 56 is a valve stem 61 having a valve member 62 formed thereon or suitably attached thereto and adapted to close the valve port 55. In this embodiment the valve stem has the extension 63 to which is attached a second valve member 64 adapted to cooperate with a valve seat 65 interposed between the inlet 51 and outlet 52. Valve members 62 and 64 are so related that when either is in engagement with its seat the other is in wide open position. A coil spring 65 is interposed between the valve member 64 and a seat in the removable cap 66.

In this embodiment, when the supply line is under normal pressure, its pressure is transmitted to the chamber 57 through any suitable pipe line communicating with nipple 58, and the resiliency of the spring 65 and flexible wall 56 is so selected that this pressure holds the valve member 62 against its seat 55, in which position the valve member 64 is held in its wide open position, permitting a free flow of water through the cross-connection which communicates with the inlet 51 and outlet 52. The cross-connection is thus sealed against the admission of atmospheric pressure at the valve 55, 62. Upon the occurrence of a predetermined drop in the pressure of the supply line the pressure in the chamber 57 diminishes to an amount wherein the resiliency of the wall 56 and spring 65 overcome said pressure, whereupon the valve member 62 is opened, admitting atmospheric pressure to the cross-connection from the chamber 59, and simultaneously moving the valve member 64 into engagement with its seat 65. Hence atmospheric pressure is admitted to the cross-connection to prevent reverse siphonic action and the cross-connection is positively closed. Obviously this means for positively closing the cross-connection can be incorporated in any of the other embodiments described when for any reason, as to prevent the escape of gases, it is desired to positively close the cross-connection upon a predetermined

drop in the pressure of the supply line as well as to prevent the setting up of siphonic action.

Fig. 7 shows another embodiment of the present invention wherein the valve mechanism for preventing siphonic action is incorporated in unitary relationship with other valve mechanism of a system. In this embodiment a plane diaphragm 70 is illustrated, but it is apparent that any other suitable form of flexible wall can be used. Diaphragm 70 is suitably clamped between the two valves of a casing 71, and divides the interior of the casing into two chambers 72 and 73. Chamber 72 communicates through nipple 74 and pipe 75 with a nipple 76 in the inlet to the thermostatic water control 77. Chamber 73, to which atmospheric air is suitably admitted as by the openings illustrated, communicates through port 78 with the outlet 79 of said thermostatic water control. Diaphragm 70 operates a valve member 80 for closing the port 78, and in the form shown a second valve 81 and spring 82 are associated with the valve 80 as in the embodiment of Fig. 6, but the second valve 81 may be omitted if desired, and the coil spring may also be omitted as in other embodiments described if the resiliency of the flexible wall 70 is sufficient to operate in the manner heretofore described. In this embodiment it will be observed that the valve mechanism for preventing siphonic action is incorporated unitarily in the design of a valve structure normally provided in the cross-connection, in this case the thermostatic water control, but it is apparent that the valve for preventing siphonic action could be incorporated with equal facility and in unitary relationship with any other valve structures for use in lines through which it is desired to prevent siphonic action.

Fig. 8 illustrates the present invention applied to a cross-connection for supplying water to a sink, tub, basin or other reservoir or container suitable for washing or sterilizing dishes or other articles, as generally indicated at 85. The cross-connection through which reverse siphonic action is to be presented is indicated by the pipes 86, and in conformity with the present invention, said line includes a fitting 87 from which pressure is transmitted through pipe 88 to the interior of a casing 89 which contains a valve actuated by a flexible wall of any suitable character. Casing 89 also communicates with a fitting 90 in pipe 86 for admitting atmospheric pressure thereto when siphonic action is to be prevented as in other embodiments described. Upon a predetermined drop in the pressure in the supply line at 87, the flexible wall in casing 89 admits atmospheric pressure to the fitting 90 and thereby prevents the development of a reverse siphonic action in the cross-connection between the pipes 86, 86. It is to be understood that the pressure-responsive device generally designated 89 for normally closing the cross-connection but adapted to admit atmospheric pressure thereto to prevent siphonic action may be of any suitable form such as herein described.

Fig. 9 illustrates the invention incorporated in another system for leading water to a jet or receptacle for washing or flushing articles to be cleansed, as generally indicated at 95. In this embodiment separate hot and cold water lines 96 and 97 respectively leading to the jet 98 are diametrically indicated, and a pressure-responsive device 99, which may be of any suitable construction such as herein described, is interposed in each of said lines and will therefore prevent siphonic action in each of the hot and cold water lines. Where the hot and cold water lines lead into a water mixing device before leading to the jet, however, a single pressure-responsive device for preventing siphonic action may be interposed in the line between the mixer and the jet, and be controlled by pressure in the line for conveying the mixed water to the jet. As illustrated, each pressure-responsive device is subjected to the pressure of its individual supply line through a pipe 100, so that the prevention of siphonic action in each of said lines is under the individual control of the pressure existing therein. Each of said lines may also be provided with a suitable check valve 101 and one or more globe valves 102 or other suitable valves.

Fig. 10 illustrates the invention applied to the supply line of a swimming pool. The water flowing to the inlet of the pool enters by way of pipe 105, flows past check valve 106, which may be a weighted disk or spring-loaded valve or a simple swing check valve as shown, and thence flows to the pool through outlet 107. Reverse flow of the water through the supply line is therefore ordinarily prevented by check valve 106, but said valve may leak sufficiently to permit a reverse flow of the impure water into the pure water line if the pressure is sufficiently reduced at the inlet. By use of the present invention, however, atmospheric pressure may be admitted to the outlet side of the check valve and thereby prevent reverse flow through the connection irrespective of the drop in pressure at the inlet side of said check valve.. As shown, the check valve fitting has communicating therewith the casing 108 of a pressure-responsive device which may be of any suitable construction such as heretofore described in conjunction with the various embodiments of the present invention. The flexible wall contained within said pressure-responsive device 108 is subjected to the pressure normally existing in inlet 105 through pipe 109 communicating therewith. As the present embodiment is to prevent the effect of leakage, the pipe 110 can be a relatively small pipe, but must be sufficiently large so that the air admitted will at least prevent any leakage that may occur past the check valve 106 from outlet 107 to inlet 105.

It will therefore be perceived that the present invention provides a device for preventing siphonic action that is capable of a wide variety of applications. While the illustrated embodiments include refrigerator cooling systems, systems for conveying water to apparatus for washing, flushing, sterilizing, etc. various articles, supply lines for swimming pools or the like, and inlet pipes to flush valves, etc., it will now be apparent to those skilled in the art that there are many other uses to which the present invention can be put. In fact the present invention has utility wherever it is desired to prevent siphonic action in a conduit upon a predetermined drop in the pressure at one end of the line. For purposes of convenience the line in which siphonic action is to be prevented is sometimes called a cross-connection, because ordinarily it will be, in whole or in part, a line crossing from a water supply line to a drainage or sewerage line; and furthermore, for purposes of convenience, the pressure on the inlet side of the pressure-responsive device is referred to as the inlet or supply pressure whether said pressure be taken from a point in the cross-connection itself or in the main supply line; but it is to be expressly understood that these terms

are used in a descriptive and relative sense and generically to facilitate designation on the parts referred to and not as terms of limitation.

It will also be apparent that by the present invention means for preventing siphonic action have been provided which normally maintain the cross-connection closed and therefore avoid the difficulties heretofore experienced where the cross-connection has been open to atmosphere. Only when the pressure of the inlet water falls below a safe minimum is the cross-connection opened to the admission of air, and it remains open only so long as said pressure remains below the predetermined minimum. Hence little opportunity is afforded for algae to give trouble by development in the lines, and the noise resulting from dripping and broken columns of water are entirely avoided. Moreover the pressure-responsive device which determines whether or not atmospheric pressure shall be admitted to the cross-connection need not be in the cross-connection itself, and unless it is also desired to close the cross-connection as in some of the embodiments illustrated, said pressure-responsive device offers no constriction of the cross-connection, but may be entirely separated from the cross-connection.

The present invention also enables the predetermination of the medium pressure at which atmospheric pressure will be admitted to the cross-connection. It also enables the association with the pressure-responsive device for preventing reverse siphonic action of means for completely closing the cross-connection, when desired, so as to eliminate the possibility of gases escaping through the cross-connection, as from a sewerage system. Moreover, the device is simple in construction, inexpensive to manufacture and install. relatively compact so that it is readily available for installation in relatively small spaces and for combination with other valve structures, and is of wide utility for use in lines of a wide variety of character and purpose.

While the embodiments of the invention illustrated on the drawings have been described with considerable particularity, it is to be expressly understood that the invention is not restricted thereto, as the illustrated embodiments have been selected only as representative of some of the many uses to which the present invention can be put and to illustrate some of the various forms of valves, flexible walls, casings, connections, etc. that may be used to embody the present invention. Hence changes may be made in the details of construction, arrangement and proportion of parts, certain features may be used without other features, and various features disclosed in particular embodiments that may be interchanged, etc., without departing from the spirit of this invention. Reference is therefore to be had to the appended claims for a definition of the invention.

What is claimed is:

1. In a device for preventing back siphoning of impure water, in combination with a supply line, a drainage line and a cross-connection between said supply and drainage lines, a casing communicating with said cross-connection, a flexible wall within said casing, means whereby atmospheric air is admitted to the interior of the casing at one side of said wall, means whereby the pressure at the supply side of the cross-connection is applied to the opposite side of said flexible wall, and valve mechanism operated by said flexible wall and controlling communication between the air side of said wall and said cross-connection.

2. In a device for preventing back siphoning of impure water, in combination with a supply line, a drainage line and a cross-connection between said supply and drainage lines, a casing communicating with said cross-connection, a flexible bellows dividing the interior of said casing into two chambers, means for applying the pressure of the water at the supply side of the cross-connection to one side of said bellows, means admitting air to the chamber at the opposite side of said bellows, and a valve member connected to said bellows and adapted to close an opening between said last-named chamber and said cross-connection.

3. In a device for preventing back siphoning of impure water, in combination with a supply line, a drainage line and a cross-connection between said supply and drainage lines, a casing communicating with said cross-connection, a flexible wall within said casing, a valve member connected to said flexible wall and adapted to close communication between said casing and said cross-connection, means whereby said flexible wall is resiliently urged to open said valve when the pressure of the supply water is below a predetermined minimum, means for applying the pressure at the supply side of the cross-connection to said flexible wall to close said valve when said pressure is above a predetermined minimum, and means admitting air to said casing and thereby to said cross connection when said valve is open.

4. In a device for preventing back siphoning through a connection between a supply line and a drainage line, a casing adapted to be connected to the connection between said lines, said connection having an air port communicating therewith, a valve member for closing said port, a flexible wall in said casing operatively connected to said valve member, means whereby atmospheric pressure has access to said port and is applied to one side of said flexible wall, and means for transmitting pressure from the inlet side of said connection to the opposite side of said flexible wall.

5. In a device for preventing back siphoning through a connection between a supply line and a drainage line, a casing adapted to be connected to the connection between said lines and having a port communicating therewith, a valve member for closing said port, a flexible wall in said casing operatively connected to said valve member, means admitting atmospheric pressure to the port side of said flexible wall, means for transmitting pressure from the inlet side of said connection to the opposite side of said flexible wall, and a spring cooperating with said flexible wall and adapted to move said wall and valve and open said port when said inlet pressure falls below a predetermined minimum.

6. In a device for preventing back siphoning through a connection between a supply line and a drainage line, a casing adapted to be connected to the connection between said lines and having a port communicating therewith, a valve member for closing said port, a flexible wall in said casing operatively connected to said valve member, means admitting atmospheric pressure to the port side of said flexible wall, means for transmitting pressure from the inlet side of said connection to the opposite side of said flexible wall, and a valve in said connection operatively connected to said flexible wall and adapted to

close said connection when said wall is moved to open said port.

7. In a device for preventing back siphoning through a connection between a supply line and a drainage line, a casing, a flexible partition in said casing dividing the interior thereof into two chambers, a conduit leading from the supply line to said casing for applying the pressure at the supply side of said connection to the chamber at one side of said flexible partition, means admitting atmospheric pressure to the chamber at the opposite side of said partition, a port between said last named chamber and said connection, and a valve operatively connected to said flexible partition for opening said port when said supply pressure falls below the predetermined amount.

8. In a system for preventing back siphoning through a supply line to a receptacle containing impure water, a casing communicating with said supply line, a flexible member in said casing, means for applying the supply pressure to one side of said flexible member, a valve member operatively connected to said flexible member and adapted to close communication between said casing and said supply line, and means admitting atmospheric pressure to said supply line when said valve member is operated by said flexible member to open said communication.

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