March 24, 1959 S. DOLENGA 2,878,826

SIPHON BREAKER AND BACKFLOW PREVENTER

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FIG. 1

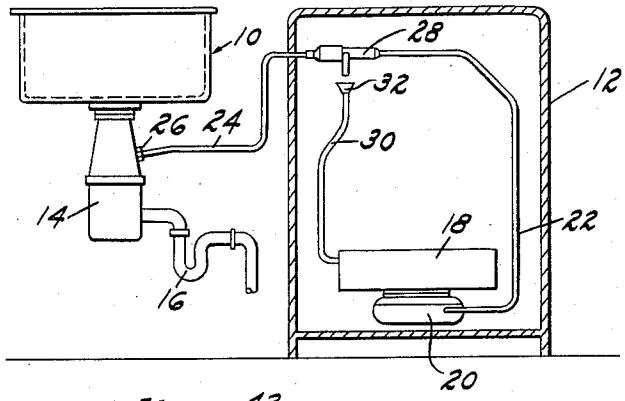


FIG. 2

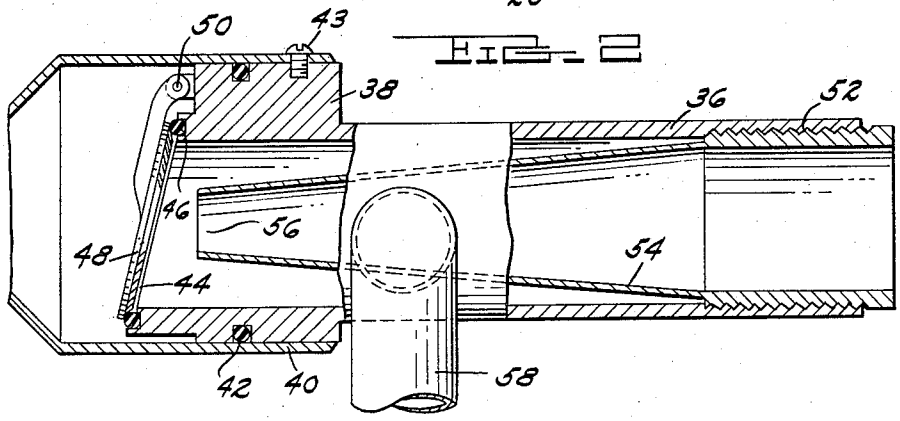
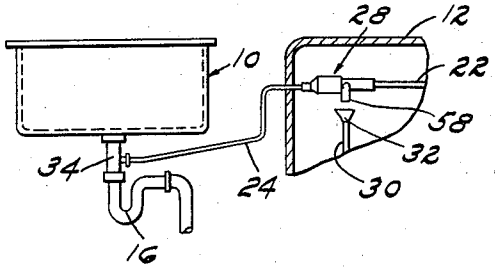


FIG. 3



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SIPHON BREAKER AND BACKFLOW PREVENTER

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9 Claims. (Cl. 137—216)

This invention has to do with the connection of discharge lines, such as of a dishwasher, with the drains of sinks and more particularly to a device adapted to be placed in the discharge line from the appliance to the sink to prevent back-flow and siphoning of waste water from the sink to the appliance.

Dishwashers usually have a pump that conducts the waste water from the well of the dishwasher to the drain of an adjacently positioned sink. The outlet of the dishwasher pump is sometimes connected with the sink drain by a continuous conduit. More often, however, the outlet of the pump is connected to the sink drain by means of a conduit having a vacuum break therein. This vacuum break is conventionally in the form of a funnel disposed at a level above the top of the sink and discharging into the pump outlet line and a second conduit from the sink drain and discharging downwardly into the funnel.

These arrangements produce considerable difficulty when the sink drain becomes plugged. If the sink drain becomes plugged and the dishwasher pump is connected by a continuous conduit with the drain, waste water in the sink will flow backwardly either because of the pressure head of the water in the sink or by reason of siphoning into the well of the dishwasher. This not only produces a messy and unsanitary condition; but if the housewife is not aware of the fact that the drain is plugged, it can also produce overflowing of the waste water in the dishwasher well.

Where the discharge conduit from the dishwasher pump to the drain is provided with a vacuum break such as described above and the drain becomes plugged, a likewise serious condition results. Under these conditions, if it is attempted to dislodge the material clogging the drain by applying pressure to the sink outlet either by means of a plunger or by means of water pressure from the faucet of the sink, the water in the drain will be discharged through the vacuum break and produce a very messy condition either under the sink or above the sink depending on where the vacuum break is located. In the case of sinks provided with garbage disposal units, the seriousness of the situation is even worse since if the drain is clogged and the garbage disposal unit is energized, the ground refuse will be pumped either into the well of the dishwasher or, in the case of an arrangement where a vacuum break is provided in the line, out through the vacuum break.

It is an object of this invention to provide a fitting adapted to be connected into the discharge line between a dishwasher and a sink drain which eliminates entirely the foregoing difficulties.

The device of the present invention is also designed and adapted to be arranged such that should the drain of the sink become plugged, the user will be warned of this condition before it has progressed too far.

In the drawings:

Fig. 1 is a generally diagrammatic view showing the fitting of this invention arranged in a discharge line between the pump of a dishwasher and a sink drain which incorporates a garbage disposal unit.

Fig. 2 is a longitudinal sectional view through the fitting of this invention.

Fig. 3 is a view similar to Fig. 1 and showing the manner in which the fitting of this invention may be arranged in a dishwasher outlet line connected with a sink drain in which a garbage disposal unit is not incorporated.

Referring to the drawings, a sink is shown at **10** and a dishwasher at **12**. The sink has a garbage disposal unit **14** connected with the outlet thereof, and the outlet of the garbage disposal unit connects with a drain **16**. In the dishwasher **12**, there is a waste water well **18** to which is connected a pump **20** for discharging the water therein into drain **16**. The outlet pump **20** has a conduit **22** that connects with a conduit **24** extending to an inlet tap **26** on the garbage disposal unit **14**. Between conduits **22** and **24**, there is arranged the fitting **28** of the present invention. The fitting **28** is preferably located adjacent the upper portion of dishwasher **12**. Another conduit **30** extends upwardly from waste water well **18** to adjacent fitting **28** and is provided with a funnel-shaped fitting **32** at its upper end. The arrangement shown in Fig. 3 is generally the same as that shown in Fig. 1 with the exception, however, that in the arrangement shown in Fig. 3, the sink is not provided with a garbage disposal unit and conduit **24** connects with the outlet **34** of sink **10**.

Referring now to Fig. 2, the details of fitting **28** are illustrated. This fitting includes an outer sleeve **36** having an externally enlarged end **38**. Over the end **38** is telescoped an end connection member **40** to which the conduit **24** is connected. An O-ring **42** is provided for forming a fluid tight connection between the enlarged end **38** of sleeve **36** and member **40**. Member **40** is arranged to be held in place on sleeve **36** by screws **43**. The enlarged end of sleeve **36** has an outlet opening **44** that is inclined to the radial plane of sleeve **36**. This inclination may be on the order of about 10°. Around the edge of opening **44**, there is provided a sealing gasket **46** which may, for example, be formed as a rubber O-ring. Outlet **44** is normally closed by a flapper check valve **48** which is hinged to swing about the pivot **50**. Fitting **28** is arranged so that pivot **50** is at the top side of the fitting when installed whereby valve **48** normally gravitates to the closed position seating on gasket **46**. The opposite end of fitting **28**, that is, the end that connects with conduit **22**, is internally threaded as at **52** to threadedly receive a venturi member **54**. Venturi **54** is fashioned as a funnel-shaped conduit having its outlet end **56** disposed directly adjacent and generally concentric with the outlet opening **44** of sleeve **36**. At one side of sleeve **36**, there is provided a short depending conduit **58** that is arranged to discharge into funnel **32** at the upper end of line **30**.

The fitting shown in Fig. 2, when installed in the manner illustrated in Figs. 1 or 3 in the discharge line of the dishwasher, is adapted to eliminate the difficulties referred to above in connection with clogged sink drains. When the pump **20** is operated to discharge the water from the waste water well **18** of the dishwasher, the waste water is caused to flow under pressure upwardly to pipe **22** and through the venturi **54**. The water issuing from the outlet **56** of venturi **54** impinges against the valve **48** to open the valve and cause the water to be discharged through conduit **24** and to the drain **16** through the garbage disposal unit **14**. I have found that the velocity of the water flowing through venturi **54** produces a slight siphoning action through the vacuum break tube **58** and therefore water does not accumulate in sleeve **36** exteriorly of venturi **54**. As soon as the pump **20** stops operating, flapper valve **48** gravitates to the closed position. Now, if it should happen that drain **16** becomes clogged for some reason and the housewife is not aware of this condition and turns on the dishwasher, on the discharge cycle pump **20** would operate to discharge water through venturi **54** and this water would simply flow into sink **10**.

As soon as the pump **20** stopped operating, flapper valve **28** would gravitate to the closed position and would tend to remain effectively sealed with the gasket **46** because of the head of water in sink **10**. This will effectively prevent the waste water from flowing back into the well **18** of the dishwater. It is conceivable, however, that small particles of food, etc. might become lodged between flapper valve **48** and its gasket seat **46** to thereby prevent valve **48** from completely closing outlet **44**. Under these circumstances, some of the water in sink **10** might slowly flow back into sleeve **36** and this water will drain out of the fittting through tube **58** and back into well **18** through conduit **30**. However, this drainage back into well **18** will occur only very slowly as permitted by the extent to which valve **48** remains open and only until the level of water in sink **10** falls to the elevation of fitting **28**. The arrangement of tube **58** with conduit **30** provides a vacuum break in the line between sink **10** and well **18**; and therefore, there will be no siphoning action. If, while drain **16** is in the clogged condition, the garbage disposal unit **14** is turned on, water under pressure will back up in line **24** and firmly seat valve **48** on gasket **46**. The garbage disposal unit will simply pump against the head of pressure, but none of this water will flow back into waste water well **18**.

Thus, it will be seen that the fitting of this invention and the manner in which it is connected with the outlet conduit of a dishwasher effectively prevents any serious reverse flow of water into the dishwasher waste water well in case of clogging of the sink drain. Furthermore, in view of the manner in which fitting **28** functions, it is not necessary that the fitting be located above the upper edge of the sink well which is normally necessary where the vacuum break in the outlet line of a conventional dishwasher hook-up has to be placed. It will also be appreciated that with the arrangement shown herein, should the sink drain become clogged, this fact will soon be indicated to the housewife because water will either accumulate in the sink when the dishwasher is turned on or the water level in the sink will not recede when the garbage disposal unit is operated. In addition, it will be observed that the provision of the fitting **28** in the pump discharge line in no way complicates the installation.

I claim:

1. An anti-siphon and backflow preventing fitting for use in a waste water line to a sink drain from an appliance having a pump discharge, said fitting comprising a body member having an inlet at one end and an outlet at the other end, a normally closed check valve within said body member spaced intermediate the inlet and the outlet to prevent the flow of water from the outlet to the inlet when closed, a tubular member within said body member and extending from adjacent said inlet toward said outlet, said tubular member having an inlet communicating with the inlet of said body member such that all the fluid entering said body member inlet is caused to flow through said tubular member and having an outlet aligned axially with said check valve, the outlet end portion of said tubular member being of smaller cross section than the adjacent portion of said body member and being spaced relatively closely adjacent to said check valve so that the water stream issuing therefrom impinges against said check valve to open the same, said body member having a vent opening therein spaced between the inlet end of the tubular member and the outlet of said tubular member, said vent opening communicating freely at all times with the interior portion of said body between the inlet thereof and said check valve.

2. The combination called for in claim 1 wherein said check valve comprises means within said body forming a valve seat lying in a generally vertical plane and a flapper valve pivotally supported within the body and responsive to gravity to close with said valve seat.

3. The combination called for in claim 1 wherein said body is of tubular shape and is threaded at the portion

thereof adjacent its inlet end, said tubular member comprising a sleeve threaded at its inlet end, the inlet end of said sleeve being in threaded engagement with the threaded portion of said body for axial adjustment to permit variation in the spacing between the outlet end of the sleeve and said check valve.

4. The combination called for in claim 1 wherein said sleeve comprises a venturi.

5. In an arrangement including a sink having a drain, a washing appliance having a pump outlet for discharging waste water from the appliance and a conduit extending from the pump outlet to the drain, the improvement which comprises an in-the-line fitting in said conduit comprising a body member having an inlet at one end connected with the portion of the conduit extending to the pump outlet and an outlet connected with the portion of the conduit connected with said sink drain, a normally closed check valve within said body member spaced intermediate said inlet and said outlet, a tubular member within said body member having an inlet and an outlet, the inlet of said tubular member communicating with the inlet of said body member such that all the fluid entering said body member inlet is caused to flow through said tubular member and the outlet of said tubular member being aligned axially with said check valve, the outlet end portion of said tubular member being of smaller cross section than the adjacent portion of said body member and being spaced sufficiently close to said check valve so that the water stream issuing therefrom impinges against said check valve to open the same, said body having a vent opening therein spaced between the inlet of said body and the outlet of said tubular member, said opening communicating freely at all times with the interior portion of said body between the inlet thereof and said check valve and a conduit extending from said vent opening to the washing appliance on the inlet side of the pump, said last mentioned conduit having an opening therein communicating with the atmosphere.

6. The combination called for in claim 5 wherein said tubular member is disposed with its longitudinal axis in a generally horizontal position above said appliance, said check valve comprising means within said body member forming a valve seat disposed in a generally vertical plane and a flapper valve pivotally supported within said body member and responsive to gravity to close with said valve seat.

7. The combination called for in claim 6 wherein said vent opening is located on said body member at one side of said tubular member, said last mentioned conduit extending downwardly from said vent opening to the appliance.

8. The combination called for in claim 6 wherein said tubular member comprises a sleeve having a frusto-conically shaped outlet end portion which is spaced from the wall of said body member, said vent opening communicating with the interior of said body member into the space between the wall of said body member and the frusto-conically shaped portion of said sleeve.

9. The combination called for in claim 8 wherein said sleeve is threadedly supported within said body member for axial adjustment whereby to permit variation in the spacing between the outlet end of said sleeve and said check valve.

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