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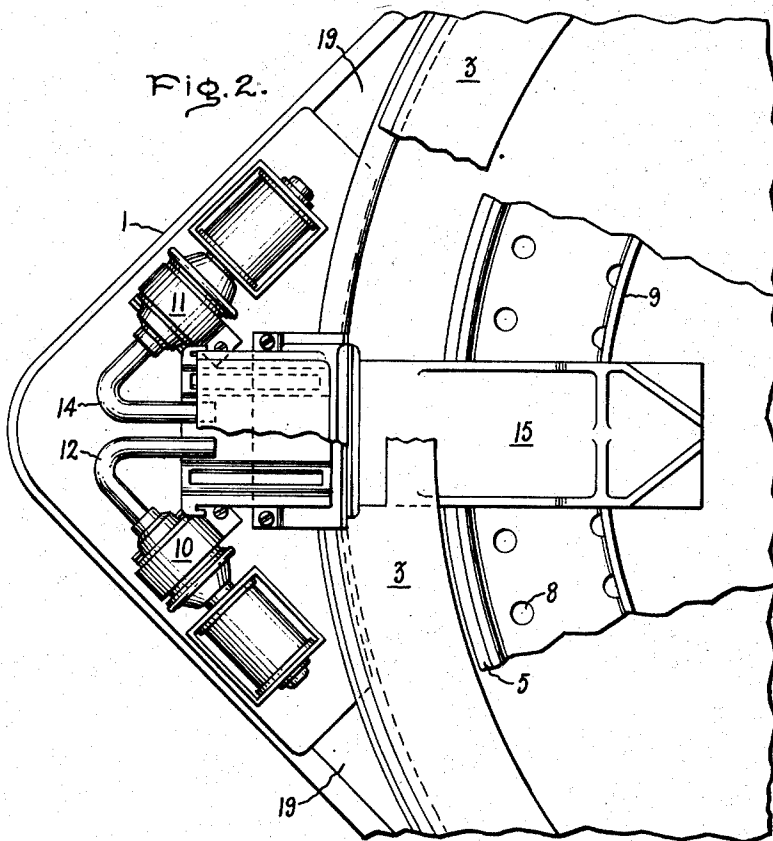
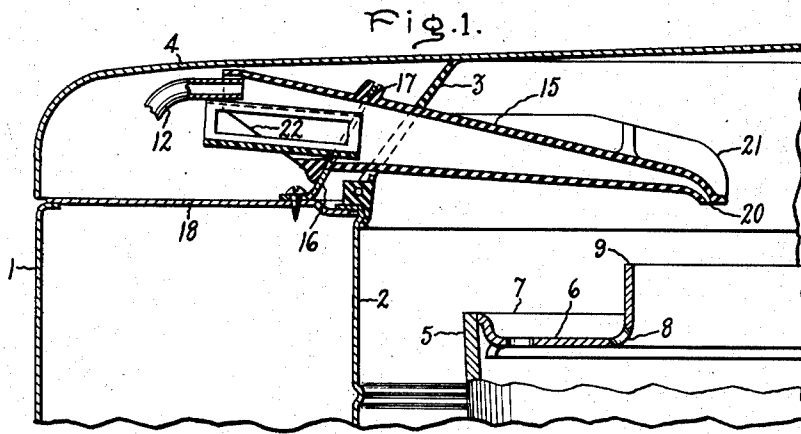
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2,638,112

ANTISIPHONAGE INLET SYSTEM FOR WASHING MACHINES AND THE LIKE

Filed June 21, 1950

2 Sheets-Sheet 1



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Fig. 3.

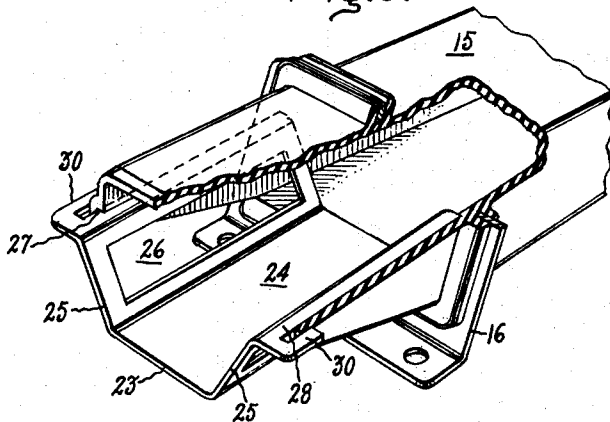


Fig. 4.

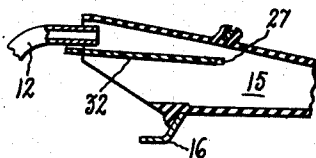
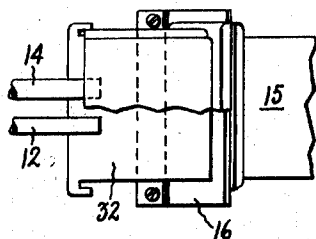


Fig. 5.



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ANTISIPHONAGE INLET SYSTEM FOR
WASHING MACHINES AND THE LIKEWinston L. Shelton, Trenton, N. J., assignor to
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This invention relates to devices for supplying water to washing machines and the like, and in particular, relates to an improved water inlet spout which precludes the possibility of a cross connection between the contents of the washing receptacle and the water piping of the building in which the machine is installed.

It is now well recognized that in plumbing fixtures or the like connected to the water supply of a building there is a danger of reverse flow of water from the fixture to the piping if the end of the faucet or the like is below the maximum overflow level of the fixture. Such a reverse flow is known in the art as a "cross connection." Clothes and dishwashing machines, and particularly those designed for automatic operation, present opportunities for the establishment of a cross connection because their attachment to the water service outlets is frequently below the overflow level of the receptacle in which the washing is done. Accordingly, most plumbing codes require that the fill pipes or fittings of such machines terminate substantially above the maximum level to which water can rise in the receptacle so as to provide a relatively large air gap between such water level and the end of the fill pipe. In clothes washing machines, the protection against cross connection must take into consideration the substantial thickness of suds which may rise well above the overflow level.

It is accordingly a principal object of this invention to provide a water inlet fitting for use in washing machines and the like to prevent cross connections even though the discharge end of the fitting may actually become submerged in water or in suds floating thereon.

It is another object of the invention to provide a water inlet fitting which may be installed in a concealed location in a washing machine but will nevertheless be reliably effective immediately to dissipate any vacuum condition which may be evident at the fill conduit of the machine, and thus prevent the backflow of impure water into the building service line.

A further object of the invention is to provide a cross connection prevention device which is without moving parts and which will afford complete protection against cross connection even under abnormally severe test and service conditions.

These objectives are fulfilled in a presently preferred embodiment by providing a water inlet system having as a principal component a fill spout which reaches in over the washing receptacle and receives within its body remote from the receptacle the ends of the pipe or pipes which are served by the water piping of the building. At said remote end the spout has a large opening communicating with the atmosphere; said opening is substantially greater than the total area of the piping received therein and

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may also be materially greater than the discharge port from which the water flows from the fill spout into the washing receptacle. Where the space available for the fill spout is limited, I obtain the aforesaid large area opening by angularly cutting the rear side wall portions of the spout so that air inlet opening is much larger than the actual cross sectional area defined by the four walls of the spout. In such an arrangement the fill pipes may actually terminate short of the bottom wall of the spout structure and I therefore provide a drip plate within the spout to divert pipe drippings into the spout for flow into the receptacle. The drip plate offers substantially no obstruction to free air flow into the spout; in one form of my invention the end of the drip plate forwardly of the supply pipes cooperates with the spout side walls to provide a baffle structure which affords additional protection.

Other features and advantages of my invention will be apparent from the following description read in connection with the accompanying drawings showing presently preferred embodiments and in which Fig. 1 is a fragmentary sectional elevation of a clothes washing machine equipped with a water inlet device embodying my invention; Fig. 2 is a top plan view of the portion of the washing machine shown in Fig. 1 certain parts thereof having been removed and others broken away to reveal underlying structure; Fig. 3 is a fragmentary perspective of the inlet end of a fill spout embodying my invention, a wall portion being broken away better to disclose one form of drip plate; and Figs. 4 and 5 are respectively a partial sectional elevation and a partial plan view of an embodiment utilizing a second form of drip plate.

In Figs. 1 and 2 there is shown a corner portion of a clothes washing machine having a rectangular outer casing or apron 1 within which is mounted a tub 2 having an upper rim 3 of rubber or the like which bears resiliently against the underside of a cover 4. It will be apparent from Fig. 2 that the tub is round, and it should be understood that rim 3 extends about its full circumference. Such a tub and rim construction is more fully shown and described in the application of Edward G. Lipski, Serial No. 164,423, filed May 26, 1950, for a Tub Construction for Washing Machines and the like, now Patent No. 2,602,563 of July 8, 1952, and assigned to my present assignee. Pursuant to conventional practice there is mounted within said tub a substantially cylindrical receptacle or basket 5 within which the clothes are washed by conventional means (not shown). In some types of washing machine the basket is arranged for rapid rotation on a vertical axis to remove by centrifugal action the free water or the water entrained in the clothes following washing and rinsing. In

such machines it is common to provide a suitable upper guard plate 6 to prevent articles of clothing from being carried over the rim of the basket. Under normal conditions the upper edge 7 of the basket constitutes the overflow spill level thereof; but under abnormal conditions an accumulation of soap suds on the water may in effect establish a polluted water line which reaches above the upper edge of the guard throat 9.

I utilize the corner area adjacent the tub for mounting conventional water valves 10 and 11 which, as is common, may connect respectively to the hot and cold water lines of the plumbing system of the building. Such connections are made with flexible hoses (not shown) and standard female couplings for attachment to the faucets of stationary tubs or the like. Frequently such faucets are actually below the level of the valves.

The valves discharge through the respective pipes or rigid tubes 12, 14 which enter the fill spout 15 embodying the present invention. As shown in Fig. 1 the fill spout is an elongated tapered structure which may be of rubber or the like. To support the spout on the casing structure we utilize a simple bracket 16 having an opening through which the spout extends. The body of the spout has a flange 17 which provides a groove to receive the top and side walls of the bracket. As appears in Fig. 1 the bottom wall of flange 17 is merely a shoulder which rests against the bottom wall of the bracket. Such an arrangement facilitates the insertion of the spout into the bracket. The bracket is suitably affixed to casing wall 18 with the spout projecting through an opening in the basket rim 3 to reach over the throat 9 and discharge directly into the basket. It should be understood that the fill spout may be of metal or any other suitable material; rubber has been selected in the preferred embodiment because of its economy and water imperviousness. I prefer to strengthen at least the upper wall of the spout so that the discharge orifice 20 will not distort during water discharge therefrom, and accordingly form the spout with suitably arranged stiffening walls 21. The geometry of the spout and support bracket is such that the inlet tubes 12, 14 are at least one inch above the plane of the spout 20.

It should be understood that although the water inlet end of the spout is in a rather confined chamber defined by the plate 13 and cover 4, said chamber is not in any sense of the word airtight. There is a substantial opportunity for air leakage into the chamber; see for example the spaces 19 at the ends of the plate 13. Said spaces communicate with the interior of the casing 1 which is of substantial volume and is in various places open to the atmosphere, as will be appreciated by those familiar with washing machine construction. It may be considered therefore that the inlet end of the spout 15 is open to the atmosphere. In order to insure a maximum air inlet I cut the side walls of the spout along the angular line 22 and introduce the valve discharge conduits 12, 14 into the end portion of the spout preferably so that said tubes lie adjacent the upper spout wall. The ends of the fill tubes are purposely positioned substantially to the rear of the bottom wall of the spout and although water discharging forcefully from the tubes will carry well into the spout without loss through the rear end thereof there is the possibility of some splashing within the spout, and drippage from the tubes follow-

ing closure of the respective valves. Means are therefore provided for conducting the tube drippings into the spout and thence into the receptacle 5. In the presently preferred embodiment which is shown to better advantage in Fig. 3, such drip protection may comprise a catch plate 23 shaped from suitable material to provide a base wall 24 and the upwardly and outwardly sloping side walls 25. I have employed "Textolite" rigid plastic sheet, as well as stainless steel and other materials. Side walls 25 are, in effect, mere quadrilateral frames which define a large area opening 26. It will be understood that the side walls of the fill spout 15 are vertical and therefore the arrangement of the sloping side walls 25 of the catch plate provides relatively large area channels between the plate and the spout side walls. The drip plate may be installed within the spout by any suitable means; for example, by providing trackways 27 along the inner side walls of the spout to receive the outwardly extending runners 28 of the catch plate. Hook portions 29 engage with the outer surfaces of the spout side walls to secure the catch plate in operative position. As clearly appears in Fig. 1 the solid bottom wall of the drip plate extends well into the fill spout to overlie the bottom wall thereof so that drippings will flow from the plate into the spout and then will follow the sloping bottom wall thereof to pass into the basket 5.

The spout construction shown in Figs. 4 and 5 is in all respects similar to the embodiment of Fig. 1. However, the catch plate comprises a simple diaphragm 32 of metal or rigid plastic material which is retained within the side wall grooves or trackways 27. It is evident that the catch plate structure shown in Fig. 3 provides a substantially greater air inlet area than the simple plate of Fig. 4, although it is obvious that even in the latter embodiment the width of the open end of the spout relative to the total width of the fill tubes 12, 14 affords an air inlet area substantially greater than the combined openings of the said fill tubes. In either embodiment the air flow in through the open rear portion of the fill spout will prevent siphonage of sudsy water along the fill spout 15 and into the tubes 12 or 14. The open bottom of the fill spout beneath the fill tubes prevents the submergence of the ends of the said tubes under any conditions. With particular reference to Fig. 4, the narrow, elongated slot defined by the forward edge of plate 32 and the top and side walls of spout 15 offers a remarkably effective barrier against the passage of suds or foam. Said slot is greater than the combined discharge area of the supply conduits, and is also greater than the area of the spout discharge 20.

A fill spout constructed according to my invention may actually be submerged in soap suds up to the barrier afforded by the top rim 3 of the tub without possibility of cross connection of said suds with either of the fill tubes. The rim 3 will prevent suds from passing about the outside of the fill spout to envelop the ends of the tubes. The discharge opening 20 of the spout 15 is of such relatively small area that it will effectively prevent the entry of suds into the spout even assuming the submergence of the end of the fill tube within said suds. The elevation of the ends of tubes 12 and 14 above the plate 13 provides an air gap proof against traversal by water even under deliberately contrived test conditions.

While I have shown particular embodiments of

my invention it will be understood of course that I do not wish to be limited thereto since many modifications may be made; and I therefore contemplate by the appended claims to cover such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A fill spout for a washing machine or the like, comprising an elongated tubular body having an inlet end adapted to receive liquid supply conduits and a discharge end having a relatively restricted opening for the flow of supplied liquid into said washing machine, said inlet end adjacent the discharge ends of said conduits having an opening substantially larger than the total discharge area of said conduits to admit atmospheric air freely about said discharge ends, said inlet end being formed and positioned with the bottom portion of said tubular body beginning forwardly of said discharge ends of said conduits; a catch plate secured within the inlet portion of said body beneath said supply conduits and having an imperforate bottom wall projecting into said body parallel with the bottom wall thereof to an extent substantially beyond the ends of said conduits, the inner end of said catch plate defining with the walls of said body an area substantially larger than the total conduit discharge area and in communication with said inlet end opening; and means for mounting said fill spout on said washing machine with the bottom wall thereof sloping toward said machine.

2. A fill spout for a washing machine or the like, comprising an elongated tubular body having an inlet end adapted to receive liquid supply conduits adjacent its upper wall portion and a discharge end having a relatively restricted opening for the flow of supplied liquid into said washing machine, said inlet end having an opening substantially larger than the total discharge area of said conduits to admit atmospheric air freely about the ends thereof, the upper portion of said inlet end extending rearwardly of the discharge ends of said conduits and the lower portion beginning forwardly of said discharge ends; a catch plate secured within the inlet portion of said body and having an imperforate wall extending beneath said supply conduits in parallelism with said bottom wall for a distance constituting a multiple of the extent of projection of said conduits into said body, the inner end of said catch plate defining with the walls of said body an area substantially larger than the total conduit discharge area and in communication with the atmosphere; and means for mounting said fill spout on said washing machine with the bottom wall thereof sloping toward said machine.

3. A fill spout for a washing machine or the like comprising an elongated tubular body having an inlet end adapted to receive liquid supply conduits adjacent the upper wall of said body and in mutually spaced by-by-side relationship and to conduct the liquid discharged thereby into said machine, the rear side wall portions of said body being shaped to define a large air inlet opening disposed about and extending forwardly of the ends of said conduits, and an elongated catch plate having side frame members extending angularly from an imperforate bottom wall, and means within said body for supporting said catch plate within said body with the said bottom wall disposed between the upper and lower walls of said body in overlapping relation with and parallel to the bottom wall thereof.

4. A fill spout according to claim 3, in which said catch plate is removably carried within trackways formed in the side walls of said body.

5. A fill spout for a washing machine or the like, comprising a tubular body having an inlet end adapted to receive liquid supply conduits adjacent the upper wall of said body in mutually spaced side-by-side relationship and to conduct the liquid discharged thereby into said machine, the rear side wall portions of said body being shaped to define a large air inlet opening disposed beneath and extending forwardly of the ends of said conduits, and a catch plate supported within said body below said conduits, said catch plate having side frame members extending in spaced relation relative to the side walls of said body and an imperforate bottom wall projecting forwardly of the ends of said body and spaced between the upper and lower walls of said body, said catch plate side frame members defining large area openings in communication with the outer atmosphere.

6. A fill spout for a washing machine or the like, comprising an elongated tubular body having an inlet end adapted to receive liquid supply conduits and a discharge end of restricted area for the introduction of supplied liquid to said washing machine, the bottom wall of said body at the inlet end thereof commencing forwardly of the upper wall of said body and the discharge ends of said conduits, said walls providing an opening substantially larger than the total discharge area of said conduits to admit atmospheric air freely about said discharge ends, a catch plate secured within the inlet portion of said body, said catch plate end having an imperforate wall extending forwardly of and beneath said conduits to overlap said bottom wall in parallel spaced relation therewith, the said catch plate wall and said body walls defining an opening larger than the said total conduit area, and bracket means for mounting said fill spout on said machine with the bottom wall of said spout sloping toward said machine to drain residual liquid from said spout.

7. A fill spout for a washing machine or the like, comprising an elongated tubular body having an inlet end adapted to receive a liquid supply conduit and a discharge end for the introduction of supplied liquid to said washing machine, said inlet end portion adjacent the end of said conduit having an opening substantially larger than the total discharge area of said conduit to admit atmospheric air freely about the said conduit end, the bottom wall of said body at the inlet end commencing forwardly of the discharge end of said conduit; a catch plate secured within the inlet portion of said body beneath said supply conduit, said catch plate having an imperforate wall extending forwardly of said conduit in substantial parallelism with the bottom wall of said body; and bracket means for mounting said fill spout on said machine with the bottom wall of said spout sloping toward said machine to drain residual liquid from said spout.

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