June 30, 1953 T. T. WOODSON 2,643,537

COMBINATION WATER INLET AND SOAP DISPENSER FOR WASHING MACHINES

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Fig. 1.

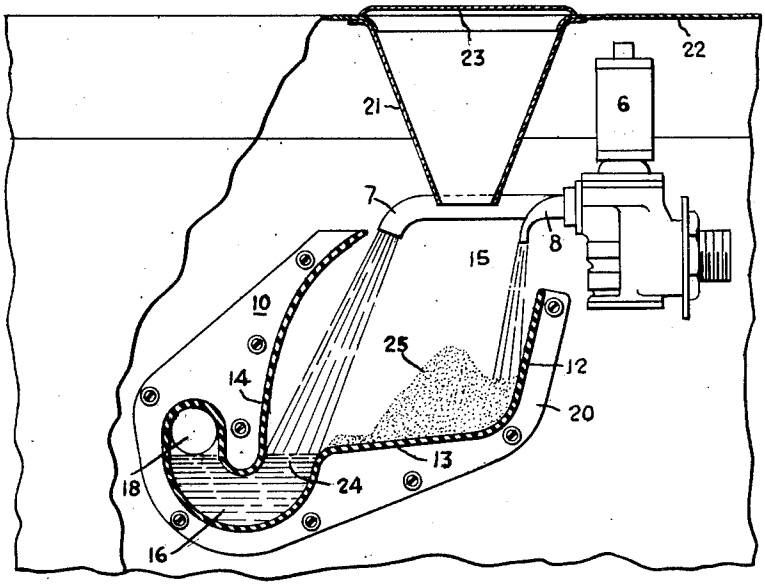


Fig. 2.

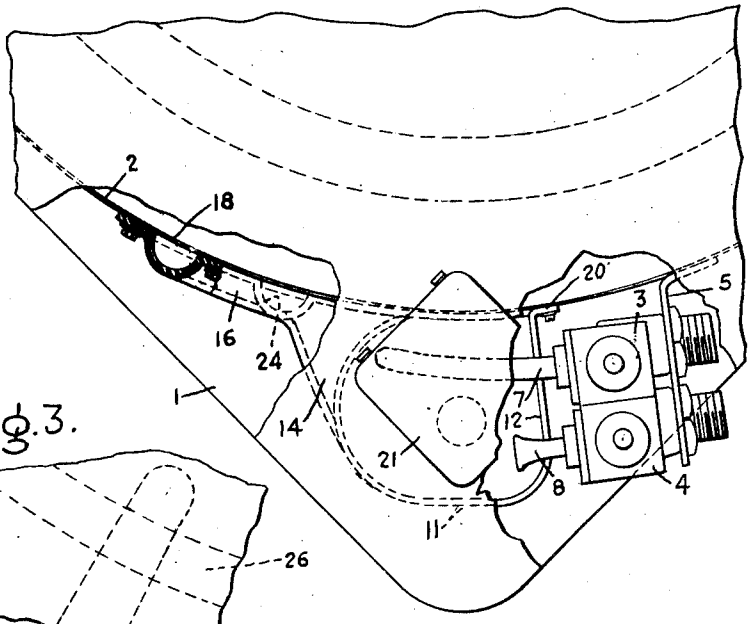
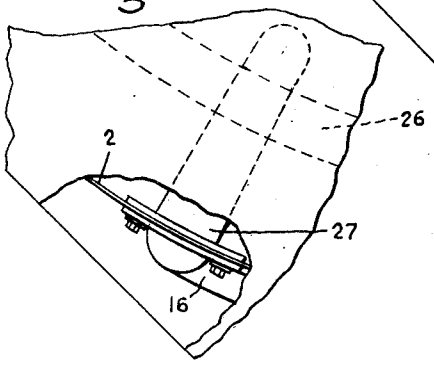


Fig. 3.



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COMBINATION WATER INLET AND SOAP DISPENSER FOR WASHING MACHINES

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4 Claims. (Cl. 68—17)

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This invention relates to an improved combination water inlet means and soap dispenser for automatic washing machines.

In certain domestic types of washing machines, automatic timing means direct a program of operations, among which are soaking, washing and rinsing. In such machines, means are provided to accommodate a charge of soap powder or other detergent material, placed in the machine at the start for automatic introduction into the washing compartment at the proper time relative to the washing stage. These machines ordinarily have a water inlet system in which warm water for soaking and rinsing is introduced directly into the machine through one channel, and hot water for washing is brought first into a soap compartment, from which it flushes the charge of soap powder or the like into the machine through another channel. Thus, mixing of soap with the soak water and the rinsing water is avoided. Examples of a soap dispenser and a water inlet system are found in my presently pending application Serial No. 623,991, filed October 23, 1945, for Powdered Soap Dispenser for Clothes Washing Machines and now Patent 2,523,800, dated September 26, 1950, and the application of Frank A. Rosenkrans et al., Serial No. 789,406, filed December 3, 1947, for Trap for Water Supply to Clothes Washing Machine, both of which are assigned to the assignee herein. The Rosenkrans device discloses a water inlet system having a suds trap or water seal to prevent the outflow of the suds which build up in large volume within the tub. Although these devices satisfactorily perform their intended functions they are relatively costly and obviously require individual application to the washing machine.

It is therefore a general object of this invention to provide a combination soap dispenser, water inlet system, and suds trap which is inexpensive to manufacture and install and will perform its several functions efficiently.

This broad objective may be attained by molding a unitary structure having an enlarged chamber into which the spouts from the hot and warm water valves discharge, and a U-trap communicating between said chamber and an outlet in registry with an inlet opening or conduit through which water flows to the machine. The chamber receives the charge of soap powder or the like, which may be fed from outside the machine. The respective spouts are so arranged that the warm water stream will pass over the soap pile directly into the trap, whereas the hot water discharge will undermine the soap pile and flush it

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through the trap into the machine. The chamber presents a large area open to the atmosphere, and by positioning the lower edge of the respective spouts at least one inch above the maximum overflow spill level of the chamber, anti-siphonage requirements of the plumbing codes may be met. The U-trap functions efficiently as a suds trap.

In the accompanying drawings Fig. 1 is a fragmentary side elevation of a washing machine partly in section showing my combined soap dispenser and water inlet system in its relation to the water valve and the soap powder inlet; Fig. 2 is a fragmentary top plan view of the washing machine with certain portions being broken away to more clearly reveal the underlying structure; and Fig. 3 is a view similar to Fig. 2 but showing the introduction of water directly into the basket of the washing machine.

The drawings show so much of an automatic washing machine as is necessary for an understanding of the invention. Illustratively the washing machine is of the well-known commercial type disclosed and claimed in my Patent 2,523,800 and in which an outer casing 1 conceals a tub 2, which comprises a water receptacle into which the water for soaking, washing and rinsing is initially fed and from which it passes to a basket disposed within the tub, and within which the clothes are actually washed. At the completion of the various operational stages, the water returns to the tub, from which it may again be pumped to the basket or discharged to a plumbing drain, according to the stage of operation.

A pair of water valves 3, 4 are suitably mounted on a bracket 5 for connection with hot and cold water services (not shown). The operation of said valves is controlled by individual solenoids 6 which are appropriately energized to suit the operational cycle established by a time-cycle switch (not shown), as is well known in the art. The valve 3 will be considered to be the warm water valve, thermostatically or otherwise arranged for a water discharge temperature of, say, 100° F.; whereas valve 4 is the hot water valve arranged to discharge water at a temperature of the order of 140° F. As is well known to those familiar with washing machine operation, warm water is used for soaking and rinsing and either hot water or a medium temperature water arrived at by the conjoint operation of valves 3 and 4, is used for washing. In other words, during soaking and rinsing only valve 3 is in operation whereas during washing either valve 4, or

valves 3 and 4 jointly, may be used. The valves have the respective individual spouts 7, 8.

The discharge from the valve spouts enters the tub by means of the combined inlet system and soap dispenser 10 comprising the present invention. The device is advantageously molded from rubber compositions or equivalent to have walls 11, 12, 13, 14 which, with the wall of the tub collectively define a chamber 15 of relatively large floor area and height communicating by means of an upwardly disposed elbow portion 16 with a tub wall opening 18. An extended flange 20 provides means by which the device may be secured directly to the wall of the tub 2 by the illustrated screws or equivalent means. The flexibility of the unit is adaptable to the tub curvature.

For charging the chamber 15 with soap, I provide a funnel-like structure 21 suitably affixed to the top wall 22 of the outer casing and closed by a hinged or removable cap 23. As appears from Figs. 1 and 2 the discharge end of said funnel overlies the chamber closer to walls 11 and 12 than to the tub wall, and particularly is remote from the mouth 24 of the trap 16. Thus soap powder entering the chamber will arrange itself in a pile 25 in which because of the normal, predictable, angle of repose of the dry material there will be a substantial depth of material at walls 11 and 12. The bottom wall 13 slopes toward the trap and merges into wall 12 through a smooth curve; and there will thus inevitably be some small accumulation of soap powder near the trap because of the travel of the granular material as it first enters the chamber.

It will be noted that the nozzle 7 extends relatively close to the forward wall 14 and the tub wall, and is directed to reach over the soap pile and discharge water substantially directly into the trap mouth 24. The nozzle 7 preferably has a circular mouth, so that its discharge will be a concentrated stream; splashes forwardly of the nozzle will strike the sloping wall 14 at an angle and be deflected directly into the trap 16, and drips or rearward sprays will not enter the pile of soap powder. The slight overhang of the upper edge of wall 14 guards against the splashing of water over said edge. In contrast to the round stream from spout 7, the spout 8 has a flat nozzle portion intended to direct a fan-like stream of water over substantially the width of the rear wall 12 to discharge relatively close thereto. The fan-wise discharge from spout 8 therefore will enter the soap pile at the rear thereof and intermix thoroughly therewith to convey it along the bottom wall 13 into the trap 16 and thence into the tub 2. In practice, the hot water flow continues long after the soap has been evacuated, so there is no substantial residue within the chamber, and none in the trap water.

The tub wall opening 18 is, of course, well above the maximum water level in the tub. However, where said port is below the blanket of suds of substantial depth which will accumulate during operation, the suds will tend to force their way out through the tub wall opening. In such situation, the trap 16 serves adequately to prevent suds escape through the opening 18. The position of said opening establishes the trap water level; and it is obvious that in order to prevent submerging the bottom portion of the soap pile the floor 13 of the chamber must be suitably above said level. My consideration of this problem indicates that with the relative proportions shown in Fig. 1 an adequate water level is assured.

In some forms of washing machines, the water is introduced directly into the basket 26 of the washing machine. In this arrangement, a suitable nozzle 27 may be fixed to the tub wall at its opening 18, to extend in a horizontal or downwardly sloping reach over the upper rim of the basket to discharge directly thereinto, as shown in Fig. 3.

As is well known, many plumbing codes require protection against the possibility of the submersion of any potable water faucet or nozzle in water or liquids which may be contaminated, and have required a minimum air gap of at least one inch between the lowermost end of such a nozzle and the maximum overflow spill level of any receptacle which may contain contaminated water. The present invention provides adequately for such protection because of the large overflow area at the top of the chamber 15 and the ease with which the ends of the spouts 7 and 8 may be fixed to provide more than the necessary one inch clearance level. It is to be considered in viewing the drawing, therefore, that nozzles 7 and 8 are related to the maximum effective height of the chamber walls sufficiently to establish the necessary clearance, with due appreciation of the relatively small meniscus effect of soapy or otherwise contaminated water.

While I have shown a particular embodiment 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 any 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. In a clothes washing machine, the combination of a receptacle having water inlet means, means providing a combined soap container and water conduit fixed relative to the receptacle through which the same may be filled to a predetermined level, said soap container and water conduit providing means including a chamber of relatively large floor area and depth and a U-trap communicating between said chamber and a discharge means registering with said inlet means, means accessible externally of said washing machine to receive soap powder or the like and deposit the same within said chamber remote from the entrance to said trap; means including a pair of spouts for discharging water into said chamber for passage through said trap into the receptacle, one of said spouts reaching over the pile of deposited soap powder and adapted to discharge water substantially directly into said trap with minimum pickup of soap powder and the second spout adapted to discharge water into said soap pile to create a turbulent mixture of soap and water for passage into said receptacle, and independently operable shutoff valves for said spouts.

2. In a washing machine, a water receiving tub, a detergent receptacle with upstanding side walls and a floor of relatively large area, said receptacle having an outlet in one corner thereof below the level of said floor, means accessible externally of said washing machine to receive comminuted detergent and deposit it in a pile within said receptacle, said receptacle outlet communicating with said tub above the normal water level in said tub, a water supply system for said tub comprising a first and second spout above said de-

tergent receptacle and a separately operable valve for each of said spouts, said first spout being positioned for water discharge directly into said receptacle outlet, said receptacle floor being within the pattern of discharge of said second spout, and said first and second spouts being fixed relative to said chamber to establish the lowermost level of said spouts at least one inch above the top of the lowermost side wall of said receptacle.

3. A water and detergent supply system for a clothes washer tub, comprising a receptacle arranged to provide a combined detergent container and water inlet conduit, said receptacle having a sloping floor of relatively large area and a wall extending upwardly from the uppermost edge of said floor, dispensing means above said receptacle to deposit comminuted detergent in a pile on said floor near said wall, said receptacle having an outlet below the level of said floor and remote from said wall, said receptacle outlet communicating with said tub above the normal water level in said tub, a first spout for supplying water for soaking clothes, a second spout for supplying water for washing clothes, said first spout being positioned above said receptacle outlet to discharge water directly thereinto, and said second spout being positioned above said receptacle and having a flat nozzle portion to discharge a flat spray of water against said receptacle wall to create a fanwise discharge across said receptacle floor.

4. A water and detergent supply system for a

clothes washer having a tub within which clothes may be selectively soaked and washed, comprising a receptacle adapted to provide a combined detergent container and water inlet conduit, said receptacle having a sloping floor of relatively large area and a wall extending upwardly from the uppermost edge thereof, dispensing means above said receptacle to deposit comminuted detergent in a pile on said floor adjacent said wall, said receptacle having an outlet below the level of said floor and remote from said wall disposed for discharge into said tub at a point above the normal wash water level in said tub, a pair of discharge nozzles with one thereof having a flat nozzle portion for forming a flat water spray, and means including said discharge spouts operable selectively to discharge water directly into said receptacle outlet to provide water for soaking said clothes and to discharge said flat water spray on said receptacle floor and adjacent said wall to create a fanwise discharge across said floor to provide water and detergent for washing said clothes.

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