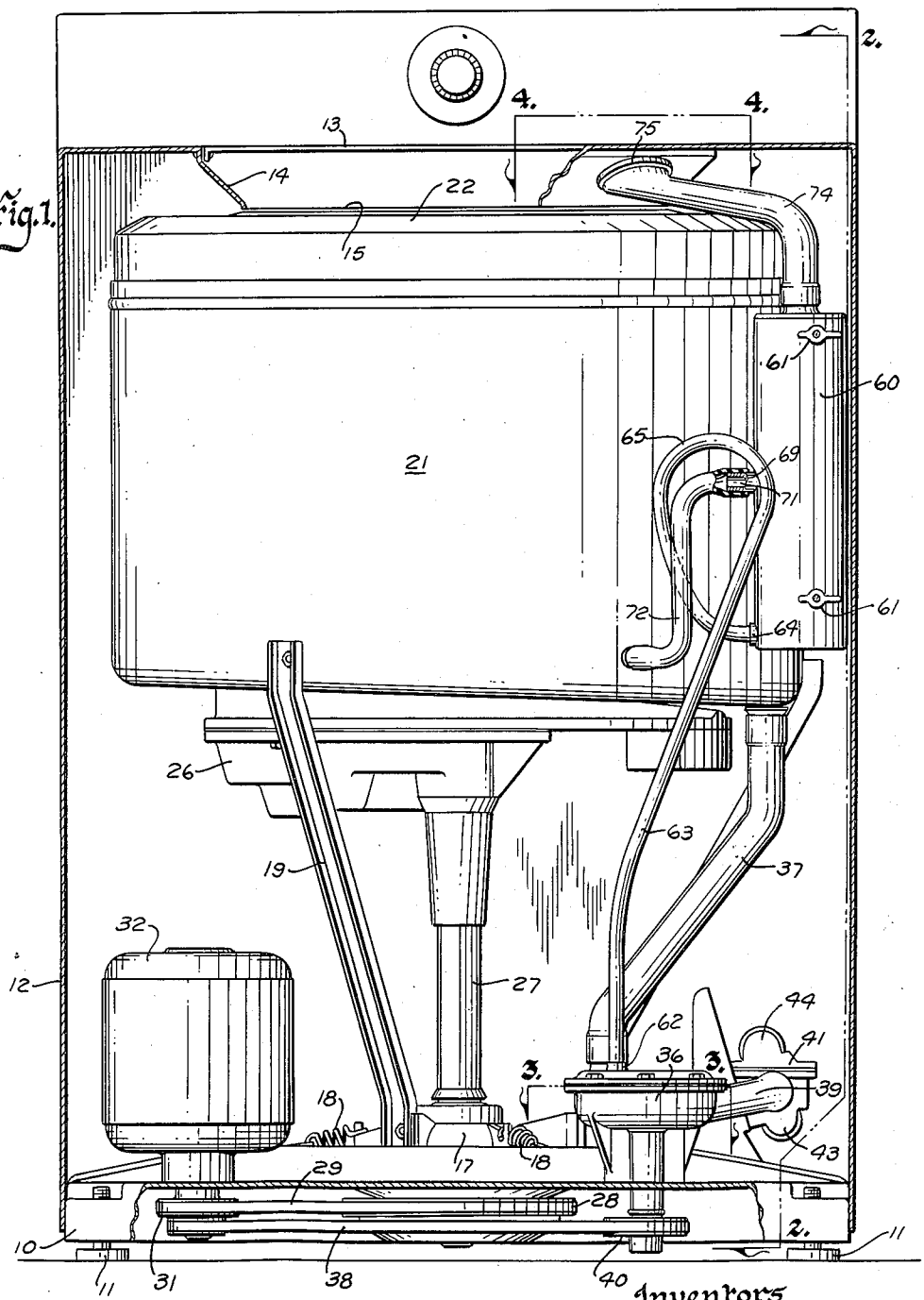
July 25, 1961 T. R. SMITH ET AL 2,993,357

AUTOMATIC DISPENSER FOR WASHING MACHINE

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Fig. 1.



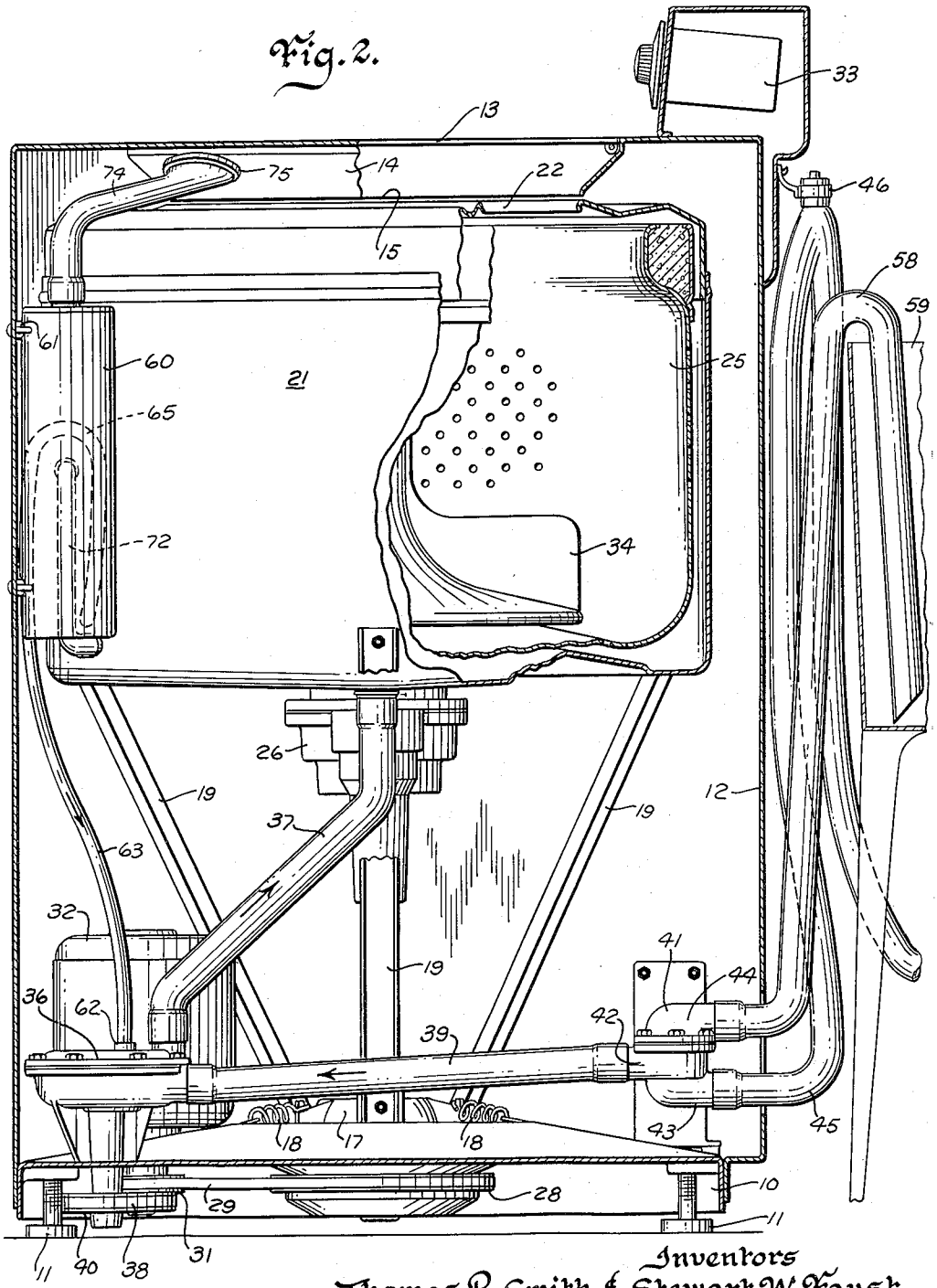
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AUTOMATIC DISPENSER FOR WASHING MACHINE

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Fig. 2.



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AUTOMATIC DISPENSER FOR WASHING MACHINE

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Fig. 3.

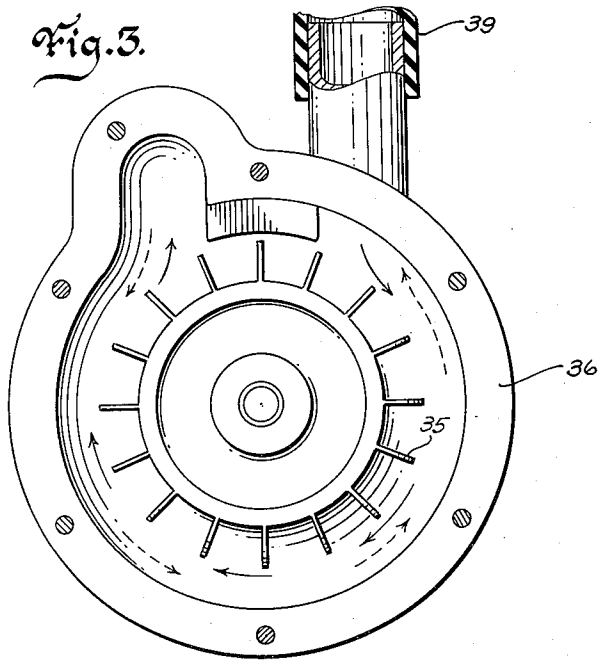
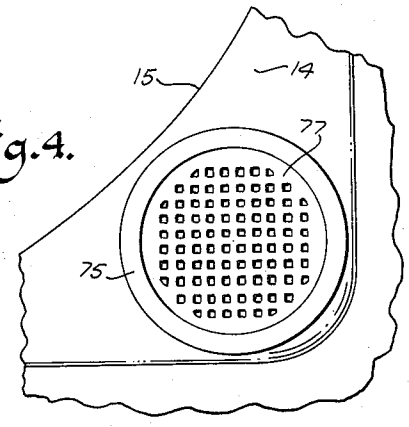


Fig. 4.



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2,993,357

AUTOMATIC DISPENSER FOR WASHING MACHINE

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Filed June 29, 1959, Ser. No. 823,650
6 Claims. (Cl. 68—207)

This invention relates, as indicated, to a dispenser for washing machines, and more particularly, to an automatic dispensing mechanism for a domestic clothes washer in which the discharge of a solution, for example bleach, is controlled and gradually diffused into the washing fluid.

This invention is related to the dispenser disclosed in application Serial No. 718,639, filed March 3, 1958, by Thomas R. Smith et al., for "Automatic Dispenser for Washing Machine," assigned to the same assignee as the present invention. In the washing machine of the prior invention identified above, a solution is metered from the bottom of the dispenser reservoir tank by a hose communicating with the pump. The metering hose which meters the solution is a vertical pipe that may be filled when solution is added to the dispenser tank, prior to the filling of the tub. The pump, since it communicates with the metering hose, also may contain solution before the washing operation. Consequently, as soon as the pump is started at the beginning of the washing cycle, the large collection of the dispenser solution is injected into the tub in an amount that is out of proportion to the normally metered quantity.

It is, therefore, an object of the invention to provide a mechanism for automatically dispensing solutions into the washing fluid of a domestic clothes washing machine. It is a further object of the invention to gradually diffuse a dispensed solution into the washing fluid. It is another object of the invention to maintain a solution in the dispenser until the washing cycle is instituted. It is still another object of the invention to prevent the introduction of a dispensed solution into the pump until the wash cycle begins. Further objects and advantages of this invention will become evident as the description proceeds and from an examination of the accompanying drawings which illustrate one embodiment of the invention and in which similar numerals refer to similar parts through the several views.

In the drawings:

FIGURE 1 is a front elevational view, with the cabinet in section, of an automatic wash machine embodying the dispenser mechanism of the invention;

FIGURE 2 is a side elevational view taken substantially along line 2—2 of FIGURE 1, partly broken away to show the interior of the tub and basket;

FIGURE 3 is an enlarged view taken along line 3—3 of FIGURE 1, showing the interior of the reversible pump employed in connection with the dispenser system; and

FIGURE 4 is an enlarged view in cross section taken substantially along line 4—4 of FIGURE 1, showing the loading opening communicating with the dispenser reservoir tank.

Referring now to the accompanying drawings, base frame 10 mounted on the adjustable leg members 11 supports a cabinet enclosure 12 which is provided with a hinged door panel 13 normally covering a recessed rectangular countersunk throat 14 which terminates in a circular loading opening 15. Mounted on a friction damper surface of a truncated spheroidal mounting dome (not shown) positioned in the central region of the base frame 10 is a support member 17 which is resiliently connected to base frame 10 by means of the three equally spaced

centering springs 18 which resist rotation of the support member 17 relative to base frame 10 but permit its nutational movement relative to that base frame.

Three tub braces 19, rigidly connected to and extending upwardly from the support member 17 in the form of an inverted tripod, are fastened to a generally imperforate tub 21 provided at its upper end with a tub loading opening 22 aligned with the opening 15 of cabinet 12.

Perforate clothes basket 25, revolubly mounted within tub 21, is rigidly connected to a stub shaft (not shown) which is journaled in a bearing (not shown) carried in the bottom of tub 21 and is directly connected to the counterbalanced gear case 26 affixed to the upper end of spin tube 27.

Journaled in a thrust bearing (not shown) carried in support member 17 is a spin tube 27 capable of being rotated at spin speeds by a drive mechanism (not shown) housed beneath base frame 10 and driven by its input pulley 28 through belt 29 and the double motor pulley 31 attached to the shaft of the reversible drive motor 32. When motor 32 is reversed by the timer mechanism 33 connected to motor 32, the reversed rotation of the drive mechanism input pulley 28 produces an oscillatory movement of agitator 34 which is positioned within basket 25 (FIGURE 2). Agitator 34 is powered by means of a center shaft (not shown) journaled within spin tube 27 and connected to a conventional type motion converting mechanism (not shown) mounted within the gear case 26 and connected to an output shaft (not shown) splined to agitator 34.

Rotation of the motor shaft of motor 32 in a clockwise direction, as viewed from the top of motor 32, produces an oscillatory movement of agitator 34 of approximately 52 cycles per minute during the washing operation while rotation of that motor shaft in a counterclockwise direction during the fluid extraction or spin-out operations produces a rotation of basket 25 at a speed of approximately 618 revolutions per minute.

Reversible pump 36, which includes an impeller 35, communicates with tub 21 through the flexible hose 37. Hose 37 permits gyratory movements of tub 21 relative to base frame 10. Pump 36 is rigidly connected to base frame 10 and has a driving pulley 40 which is rotated by means of the double motor pulley 31 through belt 38 so as to rotate in the same direction during the washing and extraction processes as the drive mechanism input pulley 28 controlling the operation of agitator 34 and clothes basket 25.

Diverter valve assembly 41 communicates with pump 36 through the conduit 39. As shown in FIGURE 2, diverter valve assembly 41 includes a short tubular intake duct 42 and two effluent ducts or hose connector conduits 43 and 44. The lower effluent duct 43 constituting the drain conduit of valve assembly 41 is connected to the drain hose 45, a portion of which is elevated above the highest expected operating fluid level within tub 21 and attached to cabinet 12 to prevent any inadvertent drainage from that tub since this illustrative embodiment utilizes no drain valve other than the diverter valve assembly 41. A solenoid operated valve (not shown) may be incorporated in hose 45 to eliminate the necessity for the elevation of hose 45 if so desired. A check valve 46 is provided in an opening positioned at the highest level of hose 45 to accommodate fluid flow from tub 21 during the operation of pump 36 while preventing back siphoning through drain hose 45 after motor 32 has been deenergized.

The diverter valve assembly normally permits only communication between conduits 42 and 43. However, upon operation of a solenoid (not shown) communication is only allowed between conduits 42 and 44.

The upper conduit 44 is connected to a suds saving hose 58 which is capable of being inserted into an external suds reservoir such as reservoir 59 in order to salvage washing fluids from one washing operation for reuse in a subsequent washing operation if so desired.

A dispenser tank 60 is rigidly secured adjacent to the top portion of cabinet 12 by mounting lugs 61 to serve as a reservoir for solutions to be introduced into the washing fluid. The tank is located above pump 36 into which it feeds the bleach solution.

A conduit fitting 62 communicates with the interior of the pump 36 at a location which is at reduced pressures, regardless of the direction of rotation of the pump impeller. In the type of pump illustrated in FIGURE 3, the impeller is in the form of a paddle wheel. An area of reduced pressure, or suction, exists adjacent the radial face whether the impeller is rotating the direction of the solid or dotted line arrows. By connecting the conduit 63 to the top cover of the pump suction will be produced no matter in what direction the impeller is rotating. Dispenser hose 63 attached to fitting 62 communicates with the bottom portion of dispenser tank 60 at a dispenser fitting 64.

A portion 65 of the dispenser hose 63 intermediate the ends thereof is at an elevation higher than the initial solution level in the tank 60. Thus, portion 65 is positioned above the connection 64 at the bottom portion of the tank. In this way solution added to the tank 60 cannot enter the pump prior to the operation of the agitator because portion 65 is above the solution level. When the pump 36 starts, solution is drawn through the hose 63.

A fitting 69 located approximately midway between the upper and lower ends of that tank 60 includes an orifice 71 which is two to four times that of the internal diameter of the orifice of fitting 64. For reasons more apparent hereinafter, fitting 69 is located above the lowest expected operating fluid level within tub 21. Fitting 69 is connected to the flexible fluid return tube 72 which is fastened to and communicates with tub 21 at a point just above the bottom of tub 21.

A flexible reservoir fill hose 74, attached to the upper end of the dispenser reservoir tank 60, bridges up and over tub 21, and terminates in a circumferentially grooved flange 75 which is received in a snap fit by an appropriate opening provided for this purpose in the recessed cabinet throat 14 as generally indicated in FIGURES 1, 2 and 4. The fill opening provided by the open mouthed hose 74 receives a plastic grill 77 capable of permitting fluid flow therethrough but adequately preventing large solid particles from entering hose 74. It will be noted that the gyratory movements of tub 21 are not impaired in any way by either of the flexible tubes 72 or 74.

From the foregoing description, operation of the dispenser system in the illustrated machine should be clear. Door panel 13 is lifted to accommodate both the placement of soiled fabrics within the clothes basket 25 and the loading of the dispenser reservoir tank 60 with the selected bleach solution. In the case of commercial bleach solutions most readily available for home laundry use, a half cup of bleach per clothes load is usually sufficient while it may be desirable to dilute commercial powder bleaches by mixing as much as two cups of water with the powdered bleaching agent in order to produce the desired solution to be placed within dispenser tank 60. These factors enter into the designed capacity of tank 60 as well as in the relationship between the elevational location of fitting 69 on that tank with respect to the lowest operating fluid level expected within tub 21. Since the intermediate portion 65 of hose 63 is above the level of the solution in tank 60, there is no possibility of the solution draining into dispenser hose 63 and pump 36.

Upon completion of the loading of the reservoir tank 60, tub 21 is then preferably filled to the desired operating liquid level within tub 21 by means of a fill spout (not shown) controlled by a solenoid operated valve (not shown) electrically connected to and controlled by the timer mechanism 33.

After tub 21 is filled resulting liquid level should be at least above the elevational level of fitting 69 so that fluid from tub 21 may freely circulate into the dispenser tank 60 to dilute the bleach solution therein and provide a closed fluid circuit through that tank during the operation of pump 36.

It will be noted that as the tub 21 is filled with washing fluid and dispenser tank 60 fills through tube 72, air trapped in portion 65 of dispenser hose 63, prevents the dispenser solution from gravitating to pump 36, until the pump is started.

Timer mechanism 33 automatically energizes motor 32 to initiate the washing operation by oscillating agitator 34, after the tub fill operation is completed. Energization of motor 32 not only causes an oscillation of agitator 34, but also produces a clockwise rotation of the pump impeller 35, as viewed in FIGURE 3, to create a fluid flow through pump 36 and its associated conduits as shown by the solid arrows in FIGURES 2 and 3. These arrows show fluid moving from pump 36 upwardly through hose 37 into tub 21, up through the fluid return tube 72, through dispenser reservoir tank 60, down through the dispenser hose 63 and into pump 36 to complete the fluid circuit.

It will be noted whereas in the prior invention of application Serial No. 718,639, the orifice of fitting 64 is of a rather restricted internal diameter, this is not necessary in the present invention. Since the siphon portion 65 of dispenser hose 63 delays entry of bleach into the system, the restricted orifice may be eliminated.

Chlorine types of bleaches not only bleach fabrics with which they come into contact but also add to the detergency quality of the synthetic detergents. However, since there may be fluorescent dyes in the detergent which are apt to be nullified by the addition of the bleach, it is also desirable that the detergent be agitated in the wash water for a short period prior to the addition of the bleach solution in order to permit these fluorescent dyes to first come into contact with and attach themselves to the fabrics. Subsequent addition of the bleaching agent does not adversely affect the dyes in most instances. By keeping the bleach solution in tank 60 during the filling operation until start of the agitator, this sequence is achieved in the instant invention without utilizing any valves or time control devices other than those controlling motor 32. Another advantage is provision for slow diffusion of bleach at the initiation of the agitation operation, rather than injection of a large amount accumulated in the dispenser hose and pump.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only, and not for purposes of limitation. Changes in form and the proportion of parts, as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

We claim:

1. In a washing machine operable through a washing operation and a fluid extraction operation, a tub for containing washing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, drive means connected to said pump means for circulating washing fluid through said conduit toward said tub during said washing operation and away from said tub through said drain hose during said fluid extraction operation, a dispenser tank adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said tub and said dispenser tank for circulation of the washing fluid from said tub through said dispenser tank during the washing operation, and a dispenser hose connected

at one end to the bottom portion of said dispenser tank and communicating at the other end with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at an elevation above the connection of the same to said dispenser tank.

2. In a device of the character described and operable through a washing operation and a fluid extraction operation, a tub for containing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, drive means connected to said pump means for circulating the fluid through said conduit toward said tub during said washing operation and away from said tub through said drain hose during said fluid extraction operation, a dispenser tank adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said tub and said dispenser tank for circulation of the fluid from said tub through said dispenser tank during the washing operation, and a dispenser hose connected at one end to the bottom portion of said dispenser tank and communicating at the other end with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at an elevation above the connection of the same to said dispenser tank.

3. In combination: a tub for containing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, reversible drive means connected to said pump means for circulating the fluid through said conduit toward said tub during a washing operation performed in said tub and away from said tub through said drain hose during a fluid extraction operation performed in said tub, a dispenser tank mounted above said pump means adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said tub and said dispenser tank for circulation of the fluid from said tub through said dispenser tank during the washing operation, and a dispenser hose connected at one end to the bottom portion of said dispenser tank and communicating at the other end with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at an elevation above the solution level in said dispenser tank.

4. In a washing machine operable through a washing operation and a fluid extraction operation, a tub for containing washing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, drive means connected to said pump means for circulating washing fluid through said conduit toward said tub during said washing operation and away from said tub through said drain hose during said fluid extraction operation, a dispenser tank mounted above said pump means as a reservoir adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said

tub and said dispenser tank for circulation of the washing fluid from said tub through said dispenser tank during the washing operation, and a dispenser hose connected at one end to the bottom portion of said dispenser tank and communicating at the other end with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at an elevation above the connection of the same to said dispenser tank.

5. In a washing machine, operable through a washing operation and a fluid extraction operation, a tub for containing washing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, drive means connected to said pump means for circulating washing fluid through said conduit toward said tub during washing operations, a dispenser tank adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said tub and said dispenser tank for circulation of the washing fluid from said tub through said dispenser tank during the circulation by said pump means during the washing operation, and a dispenser hose communicating with said dispenser tank and with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at an elevation above the solution level in said dispenser tank, whereby drainage from said dispenser tank is prevented until operation of said pump means.

6. In a washing machine operable through a washing operation and a fluid extraction operation, a tub for containing washing fluid, pump means, a conduit communicating with said pump means and said tub, a drain hose communicating with said pump means, drive means connected to said pump means for circulating washing fluid toward said tub during washing operations, a dispenser tank mounted above said pump means adapted to contain a solution for discharge into the washing fluid, a fluid return hose communicating with said tub and said dispenser tank for circulation of the washing fluid from said tub through said dispenser tank during the circulation by said pump means during the washing operation, and a dispenser hose connected at one end to the bottom portion of said dispenser tank and communicating at the other end with said pump means at a location of reduced pressure when operated, said dispenser hose having an intermediate portion at a height above the connection of the same to said dispenser tank.

References Cited in the file of this patent

UNITED STATES PATENTS

1,327,662	Dudley	Jan. 13, 1920
2,155,254	Clark	Apr. 18, 1939
2,523,799	Woodson	Sept. 26, 1950

FOREIGN PATENTS

942,142	Germany	Apr. 26, 1956