Oct. 15, 1957 A. ANDERSON 2,809,650

WASHING MACHINE AND METHOD

Filed Nov. 21, 1955

FIG. 1

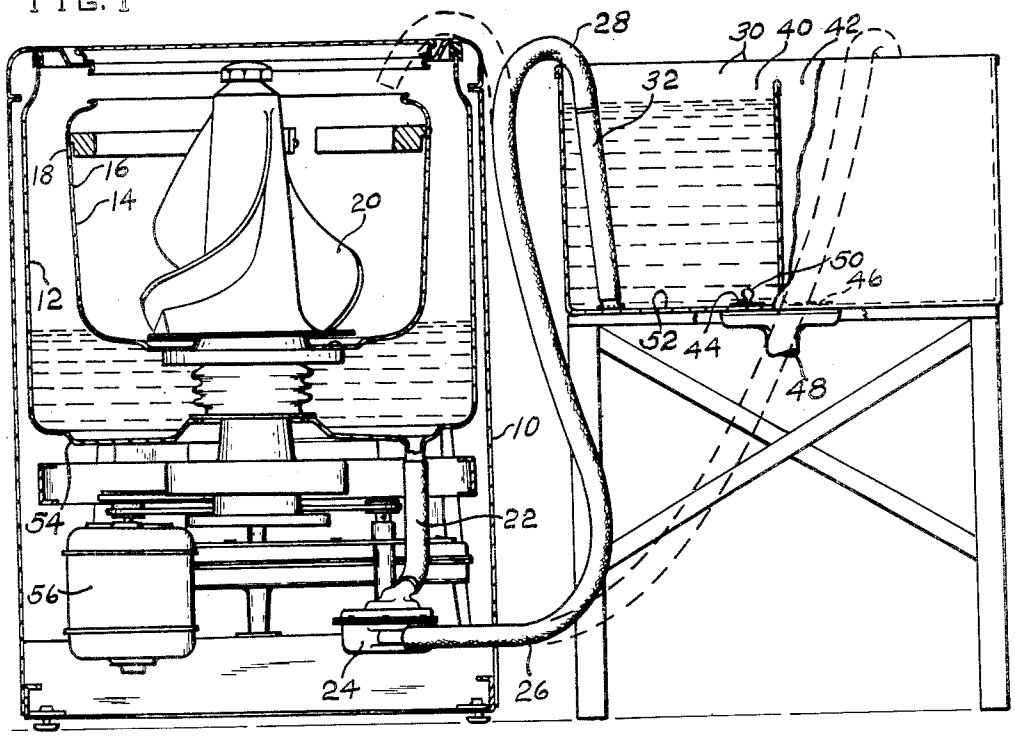
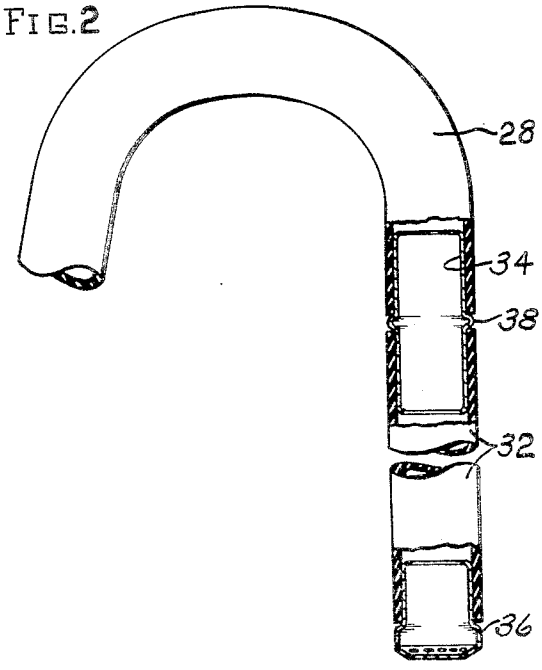


FIG. 2



INVENTOR.
ANDERS ANDERSON
BY J. P. Kaiser
ATTORNEY

United States Patent Office

2,809,650

Patented Oct. 15, 1957

2,809,650

WASHING MACHINE AND METHOD

Anders Anderson, Syracuse, N. Y., assignor to The Murray Corporation of America, Syracuse, N. Y., a corporation of Delaware

Application November 21, 1955, Serial No. 548,129

2 Claims. (Cl. 137—13)

This invention relates to domestic automatic washing machines, and more particularly to a method and apparatus for reusing the same wash solution in successive wash cycles.

In automatic washing machines it has been the practice to perform a cycle of washing, which consists of introducing wash fluid and detergent, washing, discharging the wash fluid and detergent to waste, rinsing, and damp drying. Where a subsequent load of laundry is to be washed, fresh wash water and detergent is required. Such procedure is wasteful of hot water and detergent, and since it is the practice of the average housewife to first wash sheets and white goods, not greatly soiled, the detergent laden wash water is capable of reuse, without adverse washing effect.

The present invention is directed to a method of procedure and apparatus for saving the detergent laden wash water for reuse in subsequent cycles, and has application to the type of automatic washers shown in copending applications Ser. Nos. 359,100 and 458,798, filed June 2, 1953, and September 28, 1954, and similar types having a pump, and an outer tub, and a vertical axis wash tub located therewithin of the imperforate type.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

Referring to the drawings wherein like reference characters indicate like parts:

Figure 1 is a sectional view of an automatic washer located adjacent set tubs such as are in common use; and

Figure 2 is an enlarged detail of an extension construction applied to the drain hose of such a washer.

In Figure 1, there is shown a washing machine having a cabinet 10, an outer tub 12 and a vertical axis wash tub 14 which has a tapered imperforate side wall 16 and is otherwise imperforate except for overflow ports such as 18 located adjacent the upper rim. The tub 14 has an agitator 20 which is adapted to effect a washing action upon clothes placed within the tub 14.

The outer tub 12 is provided with a drain 22 reaching to a pump 24, the outflow of which passes through a drain hose 26, the upper end being provided with a goose neck 28. Such drain hose is adapted to hook over the edge of a set tub 30 and is provided with an extension 32 adapted to reach to the bottom of the set tub 30. The goose neck 28 is provided with a ferrule 34 for connecting the end of the goose neck to the extension 32 and such extension at its open end is provided with a perforate end fitting 36. The ferrule 34 is provided with a bead 38 and is readily insertable into the goose neck 28 as well as the upper end of the extension 32 so that the extension may be applied to the hose 26 or removed therefrom as may be desired. The perforate end fitting 36 is likewise readily insertable into the end of the extension 32 and is removable therefrom to facilitate removal of lint and other accumulation. The ferrule 34 and the end fitting 36 make a snug air-tight connection to the respective end of the hose 26 and extension 32.

The set tubs are divided into two compartments 40 and 42 each of which has a separate drain 44 and 46 leading to a common outlet 48. The drain 46 is provided with a plug 50 so that wash water may be retained in the tub 40. The lower level or bottom 52 of the set tubs is at a higher level than the bottom 54 of the tub 12 and the pump 24 is of the centrifugal type and permits free flow of liquid therethrough in either direction at such time as the pump 24 may not be running. The level of the bottom 52 of the set tubs is sufficiently high so that wash water temporarily placed within the tub 40 may flow by gravity into the tub 12 of the washing machine. Except for the addition of the extension 32, and the use of a set tub for water storage, the washing machine may be the same as those disclosed in the aforesaid pending applications.

As will be well understood in the art the washing machine is provided with a timer for causing the machine to proceed through its cycle of filling the tub 14, thereafter oscillating the agitator 20 through a wash period, following which the tub 14 is spun an its vertical axis and wash water is discharged by centrifugal action up the inclined wall 16 and out through the ports 18. The water thus centrifugally discharged from the tub 14 falls in the outer tub 12 and is ordinarily removed therefrom and discharged to waste by action of the pump delivering the water to the set tub 40 or the set tub 42 either of which has a drain for such wash water. Thereafter the tub 14 is filled with rinse water, agitation continued for a period following which said rinse water is centrifugally expelled from the tub 14 by centrifugal action resulting from the high speed rotation of the tub 14. Thereafter further high speed rotation of the tub 14 acts to extract further moisture from the laundry and effect damp drying. Through all of the foregoing operations the pump 24 is continuously driven by the motor 56 which also drives the agitator 20 and spins the tub 14.

In order to effect saving of the detergent laden wash water for a subsequent washing cycle, the drain hose 28 is fitted with the extension 32 and placed within the set tub 40 with a drain plug 50 in place. As soon as the washing portion of the cycle has been completed and the tub 14 spun for removal of said wash water from the tub 14, the centrifuged wash water caught by the tub 12 is pumped by the pump 24 into the set tub 40 and retained. At this point the operator of the washing machine will move the drain hose 28 to the set tub 42 which is open to drain so that at the completion of the rinsing portion of the wash cycle the rinse water will be delivered to the tub 42 and drained away. Thereafter, as before, centrifugal extraction takes place and the laundry is damp dried.

To wash a subsequent batch of laundry using the detergent laden wash water temporarily stored in set tub 40 the operator first shifts the extension to the goose neck of the discharge hose from set tub 42 to the set tub 40 and then momentarily starts the motor 56 and the pump 24 to drive the air upwardly through the discharge hose 26 and out through the end of the extension 32 thereof whereby to remove any air lock in the discharge hose. In such machines the pump 24 is never able to empty the hose 26 beyond driving the water into the hose, so that there is always a hose full of water available. Thereafter while the motor is at rest and the pump stationary the detergent laden wash water contained in

set tub **40** syphons back into the tub **12** by gravity flow, the flow being started by the water retained in the hose. When substantially all of the water stored in set tub **40** has flowed into the tub **12**, the goose neck is shifted from the set tub **40** and inserted into the tub **14**. At this time, the extension **32** can be removed if desired, unless subsequent use is to be required for a third reuse of the wash water. At this point, either the pump is started, or the washing cycle is started, the first portion of which cycle comprises the operation of filling the tub **14** from the domestic supply. The capacity of the pump **24** is so great that the wash water transferred to the tub **12** by gravity syphon, is quickly transferred to the tub **14** and while additional water may be introduced into said tub **14** from the usual domestic hot water supply during such transfer, there is little time for much additional water to be added to the tub **14** before there has been transferred to the tub **14** the entire contents of the tub **12**. Additional domestic hot water is supplied to the tub **14** as is necessary to make up for that retained by the laundry following the end of the previous wash period and when the proper level has been attained agitation and washing commences. At this point, or as soon as all of the detergent laden wash water from the tub **12** has been discharged into the tub **14**, the goose neck **28** is returned to the tub **40** with the extension, if it be desired to reuse the wash water in a third washing cycle, or the goose neck without the extension may be transferred to the tub **42**, or left in tub **40** and the drain plug **50** removed, and thereafter the wash cycle will continue in the usual manner with the wash water being drained away. In the event that the detergent laden wash water is to be reused, the operations previously described will be undertaken by the operator in the same manner. It will appear that the wash water will have a tendency to cool while in the set tub **40** and, if desired, an insulated storage tub could be used which would tend to hold the water at the temperature at which it is discharged from the washing machine. However, in practice, subsequent loads of washing are often effected at somewhat reduced temperatures because of the nature of the laundry to be washed, and the slight loss of temperature is thus found to be of benefit, and suit the general plan of washing in sequence of different and successive batches of laundry.

From the above, it will be seen that by the mere addition of an extension on the outlet hose, automatic washers of the type described may be operated so as to conserve the wash water and soap for consecutive wash loads, and all without any alteration, or the introduction of equipment not generally available.

While the invention has been described in conjunction with certain apparatus, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In laundry apparatus for performing successive cycles of operation including sequentially washing, rinsing and damp drying while using the same wash water during the washing period of each cycle which comprises, in combination, a washing machine having a wash tub adapted to independently retain wash water during a washing operation, a surrounding drain tub, means for discharging wash water from said wash tub to said drain tub at the end of a wash period, a storage vessel adjacent said drain tub located at an elevation above said drain tub, a drain, means to empty said drain tub comprising a centrifugal pump having a free passage therethrough when inoperative located beneath said drain tub and a discharge hose having a goose neck on its free end forming an inverted siphon, said siphon having one branch connected to said pump, and the other branch extending downwardly to an open end a sufficient distance to reach over the edge and substantially to the bottom of said storage vessel, said siphon being adapted to be transferred between said storage vessel, said wash tub and said drain to selectively discharge into any one thereof, and hang over the rims of said wash tub and storage vessel, whereby, when said open end branch is submerged in wash water in said storage vessel and the air is driven out of said hose by momentary operation of said pump to lift the residual water within the hose into the siphon, a reverse gravity siphon may be established to transfer the contents of said vessel to said drain tub by gravity flow through the inoperative pump.

2. The method of temporarily storing for reuse in a subsequent cycle, wash water discharged from a washing machine adapted to sequentially wash, rinse and damp dry in a cycle of operations, and having a vertical axis wash tub and surrounding drain tub adapted to receive wash water from said tub at the close of a washing period, which comprises pumping said wash water through an inverted hose siphon into a storage vessel having an elevation above said drain tub, transferring said siphon to a drain outlet while completing the cycle of operations, transferring said siphon to said storage vessel at the close of the cycle of operations, effecting a gravity siphon flow of water from said storage vessel to the drain tub with the residual water in the hose siphon by momentarily energizing said pump to raise the residual water in the hose into the siphon and drive the air out, shifting said siphon hose from said storage vessel to said wash tub after gravity transfer of the wash water contained in the storage vessel to said drain tub, pumping said wash water from said drain tub to said wash tub, and thereafter commencing a second cycle of operations.

References Cited in the file of this patent

UNITED STATES PATENTS

2,372,769	De Remer	Apr. 3, 1945
2,562,610	Geldhod	July 31, 1951