

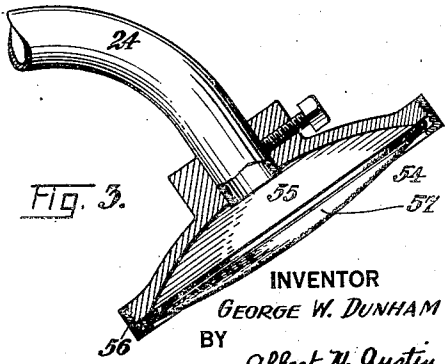
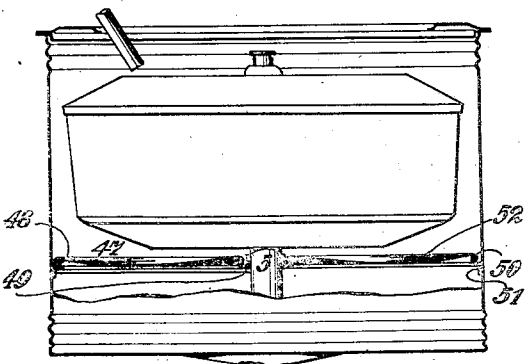
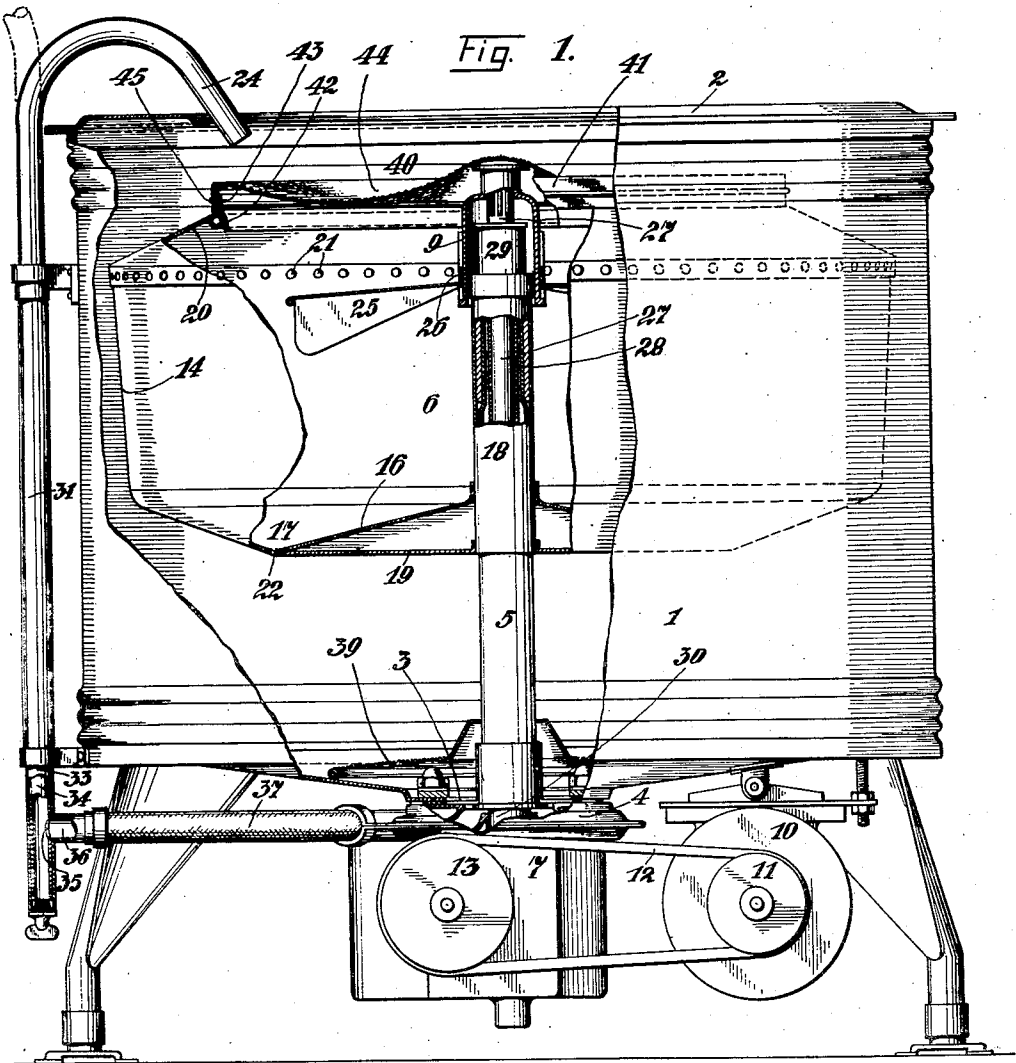
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FILTER SYSTEM FOR LAUNDRY MACHINES

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FILTER SYSTEM FOR LAUNDRY MACHINES

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The invention relates to filtering apparatus for laundry machines, and, more particularly, to filtering apparatus built in a laundry machine of the type comprising a tank in which may be mounted a receptacle for holding the laundry and means for agitating the laundry to wash it, together with a circulatory system for circulating the laundry liquid. Means for rotating the receptacle may also be provided in order to extract the liquid from the laundry by centrifugal force to dry the laundry.

The laundry machine may include a tank, in which may be mounted for rotation a receptacle, which may be of the imperforate type for holding both the laundry and laundry liquid. Suitable agitating means may be provided to agitate the laundry and laundry liquid for washing the laundry, and means may be provided for rotating the receptacle to discharge the liquid therefrom, thereby drying the laundry.

A circulatory system may be furthermore provided for continuously transferring the laundry liquid from the bottom of the tank to the top of the receptacle for washing and rinsing, if desired. Furthermore, filter devices may be provided which may be disposed in the path of circulation of the laundry liquid for filtering out the impurities from the laundry liquid which have been extracted from the laundry. A cloth filter will be most desirable, because it may be made of cheap material and of fine mesh. It has been found that, during the washing operation, by the use of a filter of this kind together with a strainer in the bottom of the tank, at the end of the washing the wash water is practically as clean and clear as when it was first put in the machine, and that there is practically no difference in the rinse water after it is used as compared with when it is taken from the faucet. The advantages and benefits of this method of washing are obvious. The laundry is much whiter and ab-

solutely free from sediment or scum either in the concentrated form which is the most objectionable, or in the distributed form, which is not so noticeable to the ordinary observer. By the invention a process and apparatus for treating laundry is provided, whereby laundry may be subjected to its several treatments including washing by a stream of pure running water kept always substantially free from impurities.

To get proper results a very fine screen or cloth filter is necessary, and it is desirable that the filter be so located as to be easily removable for the purpose of cleaning, as the sediment and dirt from the laundry will clog up a large surface in a short time.

Various other objects and advantages of the invention will be obvious from the following particular description of forms of mechanism embodying the invention or from an inspection of the accompanying drawings; and the invention also consists in certain new and novel features of construction and combinations of parts hereinafter set forth and claimed.

Referring now to the drawing in which there is shown for purposes of illustration several modes of practicing the invention:

Fig. 1 is an elevation of a laundry machine with parts broken away to show the construction thereof;

Fig. 2 is a more or less diagrammatic elevation of the type machine shown in Fig. 1 but having the filter in a different position; and

Fig. 3 is a detail showing a filter mounted on the discharge nozzle.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring now to the drawing, the laundry machine may comprise the usual tank, 1, 20

which may be supported by the usual legs. The tank may be generally cylindrical and may be provided with a cover 2, as shown. The bottom of the tank may be provided with a large central opening 3 to which may be secured a horizontally disposed centrifugal pump 4 having its intake communicating with the bottom of the tank. Projecting upwardly from the upper casing wall of the pump 4 may be a hollow pedestal 5 upon the top of which may be journaled an imperforate type receptacle 6.

Secured to the bottom of the pump 4 may be a gear box 7 in which may be mounted suitable gearing for imparting the necessary motions to the receptacle 6 and agitator 9. Suspended preferably from the bottom of the tank may be a driving motor 10 having a drive pulley 11, on which may be mounted a belt 12 which is also mounted on a driven pulley 13 to drive the mechanism in the gear box 7.

The receptacle 6 may comprise an outer wall 14 flaring slightly upwardly, a bottom 16 forming an annular trough 17, and a central hub 18 which is mounted over the pedestal 5. A suitable strengthening plate 19 may connect the bottom of the trough 17 to the hub 18. A guard ring 20 may be provided extending upwardly and inwardly to prevent loss of laundry from the receptacle during the several operations. A plurality of discharge openings 21 may be provided through which the liquid may overflow during washing or rinsing, and through which it may be discharged during drying. A plurality of sediment disposing holes 22 may be provided in the bottom of the trough, these holes effectively allowing the heavy dirt from the laundry which settles to the bottom of the receptacle to pass therethrough. The amount of laundry liquid lost through the holes may be negligible compared to the amount supplied by the discharge nozzle 24, this to be described more in detail hereinafter.

A suitable agitator 9 may be provided including a plurality of blades 25 disposed in the receptacle, and secured to a hub 26. The agitator hub may be detachably connected to a central shaft 27 which may have imparted thereto a rotary oscillatory motion from the gear box 7. Surrounding the central shaft 27 may be a tubular shaft 28 which may be detachably connected to the receptacle by the clutch 29, and from which the impeller 30 of the pump may also be driven.

At the side of the tank a standpipe 31 may be provided, the standpipe comprising a riser tube 33 into which may be telescopically fitted a flow pipe 34 having at its upper end a goose neck nozzle 24. The flow pipe may be open at its lower end and may be provided with an opening 35 in its side wall registering with the branch 36 on the riser tube (when in the position shown). The branch 36 of the

riser tube is connected to the discharge end of the pump 4 by a flexible conduit 37 so that vibrations due to the rotation of the receptacle and associated parts will not be communicated to the standpipe 31 therethrough. It will be understood that when the flow pipe 34 is in the position shown, the laundry liquid may be pumped from the bottom of the tank 1 up through the standpipe 31 and be discharged from the discharge nozzle 24 into the receptacle 6. It will be appreciated that by turning the flow pipe 34 or by raising it slightly the opening 35 in the flow pipe may be brought out of register with the lateral branch 36, thereby closing the standpipe to the flow of liquid. By raising the flow pipe so that the lower end thereof is above the lateral branch 36, liquid may be discharged through the standpipe and the flow pipe at this raised position may be rotated to any angular position to allow liquid to be discharged therefrom.

In the washing operation the receptacle 6 may be filled with laundry and laundry liquid, and the agitator 9 may be connected to the central shaft 27 which will have a rotary oscillatory motion imparted thereto by the gearing in the gear box. At the same time the flow pipe 34 may be in the position shown and laundry liquid may be continuously circulated from the bottom of the tank into the top of the receptacle, whence it will overflow through the discharge openings 21 back to the bottom of the tank.

In order to rinse the laundry pure water may be substituted for the washing liquid, and the operation may be carried on in the exact manner just stated. For an alternative method of rinsing, the agitator 9 may be removed and the receptacle connected by means of the clutch 29 to the tubular shaft 28 to rotate at centrifugal discharging speed. The flow pipe 34 may be raised and its discharge nozzle 24 rotated so that the rinse water may be discharged from the bottom of the tank clear of the laundry machine, as for instance, into a sink. As the receptacle rotates, in this method of rinsing, a continuous flow of rinsing water may be caused into the top of the receptacle by means of a hose (not shown). In order to dry the laundry the receptacle may be caused to rotate at centrifugal discharging speed and the flow pipe may be adjusted so that no water may flow therethrough, the water collecting in the bottom of the tank, or the flow pipe may be adjusted so that the water may be discharged clear of the machine.

As the washing operation proceeds the originally clean washing liquid ordinarily becomes soiled due to its extracting the dirt and impurities from the laundry. In order to keep the washing liquid comparatively pure, a filter may be provided anywhere in the path of circulation. A coarse filter such as a screen

39 may be provided at the bottom of the tank, the screen having a large foraminous flat portion, the entire area of which is effective for screening even though the water becomes very low in the tank. To take out the fine impurities from the liquid a fine mesh filter may be provided.

In Fig. 1 a fine mesh filter 40 is shown comprising a ring 41 having an annular seat 42 fitting the top of the guard ring 20 and having an annular groove 43, and being provided with a filter cloth 44 of fine mesh, the filter cloth being held in the annular groove by means of a piece of string or cord 45. The filter cloth may rest on the top of the agitator hub 26, the oscillation of the agitator hub during washing having no damaging effect on the filter cloth. During washing or rinsing as the liquid is discharged from the discharge nozzle 24 it is strained or filtered by the filter cloth 44 before it goes into the receptacle. The suds which may accumulate on the top of the filter cloth 44 are effectively by-passed by allowing them to flow over the top of the filter cloth and down the side of the receptacle 6. The cleaning substance in the washing liquid is to a large extent in solution, so that the by-passing of the suds around the laundry is not an objection but an advantage. The provision of a by-pass for the suds is desirable because in many cases the suds would otherwise give trouble by piling up and flowing over on the floor of the room.

After each washing and rinsing operation the filter 40 may be removed and cleaned off with a hose, since the lint, sediment and other impurities from the laundry liquid will clog up the fine mesh of any cloth very quickly. The filter is easily removable for this purpose. Preferably the filter cloth may be of some cheap substance which the user of the washing machine may buy in a dry goods store, and may replace as often as desirable or necessary.

As above stated the filter cloth may be provided anywhere in the path of the laundry liquid so long as there is insured that only the filtered liquid may reach the receptacle. As a further example, a filter 47 may be disposed below the receptacle as shown in Fig. 2. The filter 47 may be made up of an inner ring 48 which may rest on an angle seat 49 secured to the pedestal 5; an outer ring 50 may be provided which may rest on an annular angle seat 51 secured to the tank; a suitable filter cloth 52 may extend between the inner ring 48 and outer ring 50. The fit between the inner ring 48 and angle seat 49 may be made loose to allow small lateral movement of the pedestal 5. The dirty liquid may overflow the receptacle to be filtered by the filter, the liquid in the bottom of the tank being clean to be pumped from the bottom of the tank back into the top of the receptacle.

As a still further modification, the discharge nozzle may be provided with a filter 54 as shown in Fig. 3. The filter 54 may comprise an enlarged head 55 secured to the discharge nozzle 24 and an annular cap 56 threaded thereon between which a suitable filtering medium 57 may be clamped.

It is obvious that either one of the filters shown in Figs. 1, 2 and 3 may be used separately or they may be used in any combination, including all together, in order to insure the desired filtering action. If the filters are used simultaneously, each may be made of a different mesh to catch the impurities which are loosened from the clothes, the degrees of mesh varying, the coarsest being in the path of the liquid nearest the discharge side of the receptacle, the finest being in the path of the liquid just before it reaches the receptacle.

Thus it will be seen that according to the invention, an apparatus is provided which washes and rinses the clothes in the most scientific and efficient manner. During washing the laundry liquid may be kept so clean that with the naked eye it is impossible to discern any difference in the liquid after the clothes are washed from its appearance before washing. Furthermore, the removal of suspended solid material from the flowing liquid causes the clothes to be absolutely free from either concentrated or distributed sediment of all sizes, and the clothes which are taken from the machine are practically perfectly washed.

While I have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. In a laundry machine, a tank, a receptacle mounted therein, said receptacle having discharge openings near the top thereof, and having parts imperforate to hold washing liquid during washing operations, an upper guard ring having its upper rim above said openings, a filter ring seated on said guard ring, a filter cloth of fine mesh secured to said filter ring, an agitator in said receptacle having a hub on which part of said cloth rests, means for imparting an oscillatory rotary motion to said agitator, and means for continuously circulating washing liquid from said tank onto the top of said filter cloth.

2. In a laundry machine, a tank, a receptacle therein for holding laundry, a circulatory system for continuously conveying laundry liquid from said tank into the top of said receptacle, a filter of large area and

fine mesh on top of said receptacle, whereby suds collecting at said filter are by-passed around said receptacle to the bottom of said tank.

5 3. In a laundry machine having an outer tank and a clothes receptacle mounted therein for rotation to centrifugally extract water from the clothes, a filter seated on the open top of said receptacle, means for agitating
10 the laundry for washing purposes, and means for continually circulating washing liquid from said tank onto the top of said filter.

In testimony whereof I have hereunto set my hand.

15 GEORGE W. DUNHAM.

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