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2,161,208

WASHING PROCESS

Original Filed Nov. 14, 1935

Fig. 1.

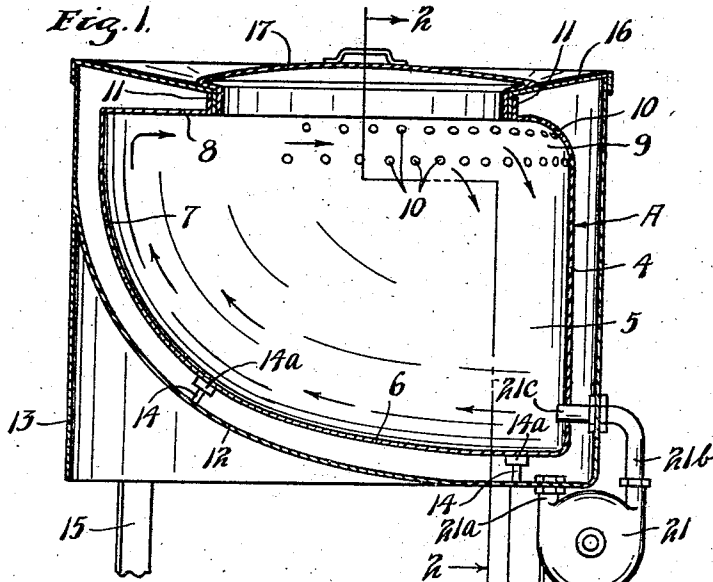


Fig. 2.

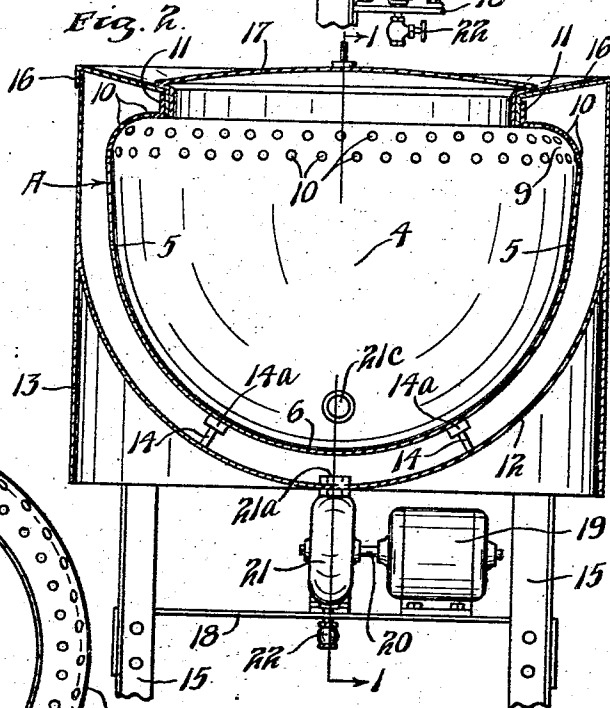
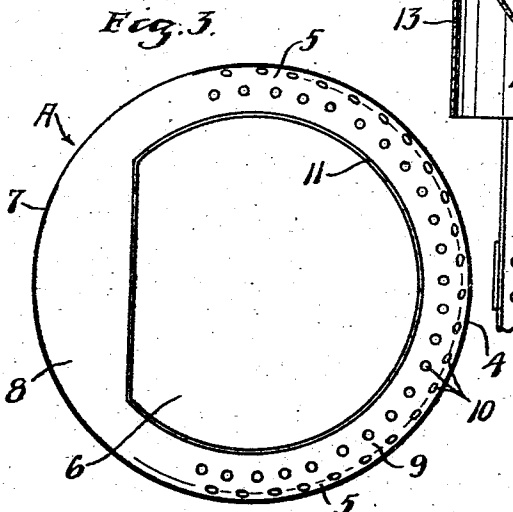


Fig. 3.



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2,161,208

WASHING PROCESS

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Original application November 14, 1935, Serial No. 49,741. Divided and this application October 21, 1936, Serial No. 106,741

2 Claims. (Cl. 8—159)

This invention relates to washing processes. This application is a division of my United States application for Letters Patent entitled "Washing machine", Serial Number 49,741, filed November 14, 1935, and allowed July 20, 1936, which application matured into Patent 2,068,356, issued January 19, 1937.

It is the main object of the invention to provide novel and improved washing processes for washing clothes, whereby clothes can be thoroughly and economically washed quickly with a minimum of power and whereby the clothes are prevented from bunching up or tying together as they are washed, and whereby the wear and injury to the clothes through the washing action is reduced to a minimum.

Another object is to provide a novel washing process which can be carried out in a tub containing no moving parts and whereby the cumulative formation of sudsy foam is prevented.

The objects and advantages of the invention will more fully appear from the following description, made in connection with the accompanying drawing, wherein a washing machine is shown which may be utilized in carrying out my novel washing processes and wherein like reference characters refer to the same or similar parts throughout the various views and, in which,

Fig. 1 is a central vertical section taken through a washing machine on the line 1—1 of Fig. 2, as indicated by the arrows;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1, as indicated by the arrows; and

Fig. 3 is a plan view of the tub of the machine. The washing processes of the invention will be described in connection with the machine shown, although of course it will be understood that other machines than that illustrated may be used in carrying out the processes of the invention.

For ease of description in the specification and claims, the front of the machine is considered to be the left hand portion of the machine, as shown in Fig. 1, of the drawing.

Referring to the drawing, there is provided in accordance with the form illustrated, a tub designated as an entirety by the letter A. This tub can probably best be described as having the general shape of the bowl of an ordinary Irishman's clay smoking pipe. In plan view the tub A is of general circular shape; in transverse vertical section, as shown in Fig. 2; the tub is of general semi-circular shape; and in central longitudinal vertical section as shown in Fig. 1, the tub is of somewhat forwardly tipped funnel-shape. The back 4 of the tub is for the most part vertically

disposed, curving into the sides 5 and also curving into the bottom 6. The bottom 6, while being dishd and curving into the sides 5, inclines generally upwardly and forwardly from the back 4 to merge into the upwardly curved front 7. Set normal to the upper part of the front 7 and projecting rearwardly therefrom is a top section forming a water deflector 8. The upper parts of the sides 5 and the back 4 are quite sharply inwardly curved adjacent the level of the deflector 8 to form the continuously inwardly curved upper section 9. A multiplicity of circumferentially spaced drain apertures 10 are provided in the curved upper section 9 and in the form shown rows of these apertures are provided at three different levels, the two lower rows being at levels adjacent but spaced somewhat below the level of the deflector 8 and the upper row of apertures being about at the same level as the deflector 8. A short continuous flange rises from the inner edges of deflector 8 and the curved upper section 9 to form a neck 11.

In the form illustrated the tub A is received within a reservoir 12 having the same general contour as to its back, bottom, sides and front, as these same parts of the tub A but being of somewhat larger size than the tub A. This reservoir 12 may be provided with a skirt 13 about its sides and front as shown to give it a somewhat better appearance. The tub A disposed in inwardly spaced relation from reservoir 12 may be conveniently supported from the bottom of the reservoir by means of rubber capped lugs 14 attached to the bottom of the reservoir, the rubber caps 14a being provided to stabilize the tub A and to prevent the transmission of vibrations from the tub A to the reservoir 12. It is, of course, understood that the rubber capped lugs 14 are not directly connected to the tub A so that it is possible to readily remove the tub from the reservoir for cleaning of the reservoir or the like.

The reservoir 12 is equipped with suitable downwardly extending legs 15 whereby the entire machine may be supported as upon a floor or the like. The upper edge of the reservoir, which is circular in shape, projects somewhat above the neck 11 and received over the top of the reservoir is a closure plate 16. Plate 16 has an outer downturned flange received about the outer part of the upper portion of the reservoir 12 and it has a downturned inner flange received within the neck 11. To permit ready drainage of water that may accumulate on the closure plate 16, the plate inclines somewhat downwardly from its outer to its inner portion. A shouldered and flanged cover

17 carrying a handle is received within the inner flange of the closure plate 16 to close the top opening in the tub A.

Secured to a shelf 18 attached to the rear legs 15 is an electric motor 19 driving through its shaft 20 a water pump 21 also mounted on the shelf 18. Water pump 21 has its intake 21a connected to the lowest part of the reservoir 12 at the central rear portion of the bottom of the reservoir. The outlet 21b of pump 21 runs through and is connected to the back 4 of the tub A at the central lower part of the same. The outlet 21b terminates in a mouth 21c directed forwardly within tub A in slightly spaced relation above the bottom 6 of the tub. Pump 21 is equipped with a drain cock 22 connected to its lowermost portion.

In preparing the washing machine for operation the tub A and the reservoir 12 are filled to a point somewhat below the level of the lowermost apertures 10. Of course, the cover 17 is removed to fill the machine and the water together with whatever soap or other washing compounds are to be used are initially placed within the tub A, the water working its way through pump 21 until part of it is received within reservoir 12. The clothes to be washed may then be introduced whereupon the top opening in the tub is closed by the cover 17, and the motor 19 is set in operation to drive the pump 21. The pump 21 will draw the washing fluid from the bottom of the reservoir 12 and force the same violently into the tub A through the mouth 21c. Almost immediately the height of the washing fluid within the tub A will rise to a point above the lowermost apertures 10 while of course the level of the fluid within the reservoir 12 will drop to a point considerably below the lowermost apertures 10.

The stream of washing fluid injected into the tub A will move rapidly upwardly and forwardly from the back 4 of the tub along the bottom 6 and along the front 7, whereupon it will strike the deflector 8 and be directed rearwardly as indicated by the arrows, Fig. 1. Water will drain into the reservoir 12 through the various apertures 10 and due to the fact that the apertures are circumferentially spaced from each other through an arc of at least 120° and preferably through a longer arc, the drainage of the washing fluid through these different apertures will not exert sufficient pull on the clothes within the tub to cause the clothes to lodge against the apertures, clog the same and prevent free circulation of the clothes. As the stream of water injected into the tub from the pump strikes the washing fluid already in the tub and the clothes within the tub, all the washing fluid in the tub, together with the clothes, will be given a circulatory movement revolving generally roughly about a cylindrical axis horizontally disposed transversely in the center of the tub. The clothes having moved upwardly and forwardly along the bottom 6 and from 7 and having been deflected rearwardly by the deflector 8 will arrive near the rear upper portion of the tub, whereupon the weight of the water soaked clothes will tend to cause them to sink by gravity to the bottom of the tub to be again acted upon by the stream ejected from the pump. Of course, the general current movement of the fluid in the tub will also assist in causing the recirculation of the clothes to the bottom of the tub.

By reason of the circulatory action of the clothes, the clothes will string out in a more or less sheet-like form and will not knot, tie or tangle

together. Due to the fact that the main body of fluid within the tub moves at a slower speed than the high velocity stream injected into the tub from the pump, the high velocity stream works through the clothes to produce a thorough cleansing action. Also the clothes move more rapidly near the front of the tub than at the rear portion of the tub which produces a further differential in the water action on the clothes, further assisting in the washing action. The weight of the clothes at the rear part of the tub tends to cause them to drop somewhat more rapidly from the top rear part of the tub to the bottom rear part of the tub, thereby producing a further differential between the speed of movement of the clothes and the speed of movement of the water to assist the washing action. By reason of these facts, the clothes are very rapidly washed and very thoroughly washed.

It is found that the water moving toward the rear of the tub strikes the back 4 of the tub somewhat below the lowest row of apertures 10. As the water strikes the back 4 it divides downwardly and upwardly, the main body of water passing downwardly. The upper division of water curls upwardly and forwardly to form a back eddy which again enters the main rearwardly directed stream at the top of the tub somewhat forwardly from the rear wall. A large part of the sudsy foam formed at the top of the tub by the soap is worked back into the water between the main stream at the top of the tub and this back eddy whereby part of this sudsy foam is trapped and dissipated. This back eddy also working upwardly at the top back part of the tub effectively acts to prevent clothes from clinging to the rear part of the curved upper section 9 of the tub.

It has also been found that during the washing action the stream issuing from the pump outlet 21c fans outwardly to move the clothes laterally toward the sides of the tub as they move forwardly and upwardly with the stream from the outlet. Then as the water and clothes move rearwardly across the upper part of the tub and then downwardly at the back of the tub, the water and clothes move inwardly from the side walls toward the center of the tub. This accidian action or lateral movement of the clothes is highly beneficial to the washing action inasmuch as the lateral movement of the clothes causes them to present different surfaces thereof to the action of the water to secure a thorough washing of all portions of the clothes.

At the central part of the tub a lower stratum of clothes moves towards the forward part of the tub while a higher stratum of clothes moves toward the rear part of the tub, and these two strata rub against each other to assist in working the dirt out of the clothes.

As the machine is put into action, the agitation of the washing fluid containing soap causes suds to form in the tub, these suds rising to the top of the tub. If nothing was done to prevent the cumulative formation of these suds at the top of the tub, the suds would soon form so much foam as to interfere with the action of the machine. The apertured curved section 9 at the upper part of the tub prevents the cumulation formation of this sudsy foam. The foam will, of course, form until it rises to a level above the lowermost apertures 10 and usually to a point about level with the middle row of apertures 10. The formed foam moved by the water at the top of the tub is carried over to points adjacent the various ap-

ertures 10 and the water draining through these apertures cooperating with the curvature of the curved section 9 causes the foam to drain out of the tub particularly through the higher apertures into the reservoir 12. The curved section 9 in conjunction with the surface of the water in the tub and the movement of the water towards the apertures together with the back eddy traps the foam so as to cause its destruction and ejection from the tub. This same action does not take place when the curved section 9 is not provided in the tub. The prevention of the cumulative formation of sudsy foam at the top of the tub is one of the most important features of the present invention. The location of the curved section 9 at approximately the same level as the deflector plate 8 also seems to have something to do with the elimination of the foam from the tub.

The water draining down from the apertures 10 in the reservoir 12 produces a water falls action to prevent the cumulative formation of foam in the reservoir. In other words, the water draining from apertures 10 keeps washing the sudsy foam down in the reservoir so as to mix the foam with the water and destroy the foam.

To drain the machine it is only necessary to open the cock 22 in the pump. The outlet 21b of the pump fits loosely through the opening in the rear of the tub A so that when desired, cover 17, closure plate 16 and the tub A can be quickly removed from the reservoir 12.

The fact that there are no moving parts within the tub A, prevents wear on the clothes while they are being washed. The tearing of the clothes and the breaking of buttons thereon is held to the minimum.

It will be seen that in accordance with my washing process, the clothes and washing fluid containing soap are circulated within a container by subjecting the clothes and washing fluid to the action of a circulating stream of the fluid moving in a substantially circular path in a vertical plane within the container and said stream is created by introducing fluid drained from the container under high pressure. The fluid is drained off by gravity near the top of the container at a multiplicity of horizontally spaced points and the sudsy foam which is formed by the agitation of the fluid is trapped and drained off with the fluid while the fluid is being collected for reintroduction.

It will, of course, be understood that various changes may be made in the steps of the washing processes without departing from the scope of the present invention which, generally stated, consists in the matter shown and described and set forth in the appended claims.

The present application contains certain subject matter which is common to my prior application entitled "Washing process and machine", Serial Number 747,035, filed October 5, 1934.

What is claimed is:

1. The process of washing clothes which consists in introducing into the rear bottom part of a washing tub, containing clothes, a single high pressure stream of a soapy washing fluid drained from the tub while directing the stream along the tub bottom and toward the tub front, deflecting the stream at the top front of the tub rearwardly to move the stream rearwardly toward the tub back and then generally downwardly to the point of introduction and trapping, withdrawing and destroying the sudsy foam formed at the top of the washing fluid by continuously draining off part of the washing fluid through the top of the tub walls by confining the motion of the draining fluid and sudsy foam to a limited upward movement to cause withdrawal of the sudsy foam and thereafter collecting the drained fluid for reintroduction.

2. The process of washing clothes which consists in introducing into the rear bottom part of a washing tub containing clothes a single high pressure stream of a soapy washing fluid drained from the tub while directing the stream along the tub bottom and toward the tub front, deflecting the stream at the top front of the tub rearwardly to move the stream rearwardly against the tub back wall to strike the back wall of the tub and divide the stream into a major current moving downwardly to the point of introduction of the washing fluid and a minor upwardly moving forwardly and inwardly deflected back eddy current at the upper rear part of the tub, and draining off the fluid through the top of the tub wall at the back and sides thereof whereby the draining causes the movement of sudsy foam through the top of the tub wall to continuously eliminate sudsy foam from the tub and destroy it.

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