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WASHING APPARATUS

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Fig. 1.

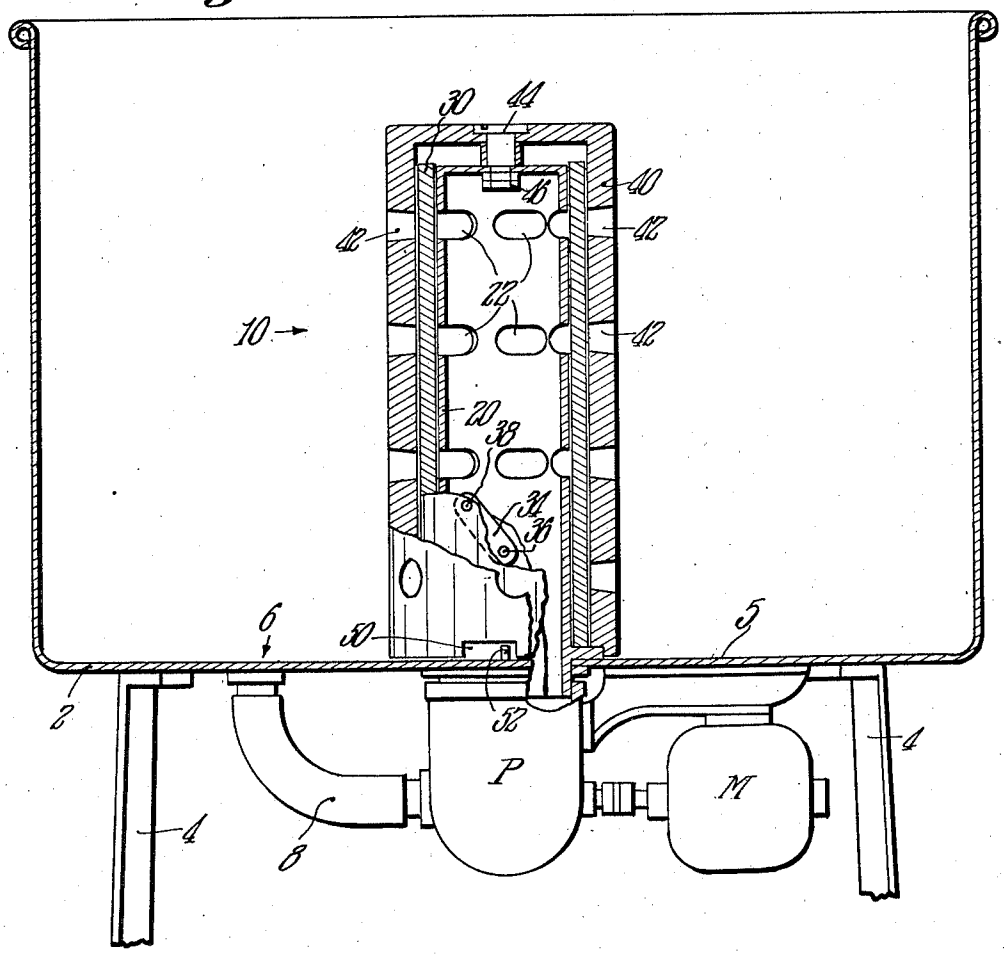
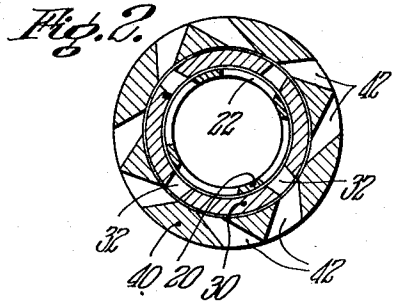


Fig. 2.



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WASHING APPARATUS

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6 Claims. (Cl. 68—190)

This invention relates to improvements in washing machines and is directed more particularly to the provision of a novel washing machine having means associated therewith which is constructed to direct the cleaning fluid against the articles being cleaned in such a way that the articles are not apt to be damaged in any way as is the case with apparatus heretofore known.

That is to say, present-day apparatus commonly includes a tub and a paddle therein with either the tub or the paddle, or both, relatively rotatable. Such mechanism not only does not satisfactorily perform its washing function but it tears and otherwise injures the articles being cleaned, particularly clothes.

With the construction of my invention, these disadvantages are obviated. That is to say, while my apparatus is simple in form and positive in operation, the arrangement is such that violent twisting and straining of the clothes, usual with ordinary washing machines, are eliminated.

Another object of the invention is the provision of an apparatus including a tub and means whereby fluid is introduced into the tub under pressure in such a way that it is first urged against the clothes in one direction and then in an opposite direction, so that the clothes are cleaned quickly and efficiently and with a minimum of effort.

As a special feature, the apparatus is so constructed that after the water has been forced into the tub and against the clothes, it is led out of the tub and forced back in again to contact the clothes. It is to be understood that while I show a motor-operated pump for introducing the water into the tub, other means may be employed.

As will appear the construction contains but few parts and is economical to manufacture.

Various other objects and advantages of the invention will be more readily apparent after a reading of the following description, reference being had to the accompanying drawing wherein:

Fig. 1 is a side elevational view of the apparatus of the invention with parts in section to explain certain novel features thereof; and

Fig. 2 is a transverse sectional view through the valve mechanism of the apparatus shown in Fig. 1.

Referring now to the drawing more in detail the invention will be fully described.

A receptacle 2 is provided, preferably in the form of a tub, and this may or may not be supported by legs 4. It has a bottom wall 5 provided with an outlet 6.

A pump P is connected as by a pipe 8 to the outlet and the pump may be operated by means of a motor of conventional form M. Valve mechanism, indicated generally by 10, is disposed within the receptacle 2 and is in communication with the pump P.

In general the valve mechanism includes a plurality of relatively rotatable cylinders, which will later be described in detail and which are so associated with one another that when fluid is introduced into the tub under pressure at least one of the cylinders is caused to move and direct the fluid against the materials being washed, first in one direction and then in the other, with the result that the same are thoroughly cleaned.

There is a stand-pipe 20 extending vertically within the tub and in communication with the pump. The pipe 20 is provided with a plurality of elongated slots 22 in its walls and its lower end is preferably fixed to the bottom wall 5 of the tub.

Surrounding the stand-pipe 20 is a relatively rotatable pipe or sleeve member 30 and this is adapted to move vertically as will appear. This sleeve 30 is adapted to function as a valve and is provided with a plurality of openings 32 as shown in Fig. 2. It is preferable that the side edges of the openings 32 converge outwardly as shown.

A link member 34 is provided and this has a lower end connected as by a pivot 36 to the stand-pipe 20 and its opposite end pivoted as at 38 to the inner wall of the sleeve 30. It will thus be seen that as sleeve 30 rotates, the link connection shown will cause the same to become elevated until the link reaches the vertical dead center after which it will descend.

The lower marginal edge of sleeve 30 is intended to abut the lower wall 5 of the tub, or a flange provided on pipe 20 as shown, when sleeve 30 is in lower position. In this way, it will be seen, the rotative movements of the sleeve 30 are limited. The sleeve rotates from one position to another and back again and as it rotates it moves upwardly and then downwardly.

An outer sleeve or cylinder 40 surrounds the valve member 30 and this is rotatable relative to said member 30 and is provided with a plurality of spaced ports 42. These openings 42 are tangentially arranged as shown in Fig. 2 and are formed to be more or less tapering.

It will be noted that the openings 42 are arranged tangentially so that one port or set of ports is directed in a clockwise direction and an adjacent one or set in a counter-clockwise direction.

That is to say, while I have shown several ports 42 and while there may be but two, it is essential that at least one be directed in a clockwise direction and at least one in a counterclockwise direction.

As stated, the sleeve 40 is relatively rotatable and there is preferably a rotatable connection between members 20 and 40. This may consist of a bolt 44 extending through top parts of the said sleeves and there may be a nut 46 for holding the parts in assembled relation.

Extending upwardly from the bottom wall 6 of the tub is a pin 52 and this is adapted to engage sleeve 40 so as to limit its rotative movements. This may be accomplished by providing a cut-out 50 in the lower end of sleeve 40 as shown so that its opposite ends will be engaged by the pin 52 as the sleeve rotates in opposite directions. The pin 52 and ends of the cut out then serve to limit movements of sleeve 40 in opposite directions.

In operation, water is forced upwardly by pump P into the hollow stand-pipe 20 and out its slots 22. The water, being under pressure, then passes out the openings 32 of valve member 30 and out tapered holes 42 in sleeve 40 when in register.

The parts are arranged for their relative movements and the openings and ports are so arranged that they operate as follows.

Water in stand pipe passes through openings 22 and into and through ports 32 and out ports 42. Due to the general direction of ports 42 in register with ports 32 in Fig. 2 the water passing through ports 42 causes member 40 to rotate counterclockwise until its rotation is stopped by pin 52 engaging the end of cutaway 50.

As sleeve 40 moves counterclockwise sleeve 30 also rotates clockwise. This is brought about because the ports 32 when in register with ports 42 offer less resistance than if out of register. Hence the sleeve 30 follows the sleeve 40 and as said sleeve 30 starts to rotate it also moves upwardly due to link 34. On reaching its uppermost position, it starts to descend while rotating and comes to rest when its lower end rests on the flange therebelow.

As sleeve 30 comes to rest, its ports 32 are disposed at the opposite ends of slots 22 of sleeve 20 and the sleeve 40 has reached the limit of its movement so that ports 32 register with those ports of sleeve 42 out of register therewith in Fig. 2. In this position the sleeve 40 starts to rotate clockwise as does sleeve 30.

As sleeve 30 rotates with sleeve 40 it is elevated simultaneously with its rotation. When it reaches its uppermost position its weight causes it to descend which causes it to rotate to the end of its stroke when the ports 32 are at the other end of slots 22 and in register with other openings 42 than those shown.

In the manner described, the sleeve 40 rotates in opposite directions or oscillates back and forth so that water is delivered from ports 42 in opposite directions.

Of course, the water which is discharged from the valve mechanism is directed against the clothes or other articles in the tub, first in one direction and then in the other, eventually finding its way to the outlet 6 through which it passes again into the pump P.

While I have described the invention in great detail and with respect to the present preferred form thereof, it is not desired to be limited thereto since many changes and modifications may be made therein without departing from the spirit and scope of the invention. What it is desired to claim and secure by Letters Patent of the United States is:

1. Washing apparatus of the class described comprising in combination, a receptacle having an inlet, means for introducing a continuous flow of fluid into said inlet, and valve mechanism in said receptacle associated with said inlet automatically operable by said fluid to deliver the same into said receptacle alternately in opposite directions, the said valve mechanism having a central tubular stand-pipe provided with openings in the side wall thereof, a sleeve oscillatable on said stand-pipe and a cylinder oscillatable on said sleeve each provided with openings arranged so that the openings of the stand-pipe, sleeve and cylinder are registerable with one another.

2. Washing machine apparatus comprising in combination, a receptacle having an inlet for fluid and means for delivering fluid continuously thereto, valve mechanism associated with said inlet including, a central stand pipe in communication with the inlet having circumferentially disposed slots, a sleeve oscillatable on said pipe provided with apertures in register with said slots, connections between said pipe and sleeve to limit relative movements thereof so that the apertures of the sleeve traverse the slots of the pipe back and forth, a cylinder oscillatable on the sleeve provided with ports for discharging fluid in opposite directions registerable with the apertures of the sleeve, means to limit movements of the cylinder relative to the sleeve and pipe, all adapted and arranged whereby fluid from the slots of the pipe causes said cylinder to oscillate in opposite directions and the sleeve to oscillate in opposite directions and to elevate and descend while oscillating in either direction and bring other ports of the cylinder into register with the apertures of the sleeve.

3. Washing machine apparatus comprising in combination, a receptacle having an inlet and means to deliver fluid thereto, a stand pipe connected to said inlet provided with circumferential slots, a sleeve oscillatable and reciprocable in opposite directions on the stand pipe having radially disposed apertures registerable with said slots from end to end as said sleeve oscillates, a cylinder oscillatable in opposite directions on said sleeve provided with pairs of ports with the ports of each pair directed in opposite directions and registerable with each aperture of said sleeve, limiting and elevating means to limit movements of said sleeve and to elevate the same and allow it to descend as it oscillates, and means to limit oscillatory movements of said cylinder, all adapted and arranged whereby fluid delivered to said stand pipe passes through the slots thereof into and through the apertures of the sleeve and certain ports of the cylinder causing the cylinder to oscillate from one position to another and the sleeve to oscillate and simultaneously elevate and descend from one position to another and bring other ports of the cylinder into register with the apertures of the sleeve.

4. Washing machine apparatus comprising in combination, a receptacle having an inlet and means to deliver fluid thereto, a stand-pipe connected to said inlet provided with circumferential slots, a sleeve oscillatable and reciprocable on the stand-pipe in opposite directions provided with radially disposed apertures registerable with said slots from end to end thereof as said sleeve moves on said stand-pipe, a cylinder oscillatable

on said sleeve provided with pairs of ports each pair including ports directed in opposed directions and registerable with an aperture of said sleeve, elevating and limiting mechanism between said sleeve and stand-pipe to move said sleeve upwardly and allow it to move downwardly as said sleeve oscillates from one position to another on said stand-pipe, stop means to limit oscillations of the cylinder in opposite directions relative to the stand pipe, all adapted and arranged whereby as fluid is delivered to said stand-pipe the same passes through the slots thereof into and through the apertures of the sleeve and certain of the ports of the cylinder causing the cylinder and sleeve to oscillate to the limit of their movement in one direction as determined by said mechanism and stop means whereupon other ports of the cylinder are registered with the said apertures of the sleeve so that the flow of fluid from the slots through the apertures and ports brings about oscillation of the sleeve and cylinder in an opposite direction.

5. Washing machine apparatus comprising in combination, a receptacle having an inlet and means to deliver fluid thereto, a stand-pipe connected to said inlet provided with circumferential slots, a sleeve oscillatable and reciprocable on the stand-pipe in opposite directions provided with radially disposed apertures registerable with said slots from end to end thereof as said sleeve moves on said stand-pipe, a cylinder oscillatable on said sleeve provided with sets of ports each set including ports directed in opposed directions registerable with an aperture of said sleeve, connections between said sleeve and stand-pipe to move said sleeve upwardly and allow it to move downwardly as said sleeve oscillates from one position to another on said stand-pipe and limit oscillation thereof, stop means to limit oscillations of the cylinder in opposite directions, all adapted and arranged whereby as fluid is delivered to said stand-pipe the same passes through the slots thereof into and through the apertures of the sleeve and certain ports of the cylinder causing the cylinder and sleeve to oscillate to the limit of their movement in one direction as determined by said connections and stop means whereupon other ports of the cylinder are registered with the apertures of the sleeve so that the flow of fluid brings about oscillation of the sleeve and cylinder in an opposite direction, the said connections including a link member pivotally connected to said stand-pipe and sleeve.

6. Washing machine apparatus comprising in combination, a receptacle having an inlet and means to deliver fluid thereto, a stand-pipe connected to said inlet provided with circumferential slots, a sleeve oscillatable and reciprocable on the stand-pipe in opposite directions provided with radially disposed apertures registerable with said slots from end to end thereof as said sleeve moves on said stand-pipe, a cylinder oscillatable on said sleeve provided with pairs of ports each pair including ports directed in opposed directions and registerable with an aperture of said sleeve, elevating and limiting mechanism between said sleeve and stand-pipe to move said sleeve upwardly and allow it to move downwardly as said sleeve oscillates from one position to another on said stand-pipe, stop means to limit oscillations of the cylinder in opposite directions, all adapted and arranged whereby as fluid is delivered to said stand-pipe the same passes through the slots thereof into and through the apertures of the sleeve and certain ports of the pairs of ports of the cylinder causing the cylinder and sleeve to oscillate to the limit of their movement in one direction as determined by said mechanism and stop means whereupon other ports of the pairs of ports of the cylinder are registered with the apertures of the sleeve so that the flow of fluid brings about oscillation of the sleeve and cylinder in an opposite direction, the said stop means including a fixed stop member and parts on said cylinder engageable therewith and the elevating mechanism including a link and pivotal connections between opposite ends thereof and the said stand-pipe and sleeve.

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