

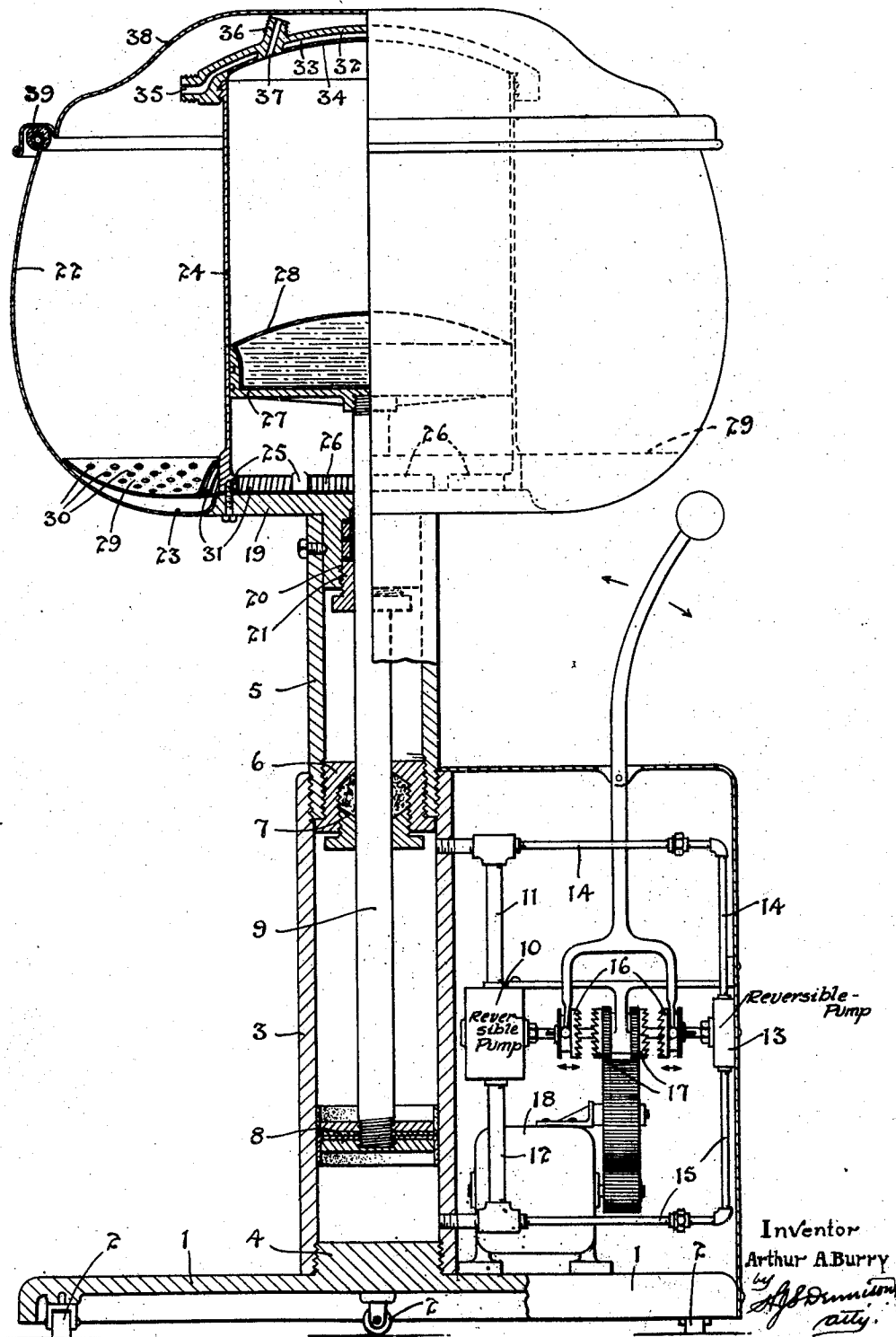
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WASHING MACHINE

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WASHING MACHINE

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The principal objects of this invention are to devise a novel form of washing apparatus whereby the clothes are first turned or tumbled by the action of the water and then the washing water is forced through the fabrics in alternating arrangement to effect a thorough cleansing of the entire fabric without contact with moving mechanical parts.

A further object is to provide a simple and effective manner of separating the water from the clothes by compression in such a manner as to avoid the tearing of delicate fabrics.

The principal features of the invention consist in the novel construction of a washing compartment surrounding a pressure chamber whereby the water is directed laterally from the pressure chamber beneath the clothes to effect a tumbling action thereof and the water is drawn back into the pressure chamber through a perforated support extending across the bottom of the washing chamber.

A further and important feature of the invention consists in the novel arrangement of a perforated water-discharging head on the pressure chamber and the flexible construction of a pressure member whereby a uniform pressure is applied to the clothes to discharge the water therefrom.

A still further and important feature of this invention consists in the novel arrangement of a plunger-operated pressure member whereby a reciprocating action is applied by fluid pressure at variable speeds.

The drawing is a part vertical section and part elevation of a machine constructed in accordance with this invention.

On reference to the accompanying drawing, the base 1, preferably formed of cast metal, is of substantially circular form supported upon suitable caster wheels 2.

A tubular standard 3 here shown formed of a length of pipe, is rigidly secured in a fluid tight joint to the base, a threaded boss 4 being formed centrally of the base.

A tubular extension 5 is secured in the upper end of the standard 3 and has mounted therein a closure block 6 in which a packing gland 7 is mounted.

A piston 8 operates within the cylinder formed by the standard 3 and the rod 9 thereof extends through the gland 7.

A fluid pressure pump 10 of a suitable design, preferably of a rotary type, is connected by conduits 11 and 12 to the top and bottom respectively of the cylinder and a pressure pump 13, also

preferably of the rotary type, is connected by conduits 14 and 15, respectively, to the conduits 11 and 12. The pump 10 is of very much greater capacity than the pump 13 and is adapted to operate the piston within the cylinder at a much faster rate of speed than the pump 13.

It will of course be understood that the pumps 10 and 13 may be of the reversible type in which case, by operating first in one direction and then in the other, the desired reciprocating movement may be imparted to the piston 8 and its associated elements, or any well known type of valve control means may be provided which will be operatively connected with the piston 8 and operate in timed sequence therewith for directing the pressure of the pumped fluid first to one end of the cylinder 3 and then to the other.

It is old and well known to direct fluid pressure to a cylinder to cause a piston therein to be reciprocated and the specific means for accomplishing this forms no part of the present invention and need not be described herein, the elements 10 and 13 being indicative diagrammatically of such a means.

A suitable arrangement of clutch mechanism 16 is provided to connect either one or other of the pumps 10 and 13 to a central operating member 17 which is here shown gear connected to an electric motor 18.

This clutch mechanism is not described in detail as the form shown is merely diagrammatic and may be altered considerably without bearing upon the invention.

A centre plate 19 is provided with a boss 20 which is secured in the upper end of the extension 5 of the standard 3 and the boss 20 is provided with a packing gland 21 surrounding the piston rod 9 which extends above the member 19.

A tub 22, preferably formed in a single piece of spun metal, is mounted upon the centre plate 19 and extends outwardly therefrom with an annular depressed bottom portion 23.

A cylinder 24 is rigidly secured on top of the centre plate 19 being mounted upon lugs 25 which space the bottom end of the cylinder above the portion of the tub covering the centre plate, thus forming a substantially annular port 26.

Mounted upon the upper end of the piston rod 9 is a piston 27 which operates in the cylinder 24. The piston 27 is of a cylindrical form open at the top and within it is arranged a flexible rubber casing 28 which is sealed and contains a substantially non-compressible fluid such as water, which however, is displaceable within its rubber container from one area to another. That

is to say, if an unequal surface is applied to the top thereof, the rubber water-filled cushion will readily conform to the shape of the surface applied.

5 Within the bottom portion of the tub 22 is arranged an annular metal sheet 29 which is slightly dished but retains the position above the depressed bottom 23.

10 The area of the annular plate 29 is perforated with a plurality of holes 30. The inner portion of the plate 29 is turned upwardly and formed with a plurality of slots 31 which thus form a grid arranged opposite to the port 26 so that water discharged laterally from the port will flow readily therethrough over the top surface of the plate 29.

20 The upper end of the cylinder 24 is provided with a cover 32 which is here shown threaded thereon and this cover is provided with a plurality of transverse channels 33 and a perforated sheet 34 is arranged on the inner side. The channels 33 are connected to a discharge 35 which is here shown in the form of a nozzle to which a hose may be connected so that the water discharged therethrough may be carried clear of the tub, or it may be allowed to discharge into the tub as may be desired.

25 A nozzle 36 is provided on the top of the cover and has a passage 37 therethrough which is directed angularly downward toward the side wall of the cylinder so that rinsing water may be directed into the cylinder.

30 A cover 38, which extends over the top of the cylinder, is arranged to rest upon the rubber ring 39 mounted on the rim of the tub 22.

35 In the operation of this machine the desired washing fluid is placed within the tub and flows through the port 26 into the bottom of the cylinder as well as filling the tub. The clothes are placed into the tub and upon the starting of the motor, the pump 10 is operated to reciprocate the piston in the cylinder of the standard. This moves the upper piston 27 in the cylinder 24. The suction of the upstroke of the piston 27 draws water through the ports 26 and causes the water in the tub to flow through the slots 31 and the perforations in the annular plate, consequently the water is drawn through the fabric of the clothes which are thus drawn downwardly against the plate.

50 Upon the reverse movement of the piston through a suitable reversing mechanism, which is not shown, the piston 27 forces the water which has been drawn into the cylinder 24 in a lateral sheet out through the ports 26, and the water thus expelled from the cylinder flows through the slots 31 in the plate 29 having the effect of tumbling the clothes about within the tub and forcing the water upwardly therethrough.

60 Upon the reversal of the movement of the piston the water is again sucked in through the port 26 and drawn again through the fabric. This action is continued for the desired length of time alternately tumbling the clothes about under the expelling pressure of the washing fluid and then sucking it back in a downward direction through the fabric and through the holes in the plate 29.

70 The peculiar arrangement of the perforated plate 29 with the substantially free passage permitted to the lateral flow of water from the ports 26, permits this alternate tumbling and sucking downward of the water by reason of the offset in the bottom formed by the depression 23.

75 It is found in practice that this washing action

is very effective and the finest of fabrics will not be injured.

When the clothes have been washed the cover 38 is removed as also is the cover 32 of the cylinder 24, and the clothes are transferred from the washing chamber into the top of the cylinder. The cover 32 is then placed in position and the pump 13 is then placed in operation by means of the clutch mechanism. This pump moves the plunger slowly upward and a compression is applied by the piston 27, forcing the clothes up against the perforated sheet 34 of the cover and the water is expelled through the channel 33 and the nozzle 35.

15 It is understood of course that the clothes in being placed in the cylinder 24 will be thicker in some places than in others, consequently the flexible rubber top of the piston permits an equal distribution of the pressure being applied to the clothes.

20 When the washing water has been expelled, rinsing water may be introduced into the cylinder 24 by connecting a hose to the nozzle 36, after which the rinsing water may be expelled in the same manner as heretofore described.

25 It will be understood that the detail construction of the plunger-operating cylinder and standard and the pump-operating mechanism may be varied to a very considerable extent without departing from the spirit of this invention.

30 What I claim as my invention is:—

1. A washing machine, comprising a tub, a cylinder arranged within the tub having ports discharging laterally above the bottom of the tub, a perforated fixed screen arranged above the bottom of the tub and substantially below the line of discharge from said ports, and a piston in said cylinder adapted to be reciprocated to force water laterally outward through said ports over said perforated screen and to draw the water downwardly through the screen.

2. A washing machine, comprising a tub having the bottom formed with a raised central portion, a cylinder mounted on said raised central portion and extending upwardly into the tub having ports at the bottom discharging laterally outward above the bottom of the tub, a perforated fixed plate spaced above the bottom of the tub and substantially in alignment with the raised central portion, and a piston operating in said cylinder and adapted to be reciprocated to force water laterally outward through said ports over the top of the perforated plate and to draw water inwardly from the space in the tub below said plate.

3. A washing machine, comprising a circular tub having the bottom formed with a raised center and a depressed annular portion curving outwardly and upwardly therefrom, an annular perforated plate spaced above the depressed annular portion of the tub surrounding the raised center portion and having an upturned inner portion formed with a plurality of slots, a cylinder mounted upon the raised central portion of the tub and spaced thereabove forming an annular port raised to discharge water laterally through the slots in the aforesaid plate and over the perforated portion of the plate, a piston in said cylinder adapted to be reciprocated to draw water through said port and to expel water there- through, a cylinder arranged below the tub, and a piston in said cylinder having a rod connected with the aforesaid piston, said latter piston being adapted to be reciprocated in its cylinder by fluid pressure.

4. A washing machine, comprising a tub, a cylinder arranged in said tub having a discharge port at the bottom opening into the interior of the tub, a water-tight cover for said cylinder having channels in its interior communicating with the cylinder interior and leading to a discharge opening, a reciprocable piston operating in said cylinder to transfer cleansing fluid through said port between the cylinder and tub interiors, and means for applying pressure to said piston to compress materials against said cover at the upper end and displace water from the materials into the said channels in the cover.

5. A washing machine, comprising a tub, a cylinder arranged within said tub having ports at the bottom thereof communicating with the interior of the tub, a cover sealing the top of said cylinder having channels therein communicating with a discharge, a perforated sheet covering said channels on the inner side of said cover and through which said channels communicate with the cylinder interior, a piston operating in said cylinder to compress materials against said perforated cover, and means for effecting said operation of the piston, said piston being operable with a back and forth reciprocating movement to force fluid in a cleansing action back and forth through said ports between the cylinder and tub interiors.

6. A washing machine, comprising a tub having a raised central portion, a rigid plate fitted into the underside of said raised central portion, a standard supporting said rigid plate and having a cylindrical bore therein, a piston operating in said bore and having a rod extending through said central plate, means for pressure operating said piston, a piston mounted on the rod of the aforesaid piston and disposed within the tub, a cylinder secured to the raised portion of said tub and encircling the latter piston, and a perforated cover for the cylinder within the tub.

7. A washing machine, comprising a tub, a cylinder mounted centrally within said tub, a standard supporting said tub centrally, a piston operating in said cylinder having a hollowed top, a flexible sealed rubber container arranged in the hollow top of said piston and containing a non-compressible fluid, means for operating said piston, and a perforated cover enclosing said cylinder.

8. A washing machine, comprising a circular base, a tubular standard mounted on said base and forming a pressure cylinder, a piston reciprocable in said pressure cylinder, a vertical pressure pump connected with the opposite ends of said pressure cylinder adapted to direct fluid pressure alternately to the respective ends of the cylinder to impart a reciprocating motion to said piston, means for operating said pump, a tub mounted on the standard, a cylinder arranged centrally within said tub and having ports at the bottom opening outwardly therefrom into said tub, a piston operating within the upper cylinder, a piston rod rigidly connecting said pistons, and a closure for the cylinder within the tub.

9. A washing machine as claimed in claim 7 in which the perforated underside of said cylinder cover is concaved and the flexible sealed rubber container presents a diaphragm-like upper wall normally convexed to conform to the curvature of the underside of the perforated cover.

10. A washing machine as claimed in claim 5 in which the cover discharge opening is of tubular form and adapted to receive a hose to direct the

water forced into the cover channels clear of the wash tub interior.

11. A washing machine as claimed in claim 5 in which said cover is provided with a water inlet extending therethrough for directing fresh rinsing water into the cylinder above the piston therein.

12. A washing machine as claimed in claim 5 in which a nozzle passage extends through said cover at an angle to the cylinder wall to direct a clean stream of rinsing water to impinge angularly against the cylinder wall above the piston whereby it exerts a turning influence to the materials in the cylinder.

13. A method of cleaning fabrics in a body of liquid, consisting in alternately forcibly projecting a quantity of cleaning fluid horizontally to flow in physical contact with the underside of a body of fabrics producing a tumbling movement of the fabrics, and then forcibly drawing the cleaning fluid downwardly through the fabrics.

14. A method of cleaning fabrics, consisting in immersing the fabrics in a cleaning fluid, then alternately forcibly drawing a portion of the fluid through the fabrics and violently discharging the withdrawn fluid in a horizontal annulus to engage the under portion of the fabrics moving the same horizontally and imparting a tumbling movement to the entire body of fabrics.

15. A method of cleaning fabrics, consisting in positively driving an annular sheet of cleaning fluid through and under an immersed body of fabrics, directing the flow of said driven fluid upwardly around the said body of fabrics, and withdrawing a quantity of the fluid through the fabrics after the driving impulse has ceased.

16. A method of cleaning fabrics consisting in first applying a forceful impulse to a body of cleaning fluid, discharging it in a substantially horizontal direction into engagement with and under a body of fabrics, diverting the flow of the fluid from its initial horizontal direction upwardly around the outer side of said body of fabrics to ultimately fall inwardly over the fabrics, and after the initial impulse has ceased drawing the fluid downwardly through the entire body of fabrics.

17. A washing machine comprising a tub, a cylinder having ports directing a lateral flow of fluid into the tub above the bottom thereof, a perforated screen arranged above the bottom of the tub and having a part substantially in line with the bottom of said ports, and a piston in said cylinder adapted to be operated to force the fluid outwardly from said ports and to draw the fluid downwardly through said screen.

18. A tub having a substantially annular port arranged centrally to direct the flow of fluid radially over the bottom, a pressure chamber connected with said port and having imperforate side walls, and means for drawing a cleansing fluid through said port into the pressure chamber and discharging same through said port.

19. A washing machine comprising a tub having the bottom curving upwardly and outwardly to join the side wall, a perforated screen spaced above said bottom and flared upwardly and outwardly to the curved wall of the tub, a cylinder having ports to direct a lateral flow of fluid into the tub over the upper surface of the perforated screen, and a piston in said cylinder adapted to be operated to force the cleaning fluid outwardly from said ports and to draw the fluid back through said ports.

20. A washing machine, comprising a tub, a cylinder having ports arranged to discharge into said tub, means for closing the top of the cylinder, a piston adapted to be operated to discharge and draw fluid into and from the tub through said ports to cleanse fabrics in the tub and to squeeze fabrics enclosed in the top of the cylinder, and means for operating said piston in said cylinder at fast and slow speeds to accomplish the cleansing of the fabrics and the squeezing of the liquid therefrom respectively.

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