

July 28, 1925.

1,547,266

R. S. ROBE

WASHING MACHINE

Filed Dec. 13, 1924

2 Sheets-Sheet 1

Fig. 1.

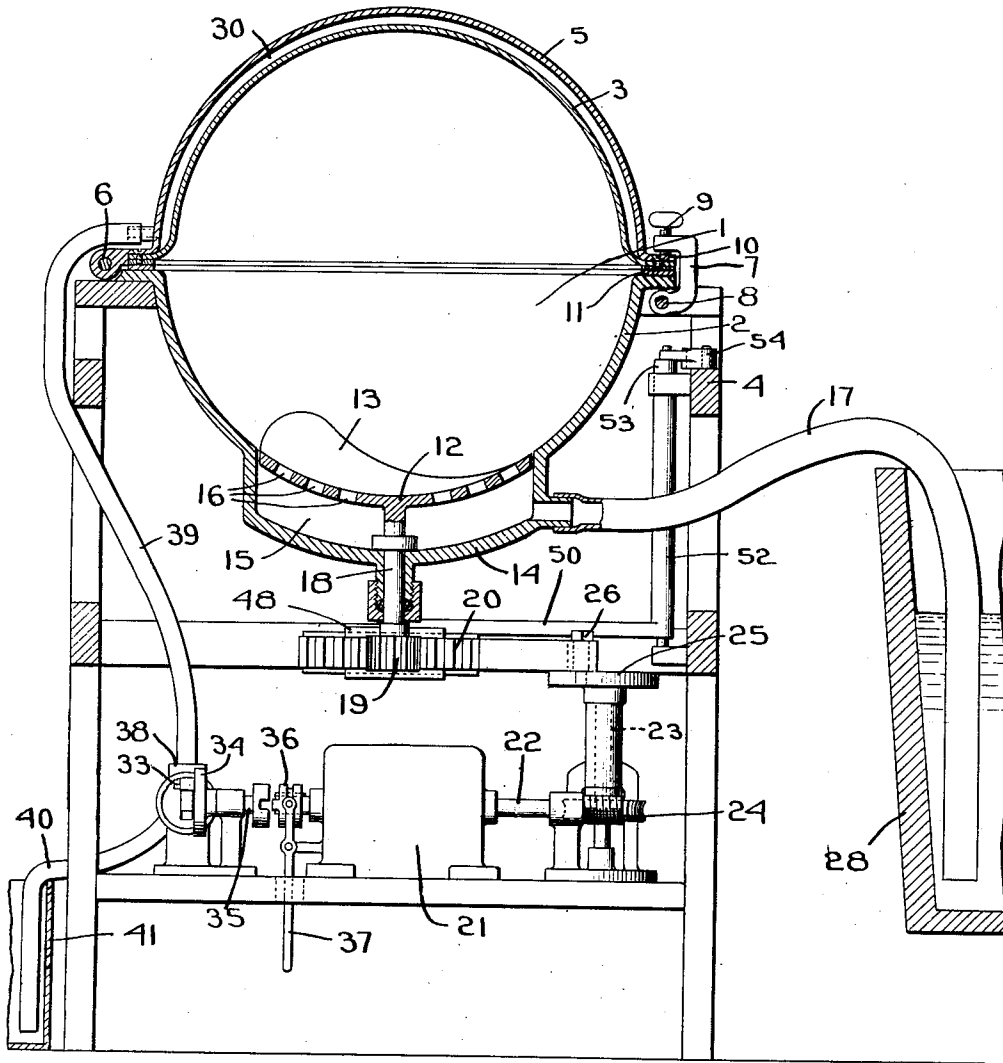
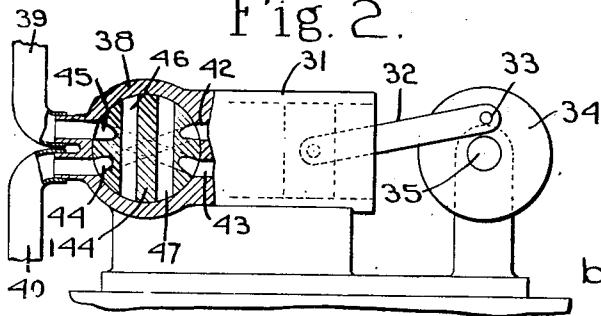


Fig. 2.



Inventor.
Robert S. Robe
by *Heard Smith & Tennant*
Attys.

July 28, 1925.

1,547,266

R. S. ROBE

WASHING MACHINE

Filed Dec. 13, 1924

2 Sheets-Sheet 2

Fig. 3.

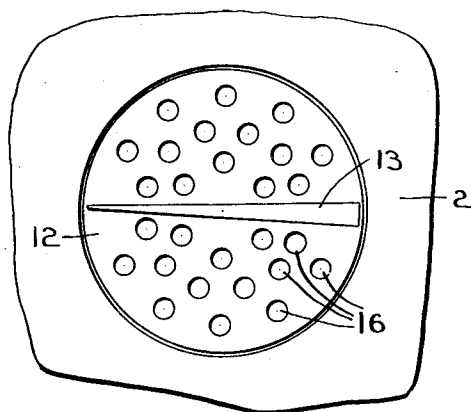
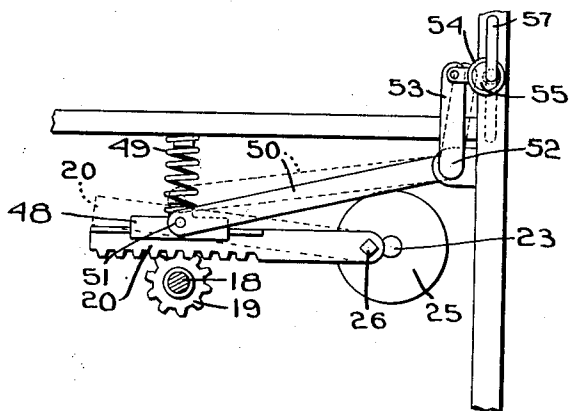


Fig. 4.



Inventor.
Robert S. Robe
by *Harold Smith & Tennant*
Attys

Patented July 28, 1925.

1,547,266

UNITED STATES PATENT OFFICE.

ROBERT S. ROBE, OF WATERTOWN, MASSACHUSETTS.

WASHING MACHINE.

Application filed December 13, 1924. Serial No. 755,646.

To all whom it may concern:

Be it known that I, ROBERT S. ROBE, a citizen of the United States, and resident of Watertown, county of Middlesex, State of Massachusetts, have invented an Improvement in Washing Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to washing machines and particularly to washing machines that are designed to be used for laundry purposes.

One type of washing machine which is now in common use is provided with an oscillatory agitating member in the bottom of the clothes-receiving compartment having one or more projections whereby the oscillating movement of the agitator agitates the clothes and also forces the washing water back and forth through the clothes.

My present invention relates to a washing machine of this type and has for one of its objects to provide a novel washing machine which is equipped with the agitating member and which is so constructed that the clothes may be washed, rinsed, blued and wrung or brought to a semi-dried condition without removing them from the clothes-receiving compartment and without the necessity of handling them in any way.

This end is accomplished by employing an expansible and contractible clothes-receiving compartment which is provided with the agitating member and by further employing means to contract the chamber under relatively high pressure thereby to force the washing water therefrom and subject the clothes to a sufficient pressure to bring them to the semi-dried condition.

The apparatus is also arranged so that the expanding movement of the clothes-receiving compartment will operate to draw water thereinto and in using the device the clothes to be washed are first placed in the clothes-receiving compartment and then the latter is expanded thus producing suction therein which draws washing water into the compartment from a suitable source of supply. When sufficient washing water has been thus introduced into the compartment the agitator is set in operation and the clothes are subjected to the washing operation. When the clothes have been suffi-

ciently washed the agitator is stopped and the chamber is contracted under relatively high pressure thus forcing the washing water out from the chamber and subjecting the clothes to sufficient pressure to bring them to a semi-dried condition. If the clothes are to be rinsed then the chamber is again expanded to draw rinsing water thereinto and after they have been agitated for a sufficient length of time the chamber is again contracted to squeeze the clothes to a semi-dried condition. The same operation may be repeated if it is desired to blue the clothes.

In order to give an understanding of the invention I have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a sectional view of a washing machine embodying my invention;

Fig. 2 is a side view of the pump for expanding and contracting the clothes-receiving chamber, said view showing the controlling valve in section;

Fig. 3 is a fragmentary view showing the agitator in plan view;

Fig. 4 is a fragmentary view showing the means for rendering the agitator operative or inoperative.

The clothes-receiving chamber is indicated at 1 and it is formed by a stationary section 2 and a movable section 3, the movement of the section 3 toward and from the section 1 providing for the contraction and expansion of the chamber 1. The fixed section 2 is shown as supported on a suitable framework 4 and it may have any desirable shape. In the construction shown it is semi-spherical but I wish to state that the invention is not at all dependent upon the particular shape of the member 2. The movable section 3 is herein shown in the form of a diaphragm which is secured at its periphery to the peripheral portion of a cover section 5 that is also herein illustrated as semi-spherical in shape, although its shape may be varied without departing from the invention.

The cover section 5 and fixed section 2 are hinged together as shown at 6 and since the movable wall 3 of the clothes-receiving compartment is carried by the cover section the swinging of the cover section upwardly on its pivot 6 will serve to open the clothes-

receiving compartment to permit clothes to be placed in the compartment 1 or removed therefrom.

When the machine is being used the cover section 5 is locked in its closed relation as shown in Fig. 1 thus making a closed clothes-receiving compartment. For thus locking the cover closed I have shown a clamping member 7 which is pivoted to the frame at 8 and which is provided with a clamping screw 9 adapted to engage a flange 10 on the cover section 5. A suitable gasket 11 will preferably be employed between the cover section and the fixed section 2 for the purpose of making a tight joint when the cover is locked.

The agitator member is indicated at 12 and preferably forms a section of the wall of the chamber 1 which is mounted for oscillatory movement and which is provided with a fin or flange 13 rising therefrom which operates during the oscillatory movement of the member 12 to agitate the clothes and to force the washing water back and forth through them.

The section 2 of the chamber is formed with an extension 14 directly beneath the agitator member 12, said extension providing a chamber 15 which communicates with the clothes-receiving chamber 1 through apertures 16 formed in the agitator member. This chamber 12 has a pipe connection 17 connected thereto through which washing water may be introduced into the compartment 1 or discharged therefrom as will be presently described.

Any suitable means for oscillating the agitator member 12 may be employed. In the construction herein shown said member 12 has a shaft 18 depending therefrom which extends through the chamber 15 and extension 14 and is provided on its end with a pinion 19 which is adapted to mesh with a rack 20. This rack has a reciprocating motion which is derived from a motor 21, the shaft 22 of the latter being geared to a vertical shaft 23 through suitable worm gearing 24 and the shaft 23 carrying at its upper end a crank disk 25 having a crank pin 26 to which the end of the rack 20 is connected. The rotation of the crank disk 25 thus reciprocates the rack 20 and produces the oscillatory movement of the agitator 12.

The pipe 17 may conveniently be a flexible pipe or hose so that the end 27 thereof may be introduced into a set tub 28 or any other container adapted to contain washing water. The introduction of washing water into the chamber 1 is accomplished by moving the wall 3 thereof upwardly thereby expanding the chamber and producing suction therein which will operate to draw the washing water from the container 28 through the pipe 17 into the com-

partment 1. The discharge of the washing water from the chamber 1 is secured by moving the wall 3 downwardly thereby to contract the chamber and if during this movement the wall is subjected to considerable pressure the washing water will not only be forced from the compartment 1 but the clothes will be squeezed sufficiently to bring them to a semi-dried condition.

In the present embodiment of the invention the contracting movement of the compartment 1 is accomplished by pumping water or some other fluid into the space 30 between the cover section 5 and the diaphragm 3, this operation forcing the diaphragm or wall downwardly thereby contracting the chamber 1. The expansion of the chamber is accomplished by the reverse operation of pumping the liquid out of the chamber 30 thereby to produce a suction therein which will draw the diaphragm or wall 3 upwardly. While this transfer of fluid into and out of the chamber 3 may be accomplished in various ways without departing from the invention I have herein shown for this purpose a pump which may be operated from the motor 21. Such a pump is indicated at 31 and it may have any appropriate construction, it having an inlet port 42 and a discharge port 43. The movable element of the pump is connected by a link 32 to a crank pin 33 on a crank disk 34 that is fast on a shaft section 35 which may be coupled to the motor shaft by a suitable clutch 36.

37 indicates a controlling handle by which the clutch can be operated. The clutch 36 and the controlling handle 37 constitute a control device by which the pressure which is developed in the chamber 30 can be controlled. In operating the device the clutch 36 will be thrown out of engagement whenever the desired pressure in the chamber 30 is reached.

This pump 31 is used for both pumping fluid into the chamber 30 and withdrawing it therefrom. Said chamber 30 is connected to the pump by a pipe connection 39 and another pipe connection 40 is employed leading from the pump to a suitable receptacle 41 containing water or some relatively non-compressible fluid.

For reversing the action of the pump I propose to employ a reversing valve 38 by means of which the inlet 42 of the pump may be connected with either the pipe 40 or the pipe 39, the discharge port being connected to the other pipe. The valve 38 is provided with a turnable ported plug 144 and when this plug is set, as shown in Fig. 2, the inlet 42 of the pump is connected to the pipe 40 through the port 44 while the discharge 43 of the pump is connected to the pipe 39 through the port 45.

When the valve is reversed then the inlet

port 42 of the pump is connected with the pipe 39 through the valve port 46 while the discharge port of the pump is connected with the pipe 40 through the valve port 47.

5 With the valve arranged as shown in Fig. 2 the pump will operate to suck water or other fluid from the tank 40 and pump it into the chamber 30 thereby forcing the wall or diaphragm 3 downwardly and contracting the chamber 1. When the valve is reversed, 10 however, the pump will withdraw water from the chamber 30 and deliver it back into the receptacle 41 again.

15 The pump is constructed to deliver water to the chamber 30 under a sufficiently high pressure to squeeze the clothes to a semi-dried condition.

20 The means for operating the agitator is constructed so that it can be rendered inoperative at the time that the clothes-receiving chamber is being expanded or contracted. This is accomplished by providing means for throwing the rack 20 into or out of mesh with the pinion 19.

25 The rack 20 reciprocates in a guide member 48 which is backed by an expanding spring 49 that tends to move the rack toward and into mesh with the pinion 19. For disconnecting the rack from the pinion 30 I provide means for shifting the guide member away from the pinion into the dotted line position Fig. 4, this movement carrying the rack out of mesh with the pinion.

35 The guide member has an arm 50 pivotally connected thereto at 51, said arm being fast on a vertical rock shaft 52 which is journaled in the bearings in the frame. The upper end of the rock shaft has fast thereon an arm 53 which is connected to 40 an eccentric sleeve 54 surrounding an eccentric 55 that is mounted on a stud or pin 56 carried by the frame. This eccentric has a handle 57 by which it may be turned.

45 The turning of the eccentric from the full to the dotted line position actuates the rock shaft 52 and thereby swings the arm 50 into the dotted line position against the action of the spring 49 which will withdraw the rack from its intermeshing engagement with 50 the pinion. When the eccentric is in the full line position the rack is held in mesh with the pinion 19 through the action of the spring 49.

55 In the operation of the device the cover 5 is first raised and the clothes to be washed are introduced into the chamber 1 after which the cover 5 is closed and locked in place. The hose 17 is then connected to the container 28 containing washing water 60 and the clutch 36 is thrown into engagement thereby to operate the pump 31.

65 The valve 38 is adjusted so that the pump will force water into the chamber 30 and thereby contracting the clothes-receiving compartment 1, which operation will force

the air out of the compartment. The valve 38 is then reversed and the pump will operate to draw water out of the compartment 30 thus expanding the clothes-receiving compartment 1 and this expansion will draw 70 washing water from the container 28 into said compartment through the hose pipe 17. During this operation the rack 20 is disengaged from the pinion 19 and the agitator is, therefore, inactive. 75

When sufficient water has been drawn into the compartment 1 then the clutch 36 is disengaged so as to stop the action of the pump and the agitator is started up by throwing the continuously-reciprocating rack into en- 80 gagement with the pinion 19. The action of the agitator results in agitating the clothes and forcing the water through them thus accomplishing the washing operation. When the clothes have been sufficiently washed the 85 agitator is stopped by disconnecting the rack 20 from the pinion 19, the pump is set in operation and the valve 38 so adjusted as to cause water to be pumped into the chamber 30 which will result in contracting the 90 clothes-receiving compartment 1 and forcing the washing water out of it and also subjecting the clothes to considerable pressure. The pipe connection 17 may then be connected to another container containing rins- 95 ing water and the action of the pump again reversed thereby causing the chamber 1 to expand. This will result in drawing the rinsing water into the clothes-receiving com- 100 partment and when sufficient amount of rinsing water has been thus introduced the pump is stopped and the agitator is again set in motion to agitate the clothes for the rinsing operation. After the clothes 105 have been sufficiently rinsed the agitator is stopped and the chamber 1 is again contracted to force the rinsing water out from it and to again compress the clothes.

If a blueing operation is desired the above-described steps are repeated. 110

At the end of the rinsing or blueing operation the clothes are subjected to the relatively high pressure by the contracting action of the compartment 1 which expresses 115 most of the water therefrom and leaves them in a semi-dried condition and ready to be hung out on the line. It will thus be seen that the entire operation of introducing the water into the clothes-receiving compartment, washing the clothes, discharging the 120 water from the compartment and bringing the clothes to a semi-dried condition ready to be hung on the line is accomplished without any manual labor in the way of handling the clothes or water. 125

I claim:

1. In a washing machine, the combination with an expansible and contractible clothes-receiving chamber having a port through which washing water is discharged, of means 130

to agitate the clothes in said chamber, and means to contract said chamber thereby to force the washing water therefrom and subject the clothes to sufficient pressure to bring
5 them to a semi-dried condition.

2. In a washing machine, the combination with an expansible and contractible chamber, of a pipe connected to said chamber, means to expand said chamber thereby to
10 draw washing water thereinto through the pipe and to contract said chamber thereby to force said water therefrom, and means to agitate the clothes in the chamber.

3. In a washing machine, the combination
15 with an expansible and contractible chamber to receive the clothes to be washed, of means to agitate the clothes in said chamber, a pipe connected to said chamber, means to expand said chamber thereby to draw washing water
20 thereinto through the pipe and to contract said chamber thereby to force the washing water from the chamber, said means including a control device by which the pressure with which said chamber is contracted may
25 be varied.

4. In a washing machine, the combination with an expansible and contractible clothes-receiving compartment, of an oscillatory agitator for agitating the clothes in said
30 compartment, actuating means to oscillate the agitator, means to render said actuating means operative or inoperative, and means to contract said chamber thereby to force washing water therefrom.

5. In a washing machine, the combination 35 with an expansible and contractible clothes-receiving compartment, of an oscillatory agitator for agitating the clothes in said compartment, actuating means to oscillate the agitator, means to render said actuating
40 means operative or inoperative, means to contract said chamber, and a control device for regulating the degree of pressure with which said chamber is contracted.

6. In a washing machine, the combination 45 with a casing, of a diaphragm extending across the same, the space on one side of the diaphragm constituting a clothes-receiving compartment, means for forcing a fluid into the space on the other side of the diaphragm
50 or to withdraw it therefrom thereby to contract or expand the clothes-receiving compartment, and means to agitate the clothes in the clothes-receiving compartment.

7. In a washing machine, the combination 55 with a casing, of a diaphragm extending across the same, the space on one side of said diaphragm constituting a clothes-receiving compartment and having a pipe connected thereto, means to pump a fluid into and out
60 of the chamber on the other side of said diaphragm, whereby the clothes-receiving compartment is contracted and expanded, and an oscillatory agitator for agitating the clothes in the clothes-receiving compartment. 65

In testimony whereof, I have signed my name to this specification.

ROBERT S. ROBE.