Jan. 10, 1933. C. W. FOSTER 1,893,797

WASHING MACHINE

Filed Nov. 10, 1930 2 Sheets-Sheet 1

Fig 1

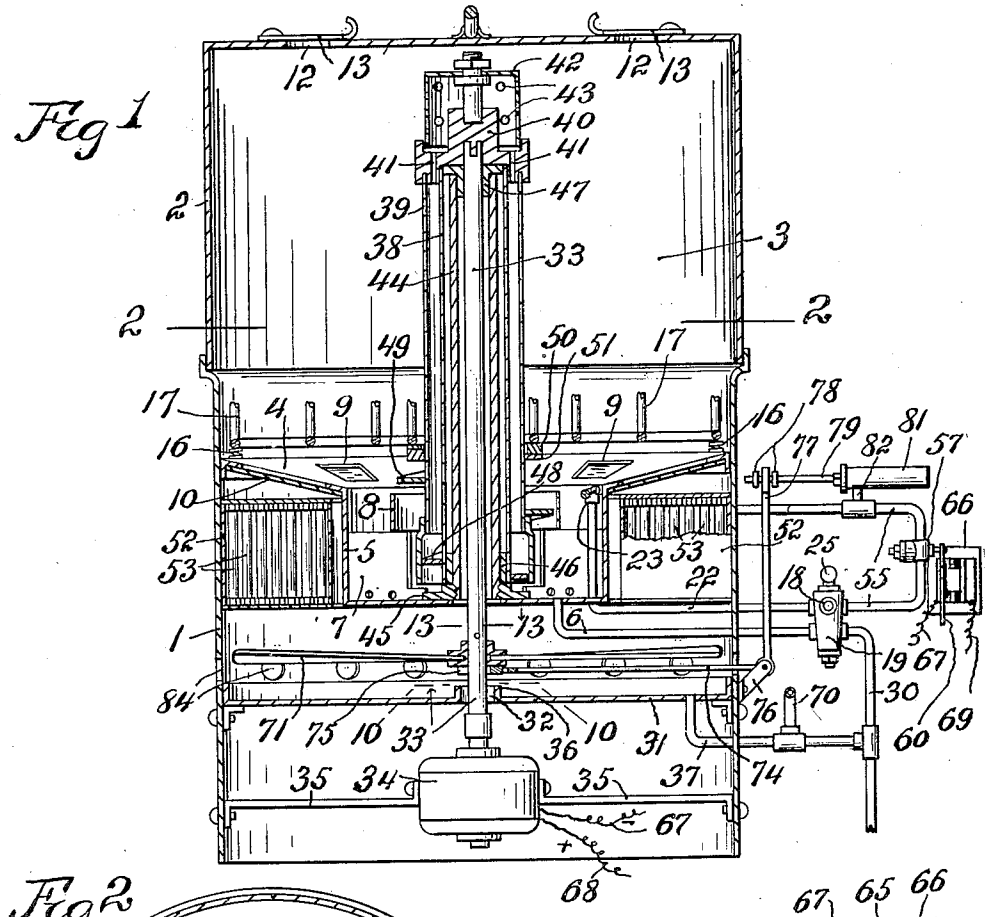


Fig 2

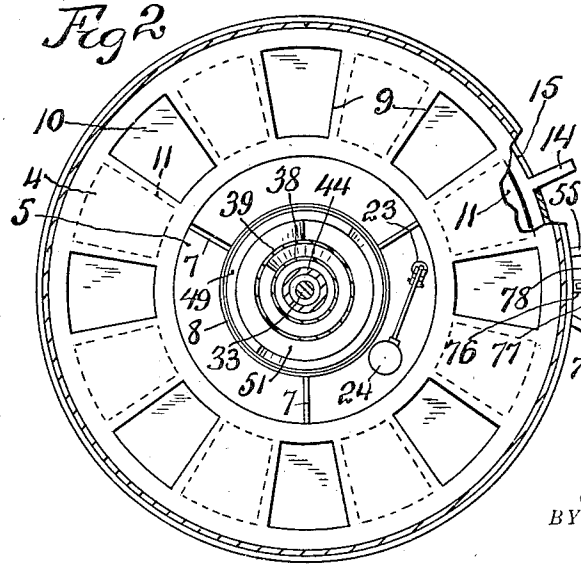
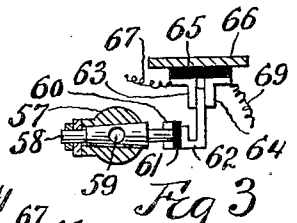


Fig 3



INVENTOR

BY Charles W. Foster

Warren W. House.

His ATTORNEY

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Fig 4

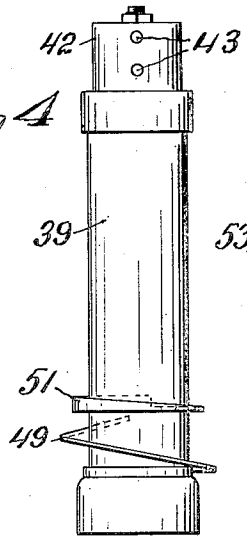


Fig 5

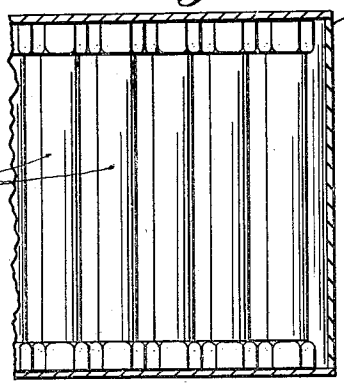


Fig 6

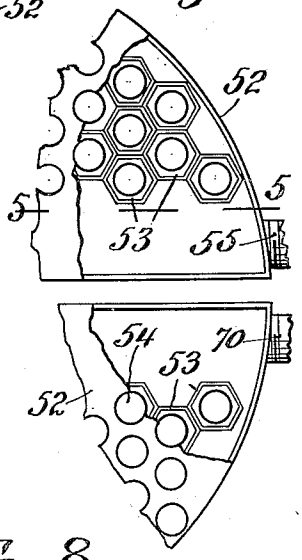


Fig 7

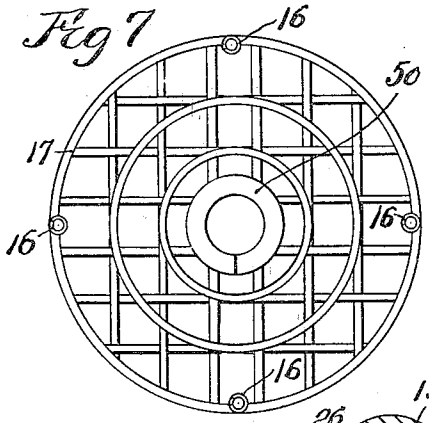


Fig 8

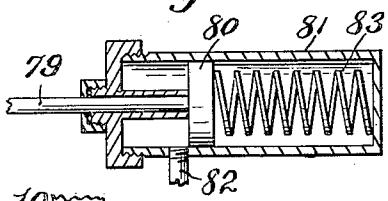
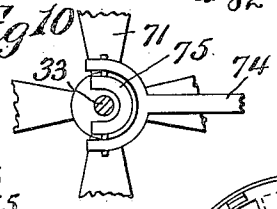


Fig 10



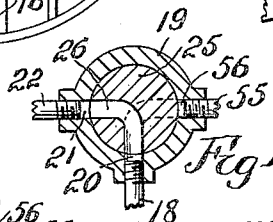


Fig 9

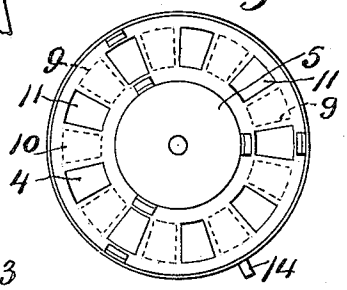


Fig 11

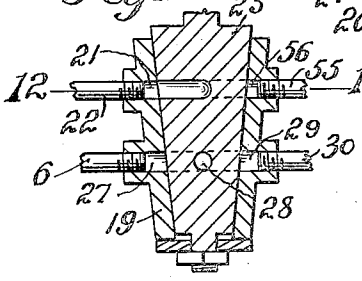


Fig 12

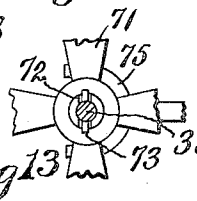


Fig 13

INVENTOR

Charles W. Foster

BY

Warren D. House.

His ATTORNEY

Patented Jan. 10, 1933 1,893,797

UNITED STATES PATENT OFFICE

CHARLES W. FOSTER, OF KANSAS CITY, MISSOURI

WASHING MACHINE

Application filed November 10, 1930. Serial No. 494,651.

My invention relates to improvements in washing machines. It is particularly well adapted for use in washing dishes.

One of the objects of my invention is to provide a novel washing machine by which articles may be washed and then quickly dried.

A further object of my invention is to provide novel means for effecting a circulation of hot water in contact with the articles washed.

Still another object of my invention is the provision of novel means by which heated air may be blown through the machine to quickly dry the articles washed, and automatic means by which on the closing of a circuit the blowing means may be put into operation, and hot water discharged through a novel radiator disposed so as to heat the air so blown.

Another object of my invention is the provision of novel means for effecting a vibrating action upon the articles that are being washed.

Still another object of my invention is the provision of a novel washing and drying machine, which is simple, cheap to make, durable, strong, not likely to get out of order, which is easily operated, and which is efficient in its operation.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings, which illustrates the preferred embodiment of my invention,

Fig. 1 is a central vertical sectional view, partly broken away, of my improved washing and drying machine, the parts being shown arranged for the washing operation.

Fig. 2 is a section, partly broken away, on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged cross sectional view through the circuit closing valve and circuit closer, the valve being shown open and the circuit closer closed.

Fig. 4 is an elevation of the rotary tubular conductor which is carried by the driving shaft of the machine and which discharges water upwardly into the washing chamber, and parts connected to said conductor.

Fig. 5 is an enlarged section on the line 5—5 of Fig. 6.

Fig. 6 is a top view, partly broken away and enlarged, of the radiator.

Fig. 7 is a bottom view, reduced, of the article supporting member and its supporting coil springs.

Fig. 8 is a vertical enlarged longitudinal sectional view of a portion of the pressure actuated mechanism which engages operatively the fan with the driving shaft, the cylinder and piston therein being the parts shown, on the line 8—8 of Fig. 2.

Fig. 9 is a reduced under view of the bottom portion of the washing chamber and of the shutter mounted thereon.

Fig. 10 is a section, looking upwardly, on the line 10—10 of Fig. 1.

Fig. 11 is an enlarged section, partly broken away, on the line 11—11 of Fig. 2.

Fig. 12 is a section on the line 12—12 of Fig. 11.

Fig. 13 is a section, looking downwardly, on the line 13—13 of Fig. 1.

Similar reference characters designate similar parts in the different views.

1 designates the bottom portion of a casing adapted to be closed at its open upper portion by a removable cover 2.

In the portion 1 is a washing and drying chamber 3 having an inclined bottom portion 4 the lower inner edge of which terminates at the upper edge of a cylindrical portion 5 adapted to hold water and having a bottom outlet discharging into a drain pipe 6, Fig. 1.

Extending inwardly from the outer side of the portion 5 are baffle plates 7 on which is supported a baffle ring 8. The inclined bottom portion 4 has a circular row of holes 9 adapted to be closed by a revoluble shutter 10 mounted on the under side of the portion 4 and having holes 11 adapted to register with the holes 9 to permit air, which has been heated, to pass upwardly through the chamber 3, and through holes 12 in the cover 2, the latter having on its top closures 13 adapted to respectively close the holes 12.

The shutter 10 has a lateral handle 14 which extends through a slot 15 in the casing, the handle, when turned counterclockwise,

as viewed in Fig. 2, serving to turn the shutter 10 from the closed position to the open position.

Supported on the inclined portion 4 are vertical coil springs 16 upon the upper ends of which rests a wire basket 17 which serves as a supporting member for articles, such as dishes, not shown, which are to be washed and dried.

For supplying hot water to the washing chamber 3, there is provided a source of hot water supply which includes a pipe 18, Figs. 1, 2 and 12, and which includes a valve casing 19 having an inlet 20 into which the pipe 18 extends, and having an outlet 21 into which extends one end of a water conductor 22, the other end of which is located in the chamber 3 and is provided with a shut off valve of usual construction and designated by 23, and which is attached to a float 24 adapted, when lifted, to close the valve 23.

Revoluble in the valve casing 19 is a valve 25, Figs. 11 and 12, which has a right angle passage 26 adapted, as shown in Figs. 11 and 12 to have its ends respectively register with the inlet 20 and outlet 21, thus permitting hot water to pass from the supply pipe 18 through the casing 19 and passage 26 into and through the conductor 22, from which the hot water is discharged into the chamber 3, the hot water collecting in said chamber 3, when the drain pipe 6 is closed, until the water level is such that the float 24 will close the valve 23.

For closing the drain pipe 6 its discharge end is fitted in an inlet 27 in the valve casing 19, which inlet is adapted to register with a passage 28 in the valve 25, said passage 28 being adapted to register with an outlet 29 in the casing 19, which outlet has fitted in it a drain pipe 30, Figs. 1 and 11.

The passage 28 is disposed so as to be disconnected from the inlet 27 and outlet 29, when the valve 25 is in the position shown in solid lines in Fig. 12, in which position the passage 26 connects with the outlet 21. When the valve 25 is turned to the position shown in dotted lines in Fig. 12, the passage 28 will register with the inlet 27 and outlet 29, as shown in dotted lines in Fig. 11.

In the casing portion 1 below and spaced from the bottom of the chamber 3 is a false bottom 31, Fig. 1, having a central hole 32 through which vertically extends an armature shaft 33 of an electric motor 34, which is supported by bars 35 attached to the inner side of the casing portion 1 below the false bottom 31. To prevent water dripping onto the motor 34, the false bottom 31 has around the hole 32 an annular flange 36.

A drain pipe 37 has one end fitted in a hole in the false bottom 31, the other end of the pipe 37 being connected to the drain pipe 30, Fig. 1.

For forcing the water in the cylindrical portion 5 of the chamber 3 upwardly, and for discharging such raised water over the articles supported by the basket 17, there is provided a tubular vertical water conductor comprising two vertical tubes 38 and 39 one inside the other and having mounted on them a head 40 having vertical openings 41 communicating with the space between the tubes 38 and 39, and having loosely revoluble thereon a nozzle comprising a cap 42 having lateral discharge openings 43, Fig. 1.

Encircling the shaft 33 within the inner tube 38 is a stationary vertical tube 44, the lower end of which is mounted in a ring 45 secured to the bottom of the cylindrical portion 5 of the chamber 3. Encircling the tube 44 is a bearing ring 46 which is adjacent to the lower end of the tube 44. Mounted in the upper end of the tube 44 is a plug 47. The periphery of the plug 47 and the ring 46 have revoluble on them the inner tube 38 of the water conductor.

For forcing water upwardly between the tubes 38 and 39 there is provided in the space between the tubes 38 and 39 near their lower ends and carried thereby a spiral water impeller 48 adapted, when said tubes 38 and 39 are revolved counterclockwise, as viewed in Fig. 2, to force water upwardly between the tubes 38 and 39, through the openings 41 into the cap 42, from which the water is discharged laterally in the upper portion of the chamber 3, and falls upon the articles carried by the basket 17.

For forcing water upwardly at the outer side of the tube 39, the latter has fastened to its periphery within the baffle ring 8 a spiral impeller 49, Fig. 1, having a lead in the same direction as the impeller 48.

To vertically vibrate the basket 17 it has fastened centrally to its under side a circular cam 50 which rests on the upper side of a circular cam 51 fastened on the periphery of the tube 39, Figs. 1, 4 and 7.

As the tube 39 revolves, the cam 51 operating on the cam 50 will lift the basket 17 and then permit it to lower once during each revolution of the tube 39. The basket 17 in lowering will be prevented from hard jolts by the coil springs 16 which will be compressed by the basket.

In the revolving of the shaft 33, and tubes 38 and 39 therewith, the cap 42 will be revolved but more slowly than the tubes 38 and 39.

In the washing operation, the closures 13 are shut, as is the shutter 10. The valve 25 is turned to the position shown in solid lines in Figs. 11 and 12, thus shutting off the drain pipe 6. The water will pass from the supply pipe 18 through the valve casing 19 and valve 25 into the conductor 22 and out of the valve 23 into the chamber 3 until the water level rises so as to cause the float 24 to close the valve 23.

The motor 34 will be operated, thus revolving the shaft 33, which will, through the head 40 rotate the tubes 38 and 39, and with them the impellers 48 and 49, thus causing the water to be forced upwardly by the said impellers, at the inner and outer sides of the tube 39.

When the washing operation has been completed, the valve 25 is turned to the position shown in dotted lines in Figs. 11 and 12, thus shutting the water from the conductor 22, and opening the drain pipe 6, so that the water will run from the chamber 3, through the pipe 6 valve 25 and casing 19 into the drain pipe 30.

For drying the articles which have been washed, heated air is blown against the said articles in the chamber 3. For heating and blowing the heated air through the chamber 3, there is provided a radiator comprising a casing 52 in the casing portion 1 and partly encircling the cylindrical portion 5 under the inclined portion 4. Vertical air conducting tubes 53 are mounted in the casing 52 and extend from the bottom to the top of said casing, the said bottom and top having holes 54, Fig. 6, which register with the tubes 53.

The tubes 53 are heated by hot water introduced into the casing 52 through a conductor 55, Figs. 1 and 6, which is fitted in an outlet 56 in the valve casing 19, which outlet 56 is adapted to communicate with the passage 26 of the valve 25, when the latter is turned to the position shown in dotted lines in Figs. 11 and 12.

The conductor 55 includes a valve casing 57, Figs. 1 and 3, in which is revolubly mounted a valve 58 having a passage 59 adapted to be disposed in the open position, shown in Fig. 3, or to be closed, when the valve is turned to the closed position.

The valve 58 has a handle 60, which carries insulation 61 to which is fastened a conductive plate 62 adapted, when the valve 58 is moved to the open position, shown in Figs. 1 and 2, to pass between and engage two electrical contacts 63 and 64 of a circuit closer, said contacts being mounted on insulation 65 mounted on a supporting plate 66, Figs. 1 and 3.

An electrical conductor 67 connects the contact 63 with one terminal of the motor 34, the other terminal of which is connected by a conductor 68 with a source of current supply, not shown. The other contact 64 is connected by a conductor 69 with said source of current supply.

The casing 52 of the radiator has connected to it near its bottom a drain pipe 70, Figs. 1 and 6, which discharges into the drain pipe 37.

When the valve 58 is turned to the open position, shown in Figs. 1 and 3, the circuit in which the motor 34 is located will be closed, through the conductors 67, 68 and 69, contacts 63 and 64 and plate 62, and the motor 34 will operate and drive the shaft 33.

If now the valve 25 is turned to connect the passage 26 with the conductor 55 and the inlet 20, hot water will pass from the supply pipe 18 through the conductor 55 into the casing 52, thus heating the tubes 53.

To permit air to be blown through the tubes 53 and into and through the chamber 3, the shutter 10 is opened, as are the closures 13.

Normally revoluble on the shaft 33 is a fan 71, Fig. 1, which fan is vertically slidable on the shaft 33. The upper end of the hub of the fan 71 has a transverse groove 72 adapted to receive the projecting ends of a transverse pin 73 in the shaft 33, Figs. 1 and 13.

To lift the fan 71 so as to have its hub operatively engage the pin 73, one arm 74 of a right angle lever has a bifurcated end pivoted to diametrically opposite edges of an arcuate plate 75, which is adapted to bear against the under side of the hub of the fan 71 so as to lift the latter, when the arm 74 of the lever rises. Said lever is pivoted at its angle to a bracket 76 mounted on the outer side of the casing portion 1, Fig. 1. The other arm 77 of said right angled lever extends upwardly and has a bifurcated upper end disposed between two collars 78 on a horizontal piston rod 79, Figs. 1, 2 and 8.

To the inner end of the piston rod 79 is fastened a piston head 80 which is reciprocatively fitted in a horizontal cylinder 81, to which, at the left of the piston head 80, Fig. 8, is connected a pipe 82 which connects with the water conductor 55, Fig. 1.

A coil spring 83 in the cylinder 81 bears against the right head, as viewed in Fig. 8, of the cylinder 81 and against the piston head 80, and normally forces the said head 80 and piston rod 79 outwardly, whereby the collars 78 on the piston rod 79 will swing the arm 77 of the lever so as to cause the other lever arm 74 to lower, and with it the arcuate plate 75, thus permitting the fan 71 to lower by gravity on the shaft 33.

When the valve 58 is open, as shown in Fig. 3, the hot water in the conductor 55 will pass through the pipe 82 into the cylinder 81, and the pressure thus exerted in the cylinder 81 will cause the piston head 80 to move to the right, as viewed in Fig. 8, thus compressing the spring 83 and forcing the piston rod 79 also to the right, whereby the collars 78 on the piston rod will swing the right angled lever 74—77 so as to lift the arcuate plate 75 and cause the fan 71 also to be lifted into driving engagement with the pin 73. The motor at the time is revolving the shaft 33, so that the fan 71 will also be revolved and will force air upwardly through the heated tubes 53 and through the holes 11 in the shutter 10, and through the holes 9 in

the inclined portion 4, and thence through the chamber 3 and out the openings 12. The articles in the chamber 3 will thus be quickly dried.

For supplying the space between the radiator casing 52 and the false bottom 31 with fresh air, the casing portion 1 has air inlet openings 84 communicating with said space, Fig. 1.

After the articles have been dried and removed from the machine, and are replaced by other articles to be washed, the valve 25 is again turned to the position shown in Figs. 11 and 12 in solid lines, and in Figs. 1 and 2, thus shutting off the supply of hot water to the conductor 55, and again connecting the conductor 22 and shutting off the drain conductor 6.

Water will thus again be supplied to the chamber 3 and the water therein will be discharged over the articles on the basket 17, as has been described, the motor 34 effecting the operation of the impellers 48 and 49. The valve 58 is left in the open position, thus causing the circuit in which the motor 34 is located to remain closed. The shutter 10 and closures 13 are again closed, and the operation of washing is again effected as has been described, following which the valve 25 will be again turned to the position shown in dotted lines in Figs. 11 and 12, thus connecting the conductor 55 with the hot water supply and cutting off the conductor 22 from such supply, and the drying operation will again be repeated, as has been described.

Thus by merely operating the valve 25, the shutter 10 and the closures 13, the washing and drying operations may otherwise operate consecutively automatically.

I do not limit my invention to the structure shown and described, as many modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is:—

1. In a washing machine, a washing chamber, air conducting means communicating with said chamber, a radiator in said conducting means, a hot water supply source, means for discharging hot water from said source selectively into said chamber or into said radiator, and means for forcing air through said air conducting means into contact with said radiator and from said radiator into said chamber.

2. In a washing machine, a washing chamber, a radiator, a hot water supply source having two conductors respectively discharging into said chamber and into said radiator and including means for selectively shunting said water into either of said conductors, means normally inactive for forcing air into contact with said radiator and therefrom into said chamber, driving means for actuating said air forcing means and normally disengaged therefrom, means actuated by water pressure in said conductor which discharges into said radiator for operatively engaging said air forcing means with said driving means and means for conducting air from said air forcing means against said radiator and then into said chamber.

3. In a washing machine, a washing chamber, a radiator, a hot water supply source having two conductors respectively connected with said chamber and said radiator and including a valve for selectively shunting said water into either of said conductors, a rotary driving member, a fan for forcing air against said radiator and into said chamber, said fan having means, when moved in one direction, for operatively engaging and being driven by said rotary member, means actuated by pressure in said conductor connected with said radiator for moving said fan in said direction for operatively engaging said fan with said rotary member, and means for conducting air from said fan against said radiator and then into said chamber.

4. In a washing machine, a washing chamber, a radiator, a hot water supply source having two conductors respectively connected with said chamber and said radiator and including a valve for selectively shunting said water into either of said conductors, driving means, a fan for forcing air against said radiator and therefrom into said chamber and normally operatively disengaged from said driving means, means actuated by pressure in said conductor connected with said radiator for operatively engaging said fan with said driving means, and means for conducting air from said fan against said radiator and then into said chamber.

5. In a washing machine, a washing chamber, a rotary driving shaft extending vertically in said chamber, a tubular conductor in said chamber carried by and rotatable with said shaft and having an open lower end and discharge means at its upper end, means in said conductor for forcing water upwardly therein when said conductor is rotated, an article supporting member vertically reciprocative in said chamber and adapted to move downwardly by gravity, and means actuated by said conductor for consecutively lifting said member during the rotations of said conductor.

6. In a washing machine, a washing chamber, an article supporting member in said chamber, resilient means supporting said member, a rotary member in said chamber having a vertical axis, and means carried by said rotary member for consecutively lifting and permitting said supporting member to lower during the rotations of said rotary member.

7. In a washing machine, a washing chamber, a rotary driving shaft extending vertically in said chamber, a tubular conductor com-

prising two tubes one inside the other said tubes being open at their lower ends, a head mounted on said tubes having discharge openings therethrough communicating with the space between said tubes said head being carried by and rotatable with said shaft, and a nozzle into which said openings discharge carried by and revoluble on said head and discharging into said chamber in the upper portion thereof, and a screw impeller between and carried by said tubes in the lower portions thereof and adapted to force water upwardly between said tubes.

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

CHARLES W. FOSTER.