Sept. 20, 1932. R. E. WARREN 1,878,254

WASHING MACHINE

Filed July 27, 1926 3 Sheets-Sheet 1

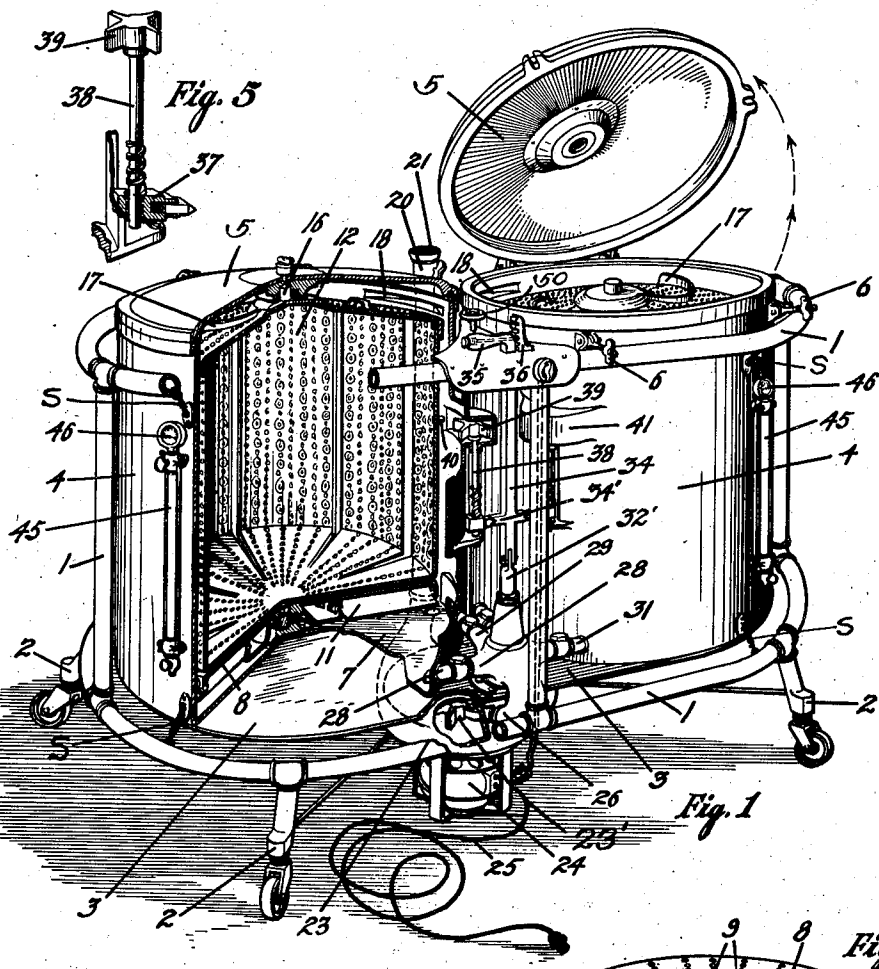

Fig. 5

Fig. 1

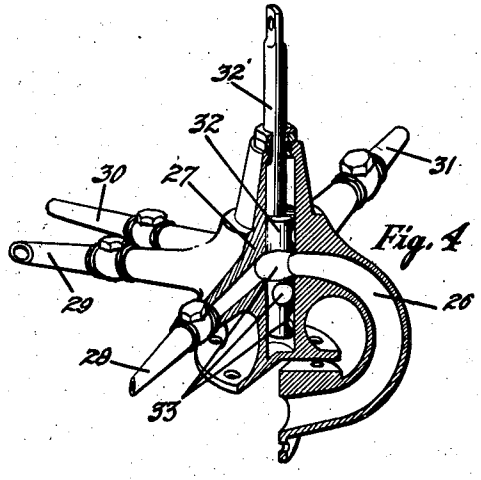

Fig. 4

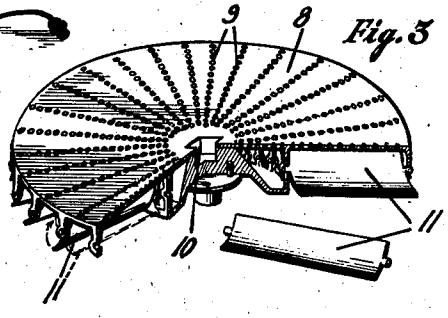

Fig. 3

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WASHING MACHINE

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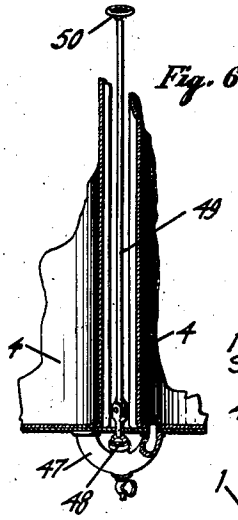

Fig. 6

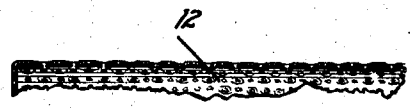

Fig. 10

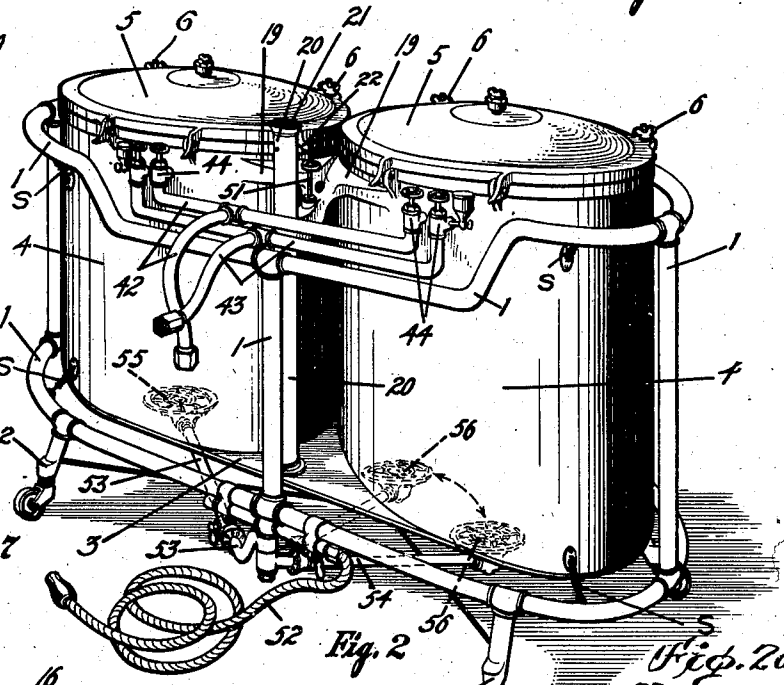

Fig. 2

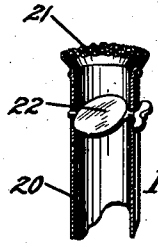

Fig. 7

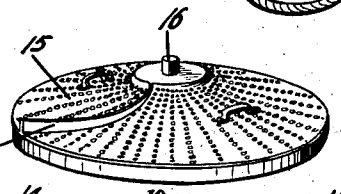

Fig. 8

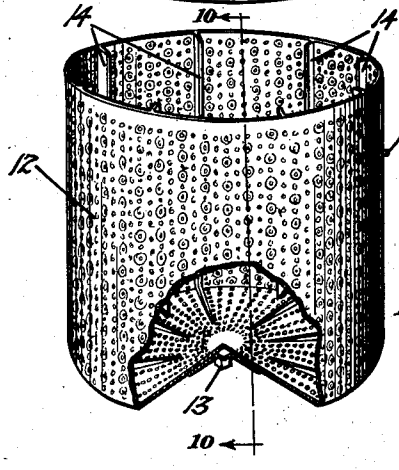

Fig. 9

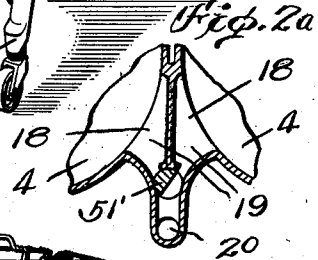

Fig. 2a

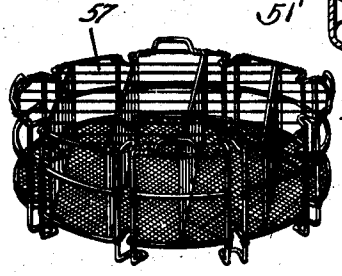

Fig. 11

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WASHING MACHINE

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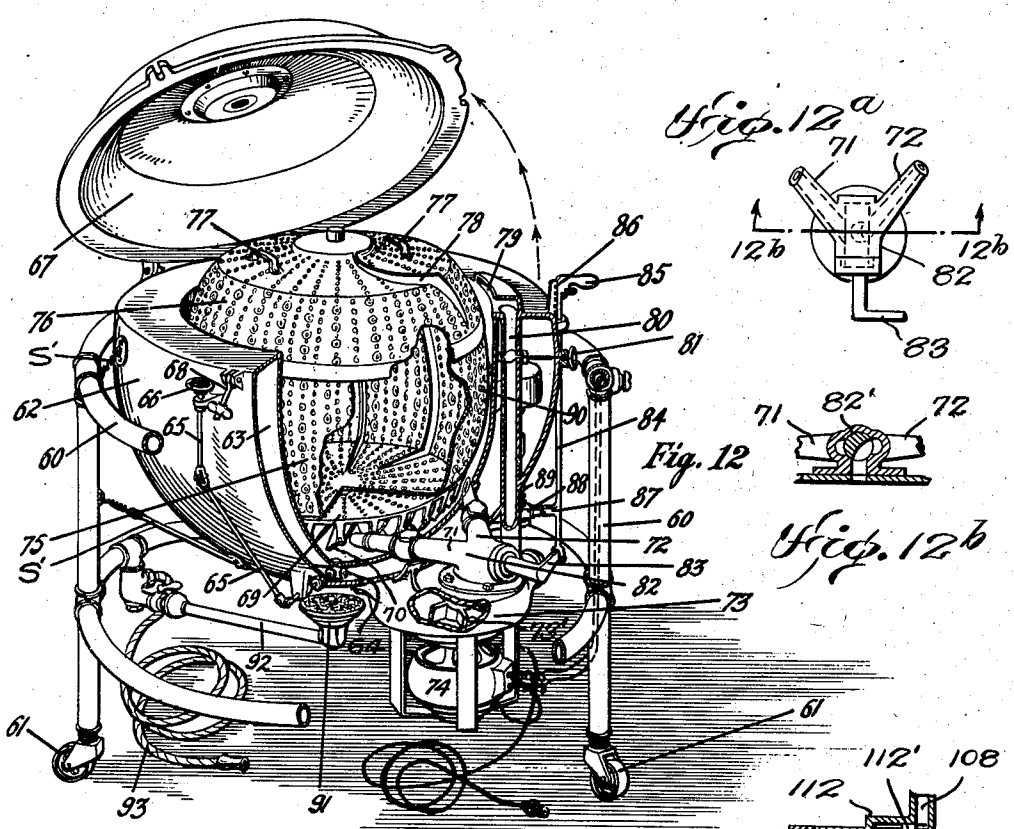

Fig. 12

Fig. 12a

Fig. 12b

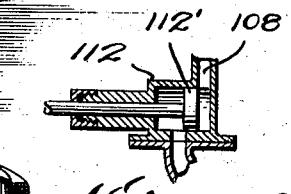

Fig. 13a

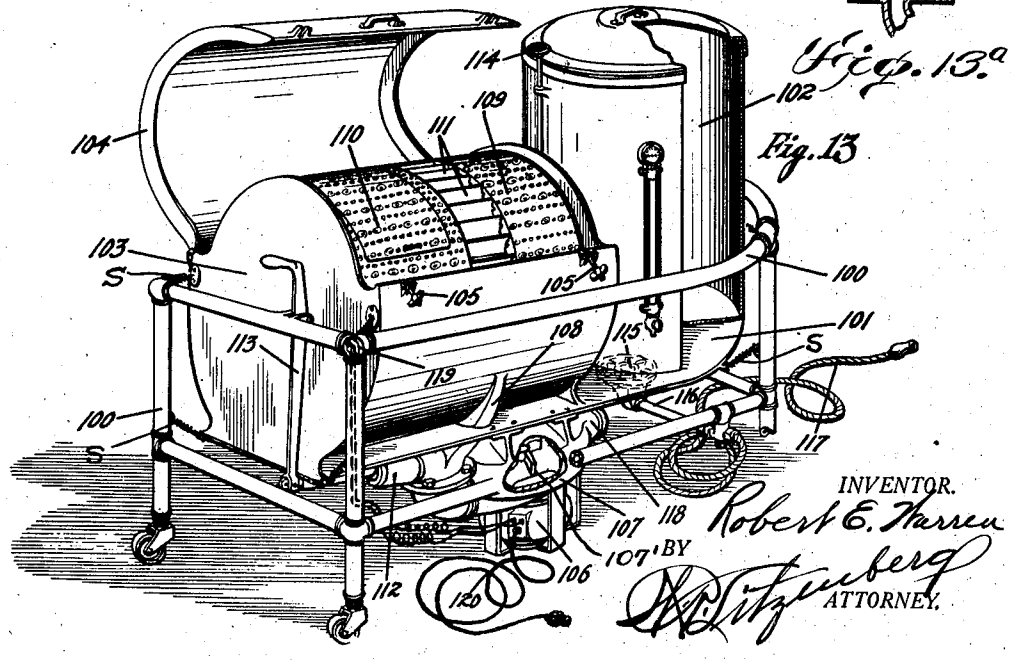

Fig. 13

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UNITED STATES PATENT OFFICE

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WASHING MACHINE

Application filed July 27, 1926. Serial No. 125,146.

My invention relates to washing machines and has among its salient objects to provide a washing machine in which air under pressure from a fan or blower is used to revolve the container or basket for the clothes or articles to be washed and at the same time said air is directed up through the water and the clothes during the washing operation; to provide in such a washing machine, means whereby the water and the air can be heated and circulated in such a way as to give the greatest efficiency without loss of heat unnecessarily; to provide a plurality of containers with means for transferring the water from one to the other for repeated use, where desirable, that is, suds can be transferred from the washing container to another container while the clothes are being rinsed, after which the rinsing water can be released and the suds returned to the washing container; to provide means whereby a change of direction of the air charge reverses the direction of rotation of the washing basket or cage; to provide means for accomplishing this change automatically and periodically, and, in general, to provide a new and efficient washing machine in which forced air circulation is utilized in the operation of the machine and in the washing operation.

Other advantages and new features will be presented in connection with the following description of the embodiments of my invention, as shown on the accompanying three sheets of drawings, which I will now describe.

Figure 1 is a perspective view of a washing machine embodying my invention;

Figure 2 is a similar view from the other side, with parts broken out and shown in section to show the interior arrangement;

Figure 2[a] is a sectional detail to show the valve 51′.

Figure 3 is a detailed view, partly in section of the revolving platform, showing the vanes or blades against which the air blast is discharged;

Figure 4 is a detailed view of a four nozzle air valve for directing the air into the two containers or compartments of the washing machine;

Figure 5 is a detailed view of means for automatically operating the valve member shown in Fig. 4, to change the direction of the air from one nozzle to another;

Figure 6 is a valve and connection from the bottom of one container to the other;

Figure 7 shows the top of an air pipe leading to the fan or blower;

Figure 8 is a view of the cover for and removed from the cage or basket;

Figure 9 is a view of the cage or basket into which the clothes are put;

Figure 10 is a fragmentary view of said cage, shown in enlarged sectional view;

Figure 11 is a perspective view of a basket for washing dishes which can be placed in the machine with dishes or other articles therein, when desired;

Figure 12 is a view showing a slightly modified form of the invention;

Figure 12[a] is an enlarged detail;

Figure 12[b] is a sectional view thereof taken on line 12[b]—12[b] of Fig. 12[a];

Figure 13 is a view showing still another form thereof; and

Figure 13[a] is a sectional detail showing valve mechanism.

Referring in detail to the drawings, the invention as illustrated in Figs. 1 and 2, comprises a carrying frame of pipe members, 1, 1, with feet and castors, 2, 2, with a floor, 3, upon which sets, within said carrying frame, two containers, 4, 4, with hinged covers, 5, 5, adapted to be clamped down tight upon said containers, as by means of hinged bolts, 6, whereby to make said containers pressure tight. Revolubly mounted upon the floor, 7, of each of said containers, is a turn table or platform, 8, Fig. 3, perforated, as at 9, with a square socket, 10, centrally in the top thereof, and with a series of vanes or blades pivotally mounted at their opposite ends as indicated and adapted to stand at an angle to said platform, as indicated, to receive thereagainst a blast of air for propelling said platform, the air being deflected and directed upwardly through the perforations, 9, 9. Said vanes or blades, designated 11, 11, can make a half turn upon their pivots to bring the opposite edge up against

the bottom of the platform, when a blast of air strikes their backs, thus making it possible to change the direction of the blast of air, as hereinafter further described, for reversing the direction of rotation of said platform, 8. Each of said containers, 4, 4, is like the other and the interior construction and arrangement is the same in each.

A cage or clothes container, 12, is provided, Fig. 9, with a centering lug, 13, in its bottom to fit into the square socket, 10, when said cage is placed within the container, 4, as shown, said cage having perforated bottom and sides, with interior vertical ribs, 14, 14, with a cover, 15, also having a top, central lug, 16, adapted to fit into a suitable bearing on the inner side of the cover, 6, as seen in Fig. 1, whereby said cage can rotate when placed upon said revoluble turn table or platform 8. The cage cover, 15, is provided on its top with a curved skimmer, 17, adapted to skim the suds from the top of the water as said cage is revolved and carry it to elongated opening 18, in the top of the side of said container, 4, which opening 18 empties through a body portion, 19, to a vertical pipe, 20, having a screen, 21, in its upper end, with a butterfly valve, 22, to close said pipe, at will, the lower end of said pipe terminating and connecting with a fan case, 23, under said mechanism, the fan 23′ of which is driven from a motor, 24, with circuit connecting wire, 25. Said fan case, 23, connects by means of a casting, 26, with a four-way nozzle valve body, 27, having two nozzles, 28 and 29, discharging at substantially right angles into the washing container, 4, at the left hand side, Fig. 1, and having two nozzles, 30 and 31, discharging at substantially right angles into the washing container, 4, at the right hand side of Fig. 1, said nozzles discharging into said containers tangentially in opposite directions, and so positioned that they discharge against the vanes, 11, 11, on the underside of the platform, or turn-table, 8, for revolving it. A valve member 32, in said valve body, 27, is adapted to be raised and lowered for the purpose of directing the air and water from the fan 23, through the casting, 26, to any one of the nozzles, 28, 29, 30 or 31, said valve member having in its body portion with said valve body, 27, gateways, 33, adapted to be moved to connect the passageway in the casting, 26, with any one of said nozzles. This provides for reversal of the washing container. In order to operate said valve member, 32, both automatically and manually, its stem, 32′, is connected with a vertical member, 34, provided at its upper end with a handle, 35, having an adjustable connection with a rack, 36, which is usable for holding the handle and its vertical member when desired, whereby said valve member can be raised and lowered by hand at will. Said vertical bar, 34, is provided with a cross arm, 34′, having an interfitting connection at each end with a screw block, 37, on a screw, 38, provided at its upper end with a star wheel, 39, adapted to be intermittently turned in either direction as the arms thereof are struck by the studs, 40, on the revolving cage or basket, 12, said star wheel being mounted within an extension chamber, as 41, there being one on each container 4, Fig. 1. As said valve member 32 is thus automatically raised or lowered by the screw, 38, the air from the fan or blower, 23, is directed into the containers, 4, 4, first in one direction, against the vanes, 11, 11, on the platform, and then in the opposite direction, swinging said vanes a half turn on their horizontal axes, and intermittently reversing the direction of rotation of said platform and said cage, 12, which also reverses the direction of the screws, 38, 38, which move said valve member. As the containers, 4, 4, are closed tight, the circulation of the air and water in said containers is from the nozzles, 28, 29, 30 and 31 into said containers, up through the clothes and cage, out through the elongated openings, 18, 18, to the vertical pipe, 20, and back to the fan. Thus a forced circulation of air and water or suds is maintained upwardly through the perforated cages, 12, 12, and said cages are revolved intermittently in opposite directions by the force of the discharge from said nozzles against said vanes, 11, 11.

In order to direct water into said containers, 4, 4, Fig. 2, supply pipes, as 42, 42, 43, 43, and valves, as 44, are provided, adapted to be connected with any suitable supply of hot and cold water. Gauges, 45, 45, are provided on the outside of the containers, 4, 4, Fig. 1, said gauges also having pressure gauges at their upper ends, designated 46, 46.

In order to transfer water from one container, 4, to the other container, 4, a connecting neck, 47, Fig. 6, is provided having its opposite ends connected through the bottoms of said containers, with a valve, 48, in the same, with an operating rod, 49, and hand wheel, 50, for operating said valve at will to permit the contents of one container to be transferred to the other. This can be accomplished readily by placing a valve in the casting, 19, connecting the elongated slots, 18, 18, said valve being indicated at 51 and 51′, whereby pressure can be created from the fan 23, through pipe 20, and valve casting 19, in one container, 4, and released in the other at will, thus forcing the contents from one to the other.

In order to provide means for heating the water in said containers, I have provided a source of gas supply, as at 52, with pivoted gas supply arms, 53, 54, having burners, 55 and 56 on their swinging ends, and being adapted to be swung to different positions

under said containers, as is clear from Fig. 2 of the drawings.

In Fig. 11, I have shown a basket, 57, adapted to be placed upon the turn table, or platform, 8, or in the cage, 12, with dishes or other articles therein to be washed, as may be desired.

In Fig. 12, I have shown a modified form of my invention, including a supporting frame, 60, with castors, 61, supporting a bowl-like container, 62, having a chamber, 63, in the walls thereof, with a valve, 64, in the bottom thereof to connect the inner chamber with the chamber, 63, said valve being operable by means of a line of connected rods, as at 65, with a hand wheel, 66, at the upper end thereof, whereby the contents from one chamber of the bowl can be transferred to the other chamber thereof. Said bowl has a cover, 67, hinged thereto and adapted to be clamped down in place by means of clamps, 68. Rotatably mounted in the bottom of said bowl is a platform or turn table, 69, with vanes, 70, under it, adapted to be driven by blasts from the nozzles, 71 or 72, from the fan or blower, 73 and 73', driven by a motor, 74.

The water in the inner bowl is transferred to the chamber 63 in the wall of the container by opening the valve 64 and, with the cover on tight, creating air pressure in the inner chamber from the blower 73.

Mounted upon said platform or turn table, is a globular basket or container 75, for the clothes or other articles to be washed, said basket being of perforated material, and having the cover, 76, having the handles, 77, and the skimmer, 78, for skimming the suds from the top of the water and directing it to the elongated slot, 79 and out through a vertical pipe, 80, and down to the fan or blower, 73, all as before done in the other form of the invention. Said pipe is also provided with a butterfly valve, 81. A valve 82' in the nozzle casting, at 82, (Figs. 12^a and 12^b) operated by a lever, 83, and a vertical member, 84, with handle, 85, makes it possible to manually change the direction of the fan discharge from one nozzle to the other, said handle having a rack adjustment, as at 86, similar to the other form. Said vertical member, 84, also has a lateral arm or finger, 87, for interfitting engagement with a screw block, 88, on a screw, 89, only portion of which is seen in said Fig. 12, but it is the same as the screw, 38, in Fig. 1, and is operated by studs, 90, on the bowl cage, 75, as indicated. Thus the direction of rotation is reversed intermittently as in the form of the invention shown in Figs. 1 and 2, and instead of having two different containers for the clothes, there is provided in this form or embodiment of the invention a double bowl adapted to hold the washing water in the inner portion of said bowl, with a chamber in the walls thereof for receiving the water when it is desired to drain out the suds and put rinsing water in the inner bowl within which the cage revolves.

A gas burner, 91, on a pipe, 92, is pivotally connected to the frame members, 60, with a gas supply hose connected thereto, as indicated, for heating the water in the bowl when desired, said gas hose is designated 93.

In Fig. 13, I have shown a further modification or embodiment of the invention, in which a frame structure, 100 is provided, with a floor, 101, a vertical tank or container, 102, and a horizontal washing container, 103, with hinged cover, 104, and clamps, 105, for securing it down tightly in place. A motor, 106, operates a fan or blower, 107, having two nozzle members, as 108, for directing air into said washing container, 103, tangentially, only one of said nozzle structures being visible, but the other being directed under the container and in the opposite direction, as will be understood. Rotatably mounted in said washing container, 103, is a revolving cage, 109, with door, 110, with a series of vanes, 111, around the middle portion of said container, so positioned that they are in alinement with the discharge nozzles and are driven by the discharge therefrom, whereby said cage is revolved alternately in opposite directions, as before described in connection with the other forms of the invention.

A valve 112' in the fan casting, as at 112 (Fig. 13^a), with an operating lever, 113, makes it possible to change the direction of the discharge from the fan to either nozzle, as desired. This will be readily understood by reference to the other form of valve control shown in Fig. 4, where the valve member moves vertically instead of horizontally, as, in this form of the invention. There is also provided in this form of the invention means for transferring water from the vertical tank, 102, to the horizontal container, 103, as desired, said means being similar to that shown in Fig. 6, the valve rod being shown at 114 in Fig. 13. It is not necessary to show a second time the mechanism shown in Fig. 6. A gas burner, 115, on a pipe, 116, is mounted under the vertical container, 102, with gas supply, 117, for heating the water therein. The inlet to the fan case, 107, is at the location 118. The electric wires for the motor, 106, are connected through the corner post, with control switch at the top, designated 119, the connecting cord, 120, being provided with a plug for connection to the usual circuit outlet.

Attention is also called to the fact that in all forms of the invention, it is the intention to support or suspend the washing containers by yielding supporting means, as at S or S', whereby to absorb or eliminate the vibration in the frame structure, these supports being in the nature of coiled springs as indicated.

Attention is also called to the fact that my

improved washing machine is also capable of use as a drier, for the water can be removed from the washing cage or basket and container therefor and said cage can be revolved at a high rate of speed to throw the water from the clothes out through the perforations and into the container, thus making it possible not only to wash the clothes, but to dry them quickly.

The turntable or platform 8, Figs. 1 and 3, is provided with the vanes or blades 11, which are adapted to be turned to different positions, as indicated in dotted lines, Fig. 3. The force of the air discharged against these vanes, through the water, propels the platform or turntable and therewith revolves the clothes container. The air is discharged through the nozzles 28 or 29, from the valve body 27, controlled by the valve member 32. This determines the direction of rotation, as will be understood from the showing and the former description of the detailed construction. The valve 32 has a stem 32′ connected at its upper end with a vertical bar 34 with which said valve can be raised and lowered to change the direction of flow through the valve, as will be clear from Fig. 4. The valve is automatically operated by the revolving container and the stud 40 striking the star wheel 39, on a screw 38, which raises the vertical bar 34, through its arms 34′ connected with said screw 38, as hereinbefore described. It will thus be seen that the air discharge can be made through either nozzle 28 or 29, in one chamber, to reverse the direction of rotation of the container in that chamber, or said air can be discharged into the other container through the nozzles 30 or 31, for driving that container for clothes, as before described. The plural discharge combination valve and nozzles are adapted to direct the air against the vanes on the clothes containers, in all forms, for driving said containers first in one direction, and then in the other, and this is intermittent, that is, the valve in each case is intermittently operated to change the direction of the discharge.

While I have provided a new type of washing and drying machine, the power for which is furnished from a motor and the driving medium is water and air, or air alone, directed against the propelling vanes and up through the basket or cage, with means for intermittently changing the direction of rotation, I do not limit my invention to the details of construction and arrangement shown for descriptive purposes, except as I may be limited by the hereto appended claims when broadly interpreted.

I claim:

1. In a washing machine, a supporting structure having a washing container mounted thereon, a perforated support rotatably mounted in said container, a cage for articles to be washed, resting on said support, propeller vanes oscillatably mounted on said support, means including nozzles for directing air and water tangentially in opposite directions and against said vanes, and means for selectively controlling the direction of the air and water through said nozzle means for reversing the direction of rotation of said cage, and a motor driven blower for furnishing the air blast.

2. In a washing machine, in combination, a washing container, a revolubly mounted member therein provided with means for propelling it, a cage carried by said member and adapted to receive the articles to be washed, a motor, and means driven by said motor for directing air and water under pressure against said propelling means, and means for thereafter conducting said air and water through said member into said cage with a surging and washing action therein.

3. In a washing machine, in combination, a washing container, means revolubly mounted therein and adapted to detachably hold a cage for articles, said means having vanes, a cage for articles carried by said first mentioned means, a motor, means driven by said motor for forcing a current of air and water against said vanes for revolving said cage, and means for changing the direction of rotation of said cage.

4. In a washing machine, a washing container, a cage for articles to be washed, means in said container for revolubly supporting said cage, vanes on said supporting means, means for directing air and water against said vanes for driving said supporting means and cage, means for thereafter conducting the said air and water up through said first means and said cage with a surging action for washing purposes, means providing a chamber in fluid communication with said container to receive suds and water therefrom, and means whereby said suds and water can be forced by air pressure from the container into said chamber, for the purpose referred to.

Signed at Los Angeles, Los Angeles County, California, this 13th day of July, 1926.

ROBERT E. WARREN.