

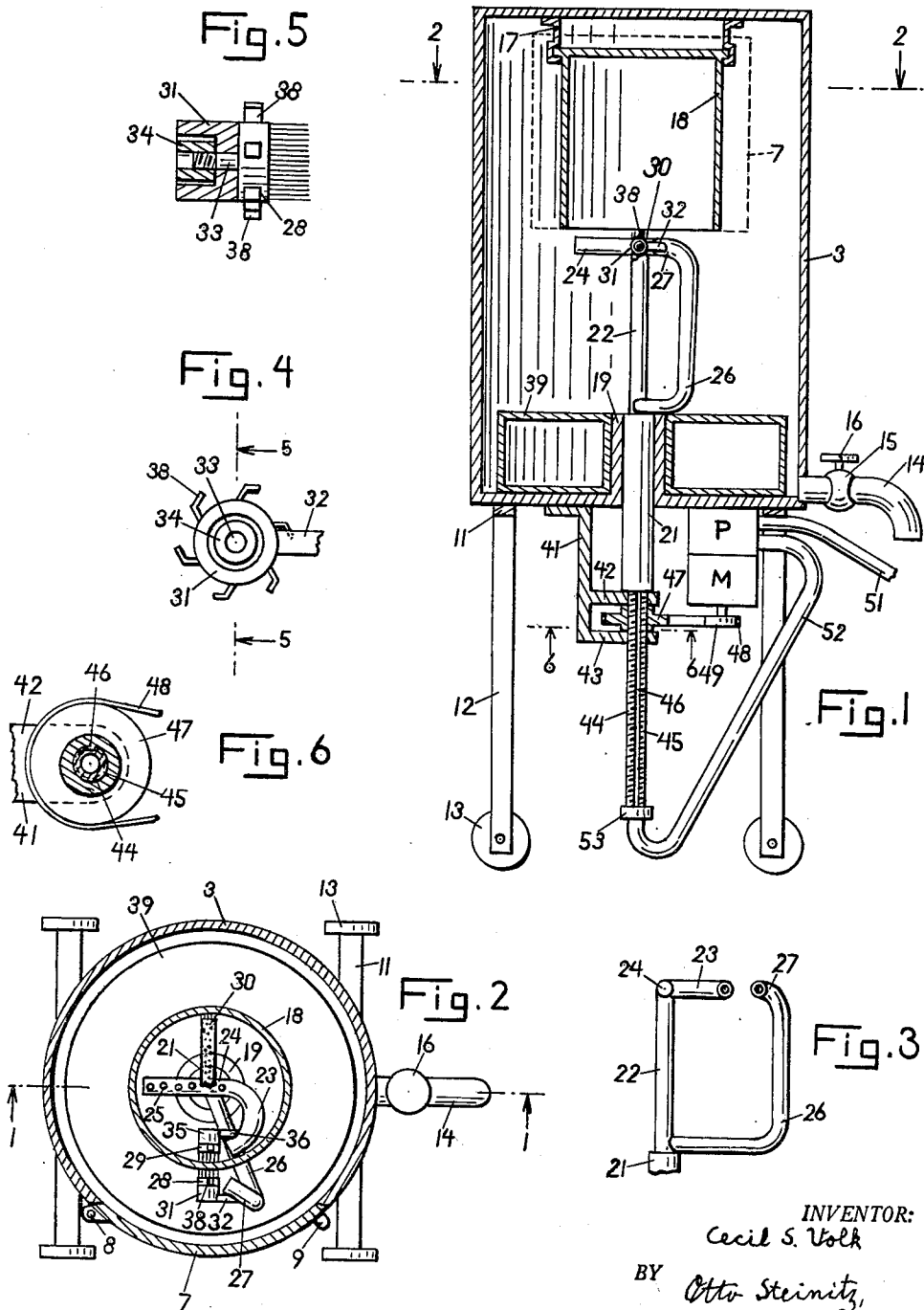
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C. S. VOLK
CAN-WASHING MACHINES

3,104,407

Filed April 8, 1963

2 Sheets-Sheet 1



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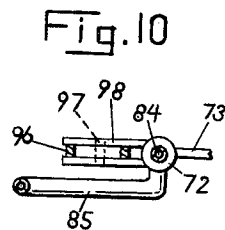
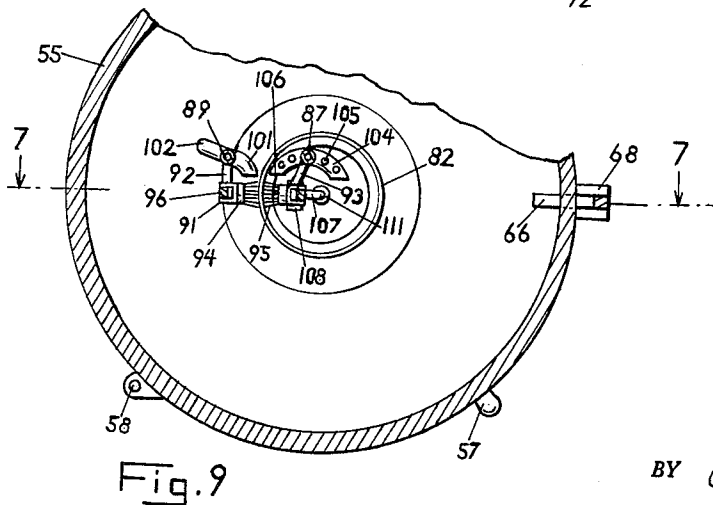
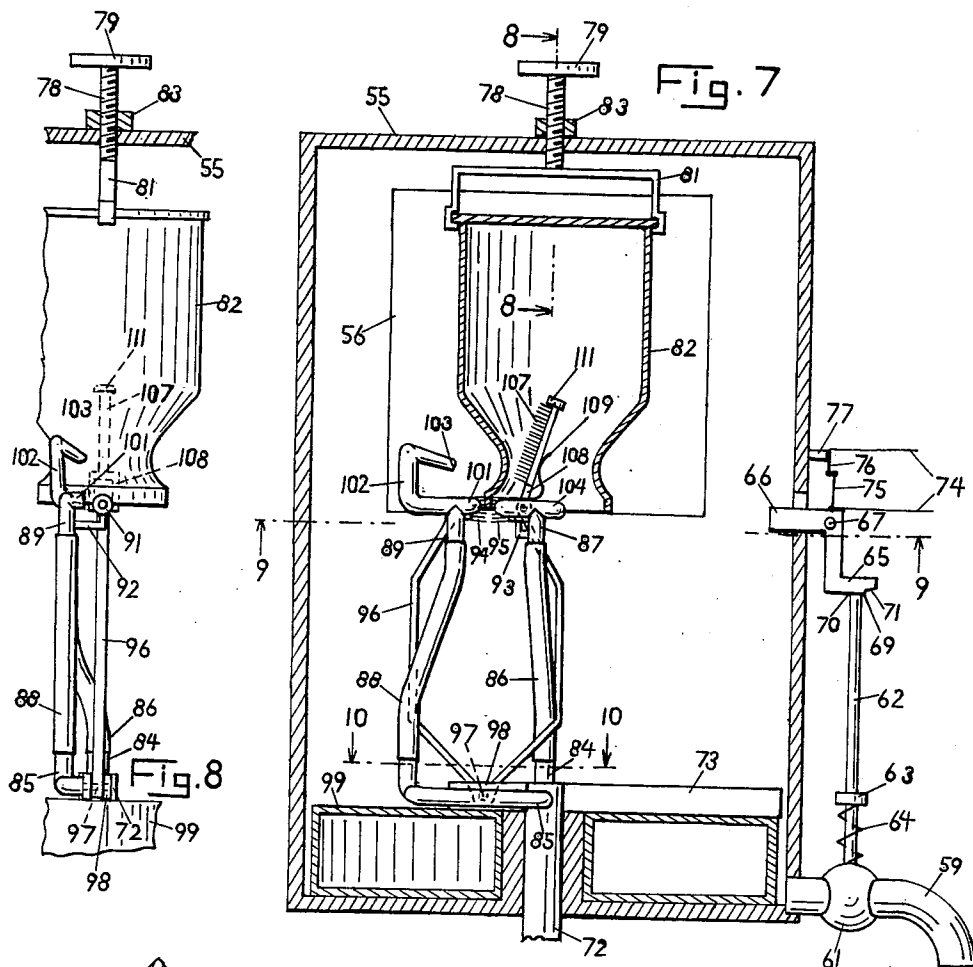
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CAN-WASHING MACHINES

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16 Claims. (Cl. 15-71)

My invention relates to machines for washing garbage cans, milk cans and similar receptacles, and its general object is to clean the cans thoroughly for repeated and sanitary use in one continuous and automatic operation.

Other objects are to wash the cans both at their inside and outside with water that may contain a detergent, a disinfectant or both, to brush the cans at inside and outside, and to direct streams of water toward the brushes whereby the brushed spots are simultaneously rinsed and dirt is thoroughly removed from them.

Further objects are to arrange an outer and an inner brush so directed toward each other that they always brush the same part of the can wall whereby strong brushing pressure can be applied without dislocation of the can because the pressure of one brush counteracts the pressure of the other brush, to rotate the brushes about the can axis while moving them along this axis and along the can wall whereby the brushes will successively reach all parts of the lateral can wall, and to rotate the brushes also about an axis perpendicular to this wall whereby their action is still more effective.

Another object is to hold the can in upside-down position so that the dirty or excessive washing water flows immediately down out of the can, and so that the entire interior of the can is accessible to the brushes.

Still further objects are to produce movements of the brushes and corresponding movements of the water-ejecting pipes in effective and simple manner, and to rotate and shift the brushes together with these pipes either hydraulically by the washing water, or mechanically by motor force, or by hydraulic and mechanical means.

Still other objects are to attain the before mentioned objects with a machine which occupies little space, which can be moved to any place desired, which allows easy and secure positioning of the can, which can be easily connected with a water supply, and which can be easily made and maintained in well working condition.

Still further objects and advantages will appear from the following description of an exemplifying embodiment of my invention and of modifications of this embodiment, from the appended claims and from the accompanying drawings in which:

FIG. 1 is a partly sectional side view of an illustrative embodiment of my invention, the sectionally represented parts being cut along the line 1-1 in FIG. 2.

FIG. 2 is a cross-section taken along the line 2-2 in FIG. 1.

FIG. 3 is a side view of a detail of the same embodiment, seen from the left side in FIG. 1.

FIG. 4 is a view of another detail, seen in the same direction as FIG. 1.

FIG. 5 is a partly sectional side view of the latter detail, the sectionally represented parts being cut along the line 5-5 in FIG. 4.

FIG. 6 is a partly sectional bottom view of still another detail, the sectionally represented parts being cut along the line 6-6 in FIG. 1.

FIG. 7 is a partly sectional side view of a modified part of the embodiment shown in FIGS. 1 to 6, the sectionally represented parts being cut along the line 7-7 in FIG. 9.

FIG. 8 is a partly sectional view seen from the left side in FIG. 7, some parts being broken off, the sectionally represented parts being cut along the line 8-8 in FIG. 7.

FIG. 9 is a partly sectional bottom view of modified

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parts, the sectionally represented parts being cut along the line 9-9 in FIG. 7, some parts being broken off.

FIG. 10 is a partly sectional top view of some details of the modified part, the sectionally represented parts being cut along the line 10-10 in FIG. 7.

All figures are represented on reduced scales, FIGS. 7 to 10 on a larger scale than FIGS. 1 to 3, FIG. 6 on a still larger scale and FIGS. 4 and 5 on a still larger scale.

The embodiment shown in FIGS. 1 to 6 comprises a housing 3 which is preferably cylindrical and has a lateral door 7 hinged to the housing at 8, and provided with a hand knob 9. Two members 11 shaped like upside-down U's are affixed to the bottom of the housing 3 and have four legs 12 supporting the housing. The legs 12 may terminate in bearings for the axes of wheels 13 whereby the machine can be easily moved to any desired place. At the lower end of the lateral housing wall, an opening is provided in which an outlet pipe 14 is secured. This outlet can be closed by a valve 15 operated by a hand wheel 16.

Means are provided for suspension of a can in the housing and are so arranged that the entire surface of the can, except two tiny spots, is left free. For example, two somewhat resilient clamps 17 are affixed to the inside of the housing top and so positioned that they engage the bottom rim of a garbage can 18 when the latter is inserted in a position in which the can is upside-down and co-axial with the housing. A central opening in the bottom of the housing is surrounded by an upward rising sleeve-like part 19 of the housing. This opening is co-axial with housing 3 and can 18.

A tube 21 passes watertightly through the sleeve 19 and has an outer diameter fitting the inner diameter of the sleeve whereby the tube 21 is rotatable in the sleeve about the axis of the housing and is shiftable in the direction of this axis. A pipe 22 forms an upward extension of the tube 21. At its upper end, the pipe 22 has a horizontal continuation which comprises a bent part 23 and a substantially straight part 24 extending radially with respect to the housing a little less far than the inner radius of the can 18. A row of openings 25 is provided in the upper side of the pipe part 24.

A pipe 26 branches off the lower end of the pipe 22 and extends in horizontal direction farther than the outer diameter of the can 18, then turns upward and terminates in a horizontally bent part 27 having an outlet opening at its end. The pipe part 23 has also an outlet opening at its free end. These two outlet openings are preferably positioned at the same level.

The tube 21 and the pipes 22 and 26 are parts of a water-conveying or conduit system which is horizontally rotatable and vertically shiftable. The pipe 22 forms a conduit of which the vertical direction extends inside of the position of the can. The pipe 26 forms a vertical conduit in a direction outside of the can position. Thereby, the conduit system can rise with these conduits moving aside of and along the lateral can wall.

Two brushes 28, 29 are so connected with the conduit system that they move with the same. For example, a brush holder 31 has an arm 32 affixed to the pipe part 27. The brush 28 has a cylindrical stem 33 rotatable in a bore of the holder 31 and secured against excessive axial shift by a nut 34 screwed on the end of the stem 33. Similarly, the brush 29 is rotatably carried by a holder 35 which has an arm 36 affixed to the pipe part 23. Each of these brushes is positioned with its bristles extending into contact with the can wall when the conduit system is in raised position, the bristles of brush 28 contacting the outside and those of brush 29 the inside of this wall.

The outlet of the pipe part 27 is directed toward the

brush 28, and the outlet of the pipe part 23 toward the brush 29. Preferably, each of these brushes has shovels 38 affixed to its periphery in the manner of a waterwheel. For example, each brush may have six shovels, some of which are omitted in FIGS. 1 and 2 for the sake of clear representation of other details.

Preferably, another brush 30 is affixed to the conduit system, for example to the pipe part 24. The brush 30 extends horizontally in radial direction of the can 18. Bristles of the latter brush extend upward and contact the bottom of the can brushingly when the conduit system is in its uppermost position. In addition, the brush 30 may have bristles extending in radial direction.

A ring-shaped swimmer 39 is positioned in the housing under the pipe 26 and preferably affixed to the same.

A bracket 41 is affixed to the bottom of the housing, extends downward and has horizontal arms 42, 43 provided with holes which are coaxial with the tube 21 and threaded to engage an outer screw thread 44 of a pipe 45 which forms a downward continuation of the tube 21. The thread 44 is interrupted by a groove 46 which extends along the pipe 45 and is so slidably engaged by an inner projection of a wheel 47 in known manner that the wheel can rotate the pipe 45 without hindering the vertical movement of the latter. The wheel 47 is secured against vertical dislocation by the bracket arms 42, 43.

The wheel 47 is rotated by a belt or chain 48 which connects this wheel with the driving wheel 49 of a motor M. This motor may also serve to drive a pump P. Motor and pump may form a compact aggregate mounted under the bottom of the housing 3.

The pump is supplied with water from any available source through a pipe or hose 51. A detergent or a disinfectant or both may be added to the water, preferably before the water is fed to the pump. The pump presses the water through a hose 52 into the pipe 45 with which the hose is rotatably connected, for example by a coupling 53 of known structure. If a water source of sufficient pressure is available, the pump may be omitted and the hose 52 may be directly connected to this source.

The operation of the described machine starts with the conduit system in the shown, lowermost position. After a can 18 has been firmly secured in the clamps 17, the door 7 and the valve 15 are closed, and the water supply is set in motion. The water pressed into the conduit system rises through pipe 45, tube 21 and then simultaneously through the pipes 22 and 26 from which the water flows through the pipe parts 23, 24 and 27, and streams out of the openings of these pipe parts.

The water ejected from the conduit system drops and gradually fills the bottom of the housing 3. The rising water level lifts the swimmer 39 and thereby the conduit system whereby the pipes 22 and 26 rise along the lateral wall of the can 18, the pipe 22 entering the interior of the can, and the pipe 26 moving outside of the same while the brushes 28 and 29 move in contact with the can wall. At the same time, the reaction of the streams flowing out of the pipe ends 23 and 27 causes the conduit system to rotate due to the fact that the directions of the outlets of these pipes do not pass through the rotary axis of this system but have components tangential to the rotation of this system.

In addition to or instead of these hydraulic means, mechanical means may be used to enforce the rising and rotary movement of the conduit system. Obviously, various mechanical devices could be used for this purpose in addition to a motor M. In the shown embodiment, the mechanical means comprise a motor wheel 49, a chain 48 driven by this wheel, a wheel 47 rotated by this chain, the pipe 45 rotated by the wheel 47, and the bracket 41 in the threaded holes of which the pipe 45 screws upward when rotated.

If the movement of the conduit system is to rely only on the hydraulic means, the mentioned mechanical means, except the motor, may be omitted, and the coupling 53

may directly connect the hose 52 with the tube 21. If the movement of the conduit system is to rely only on the mechanical means, the swimmer 39 may be omitted. In any case, the pump may be omitted and the hose 51 directly connected with the coupling 53 if the pressure of the water source is sufficiently high. The simultaneous use of both, hydraulic and mechanical means, results in a particularly strong and reliable drive of the circuit system.

The brushes rise with the conduit system and brush the lateral wall of the can 18 from the open can side up. The water streaming from the pipe ends 27 and 23 keeps the brushes clean, washes the brushed spots of the can, and also hits the shovels 38, causing the brushes to rotate in their holders in addition to their rotation with the conduit system. This results in a strong cleaning action. Water streams also upward from the openings 25 and washes the inside of the can bottom. This inside is brushed by the brush 30 when the conduit system approaches its uppermost position.

More or less dirty water drops down from the washed spots and gathers at the bottom of the housing, thereby urging the swimmer 39 upward. Preferably, this swimmer is affixed to the conduit system whereby the swimmer rotates and stirs the water gathered at the housing bottom. The stirring prevents the dirt from settling down so that the dirt will readily flow out when the valve is opened. This valve 15 and the pipe 14 are of relatively large width whereby dirt can easily pass through them.

When the conduit system has reached its uppermost position, the washing of the can is finished. Then, the valve 15 is opened and, if mechanical moving means have been used, the same are reversed whereupon the conduit system returns to the shown position. The can is then taken out of the housing through the temporarily opened door 7. If desired, the water supply may be resumed with the valve 15 remaining open in order to clean the housing bottom thoroughly before another can is inserted for being washed.

FIGS. 7 to 10 illustrate modifications of the embodiment described in the foregoing. The parts positioned under the housing are omitted in these figures and may be identical to the parts positioned under the housing in the first described embodiment.

The modified parts comprise a housing 55 which is similar to the housing 3 and has a door 56 provided with a hand knob 57 and hinged to the housing 55 at 58. In an opening of the lower end of the lateral housing wall, an outlet pipe 59 is affixed. A valve 61 is incorporated in the pipe 59. The valve 61 is operated by a stem 62 provided with a flange 63. A spring 64 is positioned between this flange and the valve and holds the valve ordinarily in closed condition.

The valve 61 can be opened by a lever having an arm 65 contacting the upper end of the stem 62, having another arm 66 reaching into the housing 55 through a slot in the lateral housing wall, and having a hinge axle 67 rotatable in bores of two projections 68 of this wall. When the lever 65, 66 is turned in the direction clockwise in FIG. 7, the arm 65 presses the stem 62 down against the pressure of the spring 64, thereby opening the valve 61, until the edge 69 of the arm 65 snaps over the edge 70 of the stem. In this position, the stem 62 contacts the surface 71 of the arm 65 and is thereby prevented from moving upward as in the shown position in which the valve is closed. The engagement of the snapped-over edges 69 and 70 prevents return of the lever into the shown position whereby the valve remains open until this engagement is released by a slight depression of the stem 62 by hand.

A tube 72 passes fittingly, rotatably and shiftably through a central opening of the housing in the same manner as the tube 21 of the first described embodiment. A bar 73 is affixed to the upper end of the tube 72 and extends horizontally to a point positioned under the arm

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66. When the tube rises and approaches its uppermost position, the bar 73 contacts the arm 66 and operates the lever 65, 66.

The motor M (FIG. 1) is operated by an electric circuit 74 of which a part is schematically shown in FIG. 7. This circuit part contains a switch having one arm 75 affixed to the lever 65, 66 and another arm 76 affixed to a projection 77 of the housing 55. When the lever 65, 66 is turned as described before, the switch 75, 76 opens, interrupting the circuit 74 and thereby arresting the motor M. The switch remains in open condition until the lever 65, 66 is returned into the shown position.

A screw 78 co-axial with the tube 72 passes through a threaded bore of the top of the housing 55 and has a top handle 79. A double clamp 81 is connected with the lower end of this screw and formed to engage the bottom rim of a can 82 similarly as the clamps 17 engage the can 18. By screwing the screw 78 more or less into the housing, the height of the clamp 81 can be adjusted whereby cans of various heights can be properly suspended in the housing. A counter-nut 83 serves to secure the screw 78 in adjusted position.

The tube 72 is a part of a conduit system which further comprises pipes 84 and 85. The pipe 84 forms an upward continuation of this tube. A flexible conduit or hose 86 is attached to the pipe 84, forms a further upward continuation and has an upper end attached to a pipe 87. The pipe 85 extends from the tube 72 horizontally to a point farther from the housing axis than the largest diameter of the can 82, then is bent and terminates in a rising part to which a hose 88 is attached. The upper end of this hose is attached to a pipe 89. The vertical direction of the conduit 84, 86, 87 extends inside of the can position. The vertical direction of the conduit 85, 88, 89 extends outside of this position.

An outer brush-holder 91 similar to the shoulder 31 is affixed to the pipe 89 by a connecting bent arm 92, and another identical inner brush holder is connected with the pipe 87 by a bent arm 93. These brush holders carry rotatable brushes 94 and 95. The structure of these holders and brushes and the position of the latter relative to each other and relative to the can wall may be identical to structure and position of the holders 31, 35 and the brushes 28, 29. The waterwheel-like shovels of the brushes are omitted in FIGS. 7 to 9 for the sake of clear representation of other parts.

The brushes 94 and 95 are supported by a member 96 so that they can move laterally without changing their mutual position. For example, this member has a lower end hinged by a horizontal axle 97 to two arms 98 which are affixed to the tube 72. From this lower member end, two arms of the member branch, extend upward and have upper ends one of which is affixed to the brush holder 91 while the other is affixed to the other brush holder.

A swimmer 99 is positioned in the housing 55 under the arms 73 and 98 and operated in the same manner as the swimmer 39.

The pipe 89 has an extension which comprises a part 101 with an outlet opening at its end. This part is so bent that this outlet points toward the brush 94. Another part of this extension 102 is first directed outward with respect to the housing axis, then upward and then in inwardly declining direction, and terminates in an outlet 103. When the conduit system has risen so far that the outlet 103 is higher than the bottom of the can 82, the stream from this outlet washes the outside of the can bottom, first near the periphery of this bottom, then gradually farther to the center which is washed when the conduit system is in its uppermost position. The pipe 87 has a horizontal extension 104 provided with openings 105 at its upper side for washing the inside of the can bottom, and with an end outlet 106 directed toward the brush 95.

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Means are provided for brushing the inside of the can bottom when the conduit system is near its uppermost position. These means are preferably so arranged that they can pass through the neck of a can of varying diameter. For example, a brush 107 has a forked lower end 108 hinged to the inner brush holder so that the brush 107 can turn in a vertical plane. A spring 109 affixed to the same brush holder contacts the brush 107 and holds the same ordinarily in the inclined, upward extending position shown. When rising of the conduit system brings the upper end of the brush 107 into contact with the can bottom, this brush is gradually turned down until, in the uppermost position, this brush extends horizontally and brushes the can bottom. Preferably, the upper end of the brush 107 is formed by a roller 111 rotatably connected with the main part of this brush whereby the contact between brush and can bottom is changed from a sliding to a rolling contact, and the movement of the brush 107 is facilitated.

The described modified embodiment comprises details which adapt the machine to washing of cans of varying diameter, for example of milk cans 82, but also comprises details which obviously may be incorporated in the first described embodiment without such adaptation. The modified embodiment is operated as follows:

While the conduit system is in the shown lowermost position and the circuit 74 is interrupted either by open position of the switch 76, 77 or otherwise, a can 82 is inserted through the temporarily opened door 56 in the housing in upside-down position so that this can is firmly held by the clamp 81. The height of this clamp is then so adjusted that the lower rim of the can reaches into the narrow space between the brushes 94 and 95 while the conduit system is so held that this space is in line with this rim. The can has then the position shown in the drawing. The valve, if not already closed, is then closed by depression of the stem 62, allowing the lever 65, 66 to turn into the shown position. The circuit 74 is closed whereby the motor M starts.

The conduit system is then rotated and raised by hydraulic or mechanical means or by both in the same manner as in the first described embodiment while the rising brushes 94, 95 are guided by the lateral wall of the can 82, and the member 96 slightly swings about the axis of the axle 97. Thereby the lateral can wall is brushed and washed in a manner corresponding to the first described embodiment.

During the last period of the rising movement of the conduit system, the can bottom is washed in the manner described before. When the conduit system approaches its uppermost position, the bar 73 operates the lever 65, 66 in the manner described before. Thereby the valve 61 and the switch 76, 77 are opened, terminating the washing operation.

I desire it understood that my invention is not confined to the particular embodiment and its modifications shown and described, the same being merely illustrative, and that my invention may be carried out in other ways within the scope of the appended claims without departing from the spirit of my invention as it is obvious that the particular embodiment and its modifications shown and described are only some of the many ways that may be employed to attain the objects of my invention.

Having described the nature of my invention, what I claim and desire to protect by Letters Patent is:

1. A can-washing machine comprising a housing; means for suspension of a can in upside-down position in said housing; a conduit system comprising a tube co-axial with the position of said can and passing fittingly, rotatably and vertically shiftably through the bottom of said housing, said system further having two conduits forming extensions of said tube and extending vertically upward, the vertical direction of one of said conduits extending outside of the position of said can and the vertical direction of the other conduit extending inside of the latter posi-

tion whereby said system can rise with one of said conduits moving outside and along the lateral wall of said can and the other conduit inside and along said wall; two brushes connected with said system and, when said conduits rise along said can wall, contacting said wall with their brushing sides, one brush from the outside and the other from the inside of said wall; one of said conduits having an outlet directed toward one of said brushes and the other conduit having an outlet directed toward the other brush; and means moving said system rotatably about the axis of said tube and vertically in the direction of said axis.

2. A machine according to claim 1 in which machine said brushes are directed toward each other whereby their contacts with said wall are on both sides of the same wall part.

3. A machine according to claim 1, further comprising a brush holder affixed to said system and carrying one of said brushes rotatably; and shovels affixed to said latter brush in waterwheel-like arrangement.

4. A machine according to claim 1, further comprising a pipe forming an extension of said system, extending, in raised position of said system, in said can in substantially radial direction of the latter, and having outlet openings directed upward whereby said latter openings are directed toward the bottom of said can.

5. A machine according to claim 1, further comprising another brush affixed to said system, extending, in raised position of said system, in said can in substantially radial direction of the latter, and having bristles extending upward farther than the parts of said system entering said can whereby said bristles, in uppermost position of said system, contact the bottom of said can.

6. A machine according to claim 1 in which machine said conduit outlets have directions having components tangential to the rotation of said system whereby the reaction of streams flowing out of said outlets tends to rotate said system.

7. A machine according to claim 1 in which machine said moving means are hydraulic and comprise a swimmer positioned in said housing a part of said system whereby water gathering in said housing tends to raise said swimmer and said system.

8. A machine according to claim 1 in which machine said moving means are hydraulic and comprise a swimmer affixed to said system whereby water gathering in said housing tends to raise said swimmer and said system, and the swimmer rotates with said system, thereby stirring the gathered water.

9. A machine according to claim 1 in which machine said moving means are hydraulic and comprise a motor, a pump driven by said motor, and a hose connecting said pump with said conduit system whereby water can be fed to said system under high pressure.

10. A machine according to claim 1 in which machine said moving means are mechanical and comprise a motor drivingly connected with said system.

11. A machine according to claim 1 in which machine

said moving means are mechanical and comprise a pipe forming a downward extension of said tube and having a threaded and longitudinally grooved outside, a bracket affixed to said housing and having a threaded hole screwingly engaged by said latter pipe, a wheel having an inner projection slidably engaging said groove, and a motor drivingly connected with said wheel.

12. A machine according to claim 1 in which machine said moving means comprise hydraulic and mechanical means.

13. A machine according to claim 1 and further comprising a pipe forming an extension of said system and having an outlet positioned outside of the position of said can, higher than said brushes and directed downwardly and inwardly inclined with respect to said housing whereby water streaming from said latter pipe will hit the upper side of the can bottom when said latter pipe is raised higher than said bottom.

14. A machine according to claim 1 and further comprising another brush extending within the position of said can, a horizontal axle connecting one end of said other brush rotatably to said system, and a spring affixed to said system and holding said other brush in a position extending obliquely upward from said axle whereby said brush is pressed down against the pressure of said spring into horizontal position when the upper end of said latter brush hits the can bottom, said other brush having bristles extending upward in said horizontal position whereby said bristles contact the can bottom when said system is in its uppermost position.

15. A machine according to claim 1 and further comprising an outlet pipe affixed to said housing, a valve incorporated in said pipe, a spring holding said pipe ordinarily in closed condition, a lever movably connected with said housing, having an arm reaching into said housing, and being operatively connected with said valve, and a bar affixed to said system and contacting said lever arm when said system approaches its uppermost position whereby said lever is operated and said valve is opened when said system is in its uppermost position.

16. A machine according to claim 1 and further comprising a motor forming a part of said moving means, an electric circuit operating said motor, a switch for closing and opening said circuit, a lever movably connected with said housing, operatively connected with said switch and ordinarily holding said switch in circuit-closing position, said lever having an arm reaching into said housing, a bar affixed to said system and movably contacting said lever arm when said system approaches its uppermost position whereby said lever is operated and said switch interrupts said circuit when said system is in its uppermost position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,302,481	Spruch	Apr. 29, 1919
1,789,321	Parry	Jan. 20, 1931