Jan. 30, 1934. C. K. CIMARIK ET AL 1,945,477

WASHING MACHINE

Filed Nov. 3, 1930 6 Sheets-Sheet 1

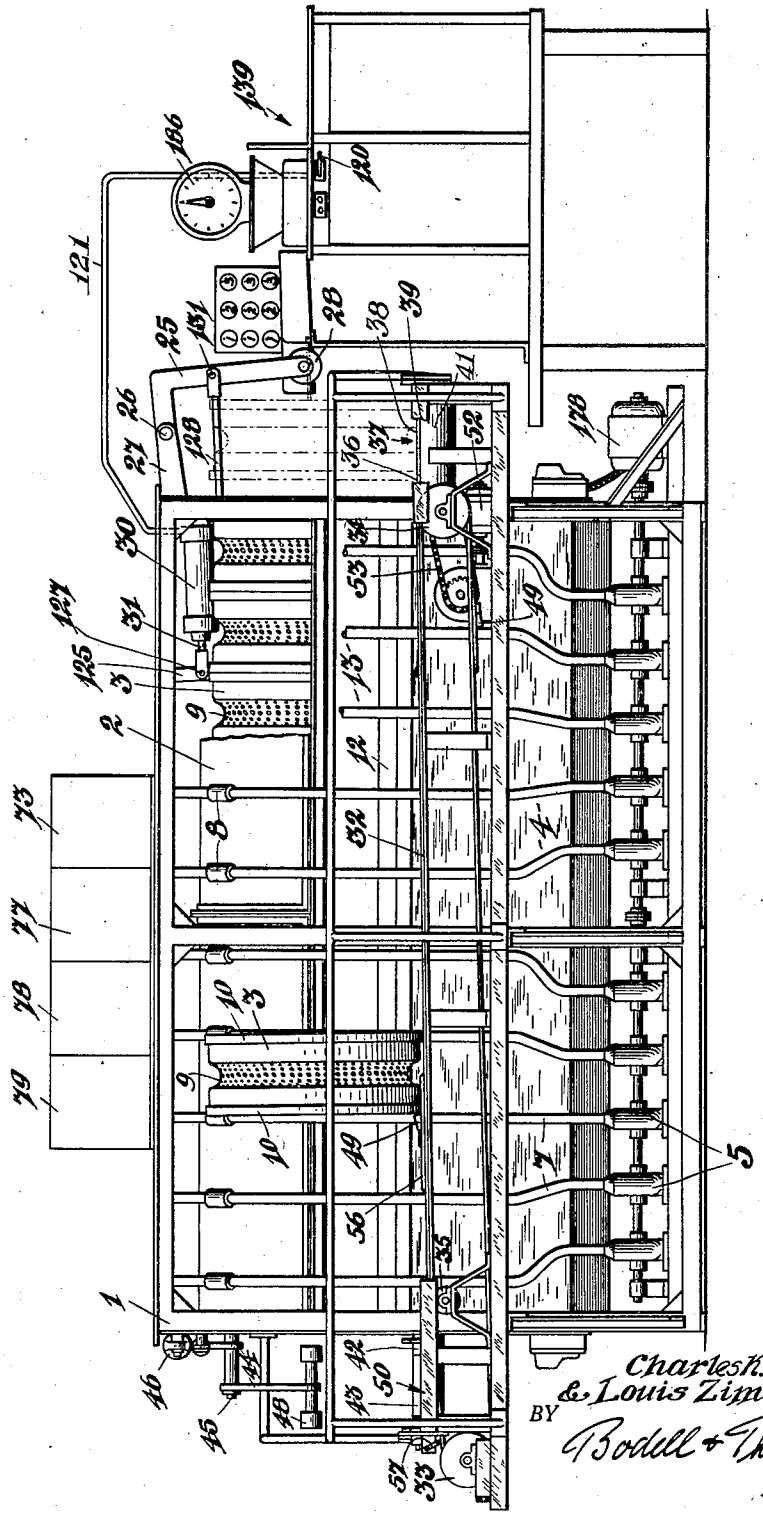


FIG. 1.

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WASHING MACHINE

Filed Nov. 3, 1930 6 Sheets-Sheet 2

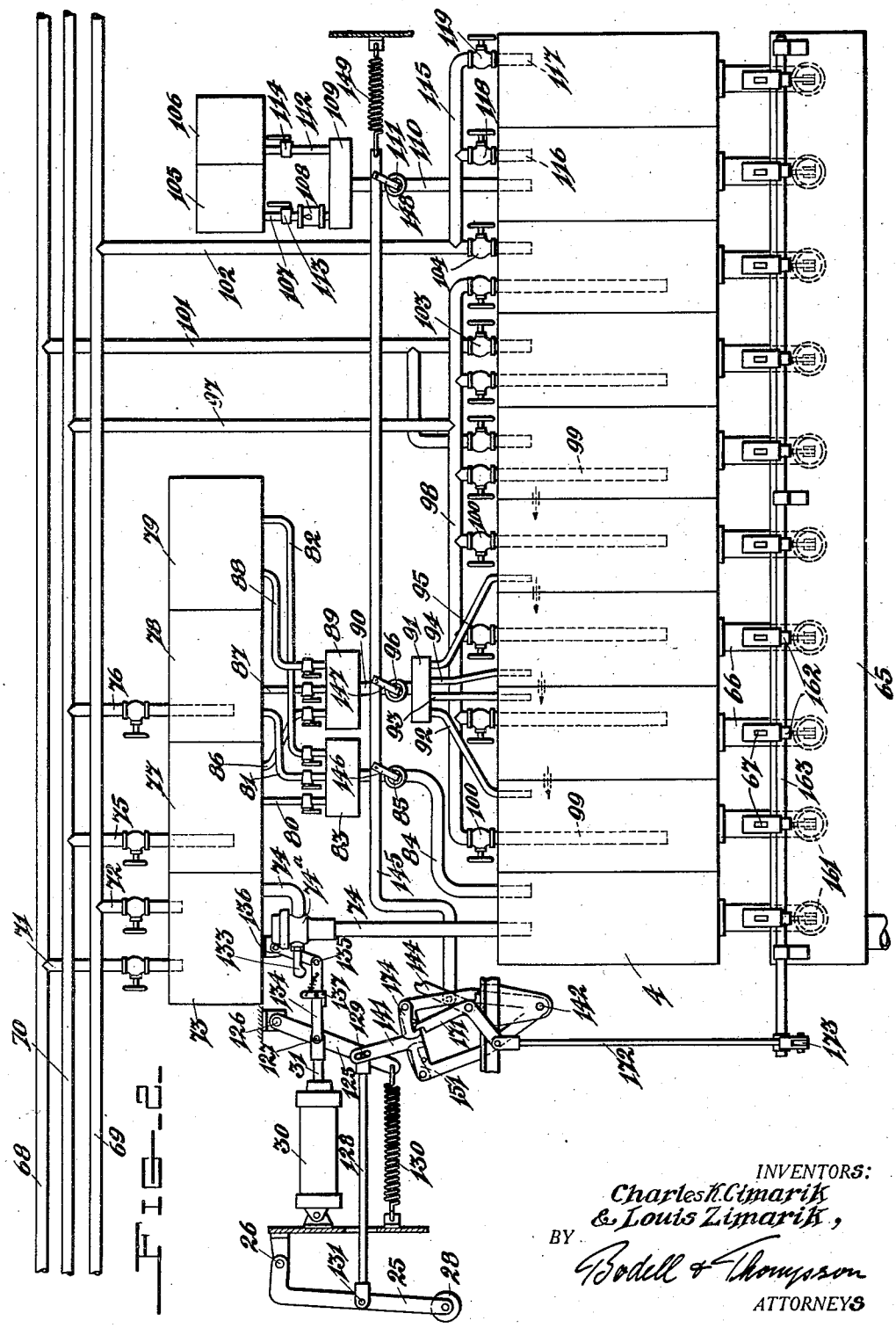


FIG. 2.

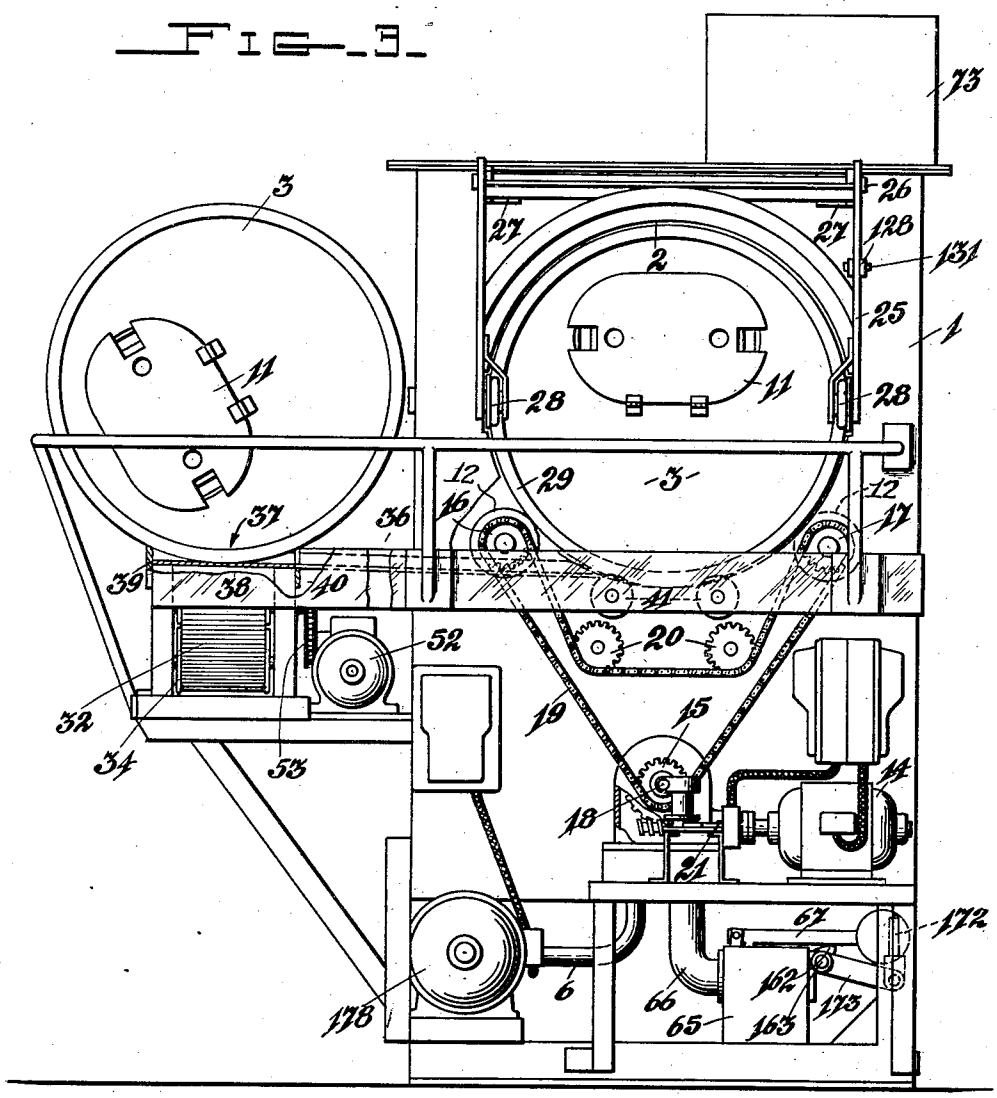
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WASHING MACHINE

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FIG. 3.



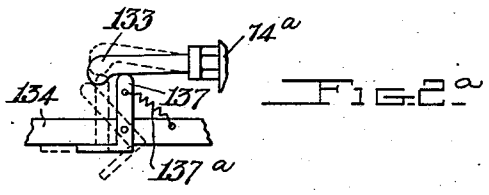


FIG. 2a

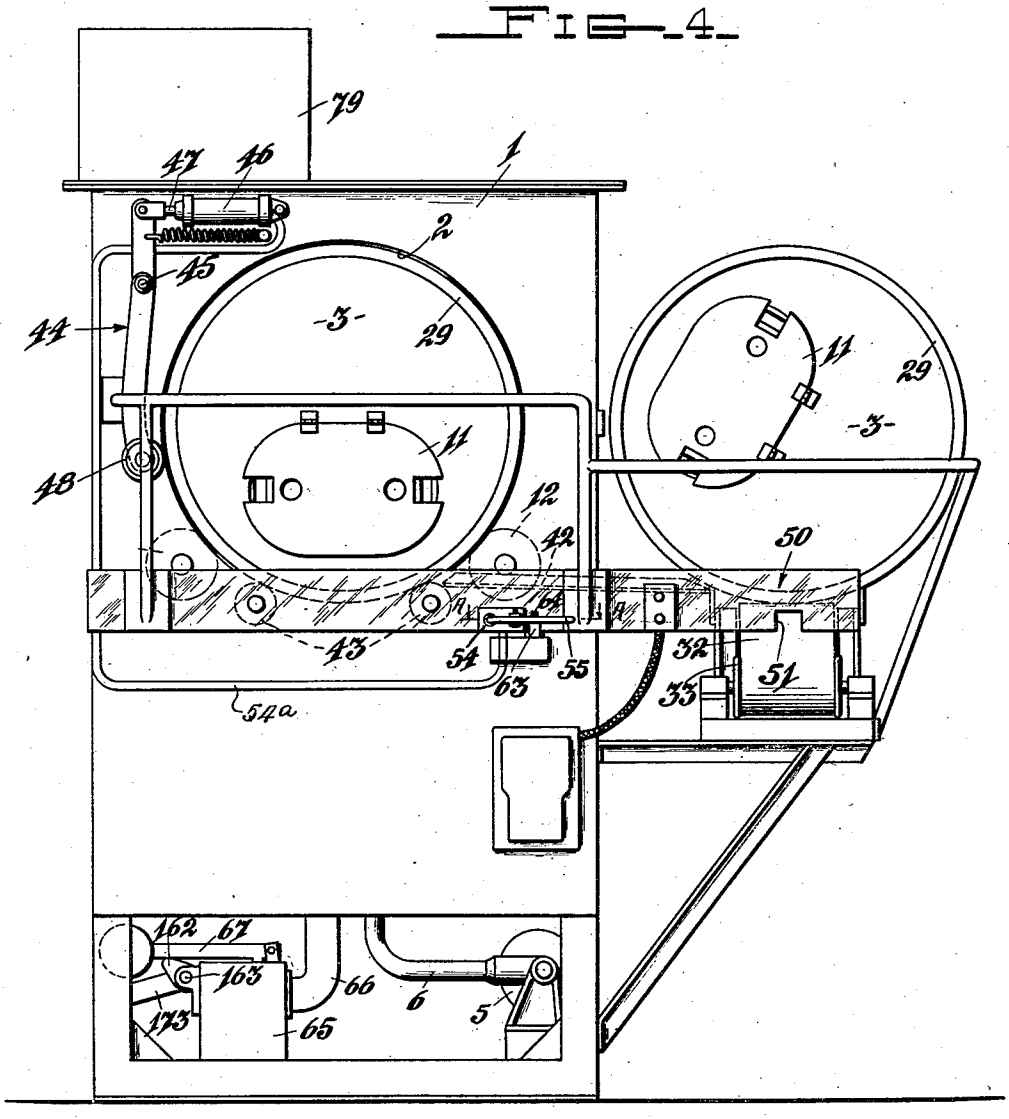
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WASHING MACHINE

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Fig. 4.



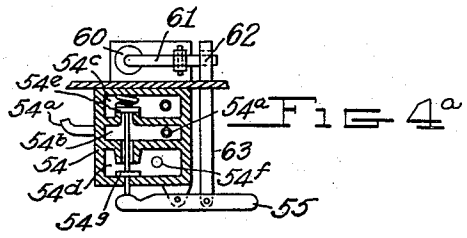


Fig. 4a

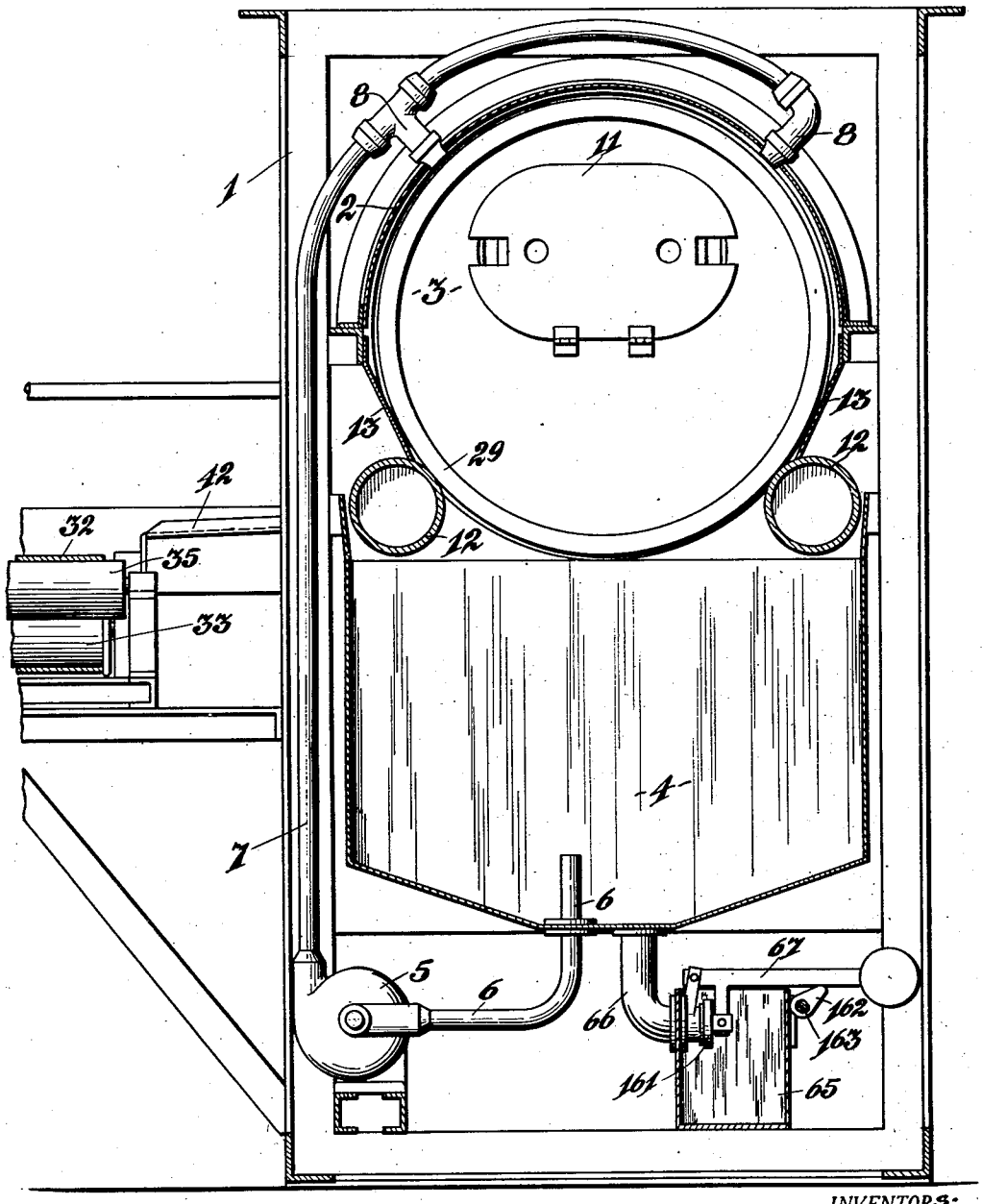
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Jan. 30, 1934. C. K. CIMARIK ET AL 1,945,477

WASHING MACHINE

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FIG. 5.



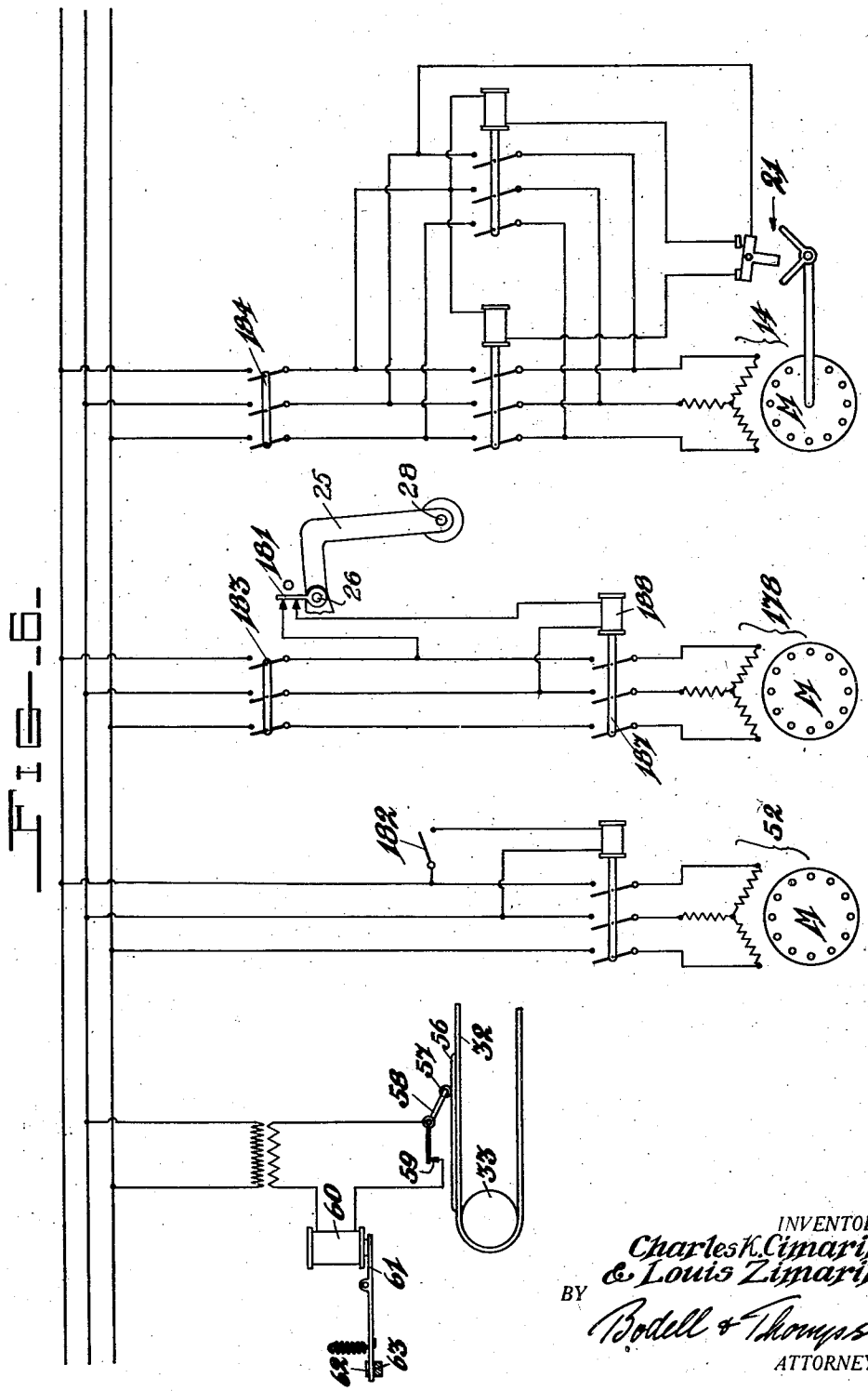
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WASHING MACHINE

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FIG. 6.



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Patented Jan. 30, 1934 1,945,477

UNITED STATES PATENT OFFICE

1,945,477

WASHING MACHINE

Charles K. Cimarik and Louis Zimarik, Akron, Ohio, assignors to The Prosperity Company Inc., Syracuse, N. Y., a corporation of New York

Application November 3, 1930. Serial No. 492,900

6 Claims. (Cl. 68—18)

This invention has for its object, a clothes washing machine, particularly for use in commercial laundries, which machine is particularly simple in construction, rapid in operation, efficient in use, and requires minimum handling of the clothes, and which is operated by one or two attendants.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

The machine is of the general type shown in the Young and Lewis Patent No. 1,220,308 issued March 27, 1917 and carries out a washing process similar to that of the Young and Lewis patent.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation, partly broken away, of this washing machine.

Figure 2 is a fragmentary, opposite side elevation from that seen in Figure 1, the washing cylinders and their operating mechanism being omitted, and other parts, such as the feed pipes for hot and cold water and steam, being also shown.

Figure 2*a* is an enlarged fragmentary view of a portion of the operating mechanism shown in Figure 2.

Figure 3 is an enlarged end elevation, looking to the left in Figure 1, certain of the piping connections and valve operating mechanism being omitted.

Figure 4 is an end elevation, looking to the right in Figure 1.

Figure 4*a* is a fragmentary sectional view along the line A—A, Figure 4.

Figure 5 is an enlarged transverse sectional view, parts being omitted.

Figure 6 is a diagrammatic view of the electric wiring for the motors, and parts actuated thereby.

This machine comprises generally, a suitable frame formed with a passage extending in a general direction, through which clothes receiving receptacles as cylinders are fed step by step to different stations along the passage where the clothes therein are treated with different washing fluids, means for supporting the cylinders on their peripheries in the passage, and for actuating them by a driving force applied to the peripheries, means for feeding the cylinders step by step through the passage and in at one end of the passage, and out at the other, a conveyor means for returning the cylinders from the exit end to the entrance end of the passage, means for supplying the washing fluid and control means for the various mechanisms.

The washing mechanism of this machine includes the cylinders, the means for tumbling them, the means for supplying and controlling the supply of washing fluids and any other means contributing to the washing operations.

1 designates the frame, which may be of any suitable form, size and construction; and 2 is the passage through which the clothes receiving cylinders 3 are passed, this passage being formed by a sheet metal casing. The passage extends transversely above vats 4 for the different washing fluids, these vats being located side by side along the passage.

The clothes in the receptacles are treated to the various fluids in the vats 4 by pumps 5, one for each vat 4, the inlet end of each pump communicating with its companion vat through a pipe as 6, and the outlet side of the pump communicating through a pipe 7 with the interior of the casing. Each pipe 7 has nozzles 8 arranged to discharge in the upper portion of the passage 2 against an intermediate peripheral circumferential perforated zone 9 of each cylinder 3. The intake pipe is located in the so-called quiet zone of the liquid in the vat in order that liquid as free of sediment as possible will be recirculated. The scum floats on the surface of the water in the vat. The sediment sinks to the bottom and the zone between the top and bottom layers of scum and sediment filled liquid is comparatively free of sediment. This is the quiet zone.

The periphery of each cylinder is provided with tread or tire surfaces 10 on opposite sides of the zone 9, by means of which surfaces the cylinders are moved about their axes, and also by means of which they are supported within the passage 2.

Each cylinder is provided with a door 11 in each end wall thereof, through which the clothes are inserted and removed from the cylinder. These doors are normally closed.

The cylinders are supported in the passage 2, and at all other times when being moved to and from the passage from their peripheries, and also are actuated from their peripheries as distinguished from being supported and/or actuated by axles.

The means for supporting and actuating the cylinders are here shown, as a pair of rolls 12 extending lengthwise of the frame, and of the passage 2, and journalled at their ends in the frame, these rolls being located to engage the lower portions of the cylinders near and on oppo-

site sides of the vertical plane of the axis of the cylinders, that is, these rollers are located below the horizontal plane of the axis of the passage 2, and the cylinders, and on opposite sides of the vertical plane of said axis. It will be understood that the passage, although preferably arranged with its axis horizontal need not be exactly horizontal.

The upper wall of the passage 2 is substantially semi-cylindrical, while the lower side walls 13, above the rollers 12, converge inwardly from the lower edges of the semi-cylindrical wall to the rollers, these walls 13 being arranged approximately tangent to the cylinders, and nearly tangent to the rollers. The portion of the passage between the rollers is unprovided with a bottom wall in order that the fluid, projected from the nozzles 8 into the cylinders through the perforated zone 9, can run out into the vats 4, with which the cylinders are aligned.

In washing operations, it is thought preferable to oscillate the cylinders, in contradistinction to rotating them constantly in one direction, and in this washing machine, the cylinders are rotated a predetermined number of times in one direction, and then the direction of rotation is reversed, and the cylinders are rotated a given number of times in the opposite direction, when the direction of rotation is again reversed. The means for actuating the cylinders to oscillate them, comprises the rollers 12 and means for actuating the rollers 12. The rollers 12 are actuated by any suitable power mechanism, here shown as an electric motor 14 and motion transmitting means between the motor and the rollers 12. This motion transmitting means consists of a pulley or sprocket wheel 15 mounted upon a shaft 18, which is connected to the motor, and pulleys or sprockets 16 and 17 which are mounted upon axles at the ends of the rollers 12, and a belt or chain 19 running over the pulleys or wheels 15, 16 and 17. The run of the belt or chain 19 between the pulleys or wheels 16, 17, also runs over idlers 20 located some distance below the cylinders 3. The shaft 18 is connected to the motor through suitable gearing. Obviously, the rollers 12 will be rotated when the motor is being actuated, and as they are rotated, the cylinders, which are resting thereon, will be rotated.

21 is a timer switch, which controls the reversing of the motor to effect a rotation of the cylinders in one direction, say four times, then in the opposite direction four times, this cycle being repeated as long as the motor is energized. The timer and the reversing switch form no part of this invention, and insofar as this machine is concerned, any mechanism may be employed to actuate the rollers 12.

There is one more cylinder 3 than is required to completely fill the passage 2 from end to end, and the cylinders are fed one by one, out of the passage at the exit end thereof as they are fed one by one into the passage from the entrance end thereof, and the cylinders are fed through the passage by pushing force applied to the cylinder at the entrance end about to enter the passage, the cylinders in the passage sliding along the rollers 12 during the feeding operation.

The means for feeding the cylinders axially through the passage, as here shown, consists of a pusher 25 here illustrated, see Figures 1 and 3, as a double angular lever pivoted at the outer end of one pair of its arms at 26 to brackets 27 on the frame, each of the angular arms of the double lever 25 extending downwardly, and carrying rollers 28 which engage the end face of the cylinder 3 at the entrance end of the passage 2, these rollers being located diametrically opposite each other to engage the cylinder on an annular surface or rim 29 located near the periphery of the cylinder. This arrangement permits sliding of the cylinders while they are being oscillated, since the rollers 28 will engage the rim 29 regardless of the position which the cylinders 3 assume while oscillating. The rollers 12 are provided with a smooth surface so that the cylinders 3 may be slid longitudinally along the rollers 12 while the rollers are rotating and causing the cylinders 3 to oscillate.

The pusher 25 is preferably power actuated, and it is here shown as actuated by a motor consisting of a cylinder 30 having a piston therein, the rod 31 of which is connected through motion transmitting mechanism, to be hereinafter described, to the pusher 25. The flow of motive fluid, as air, to and from the cylinder 30 is controlled, as will be hereinafter described.

The means for conveying the cylinders from the exit end of the passage 2, back to the entrance end, is preferably a power actuated conveyor belt 32 running over rollers 33, 34 at opposite ends of the frame and also over an intermediate roller 35, the belt being located outside of the passage 2 and extending substantially parallel thereto. In addition to the belt, said means also includes tracks at opposite ends of the passage 2 arranged at a right angle to the passage and the belt, and along which tracks the cylinders roll, the cylinder being ejected at the exit end of the passage rolling along one track, and the cylinder about to be placed in the entrance end, rolling along the other track from the belt to the entrance end of the passage 2.

36, Figure 3, are the tracks at the entrance end of the passage, along which the cylinder rolls from the conveyor belt to the entrance end of the passage 2, these tracks 36 being merely spaced apart angle irons and inclined downwardly toward the entrance end of the passage 2, so that the cylinder rolls by gravity from a receiving platform 37 located beyond the belt 32 or the roller 34 thereof, to the entrance end of the passage 2. This receiving platform 37 consists of a plate 38 and spaced apart and transverse bars 39, 40 at the outer end of the track 36, the bar 39 acting also as a barrier to hold the cylinder from rolling outwardly, the bar 40 has its intermediate part cut away, so as not to obstruct the rolling of the cylinder along the track. The plate 38 is located midway between the bars 39, 40 and supports the cylinder from tilting when it is leaving the belt and being transferred to the platform and reaches the cut-out portion of the bar 40. Means is provided for supporting the cylinder at the entrance end of the passage and at the inner ends of the tracks 36 prior to and while the cylinder is being pushed by the pusher 25 into the entrance end of the passage 2. This means is here shown as a pair of rollers 41 located between, below and beyond the ends of the driving rollers 12. These rollers 41 are so located that they hold the cylinder elevated slightly, so that the periphery of the cylinder clears the periphery of the drive rollers 12 while it is being pushed by the pusher 25 into the passage 2 over on the driving rollers. The rollers 41 constitute a rest for the cylinder while being loaded and also performs the important function of permitting the cylinder resting thereon to be rotated by

hand, so as to locate the door 11 above a horizontal diameter of the cylinder when the cylinder is being loaded with clothes.

42 designates the tracks at the exit end of the passage 2, these extending from the exit end to a receiving platform over the belt 32. The tracks 42 are also of angle iron, but are so located that the cylinder, when fed out of the exit end of the passage 2, will not roll by gravity down the tracks 42, until the cylinder has been rolled up off rollers or rests 43 onto the higher inner ends of the inclined tracks 42. The cylinders, when fed out of the exit end of the passage, are supported on rollers 43 similar to the rollers 41, but these rollers 43 are located lower than the drive rollers 12, so that when the cylinders are being expelled from off the ends of the drive rollers 12, they are, at least at the beginning of the operation, held off the rollers 43. These rollers 43 also permit the cylinder thereon to be rotated by hand to locate the door 11 below the horizontal diameter of the cylinder so that the clothes can be removed from the cylinder.

Means is provided for starting the cylinder supported on the rollers 43 over the track 42 to the conveyor belt 32. This means is here shown, as a pusher 44 acting on the periphery of the cylinder at a right angle to the axis of the cylinder. This pusher 44 is a lever pivoted at 45, and is actuated by a cylinder 46 having a piston therein, the rod 47 of which is connected to the lever 44. When motive fluid, as air, is permitted to enter the cylinder 46, obviously, the lever 44 will be rocked, causing the lever 44 to be pushed to the right, Figure 4, and roll or lift the cylinder on the rollers 43 to the right off of said rollers and onto the inner end of the inclined track 42. The cylinder then rolls down the track 42 to the belt 32 where it remains until picked up, by pick-up devices on the belt. The pusher 44 is provided with a pair of anti-friction members 48 acting on the treads 10 of the cylinder 46. The flow of fluid to and from the cylinder is controlled, as will be presently described.

There are a plurality, usually three, lugs, or pick-up devices 49 spaced equidistant apart on the belt 32. The construction of these pick-up devices, which, insofar as this invention is concerned, may be considered cleats, form no part of this invention.

The tracks 42 open onto a receiving platform or rest 50 where the cylinder rests until picked up by one of the pick-up devices 49. The frame of the machine is provided with a cut-out 51 forming a clearance for these pick-up devices 49.

The conveyor belt 32 runs constantly during the operation of the machine, and is actuated by an electric motor 52, and motion transmitting means, as a belt 53 between the motor and the rollers 34 over which the belt runs.

The control of motive fluid, as air, to the cylinder 46 from any source of supply, is controlled by a valve located in a valve casing 54, Figure 4. The valve casing 54 is connected with the cylinder 46 by a pipe 54^a. The pipe 54^a connects with a central chamber 54^b in the valve casing 54. The valve casing 54 also contains the chambers 54^c and 54^d. The chamber 54^c is supplied with working fluid from a suitable source and a normally closed spring loaded valve 54^e controls the flow of working fluid from the chamber 54^c to the chamber 54^b which connects with the pipe 54^a leading to the cylinder 46. The chamber 54^d is provided with an exhaust port 54^f which communicates with the outside atmosphere. An exhaust valve 54^g, which is mounted on the same stem with the valve 54^e, controls the flow of working fluid from the chamber 54^b to the exhaust chamber 54^d. The valves 54^e and 54^g are operated by a lever 55, which thrusts against the end of the stem on which these valves are mounted, and means is provided for preventing the operation of the lever 55, or the operation of the pusher 44, when one of the pick-up devices 49 is in such position that the cylinder would roll over onto the pick-up device.

As here illustrated, see Figure 6, each pick-up device includes a lift plate 56 on the belt, and this lift plate coacts with a follower 57 on a switch lever 58. When the lift plate 56 engages the follower, it operates the switch lever 58 to close the switch at 59 so as to cut in a magnet 60 in the circuit, and this magnet causes its armature 61 to interlock at 62 with a sliding bar 63 pivoted at 64 to the lever 55. Thus, the lever 55 can not be operated and hence, the pusher 44 can not be operated while a pick-up device is under the receiving platform 50 and out of position to properly cooperate with a cylinder that may be moved to, or over onto, the receiving platform 50.

The vats 4 are connected to a drain conduit 65 common to all of them, and each vat 4 is connected to the drain conduit 65 by a drain pipe 66. These drain pipes 66 have normally closed valves 161 therein which are held closed in any suitable manner as by weighted levers 67. These drain valves are operated from the cylinder 30 in a certain sequence with the pushers 25, and other valves which control the flow of materials to the vats, as will be presently described.

As will be understoood, the vats contain different washing fluids, or the cylinders or the clothes therein are subjected to treatment by different fluids at the various stations along the passage 2.

Referring to Figure 2, 68 and 69 are respectively hot and cold water feed pipes, and 70 a steam pipe. Both the hot and cold water pipes 68 and 69 communicate through valve controlled branch pipes 71 and 72 with a receptacle 73 having an outlet pipe 74 discharging into the first of the vats 4. The steam pipe communicates through branch pipes 75 and 76 with receptacles 77 and 78 respectively, one containing an alkali, and the other, soap. There is another receptacle 79 in this group, containing a bleach. The receptacles 77, 78 and 79 are connected by pipes 80, 81 and 82 to a header or manifold 83 which communicates by a pipe 84 with the first of the vats 4. These pipes 80, 81 and 82 are provided with suitable valves operable at the will of the operator, and also the pipe 84 has a suitable shut off valve 85 therein. The receptacles 77, 78 and 79 are also connected by pipes 86, 87 and 88 to a manifold 89 which communicates through a pipe 90, with a second manifold 91 having branches 92, 93, 94 and 95 leading to the second, third, fourth and fifth vats 4. The pipe 90 also has a shut off valve 96 similar to the valve 85.

The steam pipe 70 is also provided with a branch 97 having branches leading to some of the vats for the purpose of heating the fluid therein, the branch 97 being here shown as communicating with a header 98 having branches 99 extending into the second, third, fourth, fifth, sixth, seventh and eighth vats of the series. These branches 99 are provided with manually operated valves 100. Branch pipes also lead from the hot and cold water pipes to other of the vats, and 101 designates a branch of the hot water pipe opening into the sixth and seventh vats of the

series, and 102 designates a branch leading from the cold water pipe into the eighth vat of the series, these pipes 101, 102 having manually operated control valves 103 and 104 therein.

105 and 106 designate receptacles for containing material to treat the clothes during the final washing operation, the vat 105 containing bluing, and the vat 106 containing what is called sour. The sour removes soap grease or traces of soap grease from the clothes. The bluing compartment is connected by a pipe 107 having a measuring device 108 therein, with a header or manifold 109 which communicates through a pipe 110 with the next to the last vat 4, the pipe 110 having a valve 111 therein similar to the valves 85 and 96. The sour compartment also communicates through a pipe 112 with the header 109. Each pipe 107 and 112 has a manually operated valve 113 or 114 therein.

For the purpose of cold water rinsing, the branch 102 of the cold water pipe is provided with a sub-branch 115 which communicates through pipes 116 and 117 with the next to the last, and the last vat 4, these pipes 116 and 117 having manually operated valves 118 and 119 therein. The arrangement of the piping in connection 68 to 119 inclusive, is a matter of choice depending upon the washing process and formulas used.

The flow of water from the compartment 73, through the pipe 74, is controlled by a valve 74a. This valve is float operated and closes automatically and its operation is similar to that of valves used in toilet flushing tanks. The operation of the valves 74a, 85, 96 and 111, and also the drain valves of the vats, are in a certain sequence with the operation of the pusher 25, which feeds the cylinders endwise through the passage 2.

It is obvious, that while the cylinders are being shifted axially from station to station, the vats are drained or partly drained of the fluid therein, and after the shifting operation, the vats are refilled with a fresh supply of washing fluid, and in this embodiment of my invention, the draining operation, and the supplying of new fluids to the various vats, is controlled by the movement of the pusher 25 by the cylinder 30. The flow of air to the cylinder 30 is controlled by a lever 120 which controls the flow of air through a pipe 121 which connects with the cylinder 30. The lever 120 is located within reach of the attendant, so that when the attendant does operate the lever 120, air flows to the cylinder 30, causing it to actuate the pusher 25 through the connection to be described, also to open the drain valves operated by the levers 67 and thereafter to move the valves 74a, 85, 96 and 111. The valve 74a is a measuring valve. It may be of any suitable form, size and construction.

The motion transmitting means (Figure 2) between the piston rod 31 and the pusher 25, is here illustrated as a link 125 pivoted at 126 to the frame of the machine and at 127 to the piston rod 31, and having a connecting rod 128 pivoted at one end at 129 to the link 125 and at the other end at 131 to the pusher 25. The movement of the pusher 25 by the piston in the cylinder 30, is against the action of a returning spring 130.

Means is provided for first opening the drain valves of the vats 4 or partly opening some of them while the pusher 25 is being operated to shift the cylinders 3 and to close said valves and open the valves 74a, 85, 96, 111 during the return movement of the pusher 25 to its starting position. The valve operating means is actuated by the piston rod 31. The motion transmitting means between the rod 31 and the operating lever 133 of the valve 74a is here illustrated as a link 134 pivoted as at 127 to the swinging link 125 and at 135 to a swinging supporting link 136, and a spring pressed pawl 137 pivoted to the link 134 and so arranged as to ratchet past the operating lever 133 during the advance movement of the pusher 25 by the piston rod 31. The operating lever 133 has a cam face at the end thereof, and the pawl 137 coacts with the cam on the operating lever 133 during retrograde movement of the pusher and lifts said lever to operate the valve 74a. This cam operation is shown in Figure 2a. The pawl 137 is pivoted with a stop joint against the link 134 which permits it to tilt on its pivot against a pawl returning spring 137a, and hence ratchet past the cam of the valve operating lever 133 during the advance movement of the pusher 25 and to be held from tilting or ratcheting during the return movement of the piston rod 31 and link 134 by the pusher and its spring 130. The pawl 137 operates the valve operating lever 133 during the first part of its retrograde movement and lifts said lever. Thereafter it moves out from under the lever 133 and clears the same permitting the lever to return to its normal position.

The motion transmitting means between the piston rod 31 and the supply valves 85, 96 and 111 is here shown as a lever 141 pivoted at 142 to the frame of the machine and at 129 by a pin and slot connection to the swinging link 125, a lever 144 pivoted to the frame and a link 145 pivoted to the lever 144 and to valve operating arms 146, 147, 148 of the valves 85, 96, 111 and a one-way clutch connection between the lever 141 and the lever 144. The lever 141 is bifurcated for a purpose to be presently described. The one-way clutch connection is here shown as a hook or pawl 151 carried by one of the bifurcations of the lever 141 and arranged to coact with a tooth on the end of the lever 144. The pawl is spring pressed or weighted to return to its normal position. During movement of the pusher 25 in a forward direction or to the right, Figure 2, the lever 141 will be actuated to the right by the lever 125 and at the end of the movement to the right, the pawl 151 will ratchet into engagement with the lever 144. During the return of the pusher 25 to its starting position by the spring 130, the pawl 151 will pull the lever 144 therewith and hence shift the valve operating rod or link 145 to the left opening the valves 85, 96, 111 to permit fluids to enter the vats. This movement of the rod or link 145 is against the action of a returning spring 149. Due to the different arcs of movement of the lever 141 which carries the pawl 151, and of the lever 144, the pawl 151 slips out of engagement with the lever 144 before the lever 141 reaches its starting position so that the spring 149 is free to react and close the valves 85, 96 and 111.

The drain valves 161 for the vats are shown as held closed by the weighted levers 67 which are raised or operated by cams 162 on a cam shaft 163. These cams may be set at different angles to open the drain valves to permit the vats to entirely drain or to but partly drain. The cam for controlling the drain valve for the first vat 4 where the fluid becomes very dirty during each washing operation is set to completely drain while the drain valves for other

vats for bluing, bleaching, etc. operations are but partly opened to drain but part of the contents during each operation. The connection for operating the cam shaft 163 is here shown as a lever 171 similar to the lever 144, a link 172 connecting the lever and a rocker arm 173 on the cam shaft, and a one-way clutch connection between the lever 141 and the lever 171. This clutch connection is a pawl 174 similar to the pawl 151 and coacting with a tooth at the end of the lever 171.

The pawls 151, 174 are arranged opposite to each other and carried by different bifurcations of the lever 141.

During forward movement of the pusher 25 the pawl 174 will first actuate the lever 171 to open the drain valves and then due to the different arcs of movement of the levers 141, 171, will release the lever 171 permitting the drain valves to be closed by their weighted levers 67 before the valves 74a, 85, 96 and 111 are opened.

Thus, when the pusher 25 is actuated to feed the cylinder 3 one step, the drain valves of the vats are first opened then closed and then during the return of the pusher to its starting position the feed valves 74a, 85, 96, 111 are opened and closed.

The rotors of the pumps 5 are actuated by an electric motor 178. Means is provided for stopping the pumps when the cylinders are being shifted in the passage 2, this means, in the machine here illustrated, acting to open the motor circuit to stop the motor. The means here illustrated consists of a switch 181 operable by the pusher 25, see Figure 6, and normally in closed position, so that when the pusher 25 is operated, the switch 181 opens and hence, the pump motor 178 is stopped while the cylinders are being shifted.

The motor 52 which drives the conveyor 32 is controlled by a switch 182. The flow of current to the pump motor 178 is controlled by a manually operated switch 183 and the flow of current to the motor 14, which drives the cylinders, is controlled by a manually operated switch 184, and also by a timer switch 21 which acts to reverse the motor in order to give an oscillating movement to the cylinders. These switches are located within easy reach of the operator.

The machine is provided with a stand 139 for the operator. The clothes are sorted at this stand into, say three classes, white, colored and extremely dirty clothes. Each customer's clothes are given the same number. The white clothes are put in one cylinder, the colored clothes in another, and the extremely dirty clothes in another, and in each cylinder a tag is placed with the customer's number on it. The first customer's clothes would be tagged No. 1; the second, No. 2, and etc. Each customer's laundry requires two cylinders and sometimes three, and preferably, one customer's clothes are not placed in the same cylinder with another customer's clothes. The laundry is weighed on scales 186 before being sorted.

The operation of the machine is as follows:

The operator places the clothes in the cylinder at the entrance end of the passage 2, this cylinder being indicated in dotted lines, Figure 1. He then operates the lever 120 to permit air to pass into the cylinder 30 so that the pusher 25 advances the cylinders one step through the passage 2 and pushes the endmost cylinder out the exit end of the passage 2 and onto the rollers 43. This operation temporarily opens the drain valves in the pipes 66. The return of the pusher 25 to normal position operates the flushometer valve 74a and temporarily opens the chemical supply valves 85, 96 and 111. Also, at the start of the working day, the switch 183 is closed to permit the current to flow to the pump motors 178 and these pump motors run constantly, except when the pusher 25 is actuated when the pump motors 178 are cut out of the feed circuit by a switch 187 operated by a magnet 188 controlled by the switch 181, which switch 181 is opened by the operation of the pusher 25.

The cylinder ejected at the exit end of the passage 2 rests on the rollers 43 until unloaded. Then the lever 55 is operated, permitting air to flow to the cylinder 46 to actuate the pusher 44, which rolls this cylinder down the tracks 42 to the receiving platform or rest 50, over the conveyor belt 32 where it is picked up by the pick-up devices 49 and carried to the front end of the machine, where it rolls by gravity down the tracks 36 into a position in front of the attendant. Here it is loaded and again pushed into the passage 2. At the start of the working day, where clothes are in only the first cylinder, the valves 100, 103, 104, 118, 119, 113, 114 and valves in the pipes leading to the manifold 89 are closed by hand, that is, all valves in pipes leading to cylinders other than the first are closed and are opened by hand as the first cylinder progresses through the passage 2. After the first cylinder passes completely through the passage 2, no further attention need be given these valves until the machine is stopped for the day when these valves together with valves in pipes 71, 72, 75, 76 are closed by hand as the last cylinder progresses through the passage 2. It is believed that the operation and control of the motors is apparent, without further description, upon reference to Figure 6.

We claim:

1. In a washing machine, a frame formed with a cylindrical passage extending in a general horizontal direction, actuating rolls extending lengthwise of the lower portion of the passage on opposite sides of the vertical median plane of the passage, clothes receiving cylinders mounted in the passage and resting on the rolls, means for supplying and controlling the supply of washing fluids to the cylinders at different stations along the casing, the cylinders being shiftable axially through the casing and slidable along the rolls, and means for actuating the rolls and for shifting the cylinders axially of the passage and along the rolls, said rolls being of the same diameter throughout the portions thereof in said passage, whereby the cylinders can shift axially along the peripheries of the rolls.

2. In a washing machine, a frame formed with a casing extending in a general horizontal direction and open at its ends to provide a passage therethrough, washing mechanism including clothes receiving cylinders in said passage, the cylinders being movable about their axes to tumble the clothes therein, a pair of actuating rollers extending lengthwise of the lower portion of the passage on opposite sides of the vertical median line of the passage, the cylinders resting on said rolls, and the cylinders being slidable axially of the rolls to load said cylinders into the passage and unload said cylinders therefrom, means at one end of the rolls for supporting the cylinders preliminary to and while being fed into the passage, and means at the other end of the rolls for supporting the cylinders while and after the cylinders are being fed off the rolls, said rolls be-

ing of equal diameter throughout the length thereof in the passage, whereby the rolls serve as a track for the cylinders during the axial shifting operation of the cylinders.

3. In a washing machine, a frame formed with a cylinder receiving passage, a cylinder movable about its axis in said passage, and shiftable axially into the passage at one end thereof and out of the passage at the other end thereof, means for supporting the cylinder at its periphery and for applying drive force to the periphery of the cylinder to move it about its axis, means for moving the cylinder axially along the supporting means while the cylinder is supported thereon on its periphery, a conveyor extending lengthwise of the casing on the outside thereof for supporting the cylinder, tracks extending transversely of the passage from opposite ends of the passage to opposite ends of the conveyor, the cylinder being rollable on its periphery from the exit end to the conveyor and from the conveyor to the inlet end of the passage, and means for supplying a washing fluid to the cylinder while in the passage.

4. In a washing machine, a frame formed with a passage extending in a general horizontal direction therethrough, cylinders movable endwise through the passage from one end to the other, means for supplying washing fluids to the cylinders at various points along the passage, means for moving the cylinders about their axes while in the passage including a pair of rolls located in the lower portion of the passage so that the cylinders rest thereon, said rolls extending from end to end of the passage and being of the same diameter throughout their length whereby they serve as tracks during axial shifting of the cylinder, and rests for the cylinders at the entrance and exit ends of the passage, the rests being located between the rolls and beyond the ends of the same.

5. In a washing machine, a frame formed with a casing having a passage extending in a general horizontal direction therethrough, clothes receiving cylinders mounted in the passage and slidable axially therethrough, means for circulating washing fluids to the cylinders in the casing, means for shifting the cylinders axially of the passage, means for controlling the operation of the shifting means, and means operatively connected with said shifting means and operated thereby for controlling the operation of said circulating means.

6. In a washing machine, a frame formed with a casing having a passage extending in a general horizontal direction therethrough, clothes receiving cylinders mounted in the passage and slidable axially therethrough, means for circulating washing fluids to the cylinders in the casing including an electric motor and pump mechanism operated thereby, a normally closed switch in the circuit of said motor, means for shifting the cylinders axially of the passage, including means for operating the shifting means and for returning the same to initial position, said switch being connected to the shifting means to be opened thereby when the shifting means is operated to shift the cylinders axially and to be closed thereby when the shifting means returns to initial position.

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