

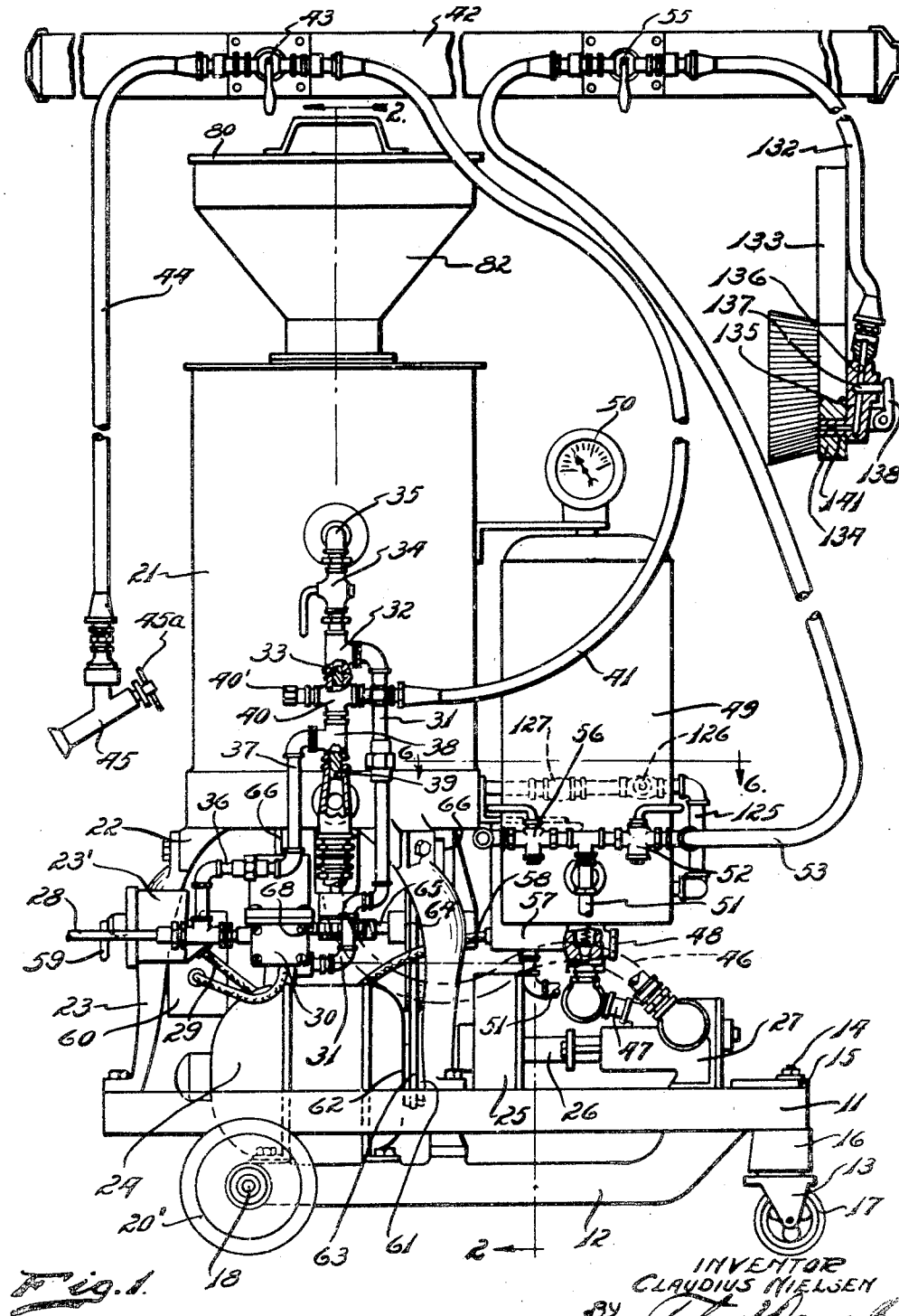
March 8, 1949.

C. NIELSEN
MIXING MACHINE

2,463,995

Filed Sept. 28, 1945

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

Fig. 2.

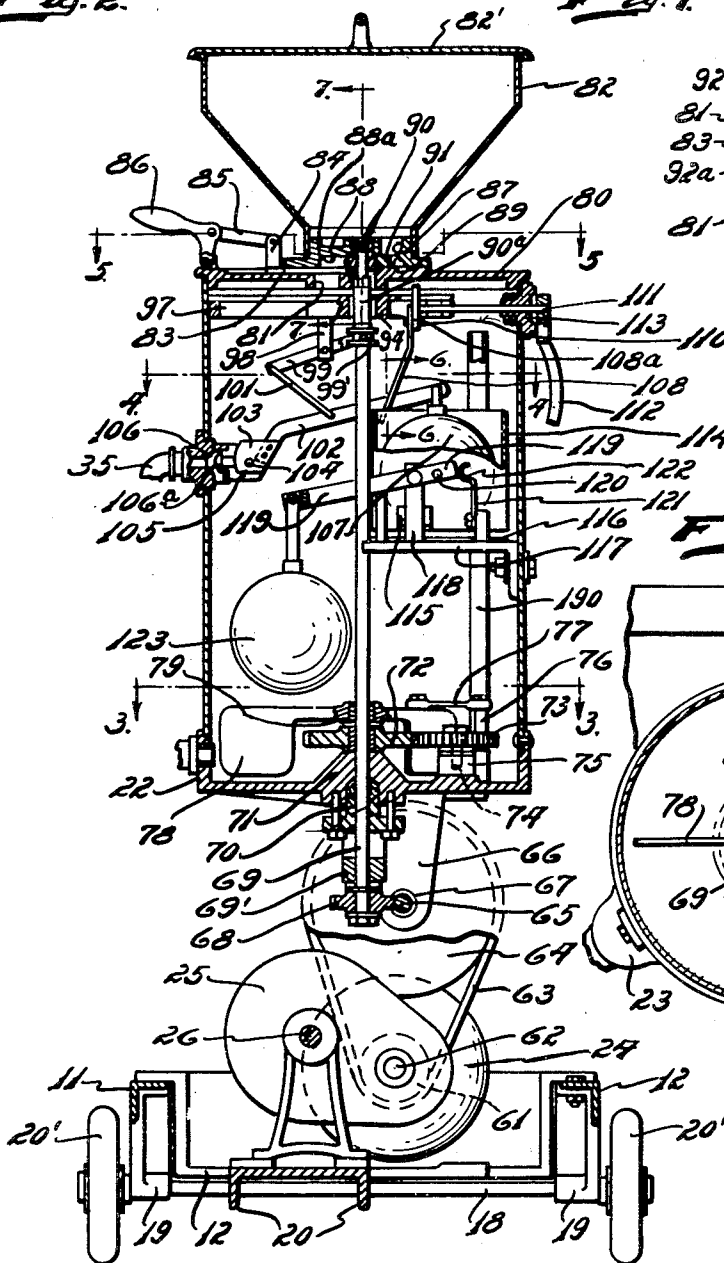


Fig. 7.

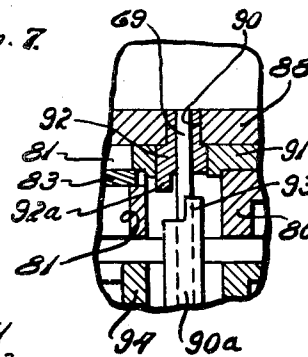
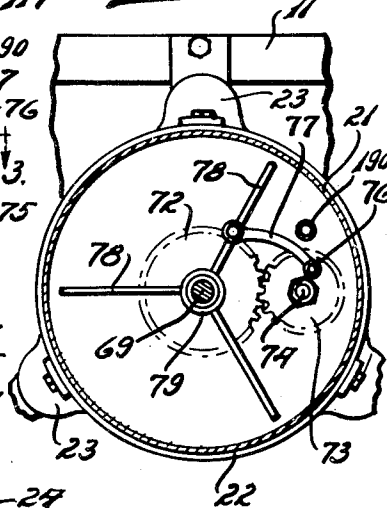


Fig. 3.



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Fig. 4.

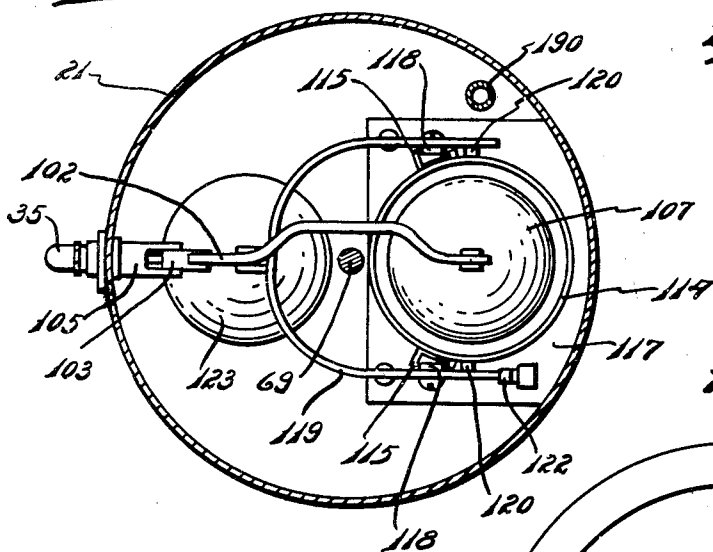


Fig. 8.

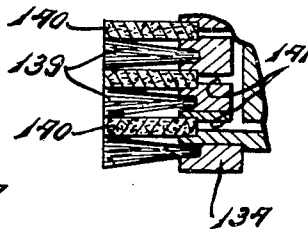


Fig. 5.

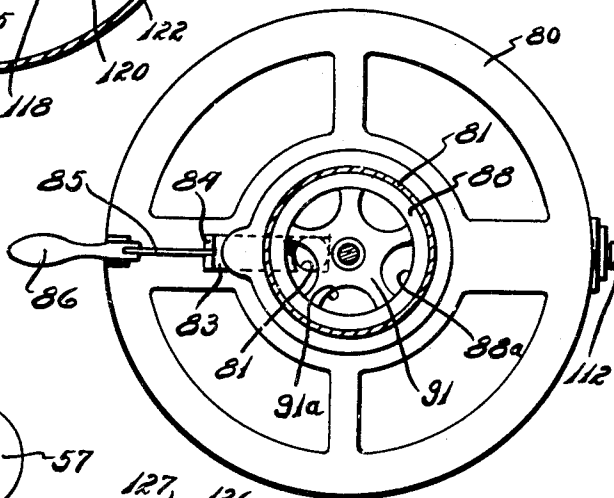
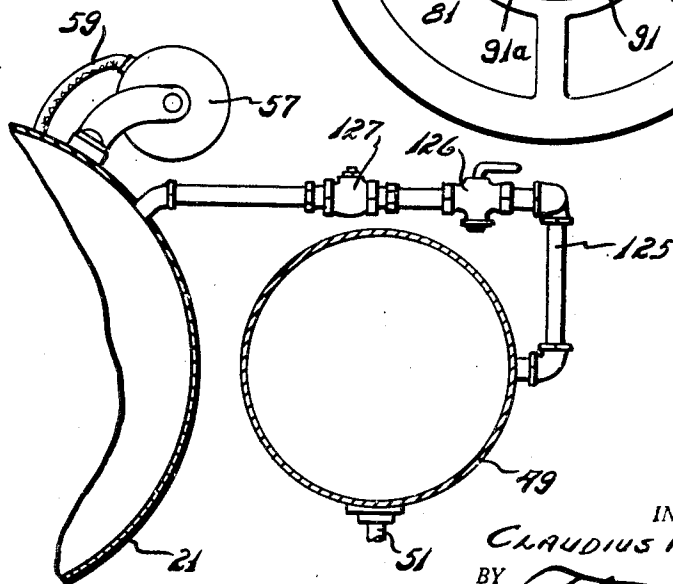


Fig. 6.



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UNITED STATES PATENT OFFICE

2,463,995

MIXING MACHINE

Claudius Nielsen, Detroit, Mich.

Application September 28, 1945, Serial No. 619,244

7 Claims. (Cl. 259—6)

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My invention relates to a new and useful improvement in a mixing machine, adapted for use in mixing cleaning compounds in powdered form in water which is delivered into a tank and from which the solution is led off for cleaning purposes.

In machines of this class the water is delivered into the mixing container from a suitable source such as the city water supply. A suitable valve control which is generally float operated is used to control the delivery of water into the tank or mixing container. Various forms of feeding mechanisms have been devised for delivering the cleaning compound into the mixing tank. A common use for machines of this type is the cleaning of painted surfaces. The machine is also used for cleaning automobiles, busses, tile surfaces, terra cotta surfaces, brick walls and the like. For the various surfaces the cleaning compound is selected because of its properties and in view of the cleaning operation which it is supposed to perform. It is important that the solution which is led off from the mixing tank on a certain job shall be of uniform intensity or strength. This is particularly important where painted surfaces are being cleaned in as much as a solution of excessive strength might result in the removal of the paint itself.

It is an object of the present invention to provide a mixing machine of this class so constructed and arranged that a positive control of the delivery of water into the mixing tank and a positive control of the cleaning compound into the mixing tank is obtained so that a pre-determined proportion between the amount of water delivered and the amount of cleaning compound delivered may be always maintained thus assuring a solution of common strength.

Another object of the invention is the provision in the mixing tank of an auxiliary tank in which a float is adapted to engage and with which is associated a mechanism operable through the rise of the liquid in the mixing tank to open and close the auxiliary tank.

Another object of the invention is the provision in a mixing machine of this class of a mechanism for positively and quickly in a rapid movement opening the water control valve to permit water to flow in and at the same time for closing the clutch which operates the mixing mechanism so that the flow of water and the flow of cleaning compound into the tank begins substantially simultaneously and also terminates simultaneously.

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Another object of the invention is the provision in a mixing tank of this class of a mechanism which is automatic in its operation so that the operator who may be drawing the solution from the tank at a great distance therefrom is free to perform his own operation without consideration of the operation of the mechanism in the mixing tank.

Another object of the invention is the provision in combination with a mixing tank of flexible conduits for leading the solution from the mixing tank and provided with control valves adjacent the ends thereof so that the operator may control the delivery of the solution through the flexible conduits.

Another object of the invention is the provision in combination with a mixing tank or machine of this class of an auxiliary or storage reservoir from which the solution is delivered to the work.

Another object of the invention is the provision in a mixing machine of this class so constructed and arranged that it may be easily and quickly transported from place to place and is of a portable nature.

Another object of the invention is the provision of a brush having a liquid delivery passage formed therein and provided with a control valve for controlling the flow of liquid to said brush.

Another object of the invention is the provision of a cleaning brush which will be substantially dripless so that it may be safely used in the interior of a building without effecting any considerable mess.

Another object of the invention is the provision of a cleaning brush having a plurality of rows of bristles spaced apart by an absorbent material such as cotton or the like with the bristles alternating with the rows of absorbent material.

Other objects will appear hereinafter.

It is recognized that various modifications and changes may be made in the detail of structure illustrated without departing from the invention itself and it is intended that such variations and modifications may be encompassed within the scope of the claims which form a part hereof.

Forming a part of this specification are drawings in which—

Fig. 1 is a side elevational view of the invention,

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1,

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2,

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a view taken on line 5—5 of Fig. 2;

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 1.

Fig. 7 is an enlarged sectional view taken on line 7—7 of Fig. 2.

Fig. 8 is a fragmentary enlarged sectional view of the brush used in the invention.

In the drawings I have illustrated the invention constructed so that it is portable and may be moved about from place to place. This is an advantage particularly in cleaning large surfaces or operating in large rooms which are to be cleaned. I provide a supporting frame embodying the rails 11 and 12. The castor fork 13 is provided with a stud 14 which projects through the plate 15 and rail 11 through the spacing lock 16 so that the structure is thus secured together. A traction wheel or castor 17 is carried by the castor fork 13. This castor 17 is mounted preferably at the medial line of the forward end of the supporting frame.

A shaft 18 is projected through suitable bearings 19 at the rear side of the supporting frame and also through the flanges 20 of a motor support. Mounted on opposite ends of the shaft 18 are the traction wheels 20'.

A mixing tank 21 is provided with a base 22 secured to which and projecting downwardly therefrom are the supporting legs 23 which are mounted on the supporting frame.

An electric motor 24 is mounted on the supporting frame and the shaft of this motor extends into a gear housing 25 into which projects a shaft 26 of a pump 27. The motor 24 is connected by the wire 29 to the switch in the switch box 23' which is operated by the switch arm 55.

An inlet pipe 28 is provided which is attached to a source of water supply under pressure. This inlet supply pipe 28 is adapted to communicate through the solenoid valve 30 with the pipe 31 which connects to the T 32 and is adapted to communicate with the valve 34 and the elbow 35 with a valve positioned on the inside of the tank 21, the description of which will be given hereinafter. Communicating with the pipe 28 is a bypass line embodying the parts 36, 37 and 38 to establish communication with the fitting 40. This fitting 40 is shown as being provided at one side with a flexible conduit or hose 41 and as being plugged with the cap 40' at the opposite side. In this conduit or delivery line 41 is interposed a manually operated control valve 43 controlling the flow of liquid to the hose 44 on the end of which is mounted an outlet nozzle 45. I have shown this delivery line 41 connected to a belt 42 which would be worn by the operator when using the device. The water by-passed through the hoses 41 and 44 would thus serve as a rinse water so that the operator would have rinsing water available when needed.

A flexible conduit 46 serves to connect the interior of the tank 21 with the inlet side of the pump 27 the outlet side of the pump 27 is connected through the conduit 47 and the pressure valve 48 with the interior of a pressure tank 49 on which is mounted the pressure gauge 50. An outlet delivery pipe 51 communicates with the interior of the pressure tank 49 and also with the manually operated valves 52 and 56. A flexible conduit 53 communicates with the valve 52 and carries at its end the cleaning brush 54 which connects through the valve 55 with the conduit 53. The outlet delivery pipe 51 communicates

with the tank 49 through a pressure switch 57 which is connected by the wire 58 and serves to control the motor 24 which drives the pump 27. This pressure switch 57 may be set at any desired pressure so that delivery of liquid into the pressure tank 49 is controlled to the pressure which is set.

The shaft 62 of the motor 24 is provided with a pulley 61 around which fastens a belt 63 which serves to drive the pulley 64 fixedly mounted on the shaft 65. This shaft 65 projects through a bracket 66 which depends from the bottom 22 of the tank 21 and serves as a support for the shaft 65. The shaft 65 is provided with worm 67 meshing with worm gear 68 fixedly mounted on the shaft 69 which projects through bushing 69' of the bracket 66 and extends through the packing gland 70 and the ball 71 on the bottom 22 of the tank 21. This ball 71 serves as a bearing for the shaft 69. Fixedly mounted on the shaft 69 is a gear 72 meshing with a gear 73 which is mounted on the bolt 74 as an axle. Secured eccentric to the gear 73 and projecting upwardly therefrom is a stud 76 to which is pivotally connected one end of an arm 77 the opposite end of which is pivotally connected to an agitating blade 78, a plurality of which project outwardly from the hub 79 loosely positioned on the shaft 69. Construction is such that as the shaft 69 is rotated the vanes or paddles 78 are oscillated or rocked thus serving to mix the liquid which is deposited in the tank 21 and assures a thorough mixing of the liquid with the powdered washing compound which is also deposited in the tank 21.

A cover 80 is provided for the tank 21. This cover is provided with an opening 81 formed therein. Mounted on the cover and projecting upwardly therefrom is a hopper 82 having a lid 82'. Slidably positioned on the cover 80 is a plate 83 which may be projected across the opening 81 and serve as a closure therefor. Projecting upwardly from this plate 83 is a lug 84 to which one end of the link 85 is pivoted the opposite end of the link being pivotally connected to the bell crank 86 which is pivotally mounted on the cover 80. By rocking the bell crank 86 the plate 83 may be moved into position to close the opening 81 or moved out of closing position to leave the opening 81 unobstructed. Mounted on the cover 80 is the head 88 over which the lower end of the hopper 82 is adapted to fit. Found in the head 88 is an opening 87 through which powdered washing compounds positioned in the hopper 82 may pass. The head 88 is provided on its under surfaces with a cavity 88A which overlies the opening 81 in the cover 80. Rotatably mounted in this cavity is a feeder plate 91 provided on its periphery with spaced apart recesses 91A. Projecting downwardly from the feeder plate 91 centrally is a tube 92 having a tongue 92A extended outwardly therefrom. This tube also extends above the feeder plate 91 as a boss and engages in an opening formed in the head 88 which serves as a bearing therefor. Slidably mounted on the shaft 69 is a sleeve 98 carrying on its upper end an upwardly projecting tongue 93 which is adapted to engage against the end face of the tube 92 and, upon rotation, engage against the tongue 92A so as to effect the rotation of the feeder plate 91 in unison with the shaft 69. The construction is such that powdered washing compound in the hopper 82 which passes through the opening 87 may deposit itself in the recesses 91A which are formed in the feeder plate 92. In this recess, upon rotation of the

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feeder plate 91, comes into registration with the opening 81 the washing compound will pass by gravity downwardly through the opening 81 into the interior of the tank 21. It is believed obvious that by regulating the distance of slidable movement of the closure plate 83 the size of the opening through this washing compound may pass into the tank 21 may be varied thus regulating the amount of compound which will pass into the tank 21 upon a rotation of the feeder plate 91. The sleeve 90A is provided on its lower end with a pair of spaced apart ribs which project outwardly from the periphery thereof and provide a channel in which the ends of a fork may be engaged so that upon a rocking of the fork the sleeve 90A may be slid upwardly or downwardly on the shaft 69 so as to be moved to operative or in-operative position.

Embracing the sleeve 90A is a hub 94 projecting outwardly from which are a plurality of arms 97 which are secured at their outer ends to the tank 21. This construction provides a sort of spider which is secured in fixed relation to the tank 21. Secured to and projecting downwardly from one of the arms 97 is a supporting bracket 98 on which is pivotally mounted intermediate its ends an actuating fork 99 which is pivotally connected to one end of the rod 101 the other end of said rod 101 being pivotally connected to the lever 102. This lever 102 is fixedly connected to the lug 103 which serves as a valve actuating shaft and which is pivotally mounted by means of the pin 104 on the section 105 of the fitting on which is formed a valve seat 106. A valve head 106A is slidably mounted in the fitting and is adapted to be moved by the cam 103 into engagement with the seat 106 so as to shut off the inflow of water through the pipe 35 into the tank 21. Pivotally mounted on the opposite end of the lever 102 is float 107. A rod 108 is hooked around the lever 102 and the upper end of this rod is pivotally connected eccentrically to a disc 108A fixedly mounted on a shaft 111 which projects to the exterior of the tank 21 and on the outer end of which is fixedly mounted a handle 112. The construction is such that when the float 107 rises to a pre-determined height the valve head 106A will be moved into closing position and shut off the inflow of water. Should it be desired to shut off the inflow of water independently of the float 107 this may be accomplished by rocking the rod 111 to lift through the medium of the rod 108 the lever 102. The operator would ordinarily resort to this action when he notices that there is sufficient cleaning solution in the tank 21 to finish the job on which he is working. It of course is necessary that when the inflow of water into the tank 21 is shut off the inflow of the cleaning compound should also be shut off in order that a solution of uniform strength may be obtained. When the lever 102 is rocked upwardly it will effect a downward movement of forked end of the lever 99 and cause the sleeve 90A to slide downwardly so that the tongues 92A and 93 will be disengaged. It is understood that while the sleeve 90A is longitudinally slidable on the shaft 69 it always rotates in unison with it. When it is slid downwardly so that the tongues 92A and 93 are no longer in engagement the feeding plate 91 will of course remain stationary and no more washing compound can be carried from the opening 81 to register with the opening 81. Consequently when the operator by rocking the handle 112 locks the valve pin 106A in closed position so that no more

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water may enter the tank 21 he at the same time effects a disengagement of the clutch formed by the sleeve 90A and the cooperating tongue 92A and 93. Likewise when the arm 102 is rocked upwardly in response to the buoyant action of the float 107 the same action will take place. The bend of the arm 102 and the length thereof as well as the distance of the float 107 therefrom is such that when a pre-determined amount of water has flown into the tank 21 so that a water level of a pre-determined height has been reached float 107 will have moved upwardly sufficiently to effect a closing of the inlet valve and to effect a disengagement of the feeder plate clutch.

Mounted on the inside of the tank 21 is a supporting bracket or table 117 on the upper surfaces of which is positioned a layer 116 of rubber or other suitable flexible sealing material. Positioned to rest upon this layer 116 is a cylindrical body 114 open at both ends. Projecting upwardly from the table 117 is a stud 118 on which is pivotally mounted the yoke arm 119, this yoke arm being mounted on the stud 118 intermediate the ends of the yoke arm. This yoke arm is connected by the pin 120 to the cylindrical body 114 so that as the yoke arm 119 is rocked upwardly and downwardly the cylindrical body 114 will also be rocked upwardly and downwardly. Projecting outwardly from the cylindrical body are spaced apart lugs 115 which engage at opposite sides of the standard or post 118 and serve as guide members. Projecting upwardly from the bed or table 117 is a spring arm 121 having a hook 122 formed on its upper end and adapted to engage the end face of the yoke arm 119. The float 123 is pivotally connected to the opposite ends of the yoke arm 119. The construction is such that as the liquid rises in the tank 21 the float 123 will also rise and force the member 114 downwardly into sealing relation with the layer 116 of rubber or other flexible material so as to form a chamber or compartment in which the float 107 is positioned. As the liquid rises in the tank 21 sufficiently high it will overflow into the member 114 over the upper edge thereof and serve to fill the compartment formed by the member 114. Consequently, the float 107 moves upwardly and downwardly in response to the amount of liquid in the member 114. As the liquid is used out of the tank 21 the float 123 will move downwardly until arm 119 has been rocked sufficiently to raise the cylindrical body 114 off of the layer 116. This will permit the liquid in the member 114 to be discharged therefrom rapidly almost instantaneously so that the float 107 will drop with a very rapid movement. This will force the sleeve 90A to move upwardly into clutch closing position by a very rapid movement and it has been found that this rapid movement to clutch closing position is necessary, or at least very desirable as experience has shown that when the sleeve 90A is moved up gradually an operation of the compound feeding plate 91 will not be effected in unison with the opening of the valve which permits the water to flow into the tank 21. In the present arrangement using the dual float operation the clutch is moved into operative position rockably and simultaneously with the opening of the valve which permits the inflow of water into the tank 21. Consequently as the water begins to flow into the tank 21 the feeding of the washing compound also begins.

The tank 121 is also in communication with the pressure tank 49 by means of a by-pass conduit 125 in which is interposed the manually operable

valve 126 and a check valve 127. When the valve 126 is opened the liquid in the pressure tank 49 may flow into the tank 21 and the check valve 127 prevents liquid flowing from the tank 21 through the conduit 125 into the pressure tank 49.

In the drawings I have illustrated the invention adapted for use simultaneously with two operators but equipped for one operator. Should a second operator desire to use the machine a hose would have to be fastened to the outlet end of the valve 56 and also the plug 40' would have to be removed and provided with a hose similar to the hose 41.

In operation the operator after connecting the liquid delivery pipe 28 to the source of water under pressure and after making the proper electrical connection so that the motor 24 may be driven, and this is usually effected by means of an extension cord and a socket plug, the operator would then close the switch 59, the hopper 82 having been previously filled with the proper kind of cleaning compound in pulverized form sufficiently fine so that it may be properly fed into the tank 21. When the switch 59 is closed the solenoid valve 30 will open and permit flow of liquid through the pipe 31, the fitting 32 the open valve 34 and the elbow 35 through the full operated valve which will be open. Motor 24 will be operated immediately upon opening of the solenoid valve 30 so that the compound feeding mechanism will also be operated. Likewise the agitating blade 78 will be operating to effect a mixture of the cleaning compound and the water as both are deposited in the tank 21. The pump of course would be operating and consequently the liquid would be withdrawn from the tank 21 and forced into the tank 49. The operator however would have opened the valve 126 so that the liquid delivered to the pressure tank 49 would return to the tank 21 and this condition would continue until the desired or pre-determined liquid level of the liquid in the tank 21 had been reached. When this liquid level in the tank 21 has been reached the inflow of water into the tank 21 will of course cease and the feeding of cleaning compound into the tank 21 will also have stopped. When this has been accomplished the operator would then close the valve 126 so that pressure would then be built up in the pressure tank 49. The pressure switch 57 would be set at a maximum and minimum pressure and when the maximum pressure is reached the circuit to the motor 24 and the solenoid valve 30 would be broken and when the minimum pressure is reached these circuits would again be closed. The operator wearing the belt 42 could then utilize the cleaning solution passing through the hose or conduit 53 and he could also utilize the rinsing water passing through the hoses 41 and 44 and emitting through the nozzle 45 which is provided with the control valve 45A.

The cleaning solution delivered through the hose 53 and through the valve 55 is carried by the flexible conduit or hose 132 to the brush. This brush comprises a handle-forming portion 133 which projects outwardly from the back 134. Mounted on this back is a fitting 135 having a pocket 136 formed therein and adapted to be closed by the valve pin 137 operated by the valve handle 138. Projecting outwardly from one face of the back 134 are alternate rows of bristles 139 and absorbent material such as cotton 140. Passages 141 are formed through the back 134 into the rows 140 of cotton or absorbent material these passages communicating with the passage 136.

Thus the operator by operating the valve handle 138 has complete control of the cleaning solution to the cleaning brush and by using the absorbent material which forms a part of the brush the operator is permitted to obtain the exact amount of cleaning solution which is necessary for the operation without any excess material. This will prevent the flowing of the cleaning solution downwardly from a wall which is being cleaned and prevent an excessive accumulation of cleaning solution on the floor or the like.

It will be noted that when the machine has been set in operation as described the operator, who may be at a considerable distance from the machine, depending upon the length of the conduits 41 and 53 will have complete control of the operation of the machine. By opening and closing the valve 137 the flow of cleaning solution from the pressure tank 49 will be controlled. As this cleaning solution is withdrawn from the pressure tank 49 and the liquid level in the tank 21 lowers the mechanism will automatically be operated to replenish the water in the tank 21 and at the same time feed into the tank 21 the proper amount of cleaning compound in proportion to the amount of water which has entered the tank 21. In this way the solution of desired strength is always obtainable. Experience has shown that the invention is one which is highly efficient in use making it possible to effect a cleaning of high class expeditiously and without the customary fuss.

What I claim as new is:

1. In a machine of the class described a mixing tank adapted for the reception of water; means for delivering water into said tank; float operated means for controlling delivery of water into said tank; a float for operating said float operated means; means for feeding washing compound in powdered form into said tank in proportion to the amount of water delivered into said tank; and means for actuating said feeding means simultaneously with operation of said float operated control means; a water container in said tank for reception of said float; and means for effecting the quick emptying of said container.

2. In a machine of the class described, a mixing tank adapted for the reception of water; means for delivering water into said tank; means for controlling the delivery of water into said tank; a liquid container in said tank comprising a wall forming portion and a separate bottom forming portion adapted, upon engagement of said wall forming portion and said bottom forming portion, for containing liquids and adapted for being filled with liquid upon the rising of the liquid in said tank to a pre-determined level; a float in said container; means for actuating said control means and connected to and operated by said float; and means operable upon the lowering of the liquid level in said tank to a pre-determined level for moving said wall forming portion and said bottom forming portion into spaced relation for effecting a rapid emptying of said container.

3. In a machine of the class described, a mixing tank adapted for the reception of water; means for delivering water into said tank; means for controlling the delivery of water into said tank; a liquid container in said tank comprising a wall forming portion and a separate bottom forming portion adapted, upon engagement of said wall forming portion and said bottom forming portion, for containing liquids and adapted for being filled with liquid upon the rising of

the liquid in said tank to a predetermined level; a float in said container; means for actuating said control means and connected to and operated by said float; and means operable upon the lowering of the liquid level in said tank to a pre-determined level for moving said wall forming portion and said bottom forming portion into spaced relation for effecting a rapid emptying of said container; means for feeding washing compound into said tank; and means operable upon the raising and lowering of said float in said container for controlling the operation of said washing compound feeding means.

4. In a machine of the class described a mixing tank adapted for the reception of water; means for delivering water into said tank; means for controlling the delivery of water into said tank; a liquid container in said tank comprising a wall forming portion and a separate bottom forming portion adapted upon engagement of said wall forming portion with said bottom forming portion for containing liquids; a float in said container; means for operating said liquid controlling means upon the rising and lowering of said float; means for delivering washing compound in powdered form into said tank; and means operable upon the raising and lowering of said float for controlling the operation of said washing compound delivering means.

5. In a machine of the class described a mixing tank adapted for the reception of water; a pressure tank communicating with said mixing tank; a pump for pumping liquid from said mixing tank into said pressure tank; means for agitating the liquid in said mixing tank; an electric motor for driving said agitating means and operating said pump; and means for controlling the circuit to said motor dependent upon the pressure in said pressure tank.

6. In a machine of the class described, a mixing tank adapted for the reception of water; means for delivering water into said tank; means for controlling the delivery of water into said tank; a liquid container in said tank, comprising: a wall-forming portion and a closure for the bottom thereof, said wall-forming portion and said closure being relatively movable, said closure being movable to closing and non-closing position and said container being adapted for containing liquid and for being filled with liquid upon rising of the liquid in said tank to

a pre-determined level; a float in said container; actuating control means connected to and operated by said float; and means operable upon the lowering of the liquid level in said tank to a predetermined level for moving said closure to non-closing position for effecting a rapid emptying of said container.

7. In a machine of the class described, a mixing tank adapted for the reception of water; means for delivering water into said tank; means for controlling the delivery of water into said tank; a liquid container in said tank, comprising: a wall-forming portion and a closure for the bottom thereof, said wall-forming portion and said closure being relatively movable, said closure being movable to closing and non-closing position and said container being adapted for containing liquid and for being filled with liquid upon rising of the liquid in said tank to a pre-determined level; a float in said container; actuating control means connected to and operated by said float; and means operable upon the lowering of the liquid level in said tank to a predetermined level for moving said closure to non-closing position for effecting a rapid emptying of said container; means for feeding washing compound in powdered form into said tank in proportion to the amount of water delivered into said tank; means for operating said feeding; and means controlling the operation of said means connected to said float and operable upon the rising and lowering of said float.

CLAUDIUS NIELSEN.

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