

May 31, 1949.

H. B. WISWALL

2,471,506

SPRAY TYPE WASHING MACHINE FOR SOLID OBJECTS

Filed March 22, 1943

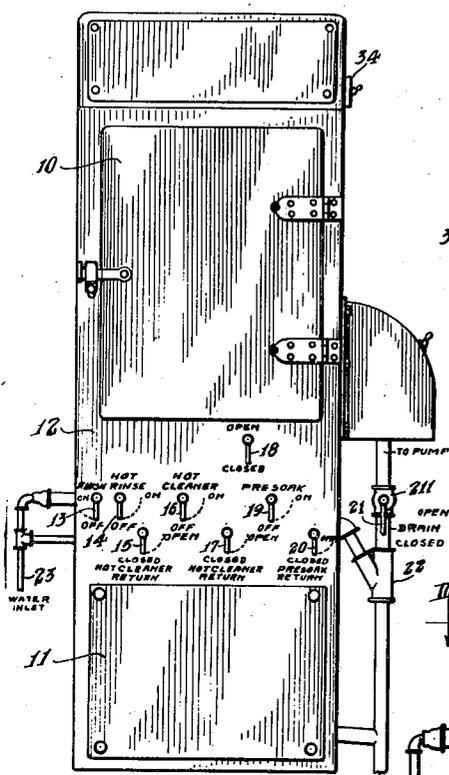


Fig. 1

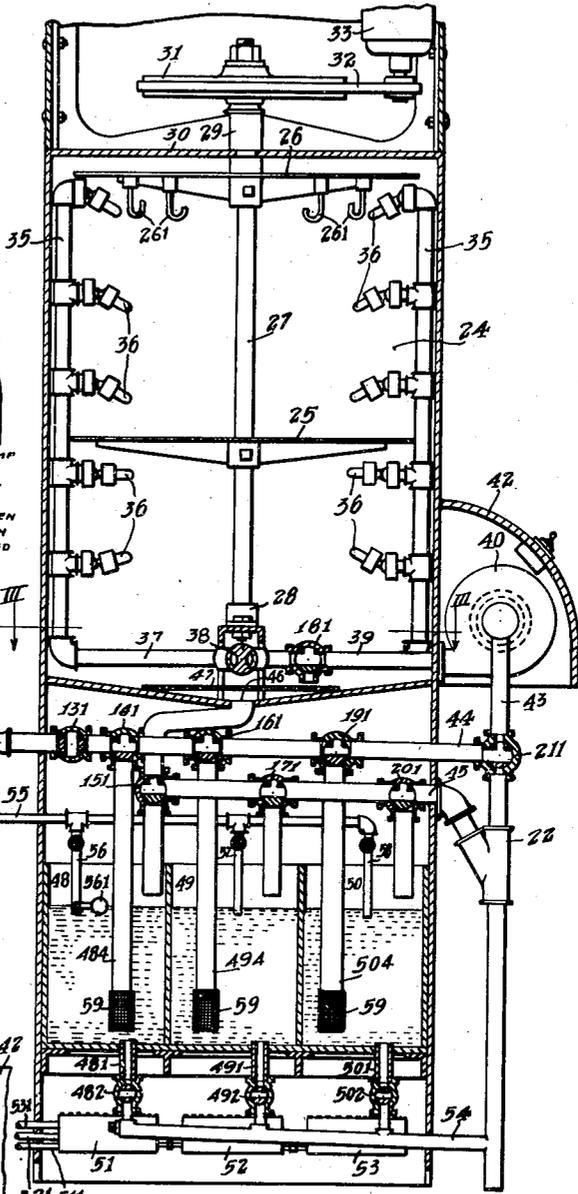


Fig. 2

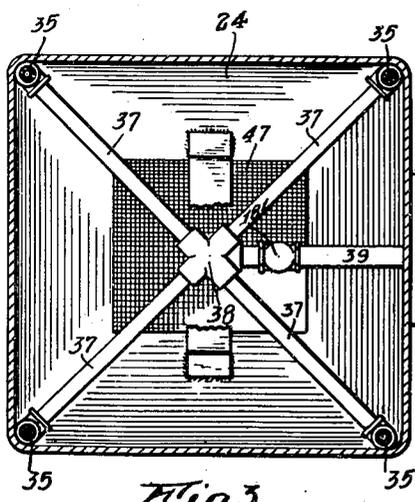


Fig. 3

Inventor  
Harry Bruce Wiswall

By  
Lyons Lyon  
Attorneys

# UNITED STATES PATENT OFFICE

2,471,506

## SPRAY TYPE WASHING MACHINE FOR SOLID OBJECTS

Harry Bruce Wiswall, Los Angeles, Calif.

Application March 22, 1943, Serial No. 479,976

3 Claims. (Cl. 134—53)

1

This invention relates to washing machines employing sprays for cleaning solid objects such as dishes, machinery parts, etc., as distinct from clothes washers.

An object of the invention is to facilitate the successive application of different cleansing liquids to articles to be cleaned and to reduce wastage of such liquids resulting from contamination each with the other.

Another object is to increase the washing efficiency of a spray type mechanical washer.

Briefly, I accomplish the first mentioned object by providing an elevated washing chamber with a plurality of separate tanks for containing different washing liquids therebelow in combination with a pump and a network of valved conduits such that liquid can be selectively circulated by the pump from any one of the tanks to the washing chamber and back to the same tank. I further provide for the draining of each liquid from the pipe network before another liquid is introduced.

I accomplish the second object by providing a rotary work supporting device in combination with a stationary system of spray nozzles within the washing chamber. The work may be rotated at relatively high speed while jets of cleansing liquid are sprayed thereon from the nozzles. This permits direct application of streams of liquid of substantial force to all portions of the surface of the object to be cleaned.

A full understanding of the invention, together with other minor objects and features thereof may be had from the following detailed description with reference to the drawing, in which:

Fig. 1 is a front elevation view of a simple embodiment of my invention;

Fig. 2 is a view similar to Figure 1 but with the front wall and portions of the side walls removed to show the interior construction; and

Fig. 3 is a horizontal section taken substantially in the plane III—III of Figure 2.

Referring first to Fig. 1, the washer therein disclosed comprises an external case substantially square in horizontal section (see Fig. 3) but of considerably greater height than width. The upper portion of the case comprises a washing chamber which is closed by a door 10. The lower portion of the case contains liquid supply tanks to which access can be attained by removing a door or panel 11. That portion 12 of the front wall of the case between the upper door 10 and the lower door or panel 11 constitutes a control panel on which are mounted various handles 13

2

to 20, inclusive, which control various valves in the system. An additional valve handle 21 is mounted directly on a valve 211 positioned in a drain line 22 which extends downwardly to a sewer connection. A water supply line 23 provides water for making up the solutions and flushing the apparatus.

Referring now to Fig. 2, the washing chamber 24 contains a rotary work support comprising a lower shelf 25 and an upper shelf 26 secured to a vertical shaft 27 which is centrally disposed in the washing compartment 24 and rotatably supported by a lower bearing 28 and an upper bearing 29, the latter being positioned in the top wall 30 of the washing chamber. The shaft 27 extends upwardly beyond the bearing 29 and has secured to its upper end a pulley 31 which is coupled by a belt 32 to the pulley of an electric motor 33. A switch 34 is provided on the exterior of the case for starting and stopping the motor 33. The upper shelf 26 is preferably provided with hooks 261 from which work pieces may be supported, or baskets containing work pieces can be supported from these hooks if desired.

In the particular design shown, four vertical pipes or headers 35 are provided, one in each of the four corners of the washing chamber 24 and each riser carrying a plurality of nozzles 36 which are preferably connected to the headers 35 by ball joints so that they can be pointed in any desired direction. The four headers 35 are interconnected with each other by pipes 37 (Fig. 3) and a connecting fitting 38 to a common supply pipe 39 containing a drain valve 181. Beyond the valve 181, the pipe 39 extends through the wall of the washing chamber and connects to the outlet of a pump 40 which, as shown, is of the centrifugal type although it might be of any other type. The pump is preferably actuated by a small electric motor directly connected thereto and positioned back thereof. The pump may be protected by a shell 42. The inlet of the pump is connected to a conduit 43 which communicates with the valve 211 which is a three-way valve, one opening of which is connected to the sewer line 22 as previously mentioned. The third opening of the valve communicates with a conduit 44 which extends transversely through the case below the washing chamber and contains four valves 191, 161, 141 and 131, which valves are controlled by the handles 19, 16, 14 and 13, respectively. Beyond the last valve 131, the conduit 44 communicates with the water supply line 23.

A second conduit 45 extends from the sewer line 22 transversely within the case through three

valves 201, 171 and 151, respectively, and thence to the drain outlet 46 of the washing chamber. A screen 47 is preferably provided in the bottom of the washing chamber to prevent the entry of large objects into the conduit 45.

Positioned below the conduits 45 and 44, within the lower part of the case, are three open top supply tanks 48, 49 and 50, respectively, each of which may have a gas burner 51, 52 or 53, positioned therebelow and adapted to be independently supplied with gas through pipes 511, 521 and 531, respectively, which may be supplied with gas from a gas main through any suitable type of control valve. The control valves may be manually operated or may be thermostatically controlled to maintain a constant temperature within the associated tank in accordance with well known practice.

Each tank is supplied with a drain pipe 481, 491 and 501, respectively, which contain shutoff valves 482, 492 and 502, respectively, and communicate with a common pipe 54 connected to the sewer line 22.

To supply water to the different tanks in making up cleaning liquids, a branch line 55, from the water supply line 23, is extended transversely above the tanks and provided with valved outlets 56, 57 and 58. In some instances it may be desirable to automatically maintain a desired level of liquid in the tanks, in which case a float valve may be connected to the water outlet. Such a float valve is shown at 561 in tank 48.

In operation, liquid is selectively circulated from the different tanks 48, 49 and 50, through the washing chamber 24 by the pump 40, and the valves in the conduits 44 and 45 permit selection of the tank from which liquid is circulated. Thus the valves 191, 161 and 141, are adapted to selectively connect the conduit 44 with any one of three conduits 504, 494 and 484, respectively, which extend down into the lower portions of the tanks 50, 49 and 48, respectively. They are preferably provided with screens 59 on their lower ends to prevent the entry of large solid objects which may have been carried into the tanks from the washing chamber.

The return conduit 45, from the bottom of the washing chamber, is adapted to be selectively connected by the valves 151, 171 and 201, either to discharge into any one of the three tanks 48, 49 and 50, or into the sewer line 22.

The valves are shown in normal position in Fig. 2 and the corresponding positions of the valve control handles are shown in Fig. 1. It will be observed that the valve 131 is closed, preventing entry of water from the water supply pipe 23 into the conduit 44 and that the valves 141, 161 and 191, are in "off" position, in which their associated pipes 484, 494 and 504, are disconnected from the conduit 44 but the latter is open from the valve 131 to the valve 211. It will also be observed that the drain valve 211 is in closed position, in which it connects the conduit 44 with the pump inlet pipe 43 but not with the sewer line 22. Similarly the return valves 151, 171 and 201, are in closed position, in which they prevent flow of liquid from the washing chamber through the pipe 45 into any one of the three tanks 48, 49 or 50, but permit it to flow straight through to the sewer line 22. The valve 181 is in closed position, in which it connects the outlet conduit 39 of the pump to the spray nozzles but does not permit drainage from the conduit 39.

Let it be assumed that the particular washer shown is to be employed for the purpose of clean-

ing machinery parts and that the tank 48 contains hot rinse water, the tank 49 contains a hot cleaning solution and that the tank 50 contains a cold presoak solution. Obviously under these circumstances the gas burners under tanks 48 and 49 will be burning but the burner under the tank 50 will be out. After the articles have been placed in the washing chamber, either by resting them on the lower shelf 25 or hanging them on the hooks 261, or placing them in baskets suspended from the hooks 261, the switch 34 is actuated to start the motor 33 and rotate the work within the washing chamber 24. Thereafter the valve control handle 20 is rotated 90° counterclockwise into "open" position, in which the return conduit 45 from the washing chamber is connected with the tank 50. At the same time the handle 19 is rotated 90° clockwise into "on" position to connect the intake pipe 504 in tank 50 with the inlet conduit 43 of the pump 40. The pump is then started by actuating its control switch 401, whereupon the cold presoak solution is circulated from the tank 50 in through the pipe 504, the valve 191, the conduit 44, the valve 211, the pump inlet conduit 43, the pump 40, the conduit 39, the valve 181, the fitting 38, the pipes 37 and the headers 35, to the spray nozzles 36. The cold presoak solution may be permitted to continue circulating for any desired length of time but it is desirable to stop the circulation after a short time by turning the valve 191 back into "off" position while leaving the valve 201 open to permit drainage of the excess solution from the washing chamber back into the tank 50. After the excess solution has drained back into tank 50, the valve 201 is returned to normal position and the cold presoak solution flushed from the entire system by opening the valve 131 to introduce water from the water supply pipe 23 through the conduit 44, the pump and the washing chamber and thence through the drain conduit 45 to the sewer line 22. When the flushing is complete, the valve 131 is closed. Thereafter hot cleansing solution from tank 49 is circulated through the washing chamber by rotating the valve 171 90° counterclockwise and valve 161 90° clockwise. When this treatment has proceeded long enough, the valve 161 is again turned into "off" position to stop the supply of the solution from the tank 49 to the pump and, after allowing a short time for excess solution to drain from the washing chamber back into the tank 49, the valve 171 is turned to closed position and the valve 131 again opened to flush the entire system with cold water from the water supply line. When this flushing operation has been completed, the valve 131 is closed and the valve 151 is rotated 90° counterclockwise and the valve 141 is rotated 90° clockwise to circulate hot rinse water from the tank 48 through the washing chamber. When this operation has been completed, the entire system may again be flushed with cold water by restoring the valves 151 and 141 to normal position and opening the valve 131. Where the solution in any one of the tanks 49 or 50 is relatively expensive and should be conserved to the maximum extent, the valve 181 may be moved into open position prior to the flushing operation to discharge all liquid remaining in the pipes and within the pump into the washing chamber and thence into the drain conduit 45, from which it will be returned to the proper tank. This valve 181 is also preferably opened when the system is shut down at the com-

pletion of a washing operation to completely drain the pump 40 and the pipes within the washing chamber.

The valve 211 is provided to facilitate complete drainage of the conduits 44 and 43. By turning this valve counterclockwise 90°, it connects both the conduit 44 and the conduit 43 to the sewer line 22. Both the conduit 44 and the conduit 45 are preferably slightly inclined toward the right so that all liquid therein tends to drain completely into the sewer line 22.

A very important feature of the system is the arrangement of the conduits and valves whereby the liquid from any tank can be completely flushed from the system before a liquid from another tank is introduced. This is particularly desirable because in some instances it may be desired to successively wash with solutions which must be segregated from each other to avoid objectionable contamination. For instance, it may sometimes be desirable to successively wash an object with an acid and then with an alkali, or vice versa, and obviously if any considerable quantity of one such liquid was left in the washing chamber or pipes and returned to the tank containing the other solution, the latter would be quickly weakened or its strength reduced to the point where it would have to be completely replaced.

Various other procedures may be employed with the apparatus shown. For instance, if the device is employed as a dish washer, it may be desirable to initially direct hot rinse water, say from the tank 48, through the spray nozzles onto the dishes while leaving all of the valves 151, 171 and 201, in normal position initially to permit washing of the major portion of the food residue on the dishes directly into the sewer line, after which the valves might be readjusted to circulate hot soapy water, say from the tank 49, through the washing chamber and back to that tank. This operation might then be followed by a final rinsing operation with hot water from the tank 48, either with or without a disinfectant in the water. Innumerable other specific procedures adapted for different washing operations will be obvious to those employing the machine.

It is to be understood that, although for the purpose of explaining the invention one particular embodiment thereof has been described and illustrated in detail, various departures from the exact construction shown can be made without departing from the invention, which is to be limited only to the extent set forth in the appended claims.

#### I claim:

1. Apparatus of the type described comprising in combination: a washing chamber having spray nozzles and a drain pipe, a circulating pump having an inlet and an outlet, means for connecting said outlet to said spray nozzles, a plurality of tanks positioned below said washing chamber for containing different cleaning liquids, each tank having an inlet and an outlet pipe, valved conduit means for selectively connecting the outlet pipe of any one of said tanks to said pump inlet, valved conduit means for selectively connecting the inlet pipe of any one of said tanks to said drain pipe; a sewer connection and a pressure water source; and means for admitting water from said source through said conduit means and pump and chamber to said sewer connection independently of said

tanks to flush said chamber, pump and conduit means from liquid of one of said tanks prior to admission of liquid from another of said tanks.

2. A washing apparatus comprising: a working chamber including spray nozzles and a drain sump; a pump having a discharge line connected to said spray nozzles; a plurality of tanks arranged side by side below said chamber; a supply and a return conduit extending across said tanks, the supply conduit connected with the intake of said pump, the other of said conduits connected with said sump, each conduit having laterals communicating with each of said tanks, and valve means disposed in series at the junctures of said conduits and laterals each adapted to communicate with its lateral or to a succeeding valve means; a sewer conduit communicable with said supply and return conduits, the valve in the drain conduit associated with the end tank communicable with its lateral or said sewer conduit, and a terminal valve in said supply conduit communicable with said sewer conduit or said pump.

3. An apparatus of the type described comprising in combination: a washing cabinet having spray nozzles, supply pipes therefor and a drain; a circulating pump having an outlet connected with said supply pipes; a series of liquid containers arranged in a row below said cabinet; a drain conduit system for said cabinet including a main line communicating with a sewer outlet, a series of lateral pipes extending from said main line to each of said liquid containers, and three-way valves disposed in series in said main line for communicating with a corresponding lateral pipe or communicating with the succeeding valve; a supply conduit system for said cabinet including a main line extending between a water supply and a sewer outlet, a plurality of lateral intake lines extending from said main line to each of said containers and to said pump, a plurality of three-way valves disposed in series in said main supply line for communication with their respective containers or communication with the succeeding three-way valve, and an end three-way valve communicable with said pump or with said last named sewer outlet.

HARRY BRUCE WISWALL.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
1,172,300	Murray	Feb. 22, 1916
1,405,243	Wing	Jan. 31, 1922
1,550,439	Irvin	Aug. 18, 1925
1,640,319	Halsey	Aug. 23, 1927
1,741,329	Montgomery	Dec. 31, 1929
1,907,269	Selmer	May 2, 1933
1,910,431	Newsome	May 23, 1933
2,025,592	Kelly	Dec. 24, 1935
2,066,232	Schmidt	Dec. 29, 1936
2,153,577	Levine	Apr. 11, 1939
2,175,677	Zademach	Oct. 10, 1939

#### FOREIGN PATENTS

Number	Country	Date
289,206	Italy	Oct. 8, 1931
290,285	Great Britain	Dec. 6, 1928
388,899	Great Britain	Mar. 9, 1933
452,510	Great Britain	Aug. 24, 1936