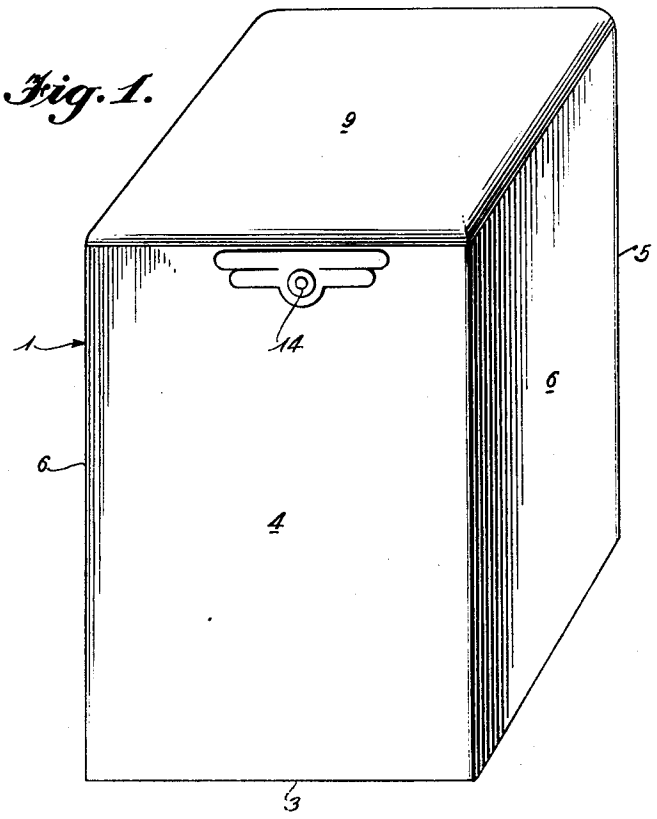
June 3, 1952 E. R. JOHNSON 2,599,110

DISHWASHING MACHINE

Filed Jan. 14, 1946 6 Sheets-Sheet 1

Fig. 1.



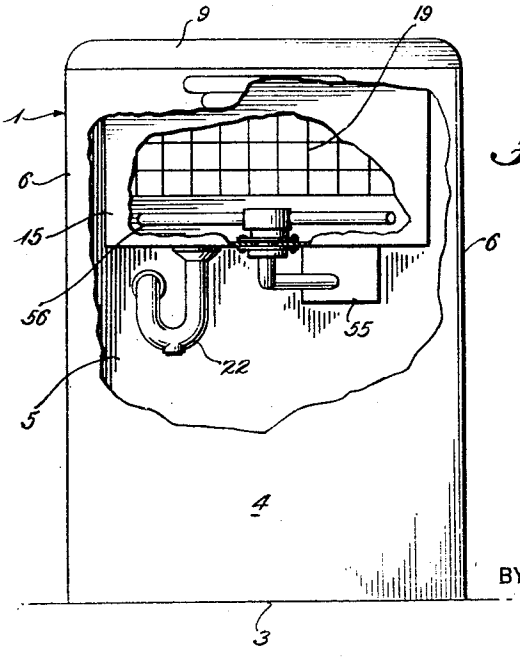


Fig. 3.

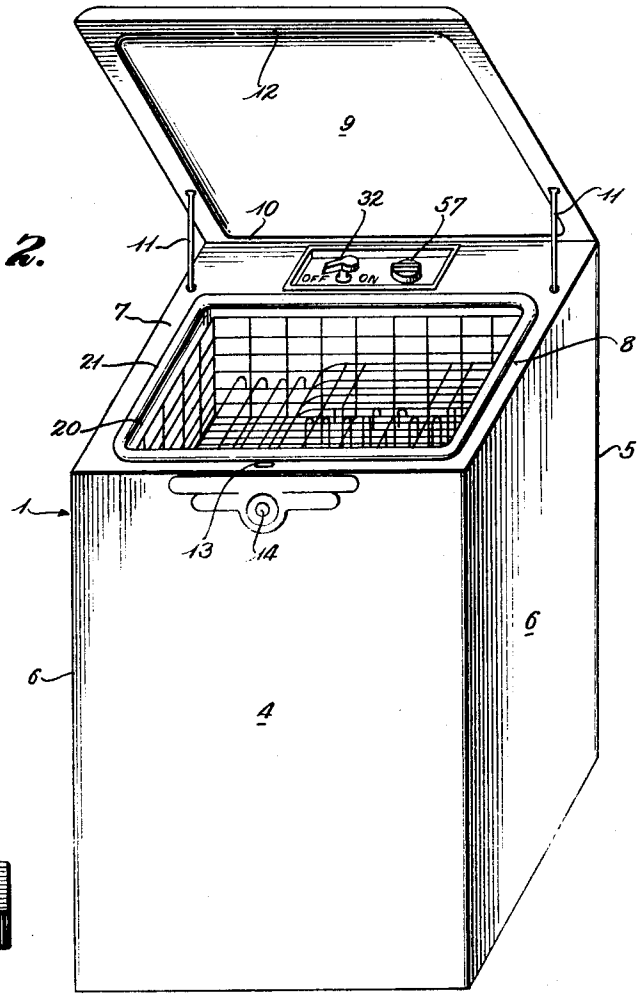
INVENTOR
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BY
ATTORNEY

June 3, 1952 E. R. JOHNSON 2,599,110

DISHWASHING MACHINE

Filed Jan. 14, 1946 6 Sheets-Sheet 2

Fig. 2.



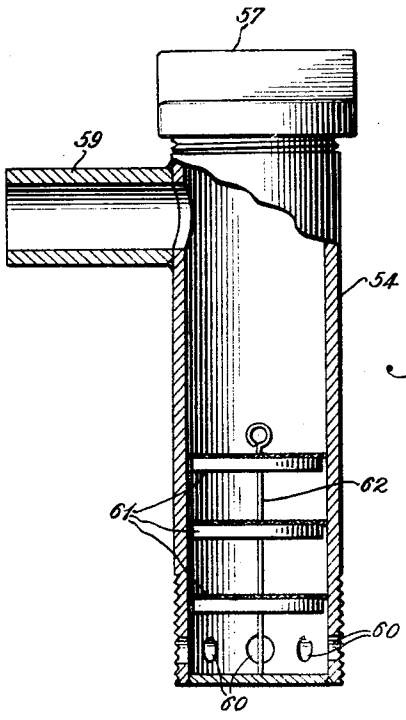


Fig. 8.

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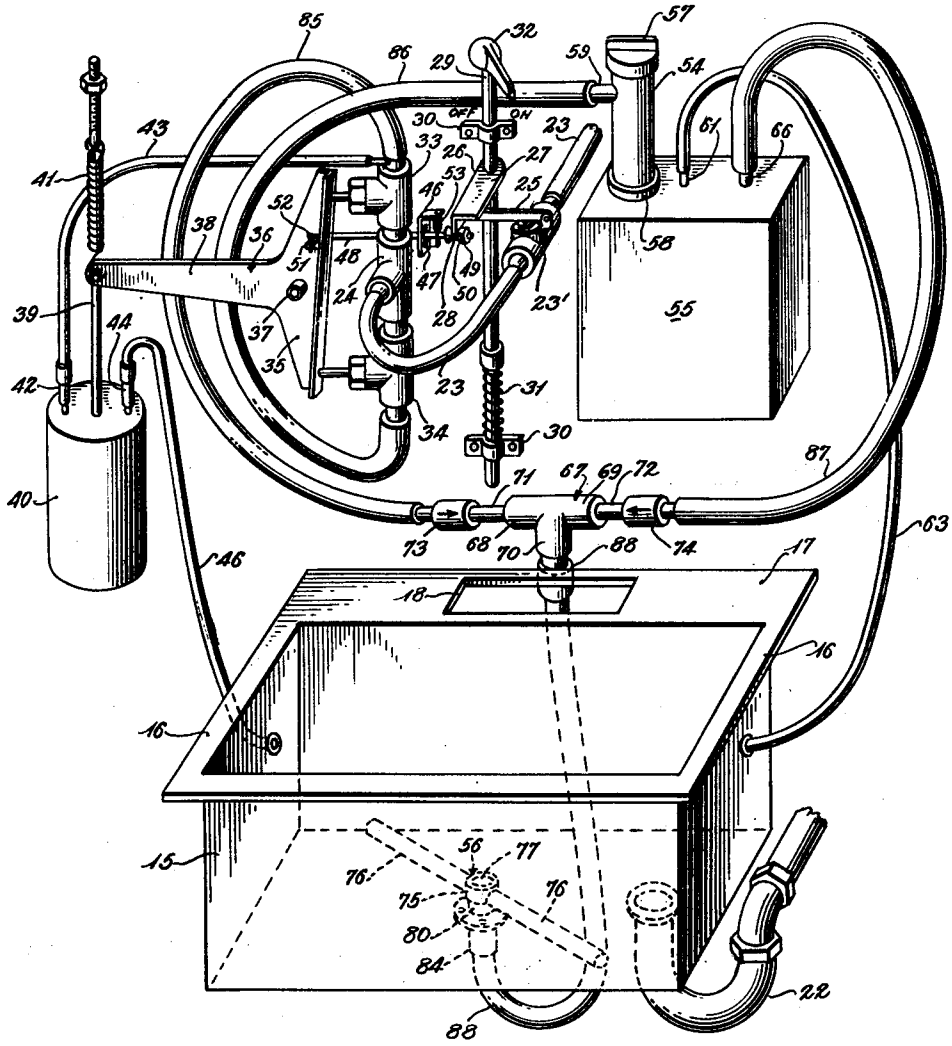
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DISHWASHING MACHINE

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Fig. 4.



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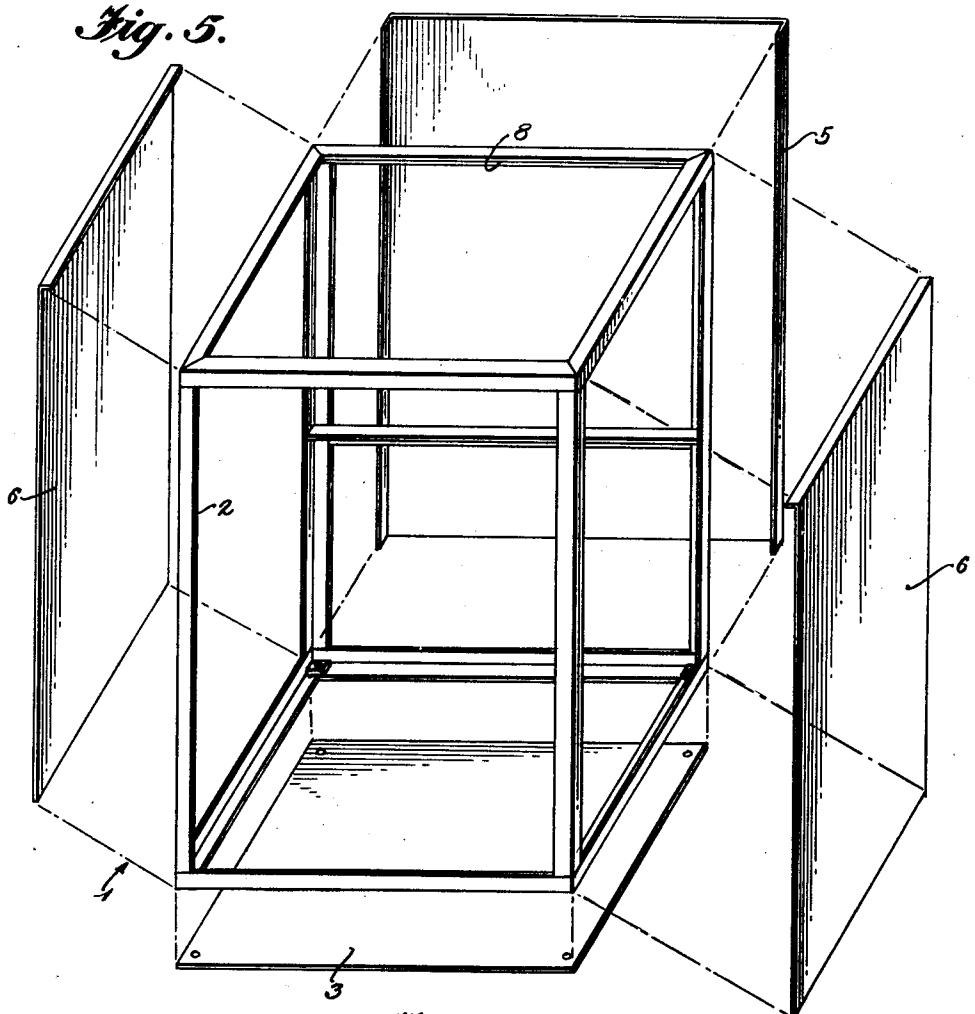
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DISHWASHING MACHINE

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Fig. 5.



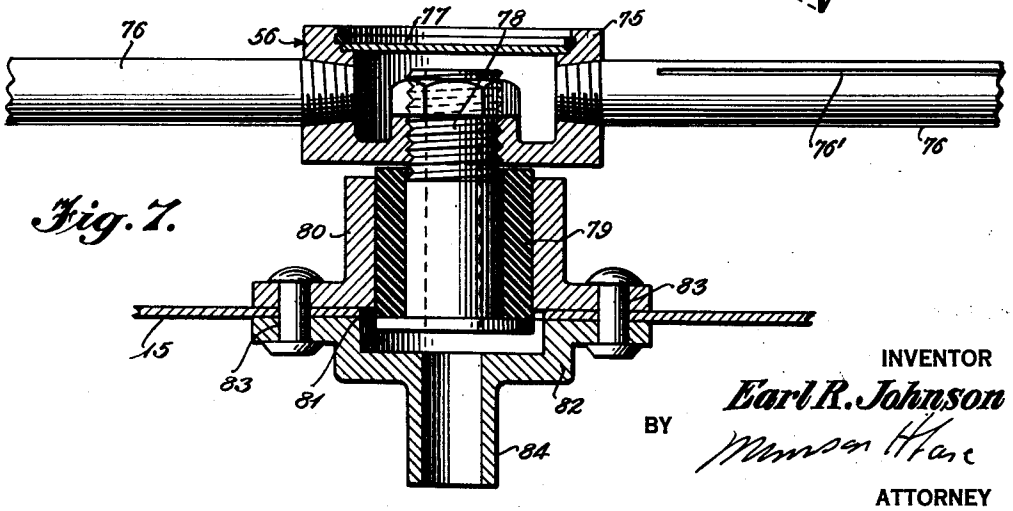


Fig. 7.

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DISHWASHING MACHINE

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Fig. 6.

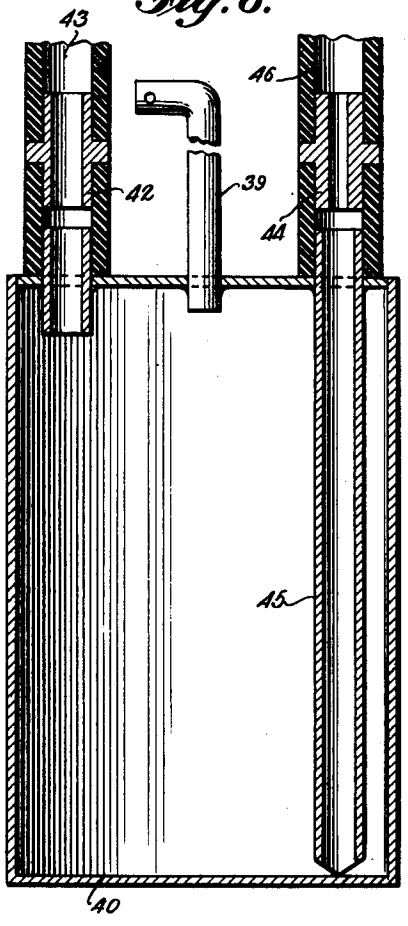


Fig. 9.

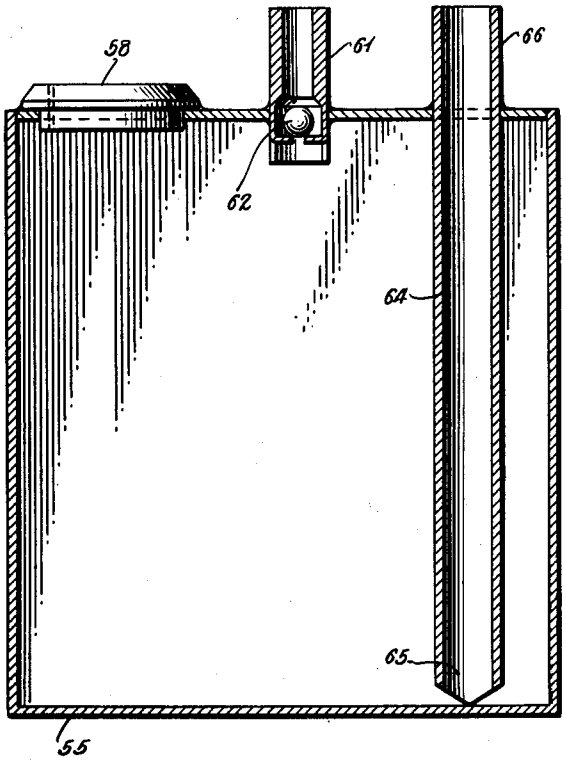


Fig. 10.

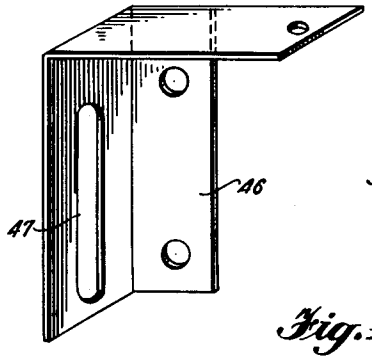


Fig. 15.

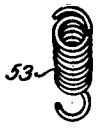


Fig. 11.

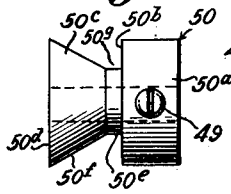


Fig. 12.

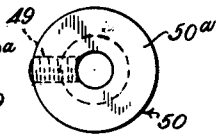


Fig. 13.

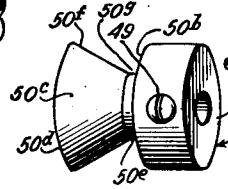


Fig. 14.



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DISHWASHING MACHINE

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Fig. 16.

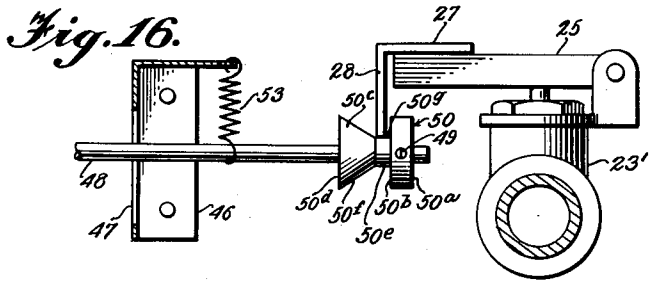


Fig. 17.

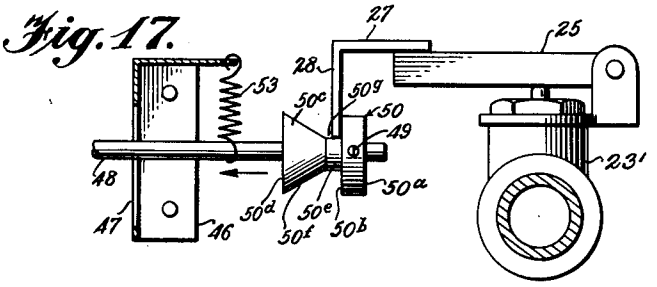


Fig. 18.

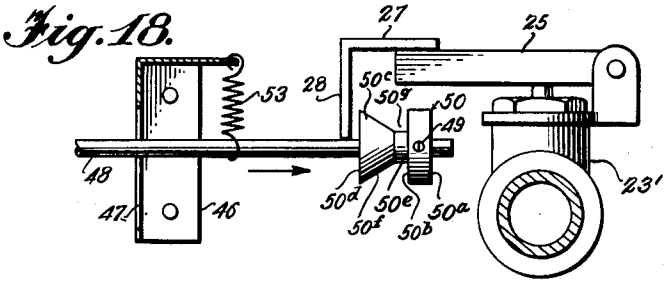
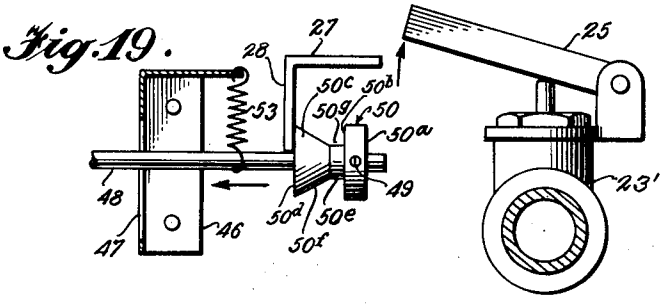


Fig. 19.



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Patented June 3, 1952 2,599,110

UNITED STATES PATENT OFFICE

2,599,110

DISHWASHING MACHINE

Earl Roycroft Johnson, Wichita, Kans.

Application January 14, 1946, Serial No. 641,054

12 Claims. (Cl. 134—56)

1

This invention relates to improvements in washing machines, and particularly to machines for washing, rinsing and sterilizing dishes, glasses, articles of chinaware and silverware, and other articles of this character.

One object of the invention is to provide a washing machine particularly designed for household use and adapted to be manufactured, sold and operated at a low cost.

Another object of the invention is to provide a washing machine of cabinet style, standard cabinet dimensions and pleasing appearance which is provided with an open top for convenience in inserting and removing the dish basket, which opening is adapted to be closed by a hinged lid secured when in closed position by a manually releasable automatic latch, and automatically movable to open position when the latch is released.

Still another object of the invention is to provide a washer which is fully automatic through a working cycle of (1) supplying a hot rinsing spray to loosen and soften grease on the dishes; (2) switching to a hot sudsing spray to complete the cleaning, and (3) then switching to a final hot rinsing spray to flush off the suds and sterilizing and drying the dishes, making hand drying unnecessary.

A still further object of the invention is to provide a washing machine which will automatically stop at the end of a working cycle and reset itself to repeat the cycle when desired and which is adapted to be adjusted for a selective action to automatically or not start a working operation when the lid is closed.

Still another object of the invention is to provide a washing machine which is operative solely by water pressure to perform its working functions at properly timed intervals, which dispenses with the use of a motor or other complex means to operate its working parts, and which embodies a novel type of rotary spray device and a simple construction of controlling means for supplying the several sprays at properly timed intervals.

Still another object of the invention is to provide a washing machine which is simple of construction, reliable and efficient in operation and composed of a comparatively small number of parts of a sort not liable to get out of order.

With these and other objects in view, which will appear in the course of the subjoined description, the invention consists of the novel features of construction, combination and arrangement of parts hereinafter fully described and claimed, and shown in the accompanying drawings, in which:

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Fig. 1 is a perspective view of the machine with its lid or cover in closed position;

Fig. 2 is a similar view of the same with the lid thrown open to expose the dish basket disposed therein;

Fig. 3 is a front elevation of the machine with a portion of its casing broken away to show the dish basket and certain other operating parts of the washing mechanism;

Fig. 4 is a perspective view of the wash basin and parts of the operating mechanism removed from the casing;

Fig. 5 is a perspective view of the parts of the casing disconnected from each other but arranged in proper relation for assemblage;

Fig. 6 is a vertical section through the timing tank;

Fig. 7 is a vertical section through the jet reaction rotary spray device;

Fig. 8 is a vertical section through the soap holder;

Fig. 9 is a vertical section through the mixing or sudsing chamber;

Fig. 10 is a perspective view of the guide bracket forming part of the two-step latch device for holding and releasing the controlling arm governing the action of the main (start and stop) valve;

Figs. 11, 12 and 13 are detail views of the abutment head of the valve controlling rod forming part of the latch device;

Fig. 14 is a view of the valve controlling rod;

Fig. 15 is a view of the rod sustaining spring; and

Figs. 16 to 19, inclusive, are views showing the working positions of the latch device acting on the valve controlling arm.

Referring now more particularly to the drawings, 1 designates the casing or cabinet of the washing machine which may be of a standard cabinet type and size and which is herein shown as comprising a frame 2 having a bottom 3, front and rear walls 4 and 5, side walls 6 and a top wall 7, all suitably secured to the frame, said top wall being provided with an opening 8. The casing also includes a lid or cover 9 hinged at its rear edge, as at 10, to the rear edge of the top wall 7 to swing upward and downward to open and closed positions. Spring loaded lift rods 11 are pivotally connected to the lid and top wall 7 and normally act to lift the lid and hold it in open position. A catch 12 is provided at the front edge of the cover to engage a coacting keeper or catch member 13 on the wall 4, whereby the lid is adapted when turned down to be held in closed position. The catch member 13 is of resilient type to recede

when engaged by the catch 12 and then snap into engagement with the latter, and a push button 14 is provided whereby the catch member 13 may be retracted to release the catch 12 and permit the closed lid to automatically swing open when desired.

Arranged within the casing is a wash or catch basin 15, the upper portion of which fits beneath the opening 8. The walls of this basin are formed at their upper edges with flanges 16 and 17, whereby the basin is held or suitably secured in position, the rear flange 17 being wider than the side flanges 16 and having a slot or opening 18 therein. This basin is designed to receive the open wirework or other suitably formed reticulated or open work dish basket 19 having a flanged upper part 20 to rest on the top wall 7, said part being provided with a rubber sealing gasket 21 against which the lid 9 closes to prevent any escape of fluid when the machine is in operation. This basket is insertible into and removable from the opening 8. The basin 15 has connected therewith a drain trap 22 which projects outward through the wall 5 for the discharge of the waste water into a suitable drainpipe or receiver.

Leading into the casing from a suitable source of hot water supply is a pipe 23 which is connected at its discharge end with a manifold or distributing pipe 24. In the pipe 23 between its inlet and discharge ends is a self-closing starting and stop valve 23' adapted to be opened and closed by downward and subsequent upward movements of a lever arm 25. Disposed above this arm is a motion transmitting member or controlling arm 26 having a horizontal flange part 27 and a vertical flange part 28. This member 26 is carried by a controlling rod 29 rotatable and slidable in bearings 30 and depressible from a normal position, in which it is held by a spring 31, against the resistance of said spring. The rod 29 is provided at its upper end with a handle or knob 32 by which the rod may be depressed or turned to either of two controlling positions, in which the handle registers with the indications "On" and "Off" marked on the casing, as shown in Fig. 2. When the handle 32 is in the "on" position the flange 27 overlies the lever arm 25, so that on the depression of the handle the lever arm will be depressed by the flange 27 to open valve 23' for the flow of hot water from pipe 23 to manifold 24, and so that upon the subsequent release of the handle the rod 29 and member 26 will be raised by spring 31 to release the lever arm and allow valve 23' to close to cut off the flow of water. When, on the other hand, the handle 32 is turned to the "off" position member 26 will be swung to a position in which flange 27 is moved outward beyond the free end of the lever arm so that, in such position of the parts, even though handle 32 is depressed, valve 23' will not be operated and will remain closed. Handle 32 is designed to be manually selectively to its "on" and "off" positions and manually depressed, if desired, to open valve 23' to start the machine in operation. The handle 32 is also arranged so that it lies in the path of downward movement of the lid 9, so that when the lid is closed rod 29 will be depressed, which will result in valve 23' being opened or not, according to whether the handle is in the "on" or "off" position. The operator may thus set the valve actuating means so that valve 23' may be opened or not in the operation of closing the lid. The valve 23' is also adapted to be automatically closed through the operation of member 26 to cut off the flow of water and stop the machine, as hereinafter described.

Arranged at the upper and lower ends of the manifold 24 are self-closing control valves 33 and 34. The stems of these valves project outward and are engaged by the cross-bar portion 35 of a T-shaped bell-crank lever 36 pivotally mounted at 37 and the main arm 38 of which is pivoted to a suspension rod 39 carrying a vertically movable timing tank 40. A spring 41 connected to the lever arm and rod normally holds the tank elevated and the lever in a position in which it holds the valve 33 open and allows the valve 34 to close. A nipple 42, communicating with the top of the tank 40, connects said tank to a flexible filling tube or pipe 43. Attached to a nipple 44 fastened to the top of the tank 40 or an outlet pipe 45 (Fig. 6) extending upward from the bottom of the tank is a flexible drain pipe or tube 46 leading to the basin, as shown in Fig. 4. The bore of nipple 42 is of greater diameter than the bore of nipple 44 for a purpose hereinafter described.

Movement of the lever arm 25 downward for a starting action on a closing of the lid and lateral movements of the member 26 to "on" and "off" positions are controlled by actuation of the handle 32, as previously described. Control of the member 26 for an automatic stopping action is also provided for to effect the stopping of the machine at the conclusion of each working cycle and in such manner as to allow the various working operations to be successively performed by means governed in action by the timing tank 40. The means provided for this purpose comprises a compensating two-step latch or clutch device for coupling and uncoupling the member 26 with and from the bell-crank lever 36. This device, as shown in Figs. 16–19 inclusive consists of a stationary guide bracket 46 arranged between the member 26 and part 35 of lever 36 and having an elongated vertical slot 47. A control rod 48 passes through said slot and has freedom of vertical and lateral movements therein. One end of this rod rests against the lower edge of flange 28 of member 26 and has secured thereto, by means of a set screw 49, a ratchet-tooth-like locking and releasing element or head 50. The other end of the rod has an angularly bent portion 51 (Figs. 4 and 14) which engages an opening in part 35 of bell-crank lever 36 and is held from displacement by a retaining pin 52. A spring 53 connects the rod with the bracket 46 and acts to normally hold the rod elevated in the slot 47 and lightly in contact with the lower edge of flange 28 of member 26. The element or head 50 (best shown in Figs. 11, 12 and 13) has a circular end portion 50^a presenting an abutment face 50^b, a conical end portion 50^c presenting an abutment face 50^d, and an intermediate small circular neck portion 50^e facing the conical surface 50^f of the portion 50^c and forming with and between said portions 50^a and 50^c a locking recess 50^g. The operation of this device will be set forth in the description of the working operation of the machine hereinafter given.

Associated with the parts above described are a soap holder 54 (Figs. 4 and 8), a mixing or sudsing tank or chamber 55 and a rotary spray device 56. The soap holder 54 comprises a receptacle having an open top projecting upward through the rear portion of the top wall 7 and normally closed by a removable cap or cover 57. This holder depends from the wall into the casing

and fits at its lower end into a flanged threaded opening 58 in the top of the tank 55. At its upper end the holder is provided with a water inlet connection 59 and at its lower end said holder is provided with suds exit holes 60 for passage of the formed suds therefrom into the tank 55. Arranged within the holder is a removable soap screen assembly consisting of a plurality of screens 61 connected to a handle rod or stem 62. The holder is designed to receive a charge of a suitable amount of soap in powdered form which is dissolved in hot water admitted through the inlet 59 and in the form of a concentrated suds passes through the screens to the exit holes 60 for discharge into the sudsing chamber 55. The amount of soap powder used is proportioned to the size of the mixing or sudsing chamber or tank so that when the sudsing chamber is filled a uniform and proper suds results from the mixing of the suds concentrate with a following supply of water in the sudsing chamber.

The sudsing tank or chamber 55, which is of suitable form and suitably supported in the top of the casing, has an air vent outlet 61 (Fig. 9) at its top controlled by a ball check valve 62. A drain tube 63 leads from this outlet to the basin 15. A suds discharge tube 64 is fixed to the top of the chamber 55 and extends outwardly therethrough and downwardly therein, said tube having an inlet end 65 located near the bottom of the chamber and an outlet end 66 projecting above the top of the chamber.

Located in suitable proximity to the basin 15 is a T-coupling or union 67 having opposite inlet end arms 68 and 69 and an intermediate outlet arm 70. The arms 68 and 69 have connected therewith fittings 71 and 72 in which are check valves 73 and 74 each opening in the direction of the union and closing in the opposite direction.

The rotary spray device 56 is of jet reaction type and comprises a hollow hub 75 (Fig. 7) carrying oppositely extending spray pipes or arms 76 having discharge slots 76' therein. Suitable means may be provided or not for varying the effective sizes of these slots. The hub may have an open top normally closed by a removable cap 77 and said hub is secured at its bottom to a hollow shaft 78 rotatable in a non-metallic water lubricated bushing 79 disposed in a bearing bracket 80 mounted on the bottom wall of the basin 15 about a water feed opening 81 therein. A bracket piece 82 is arranged to bear against the bottom wall of the basin 15 about the opening 81 and is secured with the bracket 80 to said wall by rivets 83 or other suitable fastening means. The bracket piece 82 is provided with an inlet nipple 84 communicating through the shaft 78 with the hollow hub 75 for the flow of water under pressure to the hub and arms 76 and discharge through the slots 76', the live water pressure causing rotation of the sprayer as the spray discharges to give a full discharge in a rotary path. The sprayer by jet reaction is arranged in the basin so that the spray is discharged with force against the dishes, etc., contained in the openwork dish basket 19.

The parts above described constitute in general the mechanical features of the washer, the organization of which is completed by the use, in addition to the pipes or tubes 23, 43 and 63, of the following flow conductors: A pipe or tube 85 leads from the upper end of the manifold 24 beyond the valve 33 to the fitting 71; a pipe or tube 86 leads from the lower end of the manifold 24 beyond the valve 34 to the inlet 59 of the soap holder 54; a pipe or tube 87 leads from the outlet 66 of the sudsing chamber 55 to the fitting 72; and a pipe or tube 88 leads from the outlet arm 70 of the T-union 67 to the inlet of the supply connections to the sprayer 56.

The operation of the machine is as follows:

The dishes are placed in the dish basket 19, soap powder is put in soap holder 54, the control handle 32 is turned to "on" position, and the lid 9 is closed and latched. (If the control handle were left in "off" position, the machine would not operate when the lid is closed.) The machine operates entirely automatically as it goes through its cycle of (1) supplying a hot spray of water to soften and loosen the grease on the dishes; (2) switching to a hot sudsing spray of soap dissolved in water to complete the cleaning; (3) switching to a final hot rinsing spray of clear water to flush off the suds and to sterilize and further heat the dishes, making hand drying unnecessary; and (4) turning itself off and resetting itself to repeat the cycle when desired.

When the control knob 32 is turned to "on" the angle shaped arm 26 on the control shaft is turned to cover the arm 25 of the quick acting valve 23'. The hot water from the source is always available at the valve 23'. Closing the lid of the machine pushes the control knob 32 and shaft 29 downward, causing the upper horizontal flange part 27 of the angle shaped arm 26 to depress the valve arm 25, thus admitting the high pressure hot water to the manifold 24 of the machine. The water then passes through open valve 33 and pipe 85 to T 67 into which it flows through check valve 73. At this time only the upper valve 33 of the manifold is open as the timing tank 40 is empty and the adjustment spring 41 is so adjusted as to carry the weight of the empty timing tank and to actuate the bellcrank 36 so as to normally hold valve 33 open and allow valve 34 to close. Check valve 74 will not admit the water to hose pipe 87, so the water goes through hose 88 to the jet reaction rotor 56, furnishing the dishes in the basin with the initial hot spray rinse. Simultaneously the small hose 43 is furnishing water to the timing tank 40 from a connection just above valve 33. As the timing tank fills the tendency of the water is to escape through drain hose 46, but its escape is retarded by the fact that the orifice of outlet nipple 44 is smaller than the orifice of nipple 42. This results in the timing tank eventually becoming filled to the point where its weight overcomes spring 41 and swings the bellcrank arm 38 downwardly to allow valve 33 to close and valve 34 to open. Water then flows through hose 86 to the soap holder 54 and mixes with the soap powder therein to form a concentrated suds which passes out into the mixing chamber 55 where it remains until the mixing chamber is filled. As stated, the amount of soap powder is proportioned to the size of the mixing chamber so that when the mixing chamber is filled a uniform and proper suds results from the mixing of the suds concentrate and the following water flowing into said chamber. The ball check air valve 62 allows the escape of air from the mixing chamber, thus permitting the chamber to fill without causing suds to flow out through the drain tube 63. As the chamber becomes filled there is a tendency of the suds to discharge through the ball check air valve, but the suds, being denser than air, cause the ball

check to snap shut and delivery of the suds through the exit pipe 87 begins under pressure of the following water which is continuing to enter through the soap chamber. The drain tube 63 is provided, however, to allow any slight amount of suds leaking past the ball check air valve as it closes or at any other time to discharge into basin 15. The suds then flow through hose 87 and check valve 74 to T 67 and, being prevented by check valve 73 from entering hose 85, go through hose 88 to the jet reaction rotor 56 which gives the dishes a hot suds spray. During this time the timing tank 40 has not been receiving water through hose 43 because the valve 33 is closed, but hose 46 has been emptying the timing tank by siphonic action. It will be apparent that as the timing tank is filled with water air is compressed in the top of the tank, which aids in subsequently emptying the tank, and that when the tank is substantially emptied the pressure therein is approximately normal atmospheric. When the timing tank has been sufficiently lightened the spring 41 acting on the bellcrank 35 brings the valves back to the original position with valve 33 open and valve 34 closed, so that hot water is supplied through hose 85 to give the dishes the final hot spray rinse. This rinse continues until the timing tank is again filled sufficiently to operate the bellcrank 36. As the bellcrank moves to actuate the valves 33 and 34 again it pulls the angle arm of the control shaft laterally off the top of the lever arm of valve 23' through the action of the latch or clutch device, thereby causing the immediate stoppage of the water supply to the machine. The two-step latch or clutch device, hereinbefore described, operates in the manner shown in Figs. 16 to 19, to control through the actions of the bellcrank 36 and the arm 27 the movements of arm 25 to hold valve 23' closed and permit it to open at the proper time periods. Fig. 16 shows the arm 27 depressed with its horizontal flange bearing on valve arm 25 and holding valve 23' open, the vertical flange of the arm 27 resting in the groove or recess 50a of the head 50. In this position of the parts the lid has been closed and the cycle has started with the hot spray rinse and the timing tank has begun to fill. Fig. 17 shows that the timing tank has just shifted bellcrank 36 to start the sudsing operation, and the bellcrank has pulled rod 48 part way over to the left in the first step of its main valve releasing action, in which arm 27 is pulled part way off arm 25 but remains engaged with recess 50a of head 50 and is engaged by shoulder 50b. Fig. 18 shows the position of the parts when the timing tank has emptied and bellcrank 36 has shifted the valves 33 and 34 to their original positions, during which rod 48 is moved over to the right and the vertical flange of arm 27 has moved over the inclined face 50f of head 50 into position to be engaged by shoulder 50d. Fig. 19 shows the second step of the main valve releasing action in which the timing tank has again filled and again moved bellcrank 36 so that the arm 27 is engaged by shoulder 50d and moved out of engagement with arm 25, whereupon valve 23' closes and stops the operation of the machine. The mixing chamber and the timing tank now drain into the basin by siphonic action and the machine is ready to go through its cycle of operation again when more soap is supplied to the soap holder and the control knob is again turned to the "on" position.

When the washing cycle has been completed the lid catch release button 14 may be pressed and the spring balanced lid will be raised without effort on the part of the operator. If the lid should inadvertently be raised at any time during the cycle the water supply to the machine is cut off at once, due to the action of spring 31 and the self-closing valve 23', thus preventing a "kitchen shower."

From the foregoing it will be seen that the invention provides a fully automatic, water pressure operated dishwashing machine especially designed for home use and for low cost production to enable its advantages and conveniences to be secured in the majority of homes. It provides a cabinet-style machine of standard dimensions with a spring balanced hinged top for ready access to the dish basket and controls, and which may be opened without effort on the part of the operator and used, if desired, as a means for automatically switching the machine into operation. The operating mechanism is of simple type, not liable to get out of order, thereby reducing repair and other upkeep costs. No motor is used, as the provision of the jet-reaction rotor spray device permits of the supply of the hot sprays for effectively performing all cleansing actions under live water pressure. In the use of this machine the washed dishes may be allowed to remain in the dish basket a short period of time to allow the final hot rinsing water to drain off for a self-drying action, thereby obviating the necessity of hand wiping.

It is recognized that many similar constructions could be used to accomplish the same results, and the mechanism herein shown and described is only presented as one mode of carrying the invention into practical effect, and it is to be understood that many minor changes in form, arrangement or construction may be made within the scope of the appended claims, without departing from the spirit of the invention or sacrificing any of its advantages.

Having thus described my invention, I claim:

1. In a dish washing machine, a source of water supply, a sprayer for spraying the dishes, a mixing device connected with the sprayer for forming with the water when supplied thereto and a suds forming agent a suds solution, a self-closing main control valve governing the flow of water from the source, a controller for opening the main valve, a normally open valve and a normally closed valve respectively controlling the flow of water from the main control valve to the sprayer and to the mixing device, and means automatically operative when the main valve is opened to keep the normally open valve opened for a predetermined period of time, then close it and open the normally closed valve and keep it open for a predetermined period of time, then return the last named valve to normal closed position and after a period close the main valve.

2. In a dish washing machine, a source of water supply, a sprayer for spraying articles, a suds forming device connected with the sprayer, a self-closing main valve for starting or stopping the flow of water from the source, a controller for opening the main valve and operable to permit the main valve to close, separate conductors respectively disposed between said main valve and the sprayer and suds forming device, normally open and closed valves in the respective conductors, whereby when the main valve is open water from the source will normally be supplied to the sprayer and cut off from the suds forming device, and an automatic timer device for al-

ternately opening and closing the second named valves and operative when the main valve is open to close the normally open valve after a period of time and open the normally closed valve and then, after a period of time, to return the valves to their normal positions.

3. In a dish washing machine, a casing, a lid for closing the casing, a cleansing fluid supply means including a start and stop valve, a washing mechanism in the casing, a control device rotatable into and out of valve operating position and slidable downwardly and upwardly to open the valve and permit it to close, said device being automatically set into operation by the lid when the lid is closed to open the valve for supplying cleansing fluid from the supply means to the washing mechanism, and means for automatically moving the controller to an inoperative position to permit the valve to close at the end of a washing operation.

4. In a dish washing machine, a casing having an opening in its top wall, a receptacle within the casing for supporting dishes and the like while they are being washed, said receptacle being insertible and removable through said opening, a lid hinged to the top of the casing and adapted to close and seal said opening, a cleansing fluid supply means including a normally closed valve, a washing mechanism in the casing adapted to spray the cleansing fluid on articles within the receptacle, a control device adapted when in one position to open the valve and when in another position permitting the valve to close, said control device being constructed and arranged so that it is automatically set in operation to open the valve by engagement of the lid therewith when the lid is closed, and means for automatically moving the controller to an inoperative position to permit the valve to close at the end of a washing operation.

5. In a dish washing machine, a source of water supply, a sprayer for spraying the dishes, a sudsing means connected with the sprayer for forming with a cleansing agent and water supplied thereto a suds forming solution for supply to the sprayer, an automatically closing main control valve governing the flow of water from the source, conductors connecting the sudsing means and also the sprayer with the source of hot water supply and also the sudsing means with the sprayer, valve means controlling the flow of water from the main control valve to the conductors and operative for alternately connecting said conductors with the source of water supply, a rocking lever controlling said valves, and a gravity operated timer connected with the water supply on the discharge side of the main control valve for controlling said lever.

6. In a dish washing machine, a source of water supply, a sprayer for spraying the dishes, a sudsing means connected with the sprayer for forming with a cleansing agent and water supplied thereto a suds solution for supply to the sprayer, a valve for controlling the flow of water, valve devices controlling the flow of water from the first named valve to the spray and suds forming means, respectively, a movable timing device comprising a receptacle supplied with water from the source and a lever operable by movements of the receptacle to control the operation of said valve devices to alternately supply water to the respective conductors for preliminary and final washing actions and an intermediate sudsing action and to then permit the closing of the first named valve, said timing device further comprising a spring which lifts the receptacle when substantially empty and moves the lever to restore the valve devices to their initial positions.

7. In a dish washing machine, a source of water supply, a sprayer for spraying articles, a suds forming device connected with the sprayer, a main valve for controlling the flow of water from the source, conductors respectively disposed between said main valve and the sprayer and suds forming device, valves in the respective conductors, whereby when the main valve is open water from the source will normally be supplied to the spray and cut off from the suds forming device, and a fully automatic timer device for alternately opening and closing the second named valves and operative during a flow of water and when the main valve is open to close the first named control valve after a period of time and open the second named control valve and then, after a period of time, to return the valves to their normal positions, said timer device comprising a gravity operated water receptacle having water inlet and drainage means and mechanism operated thereby to operate the valves.

8. In a dish washing machine, a casing, a lid for closing the casing, a cleansing fluid supply means, a washing mechanism in the casing, and a valve mechanism including a control device engageable by said lid during the closing operations and manually adjustable to "on" and "off" positions independent of said lid, said valve mechanism being operable by the lid to control the supply of fluid to the washing mechanism when the control device is in "on" position and being inoperative when the control device is in the "off" position.

9. A dish washing machine comprising, in combination, a casing provided with spraying means for dishes or the like, a main valve connected to and governing the flow from a source of hot water, a mixing or sudsing tank connected with the spraying means, a soap holder discharging into the mixing or sudsing tank, means including conduits and valves for governing the flow of water from the main valve to the spraying means either directly or by way of the mixing or sudsing tank, timing means operated by the flow of water from the discharge side of the main valve for controlling the length of each phase of the cycle of operation, and hand-operated means to set the flow-governing means to operative or inoperative position.

10. A dish washing machine comprising, in combination, a casing provided with spraying means for dishes or the like, a main valve connected to and governing the flow from a source of water, said main valve being self-closing, a soap holder, a mixing or sudsing tank into which the soap holder discharges, conduit means including a normally closed valve connecting the soap holder with the main valve, conduit means including a normally open valve connecting the spraying means with the main valve, conduit means connecting the mixing or sudsing tank with the spraying means, and means for governing the flow of water from the main valve to the spraying means either directly or by way of the mixing or sudsing tank, said flow-governing means comprising a manually-operated mechanism to start the operation, a timing tank, a filling pipe discharging into the timing tank and coupled with the discharge side of the normally open valve, a drain pipe coupled to the timing tank and having means restricting the flow therethrough so that the timing tank readily fills, lever

means connected to the timing tank, a spring connected to the timing tank and lever and operating to lift the timing tank when substantially empty thereby to swing the lever, means connected with the lever to operate said normally open and normally closed valves, and other means connected with the lever to move part of said manually-operated mechanism to permit the main valve to close.

11. In a dish washing machine or the like, a cabinet for enclosing articles to be cleaned having an opening to permit insertion and removal of said articles, and closure means for said opening movable to open or closed position, spray means within the cabinet, cleaning fluid supply means, and conduit means connecting the spray means with the source of supply, control means for regulating the supply of cleaning fluid through said conduit to said spray means, including a member manually movable to "on" and "off" positions independent of the closure means, and being engageable by said cabinet closure means as the closure means is closed, said member when in "on" position being operative to actuate said control means to admit fluid to said fluid spray means on engagement by said closure means, and being inoperative when in the "off" position.

12. In a dish washing machine or the like, a cabinet for articles to be cleaned, having an opening for the insertion and removal of said articles, closure means for said opening movable to open or closed position, spray means within said cabinet for supplying cleaning fluid to said articles, conduit means for supplying cleaning fluid to said

spray means, normally closed valve means in said conduit means interposed between the spray means and the source of fluid supply, and control means for said valve means including a member manually movable to "off" and "on" positions independent of the cabinet closure means, said member being engageable by said cabinet closure means as the closure means is closed, and being operative to open the valve when in "on" position and being inoperative when in "off" position.

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