April 2, 1940. J. W. CHAMBERLIN ET AL 2,195,615

CLEANING MACHINE

Filed April 5, 1937 3 Sheets-Sheet 1

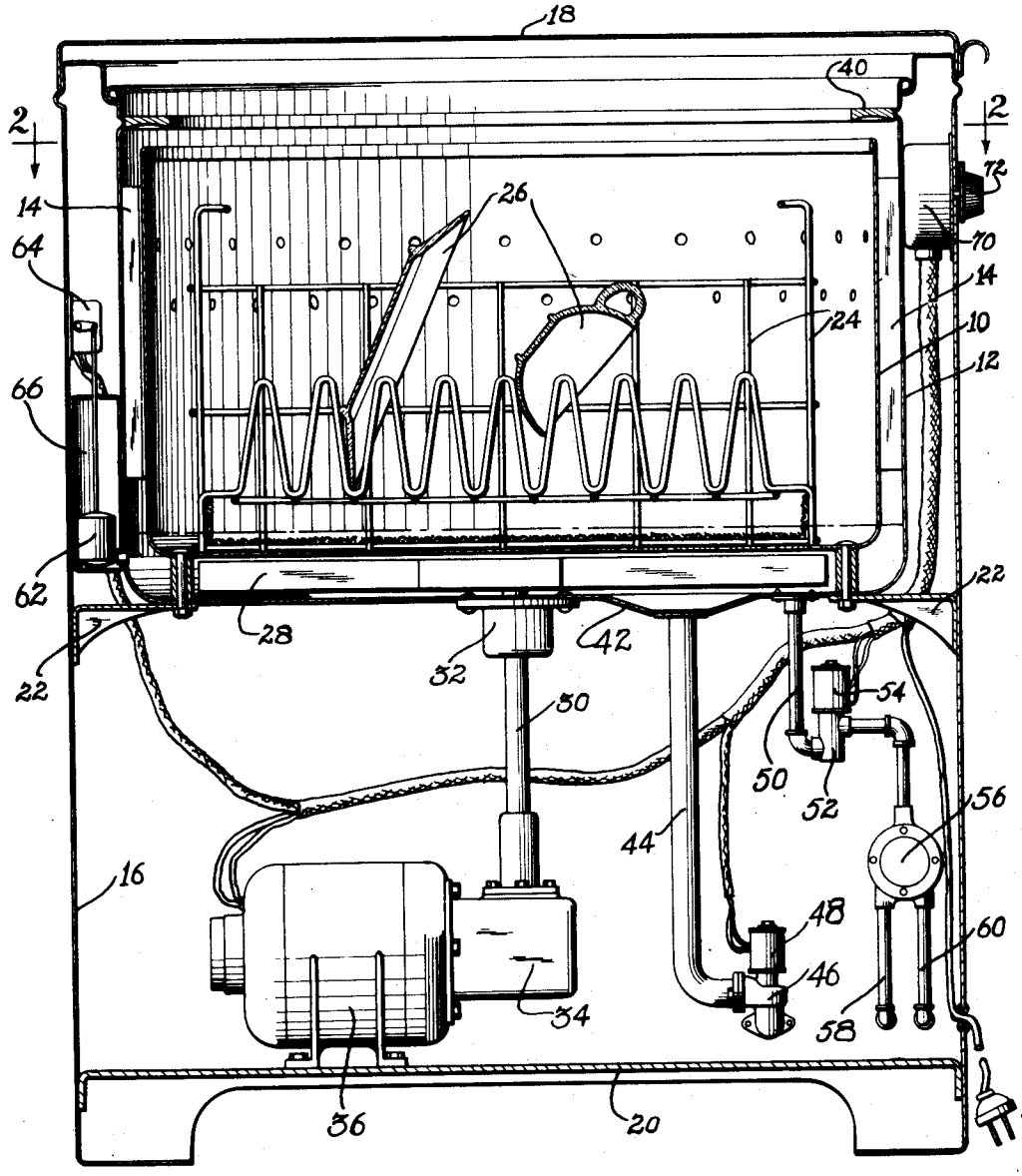


Fig. 1

INVENTOR.
JOHN W. CHAMBERLIN
REX EARL BASSETT Jr.
BY McCorkey & Booth
ATTORNEY.

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CLEANING MACHINE

Filed April 5, 1937 3 Sheets-Sheet 2

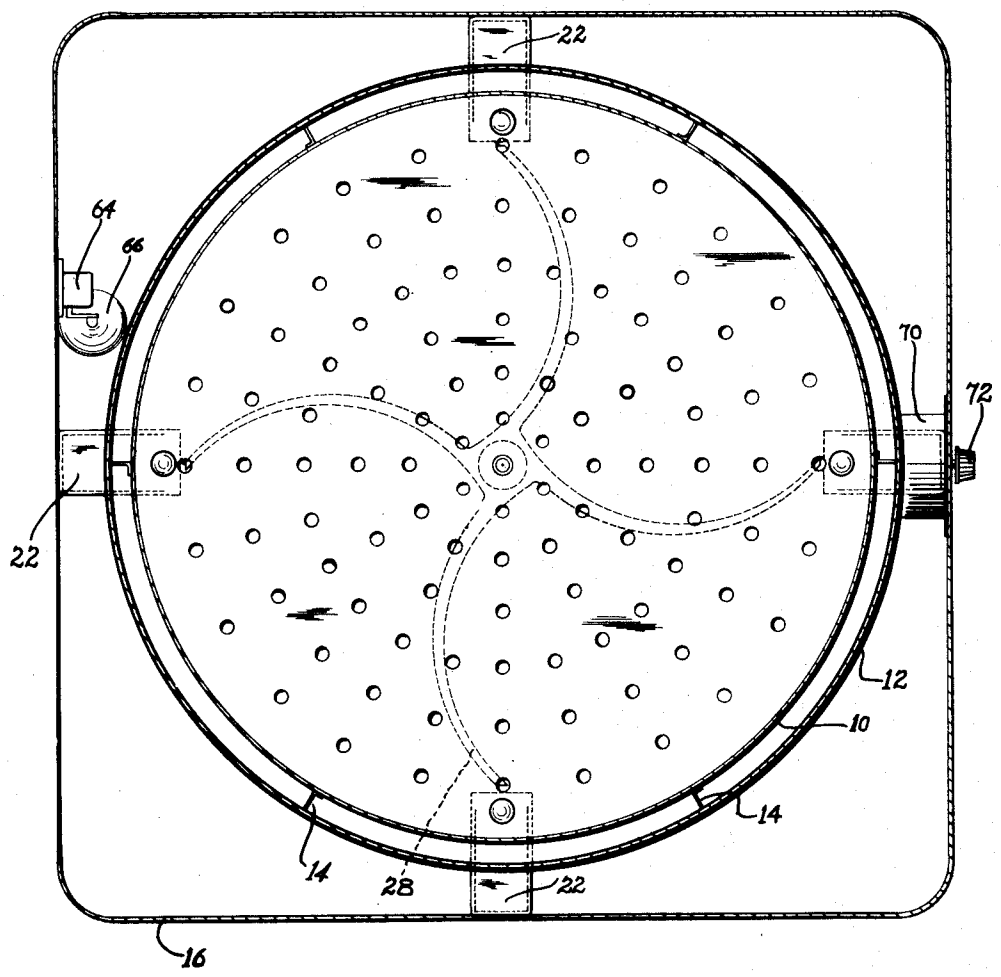


Fig. 2

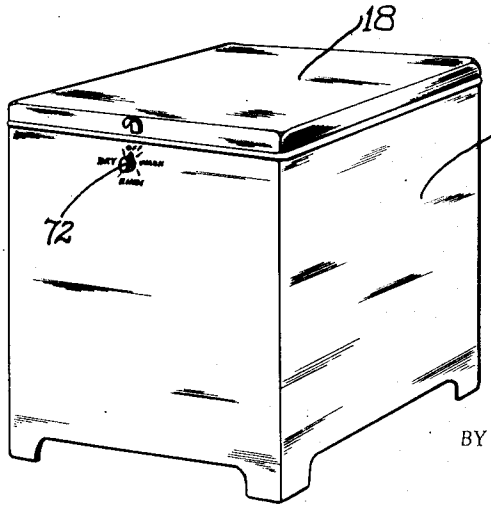


Fig. 3

INVENTOR.
JOHN W. CHAMBERLIN
REX EARL BASSETT Jr.

BY McCoubrey & Boode
ATTORNEY.

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Filed April 5, 1937 3 Sheets-Sheet 3

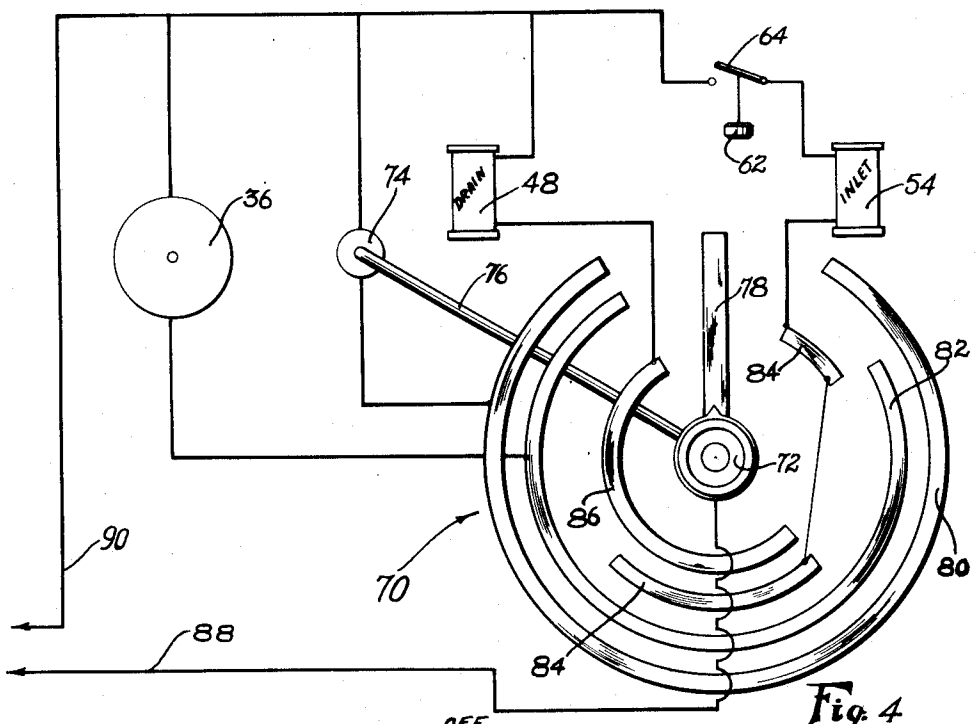


Fig. 4

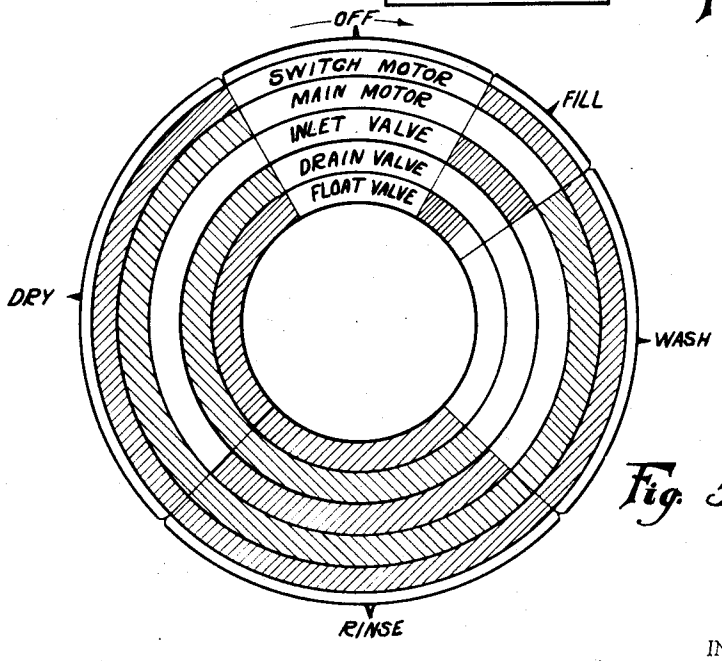


Fig. 5

INVENTORS
JOHN W. CHAMBERLIN
REX EARL BASSETT Jr.

BY McCoubrey & Booth
ATTORNEY.

Patented Apr. 2, 1940 2,195,615

UNITED STATES PATENT OFFICE

2,195,615

CLEANING MACHINE

John W. Chamberlin and Rex Earl Bassett, Jr., South Bend, Ind., assignors to Bendix Home Appliances, Inc., Detroit, Mich., a corporation of Delaware

Application April 5, 1937, Serial No. 134,965

1 Claim. (Cl. 141—9)

This invention relates to washing machines, and is illustrated as embodied in an automatic dish washing machine. An object of the invention is to provide a simple machine which will not get out of order, and which will operate effectively in an automatic cycle to wash and rinse, and preferably also to dry, dishes or other articles placed therein.

In the arrangement illustrated, an automatic control device first causes the machine to fill with hot water or other cleaning liquid to a predetermined level, and then starts the operation of an agitator or water-circulating device. This is preferably a motor-driven impeller or centrifugal pump, which withdraws the water from the bottom of an inner container in which the dishes are placed, and drives it upwardly through the space between the side wall of the inner container and the side wall of an outer container or tub, to be directed at the top of said walls back over the dishes again.

Various features of novelty relate to the novel cycle of operation of the machine, and to various constructions and arrangements of the parts of the machine which are desirable in operating according to such a cycle. These features, and additional objects, will be apparent from the following description of the illustrative embodiment shown in the accompanying drawings, in which:

Figure 1 is a vertical section through the machine;

Figure 2 is a horizontal section through the machine on the line 2—2 of Figure 1;

Figure 3 is a perspective view of the machine;

Figure 4 is a wiring diagram; and

Figure 5 is an operations chart showing the cycle of the machine.

The illustrated machine comprises an inner container 10 having a perforated horizontal bottom and a substantially vertical cylindrical side wall, and which is mounted within a similarly formed outer container or tub 12. The two containers may be rigidly secured together by vertical spacers 14 which also serve as guides in directing the wash water vertically upward.

These parts are inclosed in a suitable casing 16 having a hinged cover 18 and a support 20 for the motor described below. Suitable brackets 22 support the two containers in the casing. Within the inner container 10 is a suitable wire structure 24 formed to support the dishes 26 therein for washing.

Between the bottoms of the two containers 10 and 12 there is an agitator or water-circulating device, shown as a bladed centrifugal impeller 28 driven by a vertical shaft 30 extending through a packing or sealing device 32. This shaft is driven through a suitable gear box 34 by an electric motor 36 mounted on the base 20.

The impeller 28 withdraws water from the inner container 10 in the central portion thereof where the centrifugal effect of the impeller is less than the force due to the static head of the water, forces part of it back up through the perforated bottom of the container 10 adjacent its side wall, where the centrifugal force causes a pressure great enough to overcome the head of the water, and forces most of the water upwardly between the side walls of the containers 10 and 12. An annular baffle 40, mounted on the side wall of the outer container 12, directs the water back into the inner container upon the dishes 26.

Approximately midway between the center and the periphery of the outer container 12, at a point where the centrifugal effect of the impeller 28 just about balances the head of the water, there is a sump 42 from which opens downwardly a drain pipe 44 having a drain valve 46 controlled by a solenoid 48.

Adjacent the periphery of the outer container 12, an inlet pipe 50 admits water at a point where the impeller 28 exerts sufficient centrifugal force on the incoming water to drive it upwardly toward the baffle 40. The intake of the water is controlled by a suitable inlet valve 52 operated by a solenoid 54. Water is preferably supplied at a predetermined fairly high temperature by a suitable mixing device 56 into which open hot and cold water pipes 58 and 60. The particular mixing device 56 herein shown is constructed in accordance with application No. 72,312, filed April 2, 1936, which has matured into Patent No. 2,146,929, granted February 14, 1939.

The level of the water in the machine is limited by means such as a float 62 operating a float switch 64 connected in series with the solenoid 54. The float 62 is arranged in a float chamber 66 which communicates with the lower portion of the outer container or tub 12.

The operation of the machine is controlled by a cyclic control device such as a motor-driven automatic multiple switch 70. This switch has a control knob 72 on the outside of the casing 16, and this knob may be formed as shown in Figure 3 to serve as an indicator showing on a suitable scale the particular point in the cycle at which the machine is operating.

As indicated diagrammatically in Figure 4, the cyclic switch is operated by a suitable self-start-

ing and preferably constant-speed switch motor **74**, such as a synchronous induction motor, driving a switch shaft **76** to carry a movable contact **78** over a series of contacts **80**, **82**, **84**, and **86** connected respectively to the switch motor **74**, to the main driving motor **36**, to the inlet valve solenoid **54**, and to the drain valve solenoid **48**. The float switch **64** is in series with the inlet valve solenoid **54**. The one line wire **88** is connected to the movable contact **78**, and the other line wire **90** is connected to the motors **36** and **74**, and the solenoids **48** and **54**, all arranged in parallel.

With the form of contacts shown in Figure 4, the cycle diagrammed in Figure 5 will be carried out. First there is an "off" position, at the top of the diagram, in which all of the contacts are open and the machine is at rest. At this time the dishes are placed in the machine, with a suitable amount of powdered soap or the like.

The cover **18** being then closed, the knob **72** is turned manually until the movable contact **78** engages the contact **80** of the switch motor. This energizes the switch motor **74** continuously to the end of the cycle. At the same time the contact **84** is engaged to open the inlet valve and fill the machine with water up to a level determined by the float **62**. Immediately thereafter the inlet valve closes.

Next the main motor **36** is started, with both the inlet and the drain valves closed, to wash the dishes in the hot, soapy water as previously described. At the end of the "wash" period, the drain valve and the inlet valve both open, and the dishes are rinsed by flushing them with clean hot water. Then the inlet valve closes, the drain valve remaining open, and the impeller circulates air over the dishes to dry them.

While one particular embodiment of the invention has been described in detail, it is not the intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claim.

We claim:

A washing machine comprising a casing having a top cover, a tub mounted in the upper part of the casing and having its open top just below said cover, a container within the tub for the work, an annular deflector carried by the upper edge of the wall of the tub and arranged to deflect into said container water impelled upwardly along the tub wall, an impeller in the lower part of the tub to impel water upwardly of said wall, a motor connected to drive said impeller, a water intake leading to the bottom of the tub adjacent the impeller and provided with an electrically-operated valve, a float chamber lying beside the tub and having its lower portion communicating with the lower portion of the tub, a float in said chamber, a switch operated by said float, a circuit including said valve in series with said float-operated switch, a drain leading from the bottom of the tub having an electrically-operated valve, and a motor-driven multiple cyclic switch which controls said motor and said drain valve and said circuit.

JOHN W. CHAMBERLIN.
REX EARL BASSETT, JR.