

June 30, 1942.

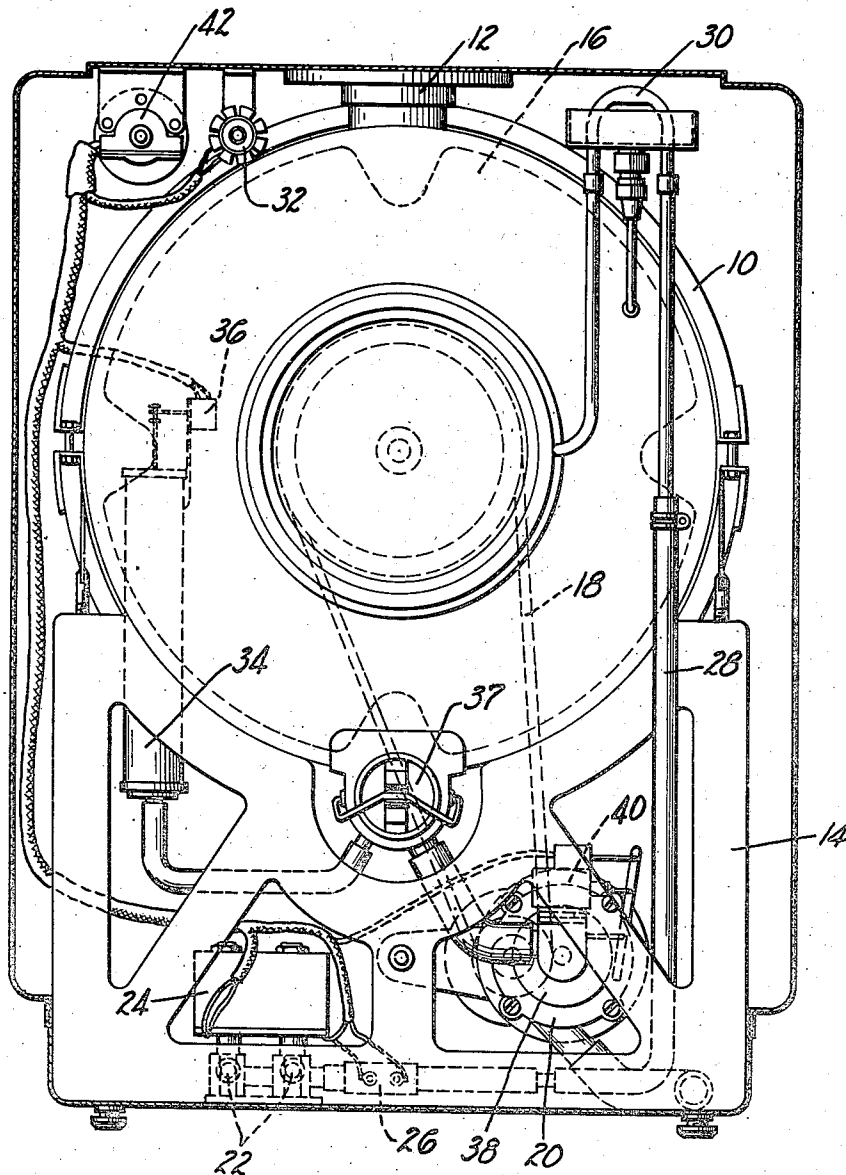
W. F. OLIVER

2,288,141

CLEANING MACHINE

Filed Aug. 16, 1940

2 Sheets-Sheet 1



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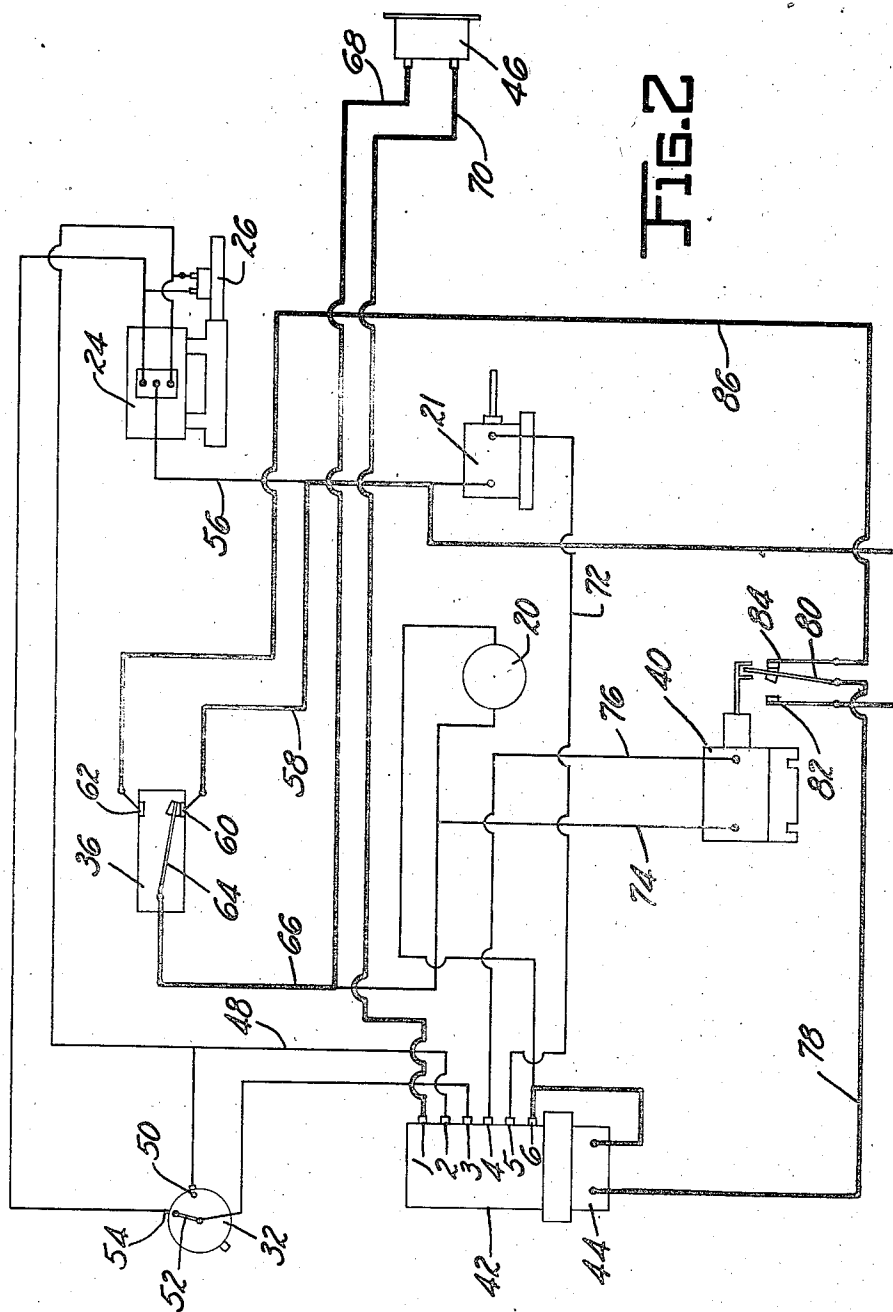
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2,288,141

CLEANING MACHINE

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Application August 16, 1940, Serial No. 352,866

1 Claim. (Cl. 68—12)

This invention relates to cleaning machines and more particularly to machines automatically controlled by a motor driven controller switch.

In automatic machines of this type a predetermined sequence or cycle of operations is carried out including filling the tub with cleaning liquid and draining liquid from the tub as well as various cleaning, rinsing and extracting operations. One such cycle is fully described and claimed in Bassett and Chamberlin Patent No. 2,165,884.

In such cycles a certain allowance of time must be made for the filling and draining operations and this can be done with reasonable accuracy under normal conditions. However, in some instances water or other cleaning liquid supplies are encountered which provide a very low pressure so that an undue amount of time is required to fill the machine and the time left for the cleaning operations is correspondingly reduced. Similarly draining must sometimes be carried out under adverse circumstances so as to require an unusual amount of time and reduce the time normally provided for rinsing operations.

It is one of the objects of the present invention to overcome these difficulties by providing a cleaning machine in which the filling and draining operations are carried out without affecting in any way the times allowed for other operations.

According to one desirable construction the invention may be embodied in a cleaning machine having a cyclic controller whose operation is suspended during draining and filling. Preferably the controller is driven by an electric motor whose circuit is interrupted when the drain is shut off and the liquid in the machine is below the desired fill level as during filling or when the drain is open and the liquid is above a predetermined minimum level.

The invention including various other objects, advantages and novel features thereof will be more readily understood from the following description of the embodiment shown in the accompanying drawings, in which:

Figure 1 is an elevation of a washing machine with parts of the casing removed; and

Figure 2 is a circuit diagram of the machine of Figure 1 with those parts of the circuit utilized in carrying out the novel operations of the present invention shown in heavy lines.

The machine as illustrated comprises a tub 10 adapted to contain cleaning liquid such as water to which a detergent material such as soap may be added through a top opening 12. The tub 10

is supported on a horizontal axis on saddles 14 to which the tub is rigidly clamped. The perforated drum or container 16 is rotatably mounted in the tub to receive material to be cleaned and is driven by a belt 18 through a motor and transmission 20. The transmission is adapted to drive the drum 16 at a low speed for washing or at a high speed for extracting cleaning liquid from the material, as is more fully described and claimed in said Patent No. 2,165,884.

Water is supplied to the tub from suitable hot and cold water supplies past valves 22 controlled by solenoids 24 and discharged into a mixing chamber 26. Mixed water in the chamber 26 controls a temperature responsive device which in turn controls one or both of the solenoids 24 so that a mixture of hot and cold water at any desired temperature may be obtained. From the mixing chamber 26 water is conducted through a conduit 28 past a breaker 30, of the type more particularly disclosed and claimed in the application of Frances M. Dawson, Serial No. 225,700, filed August 18, 1938, now Patent Number 2,211,459, issued August 13, 1940, and into the tub. If it is desired to obtain hot water only, as in washing linens and cotton materials, the cold water solenoid may be cut out of the circuit by a selector switch 32. The level of water in the tub is controlled by a float device 34 operating a switch 36 to interrupt the circuit to the solenoids 24 when the water reaches a predetermined level so that the valves 22 will be closed.

Water is drained from the machine at the end of the washing operation and during the rinsing and extracting cycles past a removable drain screen 37 communicating with the inlet of a pump 38 driven by the motor 20. The inlet of the pump is controlled by a valve opened and closed by the operation of a solenoid 40 which when energized opens the valve and when de-energized allows the valve to close under the influence of a spring, not shown.

Operation of the machine to carry out a predetermined cleaning cycle is controlled by a time switch and controller 42. As best seen in Figure 2 the controller 42 includes a series of contacts 1, 2, 3, 4, 5 and 6 adapted to be selectively placed in circuit by cam devices driven by an electric synchronous motor 44.

In the normal operation of the machine, connection is made to a suitable source of power, as for example, through a plug device 46, and the cam shaft of the controller 42 is advanced manually to its starting position in which a circuit is closed between the contacts 1 and 6 to close a

circuit through the motor 20. At the same time, or very shortly thereafter, a circuit is also closed between the contacts 2, 3 and 1 to connect one side of the power line 46 to the contact 2, and to a wire 48 leading to a contact 50 on the switch 32, and also to one side of the solenoid 24 which controls the hot water inlet valve. The contact 3 is connected to a blade 52 in the switch 32 which is adapted to be connected either to the contact 50 or to a contact 54 leading to one side of the solenoid 24 controlling the cold water inlet valve. Both of the solenoids 24 have their other sides connected to a common wire 56 connected to a wire 58 which leads to a low switch contact 60 on the water level switch 36. The water level switch also includes a high level contact 62 and a blade 64 movable by the float device into engagement with either of the contacts 60 or 62, and which is connected by a wire 66 to one side of the power source indicated at 68, the other side of the power source indicated at 70 being connected to the controller switch contact.

The transmission forming a part of the motor power unit 20 is controlled by a solenoid 21 having one side connected to the wire 58 and its other side connected through a wire 72 to the contact 5. The drain valve solenoid 40 has one side connected through wire 74 to the power line 68, and its other side connected through a wire 76 to the contact 4.

One side of the controller motor 44 is connected to the contact 6 and the other side is connected through a wire 78 to a switch blade 80 adapted to be moved by the solenoid 40 between two contacts 82 and 84. The contact 82 is connected to the wire 58 and the contact 84 is connected by a wire 86 to the high contact 62 of the float switch 36.

Before the machine is started up the drain valve controlled by solenoid 40 is normally closed, the solenoid 40 being de-energized and the blade 80 being in engagement with the contact 84. Also since no liquid is in the tub the blades 64 of the float switch will be in its lowermost position in engagement with the low contact 60. If, at this time, the timer switch is advanced to its starting position, as described above, a circuit will be completed from power line 70 to contact 1, through the switch to the contact 6 and through the motor 20 to power line 68 so that the motor will be operated to drive the drum 16. At the same time a circuit will be completed from the power line 70 to common contact 1, through the switch to contacts 2 and 3, through wire 48 and switch 32 in parallel to both solenoid coils 24, through wires 56 and 58, contact 60, blade 64 and wire 66 to the other power line 68. Thus water will be admitted to the washing machine. At this time the motor 44 is not energized due to the fact that blade 80 is disengaged from contact 82 to interrupt its circuit.

When the water rises to the desired level in the tub the blade 64 will be moved up into engagement with the contact 62, this action preferably being a snap-action. At this time the solenoids 24 will be de-energized to stop the water input due to interruption of the circuit between contact 60 and blade 64. At the same time a circuit will be established through the motor 44 from power line 70 to common contact 1, through the switch to contact 6, through motor 44, wire 78, blade 80, contact 84, wire 86, contact 62, blade 64, and wire 66 to power line 68. Thus the motor 44 will be energized and start driving the cam-

shaft of the timer switch 42 to carry out a washing operation.

After predetermined washing time, as determined by the setting of the timer switch, a circuit will be established between contact 1 and contact 4 to energize the solenoid 40 through wires 76 and 74 connected to the power line 68. The solenoid plunger will move to the left as seen in Figure 2 opening the drain valve and moving the blade 80 into engagement with the contact 82. This interrupts the circuit to motor 44 so that it stops and remains stopped during the draining operation.

At the end of the draining operation the float device will again move the blade 64 down into engagement with the contact 60 and the circuit through the motor 44 will be re-established from power line 68 through wire 66 to blade 64, contact 60, wire 58, contact 82, blade 80, wire 78 through the motor through contact 6 through the switch to contact 1 and to the power line 70. At this time a flushing operation may be carried out by opening the water inlet valves while maintaining the drain valve open, and any desired rinsing operation may likewise be carried out by closing the drain valve and filling the tub with fresh water. At the completion of the rinsing and flushing operations the transmission may be shifted to high speed by establishing a circuit in the switch from contact 1 to contact 5 to energize the solenoid 21 so as to extract cleaning liquid from the material by driving the drum 16 at high speed.

It will be noted that with the above circuit the timer switch motor 44 is de-energized during both the operations of filling the tub with water and of draining the water therefrom, but is in circuit at all other times. In this way variations in the time required for filling or draining due to external conditions are excluded from the normal operating cycle so that the same time is always available for the washing, rinsing, flushing and extracting operations.

While one embodiment of the invention has been shown and described in detail it will be understood that this is for the purpose of illustration only and is not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claim.

What is claimed is:

A cleaning machine adapted to perform a low-speed washing operation and a high-speed extracting operation, a motor driven controller having means for maintaining the low-speed washing operation and the high-speed extracting operation each for its own predetermined length of time, a float controlled three-way switch, a drain valve controlled three-way switch serially included in the circuit of the controller motor, one pair of the float controlled three-way switch contacts and one pair of the drain valve controlled three-way switch contacts serving to close the circuit of the controller motor to start the low-speed washing operation when the cleaning liquid reaches a predetermined high level and the drain valve is closed and the other pair of the float controlled three-way switch contacts and the other pair of drain valve controlled three-way switch contacts serving to close the circuit of said controller motor to start the high-speed extracting operation when the cleaning fluid reaches a predetermined low level and the drain valve is open.

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