Feb. 7, 1939. O. V. JACKSON 2,146,433

WASHING MACHINE FOR DISHES AND THE LIKE

Filed Aug. 14, 1935 2 Sheets-Sheet 1

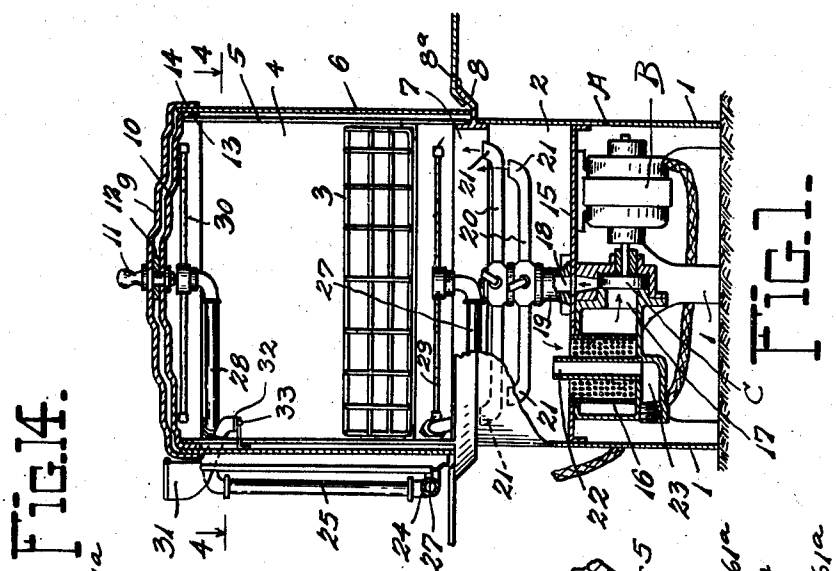


FIG. 1.

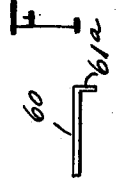


FIG. 14.

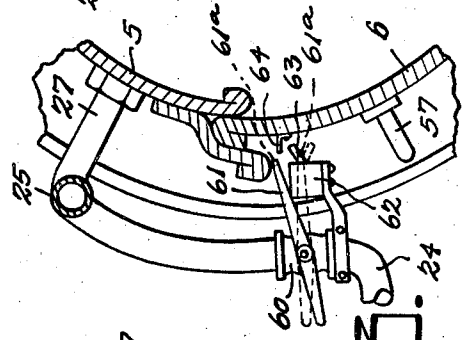


FIG. 13.

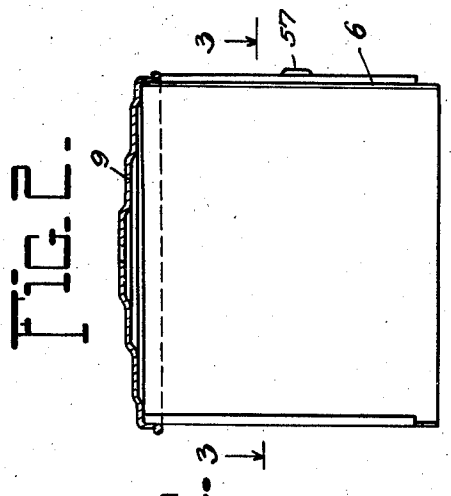


FIG. 2.



FIG. 11.

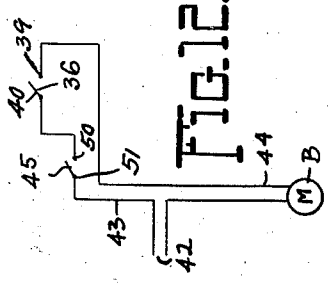


FIG. 12.

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Feb. 7, 1939. O. V. JACKSON 2,146,433

WASHING MACHINE FOR DISHES AND THE LIKE

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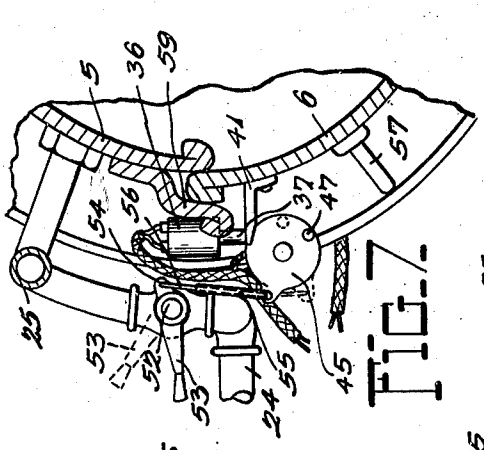


FIG. 7.

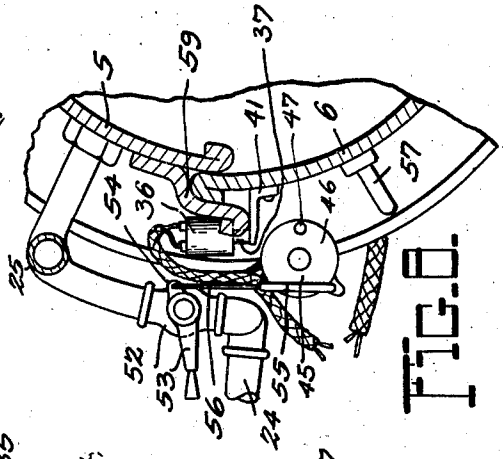


FIG. 8.

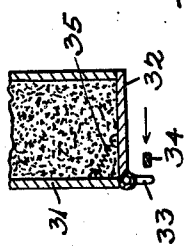


FIG. 5.

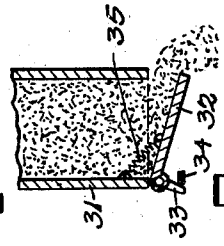


FIG. 6.

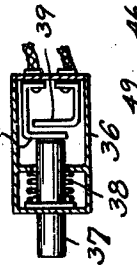


FIG. 9.

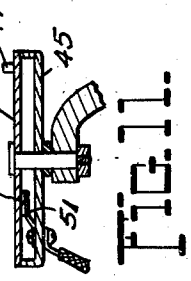


FIG. 11.

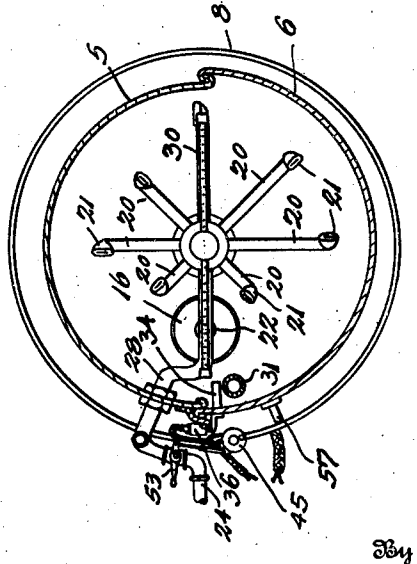


FIG. 4.

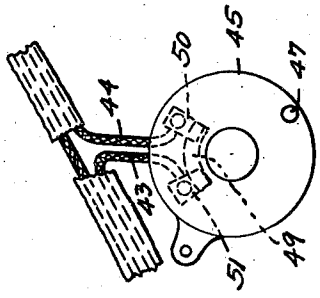


FIG. 10.

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UNITED STATES PATENT OFFICE

2,146,433

WASHING MACHINE FOR DISHES AND THE LIKE

Otto V. Jackson, Cleveland, Ohio

Application August 14, 1935, Serial No. 36,207

4 Claims. (Cl. 141—9)

The present invention embodies certain novel improvements in washing machines designed particularly for the washing of dishes, of the type adapted to be connected with a water main or line supplying water to the machine under pressure, which water, through the provision of suitable spraying means and nozzle parts, is adapted to be directed against dishes or similar articles to be washed in the machine.

The novel features of the invention involve primarily the employment of a soap dispenser utilized in conjunction with door means whereby access is had to the washing compartment or chamber of the machine, the door means coacting with the soap dispensing instrumentality in such a manner that after charging of the machine with the articles to be washed, the action of closing the door operates the said dispensing instrumentality to feed a measured quantity of soap, preferably in comminuted form, to the washing chamber of the machine.

Other important features of the invention include the provision of control means for the motor which operates a pump that forces washing fluid to the washing chamber, which control means is operable by the door by which access is had to the washing chamber, so that on closing of the door the motor operated pump will be started for introducing the washing fluid into the washing chamber. The last mentioned means is peculiarly associated for cooperation with the operating device or valve which controls the admission of rinsing water to the washing chamber for rinsing the dishes or other articles being cleaned after thorough washing thereof. The cooperation just referred to is such that upon the introduction of the rinsing water by operation of the admission valve therefor, the motor which actuates the pump that supplies the washing fluid to the washing chamber is stopped. Thus the means for handling the washing fluid and the rinsing fluid, introduced at proper times to the washing chamber, are interlocked in a manner preventing the admission of both of these fluids to the chamber at the same time.

The invention further involves a novel construction of a hood enclosure which provides the washing chamber, and mode of assembling said hood upon the body of the washer, or the wash water receptacle, together with a special construction of top members associated with the hood and with the door that is movably mounted on the latter and affords access to the washing chamber.

In the accompanying drawings:

Figure 1 is a vertical sectional view of the washing machine embodying the essential features of the invention.

Figure 2 is a view showing the door structure of the hood which provides the washing chamber.

Figure 3 is a sectional view through the door of the hood taken about on the line 3—3 of Figure 2.

Figure 4 is a horizontal sectional view through the hood portion of the machine, taken about on the line 4—4 of Figure 1.

Figure 5 is a fragmentary sectional view of the lower portion of the soap dispenser, its door closed, and the door tripping member inactive in relation to the door.

Figure 6 is a view similar to Figure 5 but showing the door of the soap dispensing receptacle in the act of being opened by the trip member therefor.

Figure 7 is a fragmentary horizontal sectional view showing more clearly the arrangement of the rinsing water inlet to the washing chamber and the disposition of the control valve therefor, and certain of the switch devices by which the operation of the motor that propels the washing fluid into the washing chamber is controlled, the starting switch for the motor being shown just previous to tripping as the door is reaching closed position.

Figure 8 is a view similar to Figure 7, but showing the rinsing water inlet valve in its closed position and the door wholly closed after actuating the switch which starts the motor which operates the pump.

Figure 9 is a detail view of the electric switch, of the pressure button type, included in the motor circuit.

Figure 10 is a fragmentary view of the rotary switch included in the motor circuit and controlled in its operation by the rinsing valve and the door.

Figure 11 is a vertical sectional view through the rotary switch illustrated in Figure 10.

Figure 12 is a simple diagram of the electric circuit arrangement including certain of the control switches.

Figure 13 is a horizontal fragmentary sectional view of a modified form of the rinsing valve with the means operated thereby to control the motor starting switch, together with means on the door also cooperating with said motor starting switch.

Figure 14 is a detail view of a control arm.

Referring primarily to Figure 1 of the drawings, A denotes the lower portion or base of the dish-washing machine of the invention, which base may comprise the feet 1, of suitable number,

and also the receptacle 2 for the wash water that constantly drains downwardly into the receptacle as the washing of the dishes or other articles in the washing chamber proceeds. The wash water is sprayed upwardly against the articles that are to be cleaned, the latter being disposed in one or more baskets 3 arranged in the washing chamber 4, which washing chamber is made up of a hood 5 having a suitable door 6 that constitutes virtually a curved segment of the hood structure movably mounted thereon in slidable relation thereto after the manner of certain known types of doors for cylindrical vessels. The receptacle 2 may be an integral portion of the base A or otherwise constructed, this not being material to the invention, there being provided at the top of the receptacle 2 an annulus 7 having a lateral and upwardly curved flange which provides a drip pan or ledge 8. When the parts of the machine or apparatus are assembled, the annulus 7 fits snugly in the upper portion of the receptacle 2, the drip pan or ledge 8 projects outwardly therefrom, and the hood 5 and the door 6 therefor have their lower edges seated in and supported upon said drip pan or ledge 8. The annulus 7 may be riveted to the upper portion of the receptacle 2 if desirable.

A double cover for the washing chamber 4 is provided, consisting of an upper cover member 9 and an inner or lower cover member 10, the two swivelly connected by a suitable central handle 11 providing an axis or bolt-like connection between the two covers, the said cover members being held spaced apart by a disc or intermediate washer 12. The lower cover member 10 is riveted or welded to the hood or shell 5, and the upper cover member 9 may be riveted or welded to the door 6.

There is ample space in the chamber 4 in which to support one or several of the baskets 3 which are to contain the dishes or articles to be cleaned.

Respecting the double cover arrangement described, it may be noted that the inner or lower cover member 10 has a depending flange 13 that snugly fits around the hood 5 whereas the upper cover member 9 has a depending flange 14 which is spaced from the flange 13. The flange part 13 of the cover member 10 is a portion secured to the hood, and the flange portion 14 of the cover member 9 is a part secured to the door 6, as previously described, by riveting or welding. The cover member 9 moves with the door when the latter is opened and closed, by reason of the swivel connection at the handle portion 11, as described.

The door 6 slides in close engagement with the hood 5, the hood is provided with a vertical opening in a side thereof of lesser dimension than the area of the door, and the door is moved between the flanges 13 and 14 to slide it to open position affording access to the interior of the washing chamber 4 for the removal of dishes therefrom or the emplacement of the articles to be washed therein.

Below the bottom of the receptacle 2 is disposed a motor B, which motor drives a centrifugal pump C. The said bottom, designated 15, of the receptacle 2, is provided with a cylindrical perforated strainer basket 16 open to the receptacle 2 so that the dirty water or washing fluid in the receptacle 2 may pass downwardly through the strainer 16 to the intake 17 of the pump C which is driven by the motor B. The pump C has a tangential outlet opening which leads to the intake opening 18 for the pipe 19 that supplies the washing fluid to the receptacle 2 and the washing chamber 4. The washing fluid passes upwardly through the intake 18 of the pipe 19 to suitable spray arms 20, one set of which is superposed above the other set, and these arms have nozzles that are inclined so that the reactive forces of the water passing through the hollow portions of the arms to their nozzles 21 cause rotation of the arms and their nozzles. The nozzle portions of the spray arms 20 of the lower set are inclined in a direction opposite to that of the nozzle portions of the spray arms of the upper set, so that the lower spray arms rotate in one direction and the upper spray arms rotate in an opposite direction as their nozzles supply the washing fluid in an upward direction to the chamber 4. An overflow pipe 22 extends a little above the bottom 15 of the receptacle 2 and connects with a drain 23.

The arrangement of the motor B, strainer 16, and the method of forcing the washing fluid into the washing chamber, are general features already known, the cycle of movement of the washing fluid being to pass downwardly to the intake 17 of the pump through strainer 16 and thereafter forced upwardly by the pump into the receptacle 2 and the chamber 4.

Of course, in addition to the washing fluid which is comprised of water with a soap or cleaning powder therein, it is desirable to have a source of supply of rinsing fluid or water, and for this purpose there is provided such a supply designated 24, connecting with a vertical pipe 25 having a branch 27 leading into the lower portion of the washing chamber 4 and a branch 28 leading into the upper portion of the chamber 4.

The branch pipe 27 terminates in a central lower portion of the washing chamber 4 and carries the rotating spray arms 29 with the upwardly directed water jets or apertures therein. The upper pipe 28 similarly terminates at the central upper portion of the washing chamber 4 and is equipped with rotating spray arms 30 having water jets through which the rinsing water is sprayed downwardly upon the dishes or articles in the basket or baskets 3 in said chamber 4.

On the uppermost portion of the machine is carried a dispensing receptacle 31 for soap or a cleaning compound, which is preferably in powdered form though a liquid compound may be readily used within the purview of the invention. At the bottom of the dispensing receptacle 31 is a door 32 having rigid therewith an arm 33 in the path of a trip member 34 which is adapted to strike said arm, after the manner shown in Figure 6, and partially open the door 32 whereby to admit a measured quantity of the cleaning power or compound to the washing chamber 4. The trip member 34, as seen in Figure 4, is carried by the door 6 near the left hand end of the door, and as the door is closed after charging the chamber 4 with the articles to be cleaned, the trip member 34 impinges the arm 33, opens the door 32 slightly, and then the trip member passes beyond said arm 33, permitting a spring 35 to close the door 32 promptly. As the door 5 for the washing chamber 4 is opened, the trip member 34 is moved in a direction opposite to the arrow of Figure 5, and, being made of resilient material, simply passes by the arm 33 by yielding as it passes, since the door 32 is closed and will not yield upwardly beyond its closed position. I do not wish to be limited to the specific means illustrated for the actuation of the door 32 of the dispensing receptacle 31, as various suitable

means may be availed of for this purpose so long as the operation involves a slight opening of the door 32 as the door 6 to the chamber 4 is closed, whereby to introduce a measured portion of the cleaning compound or soap into the chamber 4 as the wash water or cleaning fluid enters said chamber.

It is notable that the wash water or cleaning fluid is admitted into the chamber 4 also at the time that the door 6 is moved to its closed position, there being employed for this purpose a motor starting switch 36, preferably, but not necessarily, of the button type, illustrated in Figure 9. The switch 36 includes the contact closing and opening plunger 37, actuated by a spring 38 so as to be retained normally in a position maintaining the contacts 39 and 40 separated. As the door 6 is moved to its closed position, see Figure 7, an abutment arm 41 on the door strikes the outer end of the plunger 37 and thereby forces the plunger to the contact closing position of Figure 8 wherein the contacts 39 and 40 are connected and current is caused to flow into the motor B, starting said motor into operation. Thereupon the pump C is put into action to propel the washing fluid upwardly through the pipe 19 to the spray arms 20 and out of the nozzles 21 upwardly into the washing chamber 4 where the articles to be cleaned are supported in a basket or baskets 3.

The electric circuit for the motor B is shown diagrammatically in Figure 12 as comprising the source of current 42 and the circuit wires 43 and 44 which are connected with the motor B, previously referred to, and which wires include the starting switch 36 and also a circuit breaker switch 45. The circuit breaker switch 45 is seen best in Figures 7, 8, and 11. This switch 45 is intended to cut off the current to the motor under certain conditions to be hereinafter set forth. Said switch 45 includes the movable or rotative disc 46 having a pin 47 projecting upwardly therefrom into the path of movement of the abutment arm 41 aforesaid, carried by the door 6 of the washing chamber 4.

The disc 46 carries an arcuate plate contact member 49 on its underside, adapted in one position of the disc 46 to connect the spring contact members 50—51. In another position of the disc 46 the contact 49 is disengaged from one of the contacts 50—51 to thereby break the circuit of the wires 43 and 44 connected with the motor.

The utility of the circuit breaker or switch 45 will be understood from the following description, having in mind the fact that it is desirable to provide for the discontinuance of the admission of the washing fluid into the washing chamber 4 when the washing operation is completed and the introduction of the rinsing fluid is to be effected.

Reverting to the rinsing fluid supply pipe 24 and the arrangement of the branches 25, 27, and 28 thereof, it is notable that the control of the passage of the rinsing fluid or water from the supply pipe 24 to the pipes 25, 27 and 28, and thus to the spray arms 29 and 30, is obtained by means of what will be called the rinsing valve or rinse water control member 52. The valve 52 has a suitable handle 53 projecting in one direction and an actuating arm 54 projecting in an opposite direction and toward the hoods. The arm 54 is connected with the circuit breaker disc 46 by means of a rod made up of an outer telescoping section 55 and an inner telescoping section 56, the former connected to the part 46 and the latter connected to the part 54.

The cooperation of the above parts will be understood by describing the complete operation of the machine in reference to the controlling of the admission of the cleaning fluid and the rinsing fluid into the washing chamber 4.

When the door 6, affording access to the washing chamber, is in an open position, the dishes or other articles to be cleaned are placed in the chamber 4, being preferably disposed in the basket or baskets 3 as previously stated. During this time of emplacement of the dishes in the chamber 4, since the door 6 is open, the supply of cleaning water or fluid is cut off because of the inactivity of the motor B, and the supply of the rinsing fluid is cut off because the valve 53 is in its closed position. The door is now moved manually, by grasping the handle 57, to closed position, and as it approaches its final closed adjustment the resilient trip member 34 thereon strikes the arm 33 of the door 32 of the dispensing receptacle 31. This feeds a measured supply or quantity of cleaning powder or soap to the washing chamber 4 and the door 32 closes after such feeding action. At the time above mentioned the circuit breaker switch 46 is positioned as shown in Figure 10, so that it connects the contacts 50 and 51.

About the time that the dispensing receptacle 31 supplies its cleaning compound to the chamber 4 in the closing of the door 6, one of the vertical edge portions of the door begins to enter the space between the hood 5 and an L-shaped flange 59 welded or otherwise secured to the hood as seen in Figures 7 and 8. At this time the abutment arm 41 on the door 6 strikes the plunger 37 of the switch 36, causing closing of the switch 36 and thereby the electric current from the source of supply 42 is conducted to the motor B. This starts the motor B into operation and similarly starts the pump C to perform its work of forcing the washing fluid upwardly through the pipe 19 to the sprayer arms 20. The fluid is sprayed upwardly to the chamber 4 and through the dishes or articles in the basket 3 and falls to the receptacle 2, passes through the strainer 16 and reenters the pump C, the cycle of movement of the wash water or fluid continuing in this manner during the entire washing operation. The washing operation, having been started in this way, is carried on for a predetermined length of time, dependent upon the amount of dishes or articles placed in the washing chamber 4, and other considerations, immaterial to the invention. When the washing operation is completed, the operator moves the rinsing fluid valve 52 to its open position as shown in dotted lines in Figure 7. The rod connection 55—56 thereupon moves the circuit breaker 46 and causes breaking of the connection between the contact 49 and the contacts 50 and 51, thereby breaking the circuit conveying the current of electricity to the motor B and stopping said motor promptly as the rinsing water is introduced, by the opening of the valve 52, into the chamber 4. The rinsing water is now being sprayed in the chamber 4 over the articles therein by the action of the spray arms 30 and 29, and when the rinsing of said articles is completed the operator closes the valve 52 to its full line position of Figures 7 and 8. This action by reason of the telescopic structure of the rod members 55 and 56 leaves the circuit breaker 45 in its open position so that the motor B remains stopped and now all water or fluid supply to the chamber

4 has been discontinued and the articles or dishes are ready to be removed from the chamber 4.

The operator now opens the door 6 by use of the handle 57, and as the door opens the abutment arm 41 relieves its pressure on the plunger 37 of the switch 36, causing opening of this switch and the portion of the circuit including the same. Almost simultaneously with the opening of the switch 36 by the movement of the arm 41 away from said switch, the arm 41 strikes the projection or pin 47 on the disc 46 of the circuit breaker 45 and shifts the disc 46 and its contact 49 from the position shown in Figure 8 back to the position shown in Figure 7, so that the electric circuit 43—44 is closed at the point where the circuit breaker contacts 49, 50, and 51 are located, though it is still maintained opened by the switch 36, preventing operation of the motor B. With the door 6 opened, the operator may remove the now cleaned articles or dishes by bodily displacing same incident to removal of the basket or baskets 3. Unwashed articles may now be emplaced in the chamber 4 and the door 6 will then be closed again, which causes the arm 41 to move the plunger 37 to close the switch 36. This starts the motor B again and commences the washing cycle in the machine as previously described.

In Figure 13 a modification of the invention is shown, wherein the parts are generally the same as previously set forth except that the rinsing valve or control member 60 carries an arm 61 moving therewith and cooperative with the motor starting switch 62, the movable switch lever of which is designated 63. According to Figure 13, as the door 6 closes, a spring arm 64 thereon strikes the switch lever or arm 63 and moves the latter part to a position closing the electric circuit to the motor B. The motor B is thus started. When the rinsing fluid control member or valve 6 is turned in a clockwise direction to open the supply line and admit rinsing fluid to the chamber 4, a vertical extension 61*a* on the arm 61 strikes the switch arm 63 while the latter is in closed position, and moves the switch to an open position, thereby breaking the electric circuit including the motor B, and stopping the motor just as the rinsing fluid enters the chamber 4. Upon completion of the rinsing operation, rinsing valve 60 is closed while the motor starting switch 62 remains in open position. The part 64, being of spring metal, will pass by the switch lever or arm 63 as the door 6 is opened, by yielding over said part 63, without affecting the operation or adjustment of the switch 62 in the door opening movement. Therefore, the part 64 only acts upon the switch lever or arm 63 as the door 6 closes.

When the dishwasher of the present invention is to be installed within a dish-table or the like, the drip pan or ledge 8 may be interlocked with the dish-table as clearly shown at 8*a* in Figure 1; in this manner the dish-washer and dish-table are connected together in a neat and most desirable manner, thereby providing a smooth surface without protuberances which would interfere with the emplacement and removal of the basket and its contents.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a washing machine, in combination, a washing chamber comprising a hood structure forming the enclosure of said chamber, a door for the washing chamber, wash water introducing means for the washing chamber adapted to be placed into and out of operation, an instrumentality carried by the door and associated therewith for initiating the operation of the wash water introducing means when the door is closed, rinse water introducing means for the washing chamber, instrumentalities for discontinuing the operation of the wash water introducing means when the rinse water introducing means is actuated to cause rinse water to enter the washing chamber, said instrumentalities comprising means cooperating with said instrumentality for conditioning the wash water introducing means for operation when the door is opened.

2. In a washing machine, in combination, a washing chamber comprising a hood forming an enclosure for said chamber, and a door for opening and closing said chamber, wash fluid introducing means for the chamber, rinse fluid introducing means for the said chamber, instrumentalities between the rinse fluid introducing means and the wash fluid introducing means to discontinue the operation of the latter when the rinse fluid introducing means is operated to introduce rinse fluid to the chamber, and means intermediate the door aforesaid and said instrumentalities for conditioning the wash fluid introducing means for subsquent operation when the door is opened.

3. In a washing machine, in combination, a washing chamber, having a door for opening and closing said chamber, wash fluid introducing means therefor, rinse fluid introducing means for the chamber including a valve, a starting device for the wash fluid introducing means, an instrumentality on the door for operating said starting device as the door is closed, a connection between the wash fluid introducing means and said valve for discontinuing the operation of the wash fluid introducing means when the rinse valve is opened to supply rinse fluid to the chamber, and cooperating means between said connection and said instrumentality on the door for conditioning said wash fluid introducing means as the door is opened so that the wash fluid introducing means will be operative to start operation on the next closing movement of the door.

4. In a washing machine, in combination, a washing chamber, wash fluid introducing means therefor, rinse fluid introducing means therefor, a valve controlling the admission of rinsing fluid to the chamber, a motor controlling the introduction of wash fluid to the said chamber, an electric circuit including said motor, a starting switch for the motor, a door for the washing chamber, an instrumentality on the door to engage the starting switch and start the introduction of wash fluid into the washing chamber, a circuit breaker for the electric circuit including the motor operable by the rinsing fluid control valve when it is moved to admit rinsing fluid to the chamber, and a part carried by the circuit breaker operable by said instrumentality on the door to restore the circuit breaker as the door is opened, the said starting switch being rendered operative by the instrumentality on the door to start the motor as the door is closed.

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