

March 21, 1939.

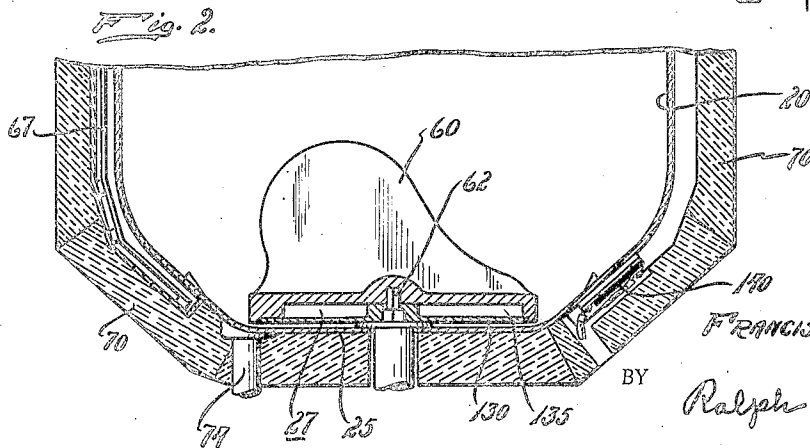
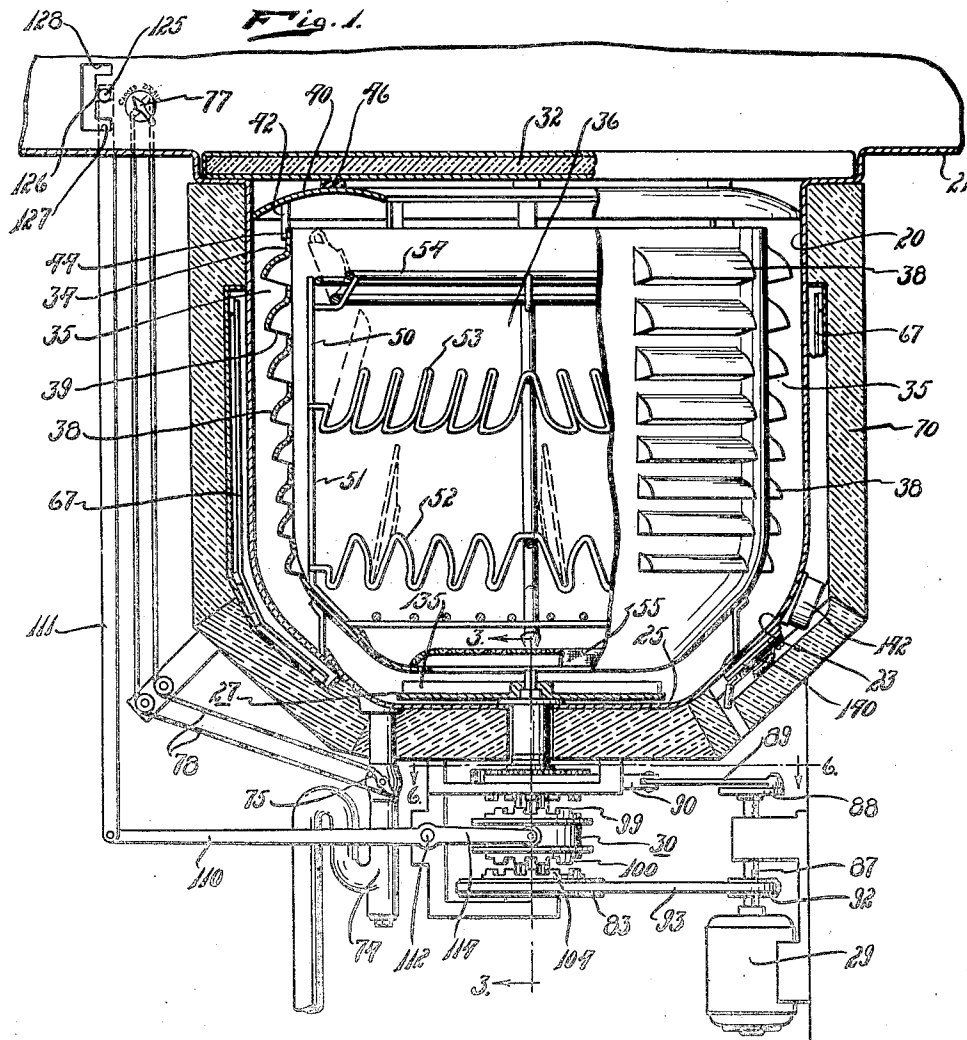
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WASHING AND DRYING APPARATUS

Filed Oct. 7, 1935

2 Sheets-Sheet 1



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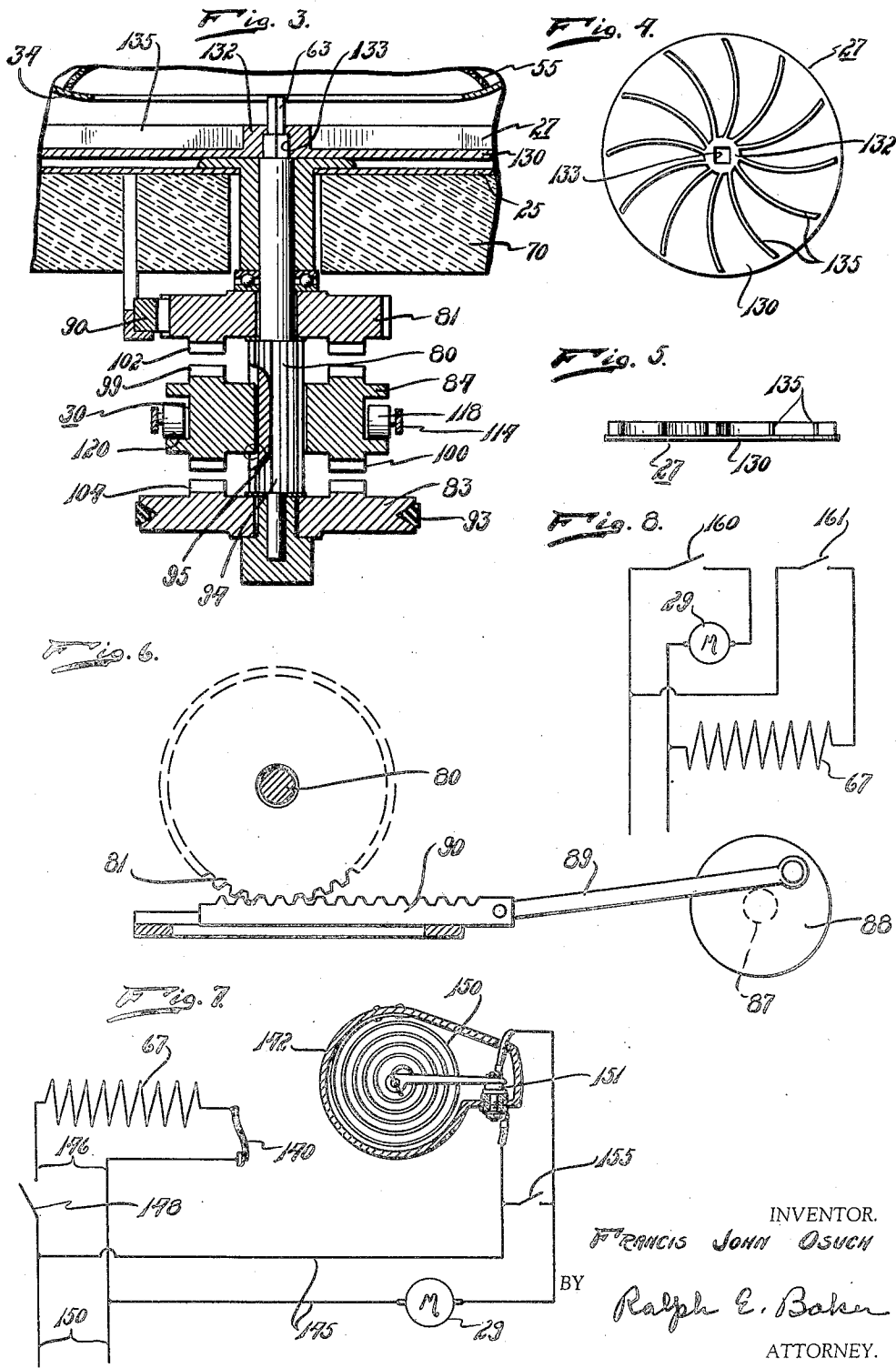
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WASHING AND DRYING APPARATUS

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Application October 7, 1935, Serial No. 43,875

1 Claim. (Cl. 141—9)

This invention relates to an improved apparatus for washing and drying dishes, clothes and the like.

An object of my invention is to provide an improved apparatus for washing dishes of the type including a compartment for the storage of objects to be washed and arranged to force the washing fluid into said compartment at the top and at predetermined elevations about the sides of the compartment through apertures too large to permit clogging and at sufficient velocity that various streams overlap, to thus insure the proper contact of the streams of washing fluid with the objects to be washed and with the proper velocity for thoroughly cleansing same.

Another object is to make provisions in the aforesaid apparatus for circulating a heating fluid in contact with the washed objects to accelerate the drying thereof.

Another object of my invention is to construct the aforesaid apparatus in such a manner that it may be readily converted for use in connection with the washing of clothes, and to provide operating mechanism therefore which may be selectively controlled for various operating movements suitable for either the washing of dishes or clothes, as desired.

Other objects and advantages will be apparent from the following description, reference being had to the accompanying drawings.

In the drawings:

Fig. 1 is a vertical view in cross section of an apparatus embodying features of my invention;

Fig. 2 is a fragmentary view of a vertical cross section of the apparatus shown in Fig. 1 as modified for performing additional washing functions embodying features of my invention;

Fig. 3 is a view taken along the line 3—3 of Fig. 1;

Figs. 4 and 5 are views of the impeller embodying features of my invention;

Fig. 6 is a view taken along the line 6—6 of Fig. 1; and

Figs. 7 and 8 are views of the electric circuits used in conjunction with the control apparatus for controlling the operation of the apparatus shown in Figs. 1, 2 and 3 of the drawings.

Referring to the drawings, the numeral 20 designates a tub. The tub 20 may be placed in the bottom portion of a sink or drain board 21. Preferably, the tub 20 is cylindrical in shape and is provided with an inwardly directed portion 23 at the lower part thereof, which is formed by sloping the lower part of the tub inwardly so as to provide sloping sides for the tub 20. By so sloping

the tub inwardly as at 23, there is provided a bottom portion 25, which is of lesser diameter than the upper portion of the tub 20.

Within the tub 20 there is provided a disc shaped impeller 27 which is positioned in the lower part of the tub and is of the centrifugal type, for forcing water upwardly about the sloping portion 23 and to the top of the tub 20. The impeller 27 is actuated by means of a motor 29 through the medium of a clutch mechanism 30.

Preferably, the tub 20 is closed by an insulated lid 32 at the top thereof. The lid 32 may be bodily lifted from the tub or the same may be hinged to the member 21, as desired. Also, within the tub, there is provided a sheath 34 which is preferably cylindrical in shape and is arranged to divide the interior of the tub into a fluid passage zone 35 and a fluid washing zone 36. As will be noted, the sheath 34 is spaced from the inner peripheral edge of the tub 20 and is provided with a plurality of louvers 38 which are formed to provide graduated openings 39, that is, the lowermost louver 38 extends within the fluid passage zone 35 a relatively short distance as compared with the uppermost louver 38, which extends laterally into the fluid passage zone a greater distance. This arrangement is provided so that when the impeller forces washing fluid upwardly adjacent the inner peripheral edge of the tub 20, some of the washing fluid will be directed into the washing zone 36 through the lowermost louver, and since each of the succeeding louvers from the bottom to the top of sheath 34 is progressively extended further into the fluid passage zone, a portion of the washing fluid will be directed into the washing zone from the fluid passage zone through the louvers 38. Thus, it will be noted that the sheath 34 provides for conducting portions of washing fluid into the washing zone throughout various places in the fluid passage zone so as to direct the flow of washing fluid into the washing zone at predetermined points throughout the fluid passage zone. In order to take care of the washing fluid which is directed through the fluid passage zone and above the uppermost louver 38, I have provided an arcuately formed baffle 40 which is provided with supports 42. The supports 42 are notched as at 44 so as to be supported by the sheath 34 so that the baffle 40 is properly spaced from the sheath 34 to permit the flow of washing fluid therebetween. The baffle 40 is provided with an insulating member 46 which is adapted to be engaged by the lid 32 for holding the baffle 40 in position during the washing action which

takes place within the tub 20. Within the tub 20 and within the inner diameter of the sheath 34 there is provided a supporting rack 50 for supporting dishes on various planes. In general, the rack 50 comprises vertically disposed wires 51 and horizontally disposed wires 52, 53 and 54. The lowermost wire 52 is in the form of reverse bends so as to support plates and the like, and the intermediate wire 53 is formed so as to provide a rack for supporting additional dishes, and the uppermost rack 54 is provided for holding the smaller articles, such as cups. The supporting rack 50 may be of any particular configuration and is designed so that the objects which are supported thereby are in alignment with various louvers 38 so that washing fluid which is directed into the fluid washing zone 36 is directed to all parts of the objects to be washed with sufficient velocity to properly cleanse the objects.

Within a device of the type hereinbefore described, the impeller 27 will set up sufficient motion so as to force the washing fluid about the tub 20 through the fluid passage zone into the fluid washing zone with sufficient velocity to properly cleanse the objects to be washed. By so controlling the flow of washing fluid by means of the sheath 34 and the graduated louvers 38, it is possible to direct the flow of washing fluid to any desired point within the fluid washing zone 36.

Also, by means of a baffle 40, the washing fluid which does not pass through the louvers 38 is directed into the top portion of the washing zone. By this arrangement, it is possible to direct streams of washing fluid through the louvers 38 and into the top of the washing zone by means of the baffle 40 in such a manner that various streams overlap and have a tendency to diffuse the water so that all parts of the objects to be washed are thoroughly contacted with the washing fluid with sufficient velocity to thoroughly cleanse same. During the washing action dirt particles are freed from the objects, and in order to prevent the recirculation of the dirt particles, a screen 55 is provided. Thus, it will be noted that the washing fluid is directed upwardly by the centrifugal impeller 27 about the inner peripheral edge of the tub 20 whence some of the washing fluid is by-passed into the washing zone through the louvers 38, and the remainder of the washing fluid is directed into the interior of the washing zone about the top thereof by means of the baffle 40. The washing fluid so directed into the washing zone is collected, after it contacts with the objects to be washed, in the lower part of the sheath 34 whence it passes through the screen 55 and is recirculated by the impeller 27. Preferably, this water action is set up by operating impeller 27 with a rotary motion.

In the event it is desired to wash clothes and the like in the tub 20, all that is necessary is to remove the sheath 34, baffle 40 and rack 50 and in their place substitute an impeller 60, as shown in Fig. 2. Preferably, the impeller 60 is so designed as to be placed over the impeller 27 and is provided with a socket 62 for receiving the uppermost end 63 of shaft 80. When this substitution is made, the clutch mechanism is operated so as to provide rotary reciprocatory movement of the impeller 60. By this type of movement, the agitator, or impeller 60, is arranged for moving back and forth so as to set up an upward movement of the fluid within the tub 20 so as to keep the fabrics which are being washed in a state of substantial suspension throughout the washing action thereof.

In the event that it is desired to heat the water in the tub 20, for either the washing of dishes and the like, or clothes, I have provided a heating element 67 which extends from the lower part of the tub upwardly to adjacent the upper part thereof. The heating element is so arranged that when only a small amount of water is being used for the washing of dishes and the like, the same will properly heat the water for washing the dishes, and is also arranged so that the water moving upwardly in the fluid passage zone 34 is being heated before it is directed into the fluid washing zone. In the washing of clothes where a large amount of water is necessary, the heating element will function to heat the water substantially to the upper part of the tub so that under either condition when clothes or dishes are to be washed, the proper amount of water will be heated to the desired temperature. In order to prevent the transfer of heat from the heating element 67 to the room in which the apparatus is installed, I have provided insulation 70 which completely surrounds the tub 20.

In the event that a ready supply of heated water is available, the same may be introduced into the tub through the uppermost part thereof and under these conditions the heating element is unnecessary. However, where a ready supply of heated water is not available, the electric heating element will adequately take care of heating the water for washing the dishes or clothes.

After the washing action of either dishes or clothes has been completed and it is desired to drain the tub 20 of washing fluid, I have provided a suitable drain 74 for permitting the water to be drained from the tub 20. In order to control the flow of water through the drain 74, I have provided valve 75 which is operated by means of lever 77 through connecting wires 78. Preferably, the lever 77 is located above the drain board 21.

Assume now that the dishes in the rack 50 have been suitably washed and that the water from the tub 20 has been conducted through drain 74. At this time it may be desired to rinse the dishes which have been so washed and after being rinsed the rinsing water is conducted through the drain 74. In order to accelerate the drying of the rinsed dishes, the heating element 67 may be placed in circuit with the electric circuit so as to heat the fluid passage zone 35. At this time the impeller 27 may be set in to motion so as to circulate air upwardly through the fluid passage zone 34 into the washing zone 36. By this arrangement, the heated fluid is continuously circulated between the fluid passage and the washing zones so as to accelerate the drying of the dishes supported by the rack 50.

The clutch mechanism 30 which is used for controlling the operation of the impeller means comprises, in general, a shaft 80, gear 81, pulley 82 and movable clutch element 84. The gear 81 is operatively connected with motor 29 by means of motor shaft 87, driving wheel 88, rod 89 and gear rack 90. Pulley 83 is operatively connected with motor 29 by means of pulley 92 and belt 93. By means of a movable clutch element 84, the gear 81 and pulley 83 may be selectively connected to the shaft 80. The movable clutch element 84 is connected to the shaft by means of flutes 94 on shaft 80 and projections 95 on the interior part of the element 84. This type of connection permits the movable clutch element to be slid longitudinally of the shaft 80 but prevents relative lateral movement about the shaft 80.

The movable clutch element 84 is provided with a plurality of teeth 99 and 100. By moving the element 84 upwardly, the teeth 99 are adapted to engage teeth 102 of gear 81, and a movement downwardly of element 84 will cause the teeth 100 to engage teeth 104 of pulley 83. When the clutch element 84 is moved upwardly to engage gear 81, the members 88 and 89 effect a reciprocatory movement of the gear rack 90 to thus rotary reciprocate gear 81. When this takes place, the shaft 80 is moved in a rotary reciprocatory movement. This is particularly desirable when clothes are being washed in the apparatus. When the movable clutch element 84 is moved downwardly to engage the pulley wheel 83, the pulley 92 and belt 93 effect a continuous rotary motion of the shaft 80 and this action is particularly desirable when dishes and the like are to be washed in the device shown in Fig. 1. In order to control the movement of the clutch element 84, I have provided levers 110 and 111. Preferably, the lever 110 is pivoted at 112 and includes a yoke-shaped extension 114 which is adapted to surround the clutch element 84 and is provided with rollers 118 adapted to be received within recess 120 of the element 84. A handle 125 is provided for actuating levers 110 and 111. The handle 125 is adapted to be placed in one of three positions, namely; 126, 127 and 128. When placed in position 126 the clutch element 84 is in neutral position, and even though the motor 29 is operating the shaft 80 will not be operated. When moved to positions 127 or 128, the clutch element 84 engages gear 81 or pulley 83, respectively, so as to effect operation of the shaft 80. During periods when the clutch element is placed in a neutral position 126, the motor, although operating, merely rotates pulley 83 and gear 81 about the shaft 80 without effecting any driving connections.

The centrifugal impeller may be of the type disclosed in Figs. 4 and 5. Any suitable size of this type impeller may be used. The impeller includes a disc shaped base 130 and upstanding central portion 132, which is provided with a recess 133 for receiving the upper end 63 of the shaft 80. The impeller also includes arcuate blades 135.

In the event it is desired to operate the electric heating element 67 for heating the water in the tub 20, I have provided means for automatically controlling the operation of the heating element, which means also effects the operation of the electric motor for driving the impeller. The automatic means consists of a bi-metallic thermostat 140 and a thermal element 142, both of which are in close relation to the outer periphery of the tub. As shown in Fig. 7, there is disclosed a motor circuit 145 and a heating element circuit 146. When the water is placed into the tub 20 and it is desired to heat the water, all that is necessary is to close switch 148 and heating element 67 is placed in circuit with power mains 150. After the element 67 has heated the water to a predetermined degree, the bi-metallic element 140, which is responsive to changes in temperature of the water, is adapted to break the electric circuit throughout the heating element so as to prevent further operation of the heating element 67. Just prior to the time when the water reaches a predetermined temperature, the thermal element 142, which is also responsive to changes of the water, is adapted to complete the

circuit to the electric motor 29 through the motor circuit 145. The thermal element 142 includes a thermal element proper 150 which is adapted to control contacts 151. Thus, the motor 29 is adapted to start operation a brief period before the electric heating element discontinues operation. After the circuit to the heating element is interrupted, the thermal element 150 maintains the contacts 151 closed until the washing action is completed, which is only for a short duration, and before the water reaches a predetermined low temperature. Thus, all that is necessary is to close switch 148 and the water will be heated until it reaches a predetermined temperature where thermal element 142 will operate to initiate operation of the motor 29, which will continue operation until the washing action is completed, after which the thermal element 142 will automatically interrupt the circuit to the motor 29. Thus, the washing action is substantially automatic. In the event that it is desired to operate the motor 29 without the heating element 67, I have provided an auxiliary switch 155 which may be closed to complete the circuit through the electric motor 29, irrespective of the function of the thermal elements 140 and 142.

In Fig. 8 there is disclosed a modified form of electric circuit connections, which includes heating element 67, motor 29 and a pair of switches 160 and 161. When it is desired to operate the motor 29 without the heating element 67, the switch 160 is closed. When it is desired to operate the heating element 67 irrespective of the motor 29, the switch 161 is closed. By closing each of the switches 160 and 161 it is possible to operate the heating element 67 and motor 29 simultaneously.

From the foregoing, it will be noted that I have provided an improved device for washing and drying dishes, and also for washing clothes. It will also be noted that I have arranged for directing the washing fluid into contact with all parts of the objects to be washed and that this washing fluid is directed through relatively large openings which are too large to permit clogging of the washing fluid, and that the fluid is directed therethrough with sufficient velocity to properly cleanse the objects. It will also be noted that I have provided for setting up a circulatory movement of a drying fluid which is heated to accelerate drying of the objects.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claim.

I claim:

A dish washing machine comprising a tub adapted to contain a washing fluid, dividing means positioned in said tub to provide washing and fluid passage zones, said dividing means including louvered by-pass means positioned at various elevations with smaller louvers at the bottom than at the top, and means for forcing a portion of said washing fluid through said fluid passage zone into said washing zone and the remainder through said louvered by-pass means into said washing zone.

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