

May 22, 1928.

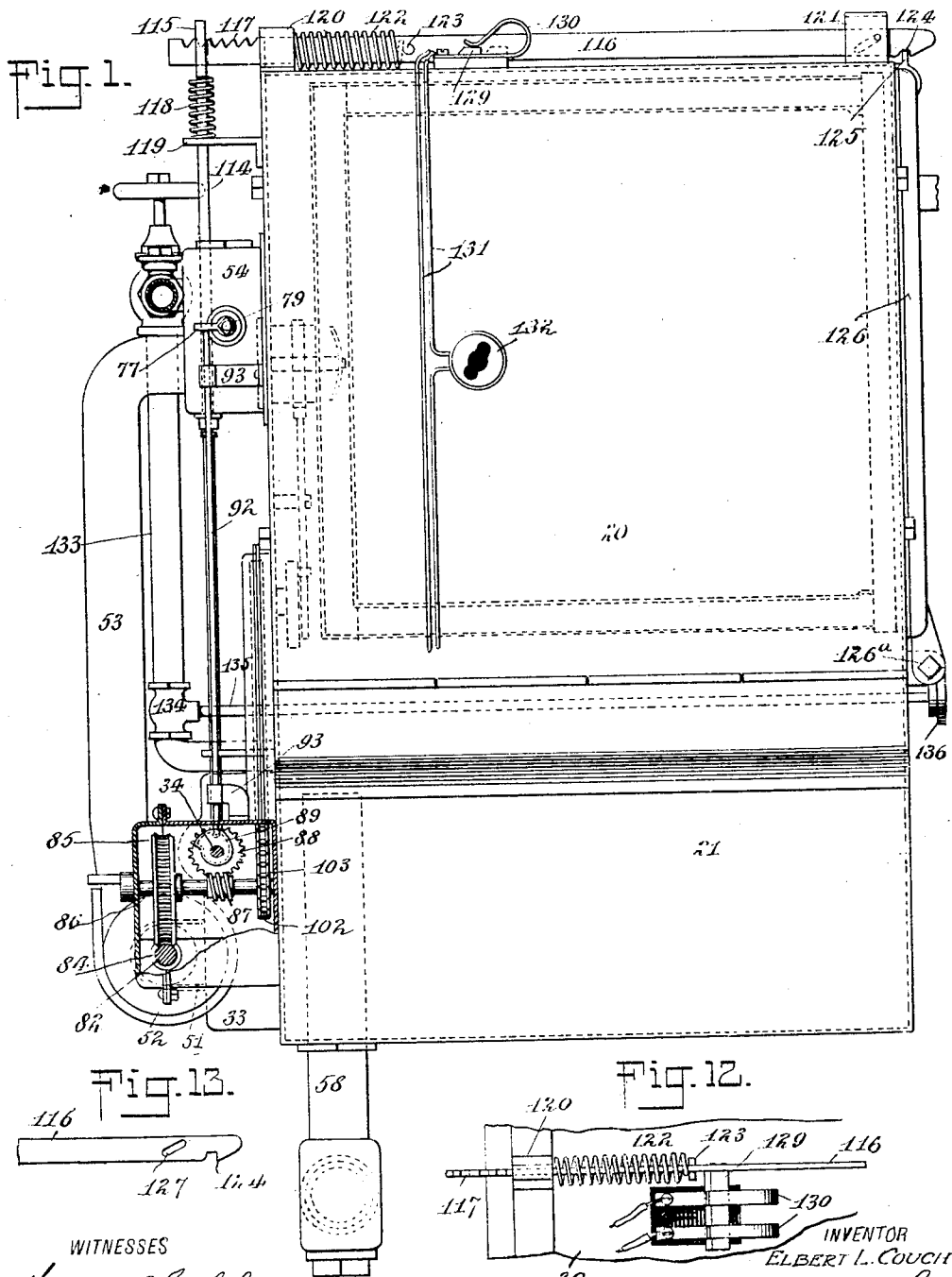
1,670,611

E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 1



May 22, 1928.

1,670,611

E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 2

Fig. 2.

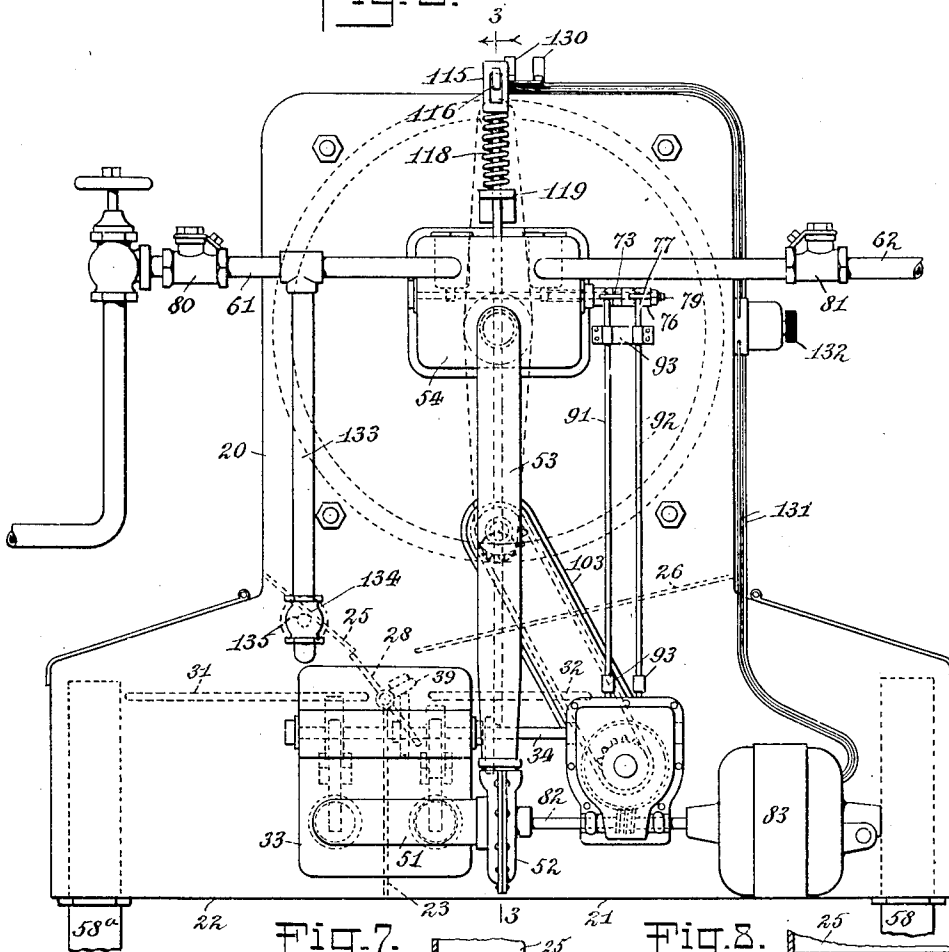
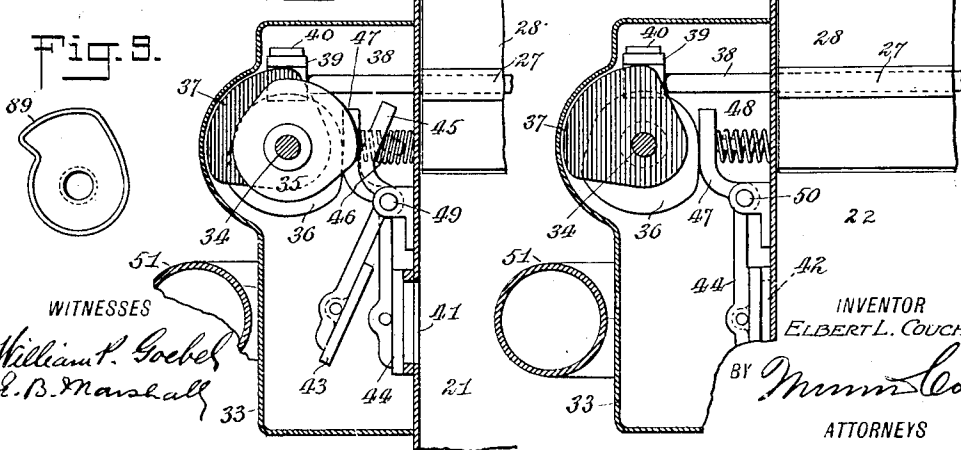


Fig. 7.

Fig. 8.

Fig. 9.



May 22, 1928.

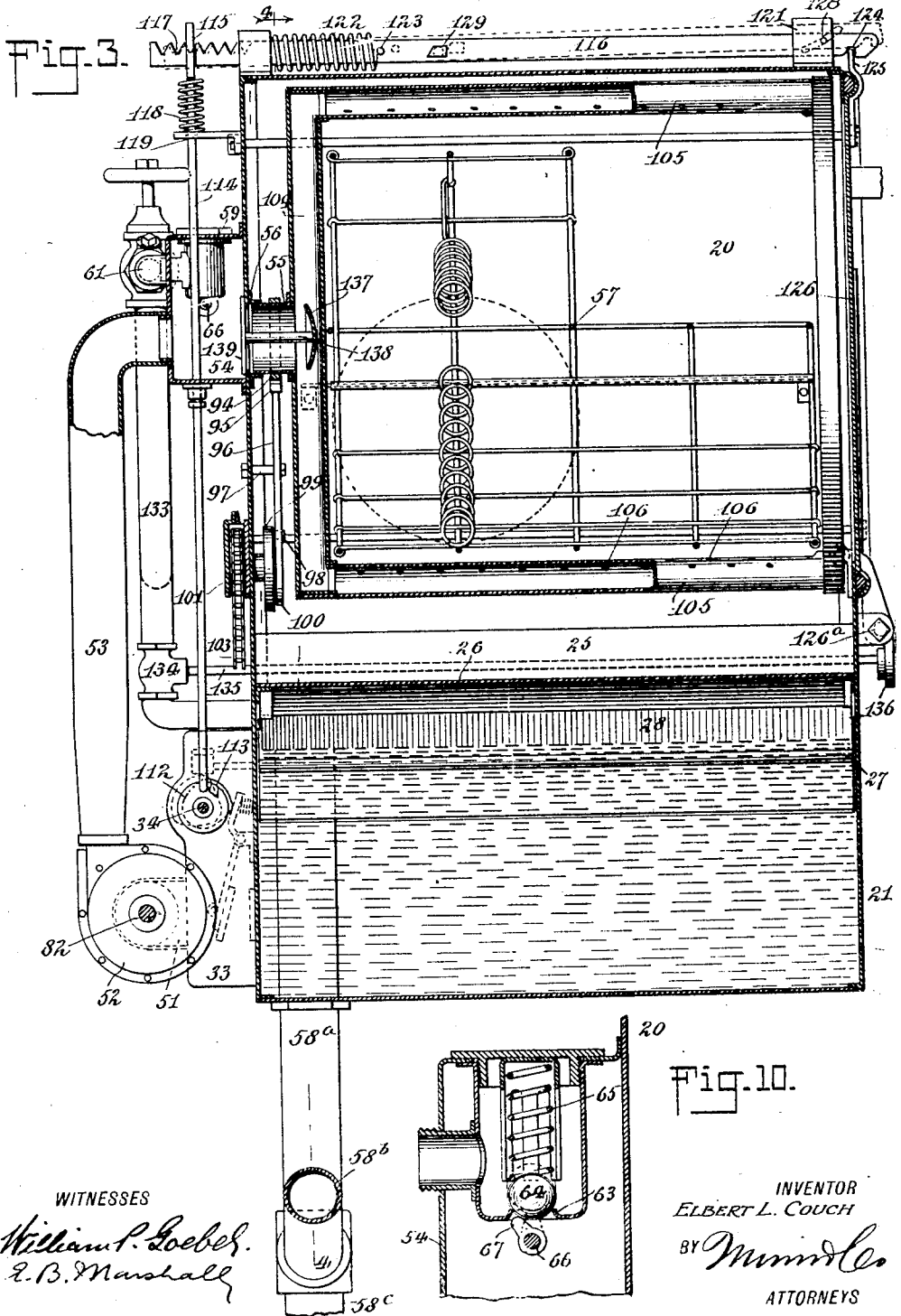
1,670,611

E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 3



May 22, 1928.

1,670,611

E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 4

Fig. 4.

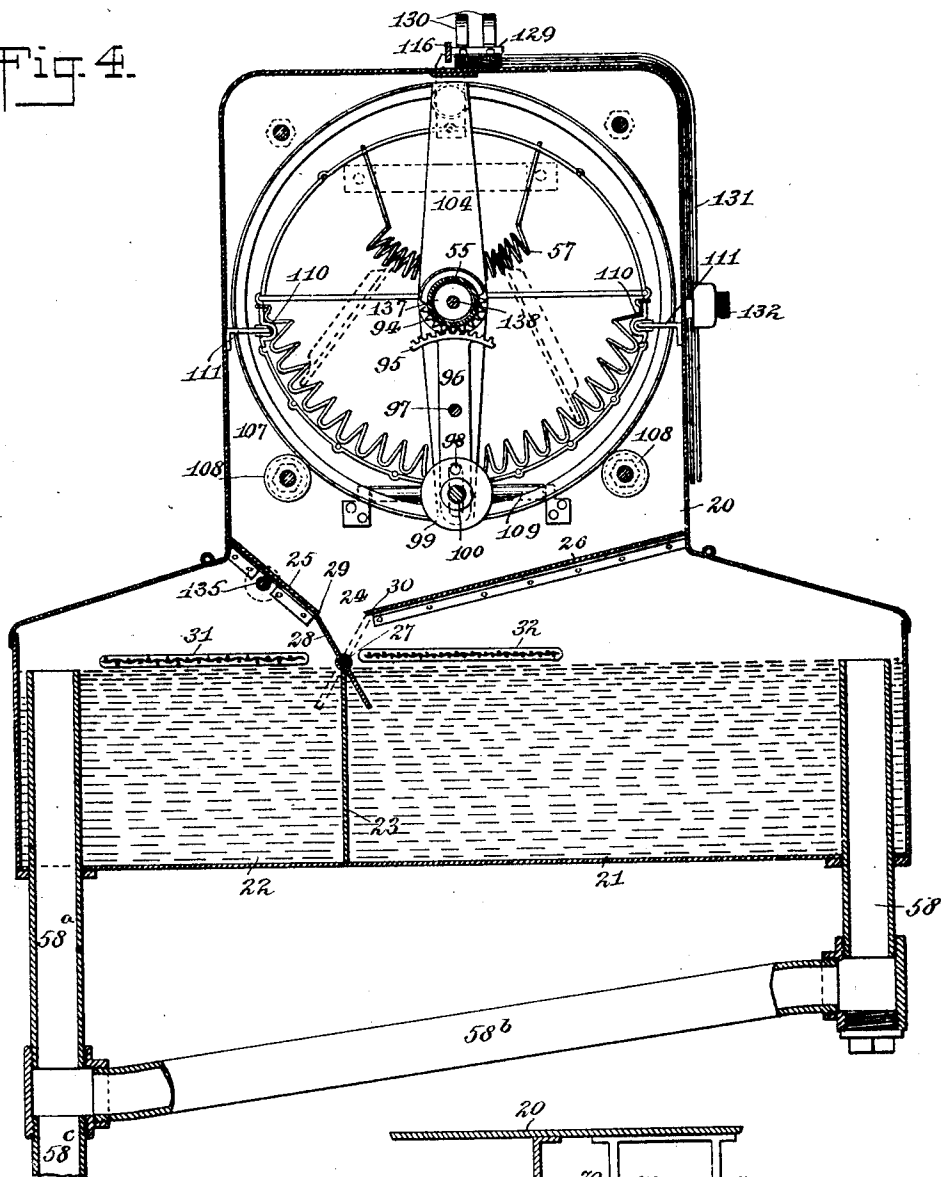
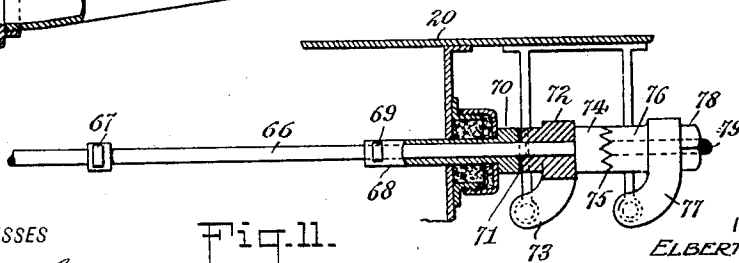


Fig. 11.



WITNESSES

William P. Goebel
E. B. Marshall

INVENTOR
ELBERT L. COUCH

BY *Munroe*
ATTORNEYS

May 22, 1928.

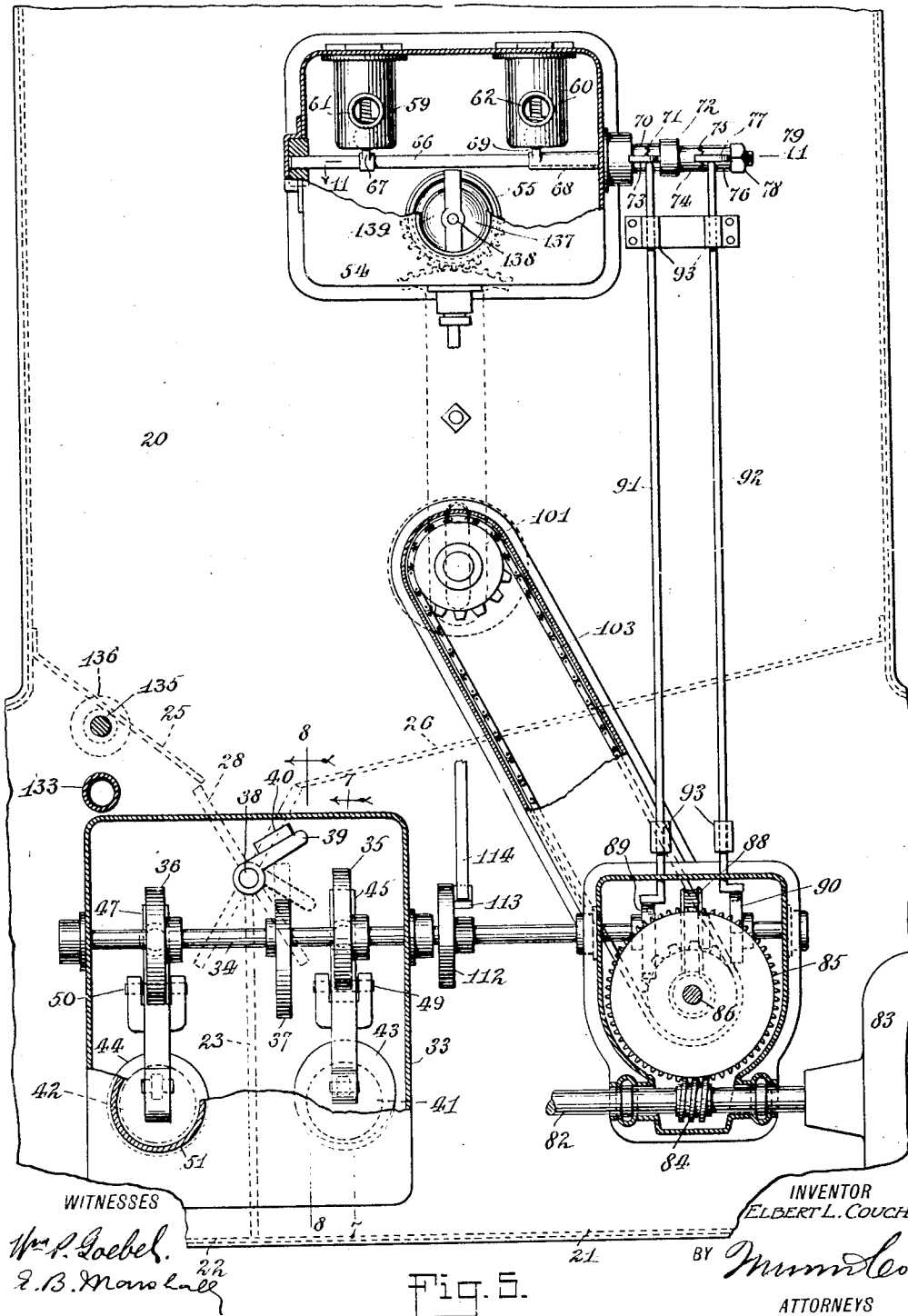
1,670,611

E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 5



May 22, 1928.

1,670,611

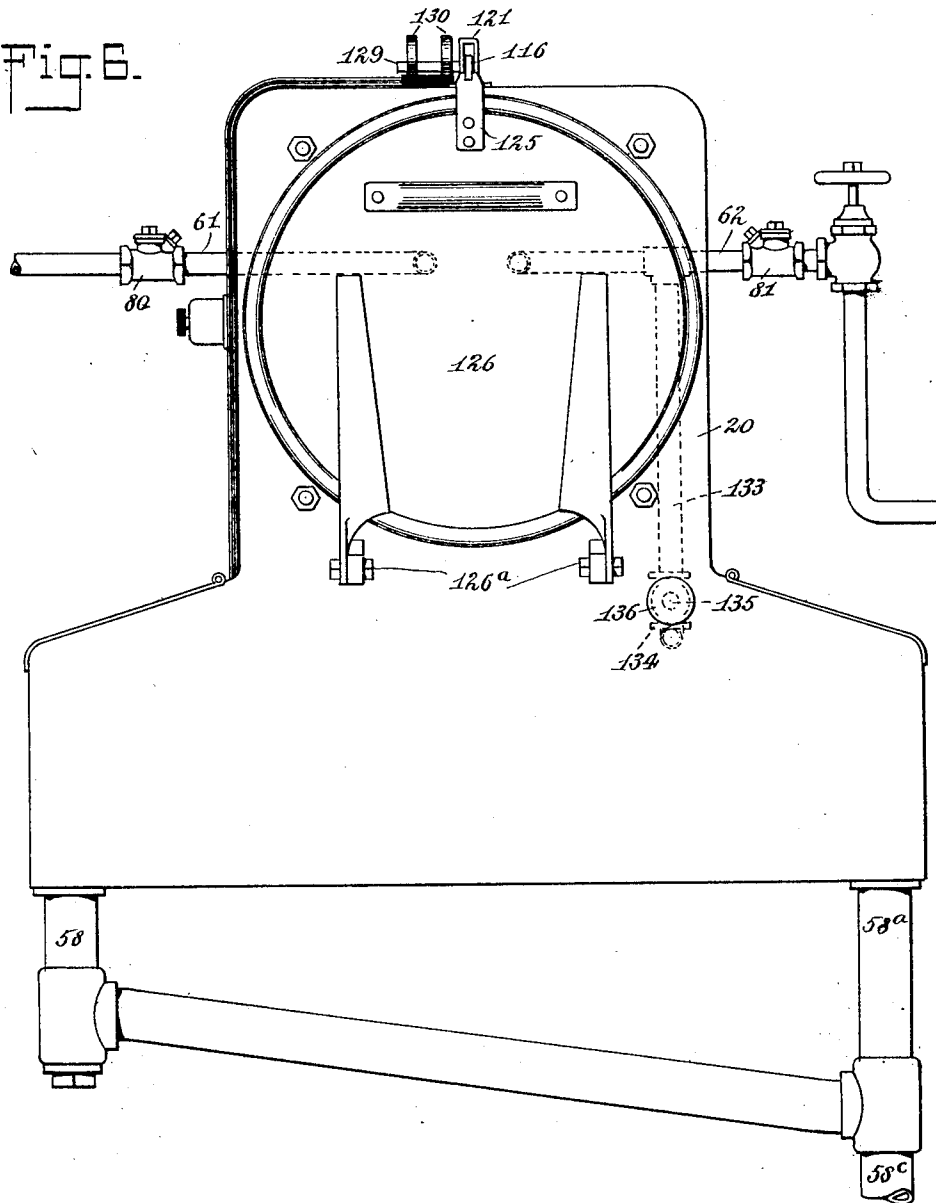
E. L. COUCH

DISHWASHING MACHINE

Filed Dec. 28, 1922

6 Sheets-Sheet 6

Fig. 6.



WITNESSES

William P. Goebel.
J. B. Marshall

INVENTOR

ELBERT L. COUCH

BY

Mumford

ATTORNEYS

UNITED STATES PATENT OFFICE.

ELBERT L. COUCH, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO COUCH & DEAN, INCORPORATED, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DISHWASHING MACHINE.

Application filed December 25, 1922. Serial No. 609,465.

My invention has for its object to provide means which will automatically wash, rinse and steam dishes disposed in a compartment in the machine.

Another object of the invention is to provide means to supply a sprayer with a fluid in connection with two tanks each of which has means operable one at a time to supply the first means with the fluid.

Another object of the invention is to provide means which will drain a fluid in the washing compartment into the tanks alternately.

Still another object of the invention is to provide means which will automatically at predetermined intervals introduce a fresh fluid into the washing machine which will flow into the tank containing a rinsing fluid, some of the rinsing fluid being directed periodically into a second tank containing a washing fluid, the overflow from the last mentioned tank flowing to an outlet.

Additional objects of the invention will appear in the following specification in which the preferred form of the invention is described.

In the drawings similar reference characters refer to similar parts in all the views, in which:

Figure 1 is a side elevation of the dish washing machine,

Figure 2 is a rear elevation of Figure 1 on a smaller scale,

Figure 3 is a similar view on the line 3—3 of Figure 2 but on the same scale used in Figure 1 of the drawings,

Figure 4 is a sectional view on the line 4—4 of Figure 3 but on the same scale used in Figure 2 of the drawings,

Figure 5 is an enlarged fragmentary sectional view taken from the rear of the dish washing machine,

Figure 6 is a view showing the front of the washing machine on the same scale as that used in Figure 2 of the drawings,

Figure 7 is a sectional view on the line 7—7 of Figure 5,

Figure 8 is a sectional view on the line 8—8 of Figure 5,

Figure 9 is a view showing one of the

cams which are used to operate the valve rods to introduce fresh water and steam into the machine,

Figure 10 is an enlarged fragmentary sectional view illustrating one of the inlets to introduce fresh water and steam into the machine,

Figure 11 is an enlarged sectional view on the line 11—11 of Figure 5,

Figure 12 is an enlarged fragmentary view illustrating the means by which the circuit is closed on the closing of the door to the washing compartment and which opens the said circuit when the door of the washing compartment is opened, and

Figure 13 is an enlarged fragmentary view illustrating the forward end of the lock bar for holding the door closed and for opening the door to the washing compartment.

By referring to the drawings, it will be seen that there is a washing compartment 20 below which there are two tanks 21 and 22 separated by a wall or partition 23. There is an opening 24 in the tank 20 above the wall or partition 23 and as the washing compartment 21 is wider than the tank 22 it will be understood that the wall or partition 23 and the opening 24 at the bottom of the washing compartment 20 will be disposed at one side of the said washing compartment. The bottom of the washing compartment 20 is inclined as shown at 25 and 26 to the said opening 24. Pivoted to the top of the wall or partition 23 at 27 there is a flapper valve 28 which extends from the front to the rear of the tanks 21 and 22 and is disposed to seat at 29 and 30 at the bottom of the washing compartment 20. It will be seen that when the flapper valve 28 is seated at the valve seat 29 that any fluid falling to the bottom of the said washing compartment 20 will be directed into the tank 21 which contains a washing fluid. When the flapper valve 28 is seated at 30 any fluid falling to the bottom of the washing compartment 20 will be directed into the tank 22 which contains a rinsing fluid. A screen 31 may be disposed in the tank 22 on brackets to collect any solid matters

which may be carried by the water which will flow into the rinsing tank 22. A similar screen 32 may be disposed on brackets in the tank 21 which receives the washing fluid.

As will be seen by referring to the drawings, there is a valve box 33 at the rear of the tanks 21 and 22. Journaled in bearings in this valve box 33 there is a shaft 34 on which are mounted cams 35, 36 and 37. The flapper valve 28 is secured to a rock shaft 38, this rock shaft 38 extending into the valve box 33, there being mounted on this rock shaft 38 an arm 39 which is engaged by the cam 37 and which is periodically raised to move the flapper valve 28 from its seat 30 to its seat 29, a weight 40 being secured to the arm 39 so that the said arm 39 is held yieldingly in its lowermost position. It will, therefore, be understood that with the rotation of the shaft 34 that the flapper valve 28 will seat alternately at the valve seats 29 and 30 at predetermined intervals.

The tank 21 has an outlet 41 and the tank 22 has an outlet 42, the outlet 41 being commanded by a valve 43 and the outlet 42 being commanded by a valve 44, these valves 43 and 44 being disposed in the valve box 33. The valve 43 has an arm 45 which is pressed against the cam 35 by a spring 46. The valve 44 has a similar arm 47 which is pressed against the cam 36 by a spring 48. The valve 43 is pivoted to a bracket at 49 in the valve box 33 and the valve 44 is pivoted to a bracket at 50 in the said valve box. It will, therefore, be seen that with the rotation of the shaft 34 not only will the flapper valve 28 be operated at predetermined intervals but that the outlets 41 and 42 in the tanks 21 and 22 will be opened periodically.

The cams 35, 36 and 37 are so proportioned that while the valve 43 is in the position shown in Figure 7 to open the outlet 41 from the tank 21 the flapper valve 28 will be in the position shown in Figure 4 to direct a fluid falling at the bottom of the washing compartment 20 into the tank 21 and the flapper valve 28 will remain in this position during a period of two seconds after the valve 43 is seated to close the outlet 41 and the valve 44 is raised to open the outlet 42. This construction is provided so that at each cycle of operation of the machine some of the fluid in the tank 22 will be conveyed by a means which I will shortly describe to the washing compartment 20 and will be directed by the flapper valve 28 into the tank 21. After the valve 44 has opened the outlet 42 for a period of two seconds the flapper valve 28 will be moved by the means which has been described to the position shown by the dotted lines in Figure 4 of the drawings so that the fluid falling into

the washing compartment 20 during the remainder of the period that the valve is open will be directed into the tank 22.

There is an outlet 51 from the valve box 33 to a rotary pump 52 and there is a communicating means 53 from the rotary pump 52 to the casing 54, this casing 54 communicating with the interior of the washing compartment 20 through a sprayer inlet 55 which is journaled in a bearing 56 at the rear of the washing compartment 20.

It will, therefore, be seen that with the rotation of the shaft 34 that the outlet 41 from the tank 21 will be opened and the washing fluid contained in the said tank 21 will be fed to the rotary pump 52 and by the means described the fluid will be directed into the washing compartment 20, this fluid falling to the bottom of the washing compartment and being directed by the flapper valve 28 into the tank 21. During this operation the dishes will be disposed in the washing compartment 20 in any desirable manner, as, for instance in a basket 57. The washing period will usually last for nine seconds and at the end of this period the valve 43 will be closed and the valve 44 will be opened to cut off communication between the tank 21 and the rotary pump 52 and to open communication between the tank 22 and the rotary pump 52. When the valve 44 has been opened for a period of two seconds and the fluid from the tank 22 has been forced by the rotary pump 52 into the washing compartment 20 and against the dishes contained therein and this fluid has fallen to the bottom of the washing compartment 20 and into the tank 21 the flapper valve 28 will be moved to the position shown in the dotted lines in Figure 4 of the drawings and during the remaining period that the valve 44 is opened the fluid from the tank 22 will be forced by the rotary pump 52 into the washing compartment 20 and against the dishes, the water falling to the bottom of the washing compartment and being directed by the flapper valve 28 into the tank 22. As has been stated, by this construction a portion of the water in the tank 22 is transferred to the tank 21 during each period that the valve 44 is opened, the excess of water in the tank 21 being carried away by the overflow outlet 58.

In the casing 54 there are two valve casings 59 and 60, the valve casing 59 being connected with a fresh water supply 61 and the valve casing 60 being connected with a steam supply 62. The valve casings 59 and 60 are of the same construction and one of these valve casings is best illustrated in Figure 10 of the drawings. Each valve casing has an outlet 63 at its bottom which is commanded by a ball valve 64 held yieldingly on its seat by a spring 65. A rock shaft 66 carries a finger 67 and a hollow rock

shaft 68 carries a finger 69, these fingers engaging the ball valves 64 to raise the ball valves periodically. The shaft 66 is disposed in the hollow rock shaft 68, as best shown in Figure 11 of the drawings, and this hollow rock shaft 68 is provided with a head 70, with teeth 71 which are engaged by similar teeth on a head 72 mounted on the shaft 66, the head 72 having an arm 73. The shaft 66 has a head 74 beyond the head 72, this head 74 having teeth 75 which are engaged by similar teeth on a head 76 mounted on the shaft 66, the said head 76 having an arm 77, the head 76 being held against the head 74 and the head 74 against the head 72 and the head 72 against the head 70 by means of a nut 78 which meshes with a thread 79 on the shaft 66 and which presses against the head 76. This construction which has been described is provided so that the arm 73 may be positioned relatively to the ball valve operable by the finger 69 and the arm 77 may be adjusted relatively to the position of the ball valve operable by the finger 67 to regulate the periods that the said ball valves will be opened by the valve rods provided for engaging the arms 73 and 77. In the pipe 61 which furnishes the fresh water supply there is a check valve 80 and in the pipe 62 which furnishes the steam supply there is a check valve 81.

The rotary pump 52 is mounted on an electric motor shaft 82 connected with the electric motor 83 and on this shaft 82 there is a worm 84 which meshes with a worm gear 85 on a shaft 86, there being a worm 87 on the shaft 86 which meshes with a worm gear 88 on the shaft 34. It will, therefore, be understood that the rotary pump 52 will rotate at all times during the operation of the washing machine and that by the means described the flapper valve 28 and the valves 43 and 44 will be operated in the manner and during the periods set forth.

Secured to the shaft 34 beyond the valve box 33 there are cams 89 and 90, the cam 89 operating a valve rod 91 engaging the arm 73. The cam 90 operates a valve rod 92 engaging the arm 77. The valve rods 91 and 92 are journaled in bearings 93 secured at the rear of the washing compartment 20. The cam 90 is so constructed that it will push upwardly the valve rod 92 for a period of three seconds at the closing of the valve 42 and before the flapper valve 28 is moved from the position shown in the dotted lines of Figure 4 of the drawings. This will serve to introduce fresh hot water into the washing compartment 20, this hot water flowing from the bottom of the washing compartment 20 to the tank 22 to replace that portion of the fluid in the tank 22 which has been transferred to the tank 21 in the manner set forth. On the closing of the valve in the valve casing 59 the cam 89 serves

to push upwardly the valve rod 91 to operate by the means described the valve in the valve casing 60, this serving to introduce into the washing compartment 20 steam, the cam 89 being so proportioned and the arm 73 being so adjusted as to permit the steam to enter the washing compartment for a period of about three seconds. The dishes are steamed to make sure that they will dry rapidly and also for sterilizing purposes.

There is gearing 94 on the sprayer inlet 55 which is engaged by a toothed sector 95 on an arm 96 pivoted at 97 to the rear of the washing machine, this arm 96 having a slot in which is disposed a pin 98 which extends from a disc 99, the disc 99 being secured to a shaft 100 journaled in the rear of the washing machine, there being also secured to this shaft 100 a sprocket wheel 101 which is connected with a sprocket wheel 102 by a sprocket chain 103, the sprocket wheel 102 being secured to the shaft 86. By this means the sprayer inlet 55 will be rocked during the period that the motor is in operation. This sprayer inlet 55 carries radially extending conduits 104 from which extend spraying arms 105 which are closed at their forward ends and which are provided with orifices 106 to direct a fluid from the sprayer arms 105 inwardly to the dishes disposed in the washing compartment 20. The forward ends of the sprayer arms 105 are connected by a ring 107 which is supported on rollers 108. At the forward end of the washing compartment 20 there is a horizontal roller 109 which assists in introducing the basket containing the dishes into the washing compartment, this basket 57 having guideways 110 for engaging brackets 111 secured to the sides of the washing compartment 20.

Mounted on the shaft 34 there is a disc 112 carrying a cam 113 for engaging the rod 114 which is provided with an opening 115 through which the lock bar 116 is disposed, this lock bar 116 having teeth 117 at the opening 115 so that when the rod 114 is held in its lowermost position by means of the spring 118 the lock bar will be locked relatively to the rod 114. This rod 114 is disposed through an opening in a bracket 119 secured at the rear of the washing machine and the spring 118 is secured to the said bracket 119 and to the rod 114. The lock bar 116 is disposed through bearings 120 and 121 and a spring 122 is mounted on the lock bar 116 and presses against the bearing 120 and a pin 123 on the lock bar 116 which serves to move the lock bar 116 forwardly when it is freed from the loop 115 on the rod 114. The forward end of the lock bar 116 has a recess 124 in which is disposed a flange 125 on the door 126 which is provided for closing the opening at the front of the washing compartment 20.

As will best be seen by referring to Fig-

ure 13 of the drawings, the lock bar 116 has an obliquely disposed slot 127 through which is disposed a pin 128 mounted in the bearing 121 which serves to raise the forward end of the lock bar 116 as the lock bar 116 is moved forwardly. This is shown in the dotted lines in Figure 3 of the drawings where the flange 125 on the door 126 is freed from the recess 124 so that the door 126 may be opened.

When the door 126 is closed after the dishes in the basket 57 have been introduced into the washing compartment 20 the flange 125 serves to press rearwardly the lock bar 116, the teeth 117 on the lock bar slipping through the opening 115 in the rod 114, it being possible to adjust the cam 113 to hold the rod 114 in its uppermost position after the operation of the machine has been stopped.

On the lock bar 116 there is a switch member 129 which closes contact between the contact members 130 which are connected with the circuit 131 which leads to the electric motor 83, there being a hand switch 132 in this circuit.

When the dishes in the basket 57 have been introduced into the washing compartment 20 and the door 126 has been closed, the switch 129 closes the circuit 131 in the manner described, the switch 132 having been previously closed so that the motor 83 will drive the shaft 82 and the mechanism connected therewith. Immediately after the operation of the motor 83 the door will be locked by the movement of the cam 113 to permit the spring 118 to press the rod 114 downwardly so that the rod 114 at its opening 115 will engage the teeth to hold the door 126 closed and the switch 129 in position to connect the contact members 130. With the operation of the motor the washing fluid from the tank 21 will be sprayed over the dishes during the period that the sprayer arms 105 are rocked by the means described, this washing operation consuming about nine seconds when the valve 43 will close the outlet 41 and the valve 44 will open the outlet 42 to rinse the dishes with the fluid contained in the tank 22. During the first two seconds that the valve 44 is opened the rinsing fluid will be directed into the tank 22, the full rinsing period being substantially twelve seconds during which the valve 44 is opened. At the end of this rinsing period the valve 44 is closed and the valve rod 92 will operate the valve in the valve casing 59 for a period of three seconds to introduce fresh hot water into the machine, this water being directed to the sprayer 105 by the means described and to the tank 22. At the end of this period of three seconds the valve in the valve casing 59 will close and the

valve in the valve casing 60 will be opened for a period of three seconds by the means described to introduce steam into the washing machine and into the washing compartment 20. At the end of this period of three seconds the cam 113 will operate the rod 114 to free the lock bar 116 which will be moved forwardly by the spring 122 to move the switch 129 out of engagement with the contact members 130 and to open the door. As has been explained, during this last mentioned period the flapper valve 28 is moved to the position shown by the full lines in Figure 4 of the drawings.

Not only is the tank 21 provided with an overflow 58, but the tank 22 is also provided with a similar overflow 58^a, one of these overflows being connected with the other overflow by means of a connecting pipe 58^b, the two overflows 58 and 58^a leading by this means to a single outlet 58^c.

Extending downwardly from the fresh water supply 61 there is a pipe 133 leading to the tank 22, there being a valve 134 commanding communication through the said pipe 133. This valve 134 is operated by the rod 135 which extends to the front of the machine and is provided with a head 136. When the tanks 21 and 22 are empty they may be filled by pressing inwardly the head 136 the water filling the tank 22 and overflowing into the tank 21.

There is a baffle plate 137 supported on a pin 138 held in place by a plate 139 disposed in the casing 54 and secured to the rear of the washing compartment 20. This baffle plate 137 serves to direct the water radially in the conduits 104.

The door 126 is hinged at 126^a.

A washing fluid or powder may be sprinkled on the dishes in the basket 57 before the basket is introduced into the washing compartment 20.

I claim:

1. In a dish washing machine, a washing compartment, a tank, a second tank, means to connect the tanks one at a time with the washing compartment, a pump in the said means, a second means to connect the washing compartment with the first tank during the period that the first tank is connected with the washing compartment by the first means and to connect the washing compartment with each of the tanks during intervals in the periods when the second tank is connected with the washing compartment by the first means, and automatic means for operating the first two mentioned means.

2. In a dish washing machine, a washing compartment, a tank, a second tank, means to connect the tanks one at a time with the washing compartment, a pump in the said means, a second means to connect the washing compartment with the first tank during the period that the first tank is connected

with the washing compartment by the first means and to connect the washing compartment with the first and second mentioned tanks one at a time during the period when
 5 the second tank is connected with the washing compartment by the first means, means to supply the washing compartment with a fresh fluid during the period that the second mentioned means connects the washing compartment with the second mentioned tank,
 10 and an automatic means for operating the first three mentioned means.

3. In a dish washing machine, a washing compartment, a tank, a second tank, means
 15 to connect the tanks one at time with the washing compartment, a pump in the said means, a second means to connect the washing compartment with the first tank during the period that the first tank is connected
 20 with the washing compartment by the first means and to connect the washing compartment with each of the tanks during intervals in the periods when the second tank is connected with the washing compartment by
 25 the first means and automatic means to supply the washing compartment with a fresh fluid.

4. In a dish washing machine, a sprayer, a tank, a second tank, means to connect the
 30 tanks with the sprayer one at a time, a pump in the said means, means to direct a fluid from the sprayer into the tanks, means independent of the tanks to supply the sprayer with a fresh fluid, a driving means for the
 35 pump, and automatic means operable by the said driving means for operating the first three mentioned means.

5. In a dish washing machine, a sprayer, two tanks, means to connect the tanks with
 40 the sprayer one at a time, a pump in the said means, means to direct the fluid from the sprayer into the tanks one at a time, means to supply the sprayer with a fresh fluid during the period that the fluid from the spray-
 45 er is directed to one of the tanks, and automatic means for operating the first three-mentioned means.

6. In a dish washing machine, a washing compartment, a pump connected with the
 50 washing compartment, a tank, a second tank, means to connect the tanks with the pump one at a time, and a second means to connect the washing compartment with the first tank during the period that the first tank is con-
 55 nected with the pump and to connect the washing compartment with the first tank and subsequently with the second tank during the period that the second tank is connected with the pump.

7. In a dish washing machine, a washing compartment, a pump connected with the
 60 washing compartment, a tank, a second tank, means to connect the tanks with the pump one at a time, a second means to connect the
 65 washing compartment with the first tank

during the period that the first tank is connected with the pump and to connect the washing compartment with the first tank and subsequently with the second tank dur-
 70 ing the period that the second tank is connected with the pump, and means to supply the washing compartment with a fresh fluid during the period that the washing compartment is connected with the second men-
 75 tioned tank.

8. In a dish washing machine, a washing compartment, a tank, a second tank, the tanks being disposed below the washing compartment, means to connect the tanks
 80 one at a time with the washing compartment, a pump in the said means, means to connect the washing compartment with the first tank during the period that the first tank is connected with the washing compartment and to connect the washing compartment with the first tank and later with
 85 the second tank during the period that the second tank is connected with the washing compartment by the first mentioned means, and means to introduce a fresh liquid into
 90 the washing compartment after the second means connects the washing compartment with the second mentioned tank.

9. In a dish washing machine, a washing compartment, a tank, a second tank, means
 95 to connect the tanks one at a time with the washing compartment, a pump in the said means, means to connect the washing compartment with the first tank during the period that the first tank is connected with
 100 the washing compartment and to connect the washing compartment with the first tank and later with the second tank during the period that the second tank is connected with the washing compartment by the first
 105 mentioned means, means to introduce a fresh liquid into the washing compartment after the second means connects the washing compartment with the second mentioned tank, means to introduce steam into the
 110 washing compartment after the operation of the third mentioned means, driving means for the pump and means actuated by the driving means for operating the first four mentioned means.
 115

10. In a dish washing machine, a tank, a second tank, each tank having an outlet, valves at the outlets, a washing compartment disposed over the tanks and having an
 120 outlet at its bottom, a valve to direct a fluid from the washing compartment outlet into either of the tanks, a pump, communicating means connecting the tank outlets with the pump and the pump with the washing compartment, means to operate the valve at the
 125 first tank to direct a fluid to the pump, means to operate the valve at the second tank to direct a fluid to the pump from the second tank, and means to operate the third valve to direct a fluid from the washing
 130

compartment into the first tank when the first mentioned means is in operative position and to direct a fluid from the washing compartment into the tanks during intervals in the periods when the second mentioned means is in operative position.

11. In a dish washing machine, a tank, a second tank, each tank having an outlet, two valves one at each outlet, a washing compartment disposed over the tanks and having an outlet at its bottom, a valve to direct a fluid from the washing compartment outlet into either of the tanks, a pump, communicating means connecting the tank outlets with the pump and the pump with the washing compartment, an inlet in the communicating means, means to operate the valve at the first tank to direct fluid to the pump, means to operate the valve at the second tank to direct a fluid to the pump from the second tank, means to operate the third mentioned valve to direct fluid from the washing compartment into the first tank when the first mentioned means is in operative position and to direct fluid from the washing compartment into the tanks one at a time during the period when the second mentioned means is in operative position, and means to supply the inlet with a fresh fluid while the third mentioned valve directs a fluid from the washing compartment into the second tank.

12. In a dish washing machine, a tank, a second tank, each tank having an outlet, two valves, one at each outlet, a washing compartment disposed over the tanks and having an outlet at its bottom, a valve to direct a fluid from the washing compartment outlet into either of the tanks, a pump, communicating means connecting the tank outlets with the pump and the pump with the washing compartment, means to operate the valve at the first tank to direct fluid to the pump, means to operate the valve at the second tank to direct fluid to the pump from the second tank, means to operate the third valve to direct fluid from the washing compartment into the first tank when the first mentioned means is in operative position and to direct fluid from the washing compartment into the first tank and subsequently into the second tank when the second mentioned means is in operative position, an inlet in the communicating means and means to supply the inlet with a fluid during the period when the third valve directs the fluid from the washing compartment into the second tank.

13. In a dish washing machine, a tank, a second tank, each tank having an outlet, two valves, one at each outlet, a washing compartment disposed over the tanks and having an outlet at its bottom, a valve to direct a fluid from the washing compartment outlet into either of the tanks, a pump, communicating means connecting the tank outlets

with the pump and the pump with the washing compartment, means to operate the valve at the first tank to direct a fluid to the pump, means to operate the valve at the second tank to direct a fluid to the pump, means to operate the third valve to direct fluid from the washing compartment into the first tank when the first mentioned means is in operative position and to direct fluid from the washing compartment into the tanks one at a time when the second mentioned means is in operative position, two inlets connected with the communicating means, means to supply one of the inlets with a fresh liquid, means to supply the other inlet with steam, a motor for the pump and means adapted to be actuated by the motor to operate the fourth means and subsequently the fifth means near the end of a cycle of operation of the machine and before the first means again operates the valve leading from the first tank.

14. In a dish washing machine, a washing compartment having an opening, a door for closing the opening, two tanks, a pump, means adapted to connect the tanks with the pump one at a time, a communicating means connecting the pump with the washing compartment, an inlet in the communicating means, a valve commanding the inlet, and means operable by the door for actuating the first mentioned means and the valve.

15. In a dish washing machine, two tanks, each tank having an outlet, two valves, one at each outlet, a washing compartment disposed over the tanks and having an opening and an outlet, a door for closing the opening, a valve for directing a fluid from the washing compartment outlet into either of the tanks, a pump, communicating means connecting the tank outlets with the pump and the pump with the washing compartment, means to operate the valves periodically and to operate the pump, and means actuated by the door for operating the second mentioned means.

16. In a dish washing machine, two tanks, a washing compartment having an opening, communicating means to connect the tanks with the washing compartment, a pump in the communicating means, two valves at the tanks in the communicating means, means to connect the washing compartment with the tanks, a valve in the second mentioned means, a door for closing the opening in the washing compartment, and means adapted to be actuated by the door for operating the valves.

17. In a dish washing machine, two tanks, each tank having an outlet, two valves one at each outlet, a washing compartment having an opening, a pump, a communicating means connecting the outlets with the pump and the pump with the washing compartment, a communicating means connecting the

washing compartment with the tanks, a valve in the second communicating means, a door for closing the opening in the washing compartment, means adapted to be actuated by the closing of the door to operate the valves and means to move the third mentioned means into inoperative position on the completion of a cycle of operation.

18. In a dish washing machine, a washing compartment having an opening, a door for closing the opening, two tanks, means to connect the tanks alternately with the

washing compartment, a pump in the said means, a second means to connect the washing compartment with the tanks alternately, electrical driving means for the pump, a circuit connected with the electrical driving means, means operable by the electrical driving means for actuating the first and second mentioned means, and means for breaking the circuit and opening the door when the electrical driving means has been in operation a predetermined time.

ELBERT L. COUCH.