

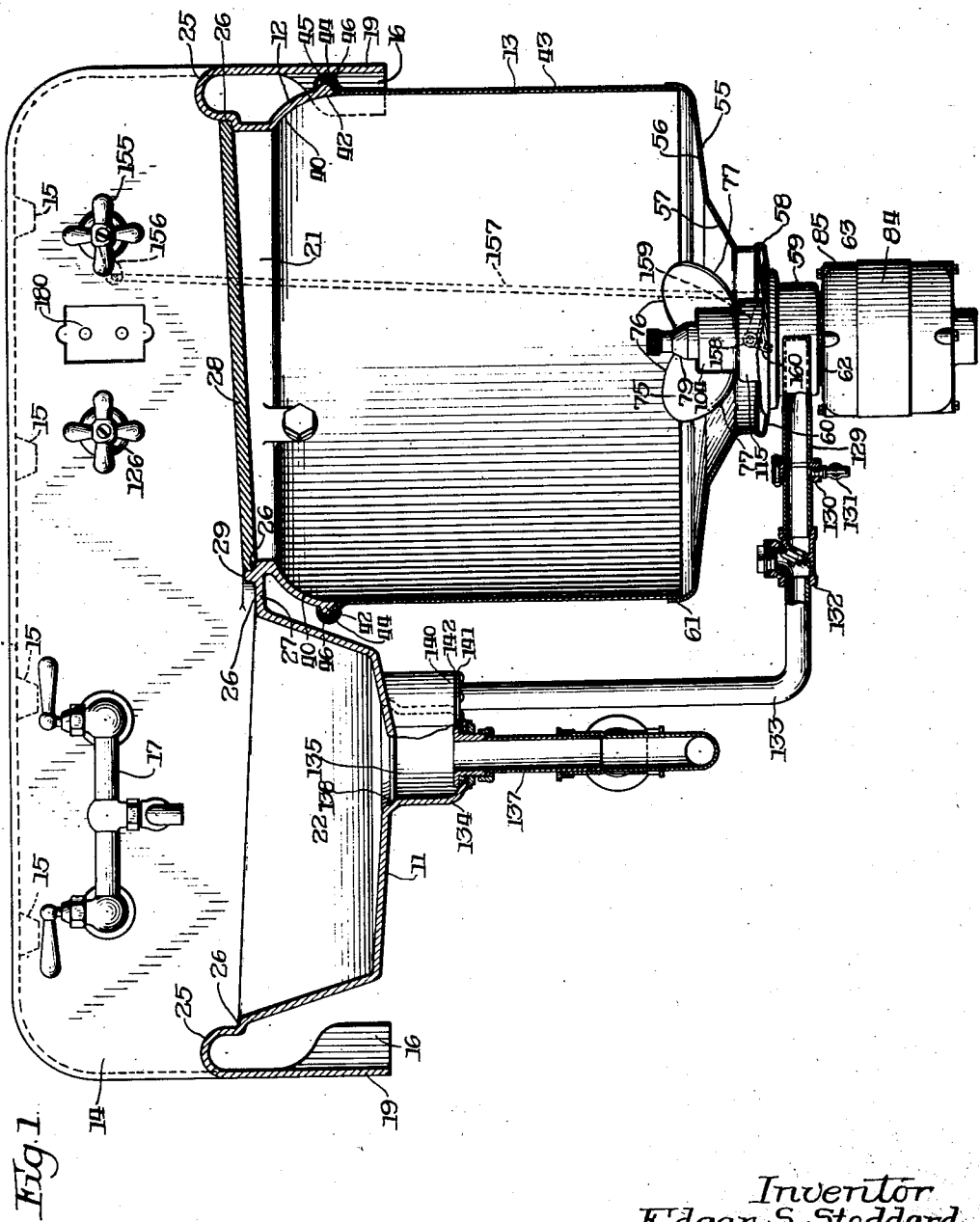
Nov. 28, 1933.

E. S. STODDARD
DISHWASHING MACHINE

1,937,100

Filed Aug. 31, 1929

6 Sheets-Sheet 1



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Nov. 28, 1933.

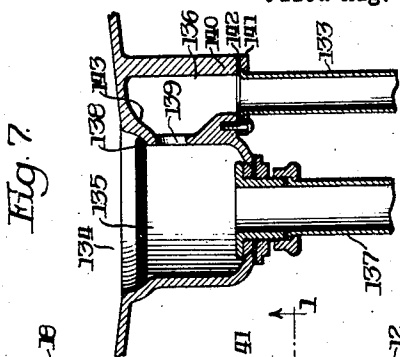
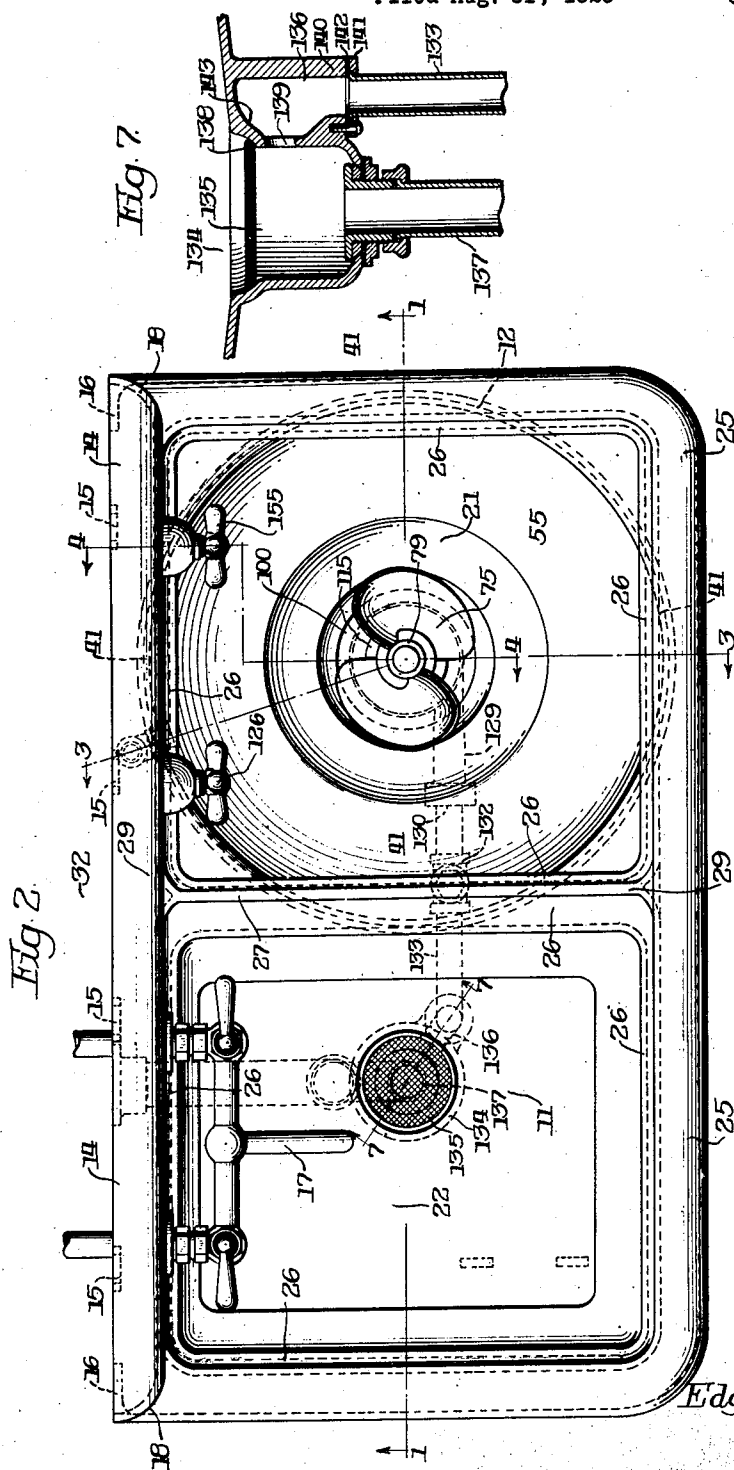
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DISHWASHING MACHINE

Filed Aug. 31, 1929

6 Sheets-Sheet 2



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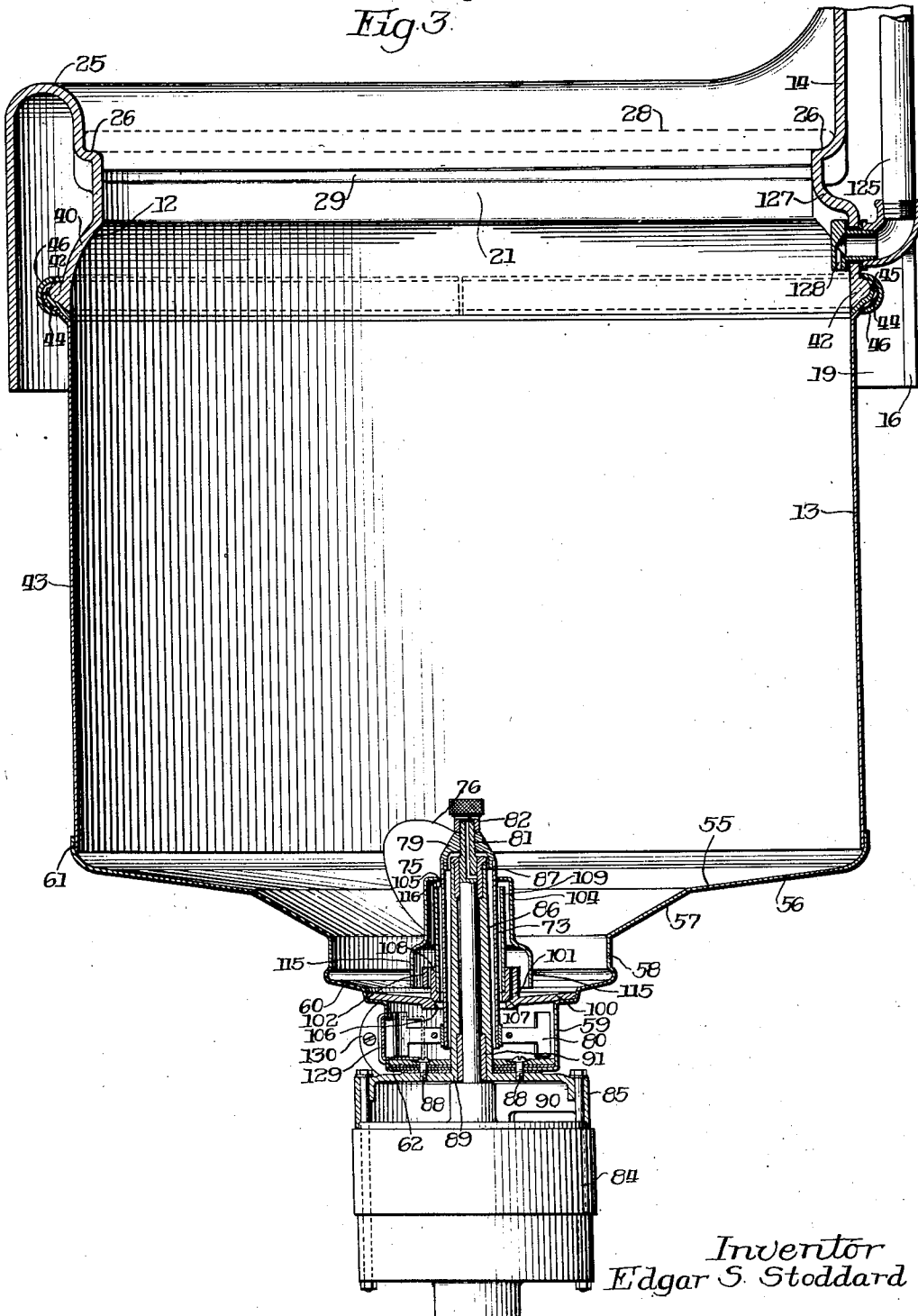
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DISHWASHING MACHINE

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Fig. 3.



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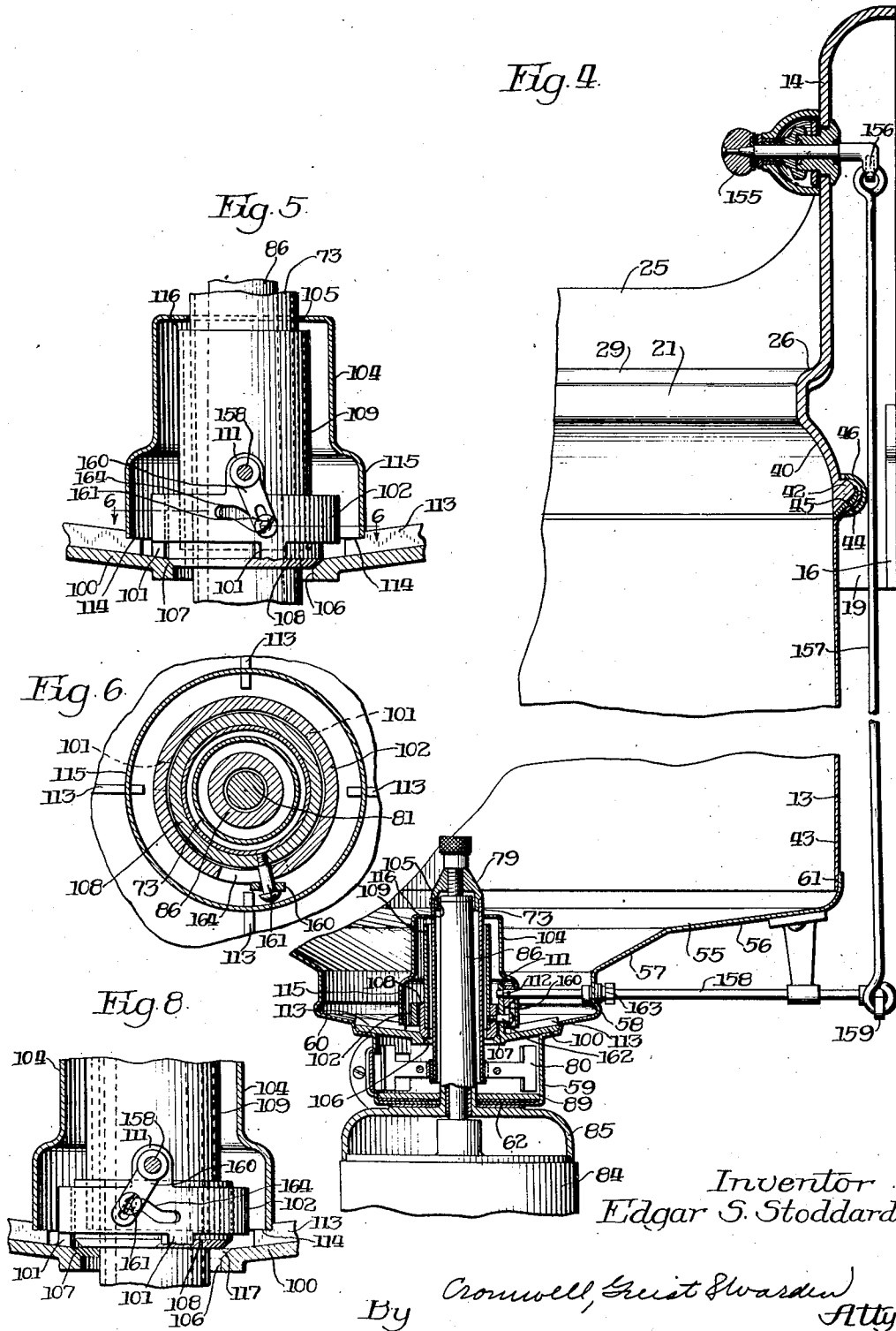
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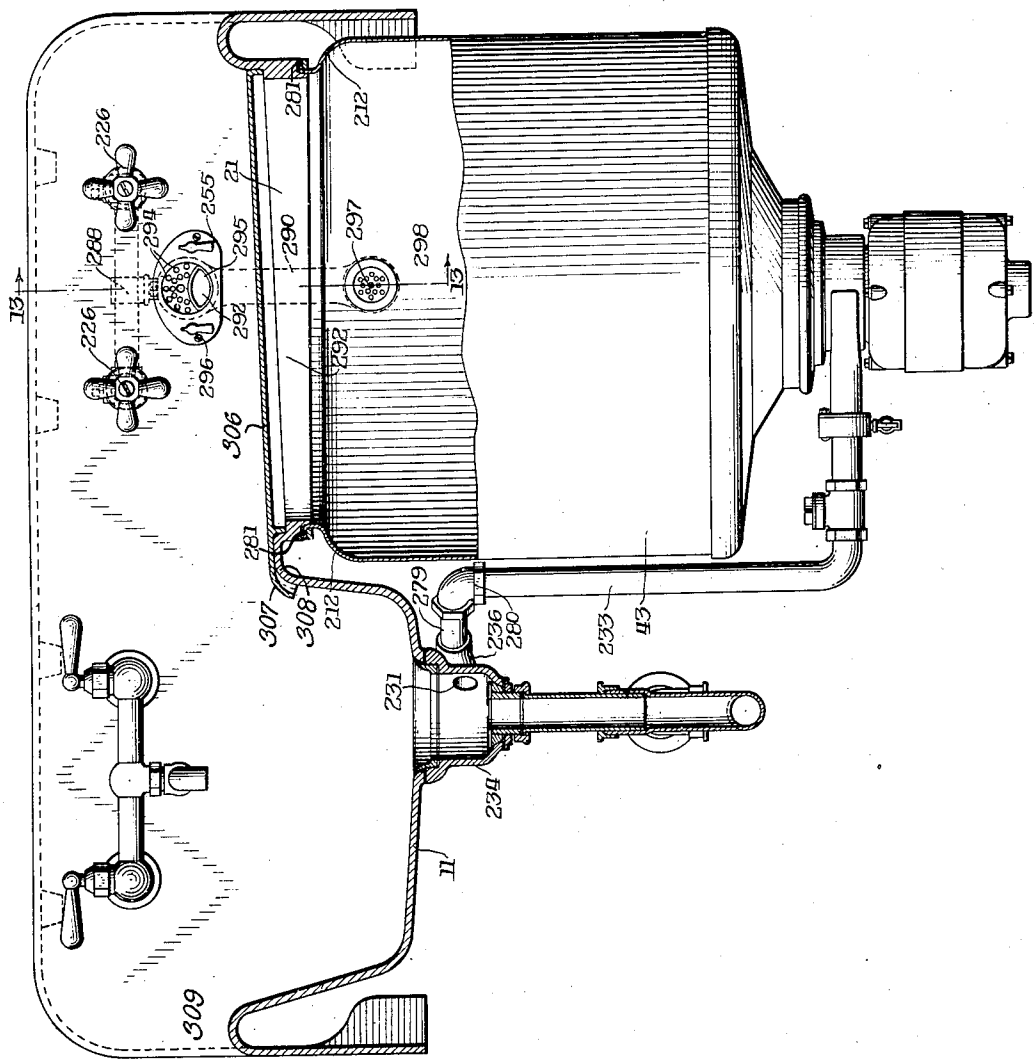


Fig. 9

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6 Sheets-Sheet 6

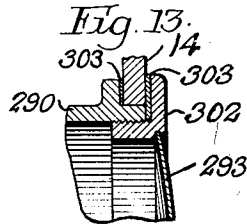
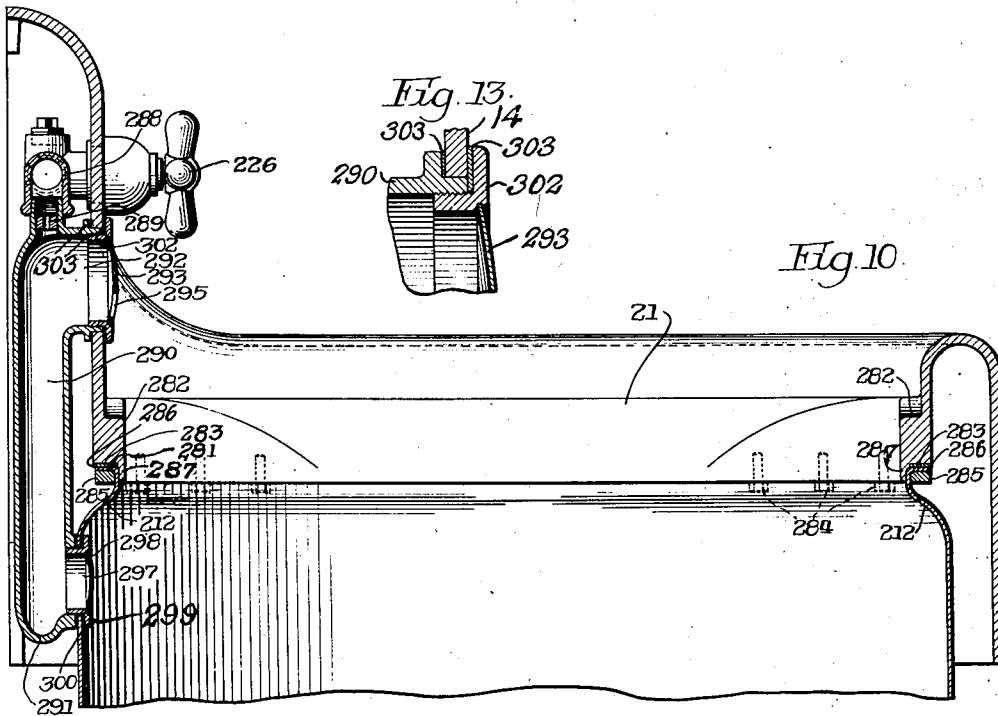
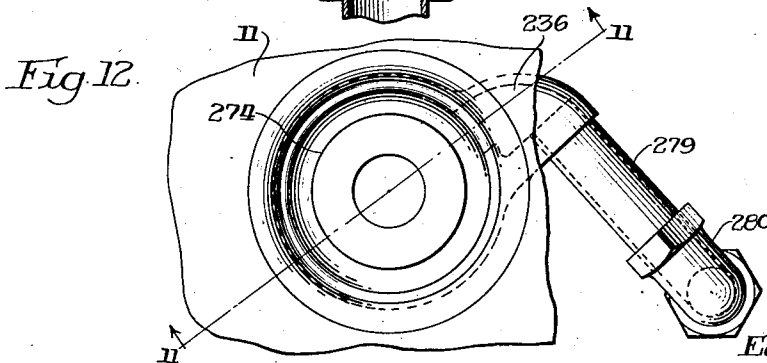
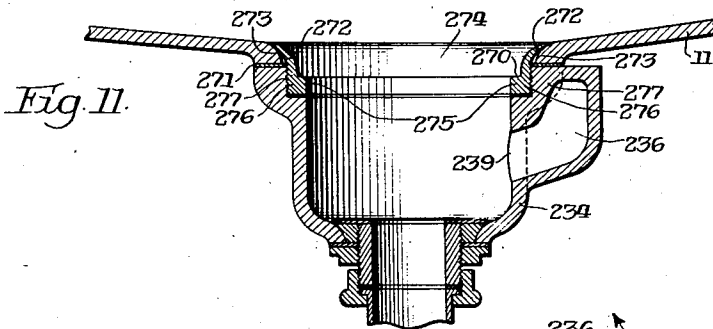


Fig. 10.



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UNITED STATES PATENT OFFICE

1,937,100

DISHWASHING MACHINE

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Application August 31, 1929. Serial No. 389,696

11 Claims. (Cl. 141—9)

This invention relates to improvements in washing machines, and especially in dishwashing machines of the non-portable type.

An object of this invention is to provide a built-in dishwashing machine which is of large capacity and which is very economical in space consumption.

Another object of the invention is to provide a built-in dishwashing machine which is adapted to cooperate in construction and harmonize in design with the household kitchen equipment now in current use.

A further object of this invention is to provide a washing machine to which may be added wash and rinse liquids and from which waste liquids may be removed in a very convenient manner without removal of the cover and/or without stopping the machine.

A still further object of this invention is to provide an improved driving connection between the inferiorly disposed motor and a rotary impeller within the washing chamber of a dishwashing machine.

Many other objects will appear during the course of the following specification, among the more important ones of which are to provide a positive and direct action discharge for a non-portable dishwashing machine, an improved cover, a cooperating inlet and discharge arrangement by means of which a stream of liquid may be kept flowing through the washing chamber of the machine throughout the washing action, and a manually actuated discharge mechanism which is adapted either to maintain a fixed quantity of water in the lower part of the machine or to cause discharge of all liquid from the washing chamber of the machine.

Although this invention is broadly directed to improvements in connection with all dishwashing machines, it is especially directed to the adaptation of centrifugal spray-projector types of dishwashing machines to built-in constructions. Spray-projector types of dishwashing machines of the portable type are shown in the Patent 1,679,455 dated August 7, 1928, and the copending applications Serial Nos. 193,414; 262,652 and 344,112 filed May 23, 1927, March 19, 1928 and March 5, 1929, respectively.

The functioning of this type of machine depends upon the operation of a small unencased screw-like impeller with spiralform blades, which impeller rotates at a high velocity of the order of 1,000 to 2,000 R. P. M. in the lower part of the tank of the machine. Only the lower part of this impeller is immersed in the shallow liq-

uid pool in the lower part of the tank. The shallow liquid pool in the lower part of the machine is maintained in relatively quiescent condition during the operation of the machine. As it turns, the impeller elevates the liquid from its lower immersed curved surfaces to its upper trough-shaped, concave projectors which throw the cleansing liquid at a tremendous velocity directly upon, or into, the objects to be cleansed. Approximately the total force of the projected mass of liquid is effective for cleansing purposes.

Although the velocity of the cleansing liquid is very high, the volume of cleansing liquid is very small, and as a result a very effective cleansing is obtained with a minimum and most efficient use of power, soap or other detergent and water. The projected mass of detergent liquid at the same time keeps the interior of the tank of the machine clean and causes all the food particles and other solid matter to collect at the bottom of the casing from whence they may be readily removed. In the operation of this unencased impeller, it is important that only the lower portion of the impeller be immersed in water, since if the impeller be totally immersed, it will not cause an efficient action. In view of the fact that the dishes and other objects are kept out of contact with the body of liquid contained in the bottom of the tank, and the cleansing is solely due to contact with the projected mass of liquid, it is important that the proper operating conditions be maintained for producing such a cleansing action.

The following drawings illustrate one embodiment of the invention as applied to the centrifugal spray-projector type of dishwashing machines, to which the invention is by no means restricted.

Figure 1 represents a vertical sectional view of the combined sink and dishwasher upon the line 1—1 of Figure 2;

Figure 2 represents a top view of the same combination;

Figure 3 represents an enlarged side sectional view of the dishwasher by itself upon the line 3—3 of Figure 2;

Figure 4 is a fragmentary side sectional view of the dishwashing machine and its discharge connections upon the line 4—4 of Figure 2;

Figures 5, 6 and 8 are side and top sectional views of details of the discharge mechanism; and

Figure 7 is a sectional view of the drain well construction of the sink upon the line 7—7 of Figure 2.

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Figures 9, 10, 11, 12 and 13 show an alternative embodiment of the invention, Figure 9 being a sectional view of the modified construction similar to Figure 1, Figure 10 being a sectional view at 90° to that of Figure 9 through the top of the dishwashing machine attachment, Figures 11 and 12 being side sectional and top views of the drain well construction for the sink, and Figure 13 being a detail showing the method of attachment of the ventilator-intake cover plate.

The combined dishwashing machine and sink structure (see Figures 1 and 2) is composed of a sink basin 11, and a dishwashing machine attachment 12 to which is attached the dishwashing machine 13. The sink basin 11 and the dishwashing machine attaching portion 12 are integral with the backboard 14. The entire unit is attached to, and supported from, the wall by means of the lugs 15. The backboard is further supported on the wall by the projections 16 which distribute the weight of the combination over a large area of the wall and prevent breakage of the plaster by the lower corners 19 of the sink back. The sink portion of the combination is provided with openings in which may be placed a standard mixer faucet 17. Around the outside of the sink 11 and attachment 12 extends the roll rim 25 which is of about even height throughout and merges into the backboard 14. Separating the sink opening 22 and the dishwasher opening 21 is a partition 27. On the inner sides of the roll rim 25, on the sides of the partition 27 and on the lower part of the backboard 14 are provided the ledges 26 which completely encompass the openings 21 and 22. The highest portions of said ledges are away from the partition 27 along the sides of the rim 25 and the lowest portions are along the sides of said partition, with the intermediate portions sloping downwardly toward said central partition. The ledges 26 are adapted to support the combination cover and drainboard 28 which may be placed over the dishwashing machine to act as a cover therefor and as a drainboard for the sink. When over the sink 11 this element will act as a drainboard for the dishwashing machine. The ridge 29 on the partition 27 functions as a retaining wall for the dishwasher cover, making it water-tight on that side and also serves to position it either over the dishwashing machine 13 or the sink 11. The central partition 27 slopes toward the sink 11 so that all liquid collecting thereupon will drain into said sink. The cover board 28 is preferably of sufficient height to permit ready drainage over the partitioning ridge 29 of the central partition 27 into the sink basin. It is preferably made of molded white rubber, although other plastics, glass, non-corrodible and/or protected metals may be utilized. The color of the plastics should be selected so as to harmonize with the balance of the unit. The drainboard cover may be provided with suitable finger holes for lifting it over the ridge 29 and placing it in position alternately over the openings 21 and 22.

The dishwasher attachment 12 is provided with a hemispherical skirt 40 (see Figures 1, 2 and 4). This skirt extends under the sides of the opening 21 at the four sides thereof, as indicated at 41 (see Figure 2). The lower end of the skirt is provided with a circular projection 42 which serves as the means for attachment of the tank 43 of the dishwashing machine. The skirt 40 enables a dishwashing machine of much larger diameter than the width of the rectangular open-

ing 21 to be placed under the attachment 12, as clearly appears from Figure 2. The diagonals of the opening 21 may be of approximately the same length as the diameter of the tank 43. This is desirable in order that racks of approximately the internal diameter of the tank 43 may be readily placed within the washing chamber by means of the opening 21. The racks may be placed within the washing chamber by setting them on edge and pushing them down through the long dimension of the opening. After being placed in position in the washing chamber they are loaded with the dishes and other articles to be washed. The upper side of the tank 43 is provided with an outward projection 44 (see Figures 3 and 4) which is adapted to be separated from the bead 42 by means of the rubber gasket 45. The gasket 45 is clamped between the bead 42 and the projection 44 by means of the semi-circular clamping ring 46. The semi-circular clamping ring 46 is of a smaller radius than the combined bead 42, gasket 45 and outwardly bent portion 44, so that it will clamp tightly against the top of the bead 42 and the bottom of the outward projection 44. The contact line of the clamping ring will be along the metallic surfaces, since the sink 11, the attachment 12 and the backboard 14 are all metallic bodies.

The tank 43 forms a washing chamber and is provided with a centrally draining bottom 55 (see Figures 1, 3 and 4). In the preferred embodiment of the invention, this centrally draining bottom increases in slope as it approaches the center of the tank. The particular bottom shown consists of two frusto-conical portions 56 and 57 and cylindrical depending portions of smaller diameter 58 and 59. The ledge 60 which connects the cylindrical portions 58 and 59 may have about the same slope as the outer portion 56 of the bottom 55. In the particular tank shown on the drawings, the outer portion 56 of the bottom 55 has a slope between 10 and 20° and the inner portion has a slope of between about 20 and 35°.

In the embodiment shown, the main body of the tank 43, which is cylindrical in shape, is made from one piece of metal, and the two conical portions 56 and 57, the cylindrical portions 58 and 59 and the connecting ledge 60 are spun from another piece of metal and welded to the cylindrical piece at the junction 61.

The lower chamber 59 is open at the bottom to receive the tubular bearing 86 which is integral with the end bell of the motor. The end bell of the motor is supported beneath the pump chamber and is attached to the flange 62 by the screws 88. Between the end bell of the motor and the sheet metal pump chamber bottom is a rubber gasket, while on the inside of the pump chamber is also a rubber gasket and a close fitting plate 89 of non-corrosive metal of sufficient thickness to compress properly the washers between it and the motor end bell, and prevent the collection of food particles between its inner edge and the tubular bearing and its outer edge and the pump chamber walls. The opening in the sheet metal pump chamber through which the tubular bearing extends is of sufficient size so that the motor and the tubular bearing may be swung slightly forward and removed from the tank, while the dishwasher is hung in its normal position relatively close to the floor. The water impeller 75 is partially contained in the chamber 58 and extends upwardly in the washing chamber to a point above the draining bottom 55. The water impelling device consists of the upper

spray-projecting portions 76, which are so shaped as to distribute the water elevated by the lower screw propeller portion 77 throughout the body of the tank in the manner previously described. It will be noted that the lower portions are cut away so as to embrace the cylindrical shell 104, and that the upper portions are attached to a conical section 79. The depending cylindrical tube 73 (see especially Figures 3 and 4) extends downwardly into the chambers 58 and 59 until it reaches a point adjacent the bottom of the chamber 59. To the lower part of the shell is attached the centrifugal pump 80. The conical section 79 adjacent to the point of attachment of the impeller blade 75 is connected to the top of the motor shaft by means of the threaded portions 82 of the motor shaft and the conical section. As stated before, the motor 84 is provided with a special end bell 85, which is adapted to be bolted to the body of the motor. This end bell is provided with a tubular portion 86 which extends upwardly into the washing chamber of the machine until it reaches a point about or slightly above the level of the draining bottom. The bearing 86 is provided with upper and lower bearing sleeves 87 and 91 of the oilless type which are adapted to fit into recesses in the top and bottom of the tubular portion 86. If desired, however, satisfactory greasing apparatus or a grease cup may be attached to the top of the shaft 81. The end bell of the motor is attached to the pump chamber bottom 62 by means of the bolts 88 and the metal plate 89. Excellent protection is afforded the operator from electrical shock, since the body of the machine is grounded by means of the plumbing connections.

Separating the upper chamber 58 from the lower chamber 59 is a removable plate or pump cover 100 which has upwardly projecting legs 101 (see Figures 3, 4, 5 and 6). These legs are integral with and support a ring 102. Projecting upwardly from the ring 102 is the bearing 111 which supports the inner extremity 112 of the rod 158. On the upper side of the plate 100 are four small symmetrically positioned baffles 113 which are preferably set tangentially but which may be set radially as shown in Fig. 6. The inner upper edges of the baffles 113 are shouldered as indicated at 114. Supported on these shoulders is the lower edge of the shell 104. The lower portion of the shell 104 is bulged outwardly as indicated at 115 so as to permit the ingress of water between the inner side of the shell 104 and the ring 102. The lower edge of the shell 104 is a substantial distance above the plate 100, so as to aid but not to interfere with efficient removal of food particles from the lower interior portion of the tank. The cylindrical member 104 is provided with an open portion 105, through which projects the impeller tube 73. The plate 100 has a central opening 106, which is inside the legs 102. The inner upper edges of this opening are beveled, as indicated at 107, so as to cooperate with the lower portion of the upwardly extending annular ring 108 to form a water seal. The shell 108 is provided with a smaller tube 109 which extends upwardly to a point slightly below the top 105 of the exterior cylindrical member 104. The cylindrical member 108 is adapted to prevent the passage of any liquid out of the washing chamber below the top of the tube 109 when in the closed position. The vertical space 116 between the top of the tube 109 and the underside of the top 105 of the shell 104 is sufficient to permit enough

vertical movement of the annular ring 108 vertically above its seat 107 in the pump cover 100 so that all waste liquid and solid matter may be drained out of the washing chamber into the pump chamber through the opening 117 (see Figure 8). The top of the sleeve 109 will determine the level of water in the washing chamber of the machine, and at the same time will serve as an overflow to permit the removal of any liquid in excess of the predetermined quantity for satisfactory operation. The liquid in the washing chamber will flow through the openings between the shell bottom 115 and the plate 100 into the annular chamber between the cylindrical members 104 and 109, and then over into the open space between the sleeve 109 and the tube 73 to which the impeller blades 75 are attached. The water then flows downwardly into the discharge chamber 59.

During the operation of the machine, a stream of water may be kept constantly flowing through the washing chamber. This water is admitted by means of the inlet connection 125 (see Figure 3), which is controlled by the faucet 126 upon the backboard 14 (see Figure 1). In Figures 1, 2 and 3 are shown the inlet connections. The inlet is so positioned that it will come under the overhanging ledge 127, and the discharge end of the inlet conduit is provided with an orifice 128 which is of such a size as to insure the admission of a constant amount of water per unit of time which will slowly fill the washing chamber up to the level of the top of the tube 109, and then the excess continuously overflows. This incoming liquid will pass down along the back of the tank without splashing and will flow into the chamber 58. Any excess thereof will overflow the cylinder 109 into the discharge chamber 59 as described above. The water overflowing into the discharge chamber 59 will be constantly removed from such chamber by means of the centrifugal pump 80 which is attached to the lower end of the impeller tube 73. If desired, however, the orifice 128 may be made larger or combined with the faucet so that the lower part of the washing chamber will fill very rapidly with water and then the inlet may be closed off when the washing chamber has been filled to the level 109. This will be indicated visually to the operator by the rate of discharge of the centrifugal pump. The flanged discharge connection 129 is welded to the side of the chamber 59 and is attached to the fixture 130. This fixture is provided with a cock 131 adapted to drain completely the chamber 159. The discharge conduit then passes through the check valve 132 and the pipe 133 into the special sink well construction 134. The check valve 132 is adapted to prevent any liquid from the sink flowing through the pipe 133 into the discharge chamber 59 and thence into the dishwashing chamber. The sink drain-well construction is shown upon Figures 1, 2 and 7. The lower part of the sink is provided with an off-center drain-well 135 which has an outside communicating compartment 136. The upper inner portion of the chamber 136 is so shaped, as indicated at 143, that the liquid will be discharged downwardly toward the drain 137. Both the well 135 and the compartment 136 are cast integrally with the sink structure. The lower part of the well 135 is constructed so as to connect with the standard drain outlet 137 and also to provide the recess 138. This recess in the upper part of the well may be provided with a strainer plate or other equivalent means. The outer compart-

ment 136 has an opening 139 which permits the liquids in said compartment to flow into the well 135. The lower side 140 of the compartment 136 is adapted to receive the discharge pipe 133 and form a liquid-tight connection therewith by means of the ring 141, the flanged tube 133 and the gasket 142.

When it is desired to drain the tank of the dishwashing machine after the washing operation has been completed, the cylindrical member 108 is lifted from the seat 107 by the handle 155 and the liquid will flow from the washing chamber under the ring 102 and the cylindrical member 108, through the opening 106 into the discharge chamber 59 and will be removed therefrom by the centrifugal pump 80. The shell 108 is lifted from the seat by means of a mechanism which is actuated by the handle 155 upon the backboard 14 (see Figures 1, 4, 5 and 6). The handle 155 actuates the lever 156 which is back of the backboard, which in turn actuates a downwardly extending rod 157. The rod 157 causes a partial rotation of the lever 158, one arm of which, 159, connects with the rod 157 and the other arm of which, 160, actuates the pin 161. The pivot 158 is above the center of the slot 164 in which the pin 161 rides (see Figures 5 and 6). This pin passes through and is rigidly attached to the combined shells 108 and 109. The rotating rod 158 passes through the wall of the lower part of the washing chamber by means of the water-tight bearing 163. This slot is of varying height so that when the arm 160 of the lever is moved to the left, it will elevate the combined cylinders 108-109 from the seat 107 and permit an outflow of the liquid from the washing chamber. When the lever 160 is moved to the right, this will cause the cylinder 108 to seat and the liquid will then accumulate in the washing chamber until it reaches the level of the top of the cylinder 109.

In operation, the dishes to be cleansed are arranged in suitable dish-holding racks positioned in the tank, and an amount of soap and/or water softening agent is placed in the bottom of the tank. The cover 28 is then placed in position over the tank of the machine. At this point the cylinder 108 should be lowered into its seat upon the plate 100, if it is not already in such position. The impeller is set in operation by the switch 180 upon the backboard 14 and the handle 126 is turned so as to admit water into the tank of the machine by the inlet connection 125. The water then will fill the washing chamber of the machine until it reaches the level of the top of the tube 109 and then will continue to overflow into the discharge chamber 59 and be pumped out into the well 134 of the sink 11. The amount of soap or other detergent and anti-precipitant is so proportioned to the amount of water flowing into the machine that the water during the initial stages of the washing operation will contain sufficient detergent material for a sufficient length of time to cleanse the dishes thoroughly, and then the dishes will be exposed to water of decreasing detergent content until they finally are thoroughly cleansed. It has been found very advantageous to subject the dishes to a cleansing liquid of high detergent value and then subjecting or rinsing them with liquid of gradually decreasing detergent value. The water flowing in through the inlet connection 125 and out through the discharge line 133 will tend to dilute and carry off the detergent and anti-precipitant until

the washing chamber of the machine contains nothing but fresh clean water. At this stage, the inflow of fresh water is stopped and the handle 155 is actuated so as to lift the cylinder 108 from its seat and permit the discharge of all the liquid in the washing chamber. The cover 28 is then removed and the dishes are allowed to stand a short while until they dry by evaporation, assisted by the accumulated heat, and are then removed from the tank of the machine. This operation may be varied as described above.

In Figures 9 to 13 is shown a modified construction, which is preferred for many purposes. In this modified construction the sink drain well 234 is not cast as an integral part of the sink. The well is made of a non-corrosive metal and is attached to the bottom of the sink 11 by the clamping ring 270 (see Figures 9 and 11) and the connection is made water-tight by the gasket 271. The ring 270 is also cast of a non-corrosive metal and is provided with an upper curved edge 272 of slightly smaller radius than the cooperating curved portion 273 around the drain opening 274 in the sink bottom. The ring 270 has a downwardly projecting portion 275 which extends down through 274 and is provided with a threaded portion 276 to cooperate with the upper threaded portion 277 of the well 234. On the right rear side of the well 234 is cast a cooperating chamber 236, provided with an opening 239 into the well 234 which is visible to a person standing at the front of the sink. The opening 239 is so constructed that the discharging water will not splash upwardly into the sink basin. The chamber 236 is connected to the discharge line 233 (see also Figure 12) of dishwasher by means of the short horizontal pipe 279 and the union elbow 280. It will be noted that the pipe 233 is positioned closely along the side of the tank 43, thus giving the machine a much more compact and pleasing appearance.

In this modified construction the hemispherical apron 212 (see Figures 9 and 10) is combined with tank 43 and made integral therewith. The top of the tank 43 is provided with a flange 281 and is attached to the sink construction at the opening 21. The opening is provided with a downwardly depending portion 282, the lower part of which is provided with a flat surface 283 and tapped holes to receive the supporting screws 284 which clamp the tank 43 tightly in position by means of the ring 285 and the gasket 286. The inner side of depending portion 282 is provided with a downward extension 287 to cover the jointure of the tank 43 and the portion 282.

In the construction of Figures 9 to 12, provision is made to temper the water entering the dishwashing chamber to the desired temperature. Means are also provided for adding suitable anti-precipitant materials and detergents to the water stream and for testing the temperature of the water stream before the water has entered the machine without interrupting the operation. The faucets 226 are adapted to control the flow of hot and cold water into the T 288 (see Figures 9 and 10). The T 288 is provided with an orifice of small diameter 289 to direct the stream of incoming tempered water downwardly through the conduit 290 into the pocket 291 without spraying or splashing outwardly through the vent 292. The vent 292 is covered with a plate 293. The upper portion of the plate 293 is perforated with moderate sized holes 294. These holes serve to permit the escape of steam and vapors from the tank 43 through the conduit 290. This ventilator

also prevents the accumulation of odors from storing dirty dishes in the machine prior to their being washed. Below the small perforations 294 is an elliptical opening 295 of sufficient size to permit the insertion of a teaspoon or similar conveyer for the addition of detergent and/or anti-precipitant to the water stream. The opening 295 is also of sufficient size and in such a location that the temperature of the incoming water may be tested by the operator inserting his or her finger into the water stream flowing through 290. The cover plate 293 also provides a cover for the switch 296 and the drain actuating device back of the drain handle 255.

When anti-precipitant and/or detergent is placed in the conduit 290 through the opening 295, it is desirable that it be fully dissolved before it passes into the washing chamber of the tank through the opening 297. For this reason the pocket 291 is provided to increase the possibility of complete solution of any additions to the water stream and diminish the tendency for these additions to be swept into the washing chamber in undissolved form. A suitable ornamental perforated cover plate 298 is provided for the opening 297. This cover plate does not prevent the ready flow of water into the wash chamber and permits free ventilation through the conduit 290.

The conduit 290 is attached to the tank 43 by the clamping ring 299 and is rendered water-tight by the gaskets 300. The attachment to the rear of the backboard 14 is made by means of the clamping ring 302 and gaskets 303. The perforated plate 298 is held in position by being of such a diameter that it can be snapped rigidly into place in a recess provided for that purpose in the ring 299. Cast integrally with the conduit 290 is a holder for the switch mechanism. On the side of this conduit is also a bearing for the lever 156 (see Figure 4) of the drain actuating mechanism. This bearing may be an integral part of the casting 290 and is similar in design and operation to the bearing shown on Figure 4 without the escutcheon and escutcheon support shown thereupon.

In the alternative form the combination sink drainboard-dishwasher cover 306 is provided with a downwardly extending lip 307 which will conform in curvature to the roll of the partition 308 between the sink basin and the dishwashing machine opening. The central portion of the lip 307 will have a slightly convex section which will provide means of gripping the cover when it is desirable to move it from one position to another in the operation of the dishwasher and utilization of sink. This lip prevents any leakage from the drainboard into the dishwashing machine when said drainboard is placed over the opening 21. The construction of the sink is such that the central partition 308 is curved on the sink basin side in the same manner as the roll 309 on the opposite side of the sink, so that the lip 307 of the cover 306 can be readily and closely supported on either curved surface. With this type of construction, the offset portion 26 of the sink basin shown in Figure 1 may be eliminated and the whole made to conform to the conventional style of sink.

What is claimed is:

1. In a dishwashing machine, a tank having a draining bottom provided with a drain opening in the lower portion thereof, an overflow tube extending upwardly from said opening, a shaft extending upwardly through said overflow tube, means outside of said tank for rotating

said shaft and an impeller mounted on the upper portion of said shaft, said impeller having a lower portion extending below the top of said overflow tube.

2. In a dishwashing machine, a tank having a bottom provided with an opening therein, an overflow tube extending upwardly from said opening, a shaft extending upwardly through said overflow tube, means below said overflow tube for rotating said shaft, and an impeller secured to the upper portion of said shaft, said impeller having a portion extending below the top of said overflow tube.

3. In a dishwashing machine, a tank having a draining bottom, a well chamber depending from the lower portion of said bottom, said chamber having an opening in its bottom, an overflow tube extending upwardly from said opening, a shaft extending upwardly through said overflow tube, means below said overflow tube for rotating said shaft, and an impeller secured to the upper portion of said shaft, said impeller having a portion extending below the top of said overflow tube.

4. In a dishwashing machine, a tank having a draining bottom, a well chamber in the lower portion of said tank and having a drain opening in its bottom, an overflow tube extending upwardly from said drain opening, means for moving the base of said tube into and out of water-tight connection with said chamber about said drain opening, a shaft extending upwardly through said overflow tube, means outside of said tank for driving said shaft, and an impeller secured to the upper portion of said shaft, said impeller having a portion extending below the top of said overflow tube.

5. In a dishwashing machine, a tank having a draining bottom, a well chamber in the lower portion of said tank, an outlet chamber beneath said well chamber, a partition having a drain opening therein between said well chamber and said outlet chamber, an overflow tube extending upwardly from said drain opening and movable into and out of water-tight connection with said drain opening, a shaft, extending upwardly through said outlet chamber and said overflow tube, means outside of said tank for rotating said shaft, and an impeller mounted on the upper portion of said shaft, said impeller having a portion extending below the top of said overflow tube.

6. In a dishwashing machine, a tank having a draining bottom provided with a drain opening in the lower portion thereof, an overflow tube extending upwardly from said drain opening, a shaft extending upwardly through said overflow tube, means below said overflow tube for rotating said shaft, and an impeller secured to the upper portion of said shaft, said impeller extending downwardly around said tube and being spaced therefrom.

7. In a dishwashing machine, a tank having a draining bottom provided with a drain opening, an overflow tube extending upwardly from said drain opening, the lower portion of said overflow tube being movable into and out of water-tight connection with said drain opening, a shell surrounding said overflow tube and spaced therefrom, said shell being spaced from the bottom of the tank, a shaft extending upwardly through said overflow tube, means outside of said tank for rotating said shaft, and an impeller secured to the upper portion of said shaft, said impeller extending downwardly about said shell and being spaced therefrom.

8. In a dishwashing machine, a tank having a bottom provided with a drain opening, an overflow tube extending upwardly from said drain opening, the lower portion of said tube being
 5 movable into and out of water-tight connection with said drain opening, an outlet chamber below said drain opening provided with an outlet conduit, a shaft extending upwardly through said outlet chamber and said overflow tube, means
 10 below said overflow tube for rotating said shaft, a pump sleeve secured to the upper portion of said shaft and extending downwardly within said overflow tube to said outlet chamber, a pump device in said outlet chamber and secured to
 15 said sleeve, a shell surrounding said overflow tube and being spaced from said overflow tube and the bottom of the tank, and an impeller secured to the upper portion of said shaft, said impeller extending downwardly about said shell
 20 and being spaced therefrom.

9. In a dishwashing machine, a tank having a draining bottom provided with a drain opening in the lower portion thereof, an overflow tube extending upwardly from said drain opening and
 25 movable into and out of water-tight connection therewith, a motor below said tank, an end bell on said motor having a tubular bearing extending upwardly into said tank through said overflow tube, a shaft extending from said motor
 30 through said tubular bearing, and an impeller secured to the upper portion of said shaft, said impeller having a portion extending below the liquid level established by said overflow tube.

10. In a dishwashing machine, a tank having
 35 a draining bottom, a well chamber in the lower

portion of said tank, a discharge chamber below said well chamber, a partition between said chambers provided with a drain opening therein, an overflow tube extending upwardly from said drain opening and movable into and out of water-tight connection therewith, a motor below said
 80 tank and having a tubular bearing extending upwardly through said discharge chamber and said overflow tube, a motor shaft extending upwardly through said tubular bearing, a pump
 85 sleeve secured to the upper portion of said shaft and extending downwardly into said discharge chamber, said sleeve being within said overflow tube and spaced therefrom to form a liquid passage, a pump mechanism in said discharge
 90 chamber and secured to said pump sleeve, a shell surrounding said overflow tube, said shell being spaced from said overflow tube and from the bottom of said tank to form a liquid passage between
 95 said shell and said overflow tube, and an impeller secured to the upper portion of said motor shaft, said impeller extending downwardly about said shell and being spaced therefrom.

11. In a dishwashing machine, a tank having a draining bottom provided with a drain opening,
 100 a discharge chamber below said drain opening, an overflow tube extending upwardly from said drain opening, a motor shaft extending upwardly through said overflow tube, an impeller mounted on the upper end of said shaft and having a
 105 portion extending below the liquid level established by said overflow tube, and valve means for draining the entire amount of water from said tank into said discharge chamber.

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