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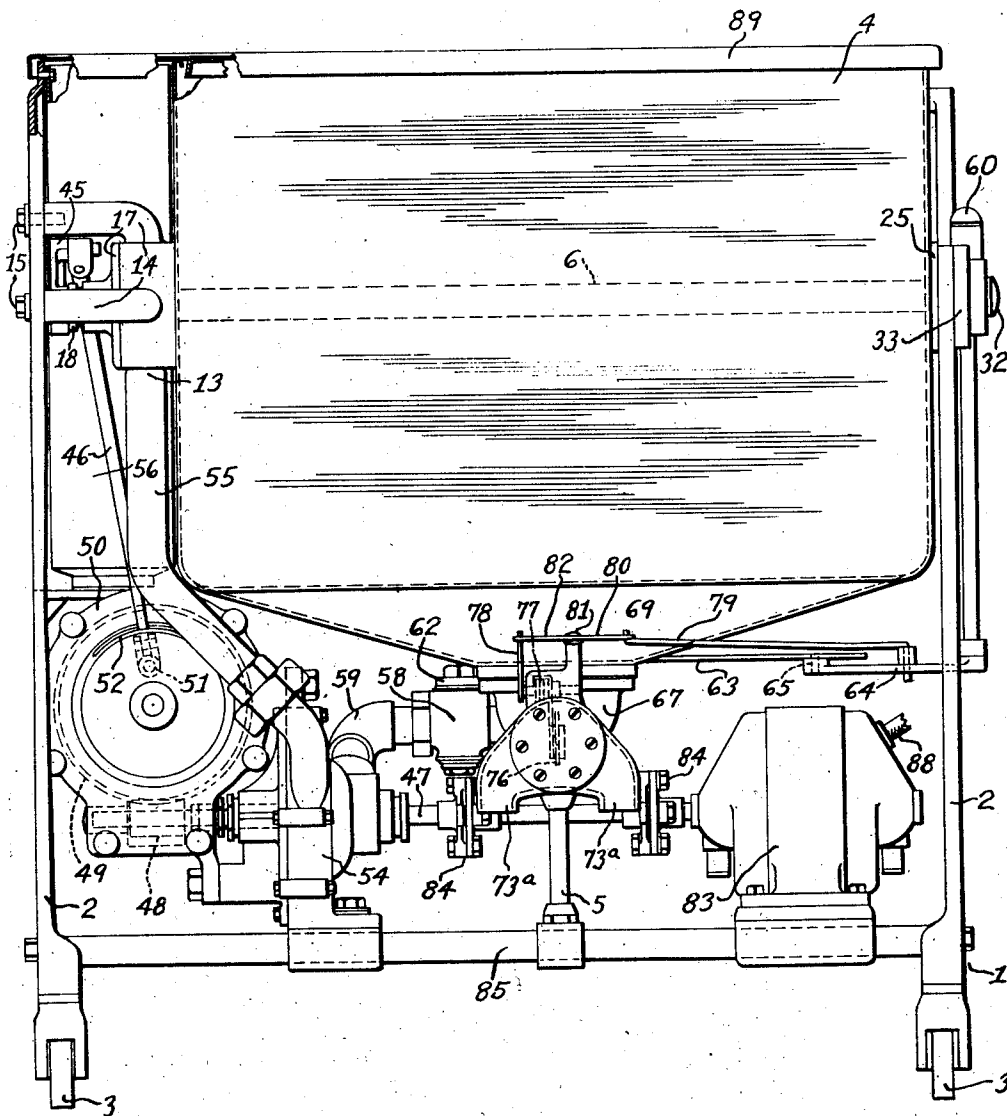
R. J. IRVIN

DISHWASHING MACHINE

Filed Aug. 16, 1921

6 Sheets-Sheet 1

Fig. 1.



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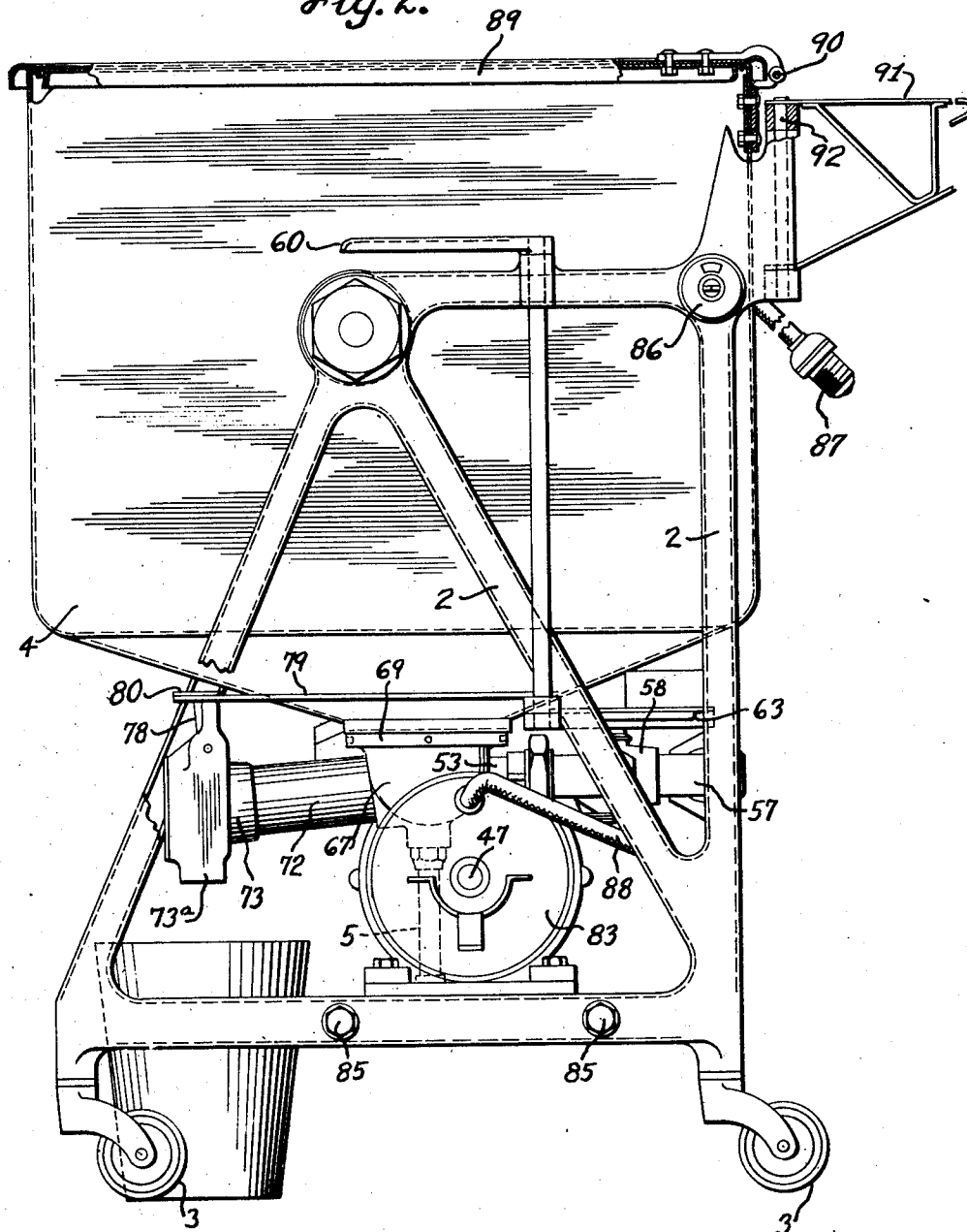
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6 Sheets-Sheet 2

Fig. 2.



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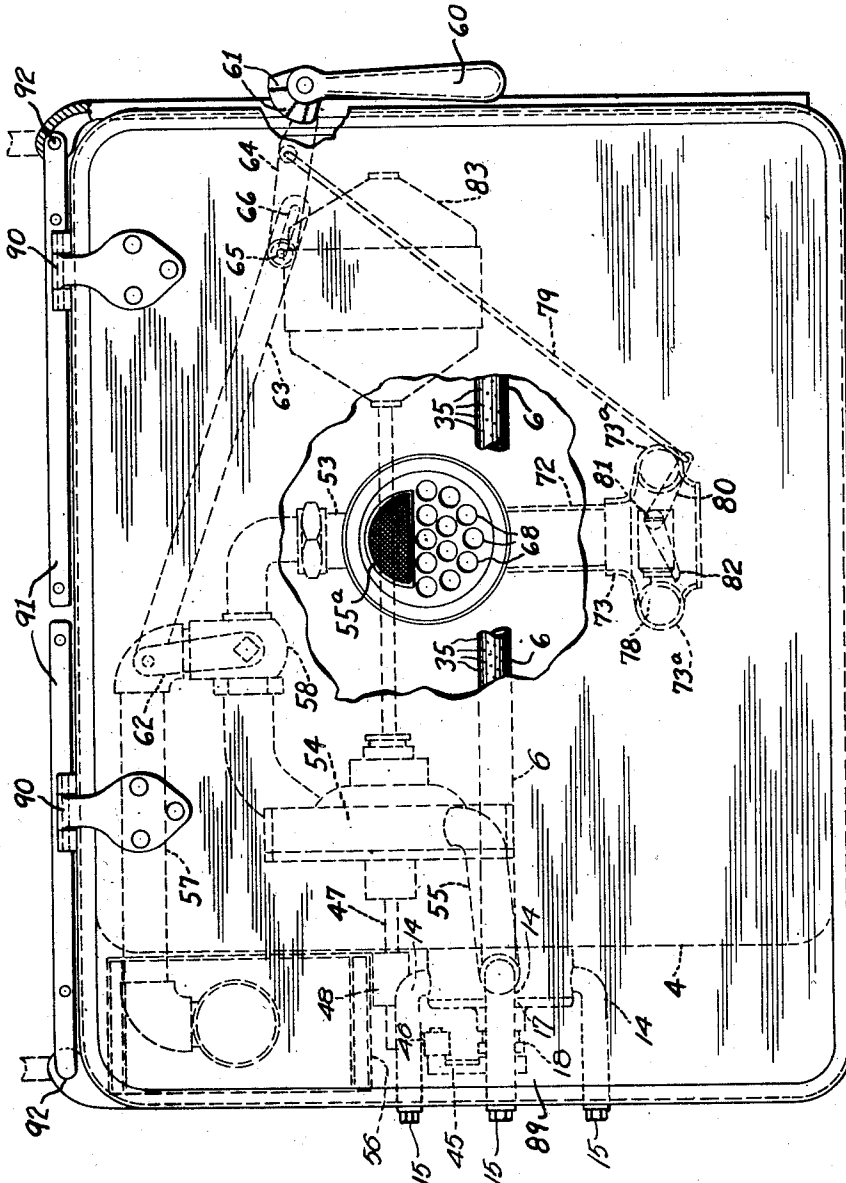
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6 Sheets-Sheet 3

Fig. 3.



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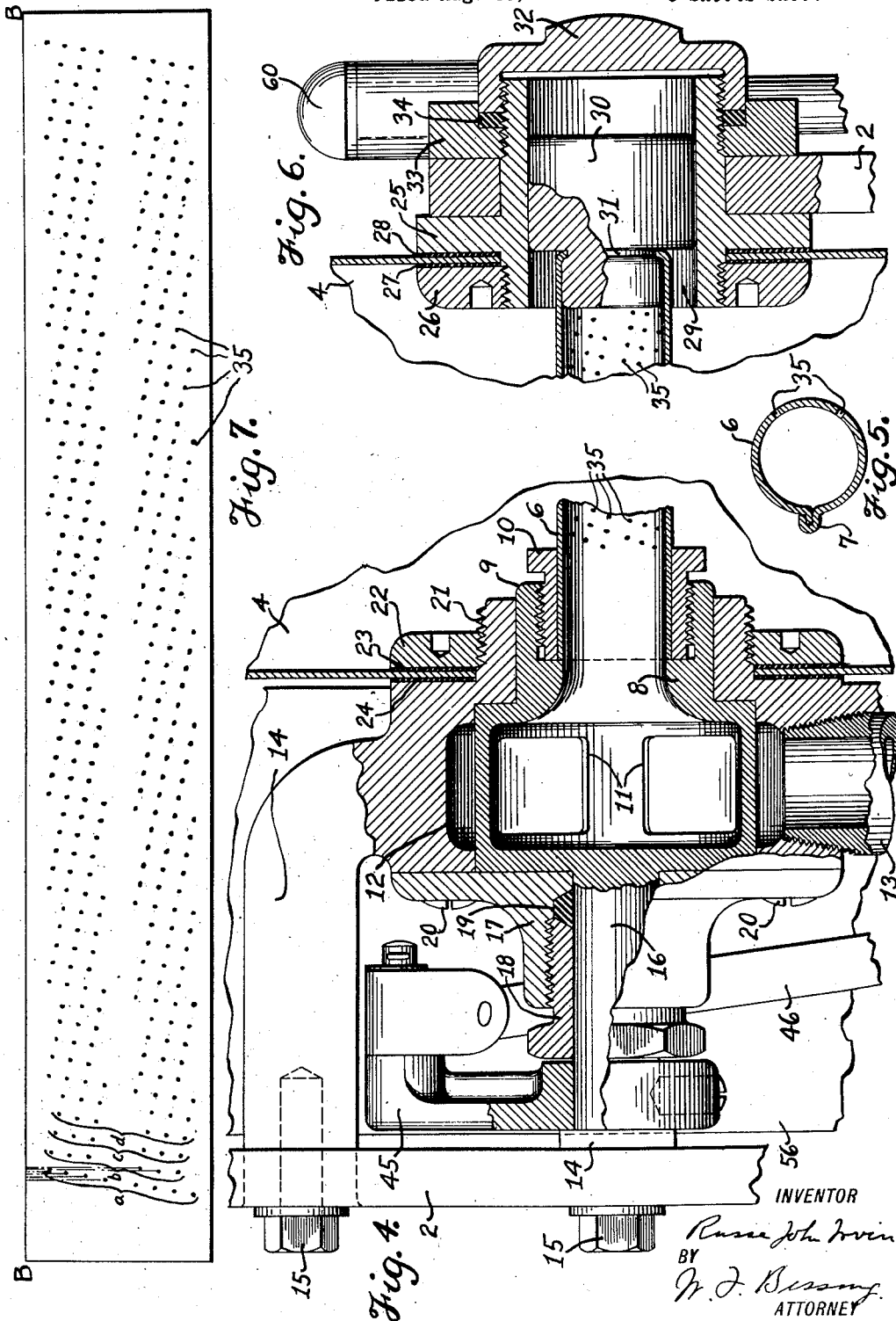
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R. J. IRVIN

DISHWASHING MACHINE

Filed Aug. 16, 1921

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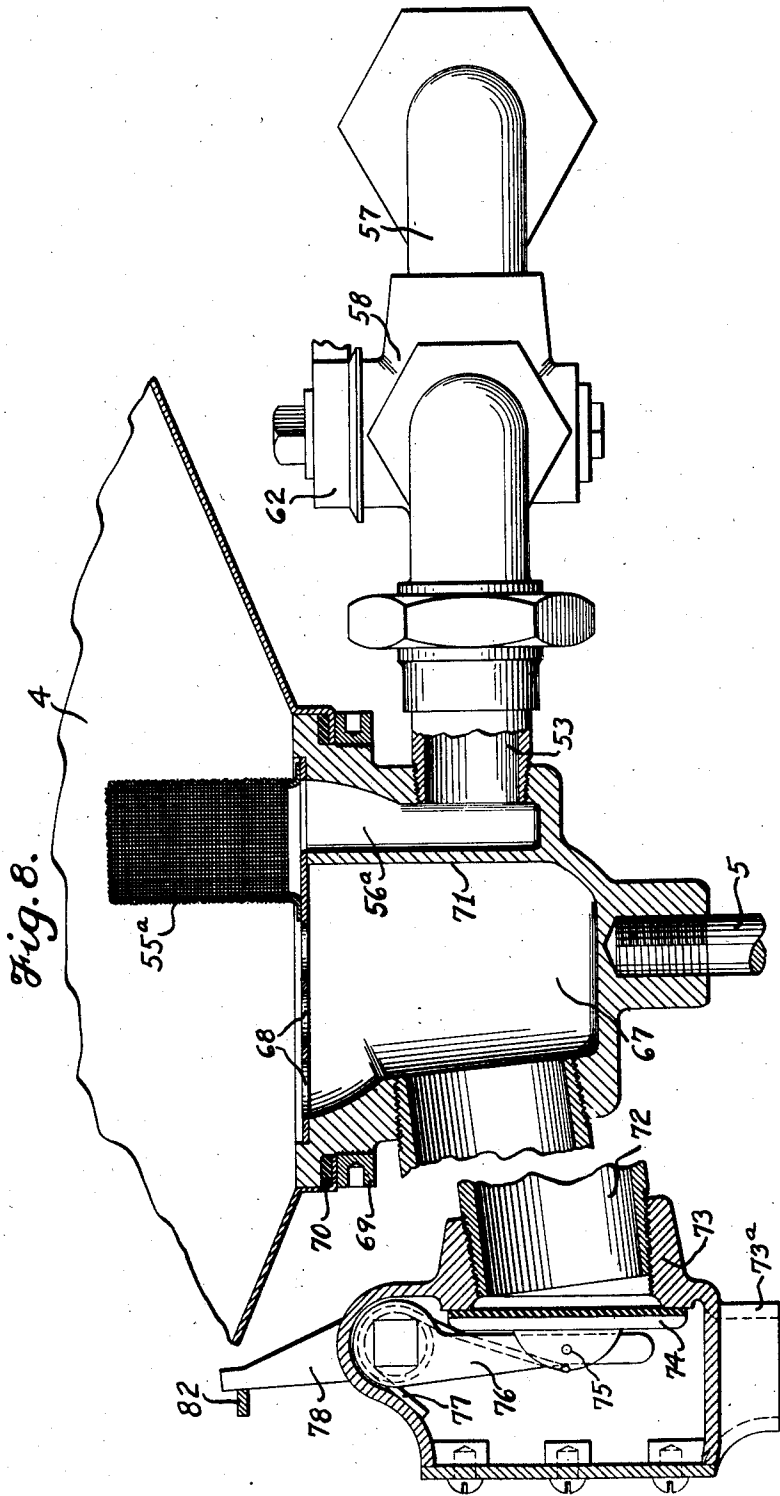
Aug. 18, 1925.

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R. J. IRVIN
DISHWASHING MACHINE

Filed Aug. 16, 1921

6 Sheets-Sheet 5



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DISHWASHING MACHINE

Filed Aug. 16, 1921

6 Sheets-Sheet 6

Fig. 9.

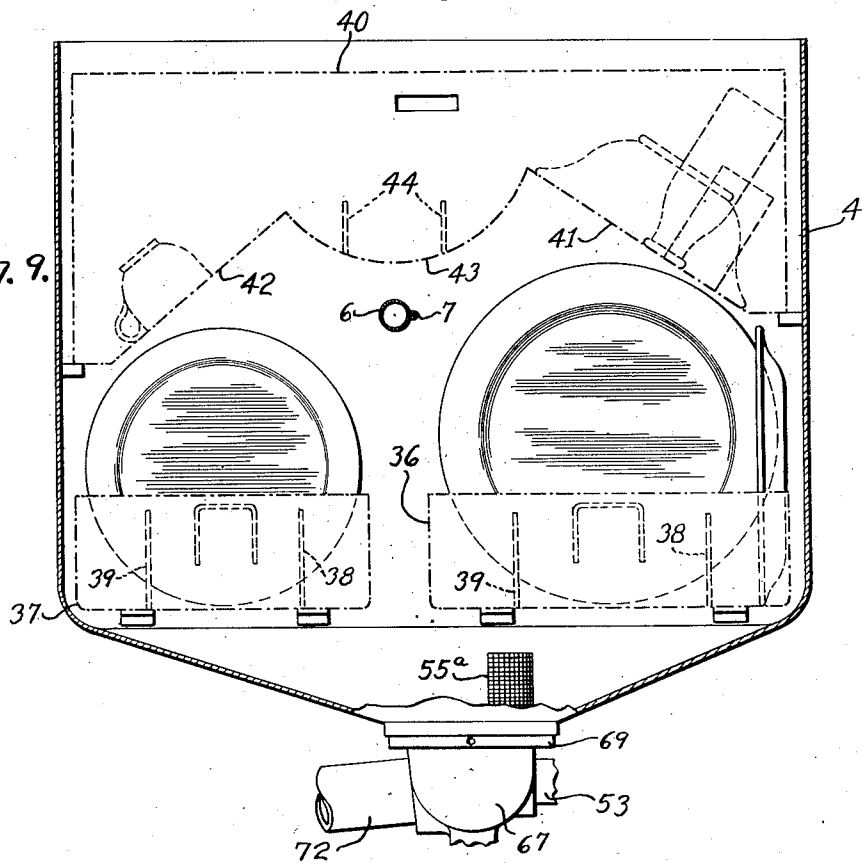
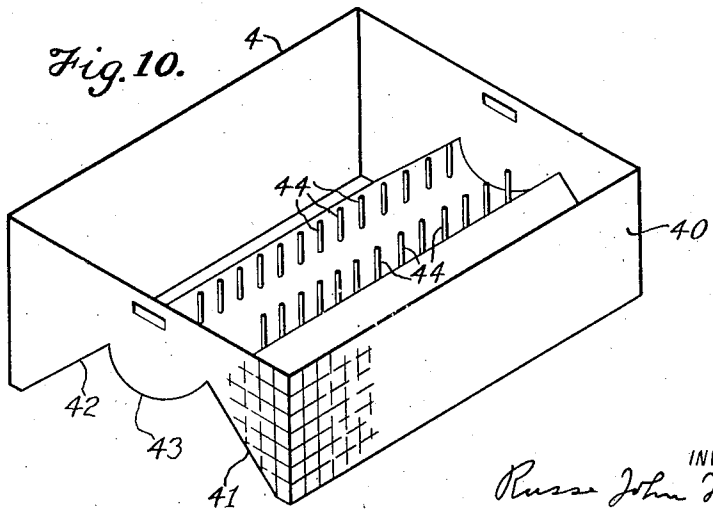


Fig. 10.



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UNITED STATES PATENT OFFICE.

RUSSE JOHN IRVIN, OF INDIANAPOLIS, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO JAMES H. BEAR.

DISHWASHING MACHINE.

Application filed August 16, 1921. Serial No. 492,642.

To all whom it may concern:

Be it known that I, RUSSE JOHN IRVIN, a citizen of the United States, residing at Indianapolis, Indiana, have invented new and useful Improvements in Dishwashing Machines, of which the following is a specification.

My invention relates to a dishwashing machine and particularly to one in which a spray pipe is employed thru which the wash water is sprayed upon the dishes, the dishes being arranged in the tank about the spray pipe.

One of the objects of my invention is to provide a dishwashing machine in which the tank for receiving the dishes to be washed also serves as a holder for containing a supply of wash water, a circulating system being provided for re-using the wash water with a set of dishes, a horizontal spray pipe being arranged in the tank and being provided with means for rocking it and with the spray holes in the pipe so arranged that all parts of the surface of the dishes are subjected to the action of the wash water.

Another object of my invention is to provide a dishwashing machine of small size which may, however, quickly wash in one cycle of operations a large number of dishes.

The machine is particularly intended for household use and for the washing of sufficient dishes, including glassware and table silver, for a family.

Another object of the invention is to provide such a dishwashing machine which is self cleaning and in which the sides of the tank will not show greasy rings or stains after the water has been drawn off.

Another object of the invention is to provide a dishwashing machine with a horizontal spray pipe of special construction and means for rocking the pipe thus providing a very efficient piece of apparatus which will search all parts of the interior of the tank with wash and rinse water and in which the jets will help each other in the washing action so that as one jet works in a line or streak upon a dish another jet will follow it with a minimum of dwell and so close to its path that while cleansing its own streak it will also help dissolve and wash away particles loosened by the jet just ahead and before these particles have time to re-set.

With the above and other objects in view my invention consists in the parts, improvements and combinations more fully pointed out hereinafter.

Turning now to the drawings which illustrate one embodiment of the invention,

Fig. 1 illustrates a front elevation of the machine.

Fig. 2 illustrates a side elevation of the side provided with the operating handle and switch.

Fig. 3 is a top plan view partly in section, of the tank and parts beneath it, illustrating the circulating, drain and rinse systems, the parts being shown in the washing position.

Fig. 4 illustrates in section one end of the horizontal spray pipe and the means for supplying it with water.

Fig. 5 illustrates a section of the spray pipe.

Fig. 6 illustrates in section the distal end of the spray pipe and its bearing.

Fig. 7 illustrates a development of the arrangement of the spray holes of the pipe.

Fig. 8 is a sectional detail illustrating the sump and drain.

Fig. 9 is a section showing the tank and the means for arranging the dishes about the horizontal spray pipe and in correct relation thereto.

Fig. 10 is a perspective view of one of the upper baskets for carrying the hollow and silverware.

The machine is provided with a frame 1 having sides 2 and may be provided with rollers 3 so that it may easily be moved about. The tank 4 for receiving the dishes is carried by the two sides of the frame, and by a bottom support which may take the form of a post 5 mounted beneath the drain of the tank.

In accordance with my invention I provide a horizontal spray pipe 6 arranged in the tank thru which pipe the wash water and rinse water are sprayed, means being provided for rocking the spray pipe. This reduces the size of the machine, the amount of water used and enables the jets to be projected against the dishes at high velocity.

The means for supplying the water to the spray pipe will now be described. In the embodiment of the invention illustrated the spray pipe which may consist of a sheet metal tube with a seam 7, is secured at its

near end to a drum 8 forming an extension of the spray pipe. The drum may be screw threaded at 9 and a nut 10 connects the pipe with the drum, so that the drum oscillates with the pipe.

The drum, which is provided with one or more openings or windows 11 is mounted so that its windows register with a water chamber 12 which may surround the drum. The end 13 of the supply pipe may be screwed into the water chamber.

Means are provided, for securing the drum to the frame of the machine. As illustrated I make use of a spider having arms 14 bolted by means of bolts 15 to one side 2 of the frame. The spider carries the water chamber and may be integral therewith. A short end 16 of a shaft which may be integral with the drum is provided with a stuffing box which consists of a housing 17 with a screw threaded neck with which a take-up nut 18 engages so as to take up or compress the packing 19 which serves to prevent leakage of water. The housing may be removably secured to the water chamber by screws 20.

Means are provided for securing the tank to the water chamber which thus serves as an additional support for the tank and for sealing the joint between the water chamber and the tank. As illustrated, a part connected to or integral with the water chamber is screw threaded at 21 and a nut 22 which engages the screw threads 21 secures the tank to the water chamber. The joint is sealed preferably by inside and outside washers 23 and 24.

The distal end of the spray pipe, in the best embodiment of the invention, is mounted in the other side of the tank so as to support it firmly and permit rotation. In the embodiment of the invention illustrated a bearing is provided for the purpose, which consists of a screw threaded sleeve 25. This sleeve also serves in the form illustrated to connect the tank with the side of the machine frame. The sleeve 25 is screw threaded on its inner end and a nut 26 securely clamps it to the tank. Washers 27, 28 seal the joint.

In the best embodiment of the invention the sleeve is made hollow as at 29 so as to receive the distal end of the pipe. Means are provided secured to the pipe for engaging the hollow interior of the sleeve so as to rotatably support the end of the pipe. I provide a plug 30 for the purpose which is secured to the pipe as by crimping the pipe into a groove 31 in the plug. The sleeve may be hollow from one end to the other and in the best embodiment of the invention I provide a screw cap 32 which screws upon the end of the sleeve. A nut 33 clamps the sleeve to the frame 2 of the machine and a packing 34 provides a water-

tight seal preventing escape of water from the end of the pipe thru the sleeve.

Means are provided for arranging the spray holes in the pipe and for holding the dishes in a predetermined relation to the axis of the pipe and for rocking the pipe so that as one jet works in a line or streak, another jet will follow it with a minimum of dwell and so close to its path that while cleansing its own portion of the dish it will also help dissolve and wash away particles loosened by the jet just ahead and before these particles have time to re-set. These means also give a twisting, scrubbing swirl when the spray is directed into concave dishes, the wash water swirling and scrubbing around the inside of the hollow ware when resting in the upper basket of the machine.

I so construct the spray pipe, arrange its holes and dispose the baskets for supporting the dishes that with a minimum amount of water and of power, I can provide the greatest number of impinging high velocity jets with the largest searching area.

In accordance with my invention I provide the spray pipe with a plurality of holes 35 which are arranged in groups and in such a way that the jets help each other, more than one jet playing upon the same field of the dish. As illustrated, I arrange the jets in a plurality of rows *a, b, c, d*, etc. these rows being parallel, the plane in which a row lies making an angle somewhat less than a right angle with the longitudinal axis of the pipe. It will be observed by projecting the centers of the holes upon a common base line, that the projections lie close together and cover closely adjacent portions of the dish to be washed. One or more of the holes of a row are projected upon the same small area as the projection of the hole from the adjacent row. The diagram Fig. 7 makes this clear. In the diagram there is indicated a plurality of jet orifices arranged in rows *a, b, c, d* which are shown projected upon the base line *B*. Where holes are not needed, the pipe is left imperforate.

Means are provided for supporting the dishes so that they may be arranged adjacent to and around the spray pipe, and the flatware spaced a short distance apart, so as to reduce the size of the apparatus, thus permitting a number of sprays to play in between the plates and rebound between them. The carriers for the dishes are provided with means for maintaining the plane surfaces of the flat dishes at an acute angle to the axis of the spray pipe. Means are also provided so that the upper set of carriers will present the hollow insides of the dishes to the jets, thereby in cooperation with the spray pipe, producing a twisting scrubbing swirl against their inner sides. In the form

illustrated I make use of baskets or trays 36, 37 for holding the large flat pieces, these baskets being provided with pins 38, 39 so arranged as to slant the faces of the dishes with reference to the spray pipe. Pins 38, 39, are spaced apart like pins 44, thus permitting slanting of the dishes.

The upper basket 40 is provided with inclined bottoms 41, 42 on which the hollow ware is inverted and may be provided with a curved bottom 43 having pins 44 arranged to carry the smaller flat dishes, and slant them with reference to the axis of the spray pipe. The knives, forks, etc. may be laid upon the inclined bottoms 41, 42 or in curved bottom 43.

These baskets are readily removable. The lower baskets may be filled and unloaded without changing their position but in order that air drying and evaporation may take place quickly, handles are provided so the operator may elevate the baskets to the top of the tank, and the baskets there located so that the free passing of the air over the contents hastens the evaporation.

Means are provided for rocking the spray pipe on its longitudinal axis. In the embodiment of the invention illustrated I provide a crank 45 secured to the shaft 16 and a connecting rod 46 for actuating the crank, a sleeve and pivotal connection securing the crank to the connecting rod and the connecting rod being vibrated from the drive shaft 47. For the means for actuating the connecting rod as illustrated I make use of a worm 48 on the shaft 47, the worm wheel 49 engaging therewith and encased in a casing 50, the connecting rod being universally pivoted to a hanger which is pivoted to the worm wheel 49, the rod being pivoted to a hanger which in turn is pivoted at 51 to the worm wheel, the rod passing thru a slot 52 in the casing. A rotation of the worm wheel will vibrate the connecting rod back and forth thru an arc of about 160 degrees.

The water for washing the dishes is emptied into the dish tank before starting the machine.

Means are provided for circulating the wash water while washing the dishes. This circulating system in the form of the invention illustrated comprises an outlet pipe 53 leading from the tank and a rotary pump 54 connected to the outlet pipe, the pump being connected to the spray pipe by means of a supply pipe 55, thru whose end 13 the water passes on its way to the spray pipe. The wash water leaves the tank thru a sieve 55^a, passing into a chamber at 56^a on its way to the outlet pipe 53.

I provide tank 56 for the rinse water and a supply pipe 57 leading from the said tank to the outlet pipe, and I also provide a three-way valve 58 for controlling the out-

let from the wash tank, the branch pipe 59 leading to the pump and the rinse water supply pipe 57. Means are provided for operating the valve. As illustrated I make use of a handle 60 for the purpose which I prefer to provide with indicating marks 61 and connect the handle to the crank 62 of the valve by means of a connecting rod 63 and a link 64 having a pin 65 at its end travelling in a slot 66 in the link 63. A partial movement of the handle from the position shown in Fig. 3 to the rinse position will move the three way valve from the washing position in which the valve opens the connection between pipes 53 and 59 leading from the main tank to the pump to and thru the drain position (where a slight dwell in the motion of the handle may take place). The continued movement of the handle to rinse position supplies the rinse water to the pump and spray pipe. In the rinse position the drain remains open.

Means are provided for draining the water from the tank after the dishes have been washed. I provide a drain pocket or sump 67 with which the tank may communicate by means of a series of large holes 68. The casing forming the sump may be screwed to the tank by the nut 69, a seal 70 making a tight joint. A wall 71 is used to separate the drain pocket from the chamber 56^a, the latter communicating with the circulating system.

A drain pipe 72 of greater capacity than the outlet pipe is screwed into the sump, its other end being screwed into a valve box 73 provided with one or more discharge pipes 73^a and provided with the form of valve such as a flat valve 74 pivotally carried at 75 by an arm 76, a spring 77 forcing the valve to its seat. The valve is operated to open by means of an arm 78 which in turn is controlled by the handle 60. A link 79 which is connected to a part operated by the handle as for example the part 64, is also connected to a bell crank 80 pivoted at 81 and contacting with the arm 78. As the handle is moved toward draining and rinsing position the bell crank is rocked, thus opening the drain valve.

Means are provided for driving the parts of the machine which may consist of the electric motor 83 driving the drive shaft 47 thru couplings 84. I locate the drive shaft and the parts operated thereby beneath the tank and support them from the cross pieces 85. The electric motor may also be mounted upon these cross pieces. The current for the motor is controlled by the switch 86 and the motor is connected to the supply circuit by plug 87 thru wires 88.

The table top 89 provides a cover for the tank to which it is hinged at 90. Brackets 91 pivoted at 92 (so that they may be thrown back out of the way) will support

the table top when the latter is thrown open.

Having thus described my invention, its operation is as follows:

The dishes, etc. to be washed having been placed in the tank, the operator first throws back the table top resting it on the brackets. This gives access to the tanks. The upper basket is placed upon the table top and dishes are placed therein as illustrated, dishes also being placed in the lower basket. The upper basket is then placed in the tank and about six quarts of water are then put into the large tank and the rinse tank is filled with about eight quarts of water. Of course the supplies may be varied. Some washing powder may be thrown into the large tank. The cover is then closed and the tank thereby sealed.

The electric switch is then thrown, which starts the motor, the pump and the mechanism for oscillating the spray pipe.

The pump draws the water thru the fine strainer 55^a and three-way valve and delivers it thru the outlet pipe and to the oscillating spray pipe. This wash water after searching the entire areas within the tank, the jets helping each other to wash the surfaces of the dishes as has been explained, finds itself again at the bottom of the tank and is then drawn thru the fine strainer into the pump, repeating its course. This happens again and again for a time determined by the operator.

When the washing has continued for a time sufficient to have cleansed the soiled ware (a few minutes will be found to be sufficient) the operator moves the handle to the position marked "Rinse". This operates and opens the drain valve 74 and permits the wash water to escape into a pair of buckets or into a sewer.

At the same time, the movement of the lever to the "rinse" position operates the three-way valve, closing the port between the wash tank and the pump and opening the port between the rinse tank and the pump, so that clean rinse water may pass into the pump, push out the wash water still there and in the water chamber 12, spray pipe and connecting pipes, and then on out searching the entire area of the wash tank. Finding itself at the bottom of the tank, it passes out of the drain which has remained open. The rinse water is never re-used. As soon as it has escaped the operator throws off the electric grip, opens the table top, sets the large basket upon it and if desired may elevate the lower baskets to the top of the tank to permit more free circulation of air. The dishes dry quickly by evaporation and are ready to be re-used or put away. The machine is already thoroughly cleaned and free of all food and soap particles. The operator may, if desired, stop the lever at the position marked

"Drain", thus emptying the wash water and permitting another quantity of wash water to be used before rinsing. This is occasionally desirable with extremely greasy pots or drip pans.

From the above description it will be clear that my invention provides a dishwashing machine which will quickly and efficiently wash the dishes and rinse them, at the same time cleansing the wash tank. It will also be observed that many changes may be made in the construction of the parts without departing from the principle of the invention.

What I claim and desire to secure by Letters Patent is:

1. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and a supply of wash water, a rinse water supply tank, a circulating system for the wash water comprising an outlet pipe connected to and leading from said dish tank, a valve for the outlet pipe, a pump connected to the outlet pipe, a spray pipe arranged in the tank and connected to the pump, a motor, means whereby said motor actuates said spray pipe about its longitudinal axis and simultaneously drives said pump, a drain pipe for said dish tank of greater capacity than the outlet pipe, a valve for said drain pipe and hand-operated means for closing said outlet pipe valve and simultaneously keeping open said drain pipe valve when the rinse water is admitted, thereby permitting the discharge of the rinse water thru said drain pipe without circulating it thru the machine.

2. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a circulating system for the wash water comprising an outlet pipe leading from the tank, a pump connected to the outlet pipe, a horizontal spray pipe arranged in the tank and connected to the pump, a motor, connections between the motor and the spray pipe for rocking said pipe and connections between the motor and pump for actuating said pump, a tank for the rinse water, a pipe between said rinse water tank and said pump, whereby the pump is adapted to pump rinse water through the spray pipe, a valve controlling the outlet pipe and the rinse water supply, and a handle for actuating said valve whereby the operator may alternately connect the pump with the dish tank and the rinse water, a drain pipe for said dish tank of greater capacity than the outlet pipe, a valve for said drain pipe, and means for controlling said last named valve, thereby permitting discharge of the wash water thru said drain pipe after washing the dishes and thereafter permitting the discharge of the rinse water through the drain pipe.

3. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a circulating system for the wash water comprising an outlet pipe leading from the tank, a pump, a pipe connecting the pump to the outlet pipe, a tank for the rinse water, a supply pipe leading from the rinse water tank to the outlet pipe, a three-way valve controlling the outlet pipe from the tank, the pipe leading to the pump, and the rinse water supply pipe, hand-operated means for operating said valve so as to admit rinse water and close the outlet pipe, a spray pipe arranged in the tank and connected to the pump, a motor, connections between the motor and the spray pipe for rocking said pipe and connections between the motor and pump for actuating said pump, a drain pipe for said dish tank, a valve for said drain pipe, and means for controlling said drain valve, thereby permitting discharge of the wash water through said drain pipe after washing the dishes and thereafter permitting the discharge of the rinse water thru the drain pipe.

4. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a circulating system for the wash water comprising an outlet pipe leading from the tank, a pump connected to the outlet pipe, a tank for the rinse water, a supply pipe leading from the rinse water tank to the outlet pipe, a three-way valve controlling the outlet pipe from the tank, the pipe leading to the pump and the rinse water supply pipe, means for operating said valve, a spray pipe arranged in the tank and connected to the pump, means for rocking said pipe, a drain pipe leading from said tank, a valve for said drain pipe and connections between said valve and the operating mechanism for the three-way valve so that the parts may be operated simultaneously.

5. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a circulating system for the wash water comprising an outlet pipe leading from the tank, a pump connected to the outlet pipe, a tank for the rinse water, a supply pipe leading from the rinse water tank to the outlet pipe, a three-way valve controlling the outlet pipe from the tank, the pipe leading to the pump, and the rinse water supply pipe, means for operating said valve, a spray pipe arranged in the tank and connected to the pump, means for rocking said pipe, a drain pocket connected to said tank, a drain pipe leading from said pocket, a valve for closing said drain pipe, and connections between said valve and the mechanism for operating the three-way valve so that said parts are operated simultaneously.

6. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a circulating system for the wash water comprising an outlet pipe leading from the tank, a three-way valve arranged at the end of the outlet pipe, a branch pipe leading from the valve chamber, a rotary pump connected to said branch pipe, a rinse water supply tank, a pipe leading from said rinse water tank to the valve chamber, a crank connected to the three-way valve, a handle for operating said valve, connections between said handle and said crank, a horizontal, rocking spray pipe arranged in said tank and connected to said pump, a drain pocket connected to said tank, a wall separating said drain pocket from the outlet pipe, a valve for controlling the discharge of drain water from said pocket and connections between said discharge valve and the handle which operates the three-way valve.

7. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and wash water, a rinse water tank, a pump beneath said dish tank, a shaft for driving said pump, a horizontal spray pipe arranged within said tank, a pipe for supplying water to said spray pipe from said pump, rocking mechanism for rocking said pipe, said mechanism including a member arranged below said tank and driven by the shaft which drives the pump, an outlet pipe beneath said tank connected to said pump and to the rinse water tank, a valve in said pipe, a drain pipe beneath the tank, said drain pipe being of greater capacity than the outlet pipe, a valve for the drain pipe and means for simultaneously opening the valve in the outlet pipe and closing the valve in the drain pipe.

8. In a dishwashing machine the combination of a tank receiving the dishes to be washed, a horizontal spray pipe arranged within said tank, means for stacking dishes adjacent to said pipe, means for rocking said pipe comprising a crank attached to said pipe, a motor-driven shaft, connections between said driven shaft and said crank for rocking said pipe, and means for circulating the wash water thru said pipe.

9. In a dishwashing machine the combination of a tank for receiving the dishes to be washed, means for stacking said dishes in said tank, and means for spraying water upon said dishes, comprising a horizontally arranged spray pipe located within the tank, means for rocking said pipe, a water chamber outside of said tank surrounding one end of said pipe and means for supplying water to said chamber, said pipe provided with a radially extending drum of greater diameter than said pipe, having an opening communicating with said water chamber.

10. In a dishwashing machine the combination of a tank for receiving the dishes to be washed, means for stacking said dishes in said tank, and means for spraying water upon said dishes, comprising a horizontally arranged spray pipe located within the tank, removable bearings for said pipe, one for each end of the pipe, connected to and passing thru the walls of the tank, means for sealing said bearings, and means for rocking said pipe.

11. In a dishwashing machine the combination of a tank for receiving the dishes to be washed, a horizontal spray pipe, means for stacking dishes adjacent to said pipe, a drum having an opening, means for securing said drum to said pipe, a water chamber surrounding said drum for supplying wash water to the dishes, a spider for securing the water chamber to the frame of the machine, a nut for securing the tank to the water chamber, and means for sealing the joint between the water chamber and the tank.

12. A dishwashing machine comprising in combination a tank for receiving the dishes to be washed and a supply of wash water, a rinse water supply tank, a circulating system for the wash water comprising an outlet pipe connected to and leading from said dish tank, controlling means for said outlet pipe and for the rinse water tank, a pump connected to the outlet pipe, a spray pipe arranged in the tank and connected to the pump, the outlet pipe and the rinse water supply tank, a motor, means whereby said motor rocks said spray pipe and simultaneously drives said pump, a drain pipe for said dish tank, a valve for said drain pipe, and hand-operated means for actuating said controlling means so as to simultaneously close said outlet pipe and open the rinse water supply to the spray pipe.

In testimony whereof, I have signed my name to this specification.

RUSSE JOHN IRVIN.