

June 10, 1930.

G. WEBB

1,762,847

DISHWASHING MACHINE

Filed Nov. 19, 1926

4 Sheets-Sheet 1

Fig. 1

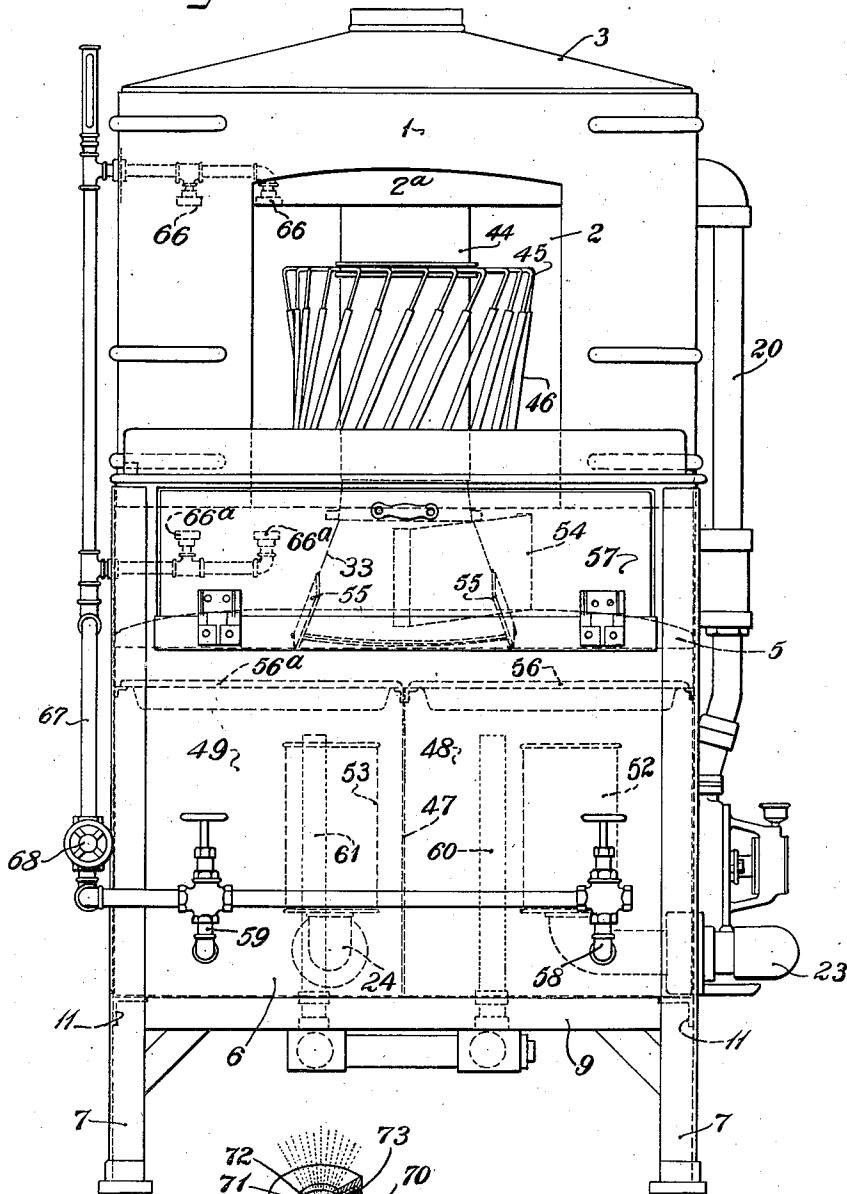
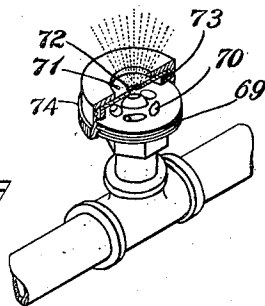


Fig. 8



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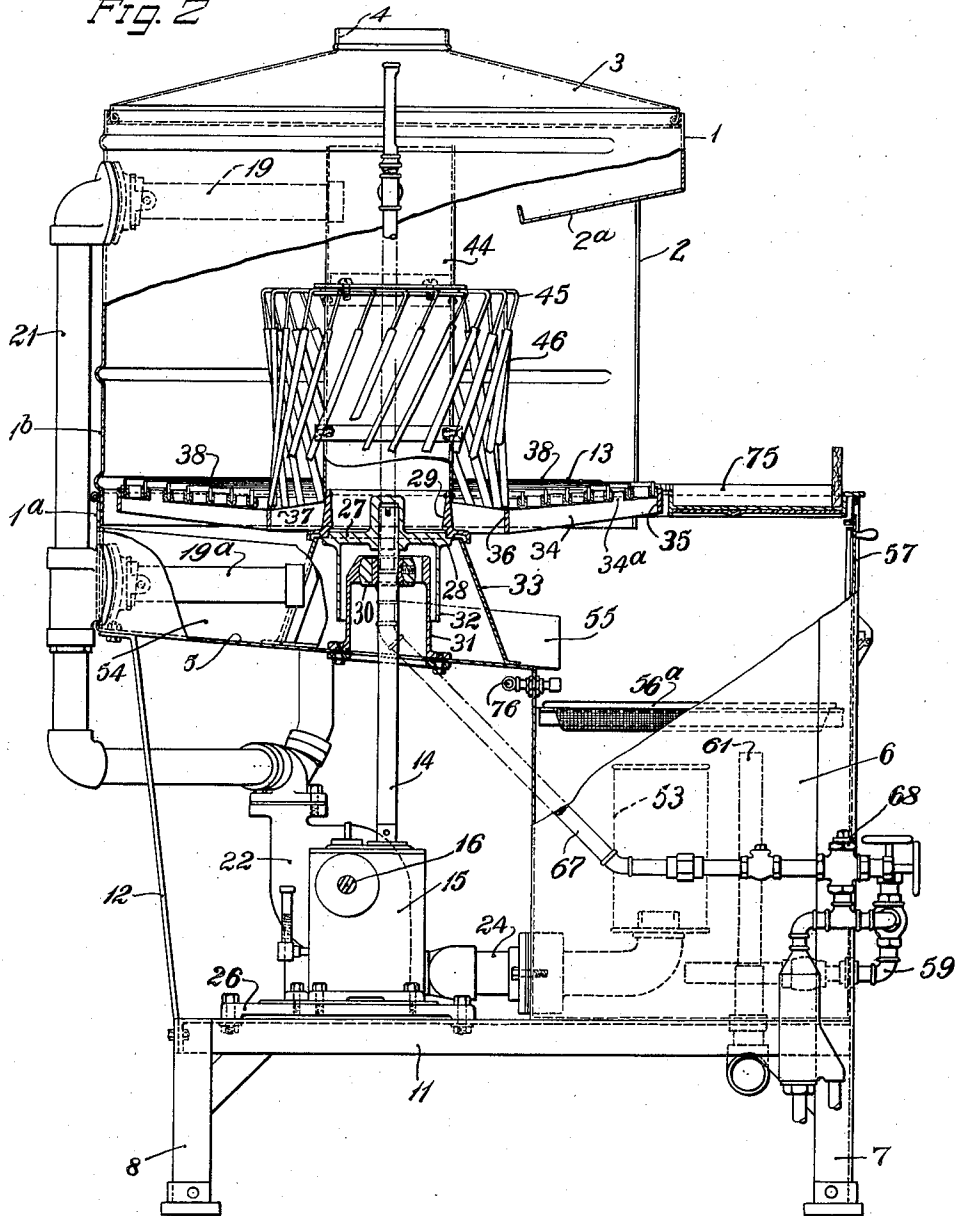
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4 Sheets-Sheet 2

Fig. 2



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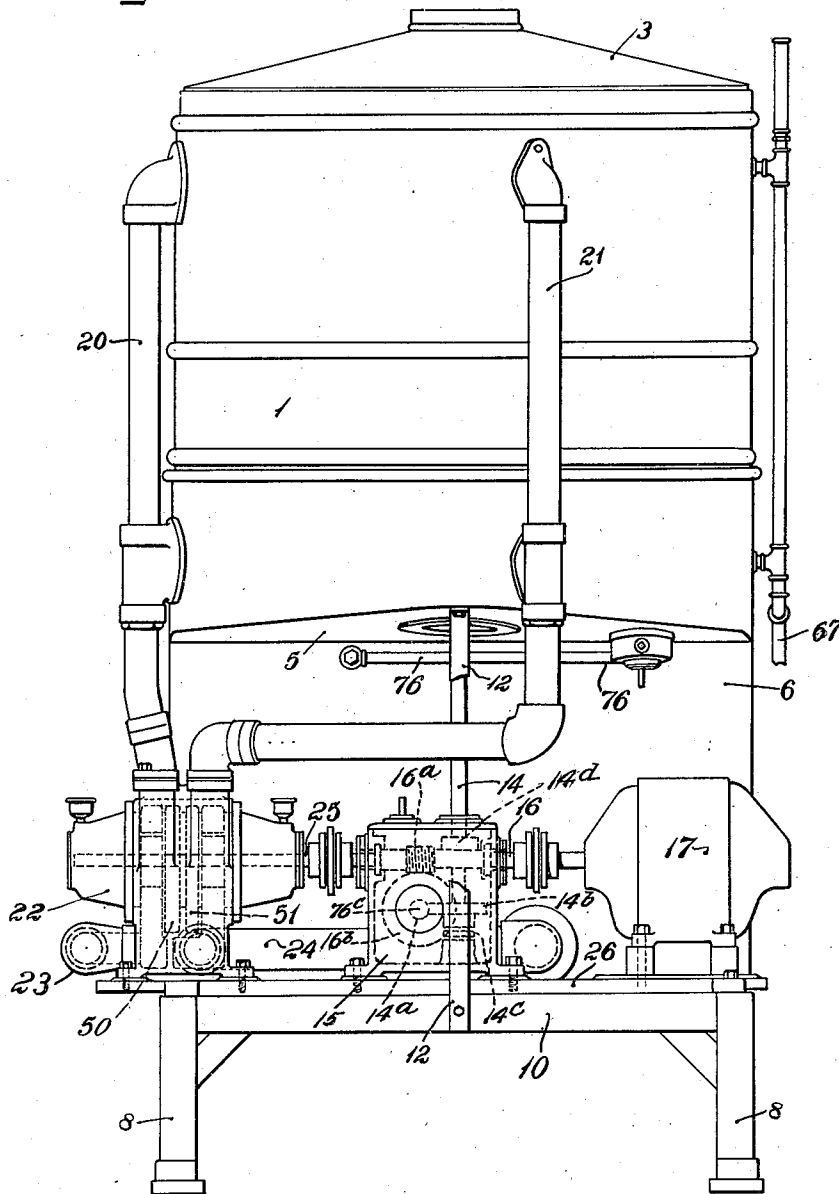
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DISHWASHING MACHINE

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4 Sheets-Sheet 3

Fig. 3



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4 Sheets-Sheet 4

Fig. 4

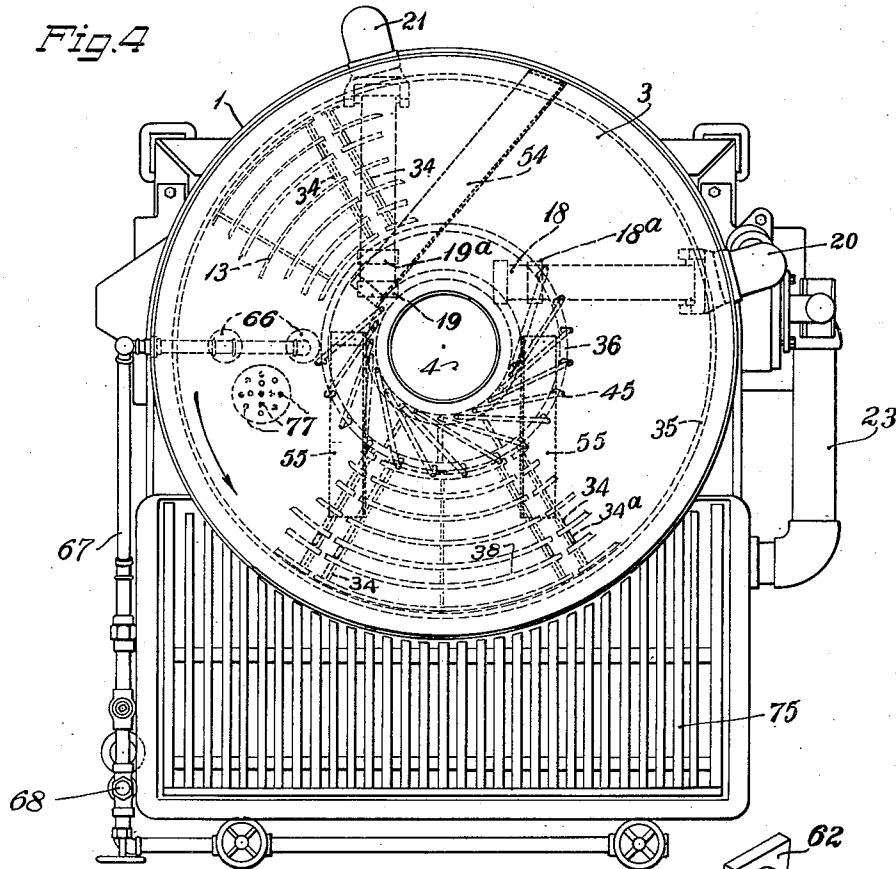


Fig. 6

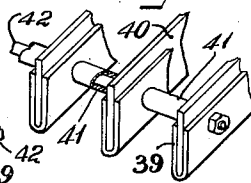


Fig. 5

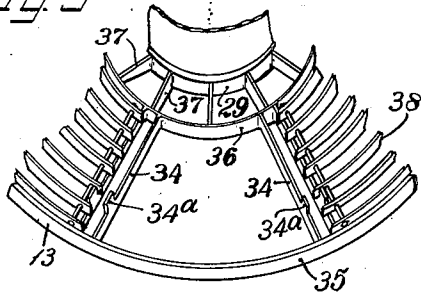
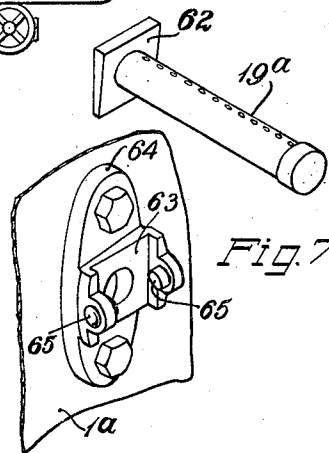


Fig. 7

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UNITED STATES PATENT OFFICE

GEORGE WEBB, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO COLT'S PATENT FIRE ARMS MANUFACTURING COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT

DISHWASHING MACHINE

Application filed November 19, 1926. Serial No. 142,379.

The invention relates particularly to dish washing machines of the rotary type wherein there is provided a casing and a circular rotary table therein for carrying the dishes during the washing operation. In a washing machine of this type, the dishes are placed upon the table through an opening in the casing and are subsequently removed, preferably through the same opening, suitable spray devices being provided so that the dishes are completely washed during a single passage through the casing.

One of the objects of the present invention is to provide an improved general arrangement of parts whereby the supporting and driving of the rotary table is accomplished more simply and more satisfactorily than in accordance with prior practice.

Another object of the invention is to provide an improved table construction whereby separate parts of the table may be independently removed to permit inspection, repair or replacement.

Still another object of the invention is to provide an improved arrangement and mounting for the spray devices by means of which the washing operation is effected.

A further object of the invention is to provide an improved final or rinsing spray means in combination with other parts of the machine.

Still other objects of the invention will be apparent from the following specification and claims.

In the accompanying drawings, I have shown the embodiment of the invention which I now deem preferable but it will be understood that the drawings are intended for illustrative purposes only and are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings, Figure 1 is a front view of a washing machine embodying the invention.

Fig. 2 is a left side view of the machine with certain parts broken away and shown in section.

Fig. 3 is a rear view.

Fig. 4 is a plan view.

Fig. 5 is a fragmentary perspective view of the rotary table, one of the dish supporting sections thereof being shown separated.

Fig. 6 is a detail perspective view showing the construction of one of the dish supporting sections.

Fig. 7 is a detail perspective view showing one of the spray pipes and the mounting therefor, the pipe and its mounting being shown separated in order that the construction may be more clearly understood.

Fig. 8 is a perspective view partly in section showing in detail one of the final rinsing nozzles.

Referring to the drawings, 1 represents the main casing of the machine which is generally cylindrical in form but which is provided at the front with an opening 2 through which dishes to be washed are introduced or supplied and the washed dishes removed, as will be more clearly explained hereafter. The casing 1 is formed of sheet metal and preferably as shown in Fig. 2 it comprises a lower part 1^a and an upper part 1^b, one of the parts, as for instance 1^b being arranged to telescopically enter the other part, as for instance 1^a. This facilitates the construction of the machine and particularly the assembling and dis-assembling thereof. The opening 2 is provided in the upper part 1^b of the casing and the said upper part is formed in an inward inclined guard or shield 2^a immediately above the opening. The casing 1 is provided with a cover 3 which is preferably removable and which is preferably provided with an opening at 4 whereby connection may be made with a pipe leading to an exhaust apparatus. The casing 1 is mounted in an elevated position and is provided with a bottom wall 5 which is preferably inclined in one direction, as for instance, toward the front of the machine.

A tank 6 is provided for holding the main bodies of washing liquids which are used and, when the bottom wall 5 of the casing is inclined downward toward the front as shown, the tank 6 is located at the front of the machine so as to receive liquids flowing along and discharged from the said bottom wall.

A suitable frame work is provided for supporting the casing and the tank and the construction of this frame work can be widely varied. As shown, however, it comprises two front uprights 7, 7 which are extended downward to provide legs and two shorter rear uprights 8, 8 which also constitute legs. Horizontal members 9 and 10 extend transversely between the uprights 7, 7 and 8, 8 respectively. Other horizontal members 11, 11 are located at the sides of the machine between the uprights 7, 7 and 8, 8. The tank 6 is connected with the uprights 7, 7 and it rests directly upon the horizontal members 9 and 11, 11. The casing 1 is supported partly by the tank 6 and partly by means of a brace 12 extending upward from the horizontal member 10.

Mounted within the casing 1 is a horizontal rotatable dish carrying table 13 which is operatively connected with a vertical drive shaft 14, the axes of rotation of the table and the shaft being coincident. The shaft 14 extends through an opening in the bottom wall 5 and at its lower end it is connected with a speed reducing power transmitting mechanism 15. The transmitting mechanism 15 is provided with a horizontal main shaft 16 adapted to be rotated at a relatively high speed and the mechanism is so constructed that it serves to drive the vertical shaft 14 at a speed very much less than that of the shaft 16. As illustrated by dotted lines in Fig. 3 the mechanism 15 includes a worm 16^a on the shaft 16 and a worm wheel 16^b on a transverse shaft 16^c. Carried by the transverse shaft 16^c is a worm 14^a which meshes with a worm wheel 14^b on the vertical shaft 14. The shaft 14 is supported on a thrust bearing 14^c and is guided by a journal bearing 14^d. As illustrated, a suitable power means, such as an electric motor 17 is directly connected with the shaft 16 of the mechanism 15.

Located within the casing 1 above and below the rotary table 13 are spray pipes, two sets of such pipes 18, 18^a and 19, 19^a being shown. These pipes are provided with holes directed respectively upward and downward so as to throw sprays or jets of liquid against dishes carried by the table 13. Connected respectively with the said spray pipes are supply pipes 20 and 21 which are located outside of the casing and which lead from a pump 22. The suction side of the pump is supplied through pipes 23 and 24 leading from the tank 6. The pump 22 is mounted with its main shaft 25 in alignment with and directly connected to the shaft 16 of the speed reducing mechanism. The two shafts 16 and 25 thus constitute a line of horizontal power shafting. Thus the one motor 17 serves to drive not only the speed reducing mechanism 15, and through it the shaft 14 and the table 13, but it also serves to drive the pump 22. Preferably, and as shown, a single plate 26 of

cast iron or other suitable material is provided for supporting the motor 17, the power transmitting mechanism 15 and the pump 22. This plate 26 is carried by the side members 11, 11 of the frame.

Preferably and as shown the table 13 is frictionally connected with the shaft 14 so that the shaft 14 can continue to rotate even though some obstruction occurs which prevents the rotation of the table. As illustrated, a hub or flange 27 is rigidly connected to the shaft 14 and this is provided with an annular shoulder at 28 which is adapted to receive and frictionally engage the lower surface of a hollow hub 29 forming a part of the main frame work of the table 13. Thus the table is held in place by gravity alone and has no positive connection with the shaft. The table is entirely supported by the shaft independently of any other parts.

For guiding the upper end of the shaft 14 there is provided a self-aligning bearing at 30, this bearing being held by means of a housing 31 secured to the inclined bottom wall 5 of the casing. In order to protect the bearing 30 from the washing liquids, the before mentioned flange 27 is provided with a depending skirt 32 which entirely surrounds the housing 31. There is also preferably provided an annular conical wall 33 which extends upward from the inclined bottom wall 5 into close proximity to the lower surface of the hub 29 of the table. This wall serves as an additional means to prevent the washing liquids from having access to the bearing and has other functions as hereinafter explained.

The main frame of the table 13 comprises as already stated a central hollow hub 29. Spokes such as 34, 34 radiate from the hub 29 and are preferably connected at their outer ends by an annular member 35. Preferably and as shown there is also an inner annular member 36 which is spaced from the hub 29 and connected therewith by means of spokes 37, 37. Preferably all of the parts of the frame as described are formed integrally, although this is not essential.

Instead of securing the dish carrying parts of the table permanently to the frame, I prefer to detachably connect them and I further prefer to make the said dish carrying parts in sections so that each section may be removed independently of the others for inspection, repair or replacement. To this end, the spokes 34, 34 are arranged in pairs as shown, the spokes of each pair being closely adjacent each other. The several sectors 38, 38 of the dish support are so constructed and arranged that each of them is carried by two spokes 34, 34 as clearly indicated in Fig. 5. Each sector 38 is held in place by gravity and can be lifted off at any time when desired.

Each sector 38 of the table support preferably comprises a plurality of strips 40, 40 of suitable non-metallic material such as fiber.

Preferably the several strips 40, 40 are carried respectively by arcuate elements 39, 39, which are preferably metallic and preferably U-shaped in cross section as shown in Fig. 6.

5 The several U-shaped elements are spaced by means of tubes 41, 41 and tie rods 42, 42 extend through the tubes and through corresponding holes in the members 39 and 40. These tie rods serve to hold all of the parts
10 of the sector 38 together. In the operation of the machine, the non-metallic strips 40, 40 serve to prevent the dishes from breakage. These strips are subject to a certain amount of wear and occasional replacement may be
15 necessary. When such replacement is required, it is only necessary to remove the tie rods 42, 42 thus completely disassembling the dish supporting sector. The worn strips 40 can then be replaced by new strips and then
20 the entire sector reassembled.

When the several dish supporting sectors 38, 38 are constructed as described, the spokes 34, 34 are preferably provided respectively with lugs 34^a, 34^a each of which fits between
25 two adjacent arcuate elements 39, 39 of the corresponding sector, and in addition lies adjacent one of the bushings 41 of the sector. The lugs 34^a, 34^a therefore serve to hold the sectors in place against horizontal movement
30 either radially or circumferentially.

The table 13 preferably carries a central cylindrical member 44 which is secured to the hub 29. Connected with the cylindrical member 44 and also with the inner member 36 of
35 the table frame are rods 45, 45 surrounded by tubes 46, 46 of fiber or other non-metallic material. These rods and tubes are preferably inclined as shown and serve to hold the dishes against inward movement. The rod and tube construction does not of itself constitute any part of the present invention.

Preferably the machine is so constructed as to have two distinct washing divisions so that the dishes are subjected to two separate
45 washing operations during a single passage through the machine. Two distinct bodies of washing liquids are maintained which are kept separate from each other so far as possible. To this end, the tank 6 is provided
50 with a partition 47 which divides it into two separate compartments 48 and 49. The pump 22 is also made with two distinct pumping chambers 50 and 51 with a dividing wall between and with a rotor (not shown) in each
55 chamber. The pump chamber 50 is supplied from the tank compartment 48 through the pipe 23 and the pump chamber 51 is supplied from the tank compartment 49 through the
60 pipe 24. Strainers 52 and 53 are located in the respective compartments 48 and 49 and serve to prevent refuse and the like from entering the respective pipes 23 and 24. The liquids from the pump compartments 50 and
65 51 are forced through the pipes 20 and 21

to the spray pipes 18, 18^a and 19, 19^a respectively.

An inspection of Fig. 4 shows that pipes 18, 18^a and 19, 19^a are quite widely separated from each other in the casing. To avoid so far as possible any mixing of any respective
70 liquids the casing is provided below the table with a partition 54 extending from the side of the casing to the conical wall 33 and with spaced additional partitions 55, 55 extending
75 from the conical wall 33 to the edge of the wall 5. The partitions 54 and 55, 55 serve to cause the respective washing liquids to pass on opposite sides of the conical wall 33 and thence into the respective tank compartments
80 48 and 49. Removable screens 56 and 56^a are provided at the tops of the respective compartments 48 and 49 to catch the coarser refuse and the like so as to prevent it from
85 entering the compartments. Access to the screens may be had through a door 57 in the front of the tank. Additional water may be supplied to the compartments 48 and 49 through valved pipes 58 and 59. Excess
90 liquid in the compartments may flow out through overflow pipes 60 and 61.

Preferably, as clearly shown in Fig. 4, the several main spray pipes 18, 18^a and 19, 19^a are located in non-radial positions, that is, they are arranged with their axes tangent to
95 circles concentric with the table and smaller than the inner diameter thereof. The non-radial location has the advantage that it reduces the amount of splash of the liquids, particularly against the radial arms or spokes
100 34, 34 of the table. Inasmuch as the spray pipes are non-radial, they are angularly disposed relatively to the substantially radial spokes 34, 34 as clearly shown in Fig. 4. I thus avoid the splashing which would otherwise
105 occur if each spoke suddenly received the full force of the spray throughout its entire length. This non-radial location of the spray pipes has the further advantage of reducing any tendency of the liquids to mix
110 above the partition 54. At best, there is a region of splash or spatter at the sides of the pipes and there is less overlap of these regions with the arrangement shown.

Preferably, as shown most clearly in Fig. 7, each main spray pipe such as 19^a is provided at its outer end with a wedge shaped
115 flange 62 having an outer contact surface which is adapted to engage a corresponding surface 63 on a supporting member 64 carried by the casing 1 and connected with the corresponding supply pipe. The supporting member 64 in addition to being provided with the contact surface 63 is further provided
120 with means, such as pins 65, 65, for engaging the inner surface of the wedge-shaped flange 62 so that the two contact surfaces are forced together when the pipe is moved downward with the flange 62 between the surface 63 and the pins 65, 65. This con-
125 130

struction makes it possible to easily remove the spray pipes for inspection or cleaning and to easily return them to their operative positions.

In addition to the main spray pipes which have been described, I preferably provide an additional rinsing spray means which acts upon the dishes just prior to their removal from the table. This rinsing spray means comprises nozzles 66, 66 and 66^a, 66^a located respectively above and below the table and connected with supply piping 67 through which fresh clean hot water may be delivered to the nozzles. The piping 67 is provided with a valve 68. While I do not necessarily so limit myself the nozzles 66, 66 and 66^a, 66^a are each preferably constructed as shown in Fig. 8, the construction being such as to provide a conical spray having the liquid uniformly distributed throughout the conical space. This is in contrast with nozzles heretofore used for similar purposes wherein conical sprays have been provided with the liquid moving entirely along the surface of the cone instead of being uniformly distributed therethrough. This uniform distribution of the sprays is obtained by using a nozzle of the type illustrated. The nozzle comprises a body portion 69 having a plurality of holes 70 therein all of which communicate with the supply pipe on which the nozzle is carried. These holes 70 are inclined with respect to the top surface of the nozzle body and are also tangent to a cylindrical surface concentric with the axis of the nozzle. A disk 71 is provided having a central hole 72 therein, and this disk is spaced from the top surface of the nozzle body by means of a spacing ring 73. A threaded cap member 74 holds the disk 71 and the ring 73 in place. By reason of the inclined tangential location of the holes 70 and by reason of the location of the central hole 72, the liquid is caused to form a conical spray body having the liquid uniformly distributed therethrough as already described.

There is preferably provided above the tank 6 and approximately at the level of the rotary table a rack 75 upon which dishes may be placed immediately before being transferred to the rotatable table and immediately after being removed from the said table. This rack is ordinarily constructed of wood and may be removable if desired.

In the operation of the machine, the table 13 is slowly rotated in the direction of the arrow in Fig. 4 and dishes to be washed are introduced through the opening 2 and placed upon the table. At the same time the pump 22 is operated at a high speed in order to force powerful jets or sprays of liquid out of the apertures in the spray pipes 18, 18^a and 19, 19^a on to the dishes upon the table. The first body of liquid contained in the compartment 48 and delivered through the spray pipes 18

and 18^a is ordinarily maintained at a moderate temperature and contains a suitable detergent. The greater part of the scrap and foreign matter is thus removed from the dishes by the liquid in the first washing division. The liquid in the second washing division contained in the compartment 49 and delivered through the pipes 19 and 19^a is maintained at a much higher temperature and may or may not contain a detergent. This liquid continues the washing operation, removing any foreign matter not removed in the first division and also providing a preliminary rinsing. Finally, the dishes move past the rinsing spray nozzles 66, 66 and 66^a, 66^a where they are subjected to the action of sprays of clean water approximately at the boiling temperature. These final spray nozzles serve to not only thoroughly rinse the dishes but also to sterilize them. When the dishes return to the position opposite the opening 2, they are removed by the operator onto the rack 75.

From the foregoing description, it will be obvious that there is a tendency for the liquid in the first division to be rapidly cooled by reason of the fact that it is constantly coming into contact with cold dishes. In order to maintain this liquid at the proper temperature, I prefer to provide means whereby a small quantity of the hotter liquid in the second division is constantly transferred to the first division. This I accomplish by means of the transfer pipe 76 which is shown most clearly in Fig. 3. This pipe is constructed to receive liquid through openings 77 formed in the bottom wall 5 in the path of the liquid in the second washing division. A part of this liquid flows through the holes 77 and through the pipe 76 into the compartment 48 of the first division.

As already stated, the table 13 is frictionally driven from the concentric supporting and driving shaft 14. In case of any accidental occurrence which might tend to stop the rotation of the table, such as the careless misplacement of a piece of silverware or a dish so as to engage one of the spray pipes, the rotation of the table will be stopped and the shaft 14 and other parts can continue in operation without any injury to the machine. The drive to the table from the shaft 14 is simple and direct without any gearing located in the washing chamber and subjected to the action of the washing liquids. The sectional construction of the dish supporting parts of the rotary table enables the non-metallic strips to be easily replaced when desired. The improved mounting for the several main spray pipes permits these pipes to be easily removed for cleaning and thereafter easily replaced without the necessity of using any tools.

What I claim is:

1. In a dish washing machine, the combina-

tion of an elevated casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a vertical shaft extending through the bottom wall of the casing, a thrust bearing for the shaft near the lower end thereof, a table in the casing rotatable about a vertical axis coincident with the axis of the shaft and adapted to carry the said dishes during the washing operation, the said table being operatively connected with and entirely supported by the said shaft, spray devices inside of the casing for directing liquids against dishes carried by the table, a line of horizontal power shafting located beneath the bottom wall of the casing and adapted to be rotated at a relatively high speed, a pump directly connected with the said power shafting to be driven thereby, pipe connections from the pump to the spray devices, and a speed reducing mechanism connected to be driven by the said power shafting and serving to rotate the vertical table rotating shaft at the required relatively low speed.

2. In a dish washing machine, the combination of an elevated casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a vertical shaft extending through the bottom wall of the casing, a substantially horizontal table in the casing supported entirely upon the shaft and adapted to carry the said dishes during the washing operation, the said table being frictionally connected with the shaft so as to be normally rotated thereby but so as to permit rotation of the shaft independently of the table in case rotation of the latter is prevented, spray devices inside of the casing for directing liquids against dishes carried by the table, a pump, pipe connections from the pump to the spray devices, and mechanism for operating the said pump and vertical shaft at relatively high and low speeds respectively.

3. In a dish washing machine, the combination of an elevated casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a vertical shaft extending through the bottom wall of the casing, a flange rigidly connected to the shaft within the casing and having an upward facing annular friction surface thereon, a substantially horizontal rotatable table in the casing adapted to carry the said dishes during the washing operation and having a hub with a downward facing annular friction surface thereon engaging the said friction surface of the said flange and serving as the sole means for supporting and rotating the table, spray devices inside of the casing for directing liquids against dishes carried by the table, a pump, pipe connections from the pump to the spray devices, and mechanism

for operating the said pump and vertical shaft at relatively high and low speeds respectively.

4. In a dish washing machine, the combination of an elevated casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a vertical shaft extending through the bottom wall of the casing, a bearing for the shaft located above the said bottom wall, an imperforate flange on the shaft above the said bearing, a substantially horizontal table in the casing adapted to carry the said dishes during the washing operation, the said table being supported entirely upon the said flange and being operatively connected thereto so as to be normally rotated thereby, spray devices inside of the casing for directing liquids against dishes carried by the table, a pump, pipe connections from the pump to the spray devices, mechanism for operating the said pump and vertical shaft at relatively high and low speeds respectively, and an annular skirt depending from the flange and entirely surrounding the said bearing to protect it from liquids sprayed from the said spray devices.

5. In a dish washing machine, the combination of an elevated casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a vertical shaft extending through the bottom wall of the casing, a bearing for the shaft located above the said bottom wall, an imperforate flange on the shaft above the said bearing, a substantially horizontal table in the casing adapted to carry the said dishes during the washing operation, the said table being supported entirely upon the said flange and being operatively connected thereto so as to be normally rotated thereby, spray devices inside of the casing for directing liquids against dishes carried by the table, a pump, pipe connections from the pump to the spray devices, mechanism for operating the said pump and vertical shaft at relatively high and low speeds respectively, an annular skirt depending from the flange and entirely surrounding the said bearing to protect it from liquids sprayed from the said spray devices, and an annular wall outside of the said skirt projecting upward from the bottom wall into close proximity with the table to further protect the said bearing from liquids.

6. In a dish washing machine of the rotary table type, the combination with a casing, spray devices and operating mechanism, of a spider within the casing rotatable about a vertical axis and comprising a hub with widely spaced supporting elements extending outward therefrom, and a plurality of similar sectors of open-work construction each detachably mounted on the said supporting

elements and together forming a substantially continuous and horizontal annular table.

7. In a dish washing machine of the rotary table type, the combination with a casing, spray devices and operating mechanism, of a spider within the casing rotatable about a vertical axis and comprising a hub with widely spaced supporting elements extending outward therefrom, and a plurality of similar sectors each detachably mounted on the said supporting elements of the spider and together forming a substantially continuous and horizontal annular dish supporting table in the path of the liquids from the spray devices, each of the said sectors comprising a plurality of arcuate strips spaced apart and concentric with the spider axis and a plurality of radial connectors between the several strips.

8. In a dish washing machine of the rotary table type, the combination with a casing, spray devices and operating mechanism, of a spider within the casing rotatable about a vertical axis and comprising a hub with widely spaced supporting elements extending outward therefrom, and a plurality of similar sectors each detachably mounted on the said supporting elements of the spider and together forming a substantially continuous and horizontal annular dish supporting table in the path of the liquids from the spray devices, each of the said sectors comprising a plurality of arcuate metallic strips spaced apart and concentric with the spider axis, a similar plurality of strips of relatively soft non-metallic material carried by and projecting above the respective metallic strips and a plurality of radial connectors between the several strips.

9. In a dish washing machine of the rotary table type, the combination with a casing, spray devices and operating mechanism, of a spider within the casing rotatable about a vertical axis and comprising a hub with widely spaced supporting elements extending outward therefrom, and a plurality of similar sectors each detachably mounted on the said supporting elements of the spider and together forming a substantially continuous and horizontal annular dish supporting table in the path of the liquids from the spray devices, each of the said sectors comprising a plurality of arcuate U-shaped metallic strips spaced apart and concentric with the spider axis, a similar plurality of strips of relatively soft non-metallic material fitted within the respective U-shaped strips and projecting above them, radial spacing tubes between adjacent metallic strips and radial tie rods extending through the tubes and through holes in the said strips.

10. In a dish washing machine of the rotary table type, the combination with a casing, spray devices and operating mechanism, of a spider within the casing rotatable

about a vertical axis and comprising a hub with a plurality of pairs of widely spaced supporting elements extending outward therefrom, and a plurality of similar sectors each detachably mounted on the said spider and together forming a substantially continuous and horizontal annular dish supporting table in the path of the liquids from the spray devices, each of the said sectors comprising a plurality of spaced arcuate strips concentric with the spider axis and directly supported upon the said supporting elements of one of the said pairs and a plurality of radial connectors between the several strips, and means projecting upward from the several supporting elements and extending between the strips of the corresponding sectors for holding the said sectors in fixed relation to the spider.

11. In a dish washing machine, the combination of a substantially cylindrical casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, a substantially horizontal annular table in the casing rotatable about a vertical axis and adapted to carry the said dishes during the washing operation, a partition in the casing below the table for dividing the lower portion of the casing into two compartments, two angularly spaced pairs of spray pipes in the casing above the respective compartments, the pipes of each pair being located respectively above and below the table for directing liquid downward and upward onto dishes on the table and the said pipes being inclined forward in the direction of table rotation and being tangent to circles concentric with the table and smaller than the inner diameter thereof, means for separately receiving the liquids collected in the two compartments, pump means for separately returning the liquids to the respective pairs of spray pipes, and mechanism for operating the pump means and for rotating the table.

12. In a dish washing machine, the combination of a casing having a bottom wall and having an opening in its peripheral wall through which soiled dishes can be supplied and washed dishes removed, means within the casing for supporting the said dishes during the washing operation, a substantially horizontal spray pipe for directing liquid against dishes supported by the said supporting means, a pump, supply piping from the pump to the spray pipe, and companion units connected respectively with the spray pipe and the supply piping and forming a readily separable joint between them, one of the said units being wedge-shaped so as to be engageable with or disengageable from the other upon vertical movement.

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